



— *Making a difference, together* —

**Annapolis Water Reclamation Facility  
Initial Odor Control Monitoring Findings**  

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**Project #: X764281**

June 10, 2024



[DPWandYOU.com](http://DPWandYOU.com)

# WELCOME

- Please note this meeting is being recorded
- We ask that you please hold your question until the question slides. There are several throughout the presentation.

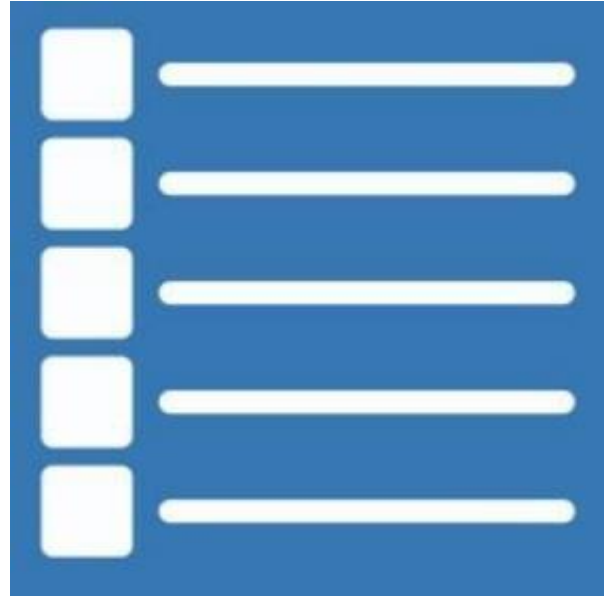
# Introductions

An aerial photograph of a wastewater treatment plant. The facility includes several large circular clarifiers, rectangular aeration basins, and various industrial buildings. In the background, a marina with many sailboats is visible. The word "ANNAPOLIS" is faintly visible in the center of the image.

National Association of Clean Water Agencies (NACWA)  
Peak Performance Award for perfect permit compliance since 2016

# Meeting Purpose

- Notify you of the scope of this project
- Provide the goals of this project
- Discuss the current status of the project and review the Initial Odor Monitoring Findings
- Provide the next steps of the project
- Provide update of design & construction project
- Answer any questions



# Reason for Capital Project



- Upgrades have been made to plant
  - Phase I upgrades included the influent pumping station, grit and bar screens and primary clarifiers
  - An evaluation was needed to ensure the sizing of the odor control systems match the previous and upcoming upgrades
- Engineering Service Request was submitted from Wastewater Operations
  - Request to review the failing odor control system in the Grit/Screen building
- Several community groups noted an increase in odor

# Goals of Capital Project (X764281)

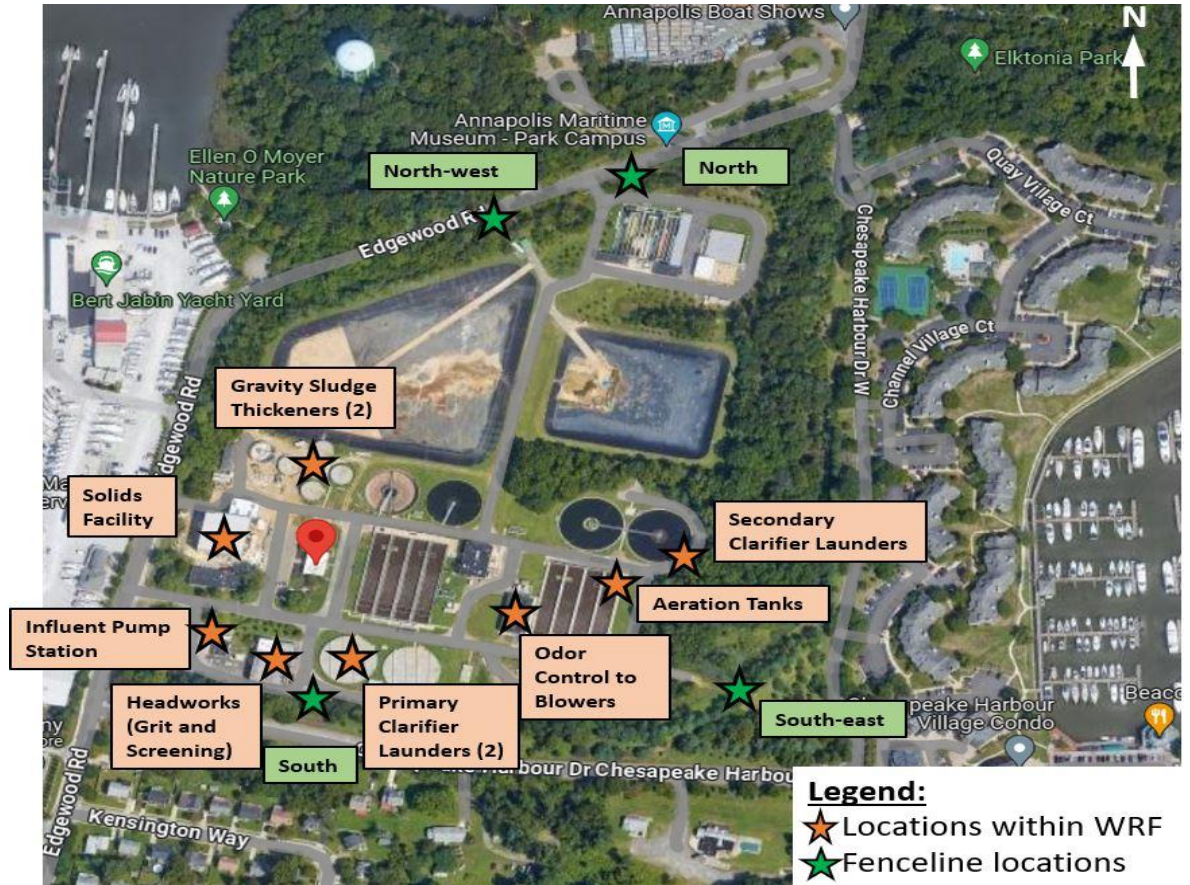
- Pinpoint the areas of focus for potential upgrades and/or operational improvements (S802389)
- Monitor individual processes to identify possible issues
- Identify level of need at each process and level of odor control needed
- Identify possible improvements to existing processes to minimize odors
- Setup the scope and estimate cost for the design/construction project, to expedite the design process

