

Use of Biotrickling Filters for Total Odor Control at Two Municipal WWTPs

Matthew E. Johnson¹, Louis D. le Roux¹, William G. Dunn²

¹BioAir Solutions, LLC, 110 Kresson-Gibbsboro Road, Voorhees, NJ 08043, USA

²Mount Holly Municipal Utilities Authority, Mount Holly, NJ 08060, USA

Corresponding Author: mjohnson@bioairsolutions.com

ABSTRACT

Over the last several years, the Mount Holly Municipal Utilities Authority (MHMUA) in New Jersey has undergone an extensive expansion project. The treatment capacity of its existing wastewater treatment plant was increased, and a new 3 Mgd plant was constructed. As part of the expansion program, MHMUA incorporated an extensive odor management program to meet its NJ DEP permit requirements and to minimize the impact on nearby residents, businesses, and travelers.

MHMUA selected BioAir Solutions' EcoFilter biotrickling filter technology as the desired odor control solution after an extensive review of the odor control products available on the market. The biotrickling filters use plastic, structured synthetic media that represents the latest in biotrickling filter technology, capable of removing both organic and inorganic odors. The EcoFilter technology combines the sustainability and low operating cost associated with biological treatment with the durability and acid-resistance of synthetic material, which eliminates media maintenance and replacement cost.

The MHMUA project represents the largest biotrickling filter installation in the state of New Jersey. It consists of five biotrickling filters that are installed at various locations at the treatment plants, treating odors from sources such as the grit and screenings building, sludge storage tank, surge tank, rotary drum thickener, gravity thickener, drain pump station, screw conveyor, and headworks.

This paper provides an overview of the project along with performance data for the odor control systems installed at the various locations at the MHMUA wastewater treatment plants.

KEYWORDS

Biotrickling filter, H₂S Removal, odor removal, biological odor control



Use of Biotrickling Filters for Total Odor Control for Two Municipal WWTP's

Louis D. le Roux – BioAir Solutions
Matthew E. Johnson – BioAir Solutions
William G. Dunn – Mount Holly MUA

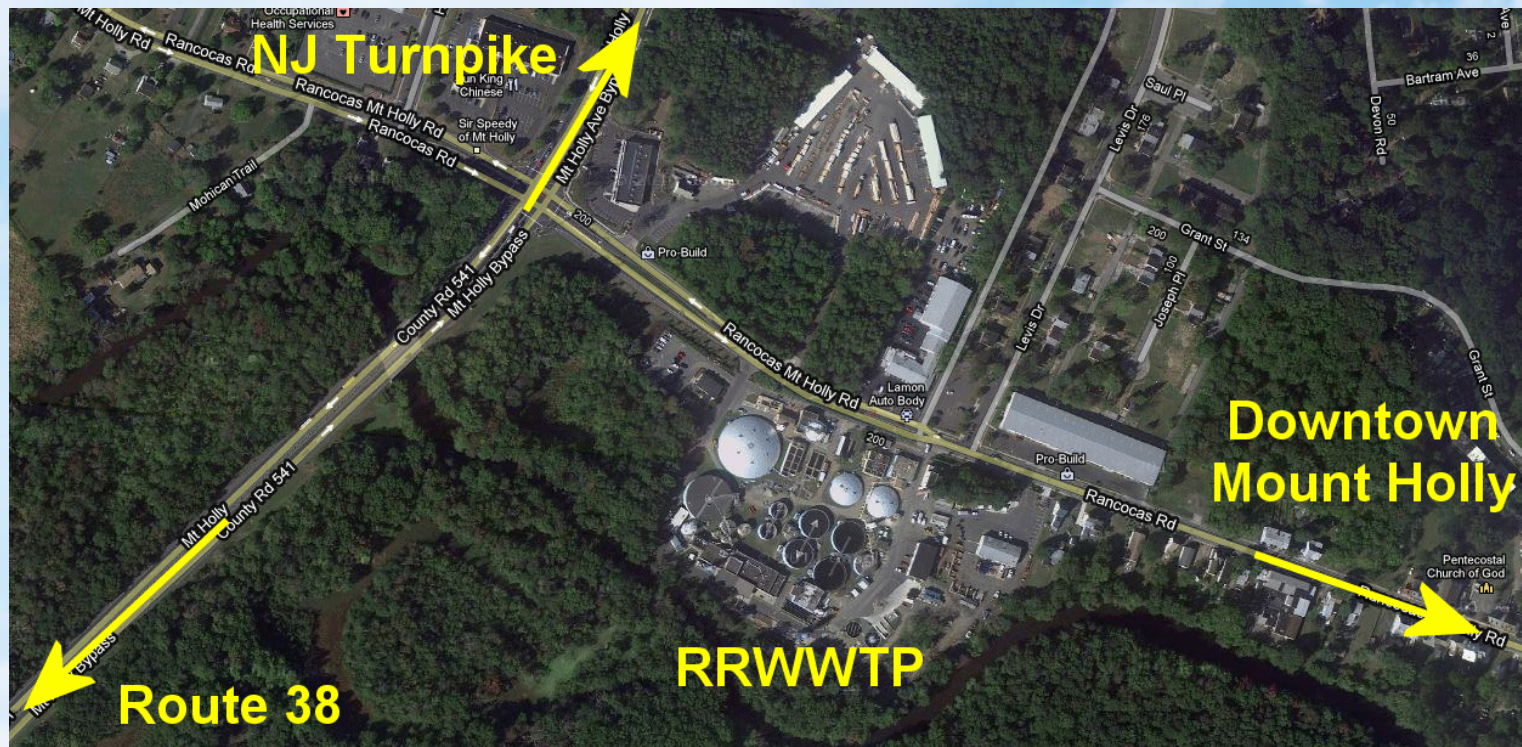
Background

Mount Holly Municipal Utilities Authority (MHMUA)

- Accepts wastewater from Mt. Holly and portions of Eastampton, Hainesport, Lumberton, Westampton, and Moorestown
- New developments within service area required additional 1 MGD capacity
- Aging plant (Rancocas Road WWTP) not meeting design capacity of 5 MGD

Rancocas Road WWTP

- Located in populated, high-traffic area
- No room for expansion
- Closely surrounded by Rancocas Road, Rancocas Creek, wetlands, and adjacent properties



Rancocas Road WWTP

- Odor complaints from traffic on Rancocas Road
- Development proposed across the street

