



CONFERENCE PROGRAM

*The Onsite Wastewater
Industry Event of the Year!*

October 25-28, 2026
Westminster, Colorado
Westin Westminster Hotel

A collaboration of the following organizations:



www.nowra.org/conference/mega-conference

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To learn more about or to join NOWRA's Corporate Membership program, please contact us at 978-496-1800,
by email at info@nowra.org, or on our website at nowra.org/about/corporate-members/.

WELCOME TO THE 2026 ONSITE MEGA-CONFERENCE!

Thank you for joining us in Colorful Colorado! We would like to extend our appreciation for your attendance at the 2026 NOWRA Mega-Conference, and for being part of our mission to take the onsite wastewater industry to new levels, not only here in Colorado but across the country. On behalf of the Colorado Professionals in Onsite Wastewater, we are excited for the opportunity to host this year's national conference in Westminster, CO.

I also want to recognize the CPOW Board of Directors, the CPOW sub-committee for Conference Planning, Tom Groves, Executive Director of NOWRA, and all the members of the Mega-Conference Planning Committee. Their hard work and dedication has gone a long way into making this year's event a success, and we couldn't do it without them!

This year's conference theme "Peak to Plains: Elevating the Future of Wastewater," speaks to the ongoing pursuit of the onsite wastewater industry to grow and change with the times, and what is in store for the future. Your attendance at this event not only helps to increase your industry knowledge and improve your business skills, but you are also helping to ensure the continued growth and development of the OWTS industry across the country. Thank you for being part of the future of the OWTS industry!

Sincerely



Kat McGarvy

Colorado Professionals in Onsite Wastewater President

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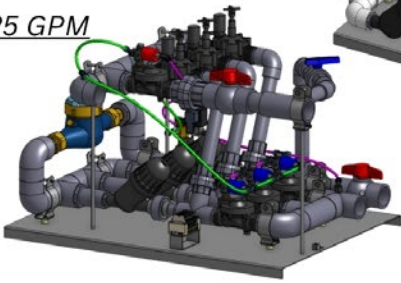
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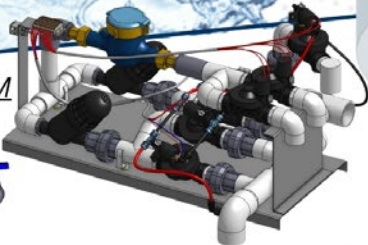
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WESTMINSTER, COLORADO
OCTOBER 2026

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- Ask about free training
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COME SAY HELLO. ASK QUESTIONS. TALK WASTEWATER.

We're looking forward to seeing you in Colorado!



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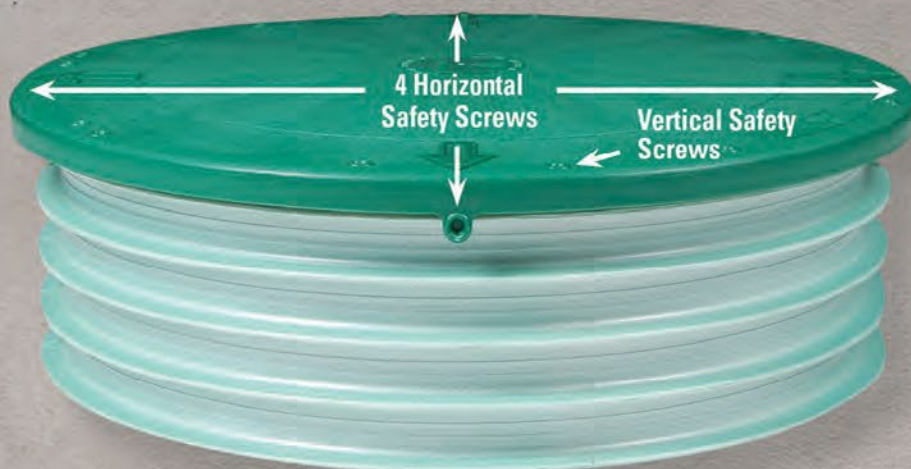
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EF-4 Combo 18

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TB-4-18 Housing
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4" Effluent Filter EF-4

One-piece effluent filter fits in 4" Sanitary Tee.

- Injection molded PolyPro
- Simple to install - Easy to clean

4" Sanitary Inlet/Outlet T-Baffle™

Injection molded T-Baffle™.

- Injection molded T-Baffle
- Fits 4" Sch. 40 and SDR-35 pipe
- Simple to install
- May also be used as Inlet & Outlet Tee

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244 ft. of 1/16" filtration area.

Increases time between filter cleaning.

EF-6 Combo Includes Filter, Housing and Bushing

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TB-6 Housing

Gas/Solids Deflector



6" Effluent Filter EF-6

One-piece effluent filter fits in 6" T-Baffle™.

- Injection molded PolyPro
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6" Sanitary T-Baffle™

Injection molded T-Baffle™.

- Injection molded
- Fits 4" Sch. 40 and SDR-35 pipe
- Simple to install
- May also be used as Outlet Tee with Solids Deflector

ANNUAL BUSINESS MEETING

Tuesday, October 27, 2026

Westminster Ballroom I | 5:00 PM – 6:30 PM

In accordance with Article III, Section 7 of the NOWRA Bylaws, all NOWRA members are formally notified through this communication of the Annual Membership Meeting, scheduled to occur on October 27, 2026, from 5:00-6:30 pm. The NOWRA 2026 Annual Membership Business Meeting will be held in the Westin Westminster Hotel and Convention Center, Westminster, Colorado. All Members are urged to attend and participate in this meeting. This notice was placed on the NOWRA website (www.nowra.org) and sent to all members in the E-newsletter.

Agenda

1. Roll Call—A master membership list will be available.
2. Reading of the 2026 Annual Meeting Notice
3. President's Report
4. Secretary-Treasurer's Report
5. Executive Director's Report
6. Committee Report
7. Other Business
8. Open Member Discussion
9. Adjournment

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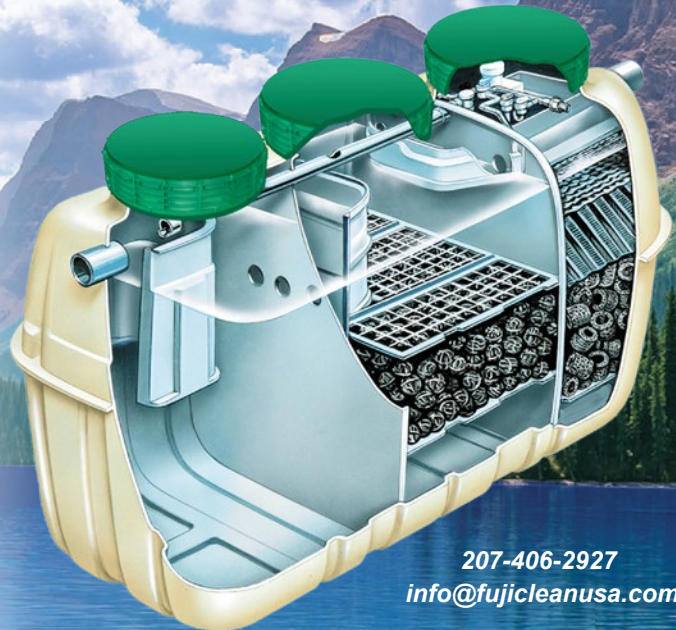


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    			2026 CONFERENCE AGENDA			Sunday, October 25, 2026		
Start	Finish							
8:00 AM	11:00 AM							NOWRA Board of Directors Meeting, Meadowbrook I
12:00 PM	5:30 PM							Registration Open, Registration Desk, Westminster Foyer
12:00 PM	5:00 PM							Optional Emerging Professionals Scholarship Cornhole Tournament, Lakehouse
12:00 PM	5:00 PM							Exhibitor Move-In, Legacy Ballroom
6:00 PM	8:00 PM							Welcome Reception, Legacy Ballroom and Westminster Foyer
			Monday Morning, October 26, 2026					
7:00 AM	5:00 PM							Registration Open, Westminster Foyer
7:15 AM	8:00 AM							BOG/Government Relations Committee, Meadowbrook I
7:00 AM	8:00 AM							Continental Breakfast in Westminster III & IV
7:00 AM	6:00 PM							Exhibit Hall, Legacy Ballroom
			Opening General Session 1			Westminster III & IV		
Room								
8:00 AM	8:20 AM							Conference Welcome Colorado Welcome - Nicole Rowan, CDPHE President, CPOW; President, NAWT; President, SORA; and Chris LeClair, President, NOWRA
8:20 AM	9:10 AM							An International Perspective on Onsite Systems - Dr. Yurie Shirakawa, Japan
9:10 AM	10:00 AM							Next Steps in Onsite Wastewater Research Findings - Dr. Bryan Brooks, Baylor University
10:00 AM	10:30 AM							Break in Exhibit Hall
10:30 AM	11:00 AM							US EPA Update - Andrew Sawyers (invited)
11:00 AM	11:30 AM							Status of Advocacy/Lobbying Efforts on Behalf of Onsite and Decentralized Wastewater, Tim Perrin and Marissa Campbell, The Southern Group
11:30 AM	12:00 PM							NOWRA Announcements and Setting the Stage, Chris LeClair, NOWRA President

2026 MEGA-CONFERENCE AGENDA

Monday Afternoon, October 26, 2026

12:00 PM	1:30 PM	Lunch Provided, Westminster III & IV Poster Presentations, Westminster Foyer				
12:00 PM	1:30 PM	Backhoe Roe-D-Hoe, Patio				
12:00 PM	1:30 PM	State Affiliate Leader Meeting, Meadowbrook I				
12:00 PM	1:30 PM	SORA Business Meeting, Meadowbrook II				
Track Topic	Cesspools	Microbial	Workforce	State	NAWT 1	Vendor Training
Track Number	1	2	3	4	5	Vendor A
Room	WB I	WB II	Standley I	Cotton Creek	Standley II	Waverly
Start	Finish					
1:30 PM	2:15 PM	2:15 PM	2:15 PM	2:15 PM	2:15 PM	2:15 PM
2:15 PM	3:00 PM	3:00 PM	3:00 PM	3:00 PM	3:00 PM	3:00 PM
3:00 PM	3:45 PM	3:45 PM	3:45 PM	3:45 PM	3:45 PM	3:45 PM
3:45 PM	4:30 PM	4:30 PM	4:30 PM	4:30 PM	4:30 PM	4:30 PM
4:30 PM	6:00 PM	6:00 PM	6:00 PM	6:00 PM	6:00 PM	6:00 PM
6:30 PM	9:30 PM	9:30 PM	9:30 PM	9:30 PM	9:30 PM	9:30 PM

2026 MEGA-CONFERENCE AGENDA

Tuesday Morning, October 27, 2026

7:00 AM	8:00 AM	Light Continental Breakfast in WB III & IV, Exhibit Hall				
7:00 AM	1:00 PM	Exhibit Hall Open, Legacy Ballroom				
7:00 AM	8:00 AM	Corporate Members Meeting, Meadowbrook I				
7:00 AM	4:30 PM	Registration Open, Westminster Foyer				
Track Topic	International/National	Soil	Education & Testing	Technical	NAWT 2/Emerging	Vendor Training
Track Number	6	7	8	9	10	Vendor B
Room	WB I	WB II	Standley I	Cotton Creek	Standley II	Waverly
Start	Finish					
8:00 AM	8:45 AM	O & M Case Study in Japan and in Asian Countries -Shirakawa	In Development: New Regulatory Professional Training Course -Blodig, Cousino, & Tate	Methodology for Quantitative Cumulative Effects Assessment of Onsite Wastewater Systems -Manwell	Challenges of Short Term Rentals (STR) Serviced by OWRs and How to Manage Them -Tatro	8:00 - 8:20 AM B1 - Roth ++++ 8:25 - 8:45 AM B2 - Roth ++++
8:45 AM	9:30 AM	EPA's Decentralized Wastewater Program Update -Faller	Best Practice Treatment Designs and Installations for Sodic Soils -Kele	High Strength Wastewater: Design, Results, and Lessons Learned -Ervin	From Crisis to Capacity: A Case Study in Building a Private Septage Disposal System -Jouvenaux	8:45 - 9:05 AM B3 - American Manuf ++++ 9:10 - 9:30 AM ++++
9:30 AM	10:15 AM	Closing America's Wastewater Gap Initiative Update -Mezzacapo	Real Estate Professionals as a Key Audience for Onsite Wastewater Education -Wassel, Halbrook, & Hawkins	Troubleshooting Treatment Processes for Optimum Dissolved Oxygen Concentrations -Lesikar	From Crisis to Capacity: Building Sustainable Septage Disposal Solutions Before your Community Runs out of Options -Birdsong	9:30 - 9:50 AM B5 - Hiblow ++++ 9:55 - 10:15 AM ++++
10:15 AM	10:45 AM	Break in Exhibit Hall, Poster Presentations Backhoe Roe-D-Hoe, Patio				
10:45 AM	11:30 AM	Challenges and Opportunities with Rural and Off-Grid Onsite System -Wirth & Yarosh	Coupling Laboratory Experiments with In Situ Investigations for the Recognition of a New On Site Sanitation Technique Case of the Optimized Vertical Sand Filter -Lakel & Decout	Evaluation of Negative Health Outcomes Associated with Soil Auger Use by Environmental Professionals -Humphrey	Pre-Backfill Digital Twin Documentation for Maintenance and Inspection -Grein	10:45 - 11:05 AM B7 - Anua ++++ 11:10 - 11:30 AM ++++
11:30 AM	12:15 PM	Closing the Wastewater Access Gap Forever: A National Roadmap to Bring Water and Sanitation to Every Community in the United States -Thatte, Thompson, & Forbis-Stokes	Quantifying Soil Suitability and Affordability of Septic Systems using Alabama State-Specific Analysis -Etter & Maxcy-Brown	Reviewing Proprietary Aerobic Treatment Units Testing Data During NSF Standard 40 Tests -Blount	Improving Permitting Efficiency with GPS/GIS: South Carolina's Selection and Deployment of a Statewide Solution -Poston & Hayes	11:30 - 11:50 AM B9 - Eljen Corp ++++ 11:55 - 12:15 PM ++++

2026 MEGA-CONFERENCE AGENDA

Tuesday Afternoon, October 27, 2026

Lunch Provided in Westminster III & IV Poster Presentations in Foyer Backhoe Roe-D-Hoe Finals, Patio						
Technical Practices Committee Meeting, Meadowbrook I						
Emerging Professionals Meet and Greet Meeting, Meadowbrook II						
Exhibitor Move-Out						
Track Topic		Looking Ahead	O&M	General Design	Technology	Financial
Track Number		11	12	13	14	15
Room		WB I	WB II	Standley I	Cotton Creek	Standley II
Start	Finish					
1:30 PM	2:15 PM	ICC 825 and the Future of Onsite Wastewater Treatment: Global Collaboration and Public Health Impact -May & Deland	Best Practices for Wastewater Management in Community Developments -Sundberg	Honu Hub - An Adaptive Decentralized Wastewater Infrastructure Solution (ADWIS) for Island Communities -Bair & Yeh	Designing Advanced Treatment Systems to Perform at High Elevations -Sherman	Asset Management as a Business Approach to OWTS Service -Lesikar
2:15 PM	3:00 PM	Are We There Yet? Vermont's Experience with Time of Travel for Siting Onsite Wastewater Systems -Douglas	UPC Compliant Solid Waste Interceptor as a Septic Alternative -Roberts	Design Considerations for RV Parks and Campgrounds -MacConnell	Utilizing Technology to Modernize a Septic Program -Morris	From Google to AI: How Homeowners Are Choosing and Communicating with Septic Contractors -Andreassen
Break, Westminster Foyer						
3:00 PM	3:15 PM					
3:15 PM	4:00 PM	Virginia Septic and Well Assistance Program: Rural Roots and Healthy Futures -Sandberg	Installation of Resilient Electrical Systems -Lesikar	Septic Tanks - Bigger is Better! -Heger	Liquid Only Sewer: Protecting the World's Water Through Scaleable Wastewater Infrastructure -Kunz	Helping Business Owners Protect Their Legacy & Exit Successfully -Ramirez
4:00 PM	4:45 PM	A Blueprint for Watershed Resource Protection Through Community Scale Integrated Infrastructure Management -Dowling & Cox	From Sample to Report: Making Sense of Wastewater Data -Faz-Cresie	Snow & Rain: Design Differences Between On-Site Systems in the Icy Cold and West Tropics -Kele & Heger	Picking Up The Pieces - Restoring a Failed Small Community Wastewater System -Buchanan	10-Year Anniversary Statewide OSS Loan Program: Successes and Lessons Learned -Cowles
NOWRA Annual Business Meeting & Reception, Westminster Ballroom I						
SORA Reception (invitation only), Flatirons						
Emerging Professionals Social and Reception (informal), offsite at The Stillery						
Regular Mega-Conference Concludes						

2026 MEGA-CONFERENCE AGENDA

Wednesday, October 28, 2026

7:00 AM		Registration, Westminster Foyer Light Continental Breakfast, Lakehouse and Cotton Creek	
8:15 AM			
Track Topic		Field Trip	Vacuum Truck Training
Room		Lakehouse	Cotton Creek I
8:00 AM	4:00 PM	Optional Field Trip Boarding at 8:15 AM Box Lunch Provided	NAWT Sponsored Vacuum Truck Training - Classroom training and parking lot (lunch not provided)
		State Affiliate USDA Technical Assistance Grant Meeting (8 AM - Noon)	
		Cotton Creek II	
		NOWRA USDA Grant	



Conference Concludes - See you next year in Columbus, Georgia! - October 17 - 20, 2027

HOTEL FLOOR PLAN

2026 Onsite Wastewater Mega-Conference

October 25–28, 2026

Westin Westminster Hotel

Westminster, Colorado

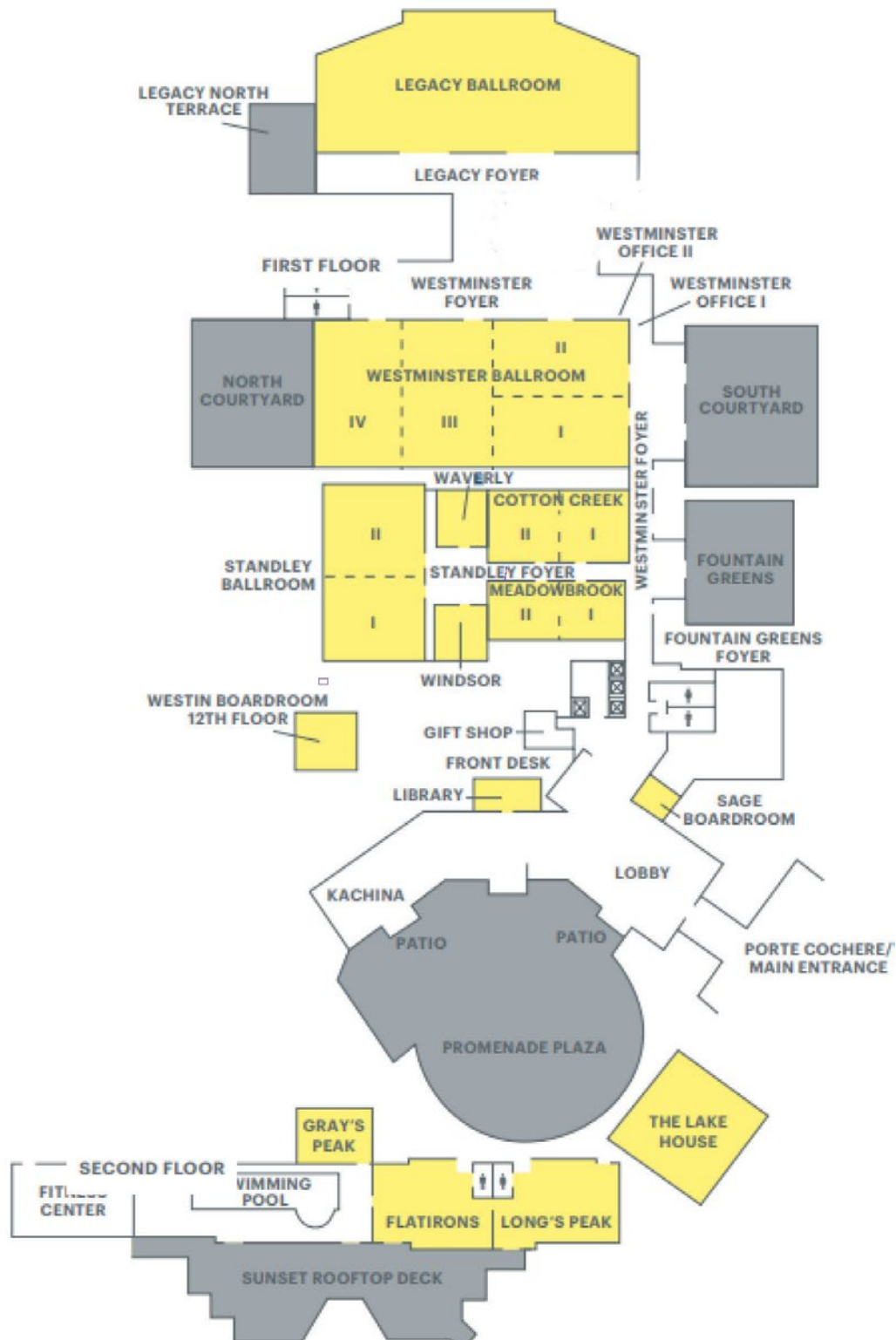
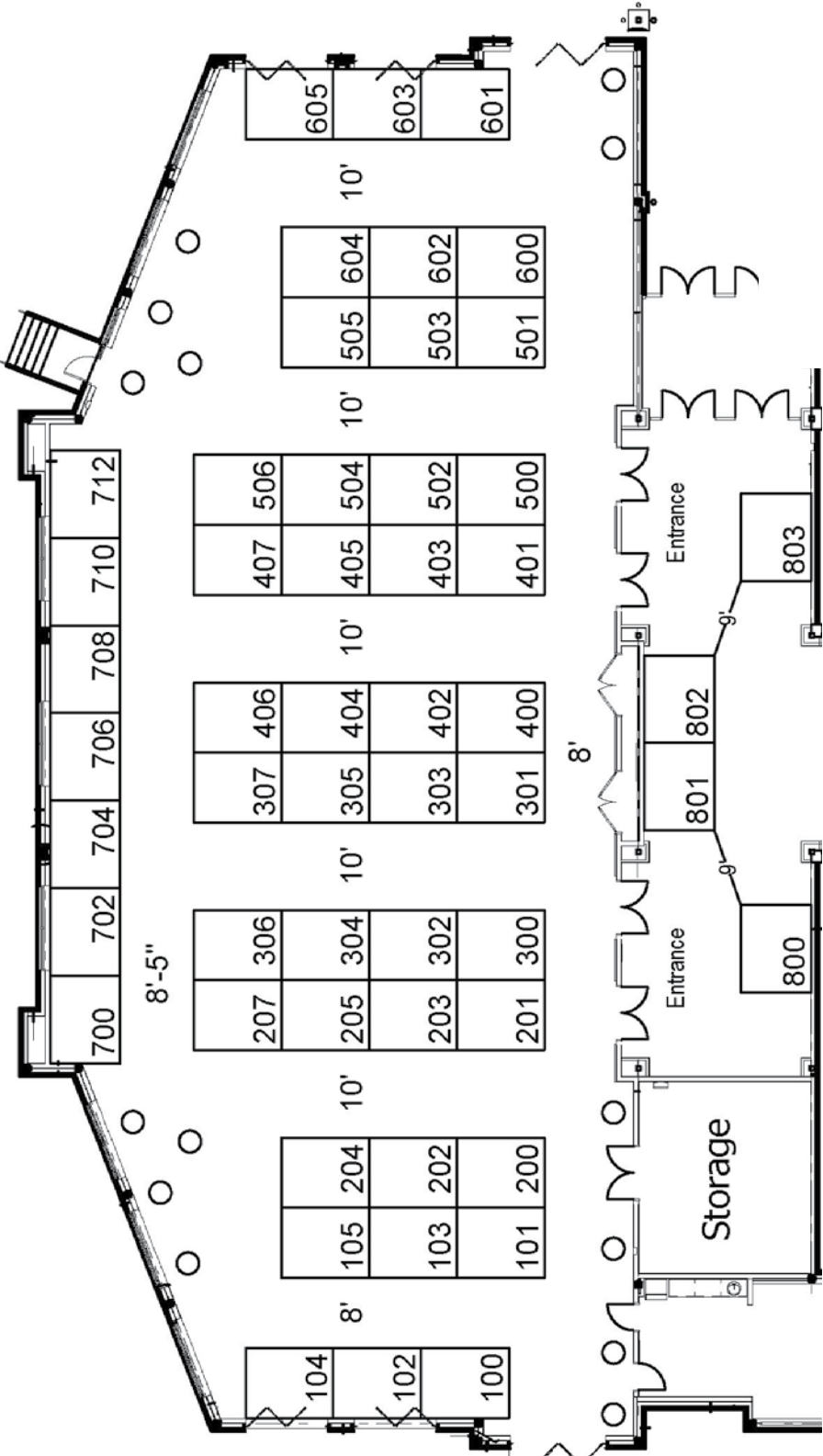


EXHIBIT HALL FLOOR PLAN



MEGA-CONFERENCE OVERVIEW AND ACTIVITIES

Helpful Conference Information

Registration Location & Hours

Registration will be open at the Registration Desk in the Westminster Foyer at the following times:

Sunday, 12:00 pm-5:30 pm

Monday, 7:00 am-5:00 pm

Tuesday, 7:00 am-4:30 pm

Admission to Mega-Conference Activities

Only those who have registered for the conference will be admitted to any educational, exhibit hall, or social activity during the 2026 Onsite Wastewater Mega-Conference. Name badges must be worn at all times and monitors will be checking. Only badges with QR Codes are allowed into sessions. Sorry, no exceptions..