# Steps taken Prior to This Meeting

- Capital project created for evaluation of Annapolis WRF Odor Control systems
  - Engineering consultant (HDR) assigned via County's open end agreements, developed a scope and agreed to terms
- Public tours and discussions held with HOA leaders and nearby businesses at plant
- Initial monitoring phase completed from March 19 - April 22, 2024
  - HDR completed report on initial readings in May
- Plant Operators are flushing filter backwash troughs on a daily basis
  - Design evaluations have been initiated for this area
- Operations has reached out to Equipment supplier for troubleshooting of the grit/screen odor control unit

# Areas Monitored - Spring

- A total of **14 loggers** were deployed
  - 10 ppm monitors
  - 4 ppb monitors
- Monitoring duration: **March 19-April 22**





# Types of Monitors Installed

Photos of AcruLog H2S Gas Monitors: Parts Per Million (ppm) (Left) and Part Per Billion (ppb) (Right)





Questions





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## Odor Monitoring Initial Findings

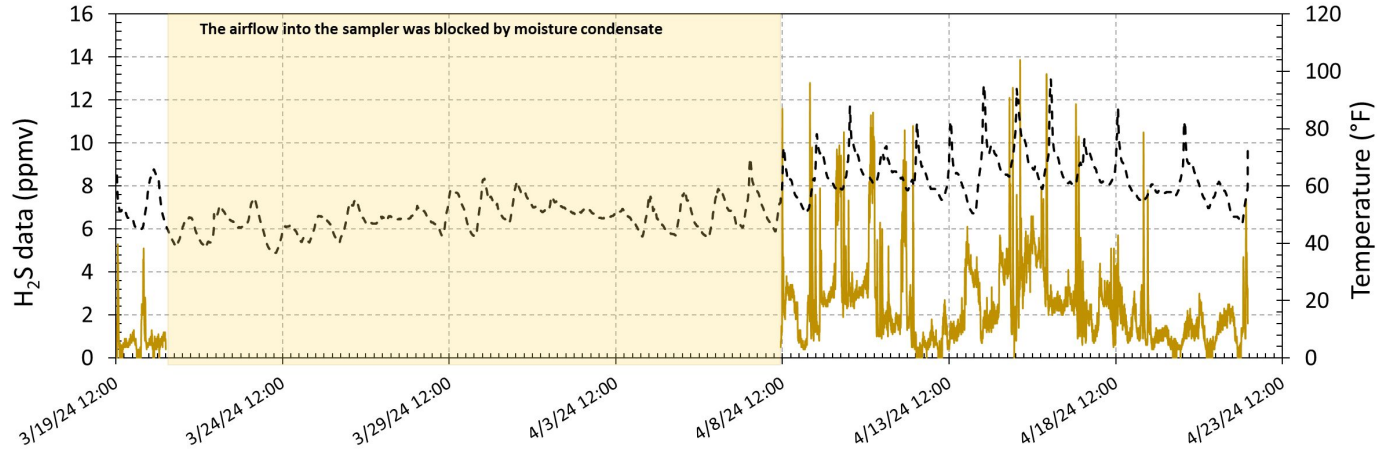
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### SPRING 2024 READINGS



[DPWandYOU.com](http://DPWandYOU.com)

