

South Wake Landfill Citizens Committee Meeting

South Wake Field Office & Remote
Sept. 28, 2022



@wakegov    

wakegov.com

Overview



Introductions

LOCI Automated Wellheads

Envirosuite Odor Reporting & Weather Data

Communications

Member Survey Results

Landfill Operations



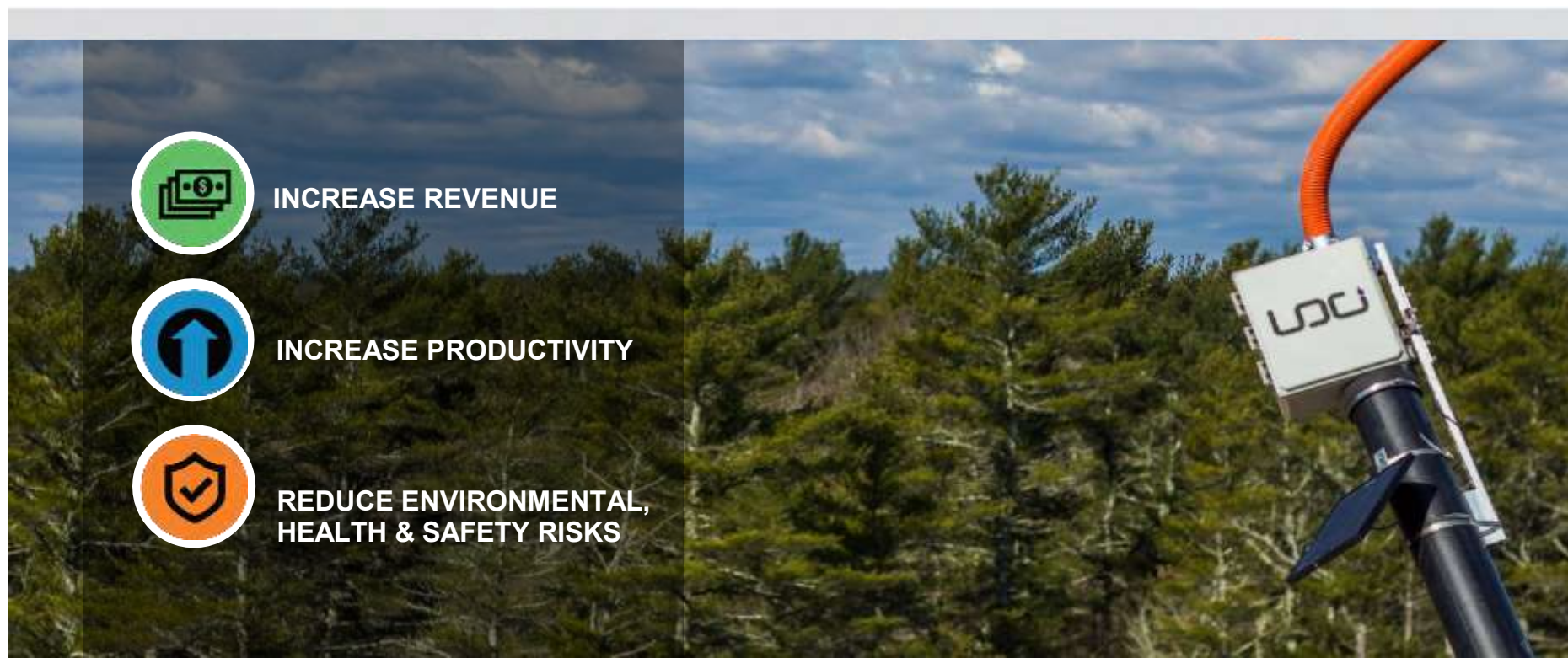
LOCI

Peter Quigley
CEO/Chairman



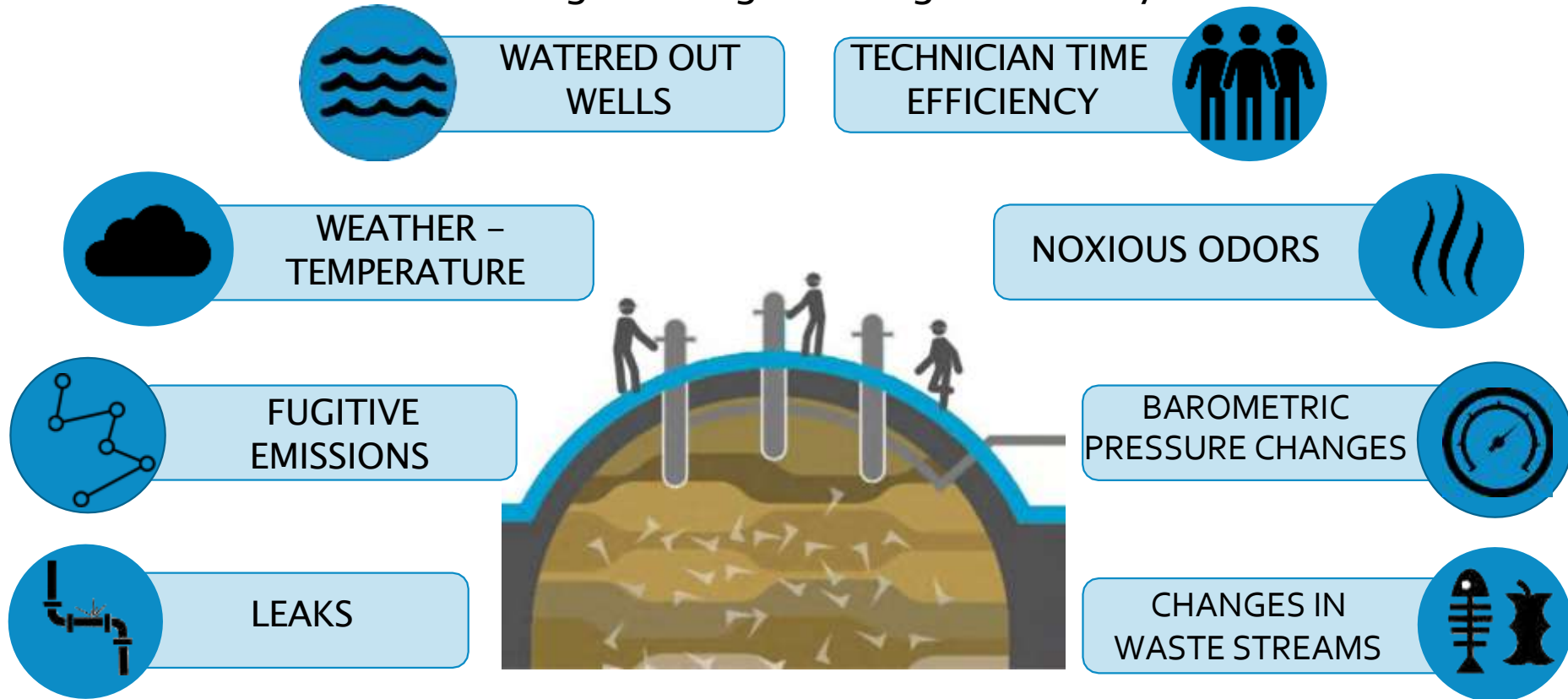
September 28, 2022

Using Real Time Data and Control Technology to Improve gas collection operations at South Wake landfill



Challenges Involved in LFG Collection

From technician time efficiency, to constantly changing environmental conditions, even the best operators have trouble optimizing collection when landfill gas tuning is managed manually.



Loci Controls

- Loci was founded in 2013 by two MIT graduate students, Melinda Sims, and Andy Campanella
- Loci's initial focus was to create a cloud connected platform that could reliably, and cost effectively measure key landfill gas process collection parameters including:
