Zero Waste Plan

UC SANTA BARBARA | 2020

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EXECUTIVE SUMMARY

Waste reduction, the reuse of items, and the recycling and composting of material, are practices that the University of California, Santa Barbara (UCSB; the University) undertakes in an effort reduce the University's environmental and social impacts. The *2020 Zero Waste Plan* serves as a planning document to assist UCSB in recognizing past programs and efforts, gaining a better understanding of current waste characterization, and importantly addresses future waste reduction and diversion opportunities. UCSB has made significant strides in the field of waste management, and implementing the recommendations outlined in the *2020 Zero Waste Plan* will continue to allow the University to reduce waste generation and divert more material from landfills.

UC Santa Barbara's waste management efforts are aimed at achieving the Zero Waste policy language in the University of California Sustainable Practices Policy. Quantitatively, the University of California (UC) has tasked campuses with diverting 90% of municipal solid waste from landfills, and referencing a baseline of FY 15-16 to reduce waste generation per capita 25% by 2025 and 50% by 2030. In addition, the UC has also specified goals around foam packaging and is dedicated to tracking Scope 3 emissions associated with waste generation.

Since the University's recycling program officially launched with Associated Students Recycling in 1994, UCSB has made significant strides in reducing the amount of waste sent to landfills. In 1994, the University diverted only 6% of the waste it generated from the landfill, and today, UCSB has a waste diversion rate of 62% as a result of campus-wide recycling and organic waste collection services, as well as reuse and waste reduction programs. Despite the University's growth in both building square footage and population, UCSB generates the same amount of waste per capita as it did in 1996. This success is largely based on strategic partnerships with procurement officers and departments on the campus, as well as source reduction efforts, such as double-sided printing, decrease in use of single-use plastics, and waste targeted waste reduction efforts.

While the University has made significant advancements in waste management program developments, UC Santa Barbara is not on target to meet the 90% waste diversion goal by the end of FY 19-20. UCSB, along with many other campuses in the UC System, has seen their waste diversion rates plateau over the past several years, and even decrease as a result of on-campus program limitations and externalities, such as the collapse in the global recycling market. UC Santa Barbara is committed to further advancements in waste reduction and diversion efforts, and as outlined in this plan, is utilizing waste data and characterization studies from buildings across campus to better understand the material composition of the University's waste stream.

Internal achievements can still be made; however, they will come at a greater cost of resources, as the programs and practices that have been implemented have addressed much of the material make up accepted by the local waste hauler and the regional recycling and composting infrastructure. This Plan not only focuses on recommending the expansion of existing programs, but also implementing practices to

reduce or divert harder to handle material, such as waste generated from laboratories and single-use plastics. These programs, combined with consistent education and outreach efforts will in turn allow the University to continue to make significant and impressive strides in waste reduction and diversion efforts. The campus-wide recommendations outlined in this plan include:

- Identifying product substitution opportunities and the elimination of materials for unmarketable recyclables – single-use plastics; product packaging, procurement education
- Establishing take-back programs and identifying product substitution opportunities for non-hazardous lab waste
- Expanding organic/ food waste collection
- Expanding reusable packaging programs at on-campus restaurants
- Improvement of reuse and resale of surplus equipment

The *2020 Zero Waste Plan* also provides recommendations for program efficiency opportunities and both internal and external funding sources for projects. While the need for new programs and the expansion of existing programs will take additional resources, improving program efficiency in terms of infrastructure layout and organization of service schedules has the ability to yield reallocate resources. This potential, in combination with both internal and external funding sources should assist the University in implementing new practices that will help achieve waste reduction and diversion goals.

UNIVERSITY DEPARTMENTS & PARTNERSHIPS OF WASTE MANAGEMENT EFFORTS

On-Campus Departments

ASSOCIATED STUDENTS RECYCLING

Since its origination in 1994, the Associated Students (A.S.) Recycling Program has played an influential role in waste management and recycling at the University of California, Santa Barbara (UCSB). The A.S. Recycling Program is funded by a mandatory student lock-in fee paid $1.64 quarterly and $1.39 in the summer. This program operates year-round and employs a staff coordinator and approximately 15 students. A.S. Recycling is responsible for servicing exterior recycling and compost receptacles, as well as interior compost receptacles in some buildings. The interior recycling, compost and landfill infrastructure in Associated Students buildings on campus is also serviced by A.S. Recycling. The A.S. Recycling staff continuously works to educate the UCSB Community about proper waste management practices through workshops, educational booths, and their recycling and composting programs. A detailed list of A.S. Recycling's programs can be found below.

A.S. Recycling Routes

The Route Riders Program employs around 10 A.S. Recycling students who use bicycles with trailers carrying separate bins to service exterior recycling and compost receptacles on-campus. In addition to the Bertha's and BigBelly bins, the Route Riders also service buildings that are part of Associated Students Route, such as the KCSB Radio Station, the A.S. Main Office, A.S. Pardall Center, A.S Food Bank, and the A.S. Bike Shop.

The education component of the Route Riders program occurs mainly through signage. All Bertha and BigBelly waste receptacles have signage: some signage specifically indicates what items can be disposed of, and in which bins, and also covers the following waste streams: commingled reycling, landfill and compost. The Route Riders themselves also act as educational tools. Their constant presence around the UCSB campus allows them to be approachable for recycling questions, as well as providing a visual tool encouraging proper recycling.

Electronic Waste Collection ("Techno")

The Techno Program targets the reuse and recycling of electronic waste (e-waste) at UCSB. The Route Riders are tasked with collecting e-waste from 45 buildings on campus. Once the various types of e-waste are picked-up from their respective bins, they are sorted and delivered to two different entities to be reused or recycled. The Route Riders take batteries and light bulbs to be properly disposed of at UCSB's Environmental Health & Safety Department. All other collected e-waste items are taken to Distribution & Logistical Services where they are either sold for reuse or recycled by a certified recycler.

Event Waste Service

A.S. Recycling provides event waste collection for on-campus events and charges a nominal fee for the service. Customers request this service and receive recycling, compost, and landfill bins set up

at their event to increase diversion. After the event, A.S. Recycling staff sort the waste to ensure recycling and compost bins are not contaminated. This program also offers 5-gallon water jugs for purchase to reduce use of single-use disposable water bottles at events. Over the years, this program has become very popular, especially with A.S. student group events.

CAMPUS SUSTAINABILITY

Campus Sustainability is a conglomeration of efforts from key faculty, administrators, students, and staff across the campus that work in a decentralized manner with the overarching goal of improving the University's effect on the environment and reducing the dependence on non-renewable resources. UCSB Sustainability is the driving force behind the Zero Waste Plan and has helped foster a culture of environmental awareness at UCSB by supporting campus-wide sustainability efforts, coordinating sustainability program development, and publicizing the sustainability work of staff, faculty, and students on campus.

Laboratory Resources, Advocates, and Teamwork for Sustainability (LabRATS)

The Laboratory Resources, Advocates, and Teamwork for Sustainability (LabRATS) Program at UCSB assists researchers on campus in reducing their impact on the environment while also improving safety, encouraging good laboratory management practices, and promoting communication and resource sharing. The program is uniquely prepared to adapt campus recycling, energy management, and sustainability practices to the unusual materials used and processes implemented in laboratories.

Program for the Assessment and Certification for the Environment and Sustainability (PACES)

PACES recognizes leaders in campus sustainability and assists departments, laboratories, and event coordinators in identifying new opportunities where they can further reduce their impact on the environment. The Green Office and Events program connects campus community members to resources that will reduce their environmental impact and increase their efficiency.

DEPARTMENT OF PUBLIC WORMS

The Department of Public Worms (DPW) manages on-campus composting programs, grows fresh produce for students and develops and maintains the Edible Campus Program (ECP) Student Farm. DPW holds workshops and demonstrations at on-campus and off-campus events to promote and educate the community about the importance and techniques of composting, vermicomposting, food waste reduction and gardening.

DESIGN, FACILITIES & SAFETY SERVICES (DFSS)

The mission of all Design, Facilities & Safety Services units is to design, build, operate, maintain, and renew the physical environment required to support the University's instructional, research, and public service mission. Units under the DFSS umbrella that affect waste management efforts include:

Design & Construction Services (D&CS)

D&CS staff is responsible for implementation and oversight of UCSB's major and minor capital improvement projects including managing the design of the project, development of bidding documents, bidding, and construction. D&CS' responsibility of these projects provides them with the ability to source materials for construction projects, as well as oversee the waste management of construction and demolition (C&D) waste as a result of their projects.

Environmental Health and Safety (EH&S)

Environmental Health & Safety (EH&S) deals with hazardous waste disposal at UCSB. The department's Hazardous Waste Program is responsible for providing hazardous waste management in compliance with federal, state, and local regulations. The department is also a sanctioned drop-off location for hazardous waste belonging to the general public. EH&S' hazardous waste management practice is built around their Hazardous Waste Minimization Program, which recommends that generators of hazardous waste consider the following items in order to reduce the production of hazardous materials: 1) source reduction – effective purchasing, chemical substitution, and good chemical inventory practices; 2) on and off site recycling of hazardous wastes; 3) treatment – neutralizing or detoxifying a chemical; and 4) proper disposal. EH&S also works very closely with UCSB's Facilities Management Department, LabRATS, and A.S. Recycling. Many of EH&S' programs are collaborations with the previously listed organizations.

Facilities Management (FM)

UCSB's Facilities Management Department is responsible for the maintenance and upkeep of the University's academic and administrative buildings and landscapes. Within Facilities Management, the Refuse, Recycling & Water Efficiency Manager is responsible for implementing programs and practices under the Associate Director of Landscaping & Custodial Service. Waste management services are primarily handled by custodial and groundskeeping staff. The custodial group is tasked with servicing indoor landfill waste, recycling, and in the Bren Hall building, compost. The custodial staff also works closely on monitoring these programs and infrastructure. The groundskeeping group has responsibility for the service of exterior landfill receptacles on campus and generates greenwaste from landscaping projects and practices.

DISTRIBUTION & LOGISTICAL SERIVCES (DLS)

Furniture Services at UCSB's Distribution & Logistical Services (DLS) is a key player in on-campus waste management. Furniture Services, a group within DLS, provides a plethora of waste management services, ranging from furniture and electronic waste pick-ups to the resale of unwanted items to the UCSB and Greater Santa Barbara communities through their Surplus Sales program. Furniture Services also assists with Gaucho Round-up, the biennial campus clean-up event that helps departments dispose of items in the correct waste streams.

HOUSING, DINING & AUXILARY ENTERPRISES (HDAE)

Housing, Dining, and Auxiliary Enterprises (HDAE) and is responsible for maintaining residence halls, student and family apartments, dining facilities, and auxiliary departments.

Residential Operations (Res Ops)

The Environmental and Energy Manager within Residential Operations (ResOps) is responsible for overseeing waste management efforts in the aforementioned locations. The custodial and landscaping staff are responsible for servicing the public landfill bins, as well as the indoor landfill and recycling bins in the residence and dining halls. ResOps groundskeeping staff is also responsible for service waste receptacles in on-campus parking lots. A large part of ResOps practices include oversight of pre-consumer and post-consumer composting practices in the four main dining commons. These dining commons generate the majority of food scraps and organic waste on-campus at UC Santa Barbara.

UNIVERSITY CENTER (UCEN)

The UCen is responsible for staffing and maintaining satellite food service areas on campus, such as those at the UCen, the Arbor, Courtyard Café, Coral Tree Café, and The Store at Buchanan Hall. The UCen participates in a multi-stream waste system that encourages the separation of different waste types. Located at the UCen is the main kitchen that is responsible for making packaged food for the satellite food service eateries. Leased food service tenants also occupy spaces at the UCen, including Subway, Panda Express, Wahoo Tacos, Santorini Greek Grill, and Starbucks. Because of the large quantities of pre-consumer and post-consumer food waste generated, the UCen also participates in a robust composting program.

ZERO WASTE COMMITTEE

The Zero Waste Committee is a student organization focused on helping raise awareness of waste management issues, and provides support to other campus organizations and departments focused in this area. The Zero Waste Committee is a student volunteer organization advised by the A.S. Recycling Program Coordinator. The Zero Waste Committee hosts education and outreach events such as the Zero Waste Festival, provides funding support for waste infrastructure needs through their grant program, and assists with implementing waste management programs.

Off-Campus Partnerships

BIODICO

BIODICO (formally BioDiesel Industries) is a sustainable biorefinery that specializes in producing biodiesel. BIODICO has a Green Restaurant Service that collects waste cooking oil from restaurants to produce biodiesel. Their closest location to UCSB is in Ventura, CA. BIODICO services numerous restaurants in the Central Coast region, as well as the Dining Commons at UCSB.

COUNTY OF SANTA BARBARA

The County of Santa Barbara Resource Recovery & Waste Management Division is responsible for regional solid waste management services. The Division provides support and resources to Santa Barbara County in the form of customer service oriented community solid waste management programs. It is also tasked with administering mandatory recycling and waste management policies as outlined by CalRecycle. One of the

Division's main priorities is public education regarding waste management efforts, which includes signage, brochures, workshops, and disseminating information regarding changes in service or changes in allowable materials in the various waste streams.

ENGLE & GRAY

Engle & Gray is located in Santa Maria, approximately 70 miles north of the UC Santa Barbara campus. Engle & Gray currently process the majority of UCSB's food scraps/ organics waste stream and has done so since the University began collecting this waste stream. Engle & Gray conducts aerobic windrow composting where it mixes UCSB's food scraps and organic waste with other organic materials from nearby farms, as well as yard waste as a bulking agent. Engle & Gray's processing time from start to finish is 120 days to ensure that pathogens are killed off and material is fully broken down. The finished product is marketed as Harvest Blend, a compost that can be applied as a soil amendment in landscaping applications.

GOLETA SANITARY DISTRICT

UC Santa Barbara and Goleta Water District's partnership is primarily for wastewater treatment services, as it receives most of the University's wastewater for processing. In 2019, UCSB and Goleta Sanitary District launched a partnership supported by a California Energy Commission EPIC Bioenergy Grant to explore the processing of organic waste, primarily food scraps from the UCSB dining commons, through biodigesters to produce renewable energy in the form of biogas. This project is still in its infancy stages and operates on a standalone system at Goleta Sanitary District. The hope is that this project provides insight on the ability of sanitary districts to utilize their biodigesters for processing organic waste that derives from municipal solid waste streams.

MARBORG INDUSTRIES

UC Santa Barbara currently has contracted services for municipal solid waste with MarBorg Industries. MarBorg provides waste hauling, portable restroom, and fencing services primarily in Santa Barbara County. MarBorg owns and operates a recycling processing facility and a clean material recovery facility. Contracted municipal solid waste service includes the following waste streams: organics, commingled recycling, greenwaste, and landfill waste. MarBorg also provides the University with services for construction and demolition waste. MarBorg works closely with the University to provide monthly data reports per waste stream, as well as per dumpster, as they utilize an on-board scale system for front-end loading trucks that service UC Santa Barbara. MarBorg is currently contracted to provide MSW waste hauling services to UCSB through June 30, 2020. This is the last year of a contract that was awarded in 2014 that specified an initial two (2) year period, followed by four (4) additional one-year periods. MarBorg also provides waste hauling services to the City of Goleta, City of Santa Barbara, County of Santa Barbara, and the unincorporated community Isla Vista.

TAJIGUAS LANDFILL

The Tajiguas Landfill is operated by the County of Santa Barbara and primarily serves communities in Central Coast region. The Tajiguas Landfill opened in 1967 with a projected 100-year lifespan. The landfill site is located in a canyon 26 miles west of Santa Barbara, along the north side of the Highway 101. The landfill capacity is estimated at 52.8M yards^3, with an additional 14.8M yards^3 of increased capacity as a

result of the reallocated access road. The average daily tonnage delivered to the landfill is estimated to be 1,000 tons per day, with a maximum processing capacity of 1,500 tons per day. Despite the projected lifespan of the landfill, and in accordance with the Integrated Waste Management Act, recent rates of landfill material entering the facility previously indicated that Tajiguas only had sufficient capacity/ ability to accept waste until 2020. The landfill has yet to reach capacity and to further extend its lifespan, the County of Santa Barbara is currently building a material recovery facility and an anerobic digester, collectively named the Resource Center. The facility is projected to open in early 2021 and will look to increase recycling rates above 85% (recycling here is defined as both organics and recycling), as well as lower greenhouse gas emissions associated with landfill organic materials.