# Monitoring Results- Influent Pump Station

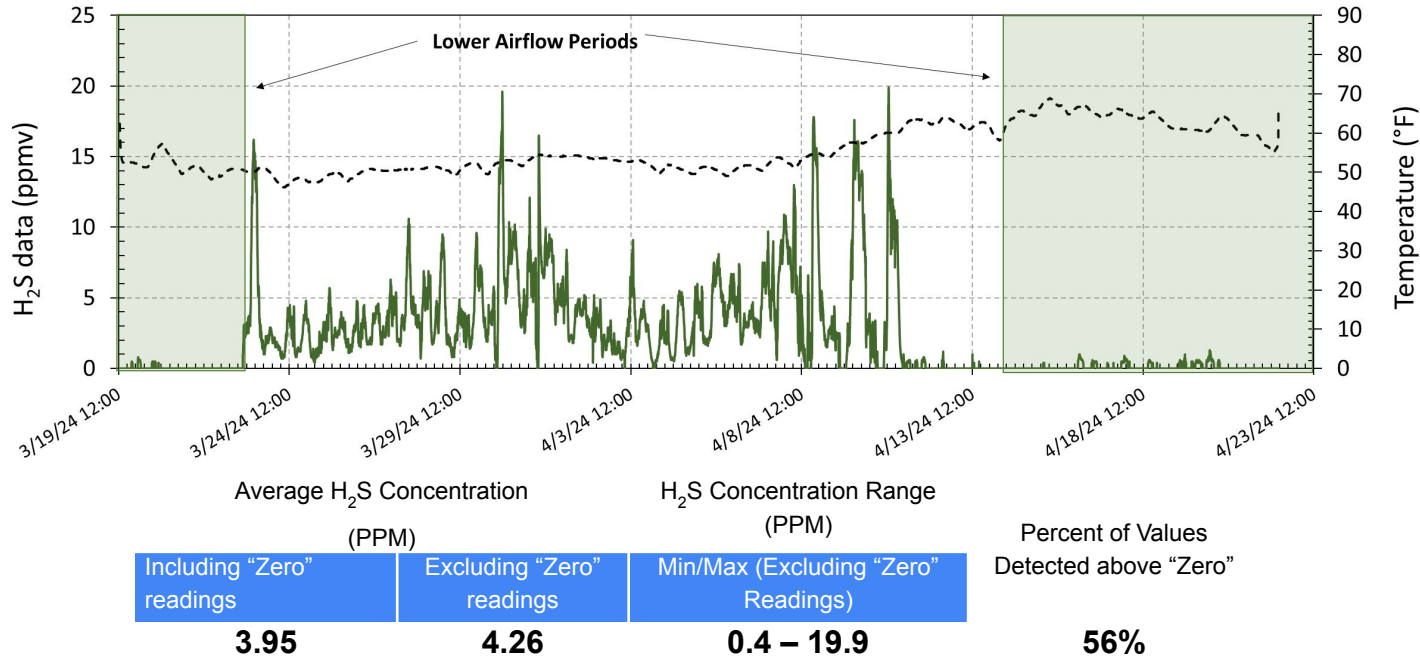


Average H <sub>2</sub> S Concentration (PPM)		H <sub>2</sub> S Concentration Range (PPM)	Percent of Values Detected above "Zero"
Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	
<b>2.30</b>	<b>2.39</b>	<b>0.4 – 13.8</b>	<b>96%</b>

The H<sub>2</sub>S readings at the Influent Pump Station are not excessive and can effectively be treated with appropriate odor control technologies (to be evaluated in subsequent TMs). These odors are currently treated with the existing biofilter.

\*\*Data collected during the sampling error period caused by condensate in the sampling tube was excluded when calculating both averages and frequency

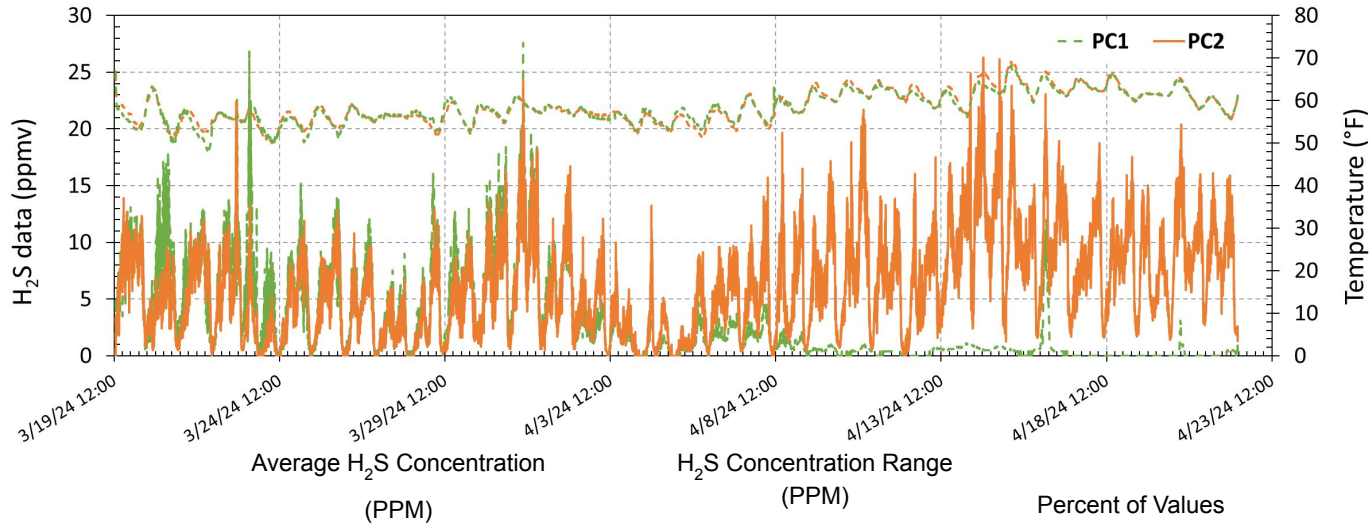
# Monitoring Results- Screen and Grit Building



The H<sub>2</sub>S readings at the Screen and Grit Building are significant. As these are not being treated, it is likely that these emissions are contributing to offsite odors.

\*\*Data collected during low air flow conditions has been excluded from the calculations of averages and frequency to prevent underestimation of values.