 - Gas composition
 - CH₄, CO₂, O₂
 - Pressure – P atm, Pa, Pb, Pc, Pf – ambient, above Loci valve, system/available vacuum, flow measurement across a restriction (venturi or orifice plate)
 - Temperature – ambient, and landfill gas
 - Remotely Actuated Valve to optimize applied vacuum – via “remote manual or automated adjustment”
- Loci ongoing focus is to leverage real time data to drive operational improvements to increase methane capture, and reduce landfill emissions

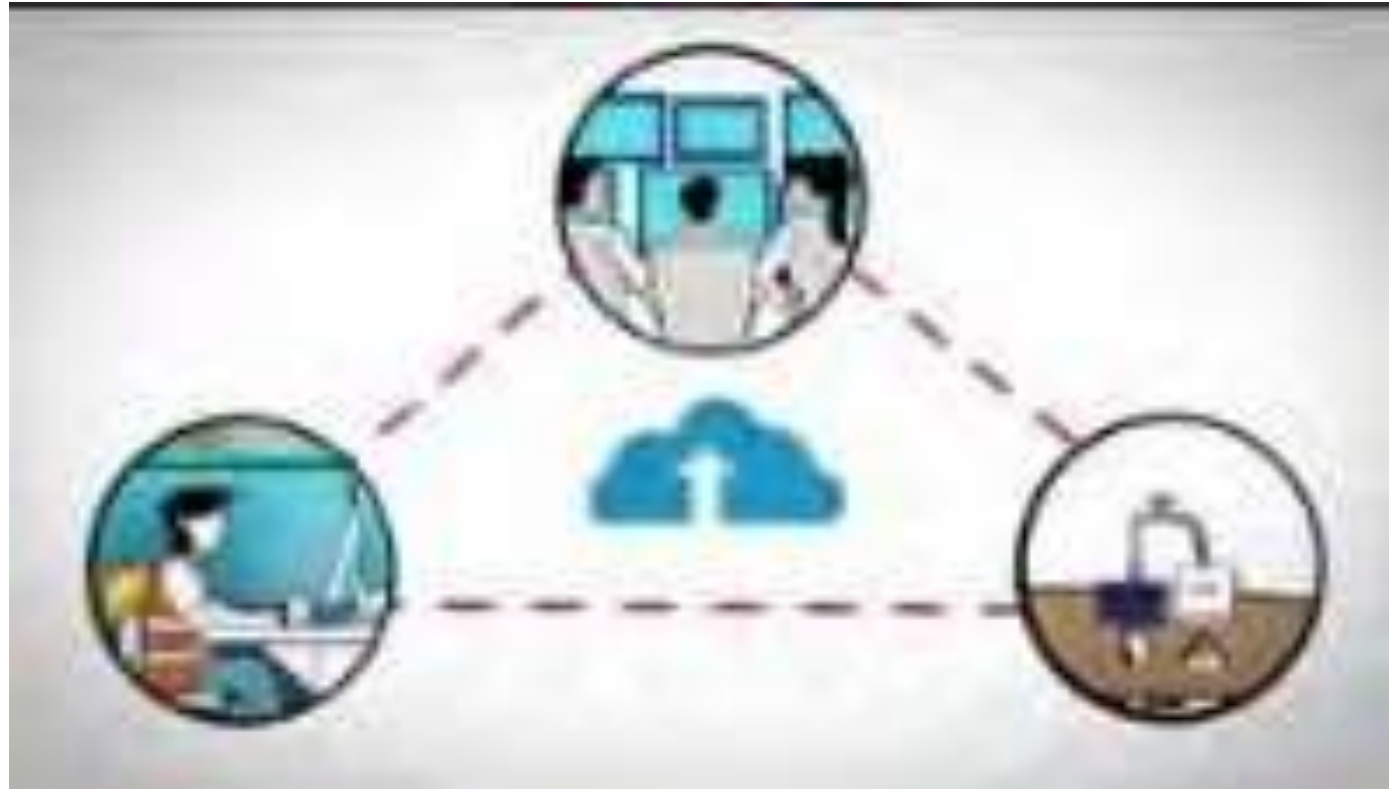


METHANE CAPTURE &
EMISSION REDUCTION

www.locicontrols.com

617-575-2716 | sales@locicontrols.com

How Loci's Real Time Control System Works



Loci Introduction

<https://youtu.be/lbdMx2CCKbc>



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WellWatcher Platform

Our cloud-connected online platform displays live data from each well and allows users to view historical data through our user interface.



