Optimizing waste services through data collection & analyses

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Roadmap

- UCSB at a glance
- Indoor Waste Infrastructure
  - Background: Building on failure
  - Real Stakeholder Engagement
  - Designing the pilot
  - Implementation
  - Results
- Rightsizing Waste Hauling Schedules
  - Making your hauling schedule work

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Interior Waste Services & Infrastructure

Custodial Service at UCSB

- 110 custodial staff members tasked with cleaning indoor spaces (offices, labs, restrooms, etc.)
- Clean over 3M ft2 (1,300 average-sized houses)
  - Each custodian cleans ~13 houses/ shift
- 80% of the staff work between 2am – 10:30am
- Waste Services (Trash and Recycling)
  - Daily: Common areas (hallways, kitchens, restrooms, etc.)
  - 1x/ week: Private offices and workspaces
    - Trash: Serviced by custodians
    - Recycling: Serviced by office occupant at nearest common bin
  - 3x/ week: Labs

Background: Building on Failure

- Received a TGIF grant to purchase over $5,000 desk-side recycling bins
- Swap clip-on with new desk-side bin
- Switch in custodial service
  - Custodian: Recycling 1x/wk
  - Office Occupant services trash at nearest centralized bin

Background: Building on Failure (cont.)

- Custodial staff and office occupants notified of changes – D-list, note cards, trainings, meetings, etc.
- Results
  - Largely welcomed but with pushback from several vocal and notable professors, mobilizing their departments
- New Opportunity
  - Landlord v. Customer Service
  - Turning a negative into a positive

Stakeholder Engagement & New Standard

- Determine the real needs of the building occupants
- Spend time with the custodial staff
  - "We can service both waste streams"

The Pilot of the Pilot

- Pilot of the pilot – Walk one building to determine pilot methodology
- Work with staff to identify inefficiencies and weaknesses
- Findings/ Issues:
  - Outdated waste infrastructure
  - Excess waste receptacles
  - No logic to waste infrastructure or documentation
  - Unclear service schedules
  - Inadequate equipment

Pilot Project - Outline

Walk 10 buildings of various types with their respective custodial staff on their normal routes

- Building types: administrative, academic, laboratory, student center, athletics
- Start times: Fridays at 4am
  - Wednesdays at 4pm
- “The Team”: Assoc. Director of FM, Sr. Custodial Superintendent, Waste Manager, Waste Intern

Pilot Project – Equipment Upgrades

Blue liners for recycling receptacles

New custodial trains

Pilot Project – Equipment Upgrades

New standard for landfill and recycling receptacles

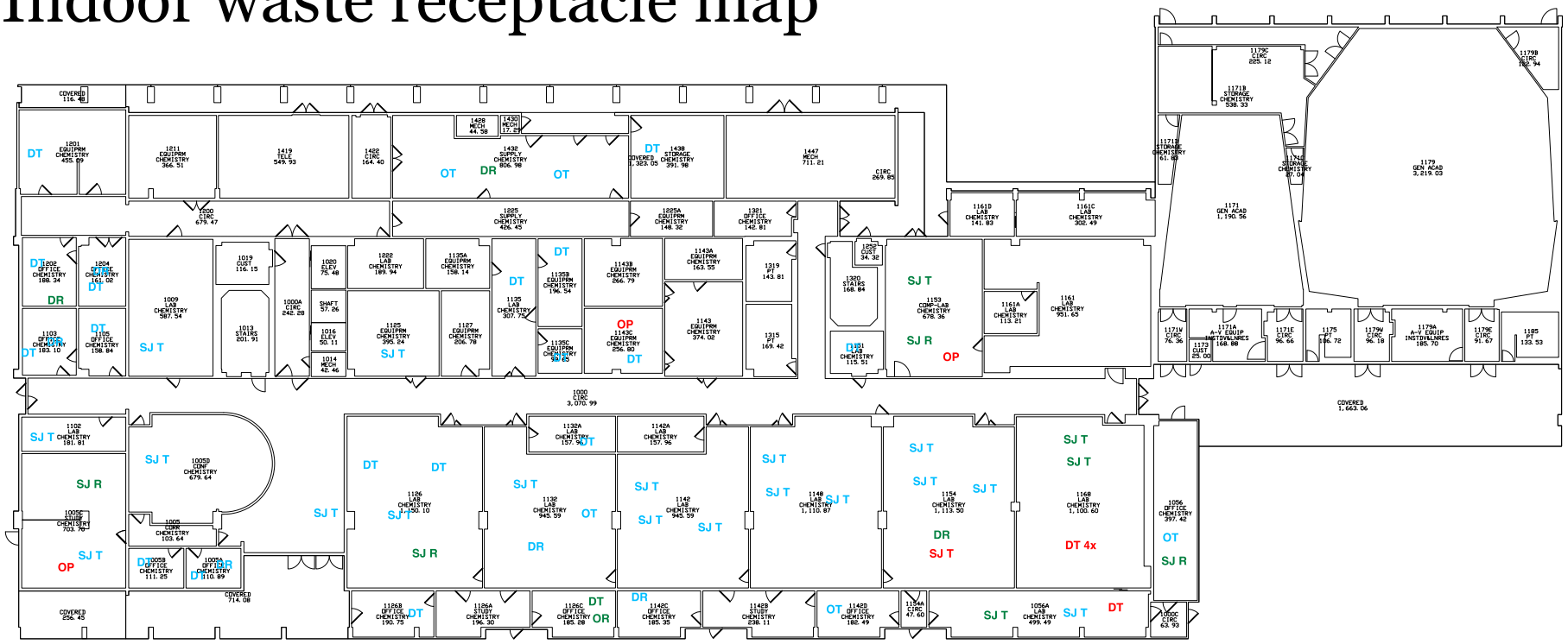
Signage for each bin on-campus

GA Classroom Waste Receptacles

- Removed waste receptacles (trash and recycling) from all General Assignment classrooms
  - Exception – Large lecture halls
- Ensured receptacles outside of classroom were adequate for volume
- Posted signs and sent email blasts

Mapping Changes

Indoor waste receptacle map



FIRST FLOOR PLAN EAST

CHEMISTRY BLDG.