Convention Center Meeting Room Locations

All conference meeting rooms are located in the convention center unless otherwise noted. The Exhibit Hall is located in the Legacy Ballroom. For more details refer to the convention center floor plan on page 13.

Conference Proceedings

All papers and presentations received in advance have been included on the USB drive provided to all attendees. All final presentations will be posted to the Mega-Conference website. Visit this link for access: www.nowra.org/conference/mega-conference/2026-conference-proceedings/.

Conference Item Sponsor

A huge thank you to:

- **Infiltrator Water Technologies** for sponsoring the Conference Tote Bags
- **FujiClean USA** for sponsoring the Conference lanyards
- **National Association of Wastewater Technicians** for sponsoring the USB drives with Conference proceedings

Conference Event Sponsors

Additional thank you to the following organizations for their event sponsorship:

Infiltrator Water Technologies	Sunday Welcome Reception
National Precast Concrete Association	Opening Session
Valley Precast	Morning breaks
Tuf-Tite, Inc.	Afternoon breaks
Eljen Corp	Off-site Social Event
Jet, Inc.	Backhoe Roe-D-Hoe Competition

MEGA-CONFERENCE OVERVIEW AND ACTIVITIES

Conference Activities

Mega-Conference Expo — Legacy Ballroom

Dozens of onsite industry companies and organizations await your visit to the 2026 Onsite Wastewater Mega-Conference Expo. Check out the list of exhibiting companies and booth locations on page 55.

Emerging Professionals 50/50 Raffle, Monday and Tuesday, October 26 & 27

Join NOWRA's Emerging Professionals Committee in their third annual 50/50 raffle. All proceeds go towards the NOWRA Emerging Professionals Scholarship Fund. The Emerging Professionals Scholarship Committee is a relatively newly formed NOWRA committee dedicated to bringing awareness and opportunities to young and emerging professionals looking to continue their onsite wastewater careers. The 50/50 raffle will take place in the Expo area Monday and Tuesday with the winner being drawn at the end of lunch on Tuesday.

Off-Site Reception – Tom's Watch Bar, Monday, October 26

(Off-site Optional Ticketed Event)

Sponsor: Eljen Corporation

Join your colleagues in a casual, fun, and relaxing environment while enjoying food, beer, and games. Tom's Watch Bar in Denver, near Coors Field, features oversized stadium screens to watch the big game, as well as golf simulators, cornhole, Jenga, and shuffleboard. Bus transportation will be provided from the conference center.

Vendor Training Room Sessions

Join several of our Mega-Conference exhibitors for a special Vendor Training Room Track. Vendors will be showing specific products and onsite solutions in focused product forward presentations. **Please note: CEUs are not offered for Vendor Training Room Sessions.**

Optional Field Trip, Wednesday, October 28, 8:30 AM – 5:00 PM

(Separate registration required)

Bus transportation is provided. All field trip participants should check in at the registration desk on Wednesday. A continental breakfast will be provided as well as the pickup of a boxed lunch before attendees board their buses. Attendees should plan to board their bus at designated location. Due to the sites being visited, private vehicles are NOT ALLOWED. Field trip attendees MUST use the bus transportation provided. All field trip participants will receive credit for their attendance.

Optional NAWT Vacuum Truck Training, Wednesday, October 28, 8:00 AM – 4:00 PM

(Separate registration required)

This optional specialized, post-conference training is designed specifically for those who own or operate vacuum trucks within the industry. It is a great resource for current owners of OWTs pumping services, and is a way to provide training and information to employees who may just be getting started in the industry. (See page 42 for more details.)

MEGA-CONFERENCE OVERVIEW AND ACTIVITIES

Meals, Breaks, and Receptions

All functions take place in the Exhibit Hall unless otherwise noted.

Sunday, October 25

- Opening Welcome Reception – (6:00 PM- 8:00 PM) – Hors d’oeuvres and a cash bar to be held in the Legacy Ballroom, Westminster Foyer, and South Courtyard (weather permitted) – **Sponsored by Infiltrator Water Technologies**

Monday, October 26

- Light Continental Breakfast – (7:00 AM – 8:00 AM), Westminster III and IV
- Morning Break in Exhibit Hall – (10:00 AM – 10:30 AM), Legacy Ballroom – **Sponsored by Valley Precast**
- Lunch - (12:00 PM – 1:30 PM) – Westminster III & IV
- Afternoon Break in Exhibit Hall – (3:00 PM – 3:45 PM) – Legacy Ballroom – **Sponsored by Tuf-Tite, Inc.**
- Exhibitors Reception in Exhibit Hall – (4:30 PM – 6:00 PM) – Legacy Ballroom
- Optional Offsite Social Event at Tom’s Watch Bar (6:30 PM – 9:30 PM) Bus transportation provided – **Sponsored by Eljen Corporation**

Tuesday, October 27

- Light Continental Breakfast – (7:00 AM – 8:00 AM), Westminster III and IV
- Morning Break in Exhibit Hall – (10:15 AM – 10:45 AM), Legacy Ballroom – **Sponsored by Valley Precast**
- Lunch - (12:15 PM – 1:30 PM) – Westminster III & IV
- Afternoon Break in Westminster Foyer – (3:00 PM – 3:15 PM) – **Sponsored by Tuf-Tite, Inc.**
- NOWRA Annual Business Meeting in Meadowbrook I – (5:00 PM – 6:30 PM) – Hors d’oeuvres and cash bar.

Wednesday, October 28

- Breakfast at Lakehouse for Field Trip – (7:00 AM – 8:15 AM)
- Breakfast in Cotton Creek for NAWT Vacuum Truck Training (7:00 AM – 8:15 AM)
- Lunch for Field Trips – box lunch provided, pick up at 8:15 AM

MEGA-CONFERENCE OVERVIEW AND ACTIVITIES

NOWRA Board & Committee Meetings

Guests are welcome to attend and observe the following NOWRA and other related meetings. All times are Mountain Standard Time.

COMMITTEE	ROOM	DATE	TIME
NOWRA Board of Directors	Meadowbrook I	Sunday, Oct. 25	8:00 am – 11:00 am
NOWRA Government Relations	Meadowbrook I	Monday, Oct. 26	7:15 am – 8:00 am
NOWRA State Affiliates	Meadowbrook I	Monday, Oct. 26	12:00 pm – 1:30 pm
NOWRA Corporate Members	Meadowbrook I	Tuesday, Oct. 27	7:00 am – 8:00 am
NOWRA Technical Practices	Meadowbrook I	Tuesday, Oct. 27	12:15 pm – 1:30 pm
NOWRA Emerging Professionals	Meadowbrook II	Tuesday, Oct. 27	12:15 pm – 1:30 pm

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Attendance at sessions will be verified by our Conference Tracker Application. A QR code is provided on each attendee's name badge. Moderators will scan each attendee as they enter the session room and scan them out if they leave the session early.

If an attendee does NOT get scanned as they enter the session room, they will not receive credit for that session. It is the responsibility of the attendee to make sure to get scanned in/out.

We will also have boards at each session room with a QR Code for attendees to scan themselves in as well.

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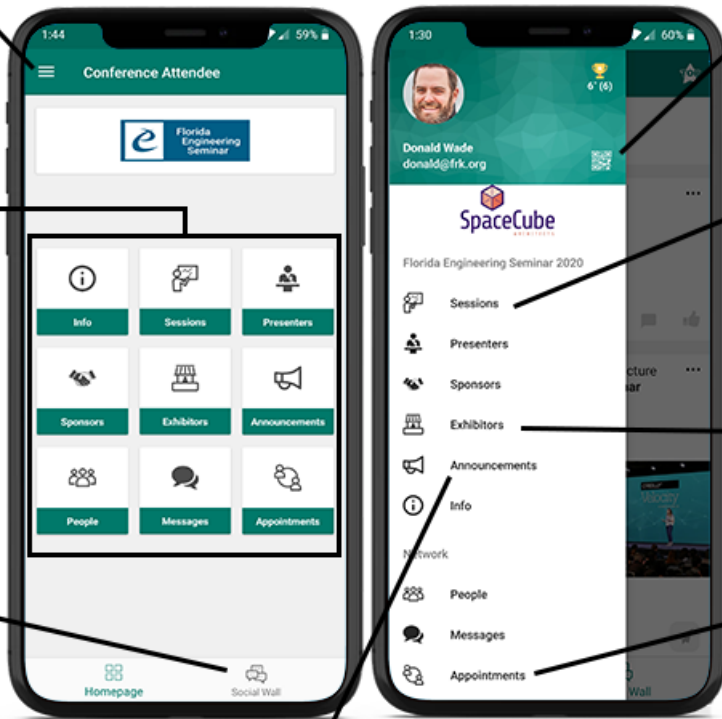
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OPENING SESSION SPEAKERS – MONDAY, OCTOBER 26

ROOM: WESTMINSTER BALLROOM III & IV | 8:00 AM TO 12:00 PM

An International Perspective On Onsite Systems –

Dr. Yurie Shirakawa, Manager, International Affairs Division, Japan Education Center of Environmental Sanitation

Dr. Shirakawa will be presenting on the Johkasou system and domestic wastewater management in Japan.

Nest Steps in Onsite Wastewater Research Findings

– Dr. Bryan Brooks, Distinguished Professor and Director, Baylor Environmental and Health Research Laboratory

Dr. Brooks will present information on his recently completed research paper, which analyzed research needs based on questions proposed by the onsite wastewater industry and onsite researchers.

US EPA Update – Andrew Sawyers, Director, Office of Wastewater Management, USEPA

This session will address current EPA programs that affect the decentralized wastewater industry. The current state of funding and future needs will be discussed, as well as information about what EPA programs address in the onsite wastewater realm.

Status of Advocacy/Lobbying Efforts on Behalf of Onsite and Decentralized Wastewater – Tim Perrin, Policy Advisor, The Southern Group, LLC

Tim Perrin is a member of the firm's National Public Policy group and assists clients interested in shaping energy, environmental, and infrastructure legislation and regulation. He is part of the team which represents NOWRA on Capitol Hill. He will provide an analysis of the legislative and regulatory landscape, initiatives underway which may have an impact on the onsite/decentralized industry and steps the industry can take to increase its influence in Washington on those initiatives.

Setting the Stage for the 2026 Mega-Conference – Christopher LeClair, President, NOWRA

Mr. LeClair will discuss NOWRA recent activities and accomplishments over the past year while welcoming attendees to the 2026 Mega-Conference. He will also announce NOWRA awards and recognitions.

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1:30–2:15 pm

Subtractive Geographic Analysis for Determining Possible Cesspool Locations in Rural and Semi-Rural Communities – *Robyn Moreno*

In Arizona, it is estimated that there are between 60,000–90,000 active cesspools, despite being illegal in the state since 1976, and federally since 2005. Cesspools are community health hazards and can contaminate groundwater aquifers in areas facing droughts and water scarcity, such as Arizona. Despite their known existence, the exact location and number of cesspools in Yavapai County, Arizona remains unknown and understudied. Our research addresses this knowledge gap and aims to elucidate the scope of the cesspool problem throughout Yavapai County by using publicly available data and GIS tools. Through subtractive analysis, we have generated heat maps that indicate the areas with a high likelihood of containing cesspools throughout Yavapai County. Additional research into this issue can assist with securing funding to help communities properly abate cesspools and improve critical infrastructure in rural communities. By better understanding the location and density of cesspools, we can prioritize enforcement and allocate funds based on cesspool density and shared risk to community health such as proximity to drinking water wells and public spaces.

2:15–3:00 pm

Identifying Onsite Solutions For A Remote Community In Hawai'i: A Community-Centered Approach to Navigating a Complex Wastewater Challenge – *Kim Falinski*

Remote communities in Hawai'i depend on healthy nearshore environments for subsistence fishing, cultural practices, and public health, yet they often lack adequate wastewater infrastructure to protect their coastal waters. Hana, Maui, is a remote coastal community characterized by porous basaltic substrate, high excavation costs, and geographic isolation from centralized wastewater treatment facilities and septic disposal options. These constraints disproportionately affect the community's low-income residents and its high proportion of individuals with Native Hawaiian ancestry. This presentation's objective is to demonstrate how community-driven data collection, alongside local partner collaboration, County resources, and the Closing America's Wastewater Access Gap (CAWAG) program, can inform effective and equitable onsite solutions to best meet the community's needs. Community members were engaged through participatory mapping and data collection to identify valued coastal areas, wastewater concerns, and locations where failing or constrained onsite systems may impact water

quality. These data were synthesized into a GIS-based report integrating community knowledge with existing environmental and infrastructure information. Project findings were shared with community stakeholders and CAWAG partners to explore technical assistance opportunities. Results highlighted community interest in improving onsite wastewater performance and increasing awareness of wastewater–coastal water connections. The process revealed a need to evaluate decentralized wastewater approaches better suited to Hana's physical, social, and economic conditions. The work also identified Resource Management Entities (RMEs) as a potential framework for sustained management, coordination, and funding. Overall, this effort illustrates how CAWAG-supported collaboration and place-based data can help close wastewater access gaps while protecting coastal resources.

3:45–4:30 pm

What's SEP? An Affective Tool to Help Finance Cesspool Conversions – *Stuart Coleman*

Hawai'i is home to over 83,000 cesspools that release 52 million gallons per day of untreated wastewater into our groundwater and nearshore marine environments. This amount of pollution is like a massive, underground sewage spill every day, posing serious threats to public health, near-shore ecosystems and coral reefs. With the severe storms and floods that hit Hawaii in March 2026, many homes were contaminated with overflowing cesspools. Despite a state mandate to phase out cesspools by 2050, funding for low- and moderate-income homeowners remains a critical gap. Our nonprofit Wastewater Alternatives & Innovations (WAI) identified an underutilized tool called a Supplemental Environmental Project (SEP) within the EPA enforcement division to help homeowners. Under SEP agreements, companies cited for large-capacity cesspool (LCC) violations can offset a portion of their civil penalties by funding environmentally beneficial projects like cesspool conversion. In the last two years, WAI has facilitated SEP agreements with two major Hawai'i corporations and assisted five low-moderate income homeowners in the conversion of five cesspools to NSF 40- and NSF 245-certified onsite treatment systems across the state. This presentation documents the program structure, project outcomes, and lessons learned through the SEP program. It also advances a call to action: the EPA should expand this program and proactively inform penalized entities about this opportunity as a win-win for compliance and community water quality. Expanding SEP eligibility and broadening awareness of the program across enforcement actions could accelerate cesspool conversions in Hawai'i and advance other beneficial remediation efforts across the country.

1:30–2:15 pm

Performance and Feasibility of Tidal-Flow Constructed Wetlands for Decentralized Wastewater Treatment – *Deeptanil Pal*

Decentralized wastewater systems face challenges like high energy consumption, limited water recycling, and a dependence on centralized infrastructure. The study evaluates tidal-flow constructed wetlands as an alternative onsite treatment approach for improving performance and reuse potential. The objective is to assess the feasibility and performance of tidal-flow constructed wetlands compared to conventional onsite systems and centralized municipal treatment. A comparative, data-driven analysis was done using a real-world case study (Ethel M Chocolate Factory, Nevada) and scaled projections for residential applications in Austin, Texas. The key comparison parameters were energy consumption, capital and operational costs, effluent quality, and water reuse potential across the multiple treatment technologies. Results show that tidal-flow systems operate at approximately 0.21 kWh/m³, significantly lower than membrane bioreactors (0.5 kWh/m³), activated sludge (0.88 kWh/m³), and textile filters (1.61 kWh/m³). Effluent quality is high as well (BOD: 6 mg/L, TSS: 5 mg/L), supporting non-potable reuse with potential for up to 100% onsite recycling. Austin currently reuses approximately 4.5% of treated wastewater. While the capital costs for a tidal-flow system are higher (approximately 20% more than those of centralized systems), annual maintenance costs are lower due to automation. Energy demand at a city scale is higher than the centralized system, but it can be offset by the elimination of conveyance infrastructures. Overall, tidal flow constructed wetlands show good potential for decentralized applications, but only for particular mid-to-large community scales where reuse, energy efficiency, and reduced infrastructure dependencies are priorities.

2:15–3:00 pm

Assessing Microbial Indicator Transport in Onsite Wastewater Mound Systems – *Jeldane Joseph*

Onsite wastewater treatment systems are used around the world to collect and treat wastewater at the site of generation. In regions where groundwater is shallow, or where soil conditions constrain vertical infiltration, wastewater effluent is routed to a raised drainfield (mound system) where treatment is assumed to occur primarily in the unsaturated mound zone through physical, chemical, and biological processes that reduce contaminant loads before they reach groundwater. Although laboratory

column experiments and modeling studies have advanced our understanding of microbial transport mechanisms, few studies have monitored microbial transport in functioning onsite wastewater systems under field conditions, leaving uncertainty about the vertical and horizontal movement of microbial indicators within these systems. This study evaluates how wastewater-derived microbial indicators and conservative tracers move through the vadose zone of a ~30-year-old mound system located at the Auburn University–Stormwater Research Facility. We will combine porewater sampling at multiple depths (1,2,3 and 4 ft) throughout the system with hydraulic monitoring and tracer tests to characterize vertical and horizontal transport pathways and assess retention of microbial indicators within the system. Tracer tests will use six concurrent tracers, including fluorescent microspheres across multiple particle-size classes, along with conservative viral surrogates, to capture transport across microbe and virus-relevant scales. Samples will be collected at regular intervals during tracer tests every 4–8 hours initially, followed by daily sampling to monitor contaminant movement over time. The outcomes will provide a defensible base line for contaminant mobility and inform monitoring and design strategies for onsite systems.

3:45–4:30 pm

Modular Biofilters With Iron-Mediated Nitrogen Removal For Onsite Wastewater Treatment

– *Zhiyue Wang*

Onsite wastewater treatment systems (OWTS) play a vital role in rural and remote regions that lack access to centralized treatment infrastructure. Biological nitrogen removal in OWTS is often limited by electron donor and acceptor availability. This study utilized iron as an auxiliary electron reservoir in dual-zone biofilters to address this issue. Three biofilters, packed with basalt, iron-coated perlite, or perlite, were operated under varying alkalinity and carbon-to-nitrogen ratios. Basalt-packed biofilters achieved the highest ammonia and total nitrogen removal (>60%). Batch activity tests indicated Feammox and nitrate-dependent ferrous oxidation as the dominant nitrogen removal pathways. Microbial analyses revealed the enrichment of iron-reducing bacteria (e.g., *Ferruginibacter*) in anaerobic zones and iron-oxidizing bacteria (e.g., *Rhodanobacter*) in microaerobic zones, indicating active Fe(III)/Fe(II) cycling. These results demonstrate that iron enhances ammonia removal under fluctuating conditions, offering a sustainable and resilient strategy for modular onsite wastewater treatment.

TRACK 3: WORKFORCE – MONDAY, OCTOBER 26

ROOM: STANDLEY II | 1:30 PM TO 4:40 PM | BREAK 3:00 PM TO 3:45 PM

1:30–2:15 pm

Surfing the Silver Tsunami with Work-4-Water: Elevating Hawai'i's Wastewater Workforce from Ridge to Reef – *Gabby Saba*

As wastewater challenges connect landscapes from peak to plains—and in Hawai'i, from ridge to reef—the need for a resilient, future-ready workforce has never been greater. This presentation highlights how WAI's Work-4-Water initiative, supported by the EPA's Innovative Water Infrastructure Workforce Development Program, is building the human infrastructure needed to sustain wastewater solutions across diverse and decentralized environments. Hawai'i faces a convergence of pressures: an aging workforce, increasing regulatory requirements, and the mandate to convert approximately 83,000 cesspools by 2050. These challenges span dense urban areas and remote rural communities alike, requiring a workforce capable of operating across geography, technology types, and cultural contexts. Work-4-Water is elevating the future of wastewater by developing career pathways that meet real-world system needs—from decentralized treatment and septic conversion to water quality monitoring and regulatory compliance. A \$1 million EPA investment supports paid training, work-based learning, and expanded career entry points, including CDL-A drivers servicing decentralized systems and laboratory professionals advancing water quality science. The program integrates technical instruction with career navigation, industry partnerships, and virtual learning models that ensure access for communities statewide. By aligning workforce development with infrastructure transformation, Work-4-Water demonstrates how investing in people is essential to advancing sustainable wastewater solutions. This session invites collaboration among utilities, educators, regulators, and community leaders to scale workforce strategies that strengthen system resilience, support environmental stewardship, and create equitable opportunities—ultimately elevating wastewater innovation from the highest elevations to the broadest plains.

2:15–3:00 pm

Lead to Attract, Retain, and Inspire: Creating a Culture Where People Want to Stay and Thrive – *David Suson*

Retention isn't about perks—and motivation isn't about pressure. It's about leadership that makes people feel valued, trusted, and part of something meaningful. In this energizing

topic, David Suson shows how to build the kind of workplace culture that today's employees want to be part of—and don't want to leave. Through powerful stories and real-world strategies, you'll discover how to lead in a way that makes people feel trusted, motivated, and committed—not because they have to . . . but because they want to. When people feel seen, supported, and stretched to grow—they don't just stay. They thrive. And they take others with them. This session shows you how to create that shift. Learning Takeaways: Learn the 3 leadership shifts that turn disengagement into ownership—so your team shows up with initiative and pride. Discover how to build connection, loyalty, and trust—without needing to be the hero or have all the answers. Walk away with practical strategies to lead through change, increase performance, and create a culture people don't want to leave.