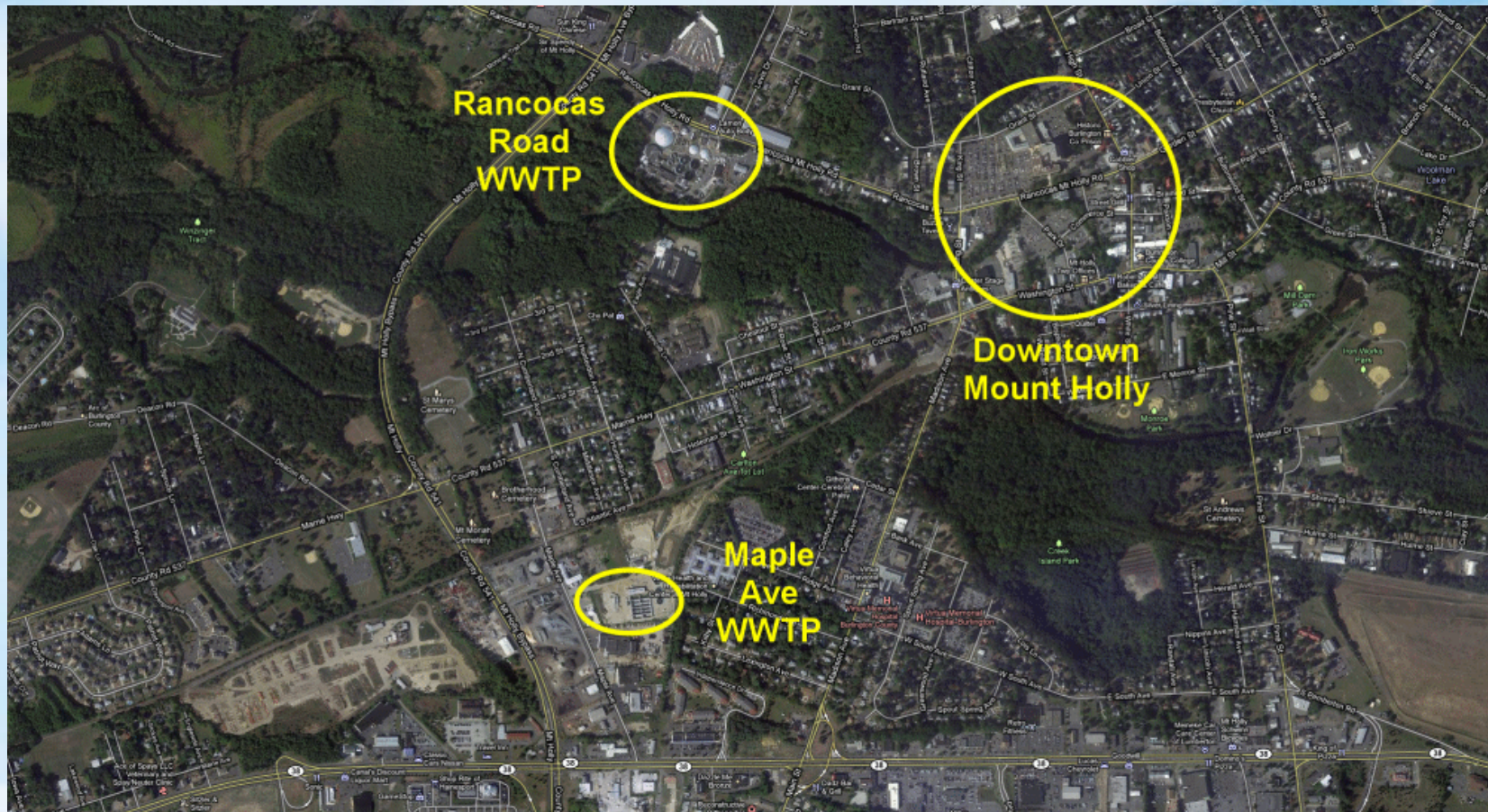


Rancocas Road WWTP



MHMUA Solution

- Expansion of Rancocas Road WWTP
- New 3 MGD plant – Maple Ave WWTP

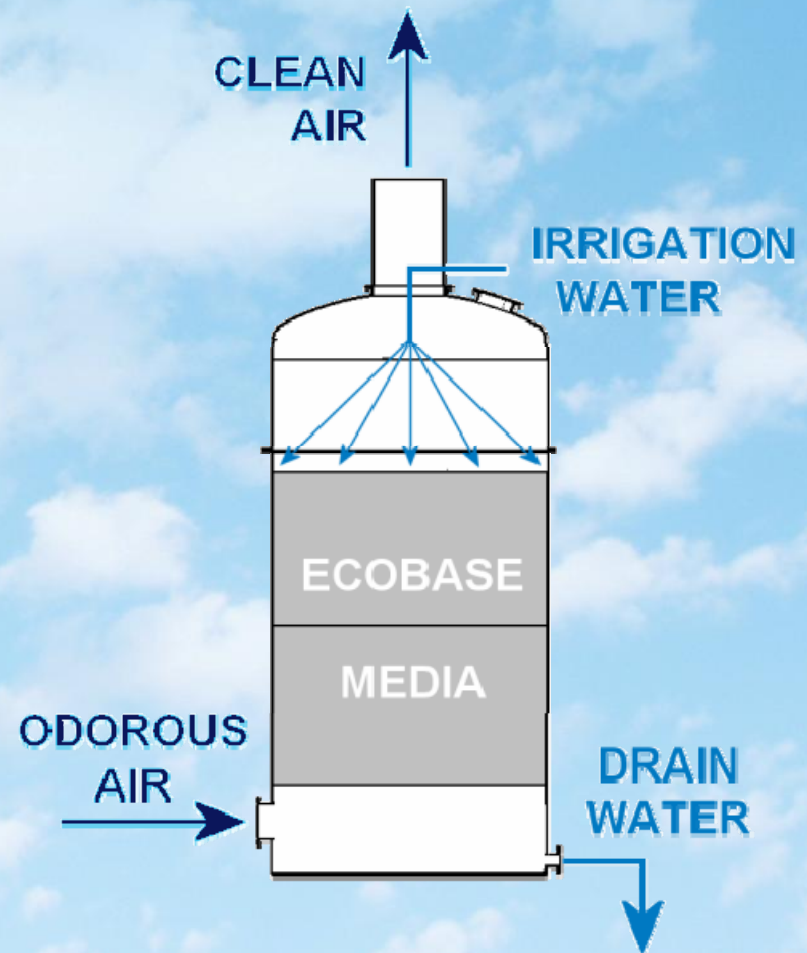


Odor Control Solutions

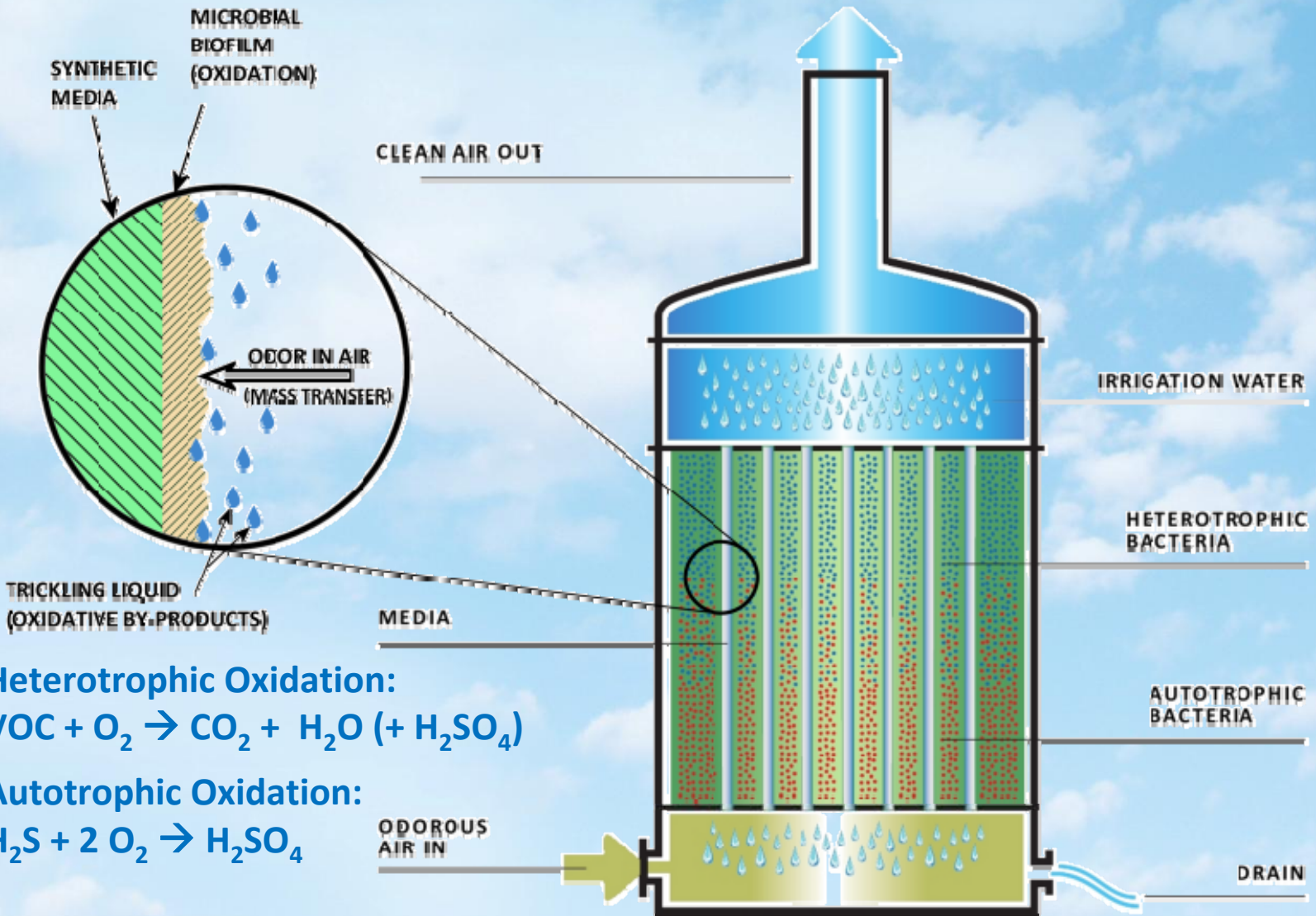
- Both plants required odor control
- RRWWTP required air discharge permits from NJDEP
- MHMUA explored various technologies
- EcoFilter® Biotrickling filters selected
 - Long media life (> 10 years) / no media change out
 - Low operating cost - no chemicals or consumables
 - Low maintenance requirements

Biotrickling Filter Process

- Microorganisms grow on the media