WELLWATCHER FEATURES

- ✓ 24/7/365 remote visibility on LFG operations
- ✓ Accessible via desktop, laptop and tablet
- ✓ Visual trending
- ✓ Automated optimization and alerts
- ✓ Increased technician productivity



METHANE CAPTURE &
EMISSION REDUCTION

Loci uses REAL TIME Aggregate & Collection Well Data to Optimize Collection

Loci's fine-tuning algorithm is like having a technician at each well 100% of the time.

Loci real time data and control system can be tailored to meet gas collection process parameters to meet landfill and beneficial use projects requirements and optimize LFG collection.

Fine-Tuning Algorithm

- Takes frequent individual collection well readings
 - Gas Composition (CH_4 , CO_2 , O_2)
 - Flow
 - Temperature
 - Pressure above/below Loci's automated valve
- Makes small incremental valve adjustments (0.5% open or close typically) every 3 hours, based on composition and pressure. During "stable" environmental conditions this will find the optimum for each collection well.

Aggregate Gas Composition Algorithm

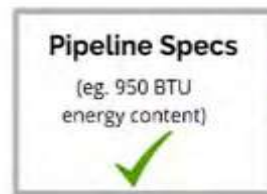
Makes batch valve adjustments, tuning multiple collection wells at the same time based on logic and real time information from a direct connection to the plant's measurement equipment.

Top-level control variables include:

- BTU, O_2 , and N_2 as measured by plant Gas
- Chromatograph or Precision O_2 meter.

Individual Well Control

Valve adjustments for individual collection wells are weighted by gain factors. The gain factors reflect how responsive each collection well is to changes in gas composition based on valve position.



Pipeline



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Loci – South Wake Landfill

- In April 2019, Loci and Wake County commenced a trial installation of Loci's real time data and control system on 30 collection wells, and 1 aggregate gas composition monitoring location.
- In January, 2022 Loci and Wake County expanded the trial installation to 75 collection wells and commenced later in 2022 field trials of real time liquid level measurement.
- Increased gas collection of 10% - 15% has been realized leveraging real time data and control system to assist Wake County gas collection operations.
- Currently 12 of the 75 vertical collection wells include real time liquid level measurement, with plans to expand the use of liquid level measurement to all vertical collection wells – which should allow for additional opportunities to optimize gas collection process and improve collection efficiency.
- We are very excited to have the opportunity to work with Wake County personnel to leverage new technology to support onsite and remote operations with goal to enhance gas collection operations, increase methane capture and reduce emissions.



METHANE CAPTURE &
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ThankYou!

Loci Controls

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Envirosuite

Greg Bracci
Vice-President



We are driven to create world-leading, science-based technology to help our customers act faster, perform better and realize their full potential with Environmental Intelligence.