3:45–4:30 pm

Conflict to Compliance: Streamlining Final Inspections in South Carolina's OSWW Program – *Michael Hayes*

The South Carolina Department of Environmental Services' (SCDES) Onsite Wastewater Program, which oversees septic system permitting and inspections, has seen applications for septic systems rise by over 60% in the last 10 years. Rising permit applications and limited staffing created backlogs prompting the implementation of a contractor self-inspection process. Although this helped staff focus on issuing construction permits, it raised compliance concerns. In response, a pilot study was conducted which introduced fixed time slots for final inspections to improve efficiency and reduce conflicts with initial site evaluations. Data analysis revealed the pilot increased Department-inspected final inspections by 76% in the experimental group and projected statewide improvements of up to 53%, leading to increased environmental protection and potentially reducing repair and septic contractor administrative costs by approximately \$278,830 annually. The study concludes that adopting an online scheduling system, combined with updated procedures and technology enhancements, will help SCDES achieve its goal of inspecting 100% of final installations, ensuring better regulatory compliance, environmental protection, and cost savings for stakeholders.

TRACK 4: STATE – MONDAY, OCTOBER 26

ROOM: COTTON CREEK | 1:30 PM TO 4:30 PM | BREAK 3:00 PM TO 3:45 PM

1:30–2:15 pm

Approaching State Legislative Initiatives: Grassroots and Growing – *Tammy Trantham and Roxanne Groover*

Building state legislative goals is often challenging and an uphill battle. This presentation will cover ideas on how to start your own grassroots campaign for your state association and build toward hiring lobbyists for your group. Making positive changes and building relationships with your state legislators can make your association stronger.

2:15–3:00 pm

Development and History of CPOW Education Program – *Kate Carney and Lisa Nicoll*

CPOW is presenting a session about our Educational Program.

Information will include how the program was developed, how it's changed through the years, like through the COVID years, and how CPOW has been able to expand the program to reach across the state and country.

3:45–4:30 pm

New NOWRA Educational Resources – *Sara Heger*

In 2026, NOWRA completed an EPA grant in partnership with the Rural Community Assistance Partnership to develop educational resource materials for the onsite decentralized industry. Three separate curricula were developed on Operation and Maintenance, Solutions for Difficult Sites and Resolving Wastewater Challenges in Small Communities. This presentation will discuss the process of development and piloting, the final resources available and how you can utilize these resources.

TRACK 5: NAWT 1 – MONDAY, OCTOBER 26

ROOM: STANDLEY | 1:30 PM TO 4:30 PM | BREAK 3:00 PM TO 3:45 PM

1:30–2:15 pm

You Got Through Year 1 . . . NOW WHAT? – *Kim Turner*

Year one in the septic industry is no joke. You survived the chaos, learned the basics, and proved you can do the work. Now comes the real question . . . what's next? This interactive class is designed for new septic professionals ready to move beyond survival mode and start thinking like business owners. We'll break down what year two and beyond really look like, including the challenges no one talks about until you're in it. We'll focus on the decisions that shape your future: Do you stay small or start to grow? When is the right time to invest in new equipment? When do you hire your first employee, and how do you do it right? How do you build systems that support growth instead of chaos? This isn't a lecture . . . it's a working session. Participants will engage in open discussions, ask questions, and work through real-world scenarios together. You'll leave with practical strategies you can immediately apply to your business. Kim Turner, owner of Turner Septic, will share her journey from starting with nothing to building a thriving, recognized brand in the wastewater industry. She'll provide a transparent look at the decisions, risks, mistakes, and wins that fueled her growth. Whether you're looking to scale, increase profitability, or gain clarity on your next steps, this class will help you build a roadmap for what comes after year one. Because getting through year one isn't the finish line . . . it's just the beginning.

2:15–3:00 pm

From Technician to CEO: The 16-Year Breakthrough That Built a Multi-Million Dollar Service Company – *Jason Birdsong*

Most service business owners don't fail because they lack skill. They fail because they stay stuck thinking like a technician. In this raw, real-world session, Jason Birdsong shares the unfiltered journey of building a service company from the ground up over 16 years—through long hours, financial chaos, burnout, and hard

lessons—into a multi-million dollar business built on systems, leadership, and culture. This isn't theory. This is the playbook. You'll learn the exact mindset shifts, financial disciplines, and operational strategies that separate overwhelmed operators from true CEOs. From finally understanding your numbers . . . to building a team that drives growth . . . to delivering WOW service that attracts premium customers—this session breaks down what it really takes to scale. If you're tired of doing everything yourself, guessing at your finances, or feeling stuck in the day-to-day grind . . . this is your wake-up call. It's time to stop surviving—and start leading.

3:45–4:30 pm

Developing Effective Onsite Wastewater Regulations for Colorado's Diverse Landscape.

– *Steve Prosis*

Developing effective onsite wastewater regulations in Colorado presents a unique challenge because of the state's diverse topography, rapidly changing population, and wide range of environmental conditions. From high-elevation mountain communities and steep, rocky terrain to expansive plains, arid landscapes, and areas with shallow groundwater, a single regulatory approach may not adequately address the needs and risks of every region. At the same time, population growth and development are increasing wastewater treatment demands in both urbanizing communities and rural areas that rely heavily on individual and small-scale systems. This presentation will examine the challenges of developing and implementing onsite wastewater regulations that are technically sound, environmentally protective, and practical for Colorado's diverse communities. The presentation will also explore the balance between statewide consistency and local flexibility, emphasizing the need for regulations that protect public health and water quality while remaining adaptable to Colorado's varied landscapes and community needs.

8:00–8:45 am

O&M Case Study in Japan and in Asian Countries

– Yurie Shirakawa

Johkasou, which are decentralized wastewater treatment facilities serving around 10 % of Japanese population, are managed under the Johkasou Act. Under this Act, Johkasou managers (users) have the responsibility to maintain them, and this maintenance is divided into “O&M (operation and maintenance)” and “Desludging.” By performing each at appropriate frequencies, the effluent quality of Johkasou meets the technical standards (BOD shall less than 20 mg/L). Furthermore, O&M must be carried out by “Johkasou Operator” who have acquired certain skills, and O&M businesses are required to employ certified Johkasou Operator. The O&M requirements for the Johkasou vary depending on its size and the specific treatment methods employed. O&M becomes even more vital as devices and systems grow more complex and technologically advanced. O&M of Johkasou more than 501 PE with a sophisticated internal structure is conducted by certified Johkasou Technical supervisor. Effective O&M is critical to ensure the functionality and longevity of any equipment or facility. This presentation will also provide information on the maintenance situation of decentralized wastewater treatment facilities in several Southeast Asian countries, in addition to Japan.

8:45–9:30 am

EPA's Decentralized Wastewater Program Update

– Heidi Faller

EPA's Decentralized Wastewater Program supports onsite wastewater systems through various efforts, including a Memorandum of Understanding (MOU) on decentralized wastewater systems with partners in the federal, state and non-profit industry; the SepticSmart program; and developing materials to support the use of onsite systems. This presentation will highlight progress on MOU activities, summarize a resource guide for decentralized systems to address natural hazards and extreme weather events, and share results from the annual SepticSmart Week. EPA will also discuss progress on The American Relief Act (P.L. 118-158, December 21, 2024), which provided \$3 billion in disaster relief funding to the State Revolving Fund (SRF) programs in states or territories with wastewater and drinking water facilities impacted by Hurricanes Helene and Milton and the Hawai'i wildfires. The Act also appropriated an additional \$85 million for the Clean Water SRF program to improve the resilience of decentralized wastewater treatment systems. EPA will share how the six states (FL, GA, NC, SC, TN, and VA) are utilizing these funds to improve the resiliency of decentralized systems to mitigate flooding and extreme weather effects or provide connections to centralized sewer.

9:30–10:15 am

Closing America's Wastewater Access Gap Initiative Update

– Michael Mezzacapo

Inadequate and failing wastewater infrastructure in rural communities directly threatens public health, degrades the environment, and impedes local economic development and opportunities. As part of Environmental Protection Agency's (EPA) RealWaterTA efforts, the Closing America's Wastewater Access Gap Initiative is supporting 100+ communities in more than 25 states. Developed specifically to address failing decentralized wastewater infrastructure in rural communities, the Initiative provides no-cost technical assistance resources to help communities evaluate alternative technologies and develop plans to secure funding. Leveraging this Initiative—along with historic funding availability through the Infrastructure Investment and Jobs Act and other federal funding programs for water infrastructure—EPA aims to ensure every American has access to clean water and adequate sanitation. This presentation will provide an updated overview of the Initiative, its successes so far, and specific case studies that illustrate the importance of back-to-basics technical assistance.

10:45–11:30 am

Challenges and Opportunities with Rural and Off Grid Onsite Systems

– Joell Wirth and Scott Yarosh

Arizona's water scarcity and rural development patterns require onsite solutions that are practical, affordable, and protective of groundwater. Many parcels face soil, space, and infrastructure constraints that demand innovative problem-solving rather than high-cost technology. Public health and environmental protection can be achieved through better design, siting, reuse integration, and management—not necessarily more expensive equipment. Regulatory modernization should emphasize flexibility, performance, and risk-based decision-making to support solutions that fit local conditions. Decentralized systems can meaningfully contribute to Arizona's water conservation goals when reuse is treated as a core design principle. Core Themes Innovation without cost escalation is essential; creative design, soil-based optimization, reuse integration, and management strategies can address site constraints without relying on expensive treatment units. Water scarcity must guide planning as drought and groundwater decline reshape long-term sustainability. Equity and practicality matter: solutions must work for the poorest parcels and residents, not only well-resourced developments. Performance-based, risk-based regulation can enable protective solutions tailored to site conditions. Decentralized systems should be recognized as part of Arizona's water infrastructure, especially when reuse is integrated. Learning Objectives Participants will be able to recognize pressures

facing Arizona's onsite sector, including water scarcity, soil limitations, and rural infrastructure gaps; describe how low-cost, practical innovations can protect public health and groundwater; evaluate regulatory barriers that push communities toward unaffordable technologies; identify opportunities for performance-based and risk-based regulatory approaches; and apply a water-resource and equity lens to onsite planning to ensure solutions work for all communities, including remote and low-income areas.

11:30 am–12:15 pm

Closing the Water Access Gap, Forever: A National Roadmap to Bring Water and Sanitation to Every Community in the United States – *Kabir Thatte*

More than 2.2 million people in the United States still live without a working tap or toilet at home. Closing the U.S. water access gap requires more than alignment—it requires a shared,

actionable plan. The Vessel Collective came together to develop a national strategy to clarify what's possible now, what requires further groundwork, and how efforts across the sector can add up to meaningful progress. Engaging dozens of organizations in its development, leaders across the U.S. WASH Sector are excited to unveil a plan forward, highlighting strategies around visibility, capacity building, and government commitment, so that we can end water insecurity for all Americans, forever. This session will do a deep-dive into Vessel's collective efforts, how a United States WASH sector came to be, and a vision for 2040. A panel, comprised of experts from across the sectors, will come together to discuss partnerships, policy, and a path for the future, exploring key themes of Visibility, Government Commitment, Capacity, Workforce Development, Technology, and Technical Assistance.

TRACK 7: SOIL – TUESDAY, OCTOBER 27

ROOM: WESTMINSTER BALLROOM II | 8:00 AM TO 12:15 PM | BREAK 10:15 AM TO 10:45 AM

8:00–8:45 am

Efficacy of a Calcium Additive to Sodified Vertisol Soil from the Alabama Black Belt – *Alistair Bebbington*

Approximately 35% of homes in Alabama's Black Belt rely on onsite wastewater treatment systems (170,000 systems), but many of the soils in the Blackland Prairie region are rated as "Very Limited" by the U.S. Department of Agriculture for wastewater dispersal. This is due to the vertisol soil's high smectite content and low hydraulic conductivity. Wastewater is high in sodium, promoting the dispersion of clay particles. This reduces the already limited hydraulic conductivity of these soils, severely hindering the performance of the system. This research explores the addition of calcium cations to improve the permeability of the soil by facilitating flocculation. Testing evaluates the conductivity performance of amended Blackland Prairie soil using calcium enriched water. Several calcium compounds will be tested. We anticipate seeing an increase in hydraulic conductivity as the calcium ions replace the sodium ions. We also plan to determine the optimal concentration of calcium in the influent water so that it can be applied to real world septic tank systems in a cost-effective manner. The results of this research could potentially improve the performance and accessibility of affordable onsite wastewater treatment systems in the Black Belt region and other areas with sodified drainfields. This improvement could result in fewer system failures which will lower the operational costs and health hazards associated with underperforming systems.

8:45–9:30 am

Best Practice Treatment Designs and Installations for Sodic Soils – *Ben Kele*

There are more than 30 million hectares of sodic soils in the US. The dispersal of water from on-site wastewater systems in sodic soils can be very problematic if best practices designs and installations are not used. Surface pooling and water-logged dispersal areas are very common problems. The presence of sodic soils turns an easy site into a difficult one. This presentation will define sodic soils and discuss the difference between sodicity and salinity. The impacts on soil structure and the movement of water through sodic soils will be examined. On-site wastewater regulations on sodic soils, such as the recent update to the Colorado State Code will be covered. Best practice design techniques for on-site systems in sodic soils will be discussed, including treatment types, dispersal application method & rate, soil amendments, and plant selection. The potential adverse impacts of water softeners and domestic RO units used in the home will also be scrutinized. Installation techniques that protect the soil and minimize damage will be presented. Maintenance techniques that improve sodic soils, such as gypsum amendments, will also be discussed. Attendees will learn how to identify sodic soils, interpret sodic & saline soil results, do best practice designs and installations for on-site wastewater systems for sodic soils, and maintenance techniques that alleviate sodic soils over time.

9:30–10:15 am

Peak Challenges with Practical Solutions: Higher Level Treatment on a Steep Rocky Mountain Site

– Julie Gustavson

Onsite wastewater treatment systems (OWTS) in mountainous environments present unique challenges related to soil limitations, terrain, climate, and multi-utility coordination. This case study highlights the design and construction of a higher-level OWTS serving eight new cabin units at Juniper Lodge & Treehouses, a boutique hospitality development located on a steep, heavily wooded slope in Evergreen, Colorado. The site is characterized by sandy loam soils with shallow bedrock, significantly limiting available vertical separation for soil treatment. To meet treatment and regulatory requirements, a higher-level treatment system was selected followed by a field designed to maximize dispersal within constrained site conditions while minimizing disturbance to existing trees. Other major design challenges included compliance with regulatory setbacks for multiple systems on a single property, steep slopes requiring switchback alignment of collection piping to control wastewater velocities, deep burial requirements associated with cold-climate installation, extensive rocky outcrops, and installation of water and fire water transmission infrastructure. The owner's desire to keep business operating as normal and to preserve mature vegetation required extensive common-trenching and adaptive field decision-making. Construction required continuous collaboration among engineers, installers, contractors, and regulators, resulting in field adjustments that differed substantially from original plans. Key lessons learned include the effectiveness of drip dispersal in wooded sites, the importance of strong designer-installer communication, and the feasibility of implementing advanced treatment systems on highly constrained mountain properties. The completion of this challenging project successfully met performance goals, and stakeholders report high satisfaction with the final installation.

10:45–11:30 am

Coupling Laboratory Experiments with In Situ Investigations for the Recognition of a New On Site Sanitation Technique. Case of the Optimized Vertical Sand Filter

– Abdelkader Lakel and Alexandre Decout

Traditional sand filtration systems are robust on-site sanitation technologies. Compared with prefabricated systems (small treatment plants or compact filters), they have the advantage of requiring limited maintenance. However, they also present the drawbacks of a large land footprint and a high demand for river sand. A national research program was established (over a period of approximately four years) to enable the optimization of this type of technology. This program, supported and funded

by the French public authorities, led to the definition of a new design approach, which was validated through two full-scale systems installed in a laboratory under controlled conditions. In parallel with this experimental work, around ten systems were implemented at private households in order to characterize the behavior of installers, operators, and property owners. This scientific work resulted in the production of an operational installation guide describing system design, recommended materials, and implementation, operation, and maintenance procedures, as well as a proposal for inclusion in national regulations. The objective of this submission is to share the scientific and technical approaches used, the results obtained, and the lessons learned with respect to the national recognition process of a new sanitation technique.

11:30 am–12:15 pm

Quantifying Soil Suitability and Affordability of Septic Systems using Alabama State-Specific Analysis

– Rebbecca Etter and Jillian Maxcy-Brown

As a septic system's treatment effectiveness is substantially dependent on the soil's properties, the U.S. Department of Agriculture has identified that many areas that have limited conventional septic suitability, thus requiring more expensive alternative/engineered septic systems. The objective of this presentation is to share a methodology developed to assess soil suitability and affordability for both conventional and alternative septic systems based on state-specific regulations and U.S. Department of Agriculture's Soil Survey Geographic Database (SSURGO) over a state-wide study area of Alabama. Multiple suitability metrics will be discussed based on data availability. We will assess the differences between these suitability metrics and analyze the affordability burden for septic users. This affordability analysis was completed using several different metrics: conventional percentage of median household income, income threshold, and hours worked at minimum wage approaches. These metrics produce a range of results. This study represents, to the best of our knowledge, the first affordability analysis for septic systems with consideration for soil properties. According to our analysis, 38.3% of Alabama's households rely on septic systems (39.1% of population), while 61.7% of households rely on centralized treatment utilities (60.8% of population). Using the state-specific soil suitability metrics, 43.2 to 44.1% of households have an affordability risk while the existing U.S. Department of Agriculture's soil suitability metric predicts 51.4% to 61.9% of households face similar affordability challenges. The difference between these results highlights the need for region-specific metrics for septic suitability to best determine their economic impact on septic users.

TRACK 8: EDUCATION & TESTING – TUESDAY, OCTOBER 27

ROOM: STANDLEY 1 | 8:00 AM TO 12:15 PM | BREAK 10:15 AM TO 10:45 AM

8:00–8:45 am

Developing a New Regulatory Professional Training Course – *Allison Blodig*

This project is a collaboration between NOWRA and NEHA to develop an in-depth training course on regulatory frameworks and best practices for onsite and decentralized wastewater treatment system environmental health specialists. The training course development is funded by a grant from the EPA to the Rural Community Assistance Program and is being created by NOWRA with support from NEHA who will also be creating an abbreviated, self-paced, online course. The course is being designed to provide essential knowledge and skills for new or less-experienced regulatory professionals, policy makers, and local officials involved in interpreting, inspecting, and enforcing onsite and decentralized regulations that are meant to ensure proper wastewater treatment and dispersal. The presentation will give an overview of how the course is being developed to help participants gain a solid understanding of how regulations are developed and implemented, as well as their critical importance in protecting public health and the environment. The goals for participants taking the course include, providing a basic understanding of onsite wastewater treatment systems, teaching them how to confidently review regulations, perform comprehensive system inspections, and enforce compliance with performance standards. The course emphasizes the vital role effective regulatory interpretation and oversight plays in protecting public and environment health in the onsite and decentralized industry.

8:45–9:30 am

Training the Regulatory Workforce – *Anne Powell*

Training the regulatory workforce is a key component to a well-run statewide onsite wastewater program. In Virginia, the centrally located Office of Environmental Health Services (OEHS) hosts environmental health staff from across the state through two sessions of an extensive training program. Since taking on the role of Environmental Health Coordinator in OEHS, I have worked diligently (with a handful of colleagues) to modernize the training program and improve its efficacy. To begin, we restructured several live webinar-style training sessions into self-guided eLearning modules. These improvements continue to save time and funds for the OEHS. The self-guided modules remain available online for reviewing before an exam, as refreshers when projects occur, or any time throughout their career with VDH. Additionally, our training program also boasts an inclusive and positive learning environment. EH staff are diverse in demographics and experience level, requiring different levels of attention and personalized training. OEHS sets a reasonable roster maximum to allow for a beneficial instructor-to-trainee ratio and a comfortable group of peers together in the classroom and field work. With a reasonable class size, trainees can work in pairs and small groups as they gain the knowledge,

skills, and abilities required of regulators in the onsite sewage program in Virginia. With this presentation, I look forward to sharing the challenges, lessons learned, and improvements made for Virginia's onsite sewage training program with fellow regulators.

9:30–10:15 am

Real Estate Professionals as a Key Audience for Onsite Wastewater Education – *Brooklyne Wassel*

Georgians in rural and some suburban areas rely on onsite wastewater systems (OSWS) to safely and effectively manage household wastewater. However, many decision makers for the home are not aware of basic care, maintenance, and signs of failure. This shows the need for public education, but generally Extension public programs related to OSWS are not well attended. However, real estate agents require annual continuing education credits to remain accredited. Real estate agents interact with numerous properties a day and serve as an important guide through the buying and selling process during which time a septic letter is a common requirement. Therefore, offering educational credit hours through Extension programming can be a major draw for attendance. Utilizing continuing education credits as an incentive, Extension professionals have provided real estate agents with three hours of educational programming including radon, well water, and septic systems. The radon segment was used for the accreditation component, however, the participating realtors quickly engaged with the OSWS portion of the program. Realtors were enthusiastic to ask questions and understand onsite wastewater as it pertains to their jobs. This audience is a key component of educating the public on OSWS as they are very likely to be the first encounter someone has with their new home and OSWS ownership. Bridging the gap and connecting with realtors opens the door for onsite wastewater education and provides a way to provide Extension education and to truly move the needle for public awareness and operating and maintaining onsite wastewater systems.

10:45–11:30 am

Evaluation of Negative Health Outcomes Associated with Soil Auger Use by Environmental Professionals – *Charles Humphrey*

Environmental professionals (EP) often use manually powered augers to evaluate the characteristics of soil for various land use decisions such as suitability for onsite wastewater treatment systems. Manually powered soil augers are lighter and less bulky than gas powered augers, cause less site disturbance than an excavator, and are typically the most economical way of determining subsoil characteristics. However, repetitive gripping, twisting, pulling, and kneeling associated with manually powered auger use may contribute to negative health outcomes for EP. Prior studies have shown that professionals in occupations

using tools that require repetitive motions such as carpentry, painting, and janitorial work may be susceptible to various musculoskeletal disorders. However, few studies have focused on occupational health risks associated with using manually powered soil augers. A survey with questions regarding the respondents' years of experience, average number and depth of boreholes created per week, soil characteristics of work areas, auger specifications, health ailments and treatment strategies was administered to 60 EP. Health ailments were reported by 95% of respondents, and most (>73%) indicated that using the soil auger caused or aggravated their injuries. The most common ailments were associated with lower back, elbows, upper back, and wrists. Physical rehab, rest, and surgery were the most common treatments. Soil conditions including presence of rocks, roots, high clay content and low moisture were reported as the most difficult conditions to use the auger. Use of personal protective equipment, auger maintenance, work rotation and rest may help reduce the likelihood of ailments.

11:30 am–12:15 pm

Reviewing Proprietary Aerobic Treatment Units Testing Data during NSF Standard 40 Tests

– John Blount

This session was developed to give the audience an overview of how NSF Standard 40 Units are tested and can be implemented as a component of a high-strength wastewater treatment train. The Standard 40 test will be explained by extracting actual BOD reduction capabilities from several brands' test results. Often, designers are unaware of the actual capabilities of treatment units, which will be discussed in detail. Additionally, the common mistake of using the maximum organic loading rate rather than the average organic load ingrate as a design factor will be discussed. The development of a unit's average organic loading reduction rate will be demonstrated through a design example. A number of tested and certified units data will be presented.

