2025

Day 1

Concurrent AM

10:45 AM
Oct 22
Track B

How Data-Driven Tools Help NVIDIA Improve Waste Diversion

Moderator: Stacy Savage

NATIONAL ZERO WASTE CONFERENCE

Speakers:

Kevin Ng

Nik Balachandran

Sydney Rogers-Lemke

ZERO WASTE USA

sbm

2025

How Data-Driven Tools Help NVIDIA Improve Diversion

Together for a Greener Tomorrow

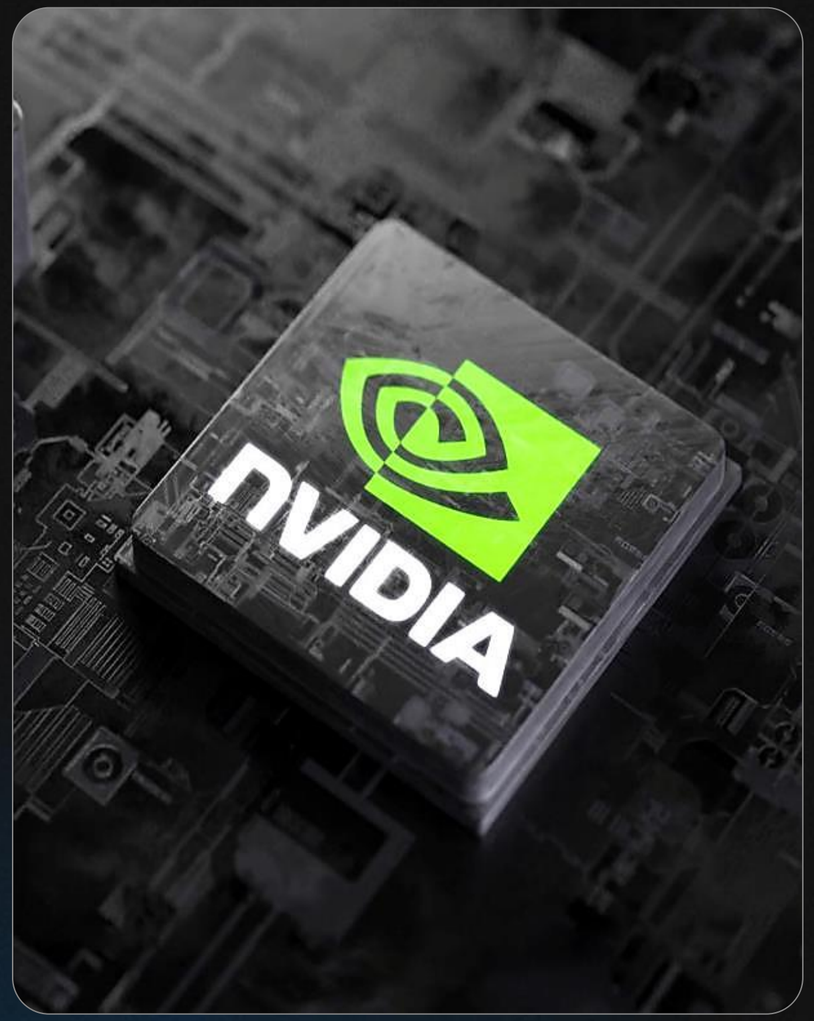
Challenge:

NVIDIA’s Fast Growth and Achieving Landfill Diversion Goals

Objective: Maintain compliance with city of Santa Clara waste regulations, avoid instances of contamination and promote environmental health and safety through proper source separation of waste.

Challenges:

- Fast growing campus bringing new employees, buildings, and projects contributing to waste stream contamination
- Existing waste tracking documents are dated – actual waste generation and contamination levels not being accurately reflected
- Looking to standardize global waste reporting but there is a lack of industry guidance



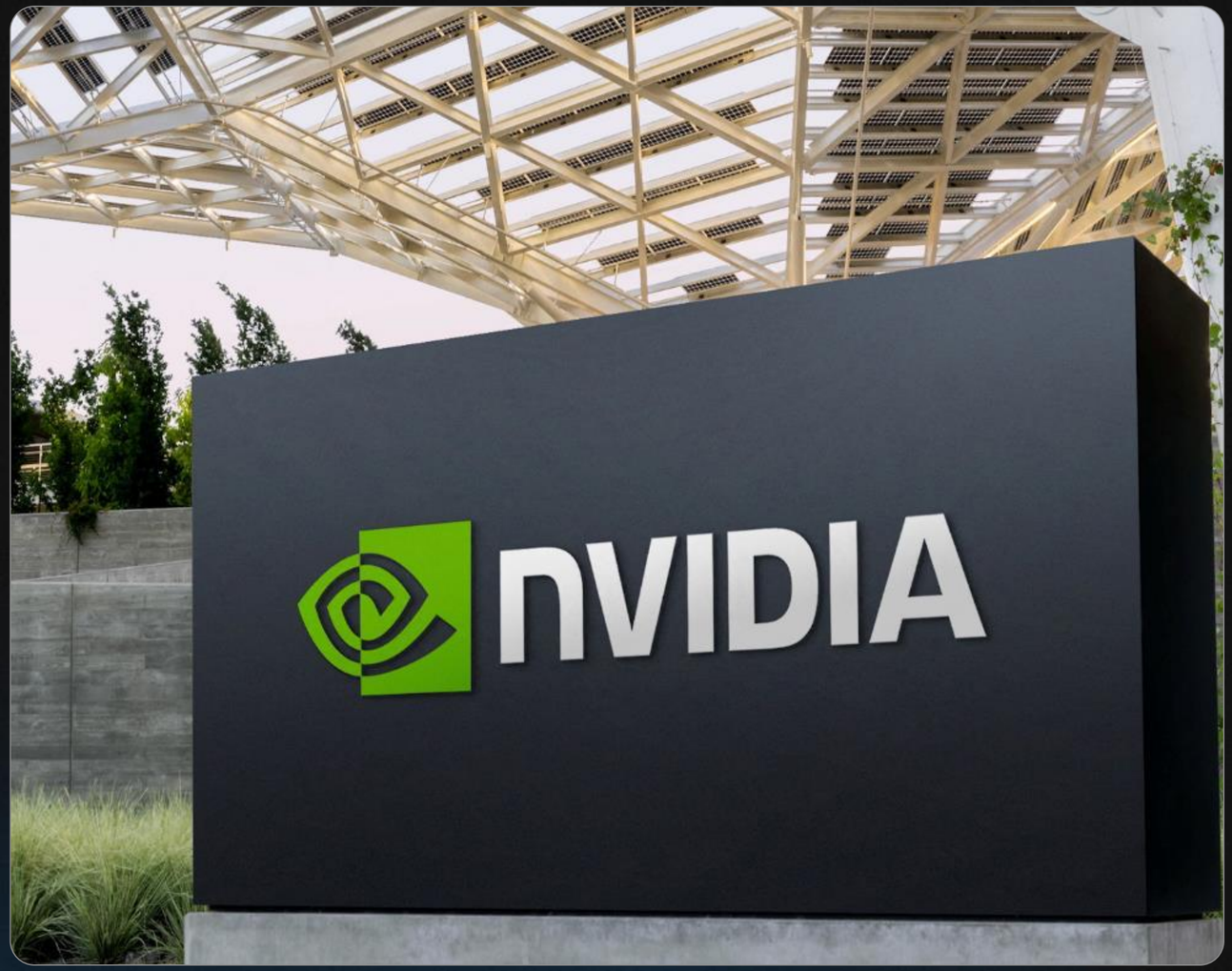
Solution:

Zabble AI Confirmation Tool

Solution: Implement tool to assess levels of contamination with minimal time and labor, document photos, and aggregate data in real-time.

Goal:

- Establish baseline contamination rate for the site
- Track waste generation and contamination coming from all relevant points of sustaining waste generation
- Use data to identify sources of contamination, opportunities for diversion, and education topics



ZABBLE

Thursday October 22nd | 10:45 AM

How Data-Driven Tools Helps NVIDIA Improve Waste Diversion

Nikhil Balachandran
CEO, Zabble Inc.

JURISDICTIONS/HAULERS

CITY OF OAKLAND

CVSan

Watsonville CALIFORNIA

The Recycling Partnership
SOLVING FOR CIRCULARITY

WASTE CONNECTIONS, INC.

PSSI
Peninsula Sanitary Service Inc.
Refuse Collection & Recycling Services

REPUBLIC SERVICES

CAMPUSES

PURDUE UNIVERSITY

ESF

USC

UCSF

GOLDEN STATE WARRIORS

Georgia State University

sbm

UCSF Health

CSUN CALIFORNIA STATE UNIVERSITY NORTHRIDGE

USC UNIVERSITY OF SOUTHERN CALIFORNIA

1 **Patent Awarded**

4 **EPA Awards Won**

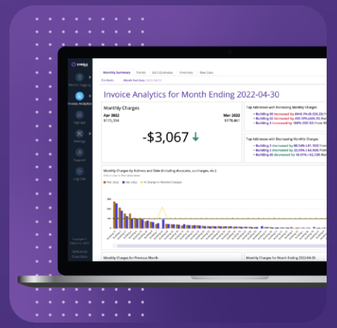
ZABBLE

ZABBLE ZERO™

A SaaS-based platform for zero waste management and workflow automation.

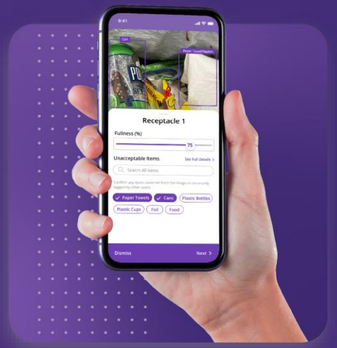
1 **Patent Awarded**

4 **EPA Awards Won**



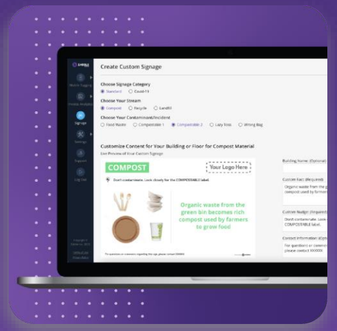
Invoice Analytics™

Document processing AI instantly digitizes hauler invoices and reports for cost saving recommendations.



Mobile Tagging™

Computer vision AI for bin fullness and object detection notifies stakeholders in real-time when problems arise.