 - Structured material
 - High surface area
 - Long life
- Odorous air passes upward through media and is discharged from top stack
- Irrigation water trickles down through media bed and drains from bottom



Biotrickling Filter Process



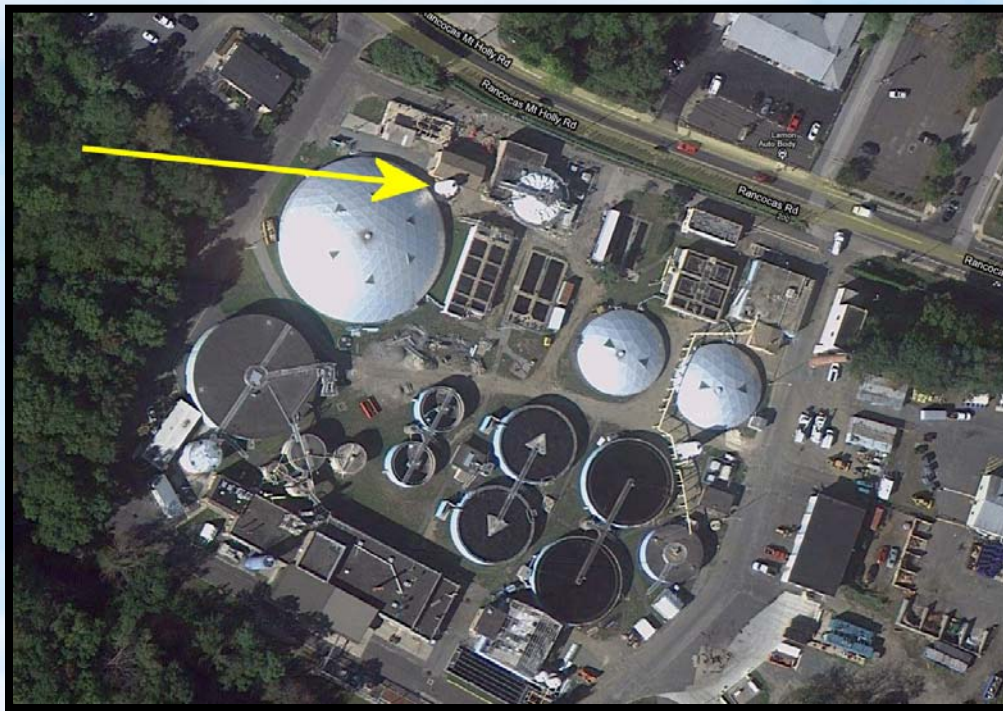
Mount Holly MUA Project

- **Rancocas Road WWTP**
 - **Headworks Area:** 1 x EcoFilter EF124
 - **Sludge Storage Tank and Surge Tank #2:** 1 x EcoFilter EF124
- **Maple Avenue WWTP**
 - **Headworks:** 2 x EcoFilter EF62
 - **Drain Pump Station:** 1 x EcoFilter EF62
- **Performance Guarantee**
 - **99% H₂S Removal**
 - **99% Ammonia Removal**
 - **95% Odor Removal**