UNIVERSITY OF CALIFORNIA WASTE MANAGEMENT GOALS

UC Sustainable Practices Policy – Zero Waste

The University of California Sustainable Practices Policy establishes goals in nine areas of sustainable practices. The policy language outlined below is that of the Zero Waste section, which was went into effect July 1, 2019. The policy language was drafted by the UC Zero Waste Working Group and undergoes annual revision.

1. The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle and compost.
2. The University supports the integration of waste, climate and other sustainability goals, including the reduction of embodied carbon in the supply chain through the promotion of a circular economy and the management of organic waste to promote atmospheric carbon reduction. In support of this goal, waste reporting will include tracking estimated scope 3 greenhouse gas emissions.
3. The University will reduce per capita total municipal solid waste generation at all locations other than health locations as follows:
    a. Reduce waste generation per capita to FY2015/16 levels by 2020
    b. Reduce waste generation by 25% per capita from FY2015/16 levels by 2025
    c. Reduce waste generation by 50% per capita from FY2015/16 levels by 2030
4. The University will achieve zero waste by 2020 at all locations other than health locations. Minimum compliance for zero waste is 90% diversion of municipal solid waste from landfill.
5. By 2020, the University will prohibit the sale, procurement or distribution of packaging foam, such as food containers and packaging material, other than that utilized for laboratory supply or medical packaging and products. The University seeks to reduce, reuse and find alternatives for packaging foam used for laboratory and medical packaging products. a. No packaging foam or expanded polystyrene (EPS) shall be used in foodservice facilities for

takeaway containers.

SITE OVERVIEW: WASTE REPORTING BOUNDARIES

Geographic Reporting Scope

The 1,055-acre UCSB campus is located in Southern Santa Barbara County on a coastal bluff overlooking the Pacific Ocean. The USCB campus borders the City of Goleta and a series of open spaces to the east, the Goleta Valley and the east-west trending Santa Ynez Mountains to the north, the community of Isla Vista to the west, and the Pacific Ocean to the south.

This 2020 Zero Waste Plan accounts for all on- and off-campus waste generation of UCSB-operated buildings. The plan's geographic scope includes all Main Campus academic buildings and residence halls, plus the on-campus housing units not connected to the core of campus: San Clemente Graduate Student Housing, Storke Apartments, Santa Catalina Residence halls, Santa Ynez Apartments, and West Campus Housing. The only off-campus buildings included in the scope of the plan are IV Theatre, Embarcadero Hall, El Dorado apartments, and Westgate apartments. These off-campus properties are included in the geographic scope because UCSB is responsible for their operational control. The plan does not include off-campus faculty housing (e.g., West Campus Family Housing) when reporting campus waste data, because faculty residence units' utilities do not fall under the operational control of UCSB. Nor does the plan account for distant, off-campus waste management efforts such as UCSB natural reserve infrastructures and satellite campuses, as these are currently considered de minimis. The reference map below labels the UCSB built environment; academic, research, and other non-residence buildings are colored purple and Housing, Dining & Auxiliary Enterprises (HDAE) buildings are colored orange (Figure 1, 2).

Figure 1 | UCSB existing built environment

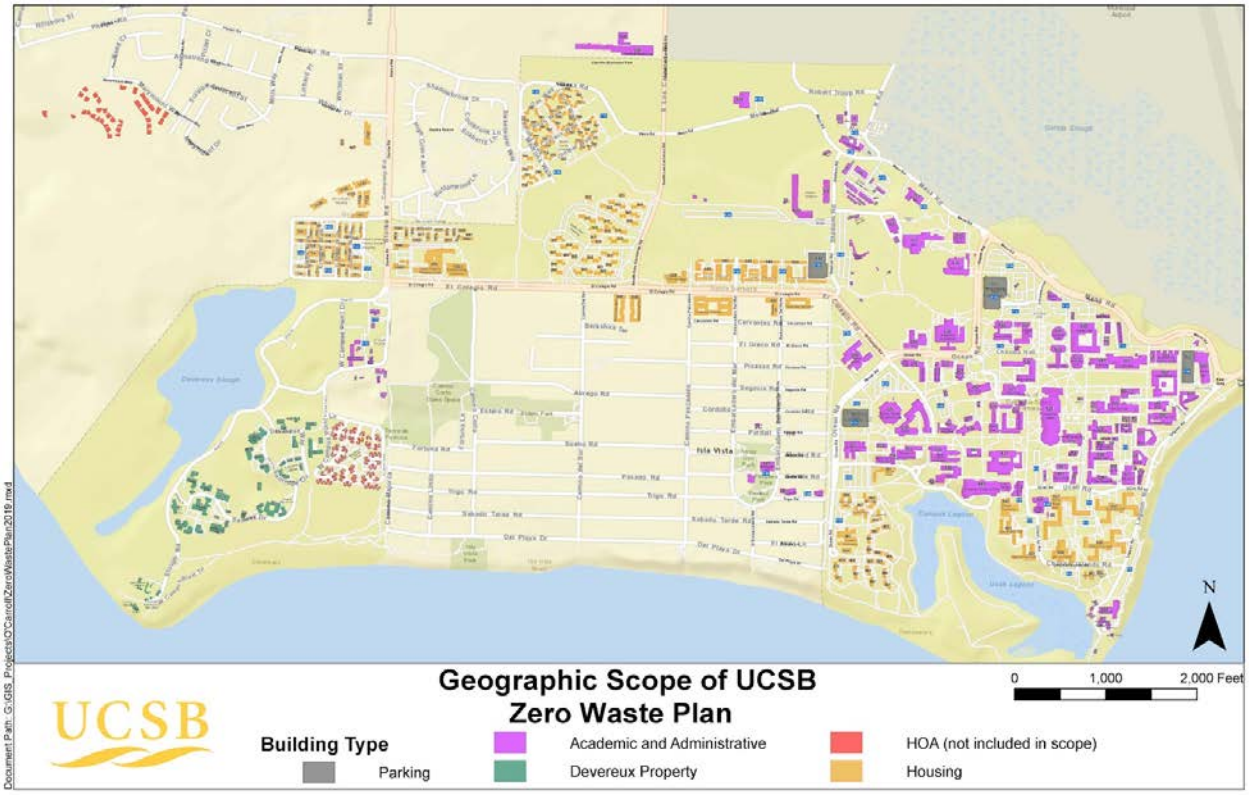
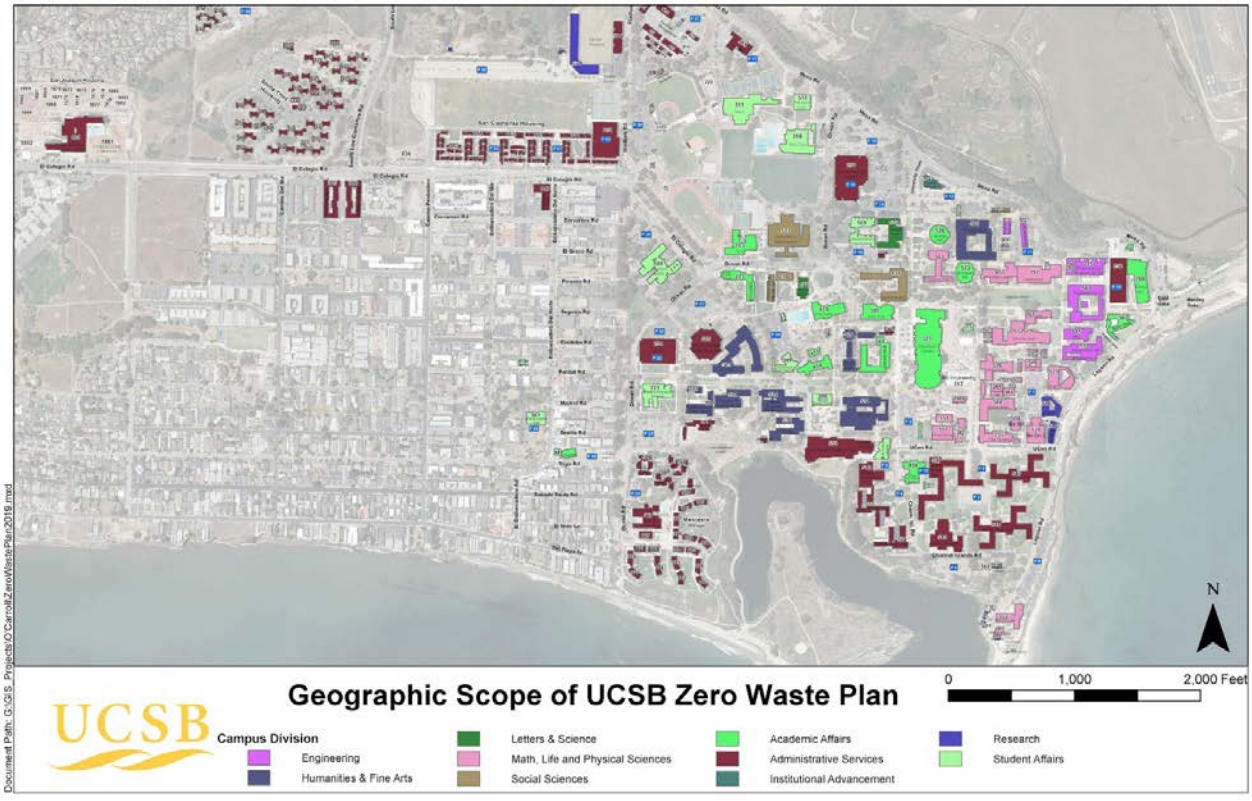


Figure 2 | UCSB building types and designations



Per Capita Metric

The specific per capita metric utilized by the University of California Office of the President for sustainability metrics is Weighted Campus User (WCU). WCU is a metric defined by the Association for the Advancement of Sustainability in Higher Education (AASHE) and commonly used in national sustainability reporting as it helps to normalize varying resource use by weighting students, faculty, and staff by their different degrees of time spent on-campus. (i.e. full-time students living on-campus utilize more resources than full-time staff living off campus). In FY 18-19, UCSB's WCU was 24,648.

Waste Streams and Focus Areas

This Plan primarily focuses on UC Santa Barbara's municipal solid waste streams (MSW) as they are the main focus of UC waste goals outlined in the Sustainable Practices Policy. The waste streams are also the waste streams that our campus community mainly interacts with (Figure 3). The MSW streams, and focus areas as follows:

- Surplus materials and goods
- Organics – including food scraps and compostable packaging
- Commingled recyclables
- Greenwaste
- Landfill waste
- Non-hazardous lab waste

Figure 3 | UCSB academic and administrative waste infrastructure

Additional waste streams that are of importance at UCSB and of minimal focus in this plan, which the exception of Hazardous waste, which is not covered are:

- Construction and demolition waste (C&D)
- Electronic waste
- Hazardous waste

HISTORICAL WASTE MANAGEMENT PROGRAMS AT UCSB

Waste Reduction & Reuse Programs

Surplus Materials

The collection, reuse, and resale efforts of surplus goods are primarily handled by Distribution & Logistical Services' Furniture Services group. Furniture Services works with departments to pick up and remove surplus or unwanted material that include furniture, electronics, or large material that cannot be disposed of due to size or safety concerns in the dumpsters provided at each building. Departments also have the ability to drop off unwanted goods and materials at Distribution & Logistical Services. For surplus goods that had an initial purchase value of over $5,000, they are part of an inventorial management program and must be recorded with Business & Financial Services before they change custody. Furniture Services allows the public to purchase the surplus material on Tuesdays and Thursdays from 1-4pm, where cash, check, and debit/ credit card are accepted. Select items are also listed online on surplus or resale websites such as Craigslist, Ebay, GovDeals, and Public Surplus. Currently, there is no active inventory or documentation process when items are received by Furniture Services from departments; therefore it is unknown whether items are in working condition, particularly electronics.

Non-electronic Items that are unable to be sold due to poor condition or are undesired, are then disposed of via MarBorg. Distribution & Logistical Services is required to pay for both the hauling and tipping costs of this 25yd roll-off dumpster for mixed material. A second roll-off for clean metal is also kept at DLS; there is no charge for the service of this 25yd roll-off dumpster. Electronic items that are unsold at the end of each month are taken away from the campus by Electronic Recyclers International for recycling (see electronic waste section for more details).

The revenue generated from the sale of surplus material from the campus is shared with Distribution & Logistical Services, as well as the department unless it is of low monetary value, then DLS keeps the money from the sale.

Municipal Solid Waste Diversion Programs

The waste receptacles and dumpster infrastructure at UC Santa Barbara primarily focuses on the municipal solid waste streams as defined in the UC Sustainable Practices Policy: organics, commingled recycling, greenwaste, landfill waste, and non-hazardous lab waste. It is common practice throughout the campus that both commingled recycling and landfill waste receptacles are paired together in both interior and exterior locations. Currently organic waste receptacles are placed in areas where food waste is commonly generated in high quantities.

Organics

Organic waste collection forms a part of UCSB's diversion efforts and is performed on both a local and industrial scales. This section will focus on the industrial organics and collection practices at UCSB. As of Fall 2019, the following items are allowable in the organics waste stream:

Food Waste

- Produce - vegetable and fruits
- Dairy products - yogurt, cheeses
- Meat and bones
- Teabags

Soiled Paper Products

- Cardboard - pizza boxes, unwaxed cardboard
- Paper towels and napkins
- Food packaging - sandwich paper, paper bags

Compostable Serviceware (must be labeled compostable)

- Utensils, clamshells, plates, coffee cups, lids, bowls

PLA 7 Products

- Drinking cups, containers

ON-CAMPUS SERVICES

Organics waste collection can be broken down into two categories, pre-consumer, and post-consumer. Pre-consumer is organic waste, mainly food waste, which are produced before the consumer has the product/ item, such as peels, rinds, bones, or often times organic discards produced in the meal preparation. Pre-consumer organics often contains less contamination due to the fact that only a select group of staff handle the waste and it does not often include food packaging. Post-consumer organics are food waste that is generated when the consumer is finished with their meal or food item and often contains more contamination because individuals who may not be knowledgeable about material accepted in the organics waste stream may dispose of it improperly, specifically when it comes to food packaging.

Large generators of pre-consumer and often clean post-consumer organics are the dining commons at UCSB. Staff preparing the meals place food scraps from the meal preparation process in designated receptacles, while staff at the dish return scrape food scraps and other organic material into similarly labeled receptacles. The staff at the dish return also sort and pick-out items that do not belong in the organics waste stream. The four dining commons each have a 40yd compactor roll-off for organic waste. Another 40yd compactor roll-off for organics is located at the UCen, which receives both pre-consumer and post-consumer organic waste from the UCen building. This roll-off on occasion can have more contamination due to the fact that there are leased tenants with various types of food packaging that is acceptable, some that is more easily identifiable than others.

In exterior spaces on campus, there are 11 public organic waste receptacles, which are serviced by A.S. Recycling. In addition, there are 32 indoor organic waste receptacles as part of an A.S. Recycling program that assists departments in having departmental-level organic waste service. These receptacles are also serviced by A.S. Recycling and the waste is transferred into 4yd dumpsters throughout campus.

In 2018, a pilot program to collect organic waste in San Clemente Villages, a student apartment complex, was introduced and has since expanded. Residents are required to take organic waste out to the respective dumpsters in their areas.

CONTRACTED SERVICES

MarBorg takes the organic waste stream to Engle & Gray, located in Santa Maria, approximately 70 miles north of the UC Santa Barbara campus. Engle & Gray currently processes the majority of UCSB's organic waste stream. Engle & Gray conducts aerobic windrow composting where it mixes UCSB's organic waste with other organic materials from nearby farms, as well as yard waste as a bulking agent. Engle & Gray's processing time from start to finish is 120 days to ensure that pathogens are killed off and material is fully broken down. The finished product is marketed as Harvest Blend, a compost that can be applied as a soil amendment in landscaping applications. The current tipping fee at Engle & Gray for this waste stream is $56/ ton.

Outside of the University, organic waste service is provided to select participating businesses and organizations, such as schools coordinated through efforts by both the County of Santa Barbara and the City of Santa Barbara; however, it is not a service that is provided to residents in Santa Barbara County.