Professional Services

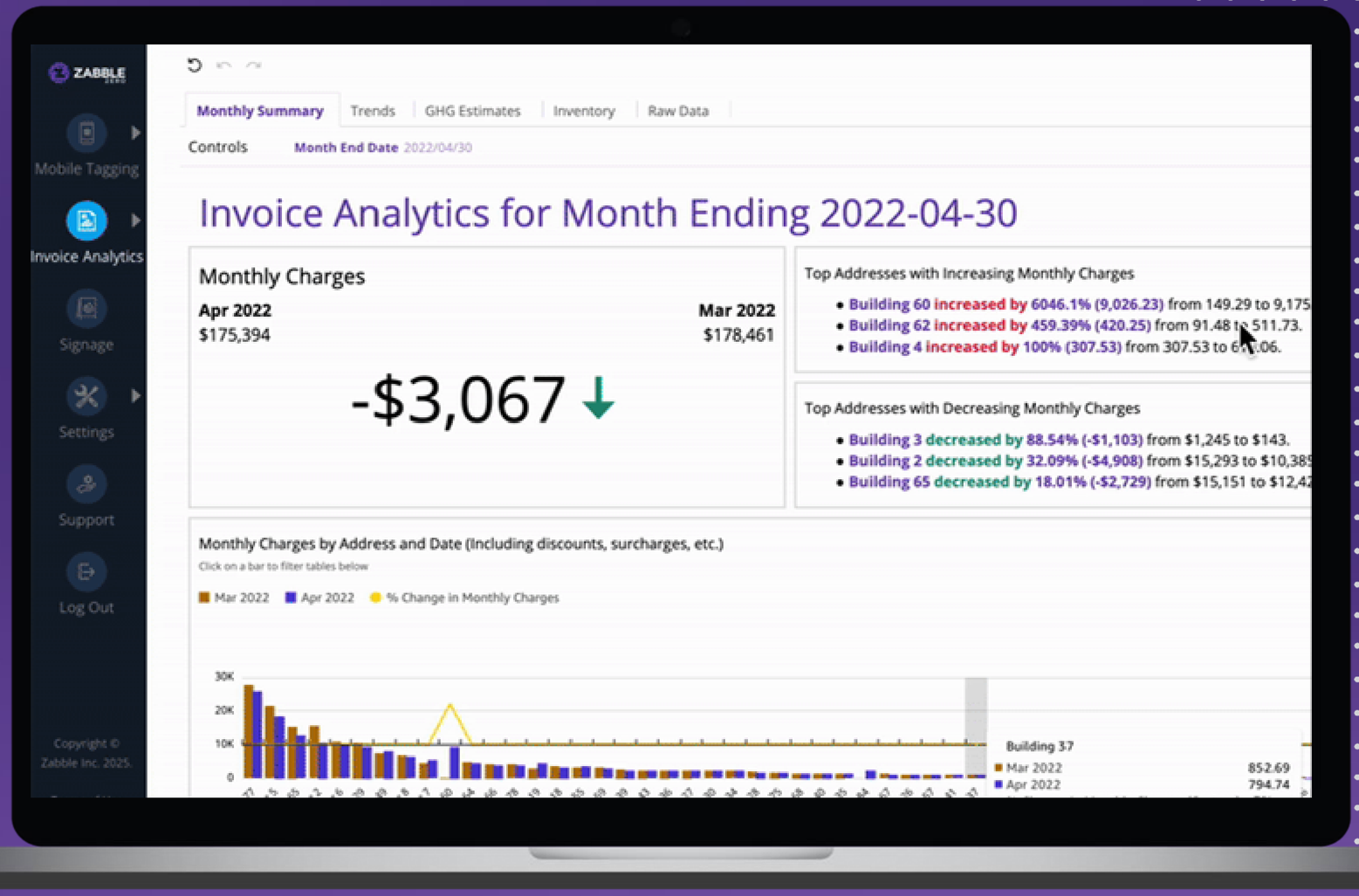
The Zabble professional services team will work with facilities, sustainability and janitorial teams to help plan, execute and track zero waste programs.

How it works

Invoice Analytics™

IN THE OFFICE

Transcribe Invoices/Reports with AI | **Access Insights & Anomalies** | **Share Data & Transform Your Program**