Odor Control Systems Provided

Rancocas Road Headworks Area – 1 x EcoFilter EF124

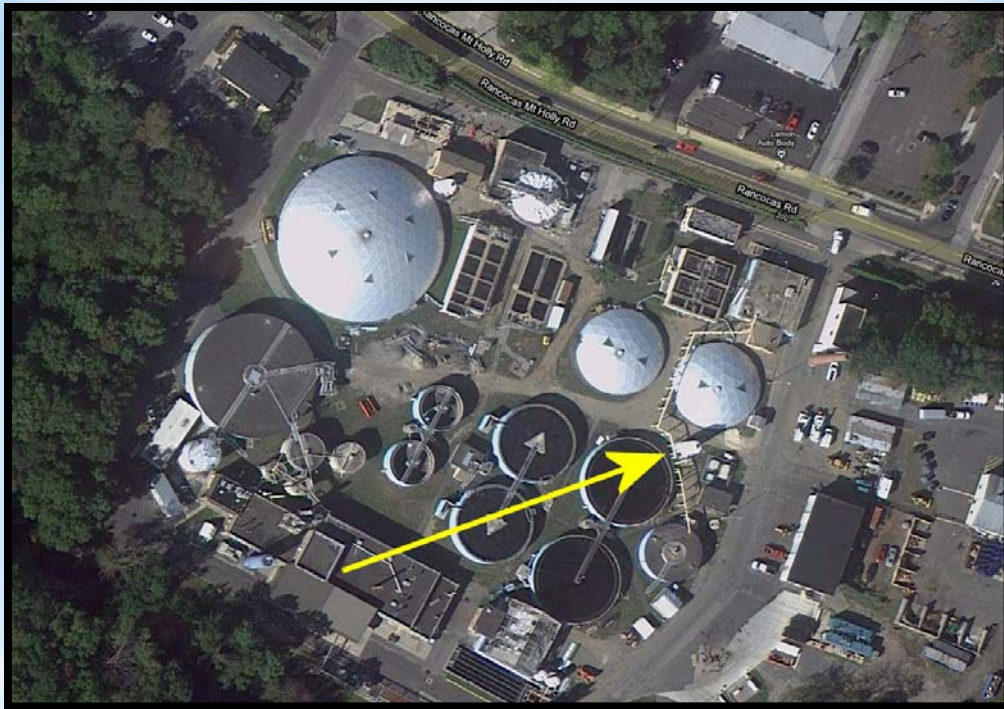
- **Odor Sources: Gravity Sludge Thickener, Rotary Drum Thickener, Headworks/Bar Screens**
- **Airflow: 4800 cfm**
- **Designed for H₂S, Ammonia, and Organic Odor Removal**



Odor Control Systems Provided

Rancocas Road Sludge Tank – 1 x EcoFilter EF124

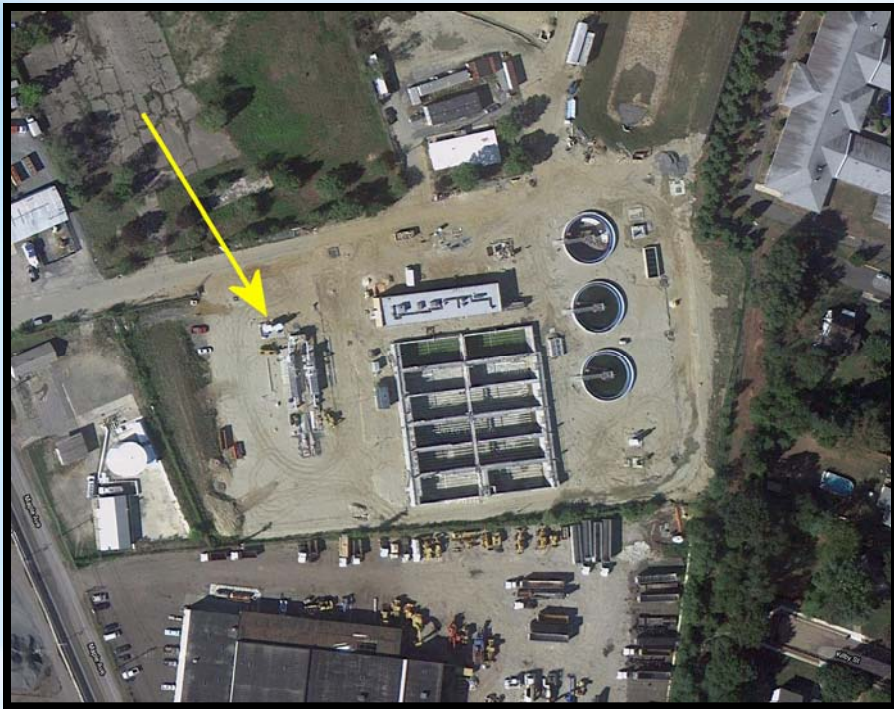
- Odor Sources: Sludge Storage Tank / Surge Tank No. 2
- Airflow: 4000 cfm
- Designed for H₂S, Ammonia, and Organic Odor Removal



