



Reuse, Recycle and Recharge “Clean” Water



# Technology Mimicking Nature's Way to Treat Wastewaters

Presented at the 2025 NOWRA Mega-Conference, October 19-22, 2025

**The materials being presented represent  
IMET's opinions, and do NOT reflect the  
opinions of NOWRA.**

Aerobic biological technology that mimics nature's way results in sustainable treatment of wastewaters



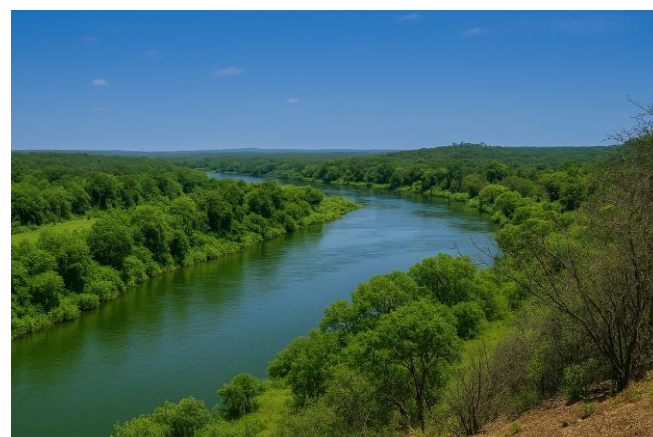
# Expected Results of Mimicking Nature in Wastewater Treatment

Negligible H<sub>2</sub>S odor

Negligible bio-sludge accumulation

Sustained healthy balance of BOD, TSS, TN and TP

Sustained active diverse microbial system, independent of hydraulic load



Nature is Sustainable  
and Successful

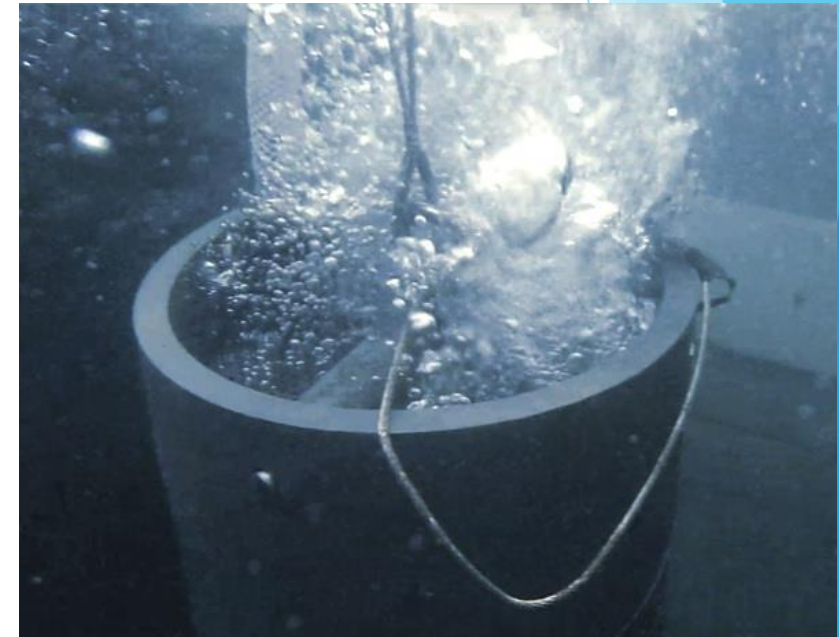
# Wastewater Treatment System Mimicking Nature