How it works

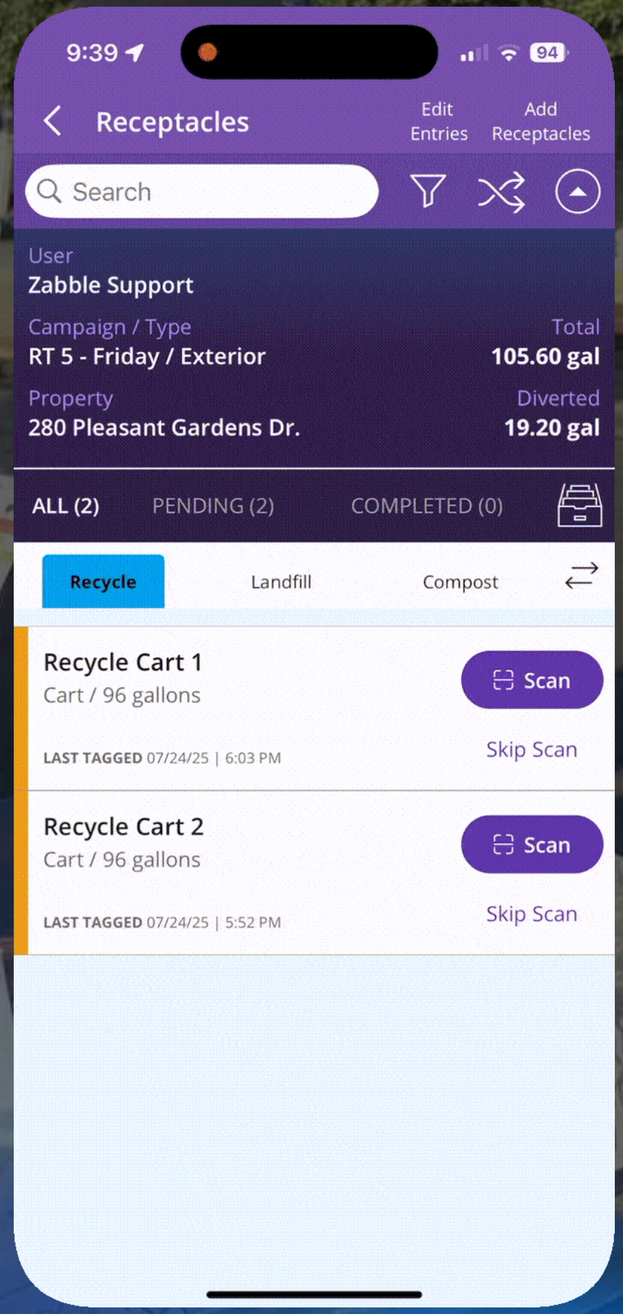
Mobile Tagging™

IN THE FIELD

Easily Import Your Property and Bin Data

Use Computer Vision AI to Tag Bin Contents

Automatically Notify the Team in Real Time

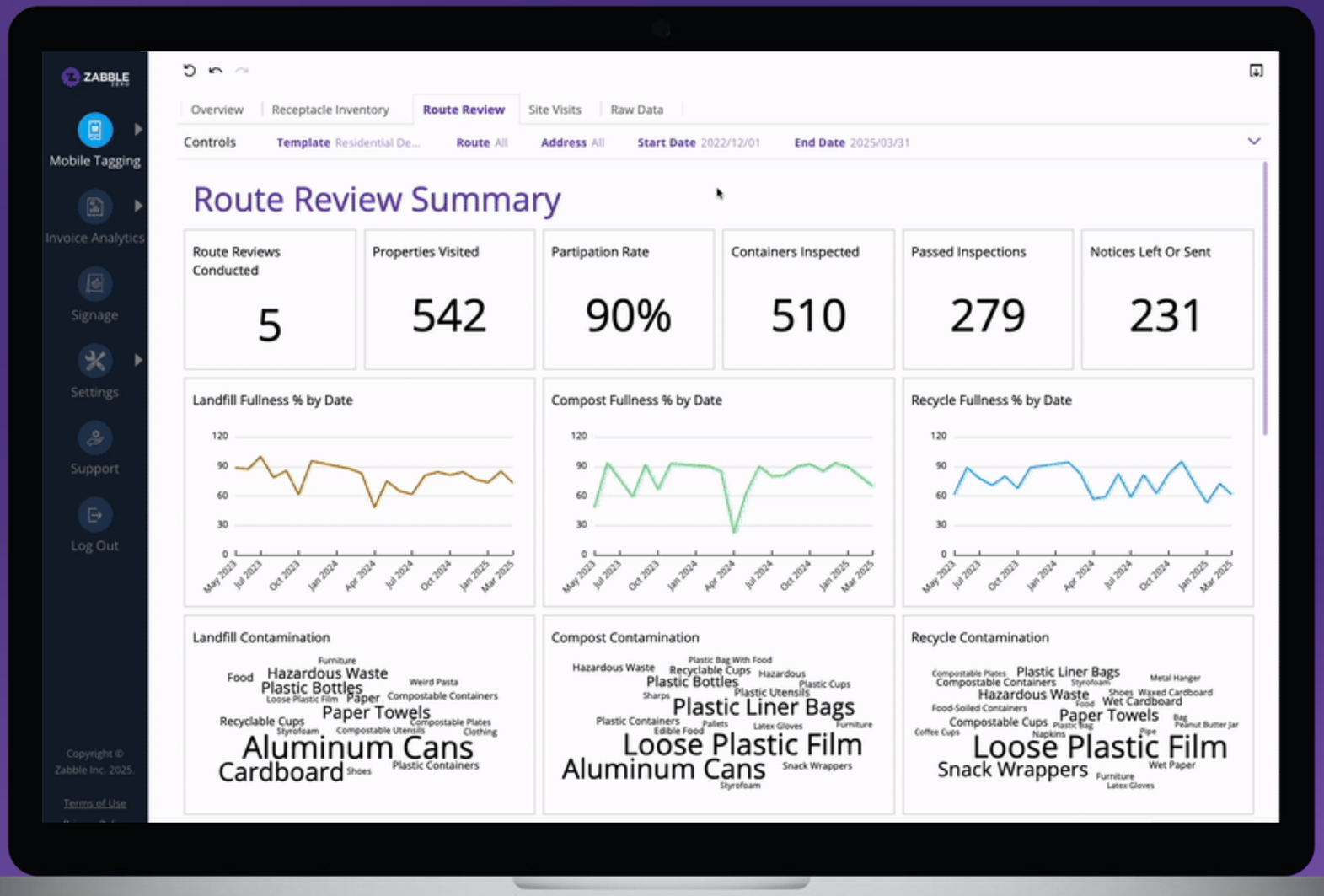


How it works

Mobile Tagging™

IN THE OFFICE

Aggregated Data | **Smart Visualization** | **Custom Alerts**



OVERVIEW

PURPOSE: To gain more transparency into **NVIDIA's waste operations** from disposal inside the building to collection at the loading dock.

10

EXTERIOR BUILDINGS

- Compliance with liner placement
- Illegal dumping
- E-waste/Hazardous waste Inspections

6

INTERIOR SPACES

- Employee day-day engagement
- Placement of food service ware

3

WASTE STREAMS

140

BINS

5,000+ Bin/Bag Inspections since Jan 2024

How it works

Mobile Tagging™

FOR CONTAINER AUDITS

(EXTERIOR)

turn **THIS...**

into **ACTIONABLE DATA**

- Mar 14, 2025 10:32 AM
- Inspector: John C.
- Building Acme
- 2214 Whyte Park
- 64g Recycling Cart
- Contaminants: Plastic Bags
- Fullness: 80%
- Contamination: 25%
- Notes

No post-inspection data entry required

How it works

Mobile Tagging™

FOR CONTAINER AUDITS

(INTERIOR)

turn **THIS...**

into **ACTIONABLE DATA**

- Mar 14, 2025 10:32 AM
- Inspector: John C.
- Building Acme
- 2214 Whyte Park
- Floor 1
- 23g Compost Slim Jim
- Contaminants: Aluminum Foil, Snack Wrappers
- Fullness: 40%
- Contamination: 15%
- Notes

No post-inspection data entry required

How it works

Mobile Tagging™

FOR WASTE CHARACTERIZATION

turn **THIS...**

into **ACTIONABLE DATA**

- Mar 14, 2025 10:45 AM
- Inspector: John C.
- Building Acme
- 2214 Whyte Park
- 33g Landfill Bag
- Contaminants: Loose Plastic Film, Snack Wrappers, Compostable Cup
- Fullness: 80%
- Contamination: 50%
- Notes

No post-inspection data entry required

HOW MANY BAGS OR BINS SHOULD WE INSPECT FOR AN ACCURATE PROFILE OF OUR WASTE STREAM?

SAMPLING STUDY

PURPOSE: To determine the minimum number of samples required to obtain an accurate estimate of contamination in a specific timeframe.