Commingled Recycling

Commingled recycling, also referred to as single-stream recycling, is the practice of combining different recyclable materials (plastics, metals, paper fibers, etc.) into the same waste stream instead of being separated based on commodity and subsequently handled separately. UCSB primarily practices commingled recycling because that is the publicly provided service to the community from MarBorg. As of Fall 2019, the following items are allowable in the commingle recycling waste stream:

Plastic Products (#1 & #2)

- Plastic #1 (PET or PETE) - beverage bottles or food containers
- Plastic #2 (HDPE) - milk jugs, detergent bottles, shampoo bottles

Paper & Cardboard

- Paper bags
- Non-waxed cardboard
- Paperboard - cereal boxes
- Paper products - envelopes, office paper, packing paper, newspaper

Metal

- Aluminum - cans, foil, trays, bottles, lids
- Empty paint and spray cans
- Scrap metal and metal parts

Glass

- Bottles and jars

Untreated wood

ON-CAMPUS SERVICES

Commingled recycling waste receptacles can be found throughout campus in both interior and exterior locations. In interior locations, two sizes of receptacles are primarily utilized to collect materials of this waste stream. 23-32 gallon receptacles are mainly utilized for common, public areas, which include lobbies, kitchens, break rooms, conference rooms, copy rooms, and hallways. Open concept office spaces also utilize commingled reyccling receptacles in the 23-32 gallon size. 7 gallon receptacles are primarily utilized in private spaces, such as offices and residence halls, but are occasionally found in areas that are larger and available to the public but generate small quantities of waste. These interior commingled recycling waste receptacles are serviced by custodial staff, and in Associated Students buildings are serviced by A.S.

Recycling. In exterior locations, 32-40 gallon receptacles are located throughout the campus and are primarily serviced by the A.S. Recycling who sorts the commingled recycling and removes any contamination prior to transferring the waste to 1.5yd - 4yd dumpsters throughout campus. Custodial staff in Facilities Management primarily transfer waste from interior and exterior receptacles into these dumpsters as well, but do not sort the waste stream for contamination. Residential Operations mainly transfers commingled recyclables into 40yd compactor roll-off dumpsters throughout their areas of the campus.

CONTRACTED SERVICES

Commingled recyclables are taken from the University to MarBorg Industries' Commercial Recyclables Processing Center located two miles from UCSB. There, the commingled recyclables are source separated into different commodities for sale. This recycling facility also serves clients in the City of Santa Barbara, the City of Goleta, and Santa Barbara County, in addition to UCSB. The facility is rated at 80 tons per day throughput for commingled recyclables. UCSB currently receives a $25/ ton credit for its commingled recycling waste stream.

The acceptable commingled recyclables and their current respective vendors include:

- Aluminum – Sold to Alpert & Alpert, an iron and metal recycling facility in Los Angeles, California. Alpert & Alpert make can sheet for aluminum can manufacturers
- Glass – Sold to Potential Industries in Wilmington, California for use in making cullet (furnace ready glass) for production of new glass containers
- Newspaper – Sold to Smurfit Stone Container and delivered to Blue Heron Paper Mill to be made into 100% secondary fiber newspaper
- Cardboard – Sold to Newport CH International and America Chung Nam to be used mainly to produce liner board which is the outside lining on a corrugated box
- PET Plastic – Sold to Potential Industries and Pacific West Recycling to be made into beverage containers and fiber fill for jackets and sleeping bags
- Mixed plastic – Sold to Pacific West Recycling to use in various products such as children's toys, benches, patio furniture, pipes, flower pots, and electronic housings
- Tin cans and miscellaneous metal – Sold to Alpert & Alpert for reuse

Greenwaste Stream

Green waste is primarily generated by landscaping and groundskeeping services at UC Santa Barbara. The University utilizes sub-grade greenwaste dumpsters for the disposal of greenwaste. The following material is accepted in this waste stream: grass clippings, leaves, branches, plant material (with the exception of

succulents and fibrous materials). The greenwaste is taken from the campus and then mulched and made available to the public. The current tipping fee for greenwaste is $46/ ton.

Landfill Waste Stream

The landfilling (commonly referred to as 'trash') of waste is the last priority for material management at UC Santa Barbara. Despite its level of prioritization, it remains a part of the University's MSW characterization. As of Fall 2019, the following items must be placed in the landfill waste stream if no organic waste receptacles are available:

Food Waste and Organic Material

- Pre-Consumer food waste - rinds, peels, cuttings
- Post-Consumer food waste - leftover or unwanted food scraps
- Fibrous plant and succulents

Plastic Products (#3-#7, including #7 'OTHER')

- Expanded polystyrene (EPS) - Styrofoam
- Plastic bags and plastic film - Saran wrap, pallet wrap, food bags and wrappers
- Food Containers - yogurt containers, clear plastic produce or food containers, straws, cups and utensils
- Compostable plastics - PLA #7 or compostable marked plastics such as utensils and food packaging

Paper & Cardboard Products

- Soiled food containers - pizza boxes
- Beverage containers - milk cartons, Tetrapack, aseptic packaging
- Waxed cardboard - produce boxes
- Compostable paper products - bowls, cups, plates

Glass

- Tempered glass - kitchen glassware
- Window glass

If organic waste receptacles are available to you on-campus, only the following items must be placed in the landfill waste stream

Plastic Products (#3-#7, including #7 'OTHER')

- Expanded polystyrene (EPS) - Styrofoam
- Plastic bags and plastic film - Saran wrap, pallet wrap, food bags and wrappers
- Food Containers - yogurt containers, clear plastic produce or food containers, straws, cups and utensils

Paper & Cardboard Products

- Beverage containers - milk cartons, Tetrapack, aseptic packaging
- Waxed cardboard - produce boxes

Glass

- Tempered glass - kitchen glassware
- Window glass

ON-CAMPUS SERVICES

Landfill waste receptacles can be found throughout campus in both interior and exterior locations. In interior locations, two sizes of receptacles are primarily utilized to collect materials of this waste stream. 23-32 gallon receptacles are mainly utilized for common, public areas, which include lobbies, kitchens, break rooms, conference rooms, copy rooms, and hallways. Open concept office spaces also utilize landfill receptacles in the 23-32 gallon size. Seven gallon receptacles are primarily utilized in private spaces, such as offices and residence halls, but are occasionally found in areas that are larger and available to the public but generate small quantities of waste. These interior landfill waste receptacles are serviced by custodial staff, and in Associated Students buildings are service by A.S. Recycling. In exterior locations, 32-40 gallon receptacles are located throughout the campus and are primarily serviced by the groundskeeping staff. Both groundskeeping and custodial staff in Facilities Management primarily transfer waste from interior and exterior receptacles into 1.5yd - 4yd dumpsters provided by MarBorg in locations throughout campus. Residential Operations mainly transfers landfill waste into 40yd compactor roll-off dumpsters throughout their areas of the campus. It should be noted that for landfill bound waste, it is not sorted prior to the transferring of the waste from UCSB receptacles to the MarBorg Dumpsters.

CONTRACTED HAULING SERVICES

MarBorg provides waste hauling services for landfill dumpsters and roll-offs Monday through Saturday, with frequency varying depending on location. All landfill waste leaving the campus is taken to MarBorg's material recovery facility to be mechanically and manually sorted to remove recyclables in the form of plastics, metal, wood, and paper from the landfill waste stream. This practice is specifically requested in

UCSB's waste hauling contract and is not a service that is provided to other customers. The material that is not recovered from this process is sent to Tajiguas Landfill. Currently UCSB pays $150/ ton to dispose of landfill MSW at Tajiguas landfill.

Non-Hazardous Lab Waste

The non-hazardous lab waste stream at UCSB is exclusive to laboratory buildings that generate autoclave waste, laboratory glassware, and other non-hazardous laboratory waste. In accordance with local, regional, and national regulations, this waste can be disposed of in the more publicly available landfill waste stream; however, contrary to the landfill waste stream, this waste is taken from the campus to Tajiguas landfill, without being sorted for recyclables. Over 50 red-lidded toters are placed in dumpster corrals adjacent to buildings that generate non-hazardous lab waste. Departments and buildings also have the capability to keep carts in their labs to facilitate dispose of this waste. MarBorg services this waste stream 1x/ week. The current tipping fee at Tajiguas for this non-hazardous lab waste stream is $115/ ton.

Other Waste Streams

Construction & Demolition Waste

Construction & Demolition waste (C&D) is defined as waste generated from construction and renovation projects including but not limited to: lumber, drywall, masonry, carpet, plastic, rocks and dirt. In the UC Sustainable Practices Policy, C&D waste is not considered part of the municipal solid waste stream and therefore does not count towards the University's MSW goals. C&D is not a direct and accurate representation of day-to-day activities regarding waste generation and is more of a reflection of current construction practices. It is still important to collect this data and UCSB works with both MarBorg and subcontractors utilizing other waste processors to record this data. For the purposes of reporting waste data to UCOP, C&D waste is reported separately from MSW.

Universal Waste

Hazardous waste regulations designate a category of hazardous wastes called universal waste. This category includes items, such as fluorescent lamps, cathode ray tubes, instruments that contain mercury, and batteries. Many of these items are collected through UCSB's electronic waste stream as outlined below. This waste stream does not count towards the University's waste diversion percentage as it is not included in the category of municipal solid waste.

Electronic Waste

Electronic and universal waste are collected by A.S. Recycling student staff from over 45 locations weekly. Once the various types of e-waste are picked-up from their respective bins, they are sorted and delivered to two different entities on campus to be reused or recycled. All items collected by A.S. Recycling are sorted and weighed with the weights being reported to Facilities Management.

The items collected for electronic waste include computers, mice, keyboards, toner and ink cartridges and most other small items with a cord. These e-waste items are taken to Distribution & Logistical Services where they are either sold for reuse or recycled by a certified recycler. Items not collected by A.S. Recycling include refrigerators, air conditioning units, and any items over 50 pounds. Those items need to be collected directly by Distribution & Logistical Services. Our current electronic waste collection hauler is Electronic Recyclers International who are E-Steward certified for their ethical e-waste recycling efforts, a certification mandated in the UC System.

The items collected for universal waste include batteries (alkaline, lithium-ion, nickel-cadmium and more), and compact fluorescent and LED light bulbs. These items are brought to be properly disposed of at UCSB's Environmental Health & Safety Department.

WASTE DATA

Waste Diversion

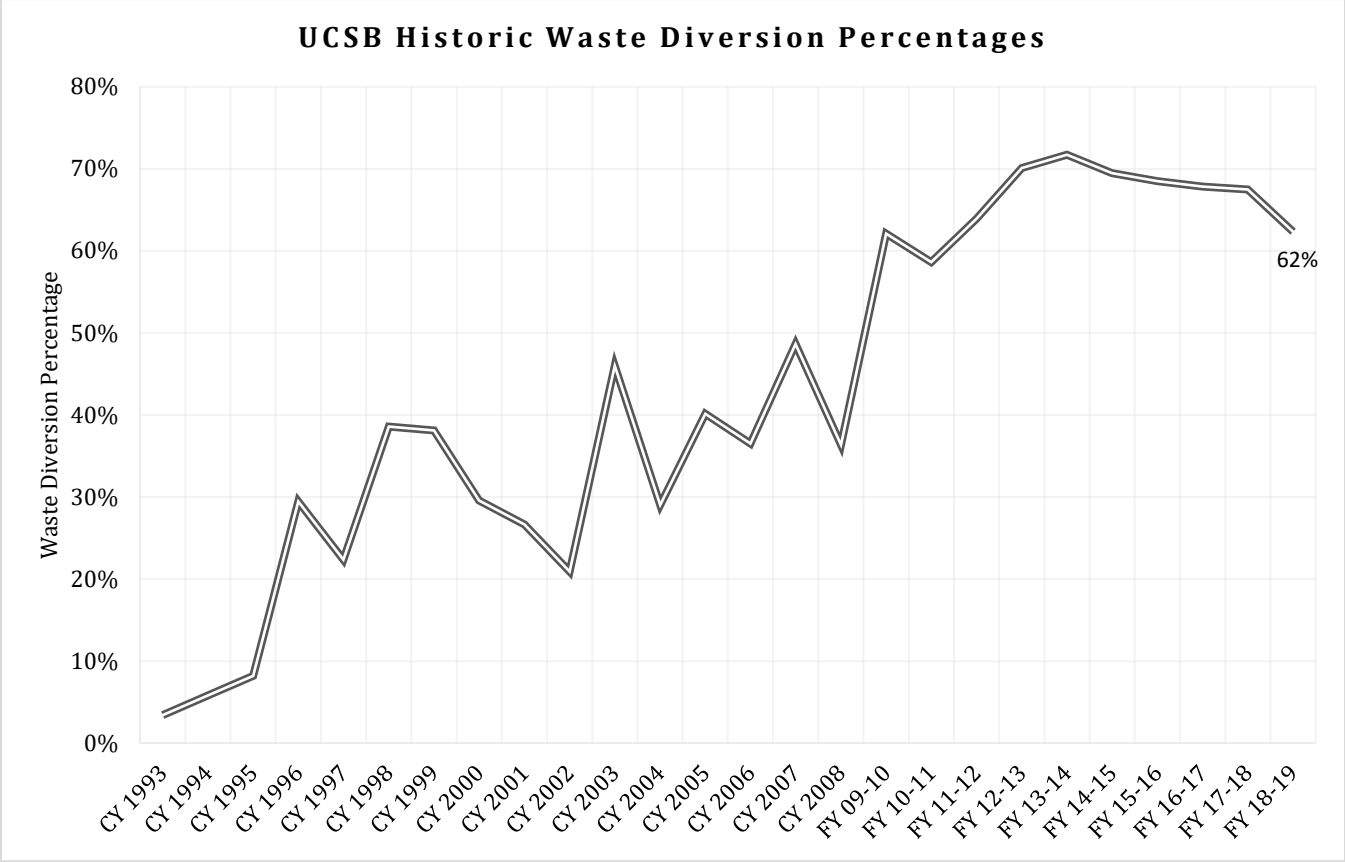
Waste and recycling data was determined to be first recorded in 1993. Data prior to 1993 cannot be found, although it may have been recorded. Data was originally reported in calendar year (CY), and then switched to Fiscal Year (FY) as decided by the University of California Office of Sustainability and UC Zero Waste Working Group. The overall trend in this data set is that diversion rates increased through the years as both UC Santa Barbara and local, state, and nation-wide efforts to recycle more and keep organics out of the landfill increased. Associated Students Recycling was created in 1992 and data waste generation and diversion data was first collected by the organization in 1993. While the early peaks and valleys of the diversion rate cannot be fully explained, one could attribute them to fluxes in the recycling market, as well as program changes both on campus and with our local waste hauler at that time. The 2008 drop in diversion rate can be attributed to the Stock Market Crash of 2008. The downturn in the economy saw significant decreases in selling prices for recycled material. As noted at that time, prices for mixed paper were selling at $20/ ton compared to the previous selling price of $105/ ton in the fall of 2017. While waste diversion and waste management efforts are driven by activism in recycling programs or composting practices, it is equally as driven by raw economics. The waste industry is no stranger to changes in the recycling market, as the demand for recyclables if often tied to markets for new goods since recycled material is often utilized in new products (i.e. metal for auto parts). In scenarios like these, waste haulers are faced with the choice of stockpiling the material until the market improves or landfilling the material.

Everything and anything is recyclable if there is a market for that material. The stagnation and decrease in recent diversion rates can be attributed to disappearing markets for recyclables, as environmental laws and regulations in foreign countries, where much of the material is processed, are tightening. The recycling market for plastics largely exists in Southeast Asia, and each year, California exports about a third of the recyclable material it collects. Most of that material, unsorted mixed paper and mixed plastics, has been sent to China for processing. In February 2013, China introduced the 'Green Fence', requiring intensive inspections of incoming loads of scrap material, in an effort to ensure that the quality of the material being imported for processing had minimal contamination. Since 2013, China's policies around the importing of goods and materials to be recycled has significantly increased in an effort to protect their own

environmental and human health, and in January 2018, China implemented the 'Green Sword', banning the importation of certain recyclables, particularly plastics, and has set contamination limits on recyclable materials. While additional recycling markets exist outside of China, many are adopting similar policies. These changes in the global recycling economy have had a direct impact on waste diversion rates at UCSB, as evidenced in Figure 4. Stagnation in the waste diversion data can also be attributed to the fact that the University has explored and implemented many common recycling and organics collection programs, such as a commingled recycling in public spaces; therefore, requiring UCSB to undertake more resource-intensive programs to recycle and divert material that is not recycled in conventional, commercial recycling programs, such as material generated from laboratories. Future market changes, for better or for worse, will likely also have direct impacts on waste diversion rates at UC Santa Barbara.