TRACK 9: TECHNICAL – TUESDAY, OCTOBER 27

ROOM: COTTON CREEK | 8:00 AM TO 12:15 PM | BREAK 10:15 AM TO 10:45 AM

8:00–8:45 am

Methodology for Quantitative Cumulative Effects Assessment of Onsite Wastewater Systems

– Bryer Manwell

Based on a current case study in British Columbia Canada, the presentation will focus on the development and implementation of a Parcel-Level Cumulative Effects Index (P-CEI) for cumulative effects impact assessment on the receiving environment. This method allows for the evaluation of the potential contribution to water quality degradation from each land parcel's onsite sewerage system(s), along with other land uses. The P-CEI focuses on parcel-specific stressors, using proxy indicators derived from land use, infrastructure, and management practices. Core indicators (i.e., nitrate, total phosphorus, pathogenic bacteria, and benthic macroinvertebrates as a habitat proxy) are used to estimate each parcel's potential export load (mass/time) to surface water/groundwater pathways. The method is GIS-enabled for scalability (e.g., via QGIS with local government parcel layers). It supports regulatory prioritization for interventions such as septic upgrades or riparian buffers. The P-CEI approach may also be applicable to other parcel scale contaminant inputs to a watershed. Within the context of developing P-CEI, we have written a paper which details a sliding scale level of effort for professional due diligence in environmental risk assessment for the onsite wastewater industry within British Columbia, Canada. By tying professional due diligence to environmental risk assessment above and beyond existing regulatory requirements, we hope to have better information for future P-CEI based watershed scale cumulative effects assessments.

8:45–9:30 am

High Strength Wastewater: Design, Results, and Lessons Learned – Sheryl Ervin

This presentation covers the effectiveness of six fixed-bed biological reactor (FBBR) wastewater treatment systems installed in Minnesota to treat high-strength wastewater (HSW). The evaluation was undertaken to move the technology from conditional approval status to a fully registered status. Treatment was targeted to meet Treatment Level C (TLC) standards: 170 mg/L BOD₅ (or 125mg/L cBOD₅), 60 mg/L TSS, and <25 mg/L FOG. Influent and effluent samples from each of the six installed systems were collected and analyzed by third-party contractors. The resulting report provides a description of the design for each system; a discussion of the facility and any concerns with design or maintenance, and a summary of results including actual BOD₅ loading; estimated flows from elapsed time meters and drawdown results; and a complete list of operation and maintenance (O&M) notes and activities performed during the evaluation period.

9:30–10:15 am

Troubleshooting Treatment Processes for Optimum Dissolved Oxygen Concentrations – Bruce Lesikar

Onsite wastewater treatment processes need air exchange and an appropriate dissolved oxygen concentration to accept and treat sewage. Air movement into and out of treatment components is critical for liquid enter and exit. Treatment processes are defined as anaerobic, anoxic, and aerobic. Oxygen management is critical to achieve an appropriate level of dissolved oxygen in treatment chambers or tanks. The basic methods for achieving air exchange and desirable oxygen levels are identified and

described. System operational features are discussed that facilitate the ability for air to exchange and oxygen to enter the liquid. These basic processes and associated features are defined and discussed to establish troubleshooting skills. Professionals with an understanding of basic processes establish competence and confidence to identify root causes of system malfunction. Treatment tanks with restricted air exchange are vapor locked. Most anaerobic tanks exchange air into the collection system. Limiting atmospheric air exchange can reduce headspace oxygen and limit concrete corrosion. Aerobic treatment processes require air exchange to maintain aerobic conditions. Monitoring component operation is critical for identification if aeration processes are operational. Aeration processes are described and methods to determine operational status of aeration system are discussed. Soil aeration is critical for oxygen delivery to the soil treatment biozone. Soil aeration methods are described along with methods to recognize the reduction in aeration rates. Troubleshooting aeration processes provide a means to determine the root cause of aeration system malfunction.

10:45–11:30 am

Pre-Backfill Digital Twin Documentation for Maintenance and Inspection – *Lucas Grein*

Onsite wastewater systems are designed to operate for decades, yet the documentation created at installation often provides limited spatial clarity to support long-term maintenance and inspection. Hand-drawn grid sketches, static permit files, and limited photographs can result in component location uncertainty, inconsistent inspection preparation, and gradual loss of original system layout context over time. This presentation examines the use of pre-backfill digital twin documentation as a supplemental record created during system installation. In this context, a digital twin refers to a visual and geospatial record of the installed system captured prior to backfill and site restoration. The objective is to explore how geospatially anchored site imagery and three-dimensional reconstruction can preserve visible system conditions before they are concealed. Methods include capturing high-resolution imagery during installation, generating orthomosaic maps and 3D site models, annotating component locations, and archiving these records alongside traditional as-built documentation. Based on multiple residential field installations, case comparisons between conventional as-built sketches and digital twin documentation will illustrate differences in spatial clarity, repeatability, and

cross-stakeholder communication. Observed outcomes include reduced locate uncertainty during service visits, improved inspection readiness, and clearer preservation of system layout for future maintenance events. The session concludes by discussing how pre-backfill digital twin documentation may complement existing regulatory records and support more consistent maintenance and inspection workflows over the lifecycle of decentralized wastewater systems.

11:30 am–12:15 pm

Improving Permitting Efficiency with GPS/GIS: South Carolina's Selection and Deployment of a Statewide Solution – *Brad Poston*

The South Carolina Department of Environmental Services Onsite Wastewater Field Operations Division created a workgroup that evaluated GPS/GIS technologies to improve the accuracy, efficiency, and professional quality of site evaluations used in the onsite wastewater permitting process. Two primary systems were tested: Moasure, a motion-based measurement device, and the Juniper Geode GPS receiver paired with Uinta software. Moasure demonstrated high precision, reporting approximately 99.7% accuracy for line measurements and providing the ability to measure both lines and areas through motion-based tracking. However, field testing revealed limitations when mapping complete sites and generating professional site plans, particularly due to difficulties exporting measurements into a usable format for documentation and reporting. The Juniper Geode GPS receiver with Uinta software provided a more balanced workflow for field and office operations. Although the Geode operates as a single-frequency receiver without RTK correction, it achieves sub-meter accuracy suitable for our site evaluation tasks. The system enables efficient collection of points, lines, and areas in the field and allows editing and export of professional site plans in PDF format. Based on this evaluation, the workgroup selected the Juniper Geode with Uinta software for implementation. Nine units were procured, and development of training and standard operating procedures will be underway once we determine our field tasks are considered outside the licensing requirements for surveyors and engineers. We contacted SCLLR to help make the determination. The proposed presentation would provide an overview of the evaluation of the GPS/GIS technologies as well as explore efficiencies gained by the application of the selected product during site evaluations as part of the permitting process.

8:00–8:45 am

Challenges of Short-term rentals (STR) Serviced by OWTS and How to Manage Them – Bill Tatro

Short-term rental (STR) properties have become increasingly common in tourism-driven communities across the United States. Many of these homes rely on onsite wastewater treatment systems that were originally designed for traditional residential occupancy patterns. However, service providers operating in these areas frequently observe wastewater use patterns that differ significantly from those assumed in residential system design. Short-term rental homes often experience concentrated weekend occupancy, rapid turnover between rental groups, and heavy water use associated with guest arrivals, laundry turnover, and cleaning operations. These use patterns can lead to hydraulic shock loading, accelerated solids accumulation, increased pump activity, and more frequent service calls. Based on field observations from service providers working in tourism-oriented communities, this presentation will explore the operational challenges associated with onsite systems serving short-term rental properties. The session will discuss common service issues, maintenance considerations, and system performance concerns that arise under these conditions. Strategies for managing these systems—including monitoring practices, maintenance approaches, and owner education—will also be presented. Attendees will gain practical insight into how short-term rental usage patterns affect onsite wastewater systems and how service providers can help property owners manage these systems more effectively.

8:45–9:30 am

From Crisis to Capacity: A Case Study in Building a Private Septage Disposal System – Jon Jouvenaux

Across the United States, septic and portable sanitation service providers are facing increasing difficulty securing reliable septage disposal. Municipal wastewater treatment plants often restrict outside haulers, limit acceptance volumes, or discontinue septage programs entirely due to capacity limitations and operational constraints. As a result, operators must travel longer distances, face rising disposal costs, and risk disruptions that can impact maintenance of onsite wastewater systems and public health. This presentation describes the development and operation of the CleanWater Farm, a privately operated septage management system designed to provide independent disposal capacity. Following a five-year planning and permitting process, a distributed collection and centralized treatment approach was implemented to overcome siting constraints and community concerns associated with septage processing facilities. The system utilizes satellite dump depots where incoming septage is mechanically screened to remove debris and grit before

temporary storage and bulk transport to an 80-acre treatment facility. The site currently processes approximately 4.5 million gallons annually of septic tank, portable toilet, and holding tank waste. Treatment occurs through two primary processes: beneficial land application across 24 acres of managed hay fields implemented through a permitted nutrient management program, and polymer-assisted dewatering that separates solids from the liquid fraction. The recovered liquid is dispersed through an infiltration system consisting of approximately 3,600 feet of infiltrator chambers. Five years of operation demonstrate stable soil conditions, increased crop yields, and zero odor complaints. This case study presents system design considerations, operational performance, and regulatory lessons learned, providing a replicable model for expanding septage disposal capacity in regions where municipal treatment infrastructure is limited.

9:30–10:15 am

From Crisis to Capacity: Building Sustainable Septage Disposal Solutions Before Your Community Runs Out of Options – Jason Birdsong

Across North America, septic pumpers, municipalities, regulators, and wastewater treatment facilities are facing a growing challenge: diminishing disposal capacity, increasing hauling distances, rising operating costs, aging infrastructure, and expanding regulatory pressures. While many industry discussions focus on the crisis itself, this session focuses on what matters most: solutions.

Join Jason Birdsong, President of NAWT and Founder of the National Septage Disposal Crisis Alliance, as he shares real-world strategies being implemented across the country to create sustainable disposal pathways, strengthen public-private partnerships, and expand treatment capacity.

Attendees will learn how communities, treatment facilities, regulators, and private industry leaders are successfully working together to identify emerging disposal capacity challenges before they become emergencies, build collaborative relationships between regulators, municipalities, and service providers, evaluate treatment facility opportunities and alternative disposal models, understand funding pathways, financial considerations, and economic feasibility, develop regional and statewide disposal strategies, create long-term solutions that protect public health, support environmental compliance, and strengthen local economies.

Drawing from national research, industry collaboration, regulatory engagement, and lessons learned through the National Septage Disposal Crisis Alliance, this session provides attendees with practical tools, proven frameworks, and actionable next steps they can immediately apply within their own communities.

The disposal crisis is real. The good news is that solutions already exist.

The organizations that thrive over the next decade will be the ones that move from reacting to the problem to leading the solution.

Learning Objectives: Identify the key drivers creating disposal capacity challenges across North America. Evaluate proven treatment, disposal, and partnership models currently being implemented throughout the industry. Develop a strategic action plan to increase disposal resilience within their own service area or jurisdiction. Understand how collaboration between industry, regulators, and municipalities can accelerate sustainable long-term solutions.

10:45—11:30 am

What Should Be Key Learning Outcomes for Universities Preparing Students to Become Onsite Professionals? – Junko Munakata Marr

Curriculum innovation in higher education is constrained by many factors, including credit hour limits, student interest, faculty expertise, teaching assignment priorities, faculty reward structure, budget, and accreditation requirements. An onsite water reclamation and reuse class has been offered intermittently for upper-level undergraduate and graduate engineering students at Colorado School of Mines (Mines) for 20 years, from which multiple students have gone on to work in the onsite industry. However, water treatment is covered across seven different undergraduate and graduate courses at Mines, and as pressure to optimize faculty efforts increases, the need to continue the onsite class is in question. The evolution of the onsite class to its current course content as well as drivers for greater efficiency across the curriculum will be used as a framework, with the goal of stimulating discussion and engagement with academics and onsite experts. How can universities best complement the education already provided by onsite professional

organizations? The ultimate goal is to identify key learning outcomes that universities should include in their curricula, regardless of the structure (e.g. standalone class or integrated into a general water/wastewater treatment class), to effectively prepare students to become onsite professionals. I am happy to collaborate and coordinate with anyone else who might be interested in this topic!

11:30 am–12:15 pm

Panel Discussion: Emerging Professionals in the Onsite Industry – Jonathan Kaiser

The onsite wastewater sector is beginning to realize an emerging challenge with having sufficient emerging professionals to be the next generation of workers. The Emerging Professionals Committee is specifically focused on supporting the development of this next generation to ensure there will be a sufficient workforce that is both interested and knowledgeable about the sector. We are exploring initiatives to improve the visibility and awareness of the great opportunities that this sector has to offer to contribute to addressing these related workforce issues. This presentation will be a panel of emerging professionals from a variety of roles within the onsite industry (students/academia, regulator, installer, manufacturer, etc.) who will discuss how they became involved in the industry, their experience with onsite wastewater systems, and factors that have impacted their experience with the industry. The panelists will discuss their initiatives, impacts, successes, and challenges. The audience will also be encouraged to engage in a discussion and share their experiences on this topic. The session is intended to form a collaborative and supportive environment that will ignite ideas for expanding or developing new programs to support emerging professionals.

TRACK 11: LOOKING AHEAD – TUESDAY, OCTOBER 27

ROOM: WESTMINSTER BALLROOM I | 1:30 TO 4:45 PM | BREAK 3:00 PM TO 3:15 PM

1:30—2:15 pm

ICC 825 and the Future of Onsite Wastewater Treatment: Global Collaboration and Public Health Impact – Shaun May

Reliable and resilient onsite wastewater treatment is essential for protecting public health, particularly in areas without access to centralized sewer systems. To support more consistent and globally applicable best practices, the International Code Council is developing ICC 825: Private Sewage Disposal Systems, an ANSI-accredited standard anticipated for publication in 2026. Developed through a global, multidisciplinary consensus process, ICC 825 brings together expertise from engineers, regulators, scientists, and public health professionals worldwide. A notable innovation is the collaboration between the ICC and the University of Miami, which integrates academic research,

environmental modeling, and public health science directly into standards development—an uncommon and forward-leaning practice in this field. The objective of this presentation is to introduce ICC 825 and illustrate how its globally informed requirements advance public health protection, support better design decision-making, and enhance the resilience of onsite wastewater systems. The standard has been in active development since 2023 through the ISPSDS consensus committee, which has evaluated international approaches, environmental data, site-specific constraints, and system performance considerations. This effort includes the creation of a structured predesign screening toolkit to assess soil conditions, flood risk, financing considerations, operations, and maintenance capacity to guide appropriate technology selection. Key outcomes of this work include draft provisions that strengthen long-term system performance under a range

of environmental and operational conditions and introduce guidance for safe onsite reuse of treated wastewater, improving resource efficiency. Attendees will gain insight into how ICC 825 provides a globally informed, academically supported, and public health-centered framework for sustainable onsite wastewater treatment solutions.

2:15–3:00 pm

Are We There Yet? Vermont's Experience with Time of Travel For Siting Onsite Wastewater Systems

– *Bruce Douglas*

The State of Vermont has had a minimum isolation distance, to protect private drinking water sources from impacts from onsite wastewater systems, dating back to at least 1949. Additional requirements based on the type of potable water source and addressing potential human health impacts have been in place since 1982. Initially, these additional requirements included a two-year time of travel (2YTOT) in groundwater down-gradient from a leachfield to protect private water sources from virus contamination. The 2YTOT was based on research that demonstrated that temperature was the most significant parameter influencing viral die-off in groundwater flow systems, logarithmic rates of virus die-off, and the fact that Vermont has relatively cold groundwater temperatures. This requirement was reviewed in the early 1990s, and rather than have an unlimited 2YTOT requirements, that could range from 10s of feet to 100s of feet, the Vermont Departments of Environmental Conservation and Health agreed to focus on the areas of the highest probability of groundwater connection, and established presumptive isolation zones that extended downslope of the minimum isolation radius based on the design flows of the onsite wastewater system and the type of downgradient potable water source. Literature reviews of virus transport in groundwater in 2010 and 2026 and the work of the National Blue Ribbon Commission for Onsite Water Systems have reinforced the general concepts of groundwater temperature affecting virus survival, logarithmic reduction values and time of travel.

3:15–4:00 pm

Virginia Septic and Well Assistance Program: Rural Roots and Healthy Futures – *Nicole Sandberg*

Virginia's Septic and Well Assistance Program began in 2021 as statewide initiative to address failing individual wastewater and water systems and help improve health outcomes to disadvantaged Virginians. On track to complete over 1000 projects by the end of 2026 and help nearly 2,000 Virginians; SWAP has

addressed over 160 inadequate drinking water sources and nearly 300 onsite septic systems or straight pipes. It's been three years (October 2023) since the last NOWRA presentation and the success of the SWAP initiative will be discussed, including highlighting how sometimes having the money to help is the least important part of helping homeowner's address water and wastewater needs. We will discuss the critical need for established operation and maintenance programs, having good partners and having strong programmatic processes and procedures.

4:00–4:45 pm

A Blueprint for Watershed Resource Protection through Community Scale Integrated Infrastructure Management – *Matthew Dowling*

Clean water is central to healthy ecosystems and economic development in communities. Intentional watershed management requires addressing interconnected land-use challenges that can impair local water quality. These challenges often include reliance on older septic systems, impaired groundwater resources, stormwater runoff, and high-intensity land uses. Our experience coordinating watershed management in southern R.I. has led to the development of a comprehensive framework designed to assess, prioritize, and mitigate water quality risks, and identify and implement locally applicable solutions to address these challenges. This framework can serve as a blueprint for developing and executing community-scale approaches to holistically manage local water resources in other regions. Here, we share approaches that communities can adopt to evaluate watershed health by assessing impaired surface waters and groundwater, identify pollution sources through comprehensive land use and infrastructure analysis, prioritize solutions based on risk, funding availability, and political considerations, develop decision matrices for strategic interventions such as upgrading OWTS technologies and stormwater management, and implement projects through targeted initiatives that combine volunteer efforts, local partnerships and diverse funding sources. Finally, we illustrate successful implementation of this framework through a case study of a community in southern RI. Our framework provides a scalable model for integrated watershed management designed for long-term resource protection. Our program's success underscores its potential as a blueprint for managing watersheds locally, emphasizing adaptive and holistic approaches.

1:30–2:15 pm

Best Practices for Wastewater Management in Community Developments – *Alex Sundberg*

Wastewater infrastructure is often the most critical—and least understood—component of RV park and manufactured housing community development. Permitting pathways, soil conditions, groundwater limitations, and nutrient reduction requirements frequently dictate project density, timeline, and long-term feasibility. Yet wastewater planning is commonly addressed late in the development process, resulting in costly redesigns, delays, or operational challenges. This presentation outlines a practical seven-step framework for integrating wastewater planning into the earliest phases of community development. The discussion begins with defining project scope and realistic design flows, including seasonal variability, amenity impacts, and phased expansion considerations. Attendees will explore how site and soil characteristics influence dispersal feasibility and treatment requirements, and how early coordination with regulatory agencies can clarify permitting triggers such as state oversight thresholds, discharge limitations, and nitrogen reduction standards. The session will compare treatment strategies ranging from conventional septic systems to advanced secondary treatment, membrane technologies, and surface discharge options. Emphasis will be placed on aligning treatment selection with site constraints, regulatory requirements, seasonal loading patterns, and long-term operational sustainability. Finally, the presentation addresses scalability, modular design approaches, and maintenance planning as key factors in protecting asset value and ensuring compliance. By applying a structured planning methodology, developers, engineers, and regulators can improve project outcomes, reduce risk, and support environmentally responsible growth in community-scale developments.

2:15–3:00 pm

UPC Compliant Solid Waste Interceptor as a Septic Alternative – *James Roberts*

Legacy onsite wastewater systems—particularly cesspools and aging septic tanks—remain a primary source of groundwater and near-shore pollution across Pacific island communities. Full system replacement is often constrained by cost, site limitations, and permitting complexity. This abstract presents Mata, an above-ground solids separation and dehydration technology designed to function as a modular pretreatment upgrade to existing onsite wastewater systems. Mata operates as a mechanically assisted interceptor that separates and dewateres settleable and floatable

solids from raw household wastewater prior to discharge to downstream treatment or disposal components. The system is installed entirely above grade, enabling deployment in high-groundwater, shallow-bedrock, and flood-prone environments. Early returns from independent third-party testing conducted with the University of Hawai'i at Mānoa demonstrated average total suspended solids (TSS) and biochemical oxygen demand (BOD5) reductions of 90% and 87% when treating residential blackwater per NSF 41 loading criteria. The presentation also outlines regulatory pathways supporting Mata's deployment, including classification as a listed solids interceptor under existing plumbing codes, third-party certification, and incremental-upgrade permitting strategies. These pathways enable rapid adoption while maintaining public-health and environmental protection standards in island and coastal jurisdictions.

3:15–4:00 pm

Installation of Resilient Electrical Systems

– *Bruce Lesikar*

Electricity is a critical energy source for implementing onsite wastewater treatment systems. Electrical circuits energize the equipment and alarm circuits. Electrical components are protected to limit risk of loss of property and destruction of components. Electrical components and associated best management practices are discussed and illustrated to protect wiring systems. The National Electrical Code is a best practices' guide for implementing safe and protected electrical systems. Best practices for electrical systems are discussed to guide achievement of long-term and resilient electrical service. Onsite wastewater treatment systems are classified as a corrosive and wet environment for electrical systems. Electrical components must be protected from exposure to gases and moisture to reduce risk of wiring corrosion and reduced electrical power to motors and compressors. Electrical motors operated outside of specified electrical voltage and amperage ranges have a reduced service life. Protecting electrical circuits extends the life of components. Best practices are presented using pictures and diagrams. As professionals, we need to understand how to construct, operate and maintain electrical system in a safe manner. The operator must be able to identify how to deenergize the electrical system and verify it is deenergized before working on the components. The National Electrical Code is written and distributed through the National Fire Protection Association, which signifies the risk to property and people when electrical systems are not constructed to minimize the risk of improper energy release.

4:00–4:45 pm

From Sample to Report: Making Sense of Wastewater Data – *Brenda Faz-Cresie*

In our industry, the ultimate goal is to preserve and protect the environment by managing and treating our world's most valuable asset: water. Understanding how we evaluate our practices is critical to providing best practice service. This presentation provides a practical overview of wastewater monitoring, focusing on how and why specific water quality parameters are selected, how laboratory analyses are performed, and how to interpret resulting data. It begins by explaining the rationale behind commonly measured parameters—such as biochemical oxygen demand (BOD), total suspended solids (TSS), nutrients, and pathogens—and how they relate to regulatory requirements, treatment efficiency, and environmental protection. The session will offer a simplified walkthrough of laboratory procedures,

highlighting key steps in sample preparation, analytical methods, quality control, and data validation. Emphasis is placed on maintaining accuracy and consistency in testing practices. We will review the importance of proper sample collection, bottle selection, preservation techniques, and holding times. These factors are critical in preventing contamination or degradation, ensuring that analytical results accurately reflect actual wastewater conditions. Finally, participants will review a laboratory report in detail to better understand its structure, terminology, and key data elements. Guidance will be provided on how to read and interpret results, identify potential issues, and apply findings in operational or compliance contexts. Overall, this presentation equips attendees with foundational knowledge to confidently engage with wastewater data, from sampling through analysis to reporting.