2	5	20-40	<1 min.
BUILDINGS	DAYS	BAGS PER DAY PER BUILDING	INSPECTION TIME PER BAG

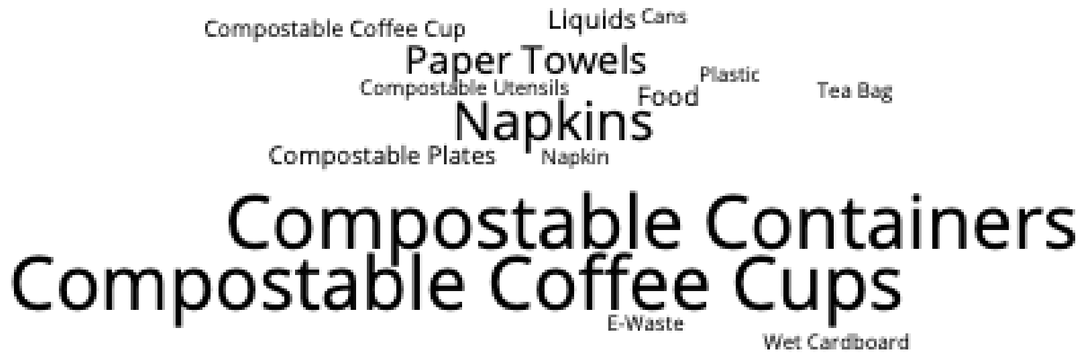
10-30% of the daily waste generated

GOAL 1: Optimizing Sampling to Estimate Average Contamination Percentage

GOAL 2: Optimizing Sampling to Estimate Frequency of Top Contamination Items

FREQUENCY OF CONTAMINANTS

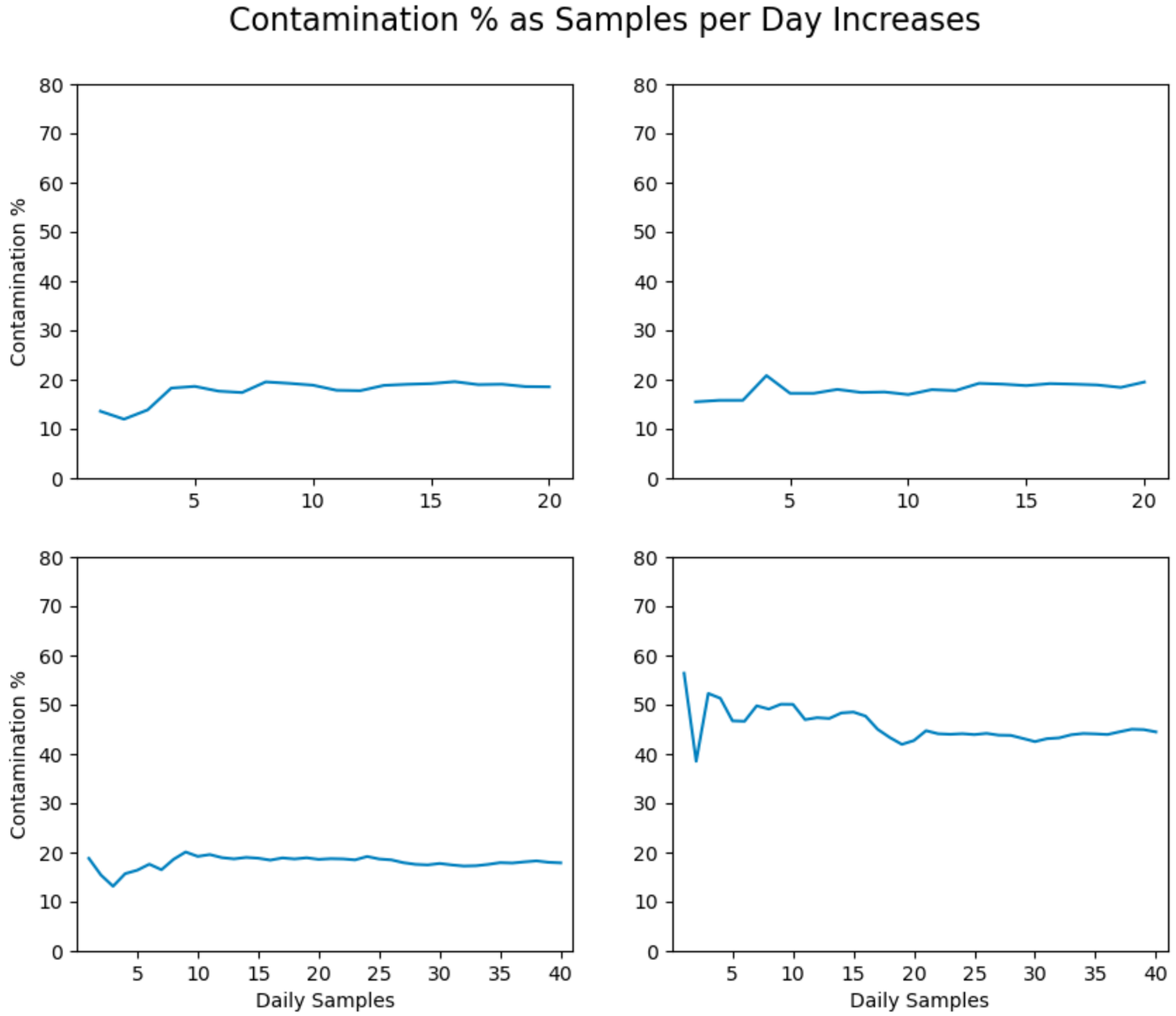
Recycle Contamination



Compost Contamination

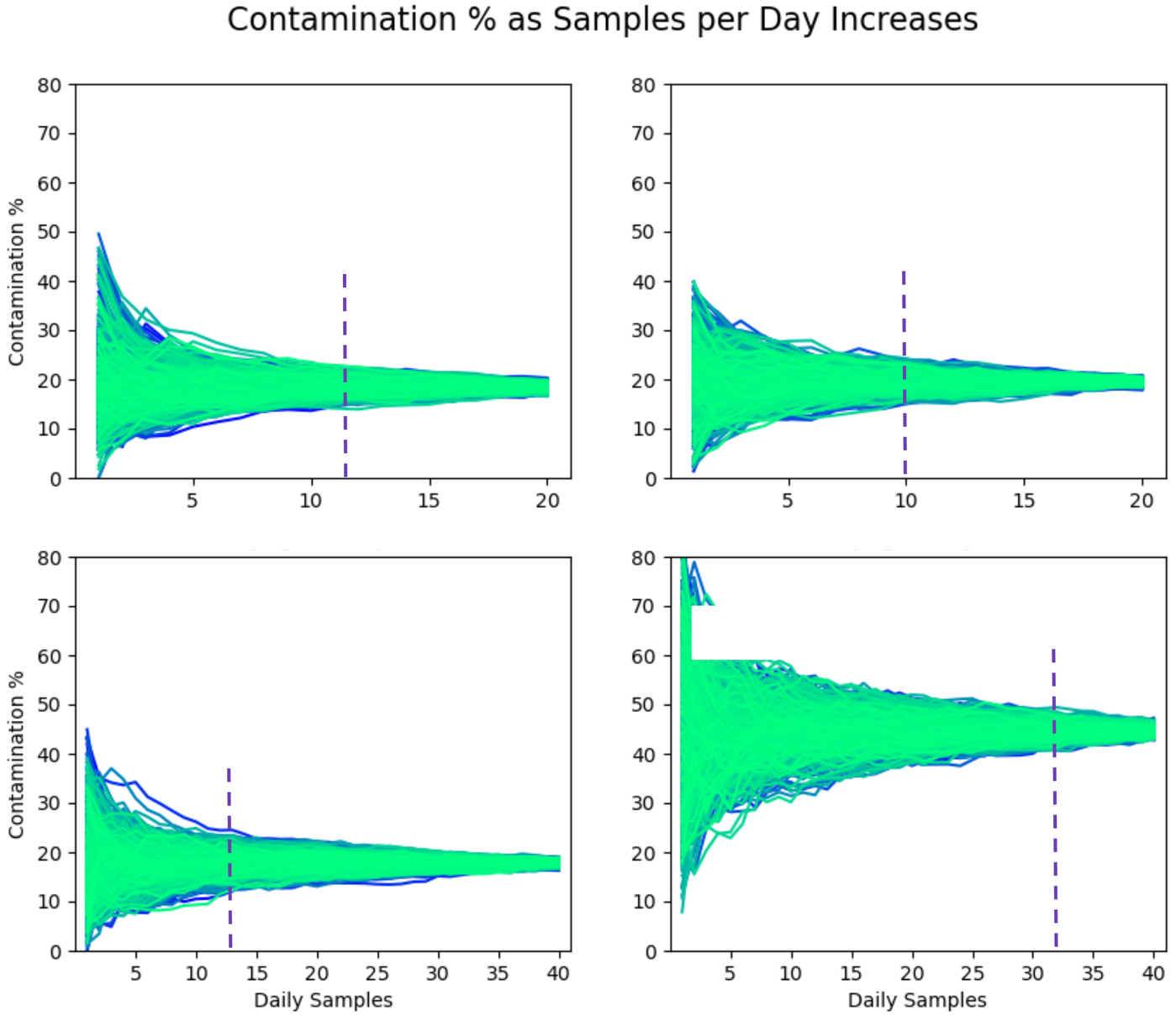
Contamination Stabilizes as the Number of Samples Per Day Increases

1 SIMULATION



Contamination Stabilizes as the Number of Samples Per Day Increases

1,000 SIMULATIONS



HOW MANY BAGS TO SAMPLE EVERY DAY?

- **~1 Minute Per Bag**
- **+/- 5 Margin of Error**

Building/Stream	Daily Samples Needed	Approximate % of Total Material	Total Samples Needed (5 DAYS)
Goal 1: Estimate Contamination Percentage			
Building 1 compost	**12**	17%	60
Building 1 recycle	**10**	14%	50
Building 2 compost	**13**	10%	65
Building 2 recycle	**32**	27%	160
Goal 2: Estimate Top Contamination Item Frequency			
Building 1 compost	**20**	29%	100
Building 1 recycle	**20+**	29%	100+
Building 2 compost	**34**	26%	170
Building 2 recycle	**37**	31%	185

MOBILE TAGGING Vs TRADITIONAL WASTE SORT

sbm

Data Overview: East Campus – ABCD

Contamination: Zabble vs Actual Weights

The contamination rates based on instances of contamination was compared to that of actual weights collected after sorting material. Each stream per building was within 10% difference threshold, except for Buildings B and C Recycle & Non-compost streams.

SBM Confidential

3

ZABBLE

Let’s talk!