In addition, decreases in waste diversion percentages in recent years can also be attributed to an increase in waste reduction efforts, specifically those targeting recyclables and food waste. Practices such as double-sided printing, water bottle filling stations, and leftover food donation programs reduce the amount of waste generated in the recyclable and organics waste stream, thereby decreasing the amount of material reported in diversion efforts. While these can have a negative impact on diversion rates, they are extremely important waste reduction efforts as noted in the following section.

Figure 4 | Waste diversion rates at UC Santa Barbara



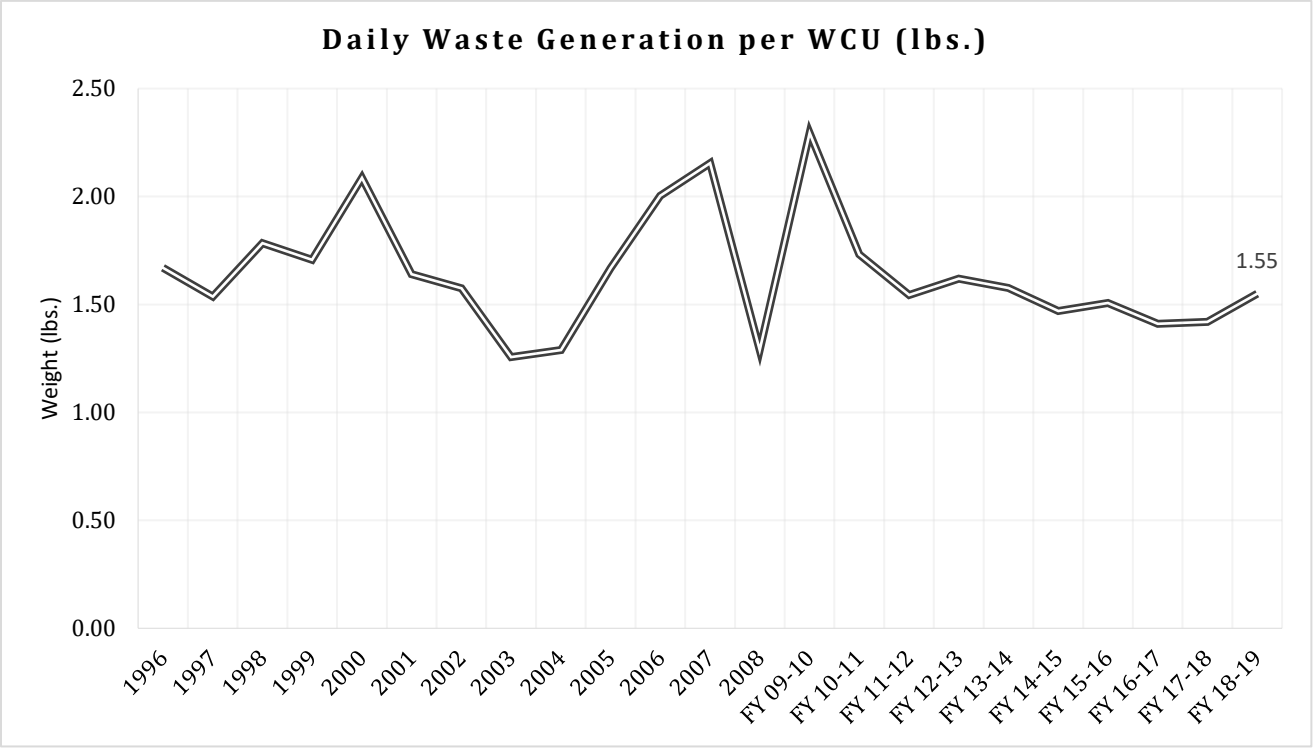
Waste Reduction

Per capita waste generation as determined utilizing the WCU metric displays the amount of waste generated on a per capita basis by UCSB students, faculty, and staff. Data was originally reported in calendar year (CY), and then switched to Fiscal Year (FY) as decided by the University of California Office of Sustainability and UC Waste Working Group. As previously mentioned WCU factors in how intensively different members of the campus utilize the University's resources (i.e. a student who lives in the residence halls uses more campus resources than a staff member who is only on campus for eight hours each day).

Waste generation can be a direct function of both campus population and building square footage growth. For the purposes of consistency, waste generation relative to campus population will only be discussed in this report, as to align with the waste reduction language in the UC Sustainable Practice Policy. As UCSB has experienced a significant growth trend in population as outlined in the campus' Long Range Development Plan, subsequently more material is being brought into campus and in turn disposed of, in order to support the campus community. Similar to the waste diversion data, the reasons peaks and valleys are difficult to determine in years prior FY 09-10, but could similarly be attributed to downturns in the waste management markets or gaps in data. Since FY 11-12, UCSB has experienced rapid growth in its campus population, as well as building square footage, including new residence halls and apartments, the addition to the UCSB Library, and a new BioScience Engineering Building.

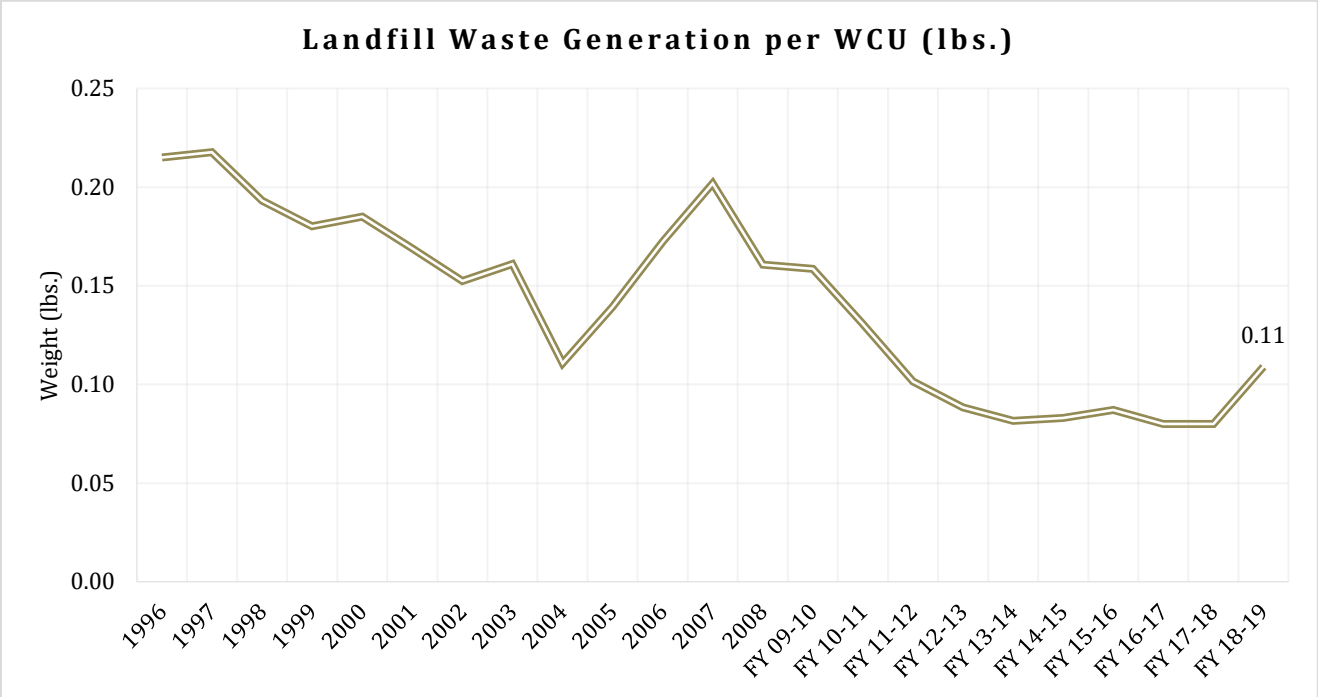
Examining total waste generation (Figure 5) is important because it collectively focuses on waste reduction efforts in all waste streams. Augmenting landfill waste generation by producing more recyclable or organic waste is beneficial to waste diversion efforts; however, utilizing waste diversion as the defining metric of waste management success neglects the recycling hierarchy - reduce, reuse, recycle. It is important to value both metrics, and prioritize waste reduction, even if waste reduction programs and practices may have a negative impact on diversion rates (i.e. more water bottle filling stations produces less single-use plastic bottle waste, a highly-recyclable material).

Figure 5 | Historic daily waste generation per capita



Landfill waste generation per capita is also an important metric. While there are no goals defined in the Sustainable Practices Policy regarding landfill waste generation per capita, it provides a good measure on reduction efforts focused on landfill-bound material (Figure 6).

Figure 6 | Historic landfill waste generation per capita



WASTE CHARACTERIZATION

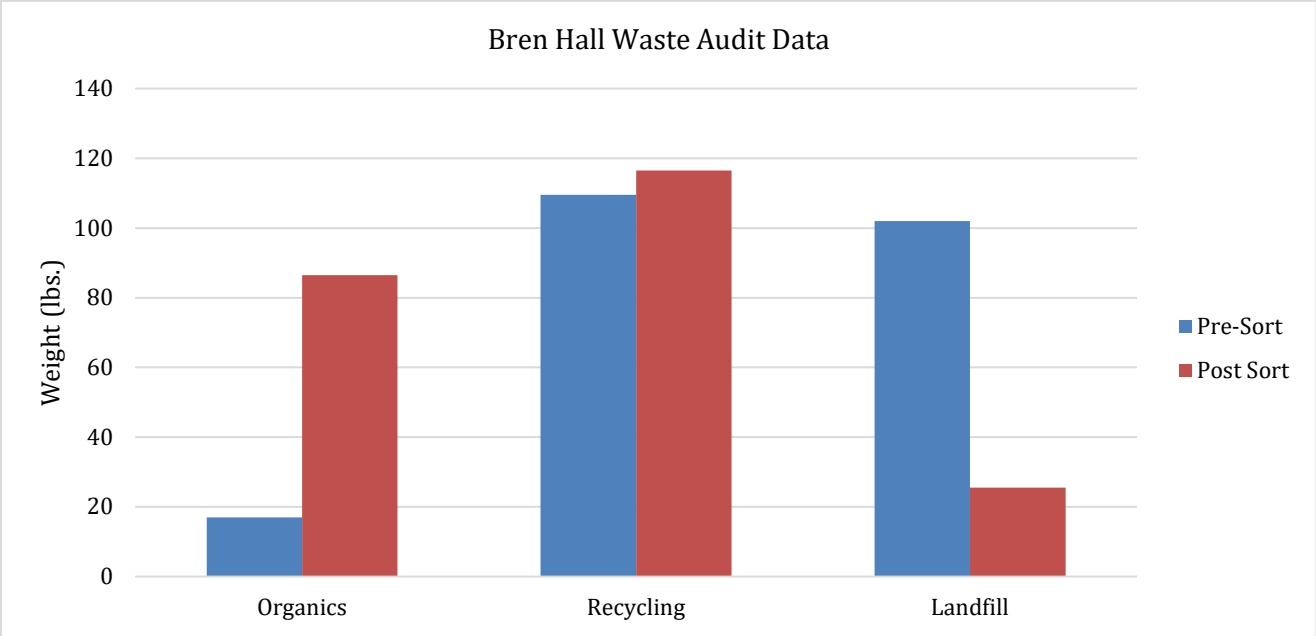
Building waste audit data over the past five years has been analyzed to produce a waste characterization for UC Santa Barbara. A waste characterization determines the material composition of the waste stream on-campus and is critical in helping to plan future waste reduction, reuse, and diversion programs and practices. Each of the following waste studies utilized the same audit methodology; however, the level of detail for each waste stream varied. Individually, the waste audits show the uniqueness of each building, and collectively they provide insight to the overall waste characterization of the campus.

Bren Hall - January 2017

Bren Hall at UC Santa Barbara is home to several departments, but mainly the Bren School of Environmental Science & Management and the Environmental Studies Department. Bren Hall has two lecture halls, staff and graduate student offices, as well teaching spaces, meeting rooms, and kitchens. The three-story laboratory section of the building also supports research labs. A three-day waste audit was conducted in January 2017 as part of the building's U.S. Green Building LEED recertification. All spaces in the building and waste streams were audited, with the exception of the hazardous waste stream. The audited waste streams were organics, commingled recycling, and landfill. Bren Hall has been an early adopter of organics waste collection in public spaces and at the time of this audit, has organic waste receptacles in seven locations. The remainder of the waste infrastructure both interior and exterior has paired recycled and landfill waste receptacles, in private offices and public spaces.

The findings of this waste audit (Figure 7) at Bren Hall correlates with the layout of waste infrastructure and general theory of waste disposal practices when certain receptacles are present. Pre-sort data for commingled recycling versus the post-sort data revealed that office occupants have a fairly good understanding of acceptable materials in this waste stream. Their sorting behavior is also supported by the fact that in both interior and exterior spaces, commingled recycling and landfill waste receptacles are paired. When looking at the data for organics, the pre-sort data shows that most organics were discarded in the landfill waste stream. This supports the University's instruction that if no organic waste receptacles are present, food scraps and organic waste, including food packaging, should be placed in the landfill receptacle. At the time of this waste audit, Bren Hall only have seven food oganic waste receptacles.

Figure 7 | Pre- and post-consumer waste audit data from Bren Hall



UCSB Library - April 2019

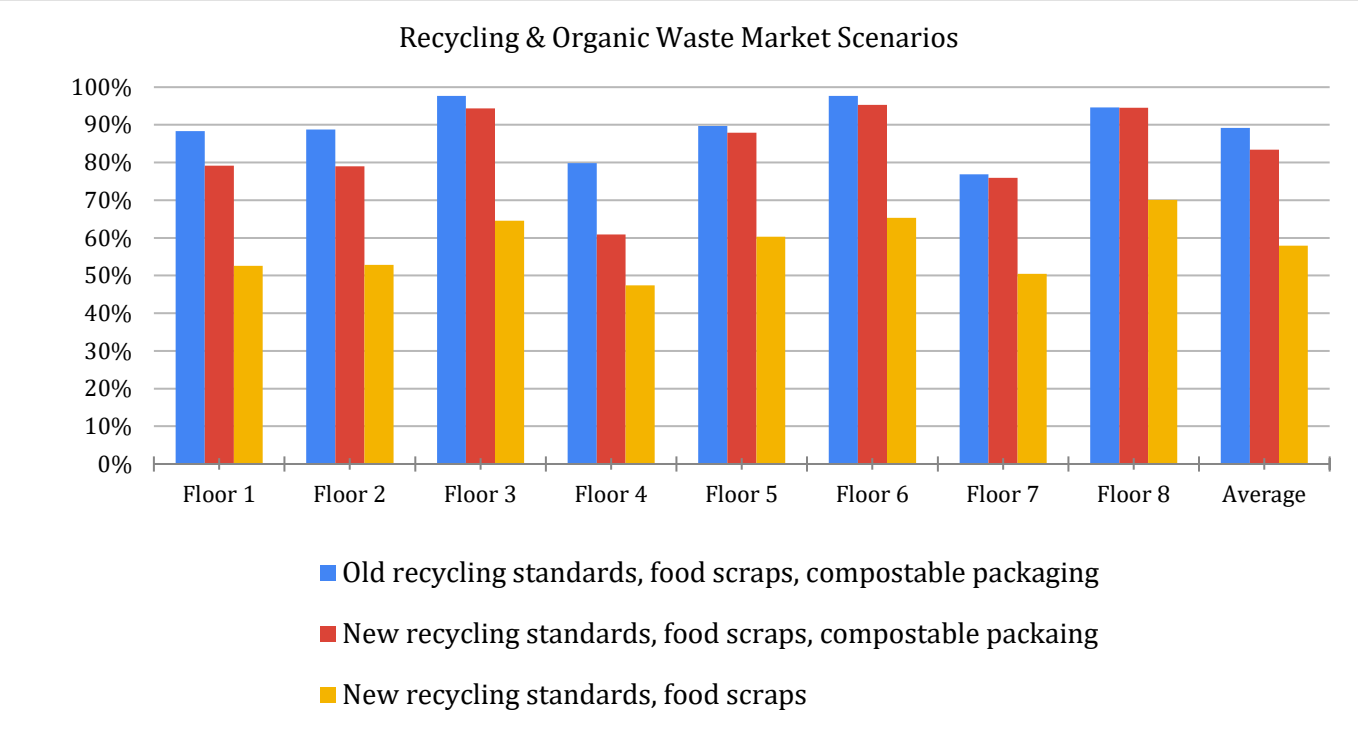
The UCSB Library is 350,000,000 ft^2 space that serves as the focal point of the University, as it is essential to everyone and every discipline, including visitors. The UCSB Library welcomes over 3,000,000 visitors each year. The Library is composed of public and private study and computer areas, a cafe, and administrative offices. In April of 2019, a three-day waste audit of the UCSB Library was conducted. Selective bins in high traffic areas were audited as part of a larger effort to efficiently and effectively introduce an organics waste stream. A total of 32 waste receptacles were audited throughout the entire building. The waste was audited into following categories: food waste, compostable products/ packaging; plastics #1 & #2, non-recyclables (plastics #3-#7, paperboard), and landfill waste. The aforementioned categories were selected in order to forecast variances in the recycling and organics waste collection and predict waste diversion percentages under different market scenarios. The categorized market scenarios were defined as follows:

- Market Scenario 1: "Old Recycling" standards (plastics 1-7, metal, cardboard, paperboard, wood), food scraps, and compostable packaging
- Market Scenario 2: "New Recycling" standards (plastics 1-2, metal, cardboard, wood), food scraps, and compostable packaging
- Market Scenario 3: "New Recycling" standards (plastics 1-2, metal, cardboard, wood), food scraps

The pre-sort data showed that collectively, only 51% of the waste was sorted correctly into the correct waste streams by the building occupants. Achievable post-sort diversion percentages varied based on the

different market scenarios. Market Scenario 1 yielded the highest achievable diversion percentage, averaging 89% across all floors of the Library. Market Scenario 2, which represents the current recycling and organics collection market yielded an achievable diversion percentage of 83%. Market Scenario 3, which represents a hypothetical scenario, which is a possibility when Santa Barbara County completes their new material recovery facility, in which compostable packaging is not acceptable, shows an achievable diversion percentage of 58% (Figure 8).

Figure 8 | UCSB Library waste audit data per floor



Life Sciences Building - May 2019

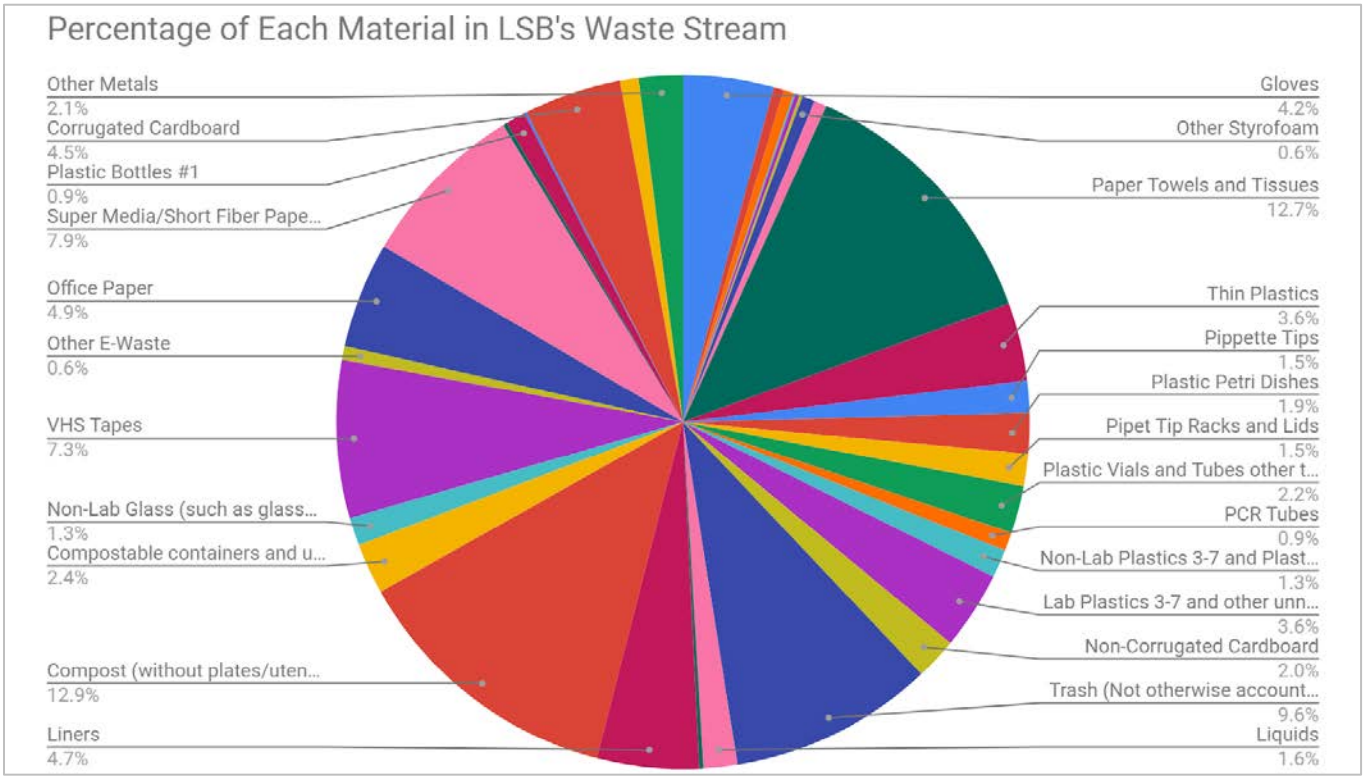
The Life Sciences Building (LSB) is primarily a laboratory building that houses research labs, and student, faculty, and staff offices, with one lecture hall. The laboratory side of the building houses both research and teaching labs.

This waste audit focused on gaining a better understanding of non-hazardous laboratory waste generated from buildings that support laboratory research. Waste generated from laboratories can be difficult to handle nor recyclable in conventional waste streams due to the chemical compositions of plastics and glass found in labs. The waste was separated into the following streams: corrugated cardboard, plastic bottles #1, super media/ short fiber paper, office paper, VHS tapes, non-lab glass, compostable food packaging, food waste, plastic liners, gloves, paper towels and tissues, thin plastics, pipette tips, plastic petri dishes, pipette tip racks and lids, plastic vial and tubes, PCR tubes, non-lab plastics #3-#7 and plastics #1-#2 (not

bottles), lab plastics #3-#7 and other unnumbered lab plastics, non-corrugated cardboard, landfill waste, liquids, other metals, other electronic waste, other Styrofoam.

The pre-sort data showed that only 14% of the total waste stream was recycled or composted properly in the building. Post-sort, 46% of the material could have been recycled or part of an organics waste stream if sorted correctly. The waste audit data (Figure 9) revealed that the majority of the total waste stream composed of laboratory generated waste that could not be recycled or organically recycled in conventional programs.

Figure 9 | LSB post-sort waste audit data



Characterization Summary

UC Santa Barbara's waste characterization varies dependent upon building function, space use, and demographic. Administrative buildings produce more material that can be recycled in the conventional, commingled recycling waste stream, as they contain more private offices and shared spaces. Academic buildings, such as lab spaces designated for chemistry, biology, and engineering disciplines have the tendency to produce more hard-to-handle material that is not capable of being recycled or composted in conventional commercial waste management services, due to the chemical composition of the material. Buildings, which provide student services such as the UCSB Library and the Student Resource Building contain more recyclables in the form of aluminum and plastic drink containers, food waste, and food packaging, which can vary in its recyclability. Buildings that house departments focused on humanities and social sciences will likely have a waste composition comparatively to the UCSB Library. Residence Halls and

housing units will have a mix of materials, with more items that are coming from off-campus purchases, as well as organics in residences with kitchens.

STRATEGIES & GOALS FOR ACHIEVING ZERO WASTE

The primary step to achieving zero waste is to construct a foundation on which to build upon. At UCSB, this foundation consists of the "Three C's" and behavioral modification towards solid waste and recycling.

The Three C's: Communication, Collaboration, and Connectivity

The Three C's consist of communication, collaboration, and connectivity. In that particular order, the Three C's represent how UCSB can achieve campus-wide unity in terms of waste management efforts. Communication between the departments and organizations both at UCSB, at the local, regional, and national scales is essential. As mentioned in previous sections and listed at the beginning of the document, there are multiple parties responsible for waste management at UCSB. Although each has unique practices are unique and has contributed to the University's previous waste management success, achieving zero waste will require the various departments to communicate and to develop a greater degree of integration.

Such communication includes: notifying and updating one another of waste management programs and practices, identifying waste management ideas and strategies, and expressing opinions on ways to improve the waste management structure at UCSB. Transcending the department level, communication regarding waste management needs to extend to and beyond the entire UCSB Community, which includes faculty, staff, students, campus visitors, and outside organizations. Everyone is an expert on waste; we all handle multiple types of waste streams on a daily basis. Communication in the forms of workshops, meetings, clubs, booths at events, and even informal conversation in passing are ways the UCSB Community can share their expertise, learn from one another, and even influence those responsible for waste management at the University. Communication alone is important, but even more so as it segues into collaboration.

Collaboration can only be achieved after communication. At the departmental level, collaboration will allow the various departments to tackle waste management issues together, which will lead to more complex and well-thought-out strategies and practices. Departmental collaboration will also allow UCSB to uniformly address waste management issues and ensure that the campus population receives the same message. Following communication and collaboration is connectivity.

With the prioritization of waste management communication and collaboration, it will be primed and ready to tackle all waste management issues together. The complex waste management issues that UCSB and other entities alike are now facing are too complex and broad for a single department to solve. Establishing the Three C's between departments and organizations both on- and off-campus will allow UCSB to continue in progress towards achieving waste management goals.

Behavioral Modification towards Waste Management

The Three C's are pivotal to fostering consistent behavioral modification towards improving waste reduction and management strategies. Education and outreach efforts need to make a transition from a topic that has been traditionally viewed as smelly and dirty to one that stresses the importance of proper waste management practices. Waste management needs to become a comfortable discussion topic, where individuals encourage one another to properly recycle and compost but also feel comfortable in calling out community members when they have identified a waste management mistake. Behavioral modification does not require a top- down approach but, rather, a more comprehensive strategy that includes all parties regardless of their social standing. Modifying individuals' behaviors towards waste management issues starts with education. Formal education is great, but even informal education is crucial in making a change. Champions for the environment and waste management justice need to share their ideas with fellow community members. They need to be change agents that inspire the creation of more champions for the environment and waste management justice. Behavioral modification towards waste management issues is a continuous process that will evolve and, once established, will result in dramatic, positive changes to waste diversion and the topic of waste management in its entirety.

Waste Diversion & Reduction Opportunities

FY 18-19 waste data shows that UC Santa Barbara has a 62% diversion rate of municipal solid waste. In order to get to the UC Zero Waste defined minimum of 90%, programs and practices to divert the remaining 28% of material from the landfill must be implemented. In addition, meeting the future per capita goals will require the expansion of existing reduction and reuse programs, as well as the introduction of new practices. For the purpose of this section, current recycling and organics collection markets will be utilized for modeling. There are two components to this section, one focusing on campus-wide goals, and the other on localized practices and opportunities. Both areas play a key role in ensuring that UCSB in successful in achieving its waste management practices

Campus-Wide Goals

Identify product substitution opportunities and the elimination of materials for unmarketable recyclables

UC Santa Barbara's MSW waste diversion percentage dropped 5% from 67% to 62% in the last fiscal year. A close look at the data reveals that changes in the recycling economy likely attributed to this decrease, as UC Santa Barbara's waste hauler indicated that recyclables, primarily plastics #3-#7 were being landfilled instead of recycled and there was zero tolerance for contamination with soiled recyclables.

It is uncertain whether the market will return for these materials, and if it does return, the exact timeline is uncertain. It is recommended that the University utilizes a combination of existing waste management policies, sustainable purchasing practices, and education to remove these unrecyclable materials from the

waste stream if possible. This will help to decrease the total amount of material sent to the landfill, potentially increase compostable numbers, and assist with waste reduction efforts.

a. Single-Use Plastics Policy

UC-wide policy language surrounding the reduction and elimination of single-use plastics is currently being developed. Draft policy includes language to eliminate plastic bags, replace disposable single-use plastic foodware with reusables or locally compostable options by 2021. In addition policy language also focuses on phasing out the procurement, sale and distribution of single-use plastic beverage bottles by 2023. This draft policy language still needs to be confirmed and adopted by the UC Sustainable Steering Committee; however, a systemwide effort to eliminate this material from the waste stream is forthcoming.

UCSB should plan accordingly, potentially developing local policy language and implementation plans on the phase out of this material. While the draft policy language has been initially approved by Campus Dining Services at UCSB, there will be implications for both operations staff, as well as customers. It is recommended that the Dining Services and the University Center develop an implementation plan with information for leased tenants on how to proceed with implementing the necessary changes. Contract language should be developed for new tenants that adheres to the elimination of single-use plastics. Specifics in the contract should include: the final UC policy for the elimination of single-use plastics, localized language specific to UCSB entities, recommendations for pre-approved product substitutes, quarterly check-ins with tenants, and non-compliance penalties. Many leased tenants are currently in contracts extending beyond 2021 and potentially even 2023. For these tenants, a request to voluntarily comply with finalized policy language should be pursued, with the understanding that elsewhere, this is the campus expectation.

b. Product packaging substitution and alternatives

Product substitution for single-use plastic packaging should be explored, trialed, and introduced. Approved and appropriate product substitutes include packaging that is locally compostable (via the organics waste stream) or reusable packaging. While locally compostable packaging that are either composed of paper fiber or PLA #7 are suitable substitutes at UC Santa Barbara, it should also be noted that their acceptance in the food scraps/ organics waste stream are debated at regional and national scales due to the time needed to break down these products, and therefore these materials are also subject to market changes in what is allowable in the food scraps/ organics waste stream. If single-use product substitutes that acceptable in the organics waste stream are preferred by campus entities, the packaging should be approved by the campus' waste management staff prior to purchasing the items. Transitioning from single-use products that were unmarketable, such as plastics #3-#7, to compostable packaging with show improvement in the University's waste diversion rates. As evidenced in the UCSB Library waste audit, 26% of the total waste audited was compostable food packaging. The preferred method for product substitution is replacing single-use items with reusables, such as food containers, plates, drinking cups, and utensils. Reusable food container programs will be discussed in a further section, but the University has made great strides in promoting reusables, specifically water bottles, by providing the campus community with clean and reliable access to filtered drinking water in the form

the UCSB Hydration Stations. Reusable programs are preferred because they are a practice of source reduction and promote the reuse of items that are not single-use and often disposable. Reusable programs benefit waste diversion efforts by eliminating material that would otherwise not be recyclable or compostable from the waste stream by acting as a product substitute. However, it is important to note that reusables that are substituted for products that have market value, such as single-use plastic water bottles will in turn have a negative impact on diversion rates since you are taking that material out of the commingled recycling waste stream. Although this seems counterintuitive, it is correct and should be prioritized as it relates to the recycling hierarchy of reduce, reuse, and recycle. Source reduction of using reusables to augment single-use plastic consumption will benefit the University's waste reduction and reuse goals.

c. Procurement Education & Outreach

Education and outreach around procurement efforts in this area is especially critical because it will dictate the goods that are available to the consumer. If goods and packaging are purchased by the procurement staff that do not meet policy mandates or are not suitable alternatives, then the consumer is left with little choice. Departmental purchasers should familiarize themselves with the different waste streams, particularly the allowable material in each waste stream. UCSB has a sustainable procurement analyst in Procurement Services that can assist staff with departmental procurement responsibilities on purchasing the appropriate packaging. It is recommended that the sustainable procurement analyst, in coordination with the waste and recycling staff on-campus, work to develop procurement guidelines around suitable product substitutes to provide to departments. Such guidelines could be hosted on the Procurement Services website and be incorporated into Gateway and buyer training sessions.