Odor Control Systems Provided

Maple Ave Headworks – 2 x EcoFilter EF62

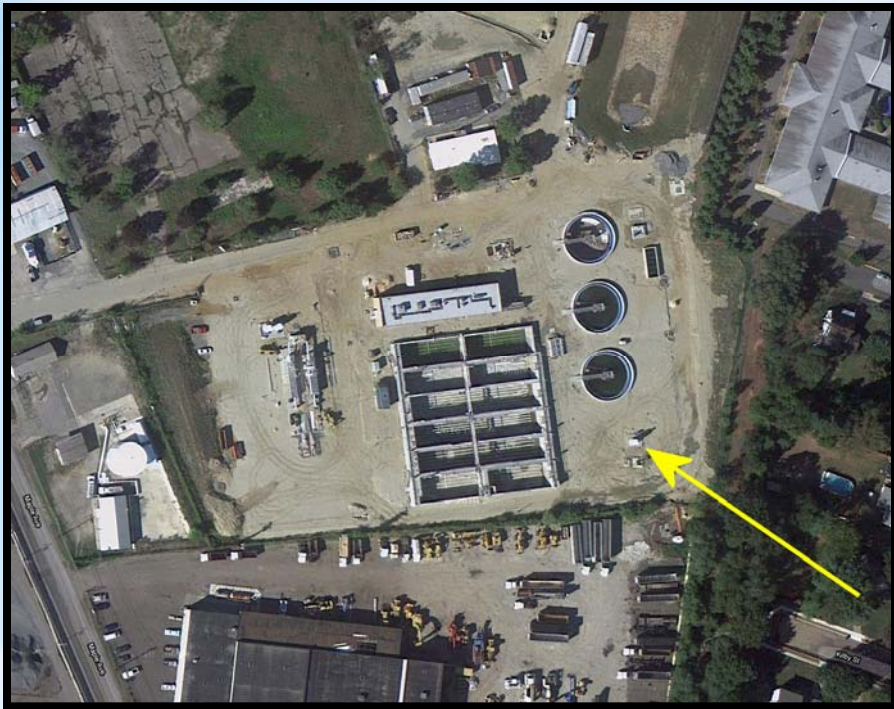
- Odor Source: Headworks
- Airflow: 1030 cfm
- Designed for H₂S and Organic Odor Removal