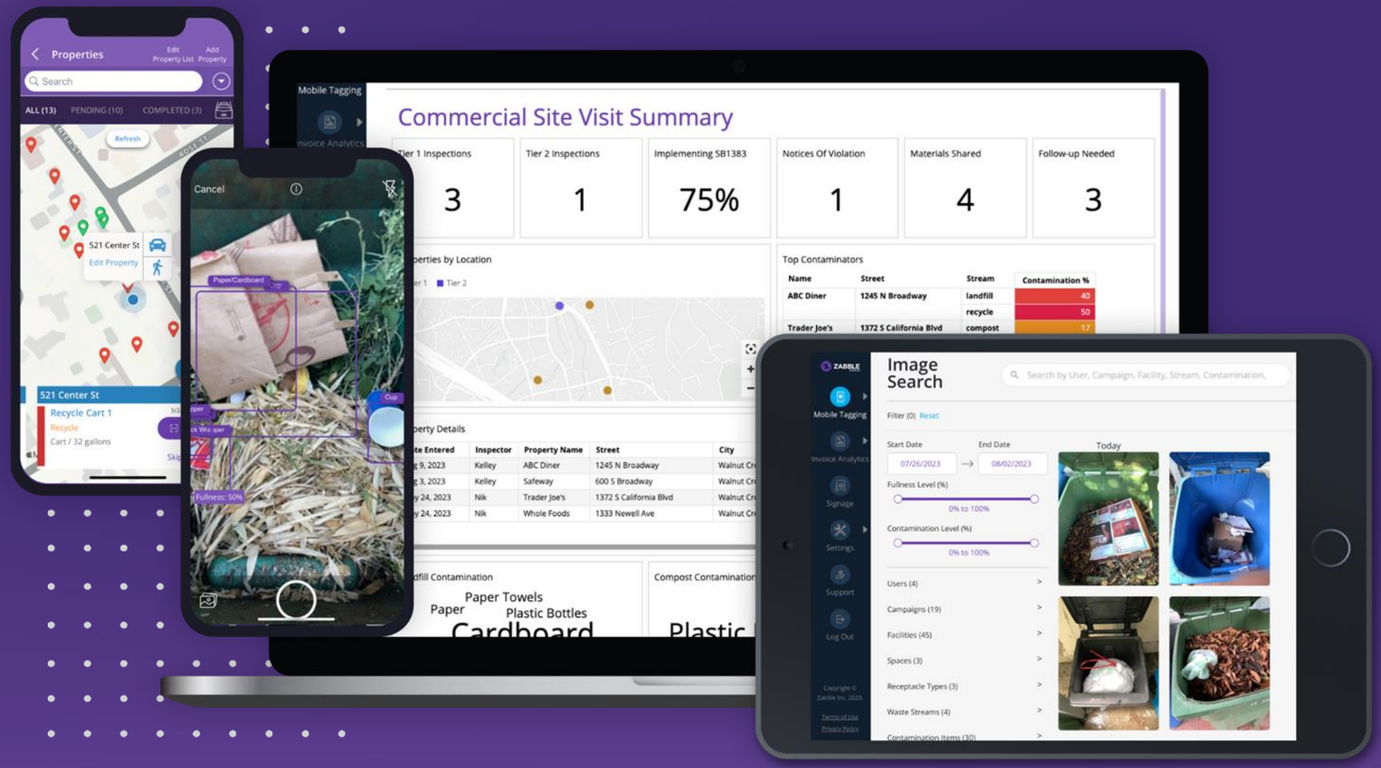
Nikhil Balachandran

CEO

(510) 366-1023

nik.balachandran@zabbleinc.com

www.zabbleinc.com



Implementation and Considerations

Determining how the tool will be used at NVIDIA to have the most meaningful data and drive best results.

Getting Started:

- Establish intent
- Determine scope of buildings, areas, and spaces

Customizing ZabbleZero:

- Determine ‘campaign’
- Establish parameters
- Customize visuals

Considerations:

- Waste equipment
- Placement and logistics
- Time and labor

Case Study:

Baseline Assessment

Challenge: No data on site contamination rate

Goal: Establish collection method using minimal time and labor.

Project:

- Priority buildings were selected for routine monitoring
- Routes were established for interior and exterior containers
- Different criteria for tagging contamination was formed for interior versus exterior waste streams
- Cadence began initially at monthly, tagging containers before waste hauler pickup

Results:

- Established baseline level of contamination on exterior and interior and contamination profile.

Charts from Sept 2024

Recycle Contamination: Word Cloud

Case Study:

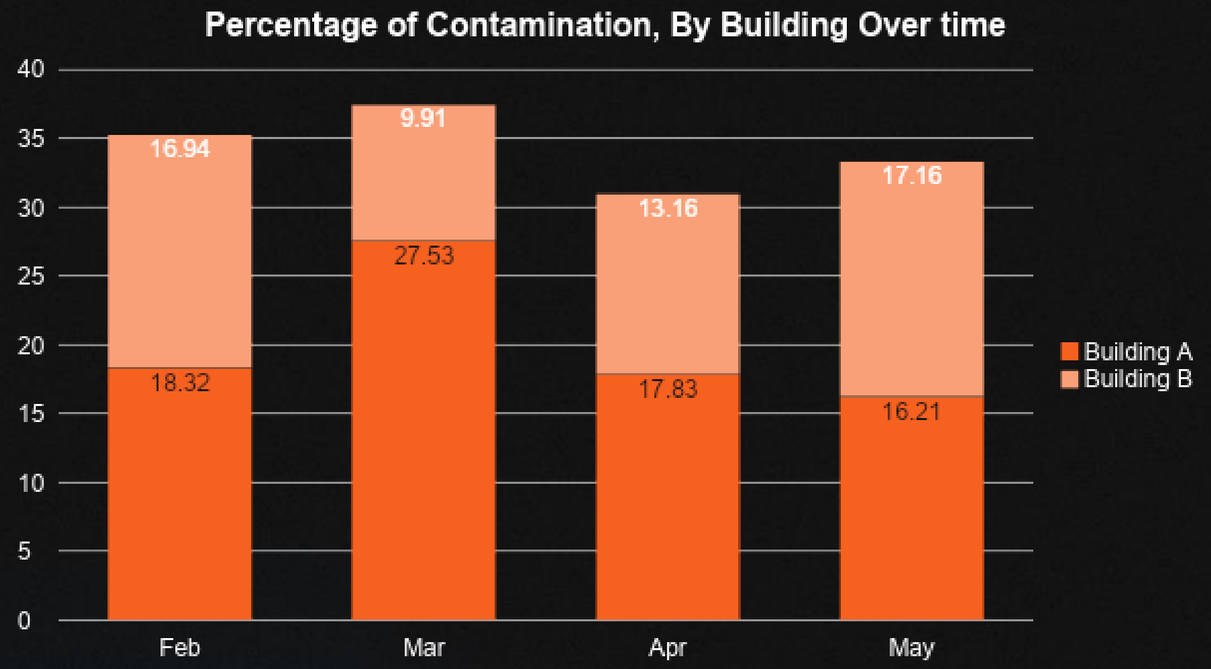
Impact of Signage

Challenge: Waste bin signage is not present due to pushback on aesthetics and necessity.

Goal: Provide actual data for the impact of waste bin signage on diversion and contamination.

Project:

- Custodial identified specific waste bins with highest foot traffic and contamination levels to use in case study
- In November 2023, pilot signage was deployed onto two sets of bins in two main buildings on the NVIDIA campus.
- Tagged waste bins with and without signage.
- Documented the impact signage has on program compliance and contamination levels.