Establish take-back programs and identify product substitution opportunities for non-hazardous lab waste

Campus waste data reveals that just over 30% of waste generated at UCSB is created in campus laboratories. As outlined in the waste characterization section, lab buildings tend to have lower waste diversion percentages due to the materials and goods that are needed for research purposes in these areas. With much of the material not acceptable in conventional recycling waste streams, specialized recycling programs, often in the form of take-back programs are required to recycle this material. As outlined in a recent study by the Laboratory Resources, Advocates, and Teamwork for Sustainability (LabRATS) group at UCSB, most take back programs, other than TerraCycle are brand specific and only accept their brands material. Take back programs also are also not free and come at a charge dependent upon material and quantity, with potential for financial penalties if there is contamination. These take back programs also often require materials to be source separated and do not allow for the commingling of the waste even if it is going back to the same supplier. The table on the following page provides information on the different take back programs offered by laboratory suppliers:

,

Program	Accepted Materials	Brand Specific	Program Costs	Contamination Penalties	Misc. Information
Corning Recycles	Packaging, pipet tip racks, styrofoam racks, paper/ plastic wrappers, plastic bags	Yes - Corning, Falcon, Axygen	Free - A pre-paid shipping label is provided for UPS or FedEx	Yes - If a single item is not meet brand guidelines, sender will pay shipping costs	Corning will receive any shipment size
ech2o	Water purification cartridges	Yes	Parties are responsible for arranging and paying shipping costs	N/A	-
Kimberly Clark RightCycle	Apparel items and nitrile gloves	Yes	Parties are responsible for arranging and paying shipping costs	No - persistent contamination issues will result in a notification	-
Sigma-Aldrich Polystyrene	Polystyrene coolers	Yes	USPS pre-paid postage stamp is provided to ship back the container	No	If is in good condition it will be used again
Thomas Scientific ez COD Recycling Service	Mercurcy based chemical oxygen demand vials	Yes	California requries that COD vials are picked up in person at $400-$600/ 5gal bucket	N/A	COD vials are uncommon in a laboratory waste stream at UCSB
VWR Garment Recycling Soluation	Used disposable apparel (no gloves)	No	12 30lb. capacity boxes at $293.61 | Gaylord recycling option at $219	N/A	-
VWR Returnable Container Advantage Program (ReCap)	200L stainless steel containers for storing BDH Acetonitrile or Methanol	Yes	Upfront purchase of the VWR container with free exchanges when empty. Need to pay for chemical costs	N/A	Exchange program that operates like propane or other gas tanks

TerraCycle is a company that specializes in recycling difficult, non-conventional items that cannot be typically recycled in commercial programs. The table below shows their recycling options for laboratory waste.

Program	Accepted Materials	Brand Specific	Program Costs	Contamination Penalties	Misc. Information
TerraCycle Disposable Gloves Zero Waste Box	Plastic, nitrile, vinyl and latex	No	$45.00 (Pouch); $124.00 (Small box); $257.00 (Medium box); $420.00 (Large box); $2,046.00 (Pallet)	N/A	-
Protective Eyeware Zero Waste Box	Eyewear - safety goggles and glasses	No	$43.00 (Pouch); $86.00 (Small box); $144.00 (Medium box); $224.00 (Large box); $1,370.00 (Pallet)	N/A	-
Safety Equipment and Protective Gear Zero Waste Box	Disposable gloves, dust masks, garments, hairnets, beardnets, earplugs, and safety glasses.	No	$139.00 (Small box); $283.00 (Medium box); $463.00 (Large box); $2,240.00 (Pallet)	N/A	-

It is recommended that in order to divert more laboratory waste from the landfill, UCSB explore the feasibility of introducing take back programs for labs, either at the campus level or per interested department. With lab gloves making up approximately 4% of the waste stream in laboratory buildings, as evidenced in the LSB waste audit, exploring the takeback program from Kimberly Clark, would be worthwhile, as it is a commonly utilized glove in lab settings. With Corning providing takeback services for thin plastic packaging (3.6% of our waste stream), pipette tip racks (1.5% of our waste stream), and Styrofoam centrifuge racks (0.08% of our waste stream) for a total of 5.2% of the waste stream, it is also worthwhile piloting Corning's take back programs. Although it should be noted that not all the material discarded from these categories were Corning products.

Another option would be to help labs find product substitutes and switch to the use of glass rather than plastics. Approximately 4% of the waste stream could have been purchased in glass in the form of petri dishes, vials, and tubes, and subsequently been washed and reutilized in the laboratory setting.

We can also consider which labs might be able to switch to the use of glass rather than plastic. 1.8% of our waste stream was Petri dishes and 2.2% was vials and tubes which could have been purchased in glass and washed with a laboratory dish washing machine.

Expanding UCSB's organic/ food waste collection

a. Academic & Administrative Spaces

Expanding UC Santa Barbara's on-campus organic waste collection programs provides the greatest opportunity for increasing waste diverted from the landfill. Many buildings on-campus do not have public organic waste receptacles, and exterior organic waste receptacles are only located by food service entities. The waste data from the Library revealed that the pre-sorting diversion rate was 58%, with a post-sorting diversion rate of 83%. At the time of the audit, the UCSB Library did not have public organic waste receptacles, only commingled recycling and landfill receptacles. Auditing the landfill bins revealed that 62% of the material placed in the landfill bins are organic materials that could be composted. In the recycling bins, it was determined that 25% of the material in these receptacles could be collected in an organic waste stream as well. Both of these suggest that introducing additional organic waste receptacles to the Library could assist in redirecting organic waste into the compost waste stream.

This data can be extrapolated to much of the non-residential portion of campus, where only landfill and commingled recycling bins are provided. The absence of organic waste bins at these locations means that the organic material is placed in a different waste stream, often going into the landfill waste receptacles, and subsequently the landfill itself. While UCSB works with MarBorg to conduct a material recovery process of the landfill waste stream at their facility prior to sending it to Tajiguas Landfill, it should be noted that the recovered material only includes unsoiled recyclable metal, plastics, paper products, and wood, and not organic material. All organic material that is placed in landfill waste receptacles at UCSB eventually makes its way to the landfill.

b. On-Campus Residences

In 2018 at the San Clemente Villages, the San Clemente Compost Pilot was launched by students from A.S. Recycling and the Sustainability Committee at Bren School of Environmental Science & Management with the support of Housing, Dining and Auxiliary Services. This was the first organics collection program in an on-campus apartment complex. During the 2018-2019 academic year, approximately 5 tons of food scraps were collected. Outreach was conducted to promote participation by hosting workshops, tabling in common spaces, email newsletter blasts, and social media posts. Due to the success of this pilot, the program expanded to the Santa Ynez Apartment Complex in 2019 and will expand to Sierra Madre Villages in 2020. The Apartment Compost Initiative (the program's new name) is expanding quickly with the goal of having an organics collection program at every on-campus apartment complex within the next couple of years. The pilot was originally funded by The Green Initiative Fund grant but is now mostly self-sustaining except for the outreach efforts by the A.S Recycling student staff.

The organics collection programs in Housing buildings have focused on apartments rather than residence halls due to the larger amount of food scraps from apartments. Efforts were made to collect organic waste from the Residence Halls with little success. The University should continue to explore opportunities to expand this institutionalized service to additional on-campus housing units.

Expanding reusable packaging programs at on-campus restaurants

A reusable clamshell program, Eco-to-Go, launched in 2019 at Coral Tree Cafe. This program was designed and implemented by A.S. Recycling students. To participate, customers go to Coral Tree Cafe and become a member of Eco-To-Go by paying a one-time membership fee of $5. Next, they order their meal and receive it in a reusable container. After enjoying their meal in the café or elsewhere, they return the container to Coral Tree Cafe at their convenience to receive a membership card to keep in their wallet. Next time they order a meal, they hand the cashier their card and get their meal in the reusable container.

Students first started working on this program in Spring 2018 with research and meetings with UCSB Dining staff. A pilot was launched in Spring 2019 to determine interest which included collecting surveys and tracking sign-ups. With significant interest expressed by customers, the cafe manager agreed to move forward. The containers were purchased through a A.S. Zero Waste Committee grant and all outreach efforts were funded by A.S. Recycling. These efforts included creating flyers for the cafe, creating membership cards, posting on social media, articles in sustainability newsletters and presentations at staff and student meetings to promote the program. Within the first six weeks, over 75 customers signed up to be program members. The final goal of the program is to have Eco-to-Go containers at all cafes and eateries on campus.

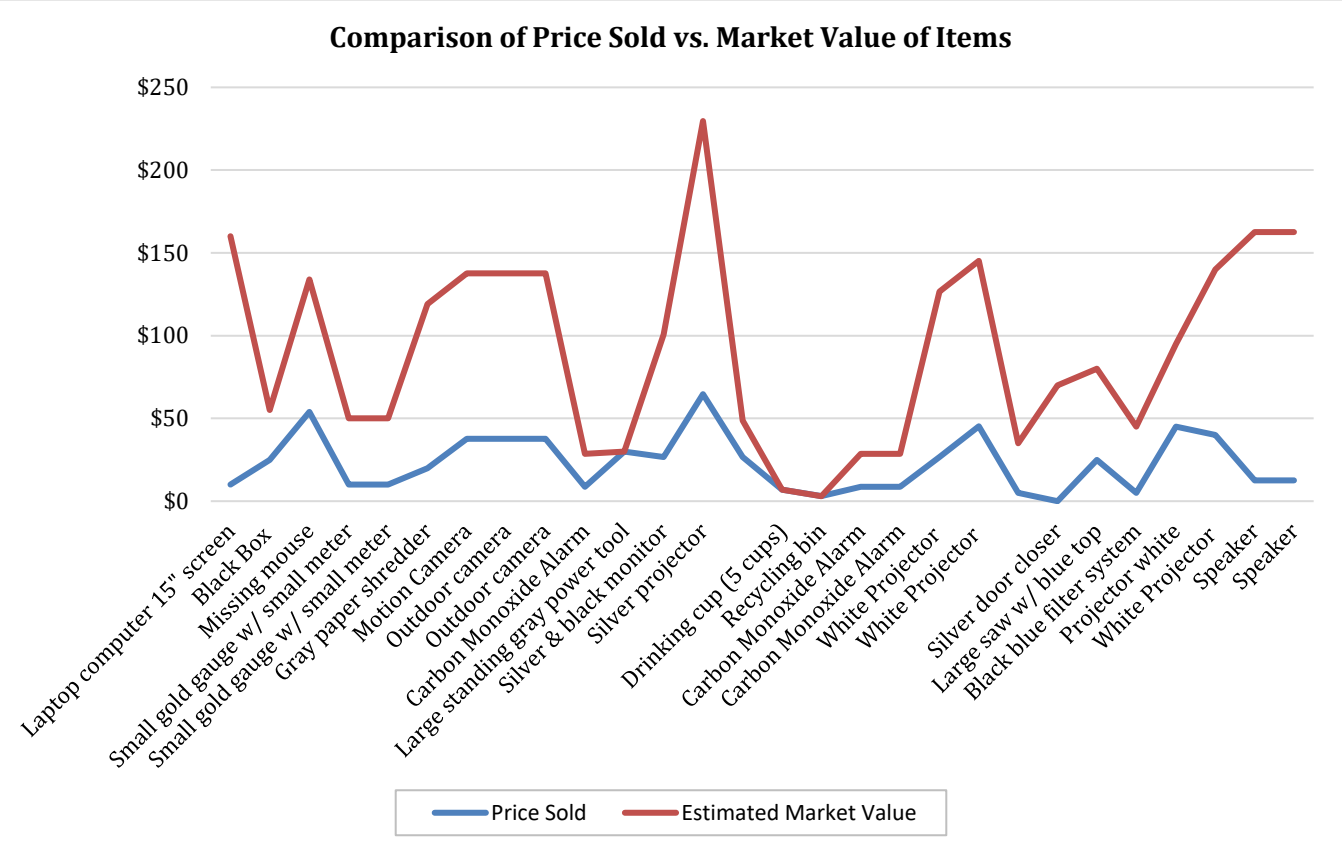
Another future goal for on-campus eateries is to offer other reusable programs such as a reusable mug program. This model could be similar to the Vessel program currently being tested at UC Berkeley and various cities in the US. The details of how this would work at UCSB have not been determined but the A.S. Recycling students are researching this possible opportunity in 2020.

Improve the reuse and resale of surplus equipment

Source reduction and product reuse opportunities are present within the University's handling of surplus equipment and goods. In an effort to improve the sale of goods and items, an inventory system would need to be implemented that begins when surplus goods are picked up from departments or dropped off at Furniture Services. This chain of command would have detailed information regarding the item and most importantly include information on its working condition as that is one of the determining factors for appropriately determining a selling price for the item. Because there is no formal methodology for determining the price of surplus goods, nor is the equipment checked for quality or working condition status, staff are obligated to make educated guesses regarding resale value. While there is correspondence between Furniture Services and the department's designating the material as surplus, there is no formal record. Data collected in 2017 determined that in a month, total sales from the sale of surplus goods was $643, with a market value potential of $11,246 for the goods that were sold during that time. Figure 10

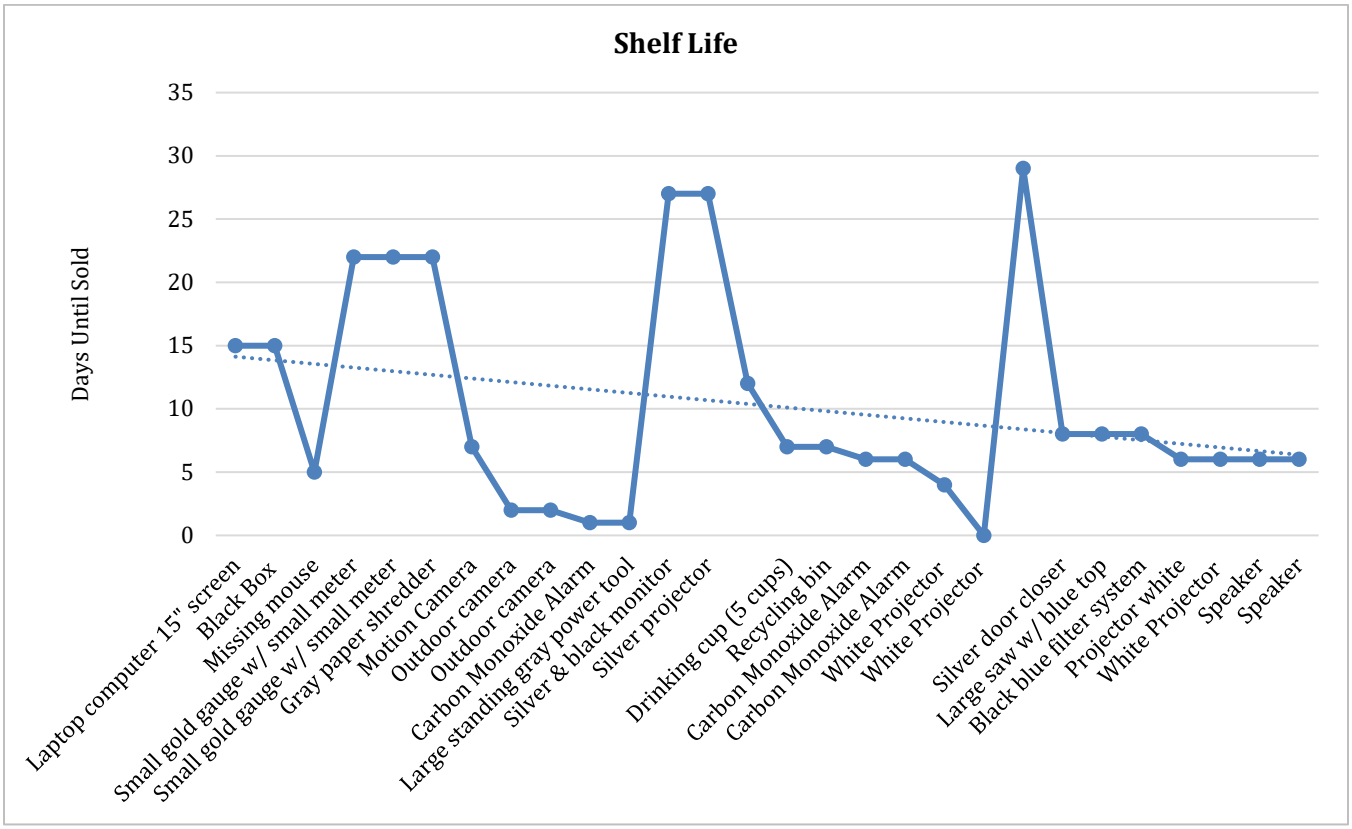
displays a comparison between the price of items sold and the researched market value. Speakers and projectors proved to be the most popular surplus goods among the student population, and also had the biggest difference between actual resale price and potential market value.