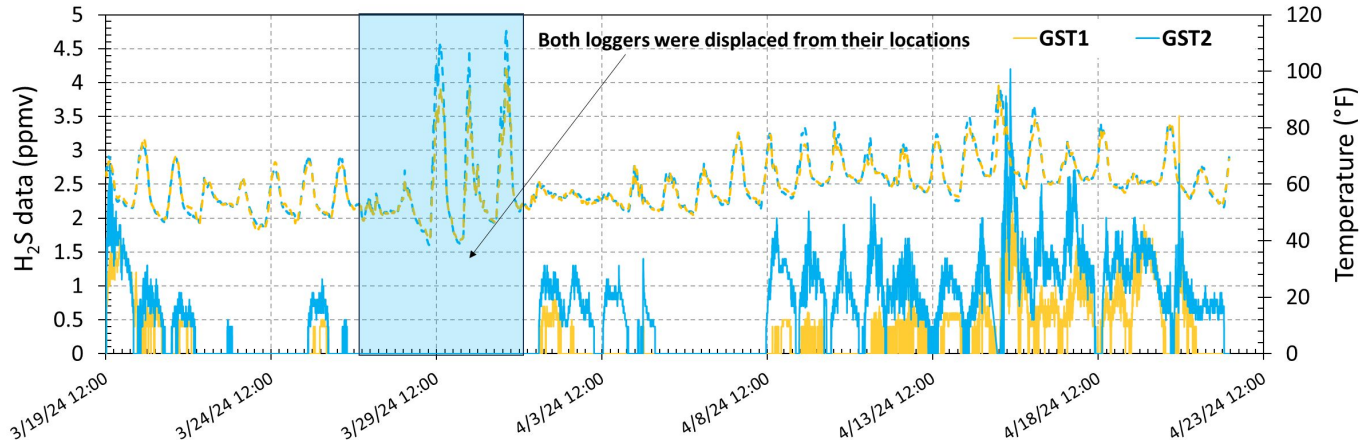
# Monitoring Results- Primary Clarifier Launder



	Average H <sub>2</sub> S Concentration (PPM)		H <sub>2</sub> S Concentration Range (PPM)	Percent of Values Detected above "Zero"
	Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	
PC1	<b>3.01</b>	<b>3.84</b>	<b>0.4 – 27.5</b>	<b>79%</b>
PC2	<b>6.15</b>	<b>6.40</b>	<b>0.4 – 26.3</b>	<b>96%</b>

- The two locations tracked consistently with each other, indicating good air movement below the covers.
- The measured concentrations are consistent with what might be expected from beneath covered primary clarifier launders.

# Monitoring Results- Gravity Sludge Thickeners



Average H<sub>2</sub>S Concentration  
(PPM)

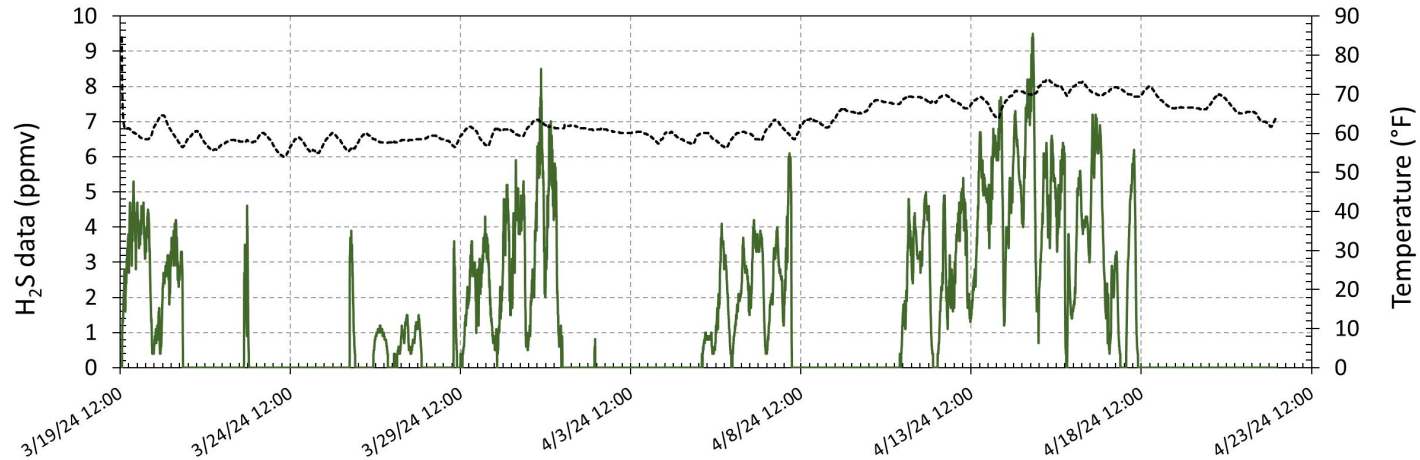
H<sub>2</sub>S Concentration Range  
(PPM)

Percent of Values  
Detected above "Zero"

	Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	Percent of Values Detected above "Zero"
GST1	<b>0.23</b>	<b>0.74</b>	<b>0.4 – 3.5</b>	<b>32%</b>
GST2	<b>0.57</b>	<b>1.05</b>	<b>0.4 – 4.2</b>	<b>54%</b>

- The measured concentrations are consistent with what might be expected from beneath covered GSTs.