TRACK 13: GENERAL DESIGN – TUESDAY, OCTOBER 27

ROOM: MEADOWBROOK | 1:30 PM TO 4:45 PM | BREAK 3:00 PM TO 3:15 PM

1:30–2:15 pm

Honu Hub: An Adaptive Decentralized Wastewater Infrastructure Solution (ADWIS) for Island Communities – *Daniel Yeh and Robert Bair*

Wastewater infrastructures on islands often face unique challenges such as saltwater intrusion, high material, labor, and energy costs, shallow aquifers, and proximity to sensitive ecosystems like coral reefs. In the U.S. State of Hawai'i, an estimated 83,000 households on cesspools discharge 52 million gallons (197,000 m³) of untreated sewage into the environment each day, harming public health and fragile nearshore ecosystems. These wastewater struggles extend beyond actual islands. On the mainland U.S., millions in remote, isolated, "island communities" in Appalachia, rural South, Alaska, and the Navajo Nation also struggle with poor sanitation due to inadequate wastewater infrastructure. Conventional onsite wastewater technologies that involve septic tanks and drainfields struggle in instances of small lot size, high water table, poor soil conditions, or hard ground which make excavation difficult. A novel onsite treatment technology called the Honu Hub was developed through support from the U.S. National Science Foundation's Convergence Accelerator program. The system is part of a new class of technologies called adaptive decentralized wastewater infrastructure solutions (ADWIS), which has four salient features: 1) advanced treatment to remove nitrogen for the protection of nearshore ecosystems; 2) production of recycled water for onsite reuse to enhance water resiliency; 3) incorporation of automated controls and remote monitoring to ensure reliability; 4) energy independence for cost reduction, using renewable sources such as solar or wind. Honu Hub is powered by the NEWgenerator, an NSS technology originally developed through the Gates Foundation's Reinvent The Toilet Program and has been piloted and commercialized in India and South

Africa. Honu Hub has a small footprint and does not require a drainfield, which enables rapid installation especially in places with small lots and poor soils. This presentation will cover the background of the technology and plans for introducing Honu Hub to Hawai'i through pilot demonstration, regulatory and financial analyses, and stakeholder engagement.

2:15–3:00 pm

Design Considerations for RV Parks and Campgrounds – *Gary MacConnell*

RV parks and campgrounds represents a \$10.9 billion (2025) industry, with the annual number of businesses growing by an average of 3.4 percent (2020 to 2025) annually. The growth in this industry has increased significantly since the pandemic, as more people have embraced the RV life style. Since many RV Parks are located in remote locations where public sewer is not available, on-site wastewater treatment systems are the only alternative. RV parks present unique on-site wastewater challenges from design, operations and maintenance perspectives. These challenges are often addressed in the each State's rules, regulations, and guidance. Source wastewater is typically considered high strength with wide swings in flows which must be addressed during the design of the system. Other considerations to be discussed include: costs, space constraints, noise, odor, chemicals, and other factors.

3:15–4:00 pm

Septic Tanks — Bigger is Better! – *Sara Heger*

As the primary treatment unit in decentralized wastewater infrastructure, the septic tank is responsible for approximately 50% of total contaminant removal. This presentation provides a technical analysis of the physical and hydraulic principles that govern tank performance and long-term system viability.

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We will explore settling theory—specifically, the behavior of discrete particles—and its direct application to septic tank geometry and sizing. The session will detail the critical relationship between hydraulic retention time and the efficient separation and storage of accumulated sludge and scum layers. Beyond hydraulic design, the presentation will address the engineering requirements for system longevity and public safety, including watertightness, access management, and secondary protection. Upon completion of this session, participants will be able to:

- Analyze the Role of Primary Treatment: Define the septic tank's function as a critical treatment unit and explain its capacity to remove approximately 50% of wastewater contaminants.
- Apply Settling Theory to Design: Evaluate the physical principles of discrete particle behavior and relate these theories to the specific geometry and sizing requirements of modern septic tanks.
- Calculate Hydraulic Performance: Demonstrate the correlation between hydraulic retention time (HRT) and the effective separation and storage of sludge and scum layers.

4:00—4:45 pm

Snow & Rain: Design Differences Between On-site Systems in the Icy-Cold and the Wet-Tropics

– Ben Kele and Sara Heger

On-site wastewater systems are installed in a wide variety of climatic conditions. Those put into locations with very cold environments encounter very different surroundings than those in the wet tropics. Snow, ice, and cold temperatures put different pressures on treatment and dispersal compared to sites that experience very warm temperatures, large volumes of rainfall, and high humidity. Yet, the basic scientific principles of treatment, dispersal, and reuse remain the same. This presentation will discuss best practice design & installation principles for on-site systems in vastly different climatic conditions. The impact on water & air temperature will be examined. The amount of sunlight and the evapotranspiration potential of the different conditions will be scrutinized. The impact of the type of rainfall and overland stormwater flow will be studied, as will the type of snow and snow melt. The influence of wind and humidity will also be calculated. Practically, case studies will show how these impacts on treatment plant selection, tank placement, dispersal techniques, protection methods against cold and/or rainfall intrusion, and potential reuse opportunities. The case studies will also provide information on potential problems that may occur with systems in very cold or wet tropic installations and offer some trouble-shooting solutions. Attendees will learn best practice design, installation and trouble-shooting techniques for cold weather and wet tropic on-site wastewater systems.

1:30–2:15 pm

Designing Advanced Treatment Systems to Perform at High Elevations – *Kevin Sherman*

The dissolved oxygen concentration in water is determined by three environmental factors; temperature, salinity and pressure. Warm water contains less dissolved oxygen than cooler water. Another way of describing this relationship is that gas solubility decreases with increasing temperature. Fresh water holds more dissolved oxygen than salt water. Another way of describing the situation is salinity negatively affects the solubility of oxygen. The solubility of dissolved oxygen in water is also influenced by water pressure. As water pressure increases, the amount of oxygen that can be dissolved in the water also increases. This relationship happens because higher-pressure forces more oxygen molecules to fit into water's molecular spaces. (Source: The Engineer's Toolbox, accessed 2 6 2026). A fundamental concept in fluid mechanics is the inverse relationship between elevation and water pressure. The higher the elevation is above sea level, the lower the water pressure, with a corresponding decrease in dissolved oxygen. Oxygen solubility has an upper limit, called the saturated dissolved oxygen concentration. Elevations significantly higher than sea level's depresses the saturated dissolved oxygen concentration compared to water sampled at sea level. Designers must recognize and quantify the dissolved oxygen shortfall and modify the design to compensate for elevation effect. Learning objectives: 1 List three physical factors that influence the dissolved oxygen concentration in a water sample 2. State an analogy that describes elevations impact on saturated dissolved oxygen concentration 3. List three ways of increasing saturated dissolved oxygen concentrations in a design

2:15–3:00 pm

Utilizing Technology to Modernize a Septic Program – *Scott Morris*

This presentation will focus on the modernization of a septic program from the lens of a local health department. We will show you how we've used technology to enhance inspections/inspection reports, increase data tracking, utilize GIS, integrate more communication to homeowners & contractors, increase efficiency, and develop operation & maintenance tracking. Communication and efficiency will be key focuses. Every septic program must continue to work on improving efficiency and building valuable communication to the public. There are a lot of smaller health departments/septic programs that continue to struggle with getting out of the paper & pencil mindset. This presentation will serve as a template of ideas for those programs to hopefully break away from that. The presentation will also have crowd engagement by using a presentation software called Mentimeter.

3:15–4:00 pm

Liquid Only Sewer: Protecting the World's Water Through Scalable Wastewater Infrastructure – *Forrest Kunz*

Accelerating economic and population growth is driving the need for environmentally safe infrastructure that can keep pace, especially in wastewater collection and treatment. This session explores how Liquid Only Sewer (LOS), or Septic Tank Effluent Pumping (STEP), paired with decentralized treatment, provides a cost-efficient and technically robust solution to support sustainable development. We will discuss how LOS systems reduce upfront capital costs, shorten construction timelines, and enable phased infrastructure investment that aligns with community growth. Technical content will cover recent advancements in effluent collection and secondary treatment, hydraulic performance, and system scalability across both rural and urban applications. Case studies will highlight how LOS technology helps overcome common growth-related challenges, such as variable flows, difficult terrain, and limited funding; while maintaining long-term operational efficiency. Attendees will gain engineering and economic insight into how LOS supports resilient, adaptable infrastructure that attracts and sustains development in expanding communities.

4:00–4:45 pm

Picking up the Pieces - Restoring a Failed Small Community Wastewater System – *John Buchanan*

This presentation will focus on the lessons-learned while providing technical assistance at a failed wastewater treatment facility at a residential development. This 18,000 gpd facility had been in operation for about 10 years, and consisted of a STEP collection system, fixed film treatment, and drip dispersal. As components experienced life-cycle failures, the operator (a public utility) performed the most minimal repairs. For example, a duplex pump station became a simplex pump station when one of the pumps burned out. Eventually, the accumulation of failed components and lack of general maintenance resulted in off-site discharges. After receiving several NOV's from the Tennessee Department of Environment and Conservation, the utility requested assistance from the Tennessee Association of Utility Districts to help with finances and management. The author was part of a team that was asked to visit the site and assess what was needed to bring the system back into compliance. Fixing components is easy – when you know where they are located. Of great concern about this facility was the complete lack of system documentation. The original engineering firm had been bought out, the utility did not keep drawings (or insist upon an as-built), and the regulators did not maintain a set of drawings. Additionally, the engineer's intent could not be determined – no system curves for the hydraulics, tank sizes (and locations), or locations of pipes was available. For this talk, the author will discuss the benefits of geo-locating components, maintain up-to-date system documentation, and then post this information at the site in a weather-proof container.

1:30–2:15 pm

Asset Management as a Business Approach to OWTS Service – *Bruce Lesikar*

Centralized wastewater management companies utilize asset management programs to achieve efficient operation of their assets. These asset management strategies serve as business guidance to effectively maintain their treatment processes. These business strategies are similar and parallel to asset management for any equipment intensive industry. These business strategies provide a framework for structuring decentralized wastewater management businesses. The business management strategies focus on proactive maintenance of the wastewater infrastructure asset. Proactive maintenance activities include: performing routine maintenance, troubleshooting system malfunction, operational evaluation and data collection, remote communication of alarm status, provider process data recording and analysis, remote data access and automated data analysis, and remote continuous process monitoring. These activities contribute to implementation of business strategies focusing on preventative maintenance, condition-based maintenance, predictive maintenance and reliability centered maintenance. Service providers implementing these business models offer customers the level of service they desire. The service company and the customer are business partners in managing the decentralized wastewater infrastructure. A service company can tailor their business to maximize customer retention and loyalty. These asset management strategies are presented and discussed as a means to improve system management and customer retention.

2:15–3:00 pm

From Google to AI: How Homeowners Are Choosing and Communicating with Septic Contractors – *Scott Andreasen*

Consumer behavior is rapidly evolving as artificial intelligence (AI) tools such as ChatGPT, Gemini, and voice assistants begin to influence how homeowners search for and select local service providers. For septic and wastewater professionals, understanding this shift is critical to remaining visible, competitive, and trusted in their local markets. This presentation explores how the transition from traditional search engines to AI-assisted discovery is changing the way homeowners evaluate and choose septic contractors. The objective is to help onsite wastewater professionals understand emerging digital behaviors and adapt their approach to customer engagement and acquisition accordingly. Drawing from real-world case studies and field observations within the septic and excavation industries, this session will outline how contractors are currently being discovered online, what factors influence AI-generated recommendations, and how digital presence impacts trust and decision-making. Additionally,

the presentation will examine how AI-assisted tools are supporting initial customer interactions, helping to streamline inquiries, improve response times, and enhance the efficiency of prequalification prior to site visits. Results indicate that contractors who align their online presence and communication strategies with these emerging technologies are experiencing improved lead quality, stronger customer trust, and increased job opportunities - often without increasing marketing spend. Attendees will leave with a clear understanding of how AI is reshaping local search and practical considerations for adapting to these changes in an evolving digital landscape.

3:15–4:00 pm

Helping Business Owners Protect Their Legacy, and Exit Successfully – *Katherine Ramirez*

This presentation gives business owners a clear, practical roadmap for exiting their business successfully—on their terms and with confidence. Attendees learn how to structure an exit that creates a true win-win outcome for both the seller and the buyer, ensuring a smooth transition, strong deal terms, and long-term success for the business. The session breaks down the essential steps every owner must take to prepare for a seamless exit, including financial readiness, operational transferability, valuation clarity, and buyer expectations. Participants discover how to avoid common deal-killing mistakes, strengthen their company's market position, and increase the likelihood of a faster, more profitable sale. By the end, business owners walk away with a deeper understanding of what makes an exit successful, what buyers look for, and how to position their business to achieve the best possible outcome. This is a practical, no-nonsense guide designed to help owners finish strong and transition with confidence.

4:00–4:45 pm

Year Anniversary Statewide OSS Loan Program: Successes and Lessons Learned – *Tamara Cowles*

Failing on-site sewage systems pose numerous dangers to human health, water quality, and our aquatic resources. Replacing a failing septic can cost upwards of \$30,000, which many homeowners cannot afford. Since 2016, the Washington state departments of Ecology and Health have been partnering with non-profit lender Craft3 and local health partners across Washington to provide affordable loans to repair or replace failing systems through a revolving loan program. This streamlined approach has delivered over \$64 million in funding and nearly 2,300 completed projects. This session will highlight the program's successes, lessons learned, and how it can serve as a model for other states.

POSTER SESSIONS: MONDAY & TUESDAY, OCTOBER 26 & 27

WESTMINSTER FOYER | 12:15 PM TO 1:30 PM

Please join us in the exhibit hall lobby to visit the poster presentation submissions. Authors will be available during the following times to answer questions and discuss their posters.

Monday, October 26, 2026

12:00 pm to 1:30 pm

3:00 pm to 3:45 pm

4:45 pm to 6:00 pm

Tuesday, October 27, 2026

10:15 am to 10:45 am

12:15 am to 1:00 pm

Developing a Framework for Community Led Local Watershed Management – *Matt Dowling & Alissa Cox*

Various factors within a watershed, including land use intensity, reliance on OWTS, and stormwater runoff influence water quality and ecosystem health. Managing these factors in a holistic and measured way is integral protecting water resources for public health, environmental health, and economic success. The goal of this project was to create a transferable framework or “blueprint” for local watershed resource management in jurisdictions and communities facing watershed management challenges. We developed this work out of necessity for ongoing local water quality programming through the lens of adaptive management to prioritize water resource assessment, planning, implementation, monitoring, experimentation, evaluation and adaptation. Our framework was developed to evaluate watershed health and resulted in the following components: (1) Assess water resource quality in a watershed at a local scale, (2) identify pollution sources through comprehensive land use and infrastructure analysis, (3) prioritize solutions based on risk, funding availability, and political considerations, (4) develop decision matrices for strategic interventions such as upgrading septic system technologies and stormwater management, and (5) implement projects through targeted initiatives that combine volunteer efforts, local partnerships and diverse funding. The success of this program is illustrated through a case study from a southern RI community where it was developed and implemented in a local coastal watershed with high-intensity residential land use. It details the specific approaches and methodology taken to effectively manage this watershed, and the lessons learned. This case study exemplifies the effectiveness of the project's blueprint and substantiates our approach to watershed management.

Developing Geospatial Inventory of Septic Systems in Bladen County North Carolina – *Sushama Pradhan & Lorna Withrow*

Approximately 65% of housing units in Bladen County are served by onsite wastewater treatment systems (OWTSs), making them a critical component of the county's wastewater infrastructure. These systems require operation permits (OPs), which have historically been maintained in paper records prior to 2000 and in digital databases thereafter. Despite this, no comprehensive or consolidated dataset exists that links OWTS

permits to standardized 911 addresses across the county, limiting effective monitoring and management. This study addresses this gap through the development of a geospatial inventory of septic systems, recognizing that such mapping is essential for integrating infrastructure location, environmental impact, and public health outcomes. Approximately 68% of OPs—originally stored as paper records—were scanned and digitized. Key information, including property address, system type, installation year, malfunction history, and proximity to water resources, was extracted. Although permits issued after 2000 were available digitally, relevant data fields still required manual extraction. Notably, over 75% of permits contained incomplete or partial address information, necessitating data reconciliation using multiple sources, including 911 address databases, master street address guides, registered deeds, county GIS systems, and mapping tools. The resulting geospatial dataset provides a comprehensive spatial framework for OWTS distribution in the county. This inventory enhances the ability of local agencies to identify systems requiring inspection, maintenance, or replacement, and supports data-driven decision-making for environmental protection and public health.

Developing Time Integrated Technology to Detect Cryptosporidium in Waterways – *Sean McKinney*

In Alabama, nearly 40% (247/548) of impaired waterways are listed due to high concentrations of pathogens and bacteria, indicating fecal contamination that poses health risks to individuals exposed to these waters. Among these, *Cryptosporidium* is particularly concerning: present in 67% of all wastewaters, it causes the illness cryptosporidiosis, a disease linked to 200,000 annual child deaths globally. In this presentation, we will showcase our recent work to improve the implementation of a time integrated cryptosporidium sampling device and analyzing water quality parameters that may affect rates of oocysts attachment. The device has been placed at locations downstream of known animal waste runoff and at depths based on a historic streamflow analysis to further increase the chance of oocyst attachment. We will be using PCR and microscopy to analyze the biofilm samples and use this data to predict where the *Cryptosporidium* oocysts originated from, whether that be human or nonhuman sources. We will use this information to further develop the device, with future testing planned to evaluate the effectiveness of the device compared to traditional EPA

filtration tests. We anticipate that future testing will show the developed device is more effective and inexpensive compared to filtration testing enabling more wide-spread water quality monitoring in areas with onsite and decentralized wastewater management. Ultimately, this research aims to establish a low-cost, multi-year framework for identifying non-point sources of *Cryptosporidium* and safeguarding water resources.

Incorporating Septage Management into Life Cycle Cost Assessments of Technologies and Strategies for Rural Wastewater Infrastructure – *Sudeshma Lama & Kevin White*

The existing wastewater infrastructure in the United States is rapidly aging, with the American Society of Civil Engineers assigning a "D+" rating, indicating systems in poor condition, over design capacity, at risk of failure and estimating a funding gap exceeding \$690 billion. . More than one in five households in the U.S. rely on decentralized wastewater treatment systems, especially in rural regions such as the Alabama Black Belt, where environmental and socioeconomic constraints limit effective sanitation solutions. The Black Belt region is characterized by low population density (~42 people per square mile) and median household incomes well below the national average, along with clay-rich Blackland prairie soils exhibiting miniscule percolation (perc rates >240 minutes per inch), which leads to widespread failure of conventional septic systems. Besides advanced onsite treatment systems, the adoption of cluster-scale wastewater treatment strategies offer a promising solution. Previous studies applying Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) to onsite and cluster wastewater systems demonstrate tradeoffs among cost, energy consumption, greenhouse gas emissions, and treatment efficiency; with cluster-based systems often outperforming individual onsite systems under multi-criteria evaluation frameworks. However, these analyses primarily focus on effluent treatment and do not account for the management of septage, which represent a critical and increasingly constrained component of decentralized systems. Septage is a highly concentrated waste stream, with chemical oxygen demand often exceeding 20,000 mg/L, and contains emerging contaminants such as per- and polyfluoroalkyl substances (PFAS), pharmaceuticals, and endocrine-disrupting compounds. Conventional disposal pathways, including land application, landfilling, and co-treatment, are becoming more restrictive in the U. S., while rural populations struggle with transportation costs and access to centralized treatment plants. This study adapts LCA methodologies to evaluate septage treatment and disposal pathways under decentralized conditions, quantifying environmental and economic impacts across the septage management lifecycle. The inclusion of septage in the life cycle analysis offers a more representative decision-making framework for wastewater technology choices in resource-constrained settings.

Investigating Septic Alternatives: Effects of Aeration on Nitrogen and Carbon Removal in an Electrified Anaerobic Baffled Reactor – *Sofie Aranguren & Amber Rule*

This study examines the performance of an anaerobic baffled reactor (ABR) with a bioelectrochemical system (BES) as an alternative to advanced treatment units for household wastewater using energy intensive aeration. This research investigates how the removal of nitrogenous and carbonaceous compounds in synthetic wastewater varies along the chambers of the reactor and how these dynamics differ between BES-only and BES with intermittent aeration. A laboratory scale, two-stage ABR (10 L) with BES was operated under alternating pumping cycles (4 hours on / 4 hours off) and conditions typical of a high use septic system, with a flow rate of 1.25 L/h, which scales to a family of six generating 600 gal/d (2271 L/d) of wastewater. Samples were collected from each chamber, including influent and effluent, and analyzed for chemical oxygen demand (COD), total nitrogen and ammonium concentrations, and fluorescence intensities of organic exudates associated with methanogenesis. Data collected over a five-month period show average removals of 67% of the ammonium and 93% of the COD for the BES with aeration and 70% of the ammonium and 76% of the COD for the BES without aeration. The use of aeration in the BES increased COD removal efficiency while overall ammonium removal stayed consistent, and total nitrogen removal was 20% higher in the BES without aeration. These findings demonstrate that BES addition to the ABR tank configuration is a low energy and low maintenance onsite treatment that meets nitrogen removal targets, with or without introduction of intermittent aeration.

Mapping Onsite Systems Across the United States: Lessons Learned and Advancements in Machine Learning Based Methods – *Nelson da Luz*

Knowing where onsite wastewater treatment systems (OWTS) such as septic tanks are across the country is critical for evaluating infrastructure investment needs, effective planning and response to natural disasters, and overall management of the environment. Despite the importance of OWTS in the overall landscape of wastewater treatment options in the US, national data collection on the types of wastewater infrastructure serving the population has not been conducted since the 1990 census. This means that there is a major gap that needs to be filled in our understanding of what communities are served by different types of buried wastewater infrastructure in the United States. At past NOWRA conferences, we presented machine learning methods that could be used to predict the locations of buried wastewater infrastructure. We have continued to improve our machine learning model and created a national inventory of buried wastewater infrastructure for the US. We present a national map of buried wastewater infrastructure service (OWTS or Sewer) in the US. Through a variety of partnerships,

we have found ways to improve our estimates including systematic data collection from the internet, adjusting model features, and improving training data quality. Testing our model against locations with ground truth data (including states along the Gulf of America and California) demonstrates accuracy levels consistently above 85%. We discuss upgrades to our approach and use cases for the national inventory. This poster will highlight projects we've completed with state agencies and non-profit organizations to advance the understanding of OWTS locations across the US.

Modeling the Institutional Drivers of Reactive Operations and Maintenance in Decentralized Wastewater Systems – Benjamin Toungh & Michel Kordahl

More than 60 million people in the United States rely on decentralized wastewater systems (DWS). In limited-resource rural communities, these systems frequently fail due to challenging environmental conditions, such as clayey soils and high water tables. While advanced treatment systems capable of withstanding these conditions exist, their long-term performance depends on effective operations and maintenance (O&M). Despite its importance, current scholarship routinely treats this critical O&M phase as an afterthought, remaining narrowly focused on initial capital funding and regulatory compliance. In this study, we argue that reactive O&M practices—defined as performing O&M only after service disruption occurs—are a major contributor to DWS failure. We use Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the drivers of reactive O&M. Using 75 survey responses from diverse stakeholders across 12 states, we model causal relationships between determinants (e.g., lack of institutional knowledge management, lack of clarity of organizational purpose) and reactive O&M practices. Preliminary results indicate that perceived government funding shortages and poor institutional knowledge management are the primary drivers of reactive O&M. Specifically, financial deficits force a triage mentality, while undocumented system histories prevent operators from engaging.