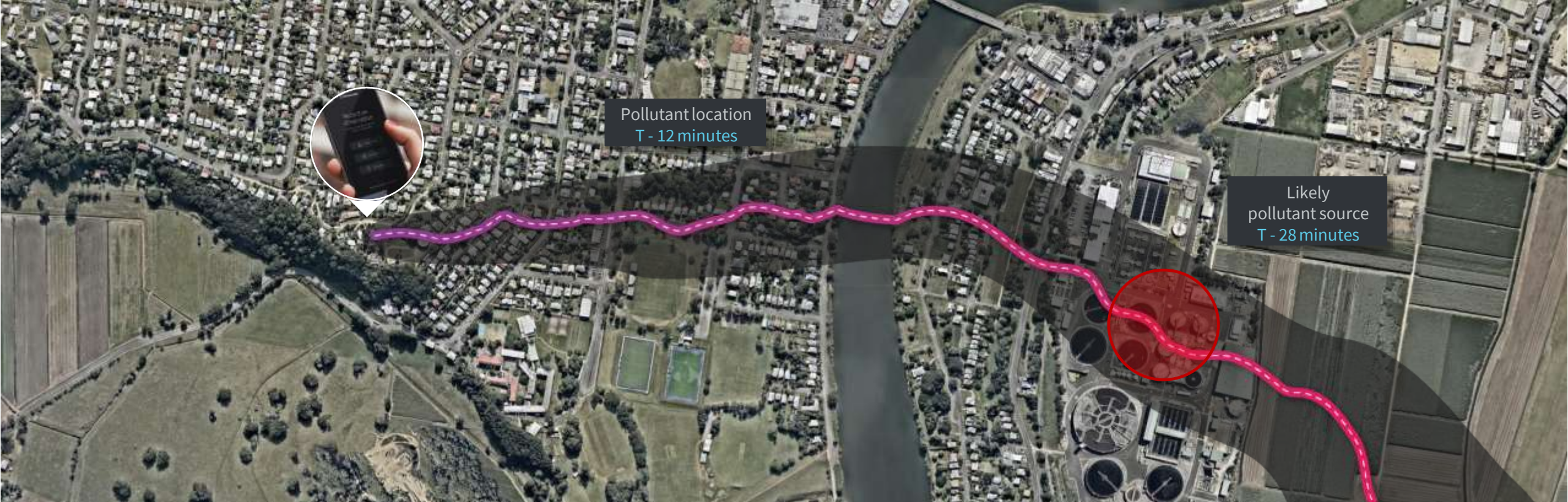
Greg Bracci
Vice-President
Envirosuite

Trusted by governments and
hundreds of Tier 1 clients globally



Gaining environmental intelligence with Envirosuite, your single source of truth





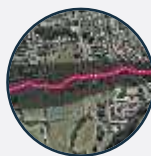
Envirosuite Trajectory Analysis



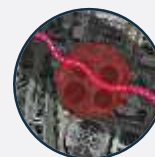
Complaint
submitted



Ticket
generated



Reverse
trajectory



Likely source
Identified



Informed
response

Workflow Observation Submission

17

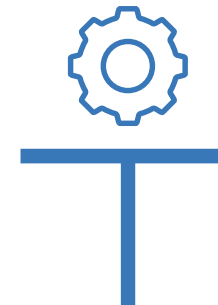
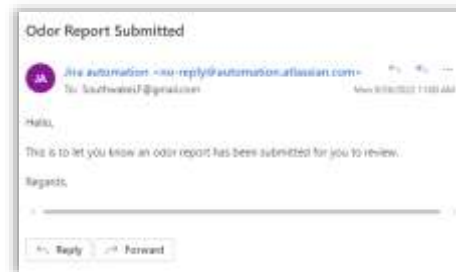
Submit Data

Validate
Data

Notify

Analyze

Resolve



Report Likely from SWLF



Report Unlikely from SWLF



Q & A



Communications

John Hamlin

Wake County Senior Communications Consultant



September Newsletter



The Science of Smell

Does it tend to smell worse at certain times?



Does the landfill smell more often this time of year?

For most of the year, the prevailing winds in our area blow toward the northeast, carrying any odors that may have escaped the landfill away from most nearby neighborhoods. But that trend flips from mid-August to mid-November, when winds are more likely to blow southwest toward Forest Springs and 12 Oaks.

Those were the findings of a 2014 study that looked at seven years of local climate data, and that trend continues to hold according to measurements from the landfill's two on-site weather stations. (You can see one of our weather stations in the photo to the right.)

The study also found that high windspeeds are our friend, and data from odor reports back that trend up too. When winds blow above 7 mph, they mix with enough fresh air to dilute any odors picked up at the landfill. Low windspeeds from 4-7 mph are the most likely to carry noticeable odors to our neighbors. Winds under 4 mph allow odors to accumulate and, if low windspeeds persist, can allow those smells to slowly spread out from the landfill.

Of course, this seasonal shift is no excuse for odor issues. Wake County is committed to investing in the latest technology and implementing the best operational practices to minimize the frequency and duration of odor issues around the landfill. We just have to work a little harder this time of year when Mother Nature works against us.

And, as always, **let us know if you smell something!** We rely on your odor reports to identify problems at the landfill and track our odor-fighting efforts.



Does it smell more around sunup and sundown?

On days with clear skies and low winds, you may notice more odors around the landfill around dawn and dusk due to a temperature inversion.

Ordinarily, the temperature of air gets cooler and cooler the higher up you go. That's why some places in the Blue Ridge Mountains average temperatures 20 degrees lower than Wake County.

During an inversion, a layer of air forms where the temperature is warmer than the air below it. That warm layer acts like a lid, trapping cooler air near the ground and preventing circulation. Odors are also trapped when an inversion occurs around the landfill, which holds those smells closer to the ground where we're more likely to notice them.

Inversions usually happen when sunrise or sunset causes temperatures to change and there's not enough wind to circulate the air. After dawn, a warm layer can form as the sun begins to heat things up and, after dusk, an inversion may happen as the atmosphere cools and the ground radiates a layer of heat.

Fortunately, inversions usually pass in a matter of hours. The quickest fix is for high winds to stir up the air, mixing the warm with the cold and breaking up the lid. If wind speeds remain low, the sun will eventually heat the air below the inversion layer to become hot enough to escape upward and carry odors away.

Regardless of whether you suspect a temperature inversion to be at play, please submit an odor report to let us know if you smell odor around the landfill.

Image credit: Science Learning Hub - Forest Avenue Primary (University of Warwick)



Normal pattern



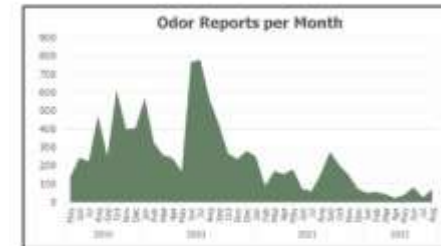
Thermal inversion

This Wednesday South Wake Landfill Citizens Committee

We're meeting Wednesday, Sept. 28, from 5:30-6 p.m. The meeting will be held as a hybrid, so you can join us online or we'd love to see you in person.

Positive Trends Continue in Odor Reporting Data

As we reported in the last newsletter, we turned a corner in August 2020 based on the number of odors reported by our neighbors. We're continuing to work hard and make major investments to reduce odor around the South Wake Landfill, and we're happy to report that the positive trend continued through August 2022.



Of course, that also means that we depend on your odor reports to tell us how we're doing! If you smell the landfill, **please take the time to let us know.** We use these data to measure which odor-fighting tactics are working and, if we see a sudden spike in reports, it alerts us to look for problems.

We've made some **encouraging progress at the landfill**, and there are many more improvements to come.

South Wake Landfill Traffic Report

It takes a lot of garbage routes to serve Wake County's 1.1 million residents, and all those trucks end up at the South Wake Landfill. From February through July, we saw an average of 4,174 truck trips per month and 164 per day when the landfill was open for business.