# Monitoring Results- Odor Control Blowers



Average H<sub>2</sub>S Concentration  
(PPM)

Including "Zero"  
readings

**1.43**

Excluding "Zero"  
readings

**3.12**

H<sub>2</sub>S Concentration Range  
(PPM)

Min/Max (Excluding "Zero"  
Readings)

**0.4 – 9.5**

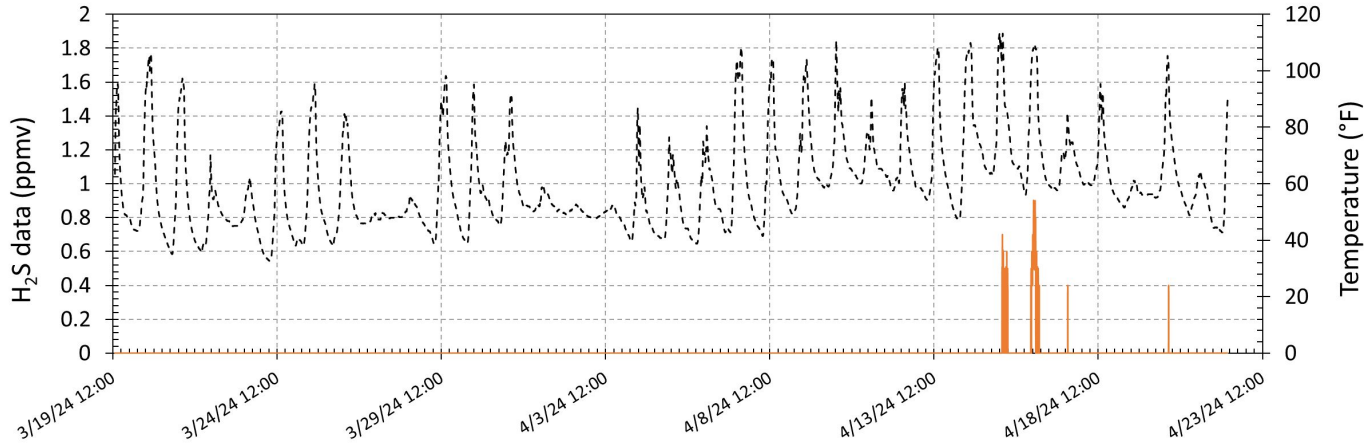
Percent of Values  
Detected above "Zero"

**46%**

- It is likely that new odor control technology will be required, as the future high-speed turbo blowers likely will not be compatible with the expected level of hydrogen sulfide concentrations.
- A future technology evaluation will be completed for these odorous air sources in subsequent TMs.



# Monitoring Results- Solids Facility



Average H <sub>2</sub> S Concentration (PPM)		H <sub>2</sub> S Concentration Range (PPM)		Percent of Values Detected above "Zero"
Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)		
<b>0.0</b>	<b>0.53</b>	<b>0.4 – 0.9</b>		<b>1%</b>

- The existing solids odor control system appears to be functioning appropriately. However, future monitoring will be completed to confirm.

# Monitoring Results- Aeration Tanks & Secondary Clarifier Launder

Location	Average H <sub>2</sub> S Concentration (PPM)		H <sub>2</sub> S Concentration Range (PPM)	Percent of Values Detected above "Zero"
	Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	
Aeration Tanks	-	-	-	-
Secondary Clarifier Launder	<b>0</b>	<b>0.4</b>	<b>0.4</b>	<b>0.04%</b>

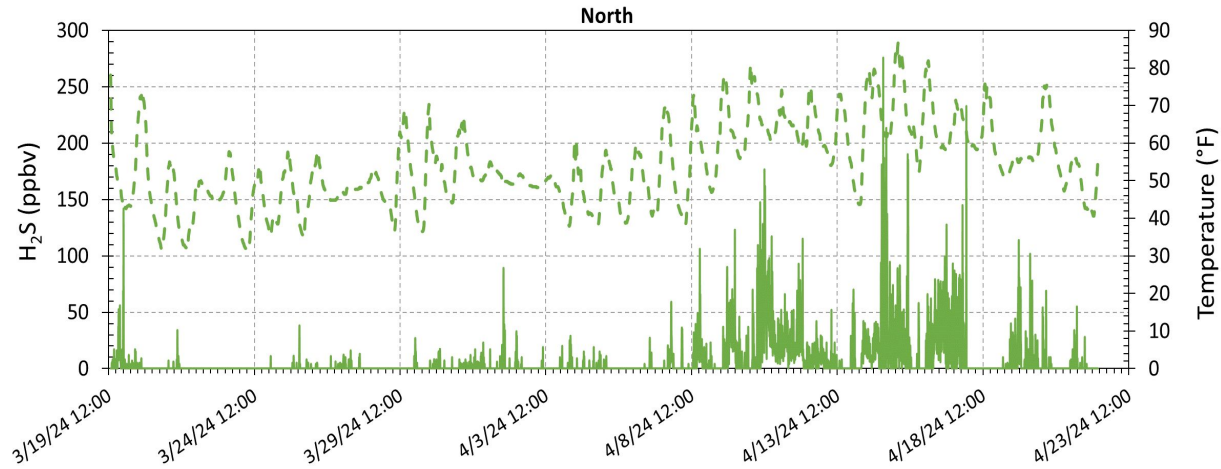
- Monitoring period: 4/1 to 4/22
- No H<sub>2</sub>S detection at aeration tanks indicating effective removal of H<sub>2</sub>S from primary clarifiers and GSTs through dispersion.
- Two (2) detection events at secondary clarifier and the detected H<sub>2</sub>S levels were 0.4 ppmv.