Predicting Wastewater Workforce Retention Impacted by Sectoral Challenges in Rural Communities – Michel Kordahl & Amal Bakchan

Rural wastewater service in many U.S. communities remains structurally fragile, shaped by limited capacity and inconsistent infrastructure funding. These systems also rely heavily on state and federal agencies and external technical assistance providers for planning, financing, and implementation. These conditions constrain long-term service provision and influence whether workers view the sector as stable and worth remaining in. Despite these sectoral challenges, workforce retention research continues to focus primarily on worker-centered determinants—such as pay and benefits, burnout, work-life balance, and career growth—while giving limited attention to the broader conditions that may drive workers away. This study develops a predictive partial least-squares structural equation model (PLS-SEM) of workforce retention in the rural wastewater sector using 150 survey responses collected nationwide. The model integrates established retention determinants with contextual challenges that characterize fragile rural service conditions, including rurality and job scarcity, reactive work culture, and investment funding diversion. Results indicate that these contextual challenges do not directly influence retention; instead, their effects are mediated through established retention determinants. This indirect pathway is critical, as retention-focused interventions are less likely to succeed when underlying sectoral challenges continue to influence the very determinants they seek to improve. Our model provides a system-level understanding of workforce retention in rural wastewater systems, linking sector conditions to individual decision-making and explaining why retaining workers is difficult. The predictive orientation of PLS-SEM can help decision-makers identify proactive policy interventions that elevate the future of the wastewater workforce, instead of placing responsibility solely on an already overburdened workforce.

OPTIONAL NAWT VACUUM TRUCK WORKSHOP: WEDNESDAY, OCTOBER 28

ROOM: COTTON CREEK I | 8:00 AM TO 4:00 PM

This optional, specialized, post-conference training is designed specifically for those who own or operate vacuum trucks within the industry. It is a great resource for current owners of OWTS pumping services, and is a way to provide training and information to employees who may just be getting started in the industry. The course provides a solid base of information regarding working with and operating a vacuum truck, along with performing their daily tasks. This one-day training course can also provide a good refresher and overview for even the most experienced operators.

Course Outline:

- Introduction – goals and objectives
- Definitions – talking the same OWTS language
- Materials – what you are hauling and how to handle problem materials
- Field Safety – how to prepare for and handle safety situations
- Understanding vacuum and pressure and staying safe with pump truck

The topics that are included in this course are:

- Materials to pump and to avoid
- Government regulations
- Truck equipment and components
- Drive and control mechanisms
- Basic and advanced pump out skills and procedures
- Loading and unloading
- Safety and emergency response plans
- Customer interaction and education
- Reasons to manage the materials
- Basic science of vacuum and pressurization
- Pumps
- Basic pump truck operations
- Manifests and reporting

OPTIONAL FIELD TRIP: WEDNESDAY, OCTOBER 28

NOTES:

- Sites will require walking on uneven ground. **Please wear comfortable walking shoes.**
- Participants should have the ability to climb stairs and stand for a period of time. Some time will be spent outside, be advised to dress in layers and bring appropriate sun and insect protection.

Itinerary:

7:00 am – 8:15 am	Registration check-in and continental breakfast
8:30 am	Buses depart Convention Center
9:00 am – 10:30 am	Stop 1: Red Rocks Amphitheater
11:00 am – 12:00 pm	Stop 2: Idaho Springs Water Resource Reclamation Facility
12:00 pm – 1:30 pm	Lunch
2:00 pm – 3:30 pm	Stop 3: The Fort Restaurant, Morrison, Colorado
4:30 pm – 5:15 pm	Return to Westminster Westin Hotel

STOP 1: RED ROCKS AMPHITHEATER — Attendees will see the 2,000 GPD system serving this iconic outdoor venue, where the Great Plains meet the Rocky Mountains.

STOP 2: IDAHO SPRINGS WATER RESOURCE RECLAMATION FACILITY — Popular mountain destination Idaho Springs features a .995 MGD water reclamation facility, which attendees will tour, allowing them to see the AGS system it utilizes.

STOP 3: THE FORT RESTAURANT, MORRISON, COLORADO — The Fort Restaurant was designed by architect William Lumpkins to resemble a drawing of Bent's Old Fort, a fur trading post on the Santa Fe Trail. 80,000 handmade mud and straw bricks were used in its construction. In February of 1963, The Fort opened with a restaurant on the lower level and the Arnold family living in the upper level. Today, it is on the National Register of Historic Places and holds several cultural and historical events throughout the year. Attendees will get to see the system serving this unique, historical location and learn about its design.

PRESENTATION AND POSTER BIOGRAPHIES

Scott Andreasen

Scott Andreasen is a digital marketing and artificial intelligence specialist focused exclusively on the septic, excavation and wastewater industry. With over 17 years of experience, he has worked with more than 500 contractors across the United States, helping them improve customer acquisition, streamline operations, and implement modern digital systems. He is the founder of Excavation Marketing Pros, a firm dedicated to supporting onsite wastewater professionals with practical, real-world strategies for navigating an increasingly digital and competitive landscape. His work centers on understanding how homeowner behavior is evolving and how contractors can adapt to changes in search, communication, and service expectations. Scott is a returning speaker at the NOWRA Mega-Conference and the host of the Excavation Profits Podcast, where he interviews industry professionals and shares insights on business growth, technology adoption, and operational efficiency. He is also the author of two books focused on helping excavation and septic contractors better understand digital marketing and lead conversion in the modern era. His presentations are known for translating complex topics such as artificial intelligence, automation, and online consumer behavior into clear, practical concepts that can be understood and applied by contractors, operators, and industry stakeholders alike.

Sofie Aranguren

Sofie Aranguren is a fourth year Environmental Engineering student at San Diego State University. She is an Instructional Student Assistant for AutoCAD Civil 3D and ArcGIS Pro classes at SDSU where she supports lab instruction and student learning. For the past year, Sofie has been conducting research in the Water Innovation and Reuse Lab. She is interested in sustainable wastewater treatment systems and currently focused on anaerobic decentralized water reuse systems. She hopes to continue exploring water treatment systems that will increase accessibility to low resource communities.

Robert Bair

Robert Bair has a PhD in environmental engineering from the University of South Florida and serves as the technical lead for the NEWgenerator. He specializes in anaerobic membrane bioreactors for wastewater treatment and is keenly interested in the use and development of cutting-edge sanitation technologies.

Alistair Bebbington

Alistair is a graduate student at Auburn University studying Civil Engineering under the advisement of Dr. Jillian Maxcy-Brown. He graduated from the University of Alabama in 2024 with a Bachelor's in Environmental Engineering. His research is investigating the potential usage of a calcium addition to onsite

wastewater treatment systems' effluent to improve drainage in the Alabama Black Belt. Alistair hopes to work at a water treatment facility after finishing his master's program.

Amal Bakchan

Amal Bakchan is an assistant professor at the Department of Construction Science at Texas A&M University. She holds a Ph.D. in Civil Engineering from the University of Texas at Austin. Her work seeks to improve access to water and wastewater services in limited-resource communities, both in the US and globally. Amal's research primarily focuses on rural and other extreme contexts, with expertise in socio-technical infrastructure systems management; infrastructure resilience; regionalized responsible management of decentralized systems; decentralized infrastructure governance, and workforce development.

Jason Birdsong

Jason Birdsong is not your average business owner. He is a transformational leader, industry disruptor, and proof that your past does not define your future. As the President and CEO of JT Services, Jason has built a multi-division home service powerhouse serving communities across Oklahoma. What started as a small operation has grown into a high-performance organization with dozens of team members, multiple locations, and a reputation for delivering elite level service across plumbing, septic, HVAC, storm shelters, and site services. But Jason's story is bigger than business. After overcoming personal adversity and rebuilding his life from the ground up, he made a decision that changed everything. He stopped trying to figure it out alone and invested in coaching, leadership, and personal growth. That decision became the catalyst that transformed his company, his mindset, and his future. Today, Jason is a nationally recognized voice in the trades. He serves as President of the National Association of Wastewater Technicians and is a leader within the Oklahoma Onsite Wastewater Association. He educates contractors and industry professionals across the country, speaking on topics such as leadership, culture, financial mastery, and the growing wastewater disposal crisis. Jason is known for delivering real world, no fluff, high impact strategies that business owners can immediately implement to drive growth, increase profitability, and build teams that win. His core message is simple but powerful: You do not build a great business by accident. You build it by becoming the person capable of leading it. Whether he is on stage, in the field, or leading his team, Jason brings energy, authenticity, and a relentless commitment to excellence. He is not just teaching business. He is building leaders.

Allison Blodig

Allison Blodig, REHS has been in the onsite and decentralized wastewater treatment industry since 1997 and spent most of her career in the manufacturing industry working with regulatory approvals and system design and troubleshooting. She is a Registered Environmental Health Specialist with the Kansas Environmental Health Association, a long-time member of the National Environmental Health Association, and is past President of the National Onsite Wastewater Recycling Association, the Kansas Small Flows Association, and the Kansas Environmental Health Association. Allison is now retired and only working here and there doing things she likes or wants to do.

John Blount

John Blount is a 1984 graduate of the University of Houston. After college he served as an Army Corps of Engineers officer on both active and reserve duty, achieving the rank of captain while being stationed in the United States, Republic of Germany and the Republic of Honduras. He has worked in the civil engineering field for forty years and is a Registered Professional Engineer (FL) (WA) (NC) (WI) (TX) (ME) as well as a LEED Accredited Professional and Certified Flood Plain Manager (CFM). He was employed by Harris County for over thirty-four years starting as an Inspector and advancing to the position of County Engineer responsible for 766 employees and over a billion-dollar annual infrastructure program. He has served on the National Sanitation Foundation (NSF) Joint Wastewater Committee for over 20 years and was previously Chairman of the Texas Onsite Wastewater Research Council appointed by the governor. Currently John is principle of Civil Solutions, a Consulting Engineering firm located in Houston.

Bryan Brooks

Bryan W. Brooks is Distinguished Professor of Environmental Science and Public Health at Baylor University in Waco, Texas, USA. His research, which includes water quality and reuse, eco-, environmental and comparative toxicology, environmental and green chemistry, chemical assessment and management, harmful algal blooms, wastewater-based epidemiology, and environmental public health practice, is ongoing on 5 continents. Working with students and other collaborators, Dr. Brooks has published over 350 articles in international scholarly journals and book chapters. He currently serves as Editor-in-Chief of Environmental Science & Technology Letters (American Chemical Society Publications; <https://pubs.acs.org/journal/estlcl>) and previously served as Editor in Chief of Environmental Management (Springer Nature). Dr. Brooks is a Fellow of the American Association for the Advancement of Science, the Society of Environmental Toxicology and Chemistry, and the Royal Society of Chemistry.

John Buchanan

Dr. John R. Buchanan is a Professor Emeritus, recently retired from the Biosystems Engineering and Soil Science Department at the University of Tennessee, Knoxville. He has greater than 36 years of teaching, research, and outreach experience

in the areas of onsite and decentralized wastewater management, water supply, water quality, and storm water engineering. Dr. Buchanan has B.S. and M.S. degrees in Agricultural Engineering and a Ph.D. in Civil Engineering, all from The University of Tennessee. John is a member of NOWRA, and the American Society of Agricultural and Biological Engineers. He most recently served as the undergraduate director of the Construction Science and Management Program housed within the Biosystems Engineering and Soil Science Department. John is a registered professional engineer in Tennessee.

Kate Carney

Kate Carney earned a Bachelor of Science Degree in Biological Sciences from Missouri University of Science and Technology and a Master of Science degree in Environmental Science and Engineering from the Colorado School of Mines. Kate has experience in soil/ site evaluations as well as the design and management of residential and commercial on site wastewater treatment systems. She is a Registered Professional Engineer in Colorado. She has taught as an adjunct professor at the Colorado School of Mines. Kate is the Executive Director of the Colorado Professionals in Onsite Wastewater.

Stuart Coleman

Stuart Coleman is the Executive Director and Co-Founder of WAI: Wastewater Alternatives & Innovations, a nonprofit dedicated to protecting water quality, reducing sewage pollution and restoring healthy watersheds. Coleman is also a public speaker, journalist, and an award-winning author of three books and over 100 articles.

Chuck Cousino

Chuck has a bachelor's degree in Environmental Health from Ferris State University and has worked in the onsite wastewater industry his entire career. This includes over 20 years in the private sector, and over 20 years in the public sector. His extensive experience within the industry includes residential, commercial, and cluster system design, site/soils evaluation, system inspection/maintenance, as well as regulation development and program oversight. Chuck is a trainer for many of the CPOW and NAWT classes. He has also chaired multiple national, state, and local associations and committees within the onsite wastewater industry. He retired from the Colorado Department of Public Health and Environment in 2025 where he served as the Onsite Wastewater Program Manager for the State of Colorado.

Tamara Cowles

Tamara Cowles is an Environmental Planner with a focus on OSS project management. In this role she offers OSS technical assistance to community partners, support for developing OSS projects, and guidance for funding opportunities. Prior to her current position, she worked for a Local Health Department overseeing Pollution Identification and Correction (PIC) projects where she conducted water studies, and septic outreach and enforcement. She is passionate about the OSS Loan Program and the service it provides community members.

Alissa Cox

Dr. Alissa Cox directs the Onsite Wastewater Resource Center at the University of Rhode Island, where she teaches professional and student audiences about onsite wastewater treatment system function, design, installation, maintenance, troubleshooting and performance monitoring. Her applied research revolves around understanding threats posed by groundwater table dynamics and climate change to current and future onsite wastewater treatment systems along the coast, as well as documenting the field performance of diverse advanced residential wastewater treatment technologies. Effective education and community engagement are central to Alissa's interests, and she works with different stakeholders to examine how research and holistic wastewater management approaches can help improve both local water quality and the resiliency of coastal communities facing myriad future changes and threats.

Nelson da Luz

Nelson da Luz, PhD, is an Assistant Professor in the Department of Civil and Environmental Engineering at Manhattan University, NY. His research focuses on advancing the management of drinking water and wastewater infrastructure systems through the integration of environmental engineering principles with data science methods. His work combines statistical modeling, machine learning, and high-performance computing to address challenges in water quality assessment, infrastructure planning, and environmental decision-making. His research has contributed to regulatory decision-making and the development of tools to better understand water infrastructure systems, including efforts to map decentralized wastewater systems and improve drinking water data quality. He has contributed to multiple externally funded projects focused on water infrastructure, data systems, and environmental health, and has served in leadership roles supporting multidisciplinary research initiatives. His research aims to develop practical, data-driven solutions to complex environmental engineering challenges with direct relevance to public and environmental health.

Alexandre Decout

Specialist in non-collective sanitation systems. President of the association of municipal controllers of President of the association of municipal controllers of non-collective sanitation systems (western part of France and overseas territories). European expert in regulatory committees. ISO member for non-collective sanitation systems: drafting of standards.

Bruce Douglas

Mr. Douglas is a professional engineer with 40 years of experience in the planning, design, construction and operation of distributed indirect and direct water reuse infrastructure in both the private and public sectors. He has a BS degree in Hydrology from the University of New Hampshire and a MS degree in Soil Science from the University of Vermont. Mr. Douglas has worked in the private sector for over 25 years on projects across the United States and internationally. He currently manages the Wastewater Program in the Vermont Department of

Environmental Conservation's Drinking Water and Groundwater Protection Division, focusing on permitting municipal water and sewer connections, non-public drinking water supplies and soil-based wastewater treatment systems ranging in scale from single family dwellings to small community systems. He was the Water Reuse Committee chair for the New England Water Environment Association (NEWEA) and a committee co-chair for the preparation of Decentralized Water Infrastructure Task Force's recent report. He participates in Building Infrastructure Locally for Decentralized Water Systems (BILD) initiative, and has current memberships in: NOWRA, the State Onsite Regulators Association (SORA), the Water Environment Federation, NEWEA, the Green Mountain Water Environment Association, and the National Blue Ribbon Commission for Onsite Water Systems.

Matthew Dowling

Matt Dowling is the onsite wastewater management program manager for the Town of Charlestown (RI) and has nearly 25 years of project coordination experience in groundwater hydrogeology, watershed management and groundwater remediation. In his current role, Matt currently oversees the individual management of over 5,000 onsite wastewater treatment systems (OWTS) in Charlestown, including over 900 advanced nitrogen reducing OWTS for protection of public health and ecosystem services. Matt's programmatic approach and methods are rooted in holistic watershed management practices. (1) University of Rhode Island, Onsite Wastewater Resource Center and Natural Resources Science Department at the University of Rhode Island

Sheryl Ervin

Sheryl Ervin has worked in the onsite wastewater industry for 22 years, both as a state regulator and a manufacturer's representative. Prior to joining Infiltrator Water Technologies in 2019 as a Senior Regulatory Specialist, she managed the state of Kansas source water protection program and held the position of Program Manager for the State of Kansas Local Environment Protection Program which managed the onsite wastewater program. She currently serves on the Colorado Professionals in Onsite Wastewater Board, including 4 as treasurer, and previously on the Kansas Small Flows Association Board of Directors, including five as treasurer, for 4 years on the SORA Board of Directors, including one as president, continues to actively participate in SORA as an industry member. Sheryl also participates in NORWA and NSF work groups and is the chair of the NSF Industry Forum and serves on the NSF Joint Committee. She co-authored the SORA paper Decentralized Onsite Wastewater Technologies Sustainable Green Infrastructure Protects Source Water Quality and Public Health in 2017. Sheryl has a bachelor's and master's degree in Geology and is a licensed professional geoscientist in the state of Texas.

Rebecca Etter

Rebecca Etter earned her PhD in Civil Engineering from Auburn University's Samuel Ginn College of Engineering. She is from rural Georgia and has completed a bachelor's and master's

degree in engineering at Mercer University in Macon, Georgia where she served as a visiting instructor before pursuing her PhD. Her research covers water and wastewater affordability and the interactions between private drinking water wells and septic systems. She was a 2024 recipient of the NOWRA Emerging Professionals Scholarship.

Kim Falinski

Kim Falinski leads strategic planning around land-based pollution and freshwater resources that connects into ocean for the Hawaii and Palmyra Chapter of The Nature Conservancy. An environmental engineer by training, she works to make the case for projects that can reduce wastewater and sedimentation impacts to nearshore ecosystems. When possible, Kim works to include nature-based and indigenous-knowledge solutions into her work, including considering the role of wetlands, taro fields and bioswales to capture nutrients and soils. She has been a technical advisor for a Maui based community water quality program since 2015, and helped to use that data to advocate for watershed management actions. Kim has provided guidance to the Cesspool Working Group for the State of Hawaii to prioritize upgrades, and has focused on finding better ways to choose the right tech solutions for the right communities in the right places to make the most difference for nearshore reef systems. Kim holds a PhD from University of Hawaii at Manoa in Tropical Plant and Soil Science (mapping sediment transport across the archipelago), a MSc from Cornell in Biological and Environmental Engineering and a BS in Electrical Engineering from MIT. She is a Professional Engineer for the state of Hawaii, affiliate faculty at UH Manoa's Water Resources Research Center.

Heidi Faller

Heidi Faller is an Environmental Toxicologist with EPA's Office of Wastewater Management (OWM) in Washington, DC. Her career with EPA includes working in the Office of Science and Technology, Office of International and Tribal Affairs, Office of the Chief Financial Officer and Office of Research and Development. Heidi joined OWM in 2011 and has served as the lead of the Decentralized Wastewater Program since 2015. She manages the Decentralized Wastewater MOU Partnership and is a leading team member of several of the decentralized program's initiatives, including Closing America's Wastewater Access Gap Program and SepticSmart Week as well as managing the septic program website. Heidi holds a Bachelor of Arts in Biology from DePauw University and a Masters of Environmental Toxicology from the University of Wisconsin-Madison.

Brenda Faz-Cresie

Brenda Faz-Cresie is the Director of Strategic Accounts for Anua, an American manufacturer specializing in onsite wastewater treatment equipment. Brenda has over 11 years of onsite wastewater industry experience, assisting designers, engineers, developers, and installers in optimizing decentralized wastewater treatment solutions for various commercial and industrial applications. Before her career in the onsite wastewater industry, Brenda spent 15 years in environmental testing, doing bench

scale treatability studies for municipal wastewater plants as well as standard analytical testing for soils and waters under both Standard Methods and ASTM methodologies. Brenda worked closely with several municipal wastewater treatment facilities around the United States and Europe, assisting owners and operators in understanding the dynamics of their own processes and upsets, and analyzing potential impacts of new waste streams to their current operations. Brenda holds a Bachelor's of Science degree in Environmental Science from Texas A&M University, a Master's of Science degree in Environmental Management from the University of Maryland University College, and has earned several credits in the Environmental Science PhD program at Louisiana State University.

Lucas Grein

Lucas Grein is the owner of Skywalker Drone Imagery, a Colorado-based aerial mapping and documentation company supporting construction and onsite wastewater projects. His work focuses on creating high-clarity site records using RTK-enabled aerial mapping and geospatial reconstruction to assist installers, engineers, inspectors, and property owners in preserving accurate documentation of system conditions at the time of installation. Lucas has field experience working alongside contractors and site professionals to capture and organize visual and spatial records that support long-term maintenance, inspection, and regulatory documentation needs. His background includes hands-on construction knowledge and practical collaboration with decentralized wastewater stakeholders throughout Colorado. His current work emphasizes improving documentation clarity and long-term record preservation through the integration of traditional as-built practices with modern geospatial tools. Lucas is based in Colorado and actively supports projects across the Front Range.

Julie Gustavson

Onsite wastewater treatment systems (OWTS) in mountainous environments present unique challenges related to soil limitations, terrain, climate, and multi-utility coordination. This case study highlights the design and construction of a higher-level OWTS serving eight new cabin units at Juniper Lodge & Treehouses, a boutique hospitality development located on a steep, heavily wooded slope in Evergreen, Colorado. The site is characterized by sandy loam soils with shallow bedrock, significantly limiting available vertical separation for soil treatment. To meet treatment and regulatory requirements, a higher-level treatment system was selected followed by a field designed to maximize dispersal within constrained site conditions while minimizing disturbance to existing trees. Other major design challenges included compliance with regulatory setbacks for multiple systems on a single property, steep slopes requiring switchback alignment of collection piping to control wastewater velocities, deep burial requirements associated with cold-climate installation, extensive rocky outcrops, and installation of water and fire water transmission infrastructure. The owner's desire to keep business operating as normal and to preserve mature vegetation required extensive common-trenching and adaptive field

decision-making. Construction required continuous collaboration among engineers, installers, contractors, and regulators, resulting in field adjustments that differed substantially from original plans. Key lessons learned include the effectiveness of drip dispersal in wooded sites, the importance of strong designer-installer communication, and the feasibility of implementing advanced treatment systems on highly constrained mountain properties. The completion of this challenging project successfully met performance goals, and stakeholders report high satisfaction with the final installation.

Michael Hayes

Michael Hayes serves as Division Director for the South Carolina Department of Environmental Services, where he leads statewide teams responsible for permitting and compliance inspections that protect public health and environmental quality. With 18 years of regulatory experience in the onsite wastewater sector, Michael has conducted thousands of site and soil evaluations, complaint investigations, and system inspections. Prior to his current leadership role, Michael managed compliance inspections across air, land, and water programs for a multi-county region, bringing a comprehensive perspective to environmental regulation and operational efficiency. Michael values teamwork, exceptional customer service, and the ability to overcome challenges, which he views as essential to achieving organizational goals and delivering positive outcomes for stakeholders.

Sara Heger

Dr. Sara Heger is a nationally recognized expert in decentralized wastewater treatment and onsite wastewater systems with nearly 30 years of experience in research, education, and technical outreach. She served as a researcher and instructor in the Onsite Sewage Treatment Program at the University of Minnesota and remains a faculty member in the University's Water Resources Science program. A past president of the National Onsite Wastewater Recycling Association (NOWRA), Dr. Heger currently works as an independent consultant based in North Dakota. In addition to consulting services, she leads several NOWRA grant-funded initiatives developing national-level curriculum and providing training and technical assistance to small communities. She travels extensively throughout the United States, delivering education, training, and technical assistance to diverse audiences, including wastewater professionals, homeowners, students, small communities, and local government agencies. She is also a regular contributor to Onsite Installer and Pumper magazines. In recognition of her significant contributions to NOWRA and the decentralized wastewater industry, Dr. Heger received the Richard J. Otis Industry Achievement Award in 2025. She holds a Bachelor of Science degree in Biosystems and Agricultural Engineering and both a Master of Science and Doctor of Philosophy in Water Resources Science.