4,174
Trips Per Month

164
Trips Per Day

Get Involved

Ever wondered what happens to your trash when it leaves the curb?



Find out with a FREE tour of the South Wake Landfill. You'll learn everything Wake County does to fight odors, protect the environment and support public health while processing the garbage from more than 1.1 million residents.

After two and a half years, our public tours are finally back! Spots are limited, so sign up today. Got a group of 10 or more interested in taking the tour? Let us know and we'll schedule a private tour on our bus.

Rather tour from the comfort of your couch? Check out our virtual tour, which includes access to behind-the-scenes areas and drone footage.

Take a Tour

September Newsletter

Sent

SWLF Newsletter September 2022

Copy

Share on Social

...

Details

Reporting

Heat Map

Email Performance

See how your emails are doing with your audience. [Compare your results to the industry average.](#)

Sent


2959

Open Rate

63.9%

Click Rate

2%



Opens	1872	Clicks	58
Sent	2959	Did Not Open	1058
Bounces	29	Unsubscribed	9
Successful Deliveries	2930	Spam Reports	1
Desktop Open Percentage	96.1%	Mobile Open Percentage	3.9%



Member Survey

Results and Discussion

Citizens Committee Survey

Two meetings a year is right

Where members get info about the landfill

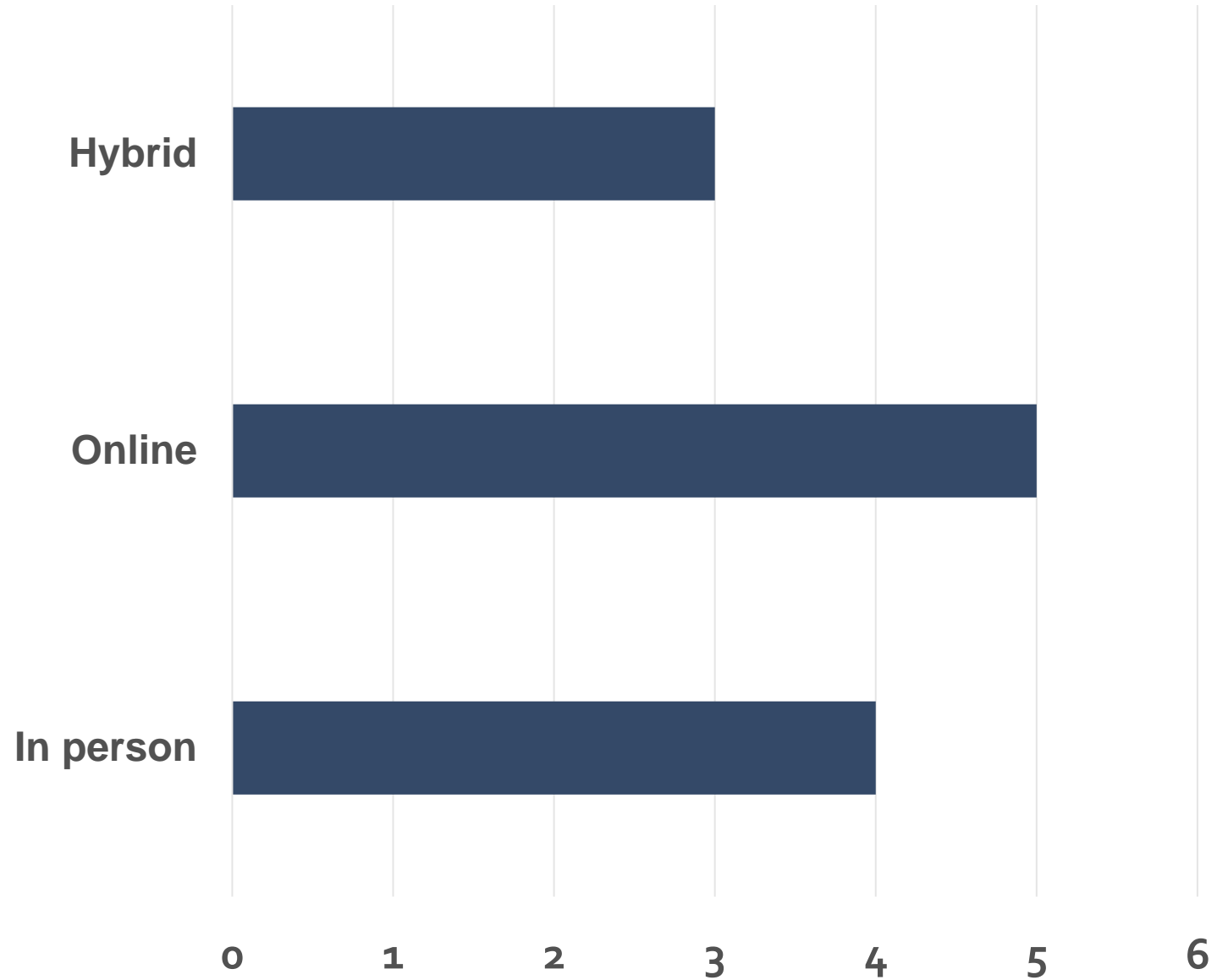
1a) Meetings

1b) Newsletter

2) Everywhere else (news, web, social, word-of-mouth)