BLDG.No.557

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Results - Quantitative

- 352 landfill receptacles were removed
  - 285 (10gal), 67 (+23gal)
- ~47,060 liners will be saved
  - 876 lbs.
- Reduction service time of waste receptacles = 393 hrs/ yr.
- Estimated reduction in contamination of 12%

Results - Quantitative

Results - Qualitative

- Improving employee welfare
  - Time spent with the custodial staff
  - Empowerment
- Less waste receptacles = more time to clean and beautify high traffic areas
- Potential to reduce work related injuries due to bending over

Next Steps

- Biannual audit of interior infrastructure by custodial supervisors
  - Inventory is provided to custodial staff and building managers

- Supervisors will now use IPad to track changes
  - Google Drive – Google Sheets vs. PDF Expert

Right-Sizing Waste Hauling Schedule (Dumpsters)

On-board Data Collection

- Contract haul with MarBorg Industries
- Loadman
  - Included in language in hauling contract
  - On-board scale system mounted on forks
  - Route is loaded into system and directs driver to next location
  - Provides real-time data as bins are collected
  - Data returns to Loadman system and can be exported

Data Management & Analyses

- Aggregated 1 year worth of waste hauling data
- Targeted dumpsters with 3+ services per week
- Focused on service reduction and seasonal variations
- Estimated to save ~$30k in hauling fees/ year

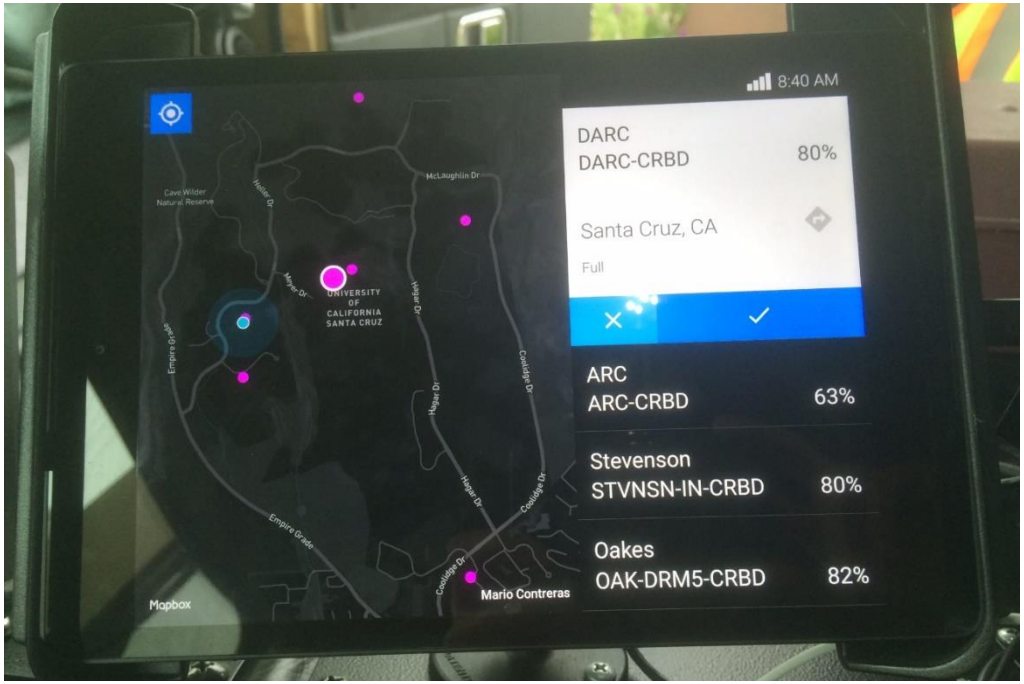
Location	Average	Service Days	# Service Days	Lbs/Service Days	Bin size (yd^3)
Embarc H	985.62	M-W-F--	3	82.13	4
Kerr	1036.46	M-W--S-	3	86.37	4
Coun/Ca Lbs	1260.08	M-W-F-	3	105.01	4
EH&S	1365.69	M-W-F	3	113.81	4
Noble Hall	1457.31	M-W-F--	3	121.44	4
Bren	1467.54	M-W-F-	3	122.29	4
Rec	1535.69	M-W-F--	3	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

Challenges

- Hauler owns Loadman hardware and software
- Currently only installed on two trucks
- Data is not provided in real-time
- Weight was the only quantitative measurable, surveyed staff for volume

Next Steps

- Continually monitor weights from Loadman software
- Establish seasonal hauling schedule
- Determine if UCSB can have access to data
- Investigate real-time technology for hauling, *Compology*



Questions