Charles Humphrey

Charles Humphrey is an Environmental Health Professor at East Carolina University (ECU). He earned his BS in Ecosystems

Assessment and MS in Soil Science from North Carolina State University, and PhD from ECU in Coastal Resources Management (Geoscience Focus). He has a combined 28 years of experience in soils and onsite wastewater. He has worked as an Environmental Health Specialists, Research Technician, Environmental Agent for Cooperative Extension, Environmental Health Professor, and Environmental Consultant.

Md. Saiful Islam

Md Saiful Islam is a Ph.D. student in Environmental Engineering at Temple University. His research focuses on the fate, transport, and treatment of emerging contaminants, including PFAS and microplastics, using field studies, laboratory experiments, and innovative remediation technologies. He has over a decade of experience in environmental consulting and academia. In 2025, he received the Water Resources Association of the Delaware River Basin (WRA) Innovation and Collaboration Award and served as Entrepreneur Lead in NSF I-Corps and Student Representative on the HDC-SETAC Board of Directors.

Jeldane Joseph

Jeldane Joseph is a graduate student in Civil and Environmental Engineering at Auburn University. She earned a Master's of Civil Engineering in 2025 at Auburn University, where her work focused on water resilience and watershed management. Her current research investigates the movement of wastewater-derived microbial indicators and tracer particles through mound systems to better understand microbial transport and retention in subsurface environments.

Jon Jouvenaux

Jon Jouvenaux is President of BBB Septic and Portable Toilets, a role he's held for more than 32 years, and the founder/developer of The Clearwater Farm, VibraWaste (developer of the MuckRaker receiving and prescreening system), and NetZero Waste. As chief visionary for BBB, Jon has created multiple vertically integrated businesses to remove operational constraints and enable sustainable growth. Educated at the "School of Hard Knocks," Jon's hands-on career began as an automotive mechanic and expanded through parts and machine-shop work, cabinet and countertop building, audio/video production and concert tour management before he joined the onsite sanitation industry 30+ years ago. His onsite experience includes mechanic, portable-toilet route driver, septic and grease-trap pumper, and septic installer for both standard and advanced treatment systems, along with roles in marketing, digital integration, and research & development. He is a licensed septic installer for standard and advanced treatment and has led development of practical technologies like the MuckRaker and The Clearwater Farm. Jon has presented at the 2025 NOWRA Mega Conference, participated in NOWRA roundtables and the 2026 WWETT Show, and has been featured in Onsite Installer, Pumper & Pro magazines and on numerous podcasts. Active in NWA Real Estate Investors, he is headquartered in NW Arkansas and advises operators across the U.S., championing "common sense approaches to complex problems" and, in his

own irreverent words, “changing the world one turd at a time.” He is married with two married children and three grandchildren.

Jonathan Kaiser

Jon joined Infiltrator Water Technologies in 2016 as a Project Engineer after graduating with his B.S. in Environmental Engineering from the University of Vermont. At Infiltrator, Jon works on the design and construction of decentralized wastewater treatment systems. Most recently, Jon has been working on design projects for the treatment of high strength waste streams, which includes wastewater generated from breweries, RV parks, and restaurants. In addition to his engineering role, he also works on product regulation and research and development initiatives. He has presented and published on a multitude of industry-related topics. Jon is currently pursuing a Master of Engineering at the University of Connecticut with a concentration in environmental engineering. He is the current chair of the NOWRA Emerging Professionals Committee

Ben Kele

Ben is an Australian on-site & decentralized wastewater treatment systems specialist. He has completed his Master’s degree in Applied Science in on-site wastewater treatment and has high hopes of handing in his PhD thesis on this topic, if he can ever find the time to write it. Ben has patented technologies from his research. He has built a company that focuses on providing on-site wastewater treatment options for difficult sites. He has a passion for working with interesting to treat effluents. He maintains that any splash you don’t taste is a good splash.

Michel Kordahl

Michel Kordahi holds a Bachelor’s degree in Civil Engineering from the American University of Beirut and is currently pursuing a Ph.D. at Texas A&M University under the supervision of Dr. Amal Bakchan. His research focuses on the regionalization of wastewater infrastructure management and workforce development in limited-resource rural communities. He is particularly interested in how governance structures, politics, and power dynamics shape infrastructure decisions, with a focus on their implications for policy.

Forrest Kunz

My name is Forrest Kunz. I am originally from Utah. I attended college at the University of Colorado Boulder from 2019-2023, where I received my bachelor’s degree in Environmental Engineering with a specification in water and wastewater. I got hired as a systems engineer at Orenco Systems, Inc., out of college, where I have been working from 2024 to now. I am working towards gaining knowledge and building strong relationships within the industry, as well as getting my PE license. I currently live in Denver, CO. In my free time I enjoy hiking, running, skiing, camping, traveling and live music.

Abdelkader Lakel

PhD: Deterministic approach on filtration systems in saturated and unsaturated flows — Nitrogen removal in non-sewered

sanitation systems (Experimentation-modelling-process Engineering). 1992-1995. Summary of studies and research: Water purification (onsite sanitation systems): a wide range of processes (laboratory, pilots, full-scale and in situ tests): filtration, activated sludge, submerged fixed cultures, SBRs, planted filters, lagoon treatment, vermicomposting, membrane devices, infiltration of treated effluents, heat recovery, anaerobic digestion at the district level, greywater and blackwater treatment systems. Mechanical behaviour of structures (networks, ...)/ Damage to structures. Support for GATES FOUNDATION in the development of reinvented toilets New techniques : adapted to the French overseas departments (Ministry of overseas departments): from research to in situ experimentations => launch of ongoing experiments New generation of sand filter (Ministry of Health and Ecology): research, platform tests, in situ monitoring. European expert in standardization and regulatory committees

Sudeshma Lama

Sudeshma Lama is a graduate student in Department of Civil, Coastal, and Environmental Engineering at the University of South Alabama. Her research focuses on decentralized wastewater infrastructure and life cycle-based evaluation of sustainable septage management strategies for rural communities. Her work examines the environmental and economic tradeoffs associated with septage treatment, management and disposal pathways to support resilient and sustainable wastewater solutions in underserved regions.

Bruce Lesikar

Bruce J. Lesikar, P.E., Ph.D., Bruce holds graduate degrees in Agricultural Engineering from Texas A&M University and University of Illinois. Bruce served in multiple roles during his professional career including: professor, researcher, director of engineering for a water treatment system manufacturer, and technical sales for rental of mobile water treatment systems. He is currently serving as a contract engineer to the Texas Commission on Environmental Quality. Bruce provides support to design reviews, educational material development, and conducts training events. Bruce enjoys developing and delivering educational materials for communicating effective use of our water resources. Wastewater is a resource to meet our water needs and we must effectively utilize the resource. Public health, public safety, environmental health and environmental safety are critical aspects of beneficial use programs. He is an active speaker at educational events such as short courses and conference presentations.

Gary MacConnell

Mr. MacConnell has degrees from Gettysburg College and Duke University. He has over 40 years of engineering experience, 32 of which have been with MacConnell & Associates. He has worked on projects throughout the United States and abroad. His area of expertise is wastewater treatment with an emphasis on on-site wastewater systems.

Bryer Manwell

Bryer Manwell, M.Sc., P.Eng., is a registered professional engineer based in Salmon Arm, British Columbia, Canada. She received her bachelor's degree in materials engineering from the University of Alberta and her master's degree in environmental engineering from the University of Calgary. Ms. Manwell is a current associate of the Canadian Onsite Technical Resource Association (COTRA) and past president of WCOWMA-Onsite Wastewater Management of British Columbia. Within the onsite wastewater industry, she works to implement environmentally sound practices, investigates complaints under the British Columbia Professional Governance Act and instructs for EQUIP Onsite Wastewater Training. Ms. Manwell has extensive experience characterizing aquifers and assessment of contaminant transport in groundwater. Further, she researches the use of permeable reactive barriers for passive treatment of nitrogen and pathogens in wastewater effluent.

Jillian Maxcy-Brown

Jillian Maxcy-Brown is an Assistant Professor of Civil and Environmental Engineering at Auburn University. In addition to teaching a variety of undergraduate and graduate level environmental engineering courses, she leads a research group focusing on developing sustainable solutions for water and wastewater challenges in low-resource, small communities. Her research interests include addressing the impacts of inadequate and/or failing wastewater management in the U.S., evaluating the affordability of access for utility customers and users of decentralized/onsite systems, and analyzing the implementation of appropriate treatment technologies for small community contexts. Before joining Auburn University, she was a postdoctoral researcher at the University of Alabama working with Dr. Mark Elliott. She earned a Ph.D. in Civil Engineering from the University of Alabama and a B.S. in Engineering with a Civil Engineering concentration from LeTourneau University.

Shaun May

Shaun May has more than two decades of experience in public health with extensive work in environmental health and onsite wastewater programs across Florida, Texas, and Colorado. His career includes regulatory oversight, permitting, field evaluation, and the development and implementation of onsite wastewater policies in diverse environmental and operational settings. This multistate experience has shaped his commitment to practical, equitable, and evidence-based approaches to decentralized wastewater management. Shaun holds a Master of Public Health (MPH) from the University of West Florida. He is a current third-year Doctor of Public Health (DrPH) student at the Colorado School of Public Health, where his academic work focuses on environmental health systems, regulatory modernization, and resilient infrastructure planning. His training combines applied research, policy analysis, and systems-level public health practice. Shaun serves as the Chair of the International Code Council's ICC 825 – Private Sewage Disposal Systems Committee, leading a globally representative group of

engineers, regulators, scientists, and public health professionals in the development of this ANSI-accredited onsite wastewater standard. In addition to his committee leadership, he is a contributing author for the International Code Council, having co-authored multiple publications related to onsite wastewater treatment and decentralized systems. Across his professional, academic, and national standards roles, Shaun emphasizes the critical function of onsite wastewater systems as foundational public health infrastructure.

Sean McKinney

Sean McKinney is a graduate student in the Civil and Environmental Engineering department at Auburn University. Sean graduated from Auburn University with a Bachelor of Civil Engineering with a specialization in Environmental Engineering in 2024. His current research focuses on developing new technologies to improve affordable water management practices in rural Alabama.

Michael Mezzacapo

Michael Mezzacapo is a Physical Scientist at the U.S. EPA Headquarters' Office of Wastewater Management. His work focuses on providing technical assistance and advancing decentralized wastewater technology in rural communities. A key part of his current role involves co-leading the Closing America's Wastewater Access Gap Initiative. Michael holds an MS in Environmental Studies from Green Mountain College and previously gained valuable experience researching and advancing cesspool conversion in Hawaii while employed at the University of Hawaii Water Resources Research Center and Sea Grant College Program.

Robyn Moreno

Robyn Moreno is an emerging professional in wastewater and has been involved in environmental regulation and natural resource management for the past 3 years. She obtained a Bachelor's of Science in Physics and has since pursued a graduate certificate in Geographic Information Systems, hoping to use these fields to assist in some of the unique needs of environmental regulation and the industry as a whole. Robyn has been at Yavapai County as an Environmental Health Specialist since April of 2025 and has thoroughly enjoyed learning about wastewater and the impacts it can have on our environment and the regulations associated with it. She hopes to use her unique experience and background to continue to create novel solutions to problems affecting the communities she serves. Elliott Dominguez is an environmental scientist with 10 years of experience in groundwater and surface water monitoring, specializing in sampling, data analysis, and regulatory compliance. He has a proven track record supporting environmental assessments and long-term monitoring programs. He is currently focused on wastewater systems, expanding expertise in treatment processes and evolving regulatory frameworks. Elliott is passionate about protecting water resources and translating complex data into practical solutions for sustainable environmental management.

Scott Morris

Scott Morris is a Registered Environmental Health Specialist (REHS) and the Director of Outdoor Environmental Health for the Licking County Health Department in Newark, Ohio. Scott has been with the Licking County Health Department for 8 years and currently oversees their septic system program. Scott graduated from Ohio University with a Bachelor of Arts degree in Environmental Biology. He focuses on program modernization while using technology and data-driven approaches to improve inspections, compliance, and public communication.

Junko Munakata Marr

Junko Munakata Marr is a Professor in the Civil and Environmental Engineering Department at Mines. She earned her BS in Chemical Engineering from Caltech and her MS and PhD in Civil Engineering from Stanford. Junko joined Mines as visiting faculty in June 1996 after finishing her PhD and has been there since. She has taught 15 different classes at Mines. Her research interests revolve around microorganisms in engineered environmental systems, as well as engineering education and sustainable community development, supported by \$40M in funding. She has served as Chair of the Environmental Engineering Division of American Society for Engineering Education and on the Association of Environmental Engineering and Science Professors Board of Directors. After stepping down as CEE Department Head in June 2024, Junko spent the 2024-25 academic year on sabbatical at Eawag in Switzerland, re-engaging with onsite treatment. After returning to Colorado, she joined the CPOW Board as the academic representative in 2026.

Deeptanil Pal

Deeptanil is a graduate student in the Sustainable Design program at The University of Texas at Austin. He is a licensed architect back in India and has a strong focus on ecological systems integrations within our built environment. His research interests lie at the intersection of environmental performance, urban ecological networks with particular emphasis on water systems and biodiversity. Previously he worked as an on-site architect with Larsen & Toubro Constructions, experiencing the execution of a large-scale project and building systems. He has also conducted research on enhancing urban biodiversity in residential developments and is currently pursuing investigations into how computational methods can reveal hidden ecological patterns in the city. Deeptanil's work bridges architecture, environmental systems, and applied research, with an emphasis on developing practical approaches to address contemporary environmental challenges in urban contexts.

Tim Perrin

Drawing on 20 years of advocacy and public affairs experience, Tim helps clients view public policy opportunities and challenges from a comprehensive perspective. Doing so informs the strategies he employs to secure policy solutions in the best interest of the client. Tim has been doing this successfully at Polsinelli for clients in the energy and environment, outdoor recreation, health care, higher education, and technology sectors. In the past, Tim worked at the American Association for

Geriatric Psychiatry (AAGP), a national medical society representing physicians and older adults. Prior to AAGP, Tim was a Washington Fellow in the office of U.S. Representative Floyd Spence (South Carolina)

Brad Poston

Brad Poston is the Program Manager for the Coastal Region of the Onsite Wastewater Field Operations Division at the South Carolina Department of Environmental Services, where he has worked since September 2024. He oversees field activities that support the onsite wastewater permitting process and contributes to efforts to improve consistency and efficiency across the program. Brad holds a Master's degree in Project Management and a Bachelor's degree in Biology. Before joining SCDES, he worked for an engineering firm, gaining practical experience assisting with surveys and operating GPS equipment—background that has been useful in evaluating geospatial tools for field operations. He lives in Hannah, South Carolina, with his wife and their two children.

Anne Powell

Anne G. Powell is an Environmental Health Coordinator for the Office of Environmental Health Services at the Virginia Department of Health. Ms. Powell has worked in the onsite sewage program with VDH since 2008 in the Virginia Beach, Blue Ridge, and Henrico Health Districts. Anne currently serves on the Virginia Onsite Wastewater Recycling Association's (VOWRA's) Board of Directors as a regulatory representative. In her current role at the Office of Environmental Health Services, she is the lead instructor for the Onsite Sewage and Private Well Training Program for new VDH staff, handles applications the Indemnification Fund, and works on a variety of projects including regulatory interpretations and updates. Anne's interest in onsite wastewater began while earning her Bachelor of Science degree in Environmental Science from Bridgewater College (Virginia). Anne is originally from Virginia Beach but has called Richmond, Virginia "home" since 2014. In her personal time, Anne enjoys all things outdoors, including camping, hiking, and kayaking with her canine sidekick, Corey, and her spouse, Stephanie.

Sushama Pradhan

Sushama Pradhan, Ph.D., serves as the Nonpoint Source Pollution Control Program Coordinator within the On-Site Water Protection Branch at the North Carolina Department of Health and Human Services. In this role, she focuses on assessing the impacts of onsite wastewater treatment systems and developing strategies to prevent degradation of both surface and groundwater quality. Dr. Pradhan earned her doctoral degree in Soil Science from North Carolina State University and brings over 15 years of research experience in onsite wastewater management. Her expertise includes evaluating the performance of onsite system technologies and modeling pollutant loadings from these systems using GIS-based hydrologic models. She currently leads the project "Decentralized Wastewater Infrastructure: Septic Systems Needs in Marginalized Communities of North Carolina," funded by the Centers for Disease Control and Prevention and the Water Detection and Elimination

(WaDE) program. Throughout her career, Dr. Pradhan has successfully managed and completed numerous multidisciplinary projects, including studies on PFAS and other emerging contaminants in septic systems and private drinking water wells, field evaluations of onsite system performance, assessments of nutrient contributions from septic systems to water resources in the Piedmont region of North Carolina, and investigations into the effectiveness of saporlite in removing E. coli infection from septic system effluent.

Steve Prosis

Steve Prosis earned a bachelor's of science degree in Agronomy with an emphasis in Environmental Science from Iowa State University (Ames). After graduation, he began his career in Colorado starting as microbiology lab technician for Coors Brewing Company. Soon after the mountains were calling and Steve moved to Summit County and became an Environmental Health Specialist with the County Health Department. Steve has participated in several statewide groups such as the Water Quality Program Managers group. In his roles with Summit County and La Plata County, Steve has always been passionate about waste water and water quality. He is excited to take on the new role as Onsite Wastewater Coordinator for the Water Quality Control Division at the state so he can assist counties and practitioners state wide.

Katherine Ramirez

Katherine Ramirez is the CEO of 10X Business Broker M&A and a nationally recognized advocate for business owners preparing to scale, transition, or exit. With a career built on strategic clarity, negotiation strength, and a deep understanding of what drives business value, she guides owners through one of the most important financial decisions of their lives: selling their company with confidence and finishing strong. Katherine specializes in sell-side representation, valuation readiness, succession planning, and buyer-seller alignment. Her approach is direct, transparent, and rooted in real-world experience—helping owners avoid costly mistakes, understand their true market position, and navigate the M&A process with precision. She is known for turning complex decisions into clear, actionable steps that protect value and create win-win outcomes. As the founder of 10X Business Broker M&A, Katherine has built a firm focused on integrity, advocacy, and results. She empowers business owners with the knowledge, tools, and strategy they need to exit on their terms and transition their legacy to the right buyer. Katherine's mission is simple: elevate business owners, protect their life's work, and ensure every client finishes strong.

James Roberts

James Roberts is the co-founder of WaiHome LLC, a Hawai'i-based company developing modular, above-ground wastewater treatment and reuse systems for island and coastal communities. He leads process development, systems engineering, and regulatory strategy, and has overseen NSF- and NOAA-funded R&D with third-party testing through the University of Hawai'i at Manoa. James holds both a Bachelor's degree and a Master's degree from the University of British Columbia.

Gabby Saba

Gabby Saba is the Director of Workforce Development at Wastewater Alternatives & Innovations (WAI), where she leads statewide initiatives to address Hawai'i's critical shortage of certified wastewater professionals through education, training, and community partnerships. With more than a decade of experience in curriculum design, youth development, and workforce innovation, she specializes in building career pathways that connect local communities to environmental infrastructure careers. Now spearheading the expansion of WAI's Work-4-Water program under the EPA Innovative Water Infrastructure Workforce Development Grant, Gabby is committed to sustainable, community-driven solutions that protect clean water, restore watersheds, and build a resilient workforce.. She designed stackable, culturally grounded training aligned with state certification standards and works closely with industry, government, and community partners to strengthen the water workforce across the islands. She also chairs WAI's Workforce Advisory Council, convening leaders from engineering, academia, utilities, and public agencies to guide workforce strategy. In addition to workforce development, Gabby leads community engagement and technical assistance under the EPA's Closing America's Wastewater Access Gap initiative, supporting rural and Native Hawaiian communities working to replace cesspools and improve decentralized wastewater systems. She has managed multimillion-dollar federal grants, secured over \$5 million in public and private funding, and oversees a multidisciplinary team advancing training, outreach, and infrastructure support statewide. A former kumu at Kamehameha Schools, Gabby grounds her work in a pedagogy of aloha 'āina, preparing the next generation of water stewards to protect clean water, restore watersheds, and build resilient communities across Hawai'i.

Nicole Sandberg

Nicole L. Sandberg is currently serving as Wastewater Infrastructure Manager with the Division of Water and Wastewater Services within the Office of Environmental Health Services at VDH and has been in this position since its creation in February 2022. Her responsibilities include managing the Septic and Well Assistance Program (SWAP) and assessing water and wastewater infrastructure needs and programs for the Commonwealth of Virginia and administering a team to implement programs to repair or replace failing onsite sewage (septic) and private drinking water (well) systems in Virginia. Prior to that, she was the Nonpoint Source Program Coordinator for the Commonwealth of Virginia for 18 years which included implementing statewide program for assisting homeowners with repairing and replacing their failing septic systems and connecting to public sewers. Sandberg received her B.S. in Biological Aspects of Conservation and her M.S. in Water Resources Management from the University of Wisconsin-Madison.

Andrew Sawyers

Andrew D. Sawyers is the Director of the Office of Wastewater Management at the U.S. Environmental Protection Agency in Washington, DC, where he oversees the management of the

National Pollutant Discharge Elimination System (NPDES), the Clean Water Act's mechanism for the permitting of municipal and industrial discharge into surface waters of the U.S. In his role as the Director of OWM, Andrew is also responsible for multiple technical and financial assistance tools for the development and maintenance of the country's wastewater infrastructure, including the Clean Water State Revolving Fund.

Previously at EPA, Andrew was the Deputy Director of the EPA's Office of Ground Water and Drinking Water. In that capacity, he worked with the Director to manage the implementation of the Federal Safe Drinking Water Act. Prior to EPA, he was the Deputy Director for the Maryland Water Quality Financing Administration, managing the State's Clean Water and Drinking Water State Revolving Funds and Maryland's Chesapeake Bay Restoration Fund. Andrew has a Ph.D. from Johns Hopkins University in Geography and Environmental Engineering.

Kevin Sherman

Kevin Sherman received a B.S. in ecology & evolution from Stony Brook University. He also has a B.S. in civil engineering from the FAMU/FSU College of Engineering. Kevin has a M.S. in Biology from the University of South Carolina, and a M.P.H. in Public health management from the University of South Florida. He also has a Ph.D. in Biological Oceanography from Florida State University. Kevin worked for the Florida Department of Health for fourteen years. From 1989 to 1992 he served as administrator of the state's onsite sewage program. For six years, Dr. Sherman served as the Executive Vice President of the Florida Onsite Wastewater Association. Currently, he is Director of Engineering and Regulatory Affairs for SeptiTech, Inc. He is a past-president of the Florida Environmental Health Association and the National Onsite Wastewater Recycling Association. He is a Professional Engineer and a Registered Sanitarian in Florida. In 2024 he was awarded NOWRA's Richard J. Otis Award for industry achievement.

Yurie Shirakawa

Ms. Yurie Shirakawa is a Manager, International Affairs Division, at the Japan Education Center of Environmental Sanitation (JECES). She has 9 years of experience in international cooperation of Johkasou system, shares the Japanese technical knowledge on Johkasou to the overseas countries. Since joining JECES in 2017, she has been involved in decentralized wastewater management projects in Viet Nam, Cambodia, Myanmar, Indonesia, India, and Laos. Her area of expertise includes provincial level ordinance of decentralized wastewater management, and municipal domestic wastewater management planning. Prior to joining to the JECES, she has been working at a Japanese construction consultancy, Pacific Consultants Co., Ltd. as an engineer, and been involved in projects related to the environment, energy, and solid waste management. Yurie holds a doctoral degree of engineering from the Tohoku University, Japan, and when she was a Ph.D. student, worked as an intern at Ecosystem-Based Disaster Risk Reduction team of United Nations Environment Program (UNEP) in Geneva.