Figure 10 | Estimated market value of items vs. sale price for surplus goods



In addition, shelf life of surplus good was also recorded to determine the market demand for items. With limited shelf and floor space at Furniture Services for their Surplus Sales program, space to display goods is extremely valuable. It is recommended that the advertising to the campus community, students, faculty, and staff be improved through social media efforts and campus-wide notifications, as well as to the greater Santa Barbara community to move product off the shelves more quickly. Currently much of the greater Santa Barbara community that visits Surplus Sales is in the interest of scrapping or reselling the goods themselves. If marketing and outreach can target individuals who are more interested in utilizing the good in its original form, products could be sold at a higher price. Figure 11 displays the average shelf life of items studied during this project.

Figure 11 | Shelf life of items at Surplus Sales during 2017 project



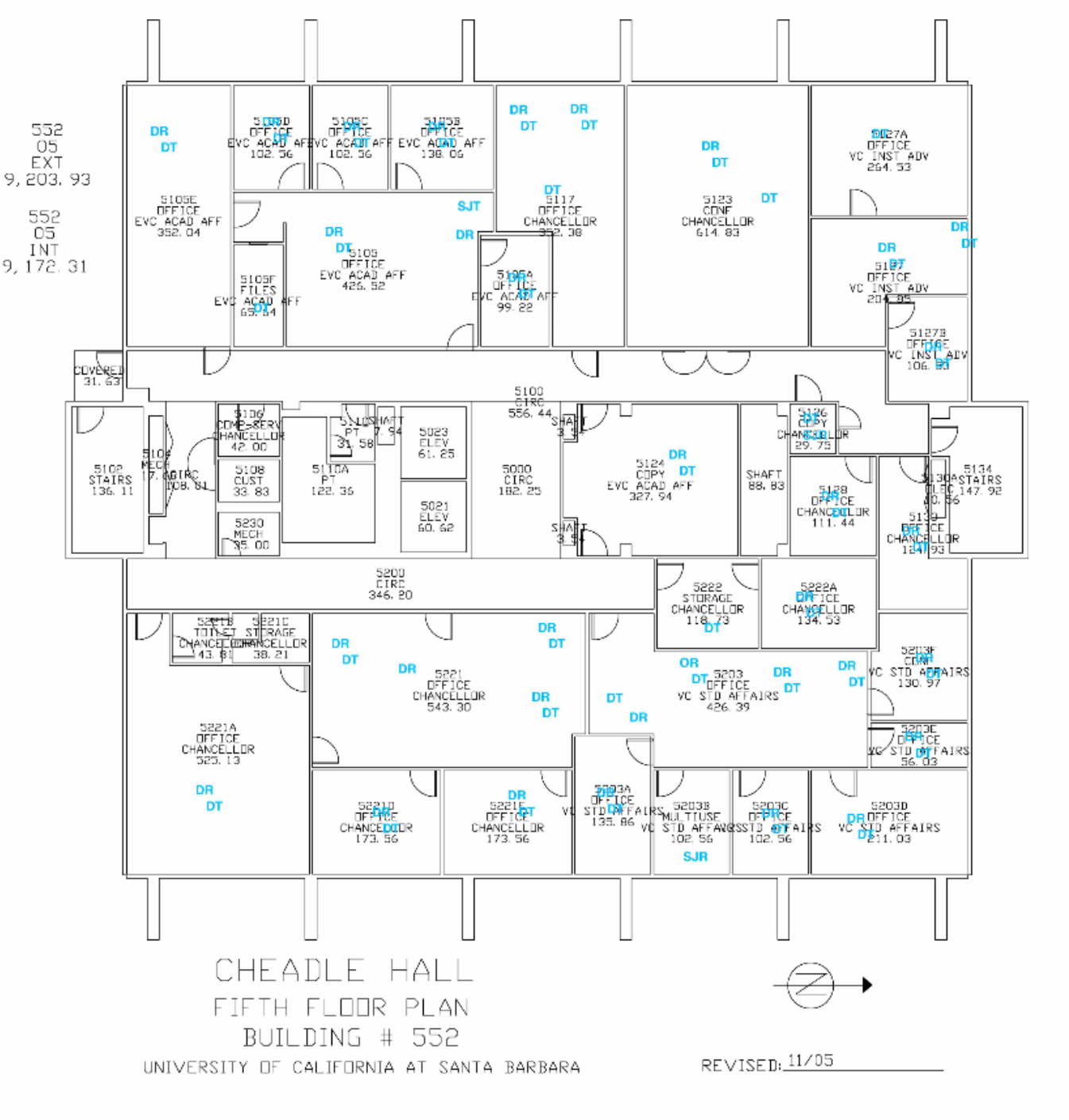
Localized Practices & Outreach Goals

Areas of opportunity to improve waste reduction and waste diversion efforts also exist on a smaller scale, either as a result of previous work conducted in this area or because they are departmental-level programs, or practices that focus on specific materials within a waste stream. Identified areas of improvement or continued improvement are as follows.

Confirm pairing of both indoor and exterior landfill and recycling receptacles

The pairing of landfill and commingled recycling receptacles is of the utmost importance at UCSB to ensure that we are providing the campus community with an equal opportunity when they are disposing of their waste. While the majority of the campus has an infrastructure where both recycling and landfill receptacles are paired, quality control checks to confirm this should be performed. All exterior waste receptacles in academic and administrative locations on-campus have been mapped. Waste receptacles in interior administrative and academic buildings have been mapped in collaboration with custodial staff; however, approximately 30% of buildings still need to have this practice performed (Figure 12). It is recommended that for interior spaces, custodial staff build this into their quality control reporting to ensure it is maintained as a regular practice and consistently updated. For exterior spaces, this should remain an annual practice as it assists campus organization with service efficiency efforts and asset management.

Figure 12 | Map of interior waste receptacles. DR = 7gal recycling; DT = 7gal trash; SJR = 23gal recycling; SJT = 23gal trash



Conduct annual building waste audits

To continue gaining a better understanding of the University's waste characterization as a whole, building waste audits should be conducted on an annual basis. The focus should be to build a waste characterization profile for the different building types: academic, administrative, and housing, with the ultimate goal of having subcategories for building types based on academic discipline and housing type (residence hall,

apartment, family apartments, etc.). The data yielded from these waste audits will allow for custom education and outreach efforts tailored to the waste material composition of the waste stream. To institutionalize this practice, both Facilities Management and Residential Operations should partner with A.S. Recycling, LabRATS, and PACES, which have vast experience in conducting waste audits, analyzing the data, and creating tailored education and outreach programs.

Host a 'Zero Waste Game Day' each year

To support the introduction and promotion of upgraded waste receptacles at the Events' Center, it is recommended that a 'Zero Waste Game Day' program be adopted by Intercollegiate Athletics (ICA) each year, starting with basketball. The program will build on the success of the original Zero Waste Game Day for a Men's Soccer game hosted in 2012 in collaboration with Facilities Management, ICA, and UCSB Sustainability. The success of this effort was evidenced by increased awareness in waste management and sustainability efforts. Following the 2012 Zero Waste Game Day, ICA partnered with Facilities Management to update the waste infrastructure in the building to ensure landfill and recycling receptacles were paired, and also sought the introduction of two organic waste receptacles. Implementing this effort on an annual basis will help to bring waste management awareness on a continuous effort.

Zero Waste clean out program (PACES and/or LabRats)

The Zero Waste Clean Out Program aims to reduce any waste management issues that occur from the frequent influx of students, staff, and faculty who occupy and leave areas on campus and to promote diversion and donation of materials in good condition to other areas on campus. The creation of guidelines and procedures for departments preparing to do a move or a large clean out will ease the process. During office or lab clean outs, departments will follow guidelines to create 'Zero Waste Zones' set to help sort office clutter/waste into different categories. These guidelines will include an ordering process of boxes for several categories of office clutter, a guide to sorting waste, and how to divert items from the landfill. In addition, a PACES employee will be available to guide the person or department throughout the process whether through email or in person. This promotes diversion and donation of reusable but no longer needed goods in these areas.

Introduce reuse and repair spaces

These reuse and repair spaces will aid in reducing textiles, electronics, and other miscellaneous items on campus. Implementing small but effective stations on campus will serve as a free reusable item and quick repair hubs. In addition, quarterly workshops will be held to teach basic repair options to any interested student, staff, or faculty member. By increasing accessibility and exposure to repair services, this program will encourage all users to identify and implement easy ways to expand the lifespan of their items.

Reduce food packaging at campus eateries

In addition to introducing a reusable container program at UCSB dining eateries, we hope to eliminate any additional landfill waste generated at these areas. Certain snack options have multiple options of distribution; snacks such as pretzels can be available in package free or compostable methods and eliminate any excess wrappers or bags that go directly to the landfill. This program will decrease the amount of food packaging on campus by providing package free options such as expanding on bulk snack selections at campus stores.

Advertise the use and availability of mini-bins for landfill waste

The majority of waste generated in private offices is recyclable. To encourage and reinforce behavior modification around waste generation practices, it is recommended that the University provide office occupants with mini, clip-on landfill bins to pair with their 7gal desk-size recycling receptacles. Currently a pilot exploring the functionality of these mini-bins is being conducted in both Anthropology and Design, Facilities & Safety Services. So far, responses have been positive regarding the change, with participants also being pleased with increased floor space as they no longer have two 7gal waste receptacles in their offices. There is also an added behavior modification benefit of the mini-bins encouraging staff to take organic waste and food scraps to a centrally located bin, which in many cases is an organic waste receptacle. This behavior modification effort is important to reinforce as more organic waste receptacles will be present in public spaces in coming years.

Online community and additional outreach

To continue the momentum of Zero Waste education and awareness, UCSB will continue to support its current campus efforts such as hosting education workshops and events centered on source reduction and waste management. In addition, further efforts will be made to create additional outreach programs such as the creation of an online community/hub. This UCSB Zero Waste online group/hub would be focused on promoting the deliverables from the following projects: the creation of digital guides/checklists/videos educating students on waste diversion at UCSB and encouraging a zero waste lifestyle, the development and promotion of a smartphone app to provide information on proper waste management efforts, and the finalization of waste management/disposal procedures and protocols for student organizations and events.

FINANCING OPPORTUNITIES

Program Efficiency Opportunities

The fact that tipping fees vary based on materials and waste stream provides potential funding sources in the form of cost savings as a result diverting more material from the landfill via means of organic waste recycling and commingled recycling, as well as practicing source reduction and reuse. With tipping fee costs at $150/ton, and the University paying $56/ton for the organic waste stream, and receiving a credit of $25/ton of commingled recyclables generated, there is significant cost avoidance by sending less material

to the landfill. Being able to reinvest this cost avoidance back into UCSB's waste management programs would allow further expansion and development of waste reduction, reuse, and diversion efforts, which in turn would continue to yield cost avoidance scenarios.

A second funding source opportunity lies within leaning the dumpster infrastructure so that the waste hauler's dumpster service schedule matches the waste generation and subsequent hauling needs of the University. Servicing dumpsters when they are less than ¾ full is arguably unnecessary; however the ability for the dumpster to be able to make it to the next service day without overflowing is dependent upon use intensity, as well as the time between service days. Utilizing the on-board scales of the MarBorg front-end loader trucks that service the campus, it was determined that 14 dumpsters were being serviced by the waste hauler more frequently than what was needed. In this efficiency improvement scenario, service schedules were reduced by a single day, moving from service 3x or 5x per week to 2x or 4x per week, respectively. The tables below detail both the original and new dumpster schedules, and the subsequent cost savings.

Original Service Schedule

Location	Avg. Weight (lbs.)	Service Days	# Service Days	Lbs/Service Days	Bin size (yd^3)
Embarc H	985.62	M-W-F--	3	82.13	4
Kerr	1036.46	M-W--S-	3	86.37	4
Coun/Ca Lbs	1260.08	M-W-F-	3	105.01	4
EH&S	1365.69	M-W-F	3	113.81	4
Noble Hall	1457.31	M-W-F--	3	121.44	4
Bren	1467.54	M-W-F-	3	122.29	4
Rec	1535.69	M-W-F--	3	127.97	3
GGSE	1690.54	M-W-F--	3	140.88	4
Psych Lbs	1759.92	M-W-F--	3	146.66	4
HSSB Lbs	1786.23	M--H-S-	3	148.85	4
Pollock	1852.08	M-W-F--	3	154.34	4
Marine Bio	2096.62	M-W-F--	3	174.72	4
Arts	2096.92	-T-H-S-	3	174.74	4
Cheadle Lbs	4180.46	MTWHF--	5	209.02	4

New Service Schedule

Location	Avg Weight (lbs.)	Service Days	# Service Days	Lbs/Service Days	Money saved (monthly)
Embarc H	985.62	-T–H–	2	123.20	$ 69.44
Kerr	1036.46	-T–H–	2	129.56	$ 69.44
Coun/Ca Lbs	1260.08	-T–H–	2	157.51	$ 69.44
EH&S	1365.69	-T–H–	2	170.71	$ 69.44
Noble Hall	1457.31	-T–H–	2	182.16	$ 69.44
Bren	1467.54	-T–H–	2	183.44	$ 69.44
Rec	1535.69	-T–H–	2	191.96	$ 52.08
GGSE	1690.54	-T–H–	2	211.32	$ 69.44
Psych Lbs	1759.92	-T–H–	2	219.99	$ 69.44
HSSB Lbs	1786.23	-T–H–	2	223.28	$ 69.44
Pollock	1852.08	M-W-F--	2	231.51	$ 69.44
Marine Bio	2096.62	M-W-F--	2	262.08	$ 69.44
Arts	2096.92	-T-H-S-	2	262.12	$ 69.44
Cheadle Lbs	4180.46	MTWHF--	4	261.28	$ 69.44

It is important to note, that careful consideration went into this analysis with our custodial staff and building occupants to ensure that we are not allowing the dumpsters to overflow due to a reduction in service. In total, this effort yielded a monthly savings of $954 and $11,457 annually. Currently the cost avoidance is being utilized to drive down the waste hauling expenditures; however, in future scenarios, these savings could be utilized to expand waste management programs.

Another modification to the hauling schedule is to begin to look at changing the route schedule from static to dynamic, so that it fits the needs and service requirements of the campus seasonally, specifically reducing service days during the summer, winter break, spring break, and other areas where much of the campus population is not on campus generating waste. This concept needs further exploring; however, it does provide another cost avoidance opportunity when it comes to UCSB's waste infrastructure and service from the waste hauler.

Agency & Organization Funding Sources

There are a number of funding opportunities available to allow us to pursue the projects outlined in the goals. Outlined below are a few institutions that have historically provided funding for waste conservation projects and a select number of particular grants for which the University may apply. In addition diversion and reduction programs, as well as modifying the waste infrastructure can also serve as a funding source to reinvest in programs.

- The University's TGIF grant system has awarded a number of grants to waste management projects on-campus. Departments on-campus should continue to look at TGIF for funding waste projects in the future. TGIF will be particularly useful for short-term, low-cost projects like piloting diversion programs of hard-to-handle materials or with support for education and outreach efforts.

- The Coastal Fund is another source of University funding available for on-campus projects. The mission of the Coastal Fund is to award funding to those projects that help conserve the UCSB coastline. In keeping, this fund will be particularly useful for projects targeting single-use plastics and other materials that pose a pollution threat to the coastline and marine life.