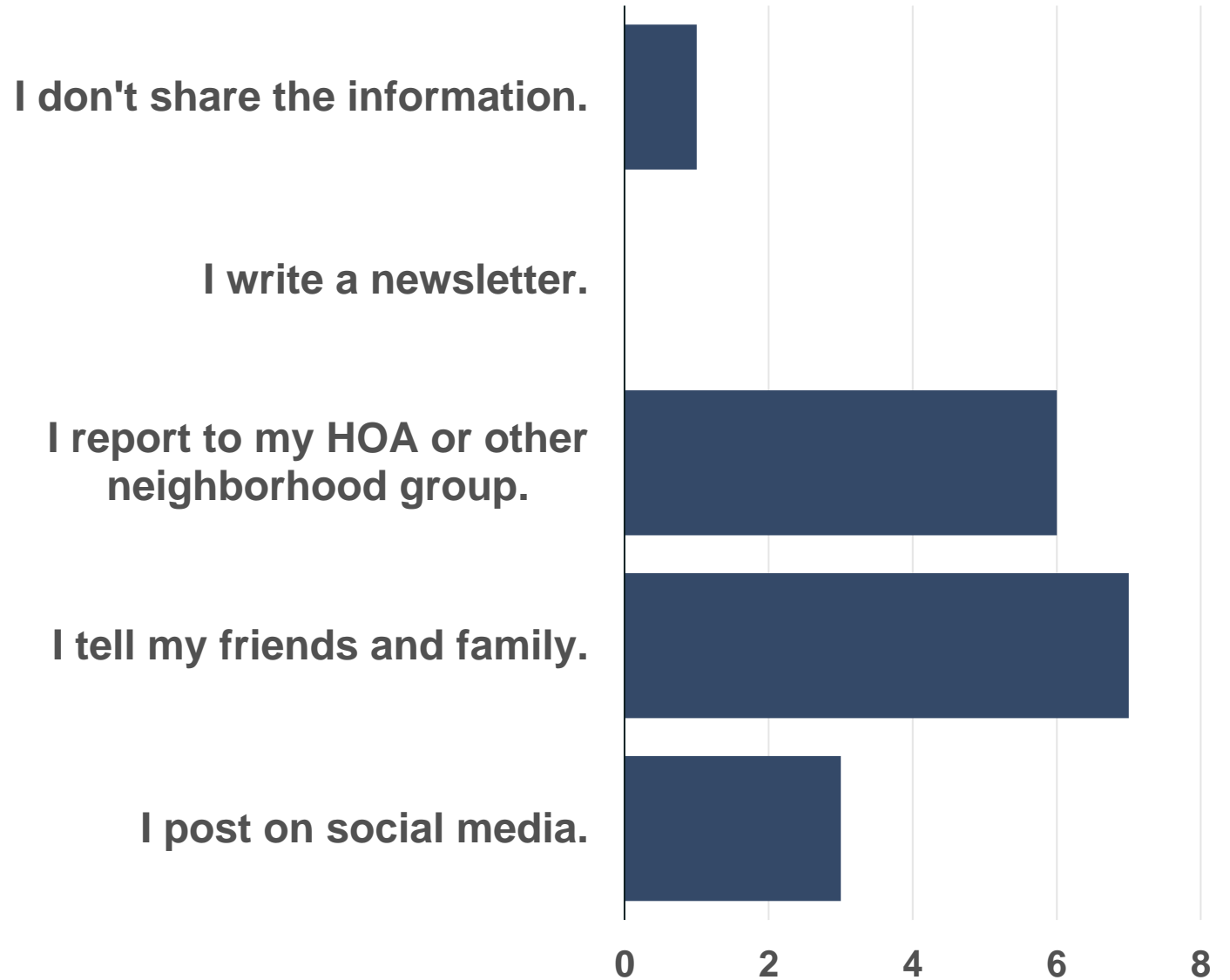
**The COVID-19
pandemic forced
our meetings
to move online.**

**Given the option, do
you prefer meetings
to be held:**



When you're able to attend, how do you share the information you learned?

(select all that apply)





Expanding Committee Membership

Open Discussion



GFL

Improvements and Investments

George Metcalf

GFL - Landfill General Manager

Using Full Dirt and Tarp Cover Every Day

Prioritizing odor reduction over other goals

- Posi-Shell had allowed us to recycle 1 million pounds of latex paint per year
- Dirt cover costs \$350,000 per year





GFL invested
\$2.1 million
in new equipment
to move to daily dirt cover

Less Trash Exposed for Less Time

**Much Smaller
Working Face**

2020

Up to 5 acres

2022

1 - 1½ acres

**Closing Earlier
Every Day**

August 2020

9:45 p.m.

June 2022

5:06 p.m.



Installed Two Odor Misting Systems in Addition to Odor Vapor System

Timely repairs when weather causes erosion

Keeps the
closed sections
of the landfill
closed

Keeps odors
trapped inside



Other Improvements by GFL

1

New Site Manager

Smoother operations

Better communication

2

On-Site Equipment Maintenance

Less downtime when equipment fails

3

Aggressive Leachate Management & Disposal

Benefits landfill gas collection


2023: Investment of millions of dollars for reverse osmosis treatment plant

4

Tiki torches in trouble spots

Solar flare units address areas with high concentrations of landfill gas

Prevents gas from escaping

South Wake Landfill - OMCP Cover Integrity Inspection Form		
General Information		
Date: <u>6/11/22</u>	Start Time: <u>12:01</u>	End Time: <u>12:11</u>
Inspectors Name: <u>Bradley's Kony</u>		
Inspectors Title: <u>Landfill Technician</u>		
Type of Inspection: <input checked="" type="checkbox"/> Regular/Weekly <input type="checkbox"/> Rainfall Greater than 1"		
Weather Conditions		
Has there been a storm event greater than 1" in the last 24 hours? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
If yes provide:		
Storm Start Date & Time:	Storm Duration (hrs.):	Precipitation inches:
<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Facility Inspection		
Are cracks present on the surface of the ground within the footprint of the constructed/active cells?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, Corrective action scheduled for date:		
Completion date of repair:		
Are there any rills present on any of the intermediate slopes?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
If Yes, Corrective action scheduled for date: <u>6/18/22</u>		
Completion date of repair: <u>6/15/22</u>		
Are there any washouts/rills with the daily cover areas of the site?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, Corrective action scheduled for date:		
Completion date of repair:		
All ditches within waste areas have no erosion rills or washouts?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
If Yes, Corrective action scheduled for date: <u>6/18/22</u>		
Completion date of repair: <u>6/15/22</u>		
Additional Comments: <u>Minor rills on East slope.</u> <u>Washout (minor) on edge of access road on East slope.</u>		
 Signature of Inspector	<u>Bradley's Kony</u> Printed Name and Title	<u>6/11/22</u> Date