# Summary of Site Source H<sub>2</sub>S Monitoring Findings

- Primary clarifier loggers showed highest frequency and magnitude of measurable H<sub>2</sub>S:
  - Detection frequency: 79% to 96%
  - Concentrations: 0.4 to 27.5 ppmv
- Screen and Grit Building air had next highest H<sub>2</sub>S concentrations:
  - Concentrations: 0.4 to 19.9 ppmv
  - Detection frequency: 56%
- Influent pump station had up to 13.8 ppmv H<sub>2</sub>S concentrations:
  - Detection frequency: 96%, except for two weeks of "zero" data due to sampling errors.
- Blower duct logger detected H<sub>2</sub>S for 46% of monitoring time:
  - Concentrations: 0.4 to 9.5 ppmv
- GSTs had high detection frequencies (32%-54%) but relatively low concentrations:
  - Concentrations: 0.4 to 4.2 ppmv
- Solids facility had low measurable H<sub>2</sub>S levels and frequency:
  - Concentrations: 0.4 to 0.9 ppmv
  - Detection frequency: 1%.



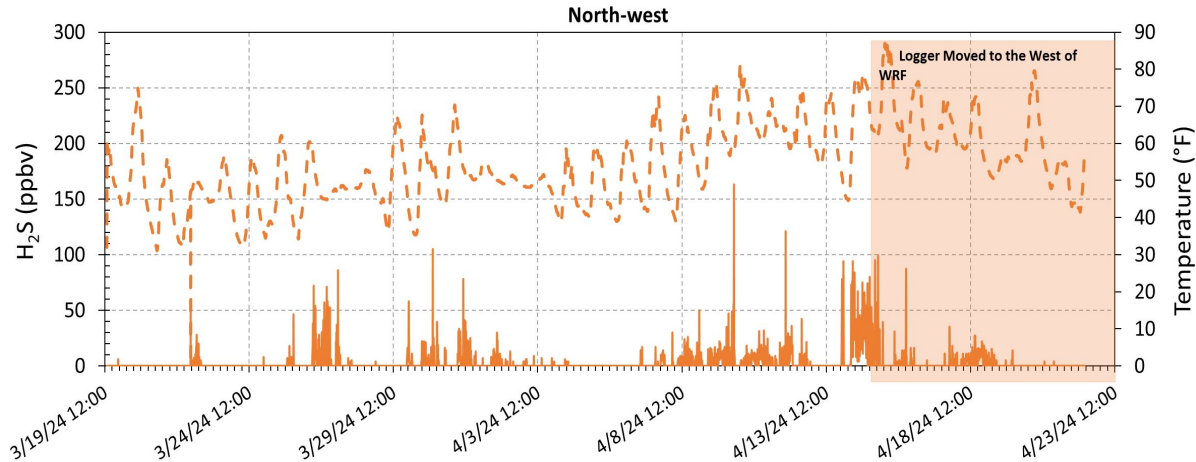
# Monitoring Data- Fenceline Loggers - North



H <sub>2</sub> S Concentration Range (PPB)			Percent of Values Detected above "Zero"
Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	
6	26	4 - 276	24%

- The higher concentrations and detection frequencies are likely influenced by prevailing winds.
- The denitrification filter backwash holding tank could be a potential source of odors that may be causing offsite impacts.

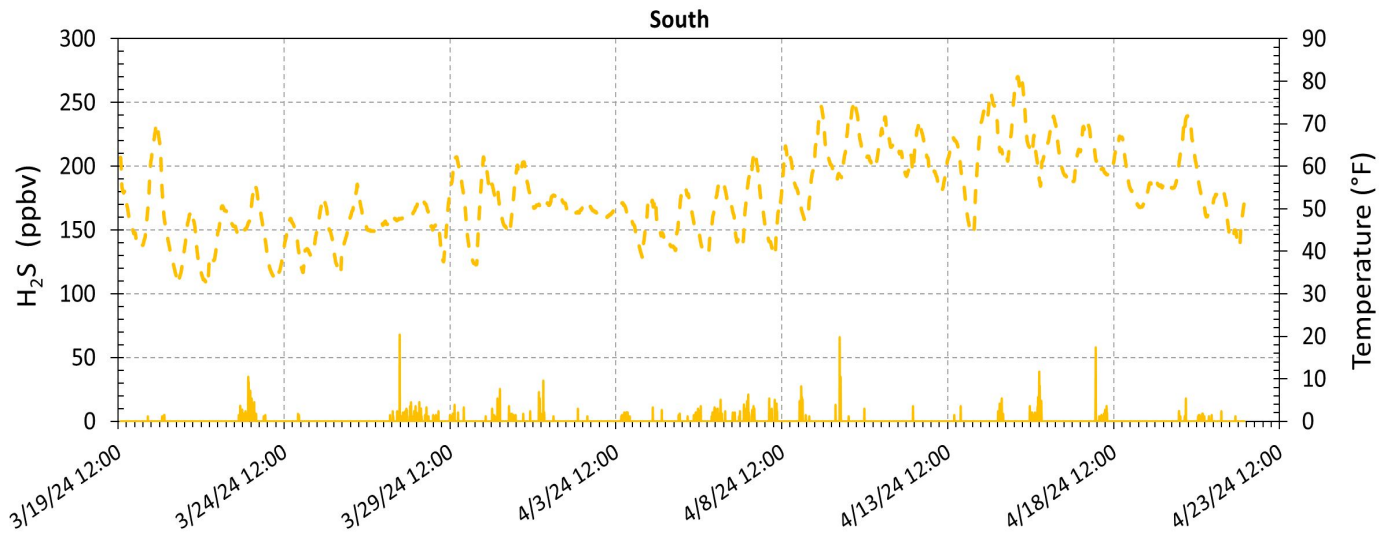
# Monitoring Data- Fenceline Loggers - Northwest



H <sub>2</sub> S Concentration Range (PPB)			Percent of Values Detected above "Zero"
Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	
3	16	4 - 163	19%

- The higher concentrations and detection frequencies are likely influenced by prevailing winds.
- The denitrification filter backwash holding tank could be a potential source of odors that may be causing offsite impacts.