**Sustain aerobic environment, with dissolved oxygen (DO) levels  $\geq 3\text{ppm}$**

***Increase air to water interface by continuous movement of the water body***

**Nature** - Currents, Eddies, Wind, Storms, Waves, Waterfalls, Rain

**Design** - Continuous movement by circulation of wastewater through the packed bed of various porous media



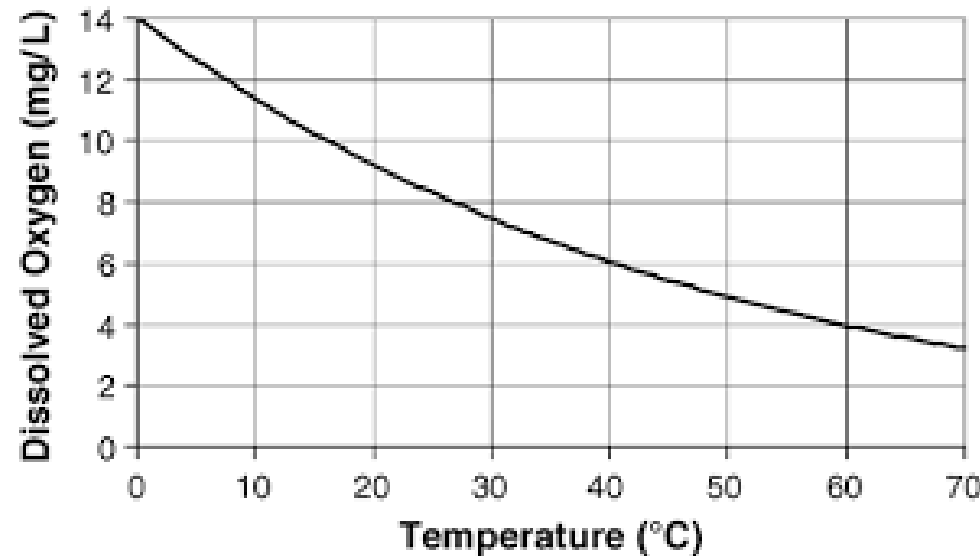
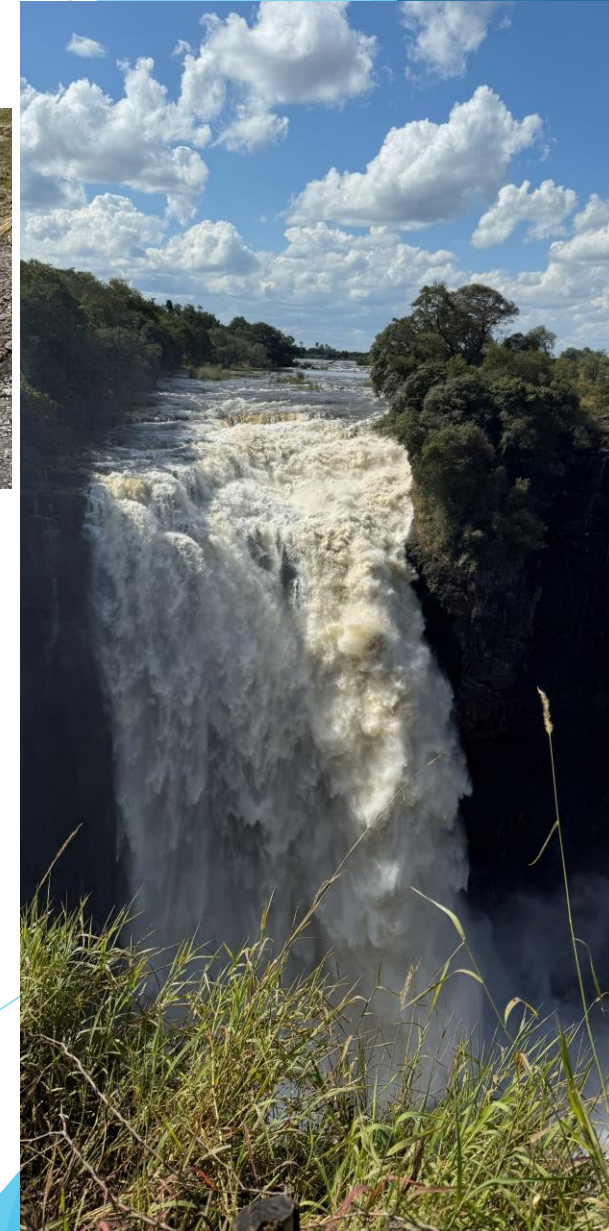
# Wastewater Treatment System Mimicking Nature

**Sustain aerobic environment, with dissolved oxygen (DO) levels  $\geq 3\text{ppm}$**

***Increase holdup time of air bubbles within the waterbody***

**Nature** – Large air to water interface via trapped air bubbles in white waters

**Design** – Entrapped air bubbles within the packed bed enabling extremely long contact time between air and water



# Wastewater Treatment System Mimicking Nature

**Sustain high population of dynamic, diverse aerobic microorganisms within the waterbody**

*Large solid surface area housing variety of aerobic microorganisms*

**Nature** – Variety of natural substrates with various surface characteristics

- ▶ Rocks, Stones, Sands, Corals, Tree Roots, Logs, etc.