Alex Sundberg

Alex Sundberg is a Technical Sales Representative and wastewater solutions specialist focused on community-scale and decentralized treatment systems across the western United States. With a background in onsite wastewater design, regulatory coordination, and manufacturer-supported engineering, Alex works closely with civil engineers, developers, regulators, and contractors to navigate complex permitting environments and implement practical, compliant treatment strategies. His experience spans RV parks, manufactured housing communities, mixed-use developments, and environmentally sensitive sites requiring advanced secondary treatment and nutrient reduction. Alex's work emphasizes early-stage wastewater planning, aligning treatment technology with site constraints, seasonal loading variability, and long-term operational sustainability. He frequently supports projects involving modular treatment systems, pressurized dispersal, and phased expansion strategies designed to protect both environmental resources and asset value. Based in Nevada, Alex collaborates with project teams throughout the West to bridge the gap between design intent, regulatory requirements, and field implementation. He is particularly interested in the intersection of wastewater infrastructure and real estate development, helping stakeholders understand how early infrastructure decisions influence density, permitting timelines, and long-term financial performance. Alex regularly presents on best practices for decentralized wastewater management, focusing on practical frameworks that support compliance, resilience, and responsible growth. His approach centers on education and technical clarity, helping industry professionals make informed decisions in an evolving regulatory and environmental landscape.

David Suson

David Suson is a keynote speaker and human connection strategist who helps leaders and teams perform at a higher level under pressure by transforming how they connect - Unlocking the potential that already exists within their people and teams. After interviewing more than 3,000 top performers and working with organizations for over 25 years, David has identified the subtle shifts that drive better communication, stronger relationships, and more consistent performance. In his keynote, David teaches The Connection Shift—a practical approach that helps leaders move from reacting to asking, "How can I?," enabling them to build trust, navigate complexity, and lead more effectively in today's fast-changing environment. He is the author of Real Leadership, Real Results and is known for delivering actionable insights that audiences can immediately apply to improve how they lead, communicate, and perform. Speaker Reel: [https://davidusun.com/speaking/Over 1000 presentations to over 100,000 people over the last 15 years](https://davidusun.com/speaking/Over+1000+presentations+to+over+100,000+people+over+the+last+15+years) See 4,500+ reviews here and past speaking engagements: <https://www.talkadot.com/s/david>

Christl Tate

Christl Tate is the Associate Director of Programs for the Education & Training Department at the National Environmental Health Association (NEHA), where she has been a dedicated professional for over 25 years. Throughout her tenure, she has managed a variety of key programs, including informatics, water, and vector control. In her current capacity, Christl oversees the Training Cooperative Agreement (CoAg) for the Food and Drug Administration (FDA) and spearheads collaborative training and resource development initiatives between industry and regulatory bodies.

Bill Tatro

Bill is the owner and CEO of Snowbridge, Inc in Breckenridge, CO. They are an all service OWTS company that services the Summit County area and Vail Valley.

Kabir Thatte

Kabir Thatte is the Vice President of Policy and External Relations at DigDeep, overseeing government affairs, public policy, and external affairs portfolios for the nonprofit. He serves as a liaison to Capitol Hill, the executive branch, and as a strategic partner to outside organizations. Kabir plays a pivotal role as a founding member and Executive Director of Vessel, an external collective of domestic WASH organizations dedicated to closing the U.S. water access gap through advocacy, data, and public communication. Under Kabir's leadership, in May 2024 Vessel hosted the inaugural U.S. WASH Convening for over 300 attendees and 100+ organizations in Washington, D.C. culminating in an advocacy day for participants with national policymakers, as well as overseeing the development of an ongoing national strategy to close the water and wastewater access gaps across the United States. Before joining DigDeep, he was the Director of the Chairman's Office at the Democratic National Committee and played key roles on various political campaigns, including Pete Buttigieg's 2020 presidential campaign and Jaime Harrison's record-setting senate campaign in South Carolina. Kabir previously consulted for organizations like Apple and Bloomberg Philanthropies, and worked in the U.S. Treasury Department during the Obama Administration as a presidential appointee in the office of Secretary Jack Lew. He holds dual bachelor's degrees in Economics and Political Science from the University of Massachusetts, Amherst, and is based in the mountains of Colorado with his 13-pound, fearless guard dog.

Tammy Trantham

Tammy Trantham has extensive experience in water quality education. She obtained her Bachelor of Science degree in Biology from Viterbo University in La Crosse, Wisconsin. She completed her Master's in Biology from Missouri State University with an emphasis in Aquatic Biology. Tammy has done educational presentations all around southwest Missouri pertaining to stream ecology, lake ecology and wastewater treatment. As the Executive Director of Missouri Smallflows Organization, she coordinates educational presentations around the state for

continuing education opportunities. She was also the Projects Assistant for Missouri Project Learning Tree, Project Water Education for Teachers (WET), and Flying WILD at Missouri State University. Here she conducts training workshops for teachers to incorporate water ecology, forestry, and bird ecology into their curriculum. Finally, Tammy is also a registered Onsite Soil Evaluator through the Department of Health and Senior Services (DHSS) to conduct soil evaluations for onsite wastewater treatment systems.

Benjamin Toung

Benjamin Toung is a second-year undergraduate Civil Engineering student at Texas A&M University. His research focuses on wastewater infrastructure operations and maintenance in rural, decentralized, limited-resource communities. Specifically, Benjamin is interested in exploring the constructs that contribute to delayed, reactive maintenance practices in these communities. In his free time, Benjamin enjoys writing Wikipedia articles about the impacts of tropical cyclones on our infrastructure and playing Deltarune.

Kim Turner

Kim Turner is a dynamic entrepreneur, industry leader, and the driving force behind Turner Septic, a New Hampshire-based company known for professionalism, transparency, and bold personality. As a woman in a traditionally male-dominated field, she has built a brand that not only delivers essential wastewater services but also reshapes how the industry is perceived. Starting from the ground up, Kim grew Turner Septic into a trusted name across New England by focusing on honest pricing, reliable service, and customer education. Her company is known for eliminating hidden fees and ensuring homeowners understand and feel confident in maintaining their septic systems. Known as the "Pumper Princess," Kim uses social media, radio segments like Tank Talk Tuesday, and public speaking to make septic care engaging and accessible. By blending humor with education, she has become a recognizable and influential voice in the wastewater industry. Her leadership has earned national recognition, including the 2026 Professional Women in Wastewater Award at the WWETT Show. She is also actively involved with the National Association of Wastewater Technicians, supporting training and mentorship for those entering the field. In addition to running her business, Kim is pursuing a Bachelor's degree in Forensic Psychology at Southern New Hampshire University. This academic background enhances her leadership, communication, and ability to connect with others. Kim Turner represents a new generation of blue-collar leadership, combining hard work, authenticity, and innovation to elevate the industry and inspire others.

Zhiyue Wang

Dr. Zhiyue Wang is an Assistant Professor in Environmental Engineering at the University of Hawaii at Manoa. Dr. Wang obtained his Ph.D. in Environmental Engineering and Science from Stanford University. His research spans novel

environmental biotechnologies, municipal wastewater treatment, nutrient recovery, and resource valorization. His research group integrates molecular tools, process engineering, and biochemical assays to design sustainable and resilient water solutions. Current research projects include decarbonization and nitrous oxide recovery, bioplastic synthesis, iron-mediated nutrient removal, and microalgae-bacteria consortia covering both centralized and decentralized wastewater treatment processes.

Brooklyne Wassel

Brooklyne Wassel serves as the Pike County Extension Coordinator and Agent for the University of Georgia Cooperative Extension service. She began her role in 2018 after receiving her bachelors and masters from Auburn University. Her Extension program is diverse and covers topics ranging from wild harvesting and pollinators to pasture management and onsite wastewater. Ms. Wassel has been involved with Georgia Onsite Wastewater Association field days, Georgia Department of Public Health new professional trainings, community outreach events, and more. Onsite wastewater continues to be an important aspect of her Extension work as it relates to both private homeowners and professionals alike.

David White

David White is a Staff Environmental Scientist with the Town of Charlestown (RI) Onsite Wastewater Management Program and Laboratory of Applied Watershed Management. His work includes onsite wastewater treatment system management, monitoring and sampling of advanced nitrogen-reducing systems, water quality data analysis, and support of Charlestown's Responsible Management Entity program. David also applies GIS and spatial analysis to groundwater and nitrogen risk assessment, OWTS performance evaluation, and municipal wastewater planning. He received a Master of Environmental Science and Management from the University of Rhode Island, with a focus on remote sensing and spatial analysis applied to wetlands, coastal systems, and watershed management.

Joelle Wirth

Joelle Wirth, R.S., is a Registered Sanitarian with more than 30 years of experience in onsite wastewater management, planning, permitting, design, and program administration. She holds a Bachelor of Science in Resource Management from Northern Arizona University and began her career as a regulator with Coconino County, where she developed a deep understanding of Arizona's unique soil, water, and rural infrastructure challenges. Joelle has been actively engaged in Arizona's Aquifer Protection Permit rulemaking process since 1999, contributing technical insight and field-based experience throughout multiple revisions of the program. Her work emphasizes practical, affordable, and protective onsite solutions that support groundwater protection and sustainable development across diverse communities. Nationally and internationally, Joelle continues to contribute to standards development and innovation in decentralized wastewater management. She serves on the National Sanitation Foundation's Joint Committee for Onsite Wastewater and is a long-standing member of ISO Technical Committee 224, where she has participated in global efforts to improve onsite wastewater management practices and low-resource sanitation technologies. Her involvement in the Bill & Melinda Gates Foundation's Reinvent the Toilet Challenge further reflects her commitment to advancing protective, accessible sanitation solutions worldwide. Joelle is an active member of SORA, NOWRA, AZOWRA, NEHA, OWAC, and OTAG, and has been recognized with multiple national and state awards for professional excellence. Her work continues to focus on integrating water-resource thinking, equity, and practical

Daniel Yeh

Dr. Daniel Yeh is a Professor of Environmental Engineering in the Department of Civil and Environmental Engineering at the University of South Florida, where he leads the Membrane Biotechnology Lab. Dr. Yeh was a Visiting Professor at NASA's Kennedy Space Center. Daniel's research interests are in the areas of water & wastewater engineering, sustainable and resilient infrastructure, and resource recovery from wastes. Daniel received his BS and MS degrees from the University of Michigan and his PhD from Georgia Tech. He is a professional engineer, AAES board certified environmental engineer, and a LEED accredited green building professional.

MEGA-CONFERENCE EXHIBITORS

10X Business Broker Mergers & Acquisitions

W1353 Pit Road
Mount Calvary, WI 53057
Katherine Ramirez
ceo@10xbusinessbroker.com

Booth #404

AK Industries Inc.

PO Box 640
Plymouth, IN 46563
James Conley
jamesc@akindustries.com

Booth #102

American Manufacturing Co. Inc.

22011 Greenhouse Rd
Elkwood, VA 22718
Alan Kidwell
akidwell@americanonsite.com

Booth #706

Anua - Geoflow - Sim/Tech

PO Box 77457
Greensboro, NC 27417
Brad Hennig
bradley.hennig@anua-us.com

Booth #403/405

Ashland Pump

1192 Commerce Parkway
Ashland, OH 44806
Taylor Stockmaster
tstockmaster@ashlandwatergroup.com

Booth #207

BioMicrobics, Inc.

16001 W. 110th St
Lenexa, KS 66219
Katie Touch
ktouch@biomicrobics.com

Booth #605

Cogent Companies

14452 W 44th Ave
Golden, CO 21117
Sean Helmer
shelmer@cogentcompanies.com

Booth #105

CPOW

PO Box 918
Strasburg, CO 80136
Lisa Nicoll
cpow@cpow.net

Booth-Foyer

Eco-Matrix

1909 S. Horseshoe Trail
Silt, CO 81652
Michele Coppersmith
ecomatrix4@outlook.com

Booth #600

Ecological Tanks, Inc.

2247 Highway 151 North
Downsville, LA 71234
Fred Frantom
Freddy.frantom@etiaquasafe.com

Booth #501

Eljen Corporation

91 Meadow Rd
Windsor, CT 06096
Melissa Sanchez
msanchez@eljen.com

Booth #301/400

Excavation Marketing Pros

15722 Glencastle St.
Sandusky, OH 28078
Scott Andreasen
scott@excavationmarketingpros.com

Booth #100

E-Z Treat Inc

PO Box 176
Haymarket, VA 20168
Madison Painter
mpainter@eztreat.net

Booth #307

Franklin Electric

9255 Coverdale Rd.
Fort Wayne, OK 46809
Josh Clark
Josh.Clark@fele.com

Booth #305

Front Range Precast Concrete, Inc.

5901 Dexter Street
Commerce City, CO 80022
Shannon Hayhurst
shannon@flxx.com

Booth #801

FujiClean USA

41 Greenwood Rd Ste 2
Brunswick, ME 04011
Jenny Borgeson
jenny@fujicleanusa.com

Booth #401/500

Geomatrix Systems

114 Mill Rock Rd E
Old Saybrook, CT 06475
Elizabeth Potts
epotts@geomatrixllc.com

Booth #708

Groundbreaker Marketing

110 Highgate Court
Boyd, TX 76023
Ashley Christian
ashley@groundbreakermarketing.com

Booth #304

Hiblow USA

1300 Tefft Ct Ste 1
Saline, MI 48176
Tim Smith
tim@hiblow-usa.com

Booth #502

Honu Hub

760 Fulton St
Aurora, CO 80010
Robert Bair
rbair@usf.edu

Booth #603

Hoot Systems

2885 Hwy 14E
Lake Charles, LA 70607
Hannah Breau
support@hootsystems.com

Booth #602

Infiltrator Water Technologies

4 Business Park Road
Old Saybrook, CT 06475
Donna Fiorentino
dfiorentino@infiltratorwater.com

Booth #201/203

Inspector Cameras LLC

8030 So. Willow St, Bldg 1 Unit #3
Manchester, NH 03103
Mark Raumikaitis
mark@inspectorcameras.com

Booth #200/202

Jet Inc

750 Alpha Dr
Cleveland, OH 44143
Kyle Bianco
kbianco@jetincorp.com

Booth #402

JNM Technologies, Inc.
PO Box 5667
Bryan, TX 77805
Joselyn Lesikar
joselyn@jnmtechnologies.com
Booth #503/505

Kubota Water and Environment USA
19910 N Creek Pkwy Suite100
Bothell, WA 98011
Joe Severin
joseph.severin@kubota.com
Booth #504

National Association of Wastewater Technicians
PO Box 6685
Broomfield, CO 80021
Lynne Seipp
info@nawt.org
Booth-Foyer

National Environmental Health Association (NEHA)
1400 S. Colorado Blvd., Suite 325
Denver, CO 80222
Soni Fink
sfink@neha.org
Booth-Foyer

National Precast Concrete Association (NPCA)
1320 City Center Dr Ste 200
Carmel, IN 46032
Claude Goguen
cgoguen@precast.org
Booth #303

Norweco, Inc.
220 Republic St
Norwalk, OH 44857
Annette Simon
asimon@norweco.com
Booth #311

Omega Liquid Waste Solutions
1753 Yvonne-Huot
Levis, Québec G7A 5N4
Rachel Marcotte
rmarcotte@omega-lws.com
Booth #506

Orengo Systems
814 Airway Avenue
Sutherlin, OR 97479
Donna Fiorentino
dflorentino@infiltratorwater.com
Booth #300/302

Pedon Tapes
6675 W US Hwy 160
Alamosa, CO
Levi Wilner
leviwilner@gmail.com
Booth #103

Polylok
3 Fairfield Blvd
Wallingford, CT 06492
Melissa Tommaselli
mtommaselli@polylok.com
Booth #601

Prinsco
1717 16th Street NE
Wilmer, MN 56201
Michelle Jones
michelle.jones@prinsco.com
Booth #604

Riovation
6633B W Gulf to Lake Hwy
Crystal River, FL 34429
Stephen Moeller
stephen@riovation.com
Booth #704

Rockpopper
1101 Maryland Ave
Deelodge, MT 59722
Gabe Mobley
gabem@rockpopper.com
Booth #800

Roth North America
PO Box 245
Syracuse, NY 13211
Jaimee Johnson
jaimeep@roth-usa.com
Booth #306

SCG Enterprises, Inc.
PO Box 1411
Conifer, CO 80433
Roger Shafer
rshafer@scgenterprises.com
Booth #205

Septilink Inc
809 NE 2nd St
Kerens, TX 75144
Joy Mundt
joy@septilink.com
Booth #700

Skywalker Drone Imagery LLC
1063 W 144th Place
Westminster, CO 80023
Lucas Grein
luke@skywalkerdroneimagery.com
Booth #406

SludgeHammer Group, Ltd.
4772 US 131 South, Building D
Petoskey, MI 49770
Anthony Graham
anthony@sludgehammer.net
Booth #104

Tuf-Tite Inc.
1200 Flex Ct
Lake Zurich, IL 60047
Urszula Pyskaty
pyskaty@tuf-tite.com
Booth #710/712

Valley Precast
28005 County Rd 317
Buena Vista, CO 81211
Jon Hllenbeck
jonh@valleyprecast.com
Booth #802

VibraWaste
4149 Cook Rd
Bentonville, AR 72713
Jon Jouvenaux
jon@vibrawaste.com
Booth #407

WaiHome LLC
59-477 Hoalike Rd
Haleiwa, HI 96712
Greg Wong
greg@waihome.com
Booth #702

Wieser Concrete
W3716 U.S. Highway 10
Maiden Rock, WI 54750
Steph Bickman
marketing@wieserconcrete.com
Booth #101

WWETT-Informa
222 W Las Colinas Blvd, Ste 450E
Irving, TX 75309
Chrissy Colclasure-Baridon
chrissy.baridon@informa.com
Booth-Foyer

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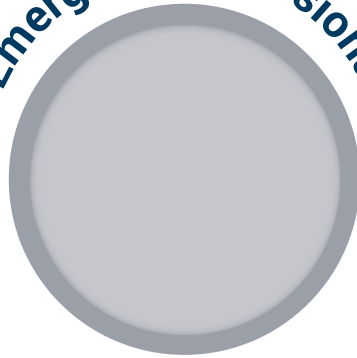
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NOWRA's Online Learning Academy makes it easy for you to obtain high quality onsite wastewater training by bringing the classes to you! It's a great option when:

- you are unable to attend in-person training events,
- you want to train new employees quickly,
- you are a few CEUs short for professional license renewal, or
- you need to better understand onsite wastewater fundamentals.

Our suite of courses has been developed by respected industry professionals from academia, engineering, soil science, and contracting. Each course offers a dynamic mix of classroom lectures, external videos and required readings, along with periodic tests of your knowledge. When you pass a course, you get a personalized Certificate of Completion, which can be used as continuing education documentation.

► Onsite A to Z

An overview of onsite wastewater treatment provides a foundation of relevant courses for many professionals.

► Installer Training

Ideal for new installers, those preparing for a certification exam, or those looking to brush up on skills.

► Troubleshooting

Step-by-step component troubleshooting—for designers, installers, regulators, service providers and more!

► Design Courses

These courses lay the groundwork for design and are continuously being expanded with new additions.

► Technical Sessions

These courses cover a wide variety of topics and were selected for their continued relevancy to the decentralized industry.

NOWRA is excited to offer five new design courses!

1. **Design: Disinfection in OWT Systems** — Gives an overview of why disinfection is important for onsite systems and how two of those methods function.
2. **Design: Community System Management Programs —Avoiding the Pitfalls** — Gain a better understanding of decentralized community systems and how to structure management and oversight of community systems.
3. **Design: Phosphorus Reduction Techniques** — Discusses the impacts of phosphorus on fresh water and how phosphorus can be reduced through treatment.
4. **Design: Commercial System Considerations** — Describes how commercial systems generate higher strength or difficult to treat wastewater and provides information to solve these treatment challenges.
5. **Design: Multiple Tanks** — Gives an overview of how multiple tanks in an onsite system function, when they're needed, and how to operate and maintain them.

We are pleased to expand our design courses. If you have topics you would like to see NOWRA cover in future courses, please contact us at outreach@nowra.org. We are always interested in providing quality education resources to the onsite industry.

FREE BUSINESS AND INDUSTRY COURSES

The NOWRA Online Learning Academy also has free online business and regulator courses available for our members and affiliates.

Sign up today!

www.pathlms.com/NOWRA

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HELP US EDUCATE HOMEOWNERS

NOWRA's Online Learning Academy now includes a free, online training module to educate homeowners about their onsite wastewater systems.

The **Homeowner's Education Course** was designed to be an engaging way for people to learn the basics of onsite treatment and maintenance. While the training's target audience is property owners with onsite systems, the concepts are also applicable to the general public, realtors, local health officials, and septic system professionals.

MORE
INFO
HERE



Onsite Wastewater
Treatment System
Homeowner
Education

Now available in
SPANISH!



*This course is designed to help homeowners get the most out of their Onsite Wastewater Treatment System (OWTS). Select the Start button in the course header to get started, or select a topic in the sidebar below to jump to a specific section.

Concepts covered in this short and easy-to-use training module include: the importance of wastewater treatment, an overview of treatment in an onsite system, typical onsite system features, final treatment and dispersal, management, maintenance, safety, and system troubleshooting.

The Homeowner's Education Course was developed through a U.S. EPA grant and in partnership with the Rural Community Assistance Partnership (RCAP).

This course is free, but users must create an account at pathlms.com/nowra/.

Questions about this course should be directed to NOWRA at info@nowra.org.

Looking for new resources to share with the public?

1. FREE Interactive Homeowner Course

Many homeowners have onsite wastewater systems, but don't know much about them or how to take care of them. Onsite systems are a vital part of any home's infrastructure and poor maintenance or improper use can lead to costly repairs or replacement. It's an expensive lesson to learn the hard way.

NOWRA developed an interactive homeowner course and guide in partnership with the US EPA and Rural Community Assistance Partnership (RCAP). This guide is for property owners and the general public to help them learn best management practices to keep their systems functioning properly.

The course is offered free of charge on NOWRA's Online Learning Academy website, but does require sign up for a free account. Sign up at pathlms.com/nowra for a free NOWRA Online Learning Academy Account.

The homeowner's course can be found at pathlms.com/nowra/courses/59159/.

2. Check out EPA's SepticSmart Resources

The EPA has many engaging SepticSmart materials for the public to use and disseminate, from videos and social media graphics to door-hangers for realtors and printouts for rental property guests. These resources can all be found at epa.gov/septic/septicmart/.

3. New and Updated Homeowner Folder

NOWRA has been hard at work updating an important resource for homeowners. The onsite industry stresses the importance of good record keeping as an integral part of onsite system operation and maintenance. It's vital to know when work was done, including pumping or repairs, and who was hired to do the work.

NOWRA's homeowner folder is a great way to not only log when work was done, but keep all receipts and records together in one place. The updated folder features new, clearer graphics in full color and improved system information prompts to help homeowners give the detail that will help future service providers determine the components present. This can lead to faster troubleshooting, which may help reduce costs if repairs are needed.

Additionally, the homeowner folder is printed with basic onsite system information, to help inform homeowners about what onsite systems are and steps they likely need to take to maintain theirs.

We have included a space for local installers, designers, or service providers to put their information on the folder to make it easier for homeowners to contact them. **The new homeowner folder is available from NOWRA's website (nowra.org) starting SepticSmart Week 2026.**



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