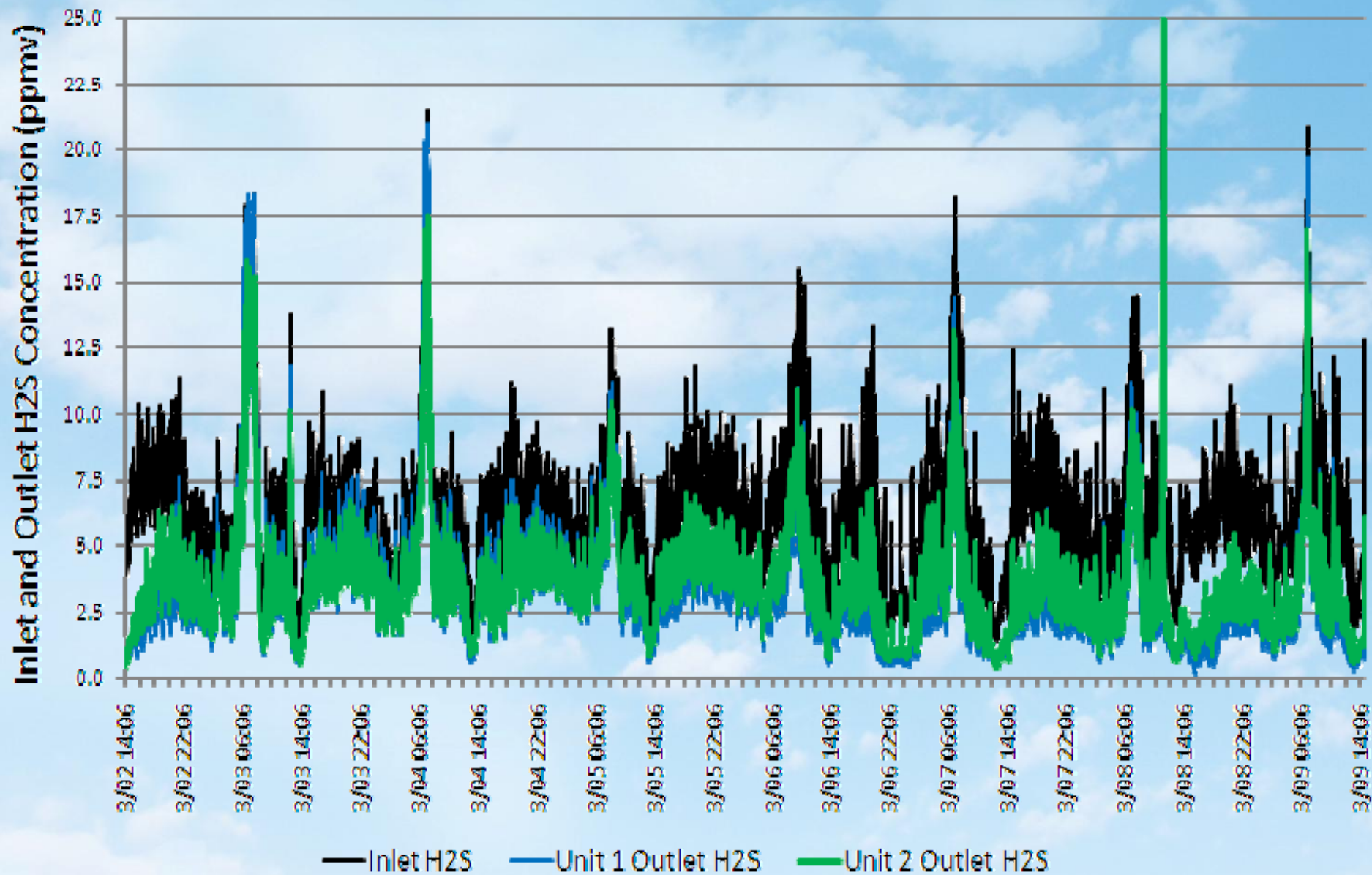
Odor Control Systems Provided

Maple Ave Drain Pump Station – EcoFilter EF62

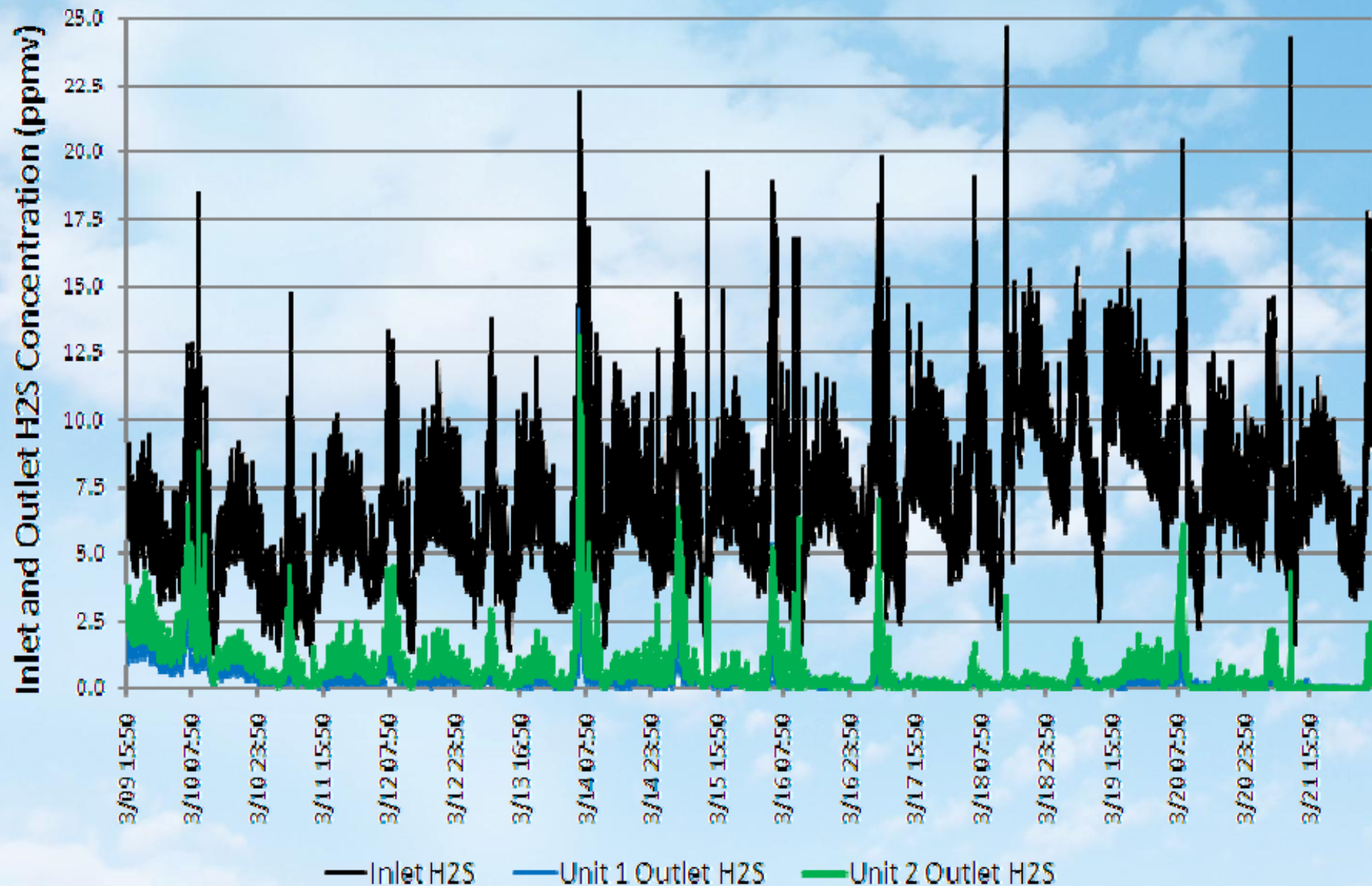
- Odor Source: Plant Drain Pump Station
- Airflow: 515 cfm
- Designed for H₂S and Organic Odor Removal



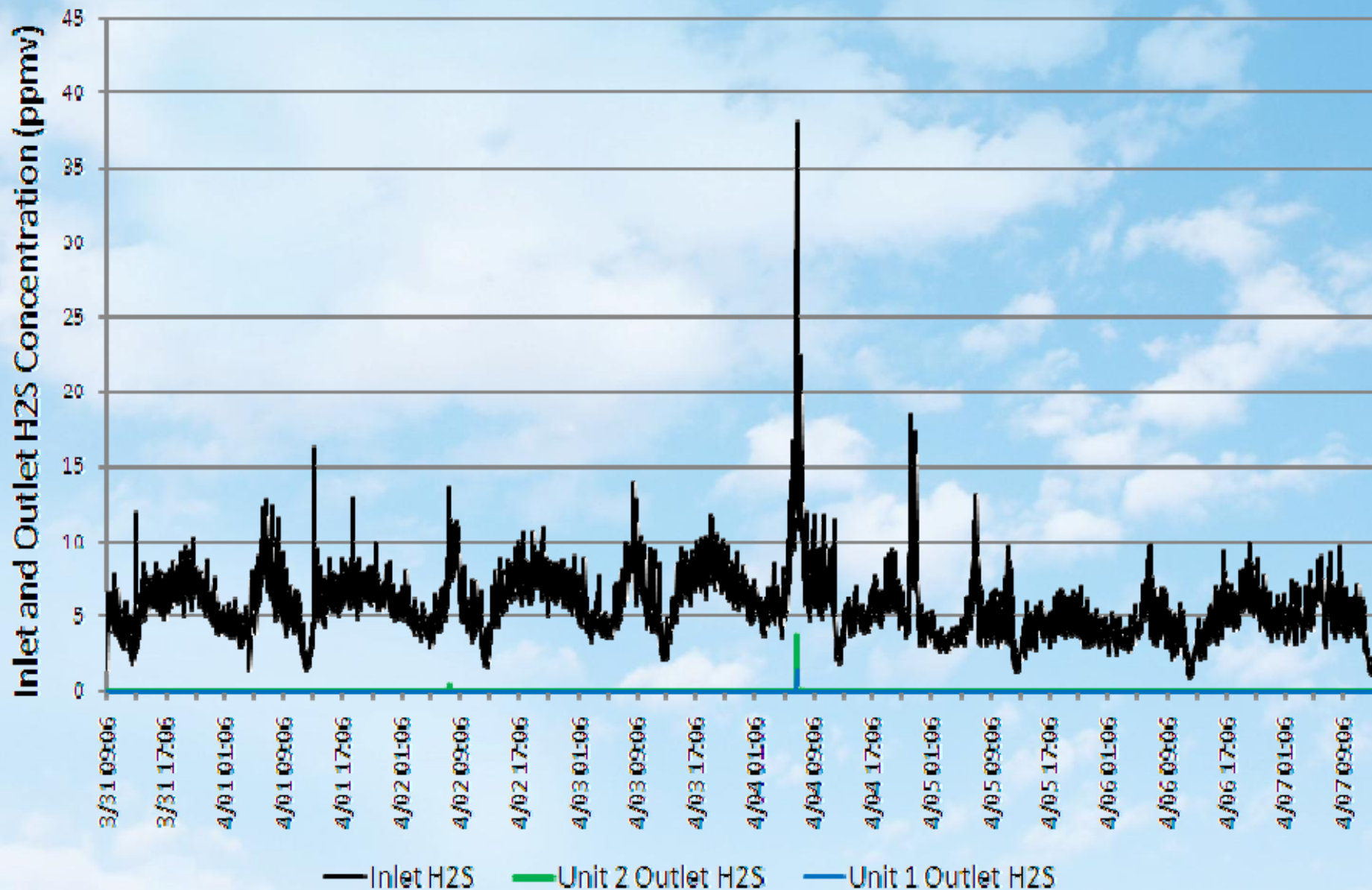
Mount Holly - Maple Ave Headworks - BioAir EcoFilter startup - Mar 2-9, 2011