**Design** - Highly porous packed bed of natural and synthetic media

- ▶ Varying Surface characteristics
- ▶ 3,000 – 16,000 sq ft / cu ft – Natural media
- ▶ 275 – 20,000 sq ft / cu ft – Synthetic media



# Wastewater Treatment System Mimicking Nature

## Treatment Module

- Packed with various natural and synthetic media with pore structures of primarily 5 to 100 micron
- Continuously aerated via diffuser installed at the bottom
- Continuously circulating wastewater from the bottom through the top

## Aeration Pump

- Aerating the packed bed to sustain aerobic environment
- Using low energy to deliver expected level of treatment



# Deliverables

## Black and Grey wastewater Treatment

- Meet or exceed discharge BOD, TSS, TN and TP requirements
- Sustain negligible H<sub>2</sub>S odors
- Significantly minimize/eliminate bio-sludge accumulation
- No washout, independent to hydraulic loading
- Reduced footprint

## Lift Stations and Grease Interceptors/Traps

- Sustain negligible H<sub>2</sub>S odors
- Significantly minimize FOG and Biosolids build up
- Reduce BOD and TSS
- Continuously seed waterbody in tank and downstream



The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. The shapes are primarily triangles and polygons, creating a dynamic, layered effect. The text is centered on a white background that occupies the left and middle portions of the frame.

Case Studies

Onsite Wastewater  
Treatment

# Overnight Camp, Up to 320 Occupants Madison, Ohio

## Pre- Treatment

- BOD reduced to < 10ppm
- Ammonia discharge requirements are met
- H<sub>2</sub>S odor complaints eliminated

Treated wastewater is discharged to nearby creek



Parameter	#1	Units	Method	Date Analy
Alkalinity (as CaCO <sub>3</sub> )	725	mg/L	2320B	7/18/2025
Ammonia (as N)	18.7	mg/L	4500NH <sub>3</sub> F	7/25/2025
Nitrite (as N)	0.68	mg/L	4110B	7/18/2025
Nitrate (as N)	0.42	mg/L	4110B	7/18/2025



# Residential Septic Cleveland, Ohio

## Before Application

- Failing septic tank
- Plugged leachfield - health hazard
- Strong H<sub>2</sub>S odor



## After Application

- Reclaimed healthy leachfield
- H<sub>2</sub>S odor complaint eliminated
- No bio-solids pump outs since installation



Over a decade in operation

Parameter	#1	Units	Method	Date Analy
BOD-5	19	mg/L	5210B	4/18/2024
T. Kjeldahl Nitrogen (TKN)	5.0	mg/L	4500Norg-B,NH3C	4/29/2024
Total Suspended Solids	8	mg/L	2540D	4/19/2024
Nitrate + Nitrite (as N)	0.47	mg/L	4110B	5/1/2024

Typical grab sample test results

# RV Camp, 280 RV Camp Sites

Andover, Ohio

2,700 - 2,800 gallon per day

Discharging wastewater meeting standards to drip soil absorption field



High Strength  
Wastewater  
Treatment



Primary  
Treatment  
Tank 1



Primary  
Treatment  
Tank 2



# Vault Toilet Metroparks Cleveland, Ohio

## Before Application

- Major odor complaints
- Patrons avoid using toilets
- Frequent bio-solids and trash pump outs

## After Application

- H<sub>2</sub>S odor complaints eliminated
- Patrons enjoy use of toilets
- No bio-solids buildup
- Minimal pump outs

## Grab Sample taken and tested by North American Testing

CBOD<sub>5</sub> = 20 mg/L

TSS = 12.4 mg/L

NH<sub>3</sub>-N = 100 mg/L



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Case Studies:

# Decentralized Wastewater Treatment Plants

# Large Resort, 250 rooms

## Converted SBR to Nature Mimicking System

Bermuda

- Effluent BOD meeting discharge requirements
- Negligible H<sub>2</sub>S odor complaints
- Healthy water discharged to ocean through deep well
- No bio-sludge pump outs



# Small Coastal Town, 3,500 Residents increasing to 5,000 - 15,000 during tourist season Karaburun, Izmir Turkiye

Healthy treated wastewater is re-used to irrigate olive grove

- Met BOD and TSS discharge requirements
- H2S odor complaints eliminated
- Negligible bio-sludge production
- Blue flag restored for the beach



## The Microbiological parameters monitored

Parameter	Coastal and transitional waters Limit values	Inland waters Limit values
Escherichia coli (Faecal Colibacteria )	250 cfu/100 ml	500 cfu/100 ml
Intestinal Enterococci (streptococci)	100 cfu/100 ml	200 cfu/100 ml



# Case Study: Lift Station

# Reduction of H2S odor and Solids Buildup

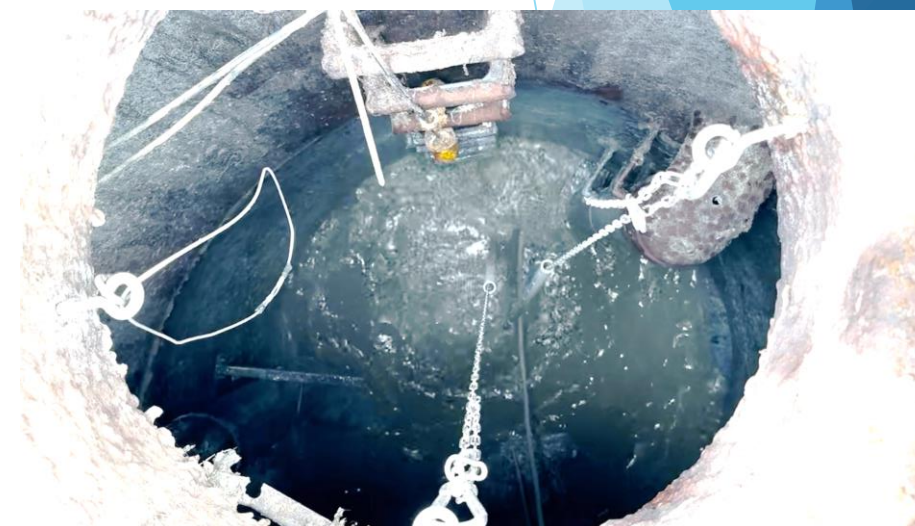
Ottawa County, Ohio

- H2S odor complaints eliminated
- Minimal solids buildup
- Significant reduction in CBOD5

PS #50 IMET installed 2/27/25	
<u>Date</u>	<u>CBOD5 Result(mg/L)</u>
2/25/25	1284.00
3/12/25	88.90
4/1/25	43.80
4/22/25	107
5/27/25	239.40



Before IMET Installation - Feb 25<sup>th</sup> 2025



After IMET Installation - April 21<sup>th</sup> 2025

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# Case Study: Grease Interceptor

# Reduction of H<sub>2</sub>S odor and FOG buildup

## Oceanfront Resort, Aruba

- H<sub>2</sub>S odor complaints eliminated
- FOG minimized
- Significant reduction of pump outs
- Significant reduction in maintenance
- Downstream lines seeded with aerobic microorganisms



# Results Achieved by Mimicking Nature in Wastewater Treatment in all Applications

## **Black and Grey Wastewater Treatment**

- BOD, TSS and TN discharge requirements met and exceeded
- H<sub>2</sub>S odor complaints negligible or eliminated
- Bio-sludge buildup substantially reduced
- No washout
- Footprint reduced for complete treatment

## **Lift Stations and Grease Interceptors/Traps**

- H<sub>2</sub>S odor complaints eliminated
- FOG and Biosolids build up significantly minimized
- BOD and TSS in wastewater substantially reduced
- Waterbody in tank and downstream continuously seeded

# IMET® Certification from



NSF/ANSI Standard 40-2020  
Residential Wastewater Treatment Systems

NSF/ANSI Standard 245-2020  
Wastewater Treatment Systems - Nitrogen Reduction