Site Odor Evaluation Form
South Wake Landfill – Apex, North Carolina

General Information		Meteorological Conditions
Site Inspector 1: <u>Matthew Wheeler</u>	Temperature: <u>70</u> °F	
Site Inspector 2:	Wind Speed & Direction: <u>2 MPH NW</u>	
Date: <u>06/18/2022</u> (mm/dd/yyyy)	Precipitation: <u>0" IN 24 HRS</u>	
Time: <u>7:00 AM</u>	Barometric Pressure: <u>30.01</u> mmHg	
Location Being Assessed for Odors: <u>PERIMETER ROAD, WORKING FACE, TOP OF LANDFILL.</u>		General Weather Description: <u>PARTLY CLOUDY WITH A SLIGHT BREEZE.</u>
Odor Intensity & Characteristics		Suspected Odor Source
<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Strong	<input checked="" type="checkbox"/> Trash <input type="checkbox"/> Gas <input type="checkbox"/> Sewage <input type="checkbox"/> Mulch <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Working Face Operations <input type="checkbox"/> High-Odor Waste Materials <input type="checkbox"/> Waste Vehicles <input type="checkbox"/> Landfill Gas Emissions <input type="checkbox"/> Leachate <input type="checkbox"/> Construction Activities <input type="checkbox"/> Off-Site Source <input type="checkbox"/> Other
Verify Control Systems		Verify Cover Integrity
<input checked="" type="checkbox"/> Landfill Gas System <input checked="" type="checkbox"/> Odor Neutralizing System <input checked="" type="checkbox"/> Leachate Management System	<input checked="" type="checkbox"/> Working Face Open Areas <input checked="" type="checkbox"/> Daily/Intermediate Cover <input checked="" type="checkbox"/> Final Cap Areas	
Response Actions		Additional Comments
<input type="checkbox"/> Odor Monitoring <input type="checkbox"/> Air Monitoring <input type="checkbox"/> Landfill Gas System Adjustments <input checked="" type="checkbox"/> Odor Neutralizing System Adjustments <input type="checkbox"/> Working Face Adjustments <input type="checkbox"/> Cover Improvements <input type="checkbox"/> Other (describe):		<u>WILL BEGIN APPLYING ODOR NEUTRALIZING PRODUCT TO THE PERIMETER AT THE START OF OPERATIONS.</u>



Wake County Improvements and Investments

Coordination with Greenway Waste

Our data trace some odors to the neighboring construction and demolition landfill

Worked to get them to go above-and-beyond what's required by law to fight odors

- Landfill gas collection
- Off-site leachate disposal



Investment in Advanced Technologies

Envirosuite

- Two weather stations
- Six eNoses

Aggressive Expansion of Landfill Gas Collection

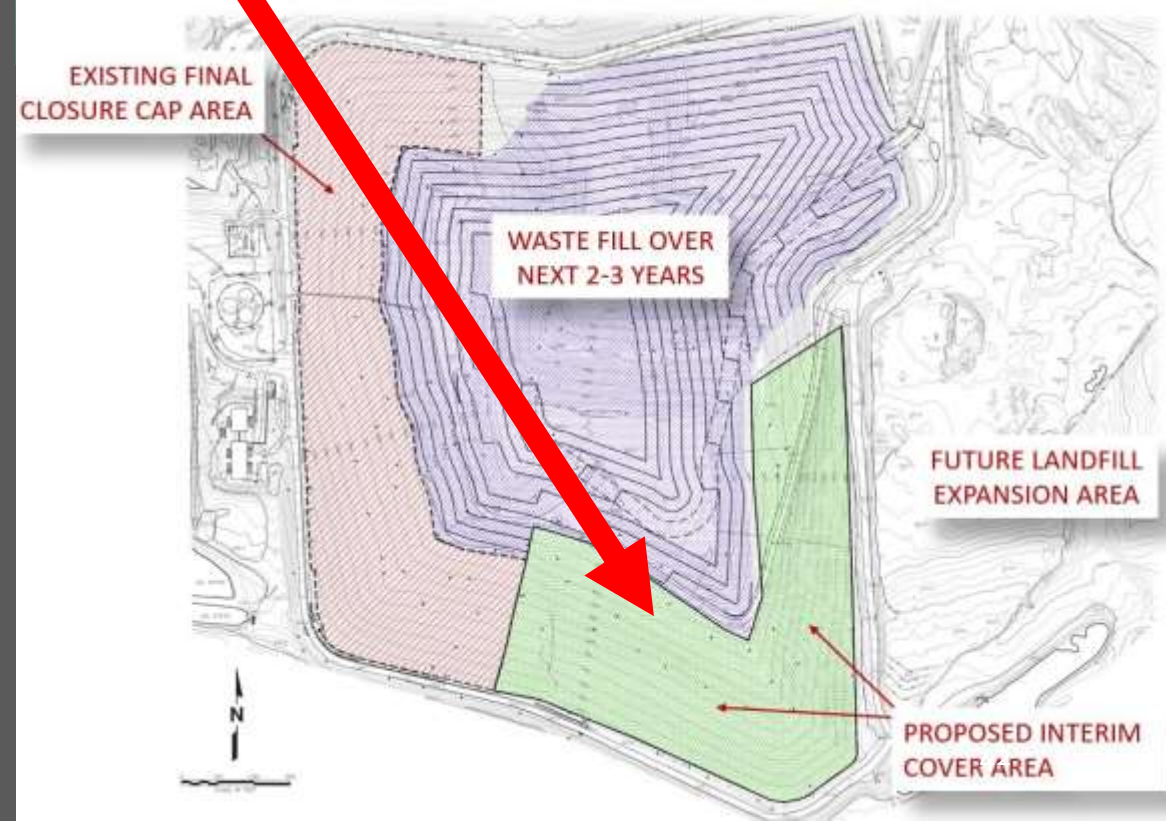
- 100+ wells
- Automated wellheads
- Full-time landfill gas technician