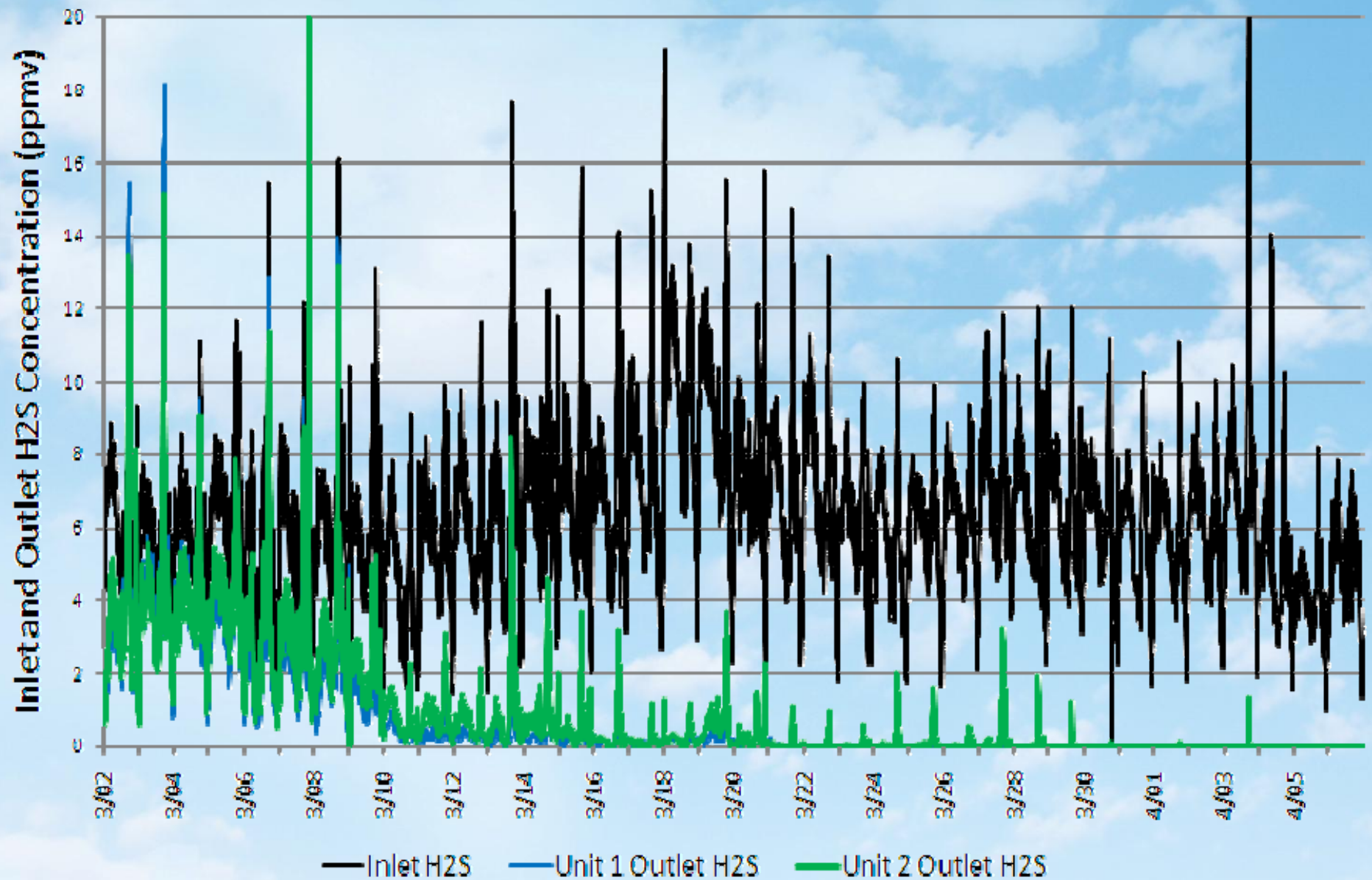
Mount Holly - Maple Ave Headworks - BioAir EcoFilter acclimation - Mar 9-22, 2011



Mount Holly - Maple Ave Headworks - BioAir EcoFilter performance - Mar 31-Apr 7, 2011



Mount Holly - Maple Ave Headworks - BioAir EcoFilter acclimation - Mar 2-Apr 7, 2011