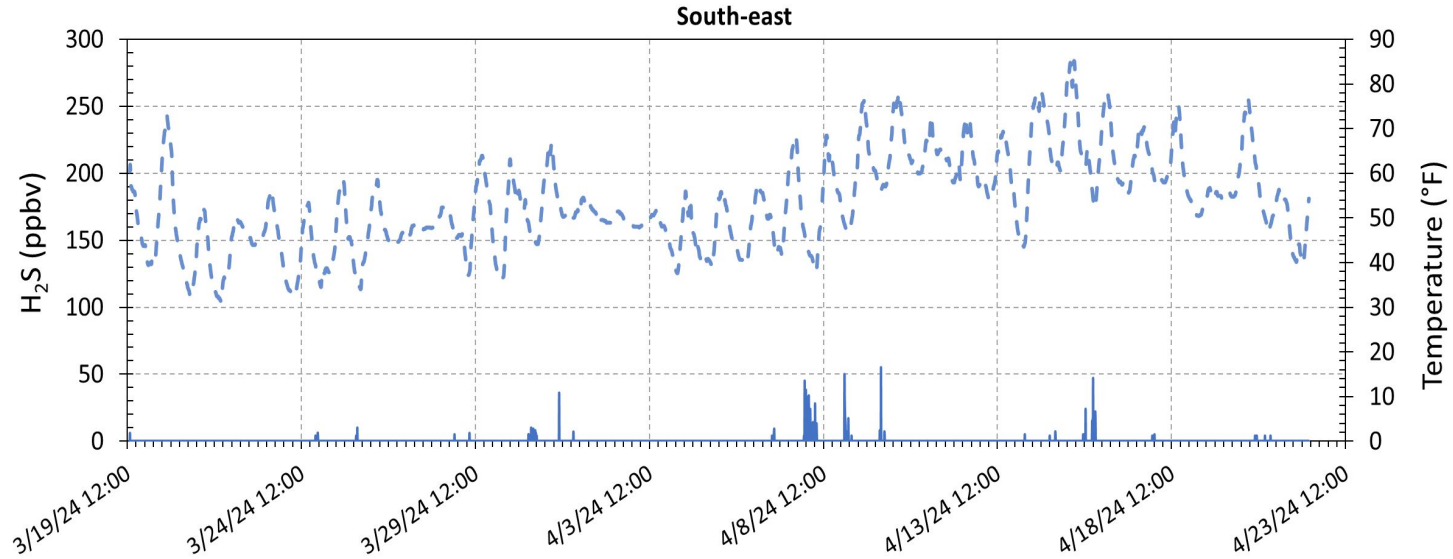
# Monitoring Data- Fenceline Loggers - South



H <sub>2</sub> S Concentration Range (PPB)			Percent of Values Detected above "Zero"
Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	
1	8	4 - 68	7%

- Relatively lower detection magnitude and frequency compared to north side fence line locations.

# Monitoring Data- Fenceline Loggers - Southeast



H <sub>2</sub> S Concentration Range (PPB)			Percent of Values Detected above "Zero"
Including "Zero" readings	Excluding "Zero" readings	Min/Max (Excluding "Zero" Readings)	
0	13	4 - 55	2%

- Relatively lower detection magnitude and frequency compared to north side fence line locations.

# Monitoring Results - Fenceline

- Logger at north fenceline, closer to Annapolis Maritime Museum and Park, recorded highest H<sub>2</sub>S concentration:
  - Detection frequency: 24%
  - Concentrations: 4 ppbv to 276 ppbv.
- Northwest fence line logger measured next highest H<sub>2</sub>S levels:
  - Detection frequency: 19%
  - Concentrations: 4 ppbv to 163 ppbv.
- Southeast and south fenceline loggers had lower detection frequencies:
  - Southeast: 2% detection frequency, concentrations 4 – 55 ppbv.
  - South: 7% detection frequency, concentrations 4 - 68 ppbv.
- Higher concentrations and detection frequencies to north and northwest likely influenced by prevailing winds.

Monitoring Locations	Average H <sub>2</sub> S Concentration		H <sub>2</sub> S Concentration Range Min/Max (Excluding “Zero” Readings)	Percent of Values Detected above “Zero”
	Including “Zero” readings	Excluding “Zero” readings		
Northwest	3	16	4 - 163	19%
North	6	26	4 - 276	24%
Southeast	0	13	4 - 55	2%
South	1	8	4 - 68	7%