Results:

- Over four months, bins with signage showed lower levels of contamination overall than bins without signage
- Signage was expanded to other containers

Case Study:

Exterior Waste Container Monitoring

Challenge: Monitor what materials are placed into exterior waste equipment before waste hauler pickups.

Goal: Document and correct any illegal dumping or incorrect placement of materials.

Project:

- Each container tagged in Zabble with contamination level
- Missed pick-ups, maintenance needs, overflowing, etc. can be documented and used to notify necessary personnel.

Results:

- Communicated and trained custodial and facilities teams
- Flag, identify, correct incorrect disposal of sensitive material
- Implement service adjustments

Case Study:

Waste Characterization

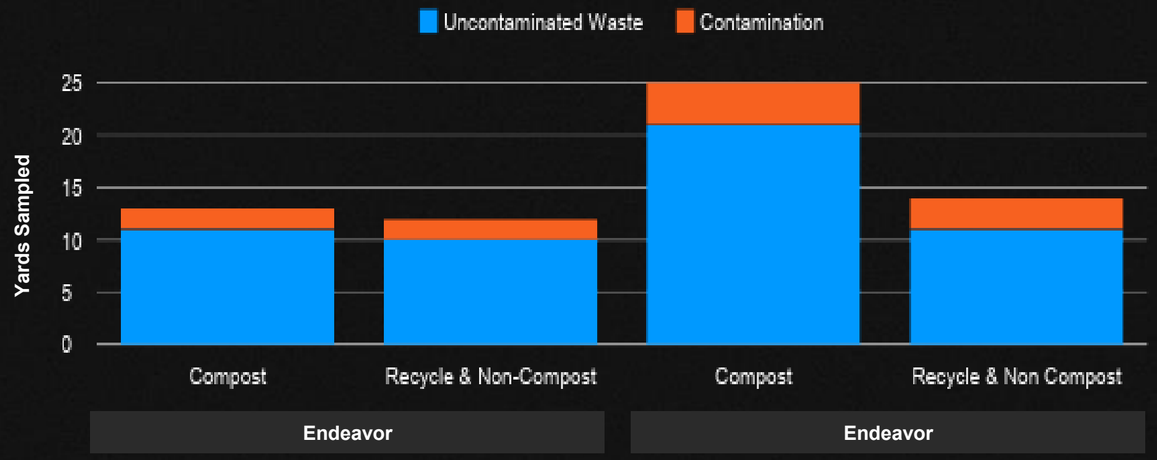
Challenge: Composition of the sites waste streams is relatively unknown.

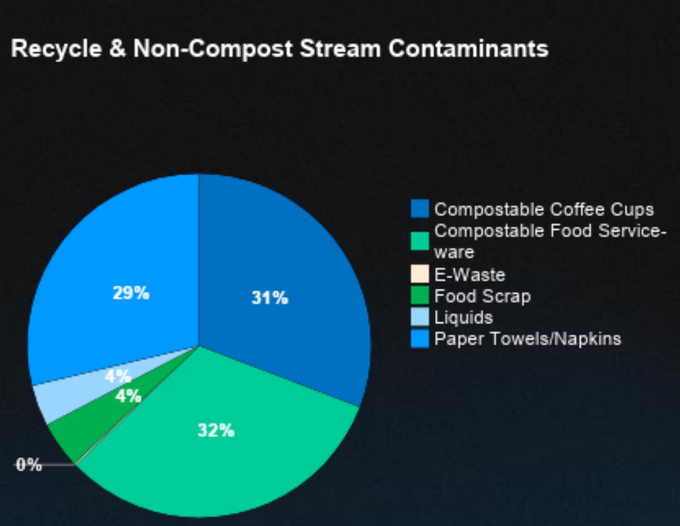
Goal: Establish baseline composition of each waste stream, providing contamination levels and identify areas of improvement.

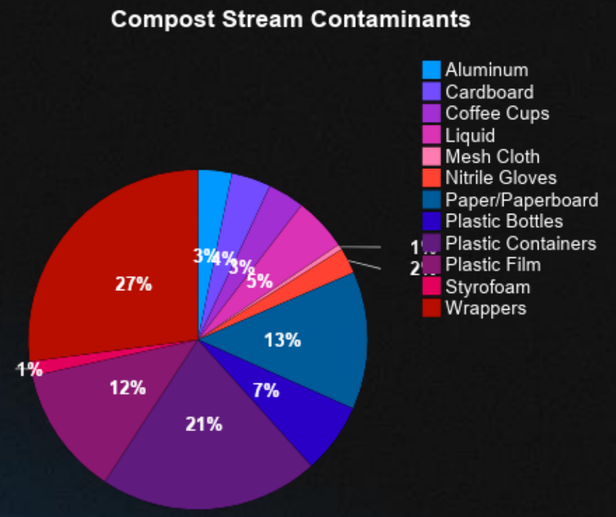
Results:

75-yard waste sample over 5 consecutive days:

- Building A had nearly 20% contamination overall across both streams.
- Building B recycle & non-compost stream nearly 50% contaminated.







Next Steps:

NVIDIA’s Fast Growth and Achieving Landfill Diversion Goals

Driving data-based change:

- Target specific locations for outreach
- Identify sources of contamination
- Use real data for education and events
- Accumulate data for reporting and regulations
- Track progress over time
- Maintain optimal waste containers

Thank You

Sydney Rogers-Lemke
Sr Manager, National Sustainability

slemke@sbmcorp.com

(650) 680-6738

About SBM Sustainability

SBM's Sustainability Team has been managing innovative programs for high-profile corporations for more than 31 years.

Dedicated Sustainability Services:

- Diversion opportunity evaluation and analysis
- Innovation in Program Implementation
- Dedicated Site Sustainability Management
- Recycling & Waste Reporting Validation
- Employee Strategy & Engagement
- Zero Waste – Gap Analysis, Events, Certification
- On-Site Daily Waste Sorting

ISSA CIMS Advanced by GBAC
GB CERTIFIED WITH HONORS