Interim Cover

Investing **\$3.7 million** to implement this fiscal year

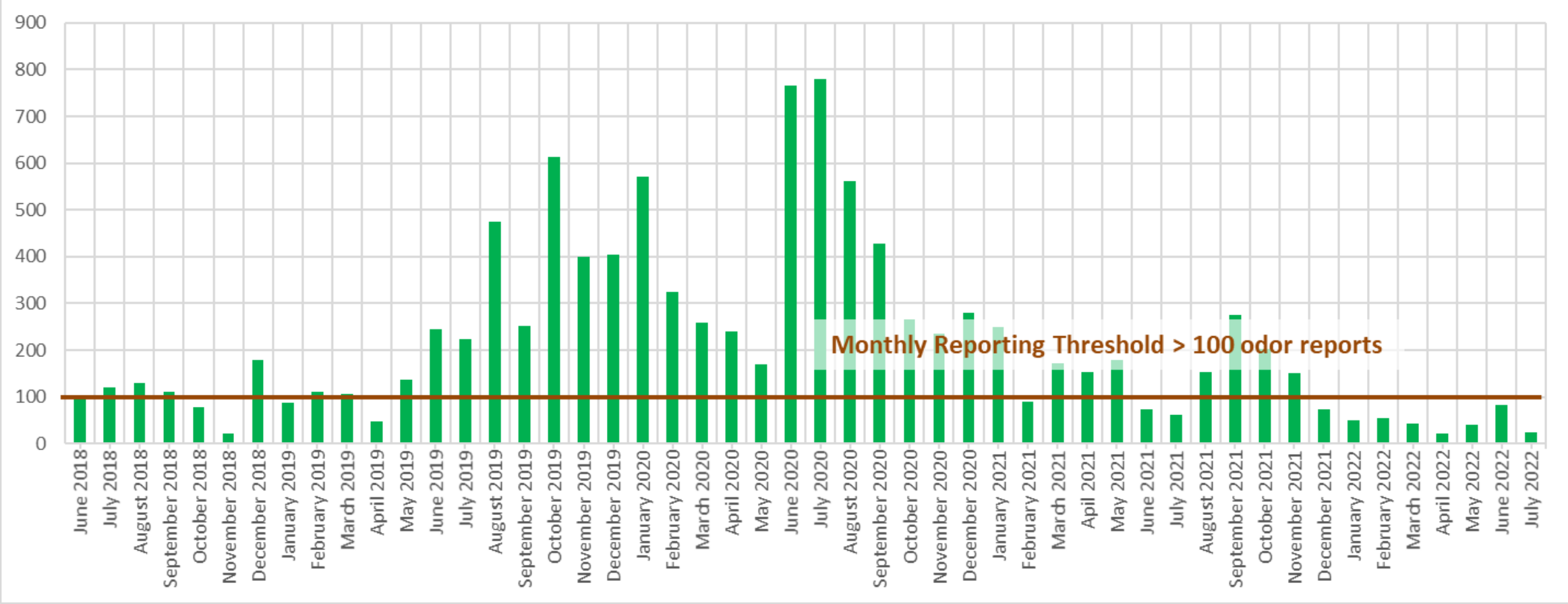
Projected to invest more than **\$13 million** over the next decade





Odor Reporting Trends

Odor Reporting Trends



Comparing Odor Reports for the Same Month in Different Years

Month to Month (Total Reports)					
	2018	2019	% change from 2018 to 2019	2020	% change from 2019 to 2020
January	18	90	400%	577	541%
February	15	112	647%	331	196%
March	29	106	266%	349	229%
April	14	48	243%	283	490%
May	14	137	879%	214	56%
June	98	245	150%	886	262%
July	121	224	85%	943	321%
August	131	476	263%	717	51%
September	112	251	124%	680	171%
October	80	614	668%	367	-40%
November	23	401	1643%	357	-11%
December	182	407	124%	517	27%

Comparing Odor Reports for the Same Month in Different Years

Month to Month (Total Reports)									
	2018	2019	% change from 2018 to 2019	2020	% change from 2019 to 2020	2021	% change from 2020 to 2021	2022	% change from 2021 to 2022
January	18	90	400%	577	541%	468	-19%	97	-79%
February	15	112	647%	331	196%	131	-60%	75	-43%
March	29	106	266%	349	229%	272	-22%	55	-80%
April	14	48	243%	283	490%	225	-20%	26	-88%
May	14	137	879%	214	56%	261	22%	55	-79%
June	98	245	150%	886	262%	88	-90%	94	7%
July	121	224	85%	943	321%	85	-91%	27	-68%
August	131	476	263%	717	51%	216	-70%		
September	112	251	124%	680	171%	371	-45%		
October	80	614	668%	367	-40%	309	-16%		
November	23	401	1643%	357	-11%	237	-34%		
December	182	407	124%	517	27%	122	-76%		

Our Work to Control Odors Never Ends

Our goal is to **minimize the frequency and duration of odor issues** around the landfill

We're committed to **investing in the latest technology** and **implementing the best operational practices**





Thank You