# Odor Complaints Logged on Smell My City App During March 19- April 22

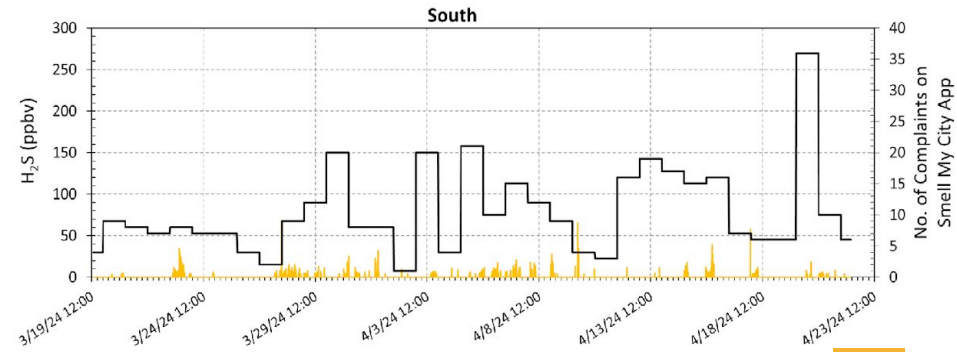
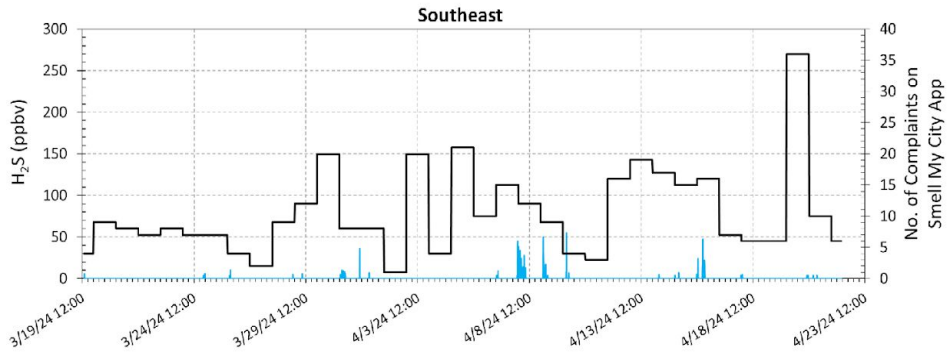
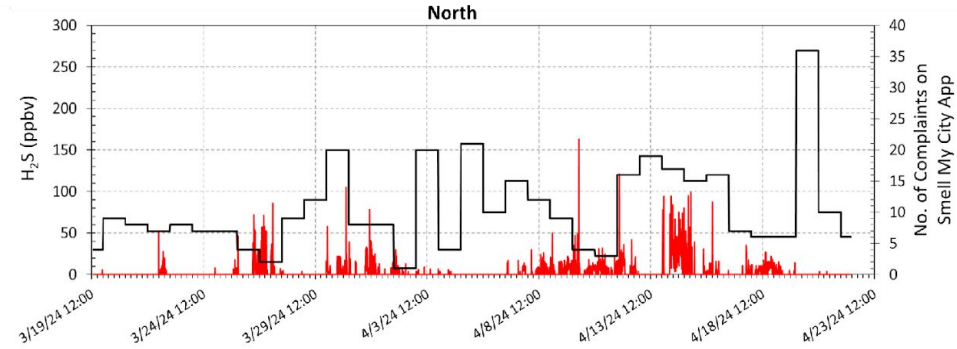
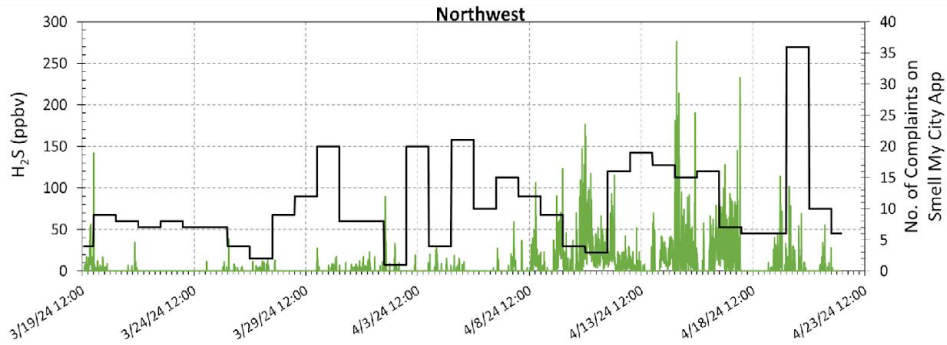


Heat map showing where most of the complaints are coming from.



Scatter plot showing the locations of individual complaints (same data shown differently)

# Number of Odor Complaints from Smell My City App per Day for the Sampling Duration Overlayed on Fence line Monitors Data



Although it appears that complaints were logged when the monitors recorded H<sub>2</sub>S spikes, a clear correlation was not observed between the two, as a considerable number of complaints were logged even when the loggers recorded negligible levels of H<sub>2</sub>S.



Questions



# Next Steps

- HDR will continue other tasks within scope to include
  - Develop dispersion modeling
    - Formulates the atmospheric processes that disperse a pollutant emitted by a source
    - Used to predict concentrations at downwind locations
  - Develop technology recommendations
- Summer monitoring
- Acquire a design engineer to design the odor control improvements



# Projected Current Schedule

- **Dispersion Modeling Technical Memo:** Mid June
- **Odor Control Systems Evaluation Technical Memo:** Late July
- **Summer Monitoring:** late June to late July/early August
- **Summer Monitoring Findings report:** late August
- **Final Recommendations Technical Memo:** September
- **Kick-off for Design of Odor Control Improvements:** Oct./Nov.

# Contact Information



## For Capital Projects X764281 & S802389:

Chris Biggerstaff  
DPW Senior Engineer  
410-222-3191  
[pwbigg14@aacounty.org](mailto:pwbigg14@aacounty.org)

## For Odor Complaints:

Annapolis Odor Report Form:  
<http://aacounty.org/annapolisWRFODor>

Report Online via SeeClickFix:  
<https://www.aacounty.org/contact/report-concern#online>

## For Water/Sewer Emergencies:

Utility Operations Dispatch Center  
410-222-8400





# Questions