Performance Summary

Maple Avenue Headworks

Inlet H₂S concentration (avg.) = 5.35 ppmv

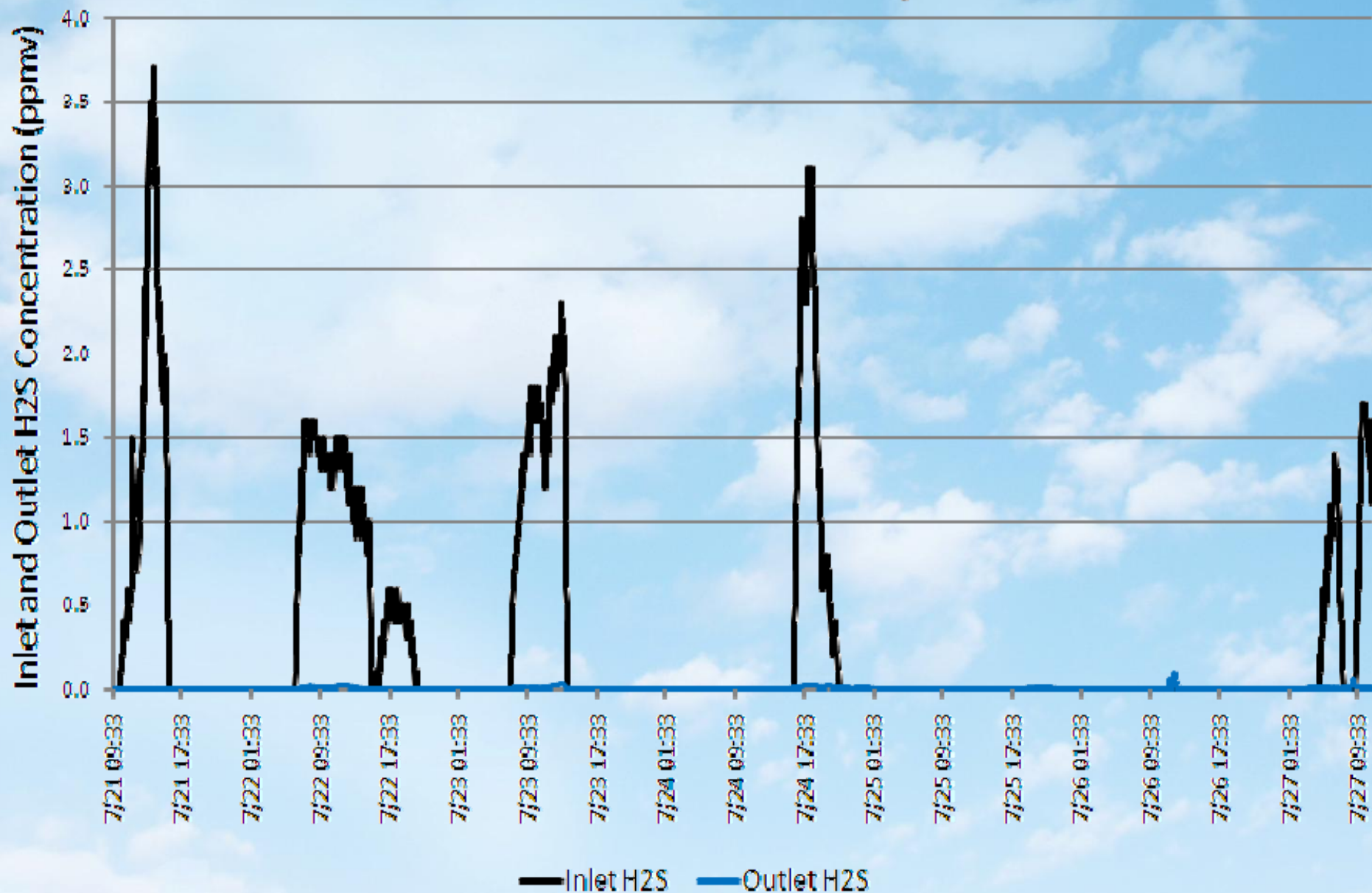
Unit 1 outlet H₂S (avg.) = 0.0003 ppmv

Unit 1 H₂S removal efficiency (avg.) = 99.994%

Unit 2 outlet H₂S (avg.) = 0.0014 ppmv

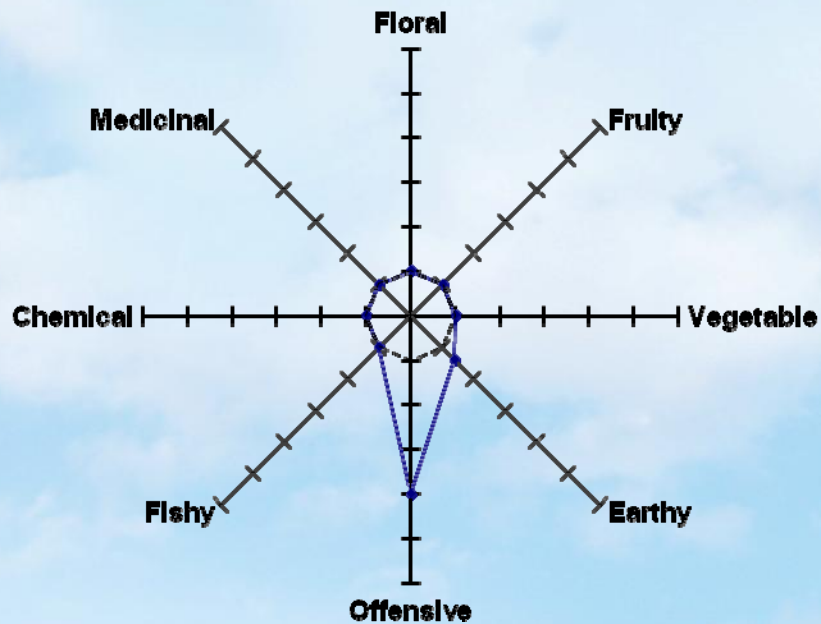
Unit 2 H₂S removal efficiency (avg.) = 99.975%

Mount Holly - Rancocas Rd Surge/Sludge Tanks BioAir EcoFilter Performance - July 21-27, 2011

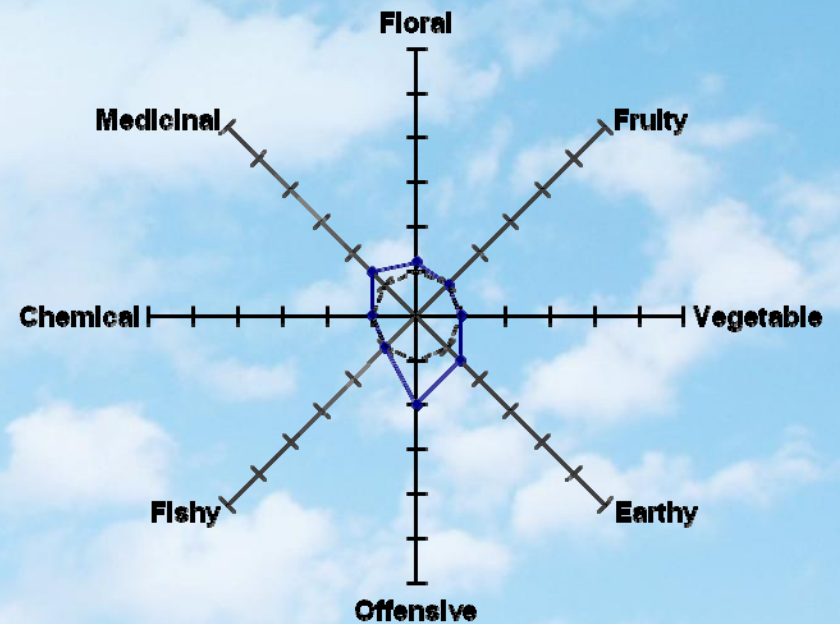


Odor Removal – RR Sludge Tank

Odor Descriptor Graph



Odor Descriptor Graph



	Inlet
DT	3300 OU
RT	1600 OU
Hedonic Tone	-4.4

	Outlet
	270 OU
	120 OU
	-0.2

Project Results

Rancocas Road WWTP

- Elimination of odor complaints from drivers and residents along Rancocas Road
- Safer and more pleasant working conditions for plant employees in Headworks Building

Maple Ave WWTP

- New plant online with little impact on nearby neighborhoods

Contact Information

BioAir Solutions

110 Kresson-Gibbsboro Rd., Suite 303

Voorhees, NJ 08043

Phone: (856) 258-6969

www.bioairsolutions.com

Mount Holly Municipal Utilities Authority

29 Washington St.

Mount Holly, NJ 08060

Phone: (609) 267-0015

www.mhmua.com

Questions?