- Cal Recycle offers grant, payment, and loan programs authorized by legislation to assist public and private entities in the safe and effective management of the waste stream. Funding opportunities range from programs targeting tire-derived aggregate grants to beverage container redemption programs. Application cycles for various programs open throughout the year and more information can be found at calrecycle.ca.gov/funding

- Keep American Beautiful partners with Coca-Cola to offer grant funding for their Public Spaces Recycling Bin Grant Program on an annual basis. Organizations and agencies looking to improve the waste infrastructure in public spaces can learn more about this program at kab.org/grants/coca-cola

- The Environmental Protection Agency (EPA) often publishes grants through the Office of Grants and Debarment. Funding opportunities can range from water projects to air quality projects and even waste and recycling projects that are cutting edge or helping to solve complex waste management issues. The EPA would be a good funding source for projects that are helping to address multiple environmental disciplines such as greenhouse gas emissions associated with waste management efforts. More information about the EPA's grants can be found here https://www.epa.gov/grants/specific-epa-grant-programs

- Waste reduction and management grant funding can also be provided by companies and businesses, such as those that produce receptacles or manage material. The University should periodically check in with waste management companies such as haulers and bin manufacturers for funding opportunities. Here is an example of a recycling grant with waste receptacle manufacturer Clean River. https://cleanriver.com/blog/grants/

- Both grants.gov and the Catalogue of Federal Domestic Assistance are useful databases to explore potential funding opportunities. Grants.gov allows easy searching of over 1,000 federal grants. In addition, grants.gov is typically where federal grants mandate application submission. The Catalogue of Federal Domestic Assistance provides detailed program

descriptions for thousands of funding programs available to the public. While not specifically waste-related, this Catalogue can be used as a resource for investigating new funding opportunities for the University. The Catalogue can be found at www.cdfa.gov.

APPENDICES

APPENDIX I | California Waste Legislation

AB 1826: Approved in September 2014, AB 1826 requires businesses that generate 8 cubic yards or more of organic waste to arrange for composting services. The bill would also require businesses that generate 4 cubic yards or more of commercial solid waste per week, on and after January 1, 2019, to arrange for organic waste recycling services and would potentially decrease that amount to 2 cubic yards, on or after January 1, 2020.

AB 901: Approved in October 2015, AB 901 implements changes of how recycling is reported. The bill requires recycling and composting operations and facilities to submit information directly to the department, rather than counties, requires disposal facility operators to submit tonnage information to the department, and to counties only on request, and requires the deletion of the requirement for counties to submit that information to cities, regional agencies, and the department.

SB 1383: Approved in September 2016, SB 1383 requires the state board to approve and begin implementing comprehensive strategy to achieve a reduction in methane by 40%, hydrofluorocarbon gases by 40%, and anthropogenic black carbon by 50% below 2013 levels by 2030. The bill would also establish targets for reducing organic waste in landfills.

AB 1884: Approved in September 2018, AB 1884 prohibits a full-service restaurant, defined in the bill, from providing single-use plastic straws to consumers unless requested by the consumer. If violated, the restaurant would receive two notices and any subsequent violation would be punishable by a fine of $25 for each day the restaurant is in violation, but not to exceed an annual total of $300.

SB 1335: Approved in September 2018, SB 1335 enact the Sustainable Packaging for the State of California Act of 2018 which prohibits food service facilities from dispensing prepared food using food service packaging unless it is reusable, recyclable, or compostable. California's Department of Resources Recycling and Recovery (CalRecycle) must clarify terms, specify criteria, and outline a process for determining the allowed types of food service packaging by January 1, 2021.

AB619: Approved in July 2019, California AB 619 allows for customers to bring their own containers to food facilities rather than using single-use disposables. The bill also clarifies existing health codes, ensuring that customers can, in fact, bring their own containers for take-out.

AB827: Approved in October 2019, AB 827 requires businesses that either generates 4 cubic yards or more of commercial solid waste or 8 cubic yards or more of organic waste per week to provide accessible easily visible recycling receptacles clearly marked with educational signage next to all trash bins, except in restrooms.

APPENDIX II | Historical & Current Waste Management Practices

This appendix contains both historical and current waste management programs and practices that could serve as inspiration to future initiatives.

Art Studio Recycling Program

The Art Studio Recycling Program aims to address recycling and waste management issues that frequently occur in the six various buildings of the Art Department. As an entirety, the waste stream of the Art Department is variable in regards to the type and amount of material being disposed of. Each of the six buildings experiences individual waste management difficulties. To assist the department and its building occupants in properly disposing of waste, Facilities Management, MarBorg, LabRATS, PACES, and A.S. Recycling are collaborating with one another, as well as with the faculty, staff, and students from the Art Department, to implement the Art Studio Recycling Program.

Bicycle Abatement Program

The Campus Service Officers (CSOs) are employed by the UC Police Department to assist the Department in upholding UCSB's rules and regulations. The CSOs are responsible for the UCSB Bicycle Abatement Program. The bike abatement program identifies bikes for removal that have been abandoned on-campus. Once a bike has been identified as abandoned, it will be impounded and held for 90 days before it is auctioned off to students at quarterly bike auction events or listed on PropertyRoom.com for auctioning. This program is conducted in accordance with University policies as well as California laws.

Books for Africa – UCSB

UCSB's Engineers Without Borders (EWB) partners with the non-profit organization Books for Africa to collect books from the UCSB Community to alleviate the book famine in Africa. Books for Africa, a Minnesota-based 501© organization, is the largest supplier of books to the African continent. Once the books reach the continent, they are distributed to schools and libraries. EWB holds book drive events and will do special pick-ups of unwanted books for donation. An estimated weight of books donated through this program is included in this Waste Diversion Plan.

Bren Hall Costume Swap

The Bren Hall Costume Swap takes place every year shortly after Halloween. Members of the Bren School Sustainability Committee (BSSC) organize the costume swap and encourage members of the Bren Community to participate in exchanging Halloween costumes. Halloween costumes that are not claimed by the Bren Community are donated to local organizations. This event does not contribute data to the Waste Diversion Plan, but it is an important practice, nonetheless.

Compost Pilot Project

The Compost Pilot Project (CPP) was a TGIF funded program that ran as a collaboration between the Sustainability Change Agent Waste Team, A.S. Recycling's compost staff, PACES, the A.S. Environmental Affairs Board, and The Coastal Fund.

The CPP initiated the addition of composting receptacles to six existing recycling clusters on-campus that were taken to the compacting compost roll-off at HDAE's Portola Dining Commons. The purpose of this pilot project was to establish the logistics of collecting compost in public spaces at UCSB, as well as to determine the behavior of the UCSB Community in relation to composting. The 2012 Winter Quarter saw the University collect over 1,000 lbs. of compost in six locations with a minimal contamination rate, and, therefore, the pilot project was determined to be a success. The CPP also encouraged the UCen to incorporate compostable food serviceware in their dining facilities, which was implemented in the 2012-2013 academic year. The CPP received a second TGIF grant to fund the purchase of four Big Belly Solar Compacting Compost Waste Bins, due largely to the pilot's success. UCSB was the first to use the BigBelly compacting units for compostables.

Due to the success of the CPP, there are compost receptacles (mostly BigBellys) near all on-campus eateries and in many office building kitchens. The compost is now collected by A.S. Recycling student staff and the Zero Waste Committee was born from this program. The CPP has had a lasting impact at UCSB. Dining Commons Waste Management Program

The Dining Commons Waste Management Program consists of standard waste management practices such as glass, paper, and can recycling, but it also includes two notable programs: pre- and post- consumer food waste composting and food oil waste recycling. All food waste is collected from HDAE's four dining facilities and is placed in compost-specific compacting roll-offs at each commons. The roll-offs are picked-up weekly by MarBorg and average ~75 tons a month collectively. The food waste is then transported from the MarBorg facility to Engle & Grey's composting facility in Santa Maria, California. Individuals using dining facilities are reminded about the practice through signage and announcements. Food oil from dining practices is recycled using a third-party, BIODICO, and they are responsible for the pick-up and recycling of food oil. HDAE is in the early stages of planning a pilot program to begin using the biodiesel fuel from their food oil waste in departmental grounds equipment.

Edible Campus Program

DPW leads the daily operations of the ECP Student Farm. After 6 years of process, the Student Farm had its groundbreaking during the Fall 2018 quarter. This space provides the opportunity for DPW to complete the closed-loop food system of using their finished compost to grow food for students who may be experiencing food insecurity. All food grown at the Student Farm along with the Urban Orchard and vertical gardens is donated to the on-campus food pantries including the A.S. Food Bank. ECP is run in partnership with UCSB Sustainability who manages grants and educational programming.

Bren Hall Vermicomposting

The kitchen on the third-floor of Bren Hall at UCSB serves as the lunchroom for the building's Bren School of Environmental Science & Management students. All faculty, staff, and students are encouraged to use the vermicompost bin to dispose of appropriate food waste. A select group of students that operate year-round are in charge of maintaining the practice and educating the Bren Community. These are referred to as the "Worm Wranglers." The compost and worm tea generated from the practice is distributed to Bren School faculty, staff, and students in need of giving their gardens an organic boost. Facilities Management has recently worked with the Worm Wranglers to purchase a small scale so the program can record the weights of the food waste before it is placed in the bins.

Eyeglass Recycling Program

The UCSB Human Resources Department participated in VSP Global's Eyes for Hope eyeglass reuse and recycling program. The program refurbishes, cleans, and labels old eyeglasses to be donated to those in need. At UCSB, eyeglasses were accepted at the Benefit Office and Open Enrollment events.

Family Student Housing Compost Program

DPW manages the Family Housing Compost Program which began in 2011 as a means of reducing trash sent to landfills from West Campus Apartments and Storke Family Student Housing and providing nutrient-rich compost for the Family Gardens. The fundamental goal of the program is to compost vegetable food waste and landscape waste for use in the Family Gardens instead of requiring transport to an external sorting facility for disposal. A central compost bin is placed at each location, where food waste is deposited without compostable bags. Grass clippings, and leaves from the maintenance crew are combined with the food waste to create compost. The compost is managed on-site by DPW, without transport, and the compost is then distributed in the Family Gardens to grow crops for residents.

FoodCycling

FoodCycling at UCSB focuses on using food recovery to address food insecurity and reduce food waste in our campus community. The purpose of the club is to tackle food security by recovering perishable foods and transferring the food to hungry people. The club provides community service opportunities to the UCSB student body to participate in food recovery operations such as gleaning.

Hazardous Waste Program

EH&S's Hazardous Waste Program assures compliance with Federal, State, and local hazardous waste regulations through education, campus cooperation, and implementation of practical and efficient policies while providing a cost-effective hazardous waste management program that protects the environment. Materials managed by the program include chemicals, biohazards, radioactive materials, and electronic waste such as batteries and lamp bulbs. In order to best serve the UCSB Community, the Program includes the following:

- Free pick-up and transportation of waste materials from research laboratories to EH&S facilities
- A Specialized facility designed for proper handling and sorting of hazardous materials
- On-going measurement and verification of hazardous waste
- Campus training and education
- The Adopt-a-Chemical Program

The Hazardous Waste Program educates hazardous waste material users mainly through signage and workshops. EH&S has readily available labels and signs for their Hazardous Waste Containers, as well as Hazardous Waste Storage Areas. Training workshops offered by EH&S include their Hazardous Waste Refresher Courses. These courses stress the previously mentioned recommendations for hazardous waste generators (source reduction, effective purchasing, etc.). The future of the program and the chemical disposal options are dictated by Federal, State, and local regulations and by the chemistry involved in disposal. Data from this program is not included in this report.

Mercury Thermometer Exchange Program

The Mercury Thermometer Exchange Program aims at reducing the use of mercury on-campus, specifically by removing unneeded mercury devices. The program removes items such as barometers and McLeod gauges but mainly focuses on exchanging mercury thermometers for new spirit thermometers.

Move-In & Move-Out

HDAE has encouraged proper recycling practices during residence hall move-in and move- out days by providing students with extra recycling dumpsters and roll-offs to encourage students to recycle properly. Students are encouraged to dispose of unwanted items through Project GIVE (see program details below). Students are educated about proper waste management practices during these events through signage and announcements during residence hall orientation events.

Pop-Up Thrift Shops

To reduce textile waste, a few student group initiatives have been in place. The A.S. Environmental Affairs Board (EAB) hosts a quarterly Pop-Up Thrift Store that promotes a less wasteful lifestyle and educates students about the difference they can make by purchasing used items.

Project GIVE

Project GIVE targets the reuse of furniture and items generated from the Move-Out practice. The program collects reusable items (books, clothing, bikes, appliances, flatware, un-opened foods, shoes, etc.) from students when they move out of the residence halls in June. The items are then transported to a designated site in Isla Vista where they are resold through Project GIVE. The revenue generated from the sale of items

is coordinated by the Student Affairs Department and is donated to various Isla Vista non-profit organizations.

"UCSB Grounds to Grounds"

UCSB Grounds to Grounds is a soil amendment program that formalizes the existing practice of applying the University Center Dining Service's post-consumer coffee grounds as a low-cost organic soil amendment at the University. Coffee grounds are taken directly from UCen dining facilities and applied directly to the UCSB landscape in strategic locations. Prior to the program, this process was done using biodegradable bags to transport coffee grounds from dining facilities to planter beds. With the program now in place, 3.5 gallon buckets are used in place of biodegradable bags. The switch to using buckets has eliminated the purchase of biodegradable bags, allowed the University to track the weight of the composted coffee grounds, and also prevented injuries to the grounds staff required to carry the bags.

UCSB Reads – Moby Duck

UCSB Reads is a common reading experience that engages the campus and the broader Santa Barbara community in conversations about a key topic while reading the same book. The 2012 theme for the program was "Making an Impact. What's Yours?" and the book chosen for the program was Moby-Duck: The True Story of 28,000 Bath Toys Lost at Sea and the Beachcombers, Oceanographers, Environmentalists, and Fools, Including the Author, Who Went in Search of Them by Donovan Hohn. Among other topics, the book's scope included heavy coverage of ocean pollution from plastics, which was a topic of discussion in many of the 2012 program's events.

Workshops, presentations, and events that were made available to UCSB and the greater Santa Barbara community included: book discussions, several movie screenings (Plastic Planet, Dirty Energy, and Bag it), numerous lectures and panel discussions regarding plastic pollution in the ocean and the Pacific Ocean garbage patch from UCSB faculty members and individuals from local organizations, Moby-Duck book give-a-ways (2,500 books), reusable bag give-a-ways, beach clean-up days, on-air readings of the book by UCSB's radio station KCSB, and even an in-person appearance and presentation by the author.

Sole4Souls

UCSB's Bren Hall participated in Deckers Outdoor Corporation's Sole4Souls footwear recycling program. Sole4Souls is an international shoe charity dedicated to providing used shoes to people in need. Bren Hall was a drop-off location for shoes for all of campus, and staff at Bren Hall worked with Deckers to organize the program. Weights from this program were not included in the Waste Diversion Plan.

Subgrade Greenwaste Dumpsters

Facilities Management has recently worked with MarBorg to install subgrade greenwaste dumpsters to facilitate the disposal of greenwaste by landscaping staff. This has eliminated the need for landscaping staff to lift greenwaste in order to dispose of it. The University currently has 20 subgrade greenwaste dumpsters, and is currently working with MarBorg to install additional subgrade greenwaste dumpsters.

Surplus Chemical Program

The Surplus Chemical Program is currently a joint operation between EH&S and LabRATS that aims at reducing chemical waste streams and expenditures on chemicals and hazardous waste management. To minimize waste in laboratories, the program promotes and facilitates the reuse of surplus chemicals within the UCSB Community. Unwanted, reusable chemicals are collected by EH&S where they are screened and logged into a database. The surplus chemicals appear on UCSB's procurement portal.

Tortilla Composting

Men's Soccer is incredibly popular at UCSB. We hold the USA record for attendance at any type of college soccer match (over 16,000). One of the game traditions is the tossing of tortillas onto the field whenever a home goal is scored (and occasionally when a refereeing decision is not popular). Composting the tortillas thrown at the UCSB Men's Soccer games is a practice that was started in 2011 by a UCSB employee. To divert the tortillas from the landfill, the Athletics Department's staff work diligently, along with the staff member, to collect the tortillas and place them in rolling bins. These are then collected by A.S. Recycling and placed in the industrial compost dumpsters on campus. It is estimated that large games can produce over 150 lbs. of tortillas, all of which are now being composted.