



STORM WATER AWARENESS WEEK
September 22-26, 2025

TREATABILITY TESTING FOR STORMWATER TREATMENT: WHEN, WHY, & HOW

SEPTEMBER 26, 2025

INNOVATIONS IN WATER | WWW.WATERTECTONICS.COM

Past Presentations

- Navigating IGP TMDL Compliance and Treatment Options (<https://www.youtube.com/watch?v=E7nItJvNssE>)
- Industrial Stormwater Treatment: The Top 5 Pitfalls to Avoid! (<https://www.youtube.com/watch?v=Pj9kUhCMW0A>)
- PFAS: Current Regulations, Evolving Challenges, & Treatment Options (<https://www.youtube.com/watch?v=ju-SgjOGkUU>)
- Active Treatment for [Industrial] Stormwater: When, Why, & How? (<https://www.youtube.com/watch?v=IPfkcW-rsAA>)



Speaker Background



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WaterTectonics

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WaterTectonics Overview

- Since 1999, WaterTectonics has designed, manufactured, and installed stormwater treatment systems for clients industrial, construction, and municipal applications
- We provide a range of simple-to-advanced solutions that can be customized to meet site-specific customer conditions and water quality goals
- Our in-house design and lab services can help with technology selection and treatability testing to validate the approach for a facility
- Our field team provides year-round field service support to ensure long-term project success



The WT Process



Stormwater Treatment Technologies

- Electrocoagulation
- Chemical Treatment
- pH Adjustment
- Advanced Oxidation
- Dissolved Air Flotation
- Clarifiers
- Media Filtration
- Cartridge/Bag Filtration
- Ion Exchange
- UV Disinfection
- UF/RO Membrane Treatment



California Experience (43%)*

- Antioch
- **Agoura Hills**
- Carlsbad
- Chico
- Chula Vista
- **Coronado**
- Crockett
- Daly City
- Downey
- **Dublin**
- **Holt**
- **Livermore**
- Long Beach
- Los Alamitos
- **Los Angeles**
- Los Osos
- Oakland
- Oakley
- **Newport Beach**
- Piru
- Rancho Cordova
- Richmond
- San Diego
- San Francisco
- San Jose
- San Leandro
- **Santa Clara**
- Santa Fe Springs
- Santa Rosa
- Stockton
- Vernon



Other Regional Experience (56%)*

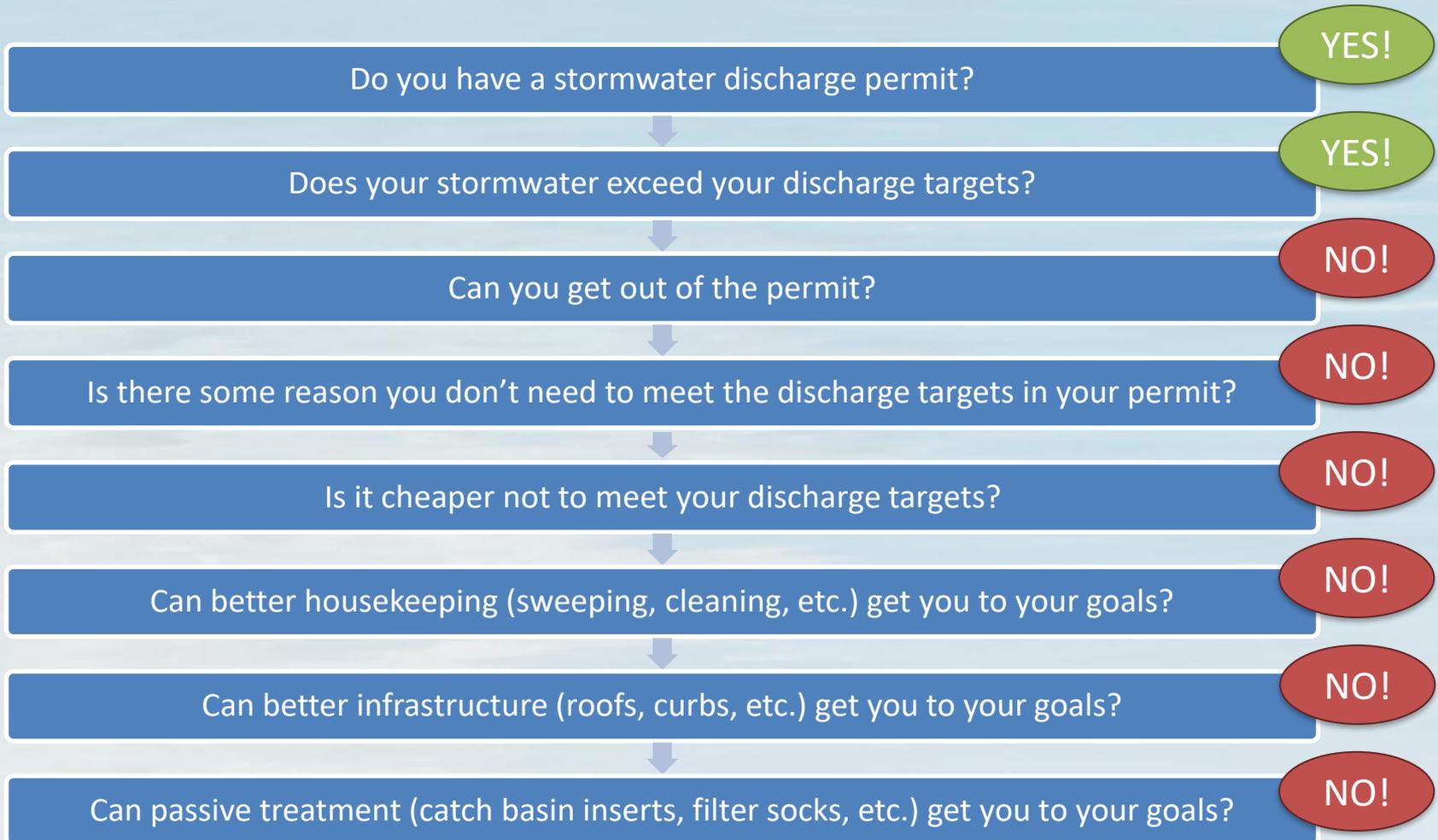
Stormwater Work

- Washington
- Oregon
- Illinois
- Texas
- Georgia
- New York
- Canada
- Massachusetts (New)
- Hawaii (New)
- Florida (New)
- Virginia (New)

Other Work

- Arizona
- Pennsylvania
- North Carolina
- Minnesota (New)
- New Mexico (New)
- Oklahoma (New)
- Tennessee (New)
- Indiana (New)

When Do I Need Treatment?



What is “Treatability Testing”?

“Treatability Testing”

Clients ship sample to us
5-55gal (10-20gal avg.)
Typical Cost = \$2-20k



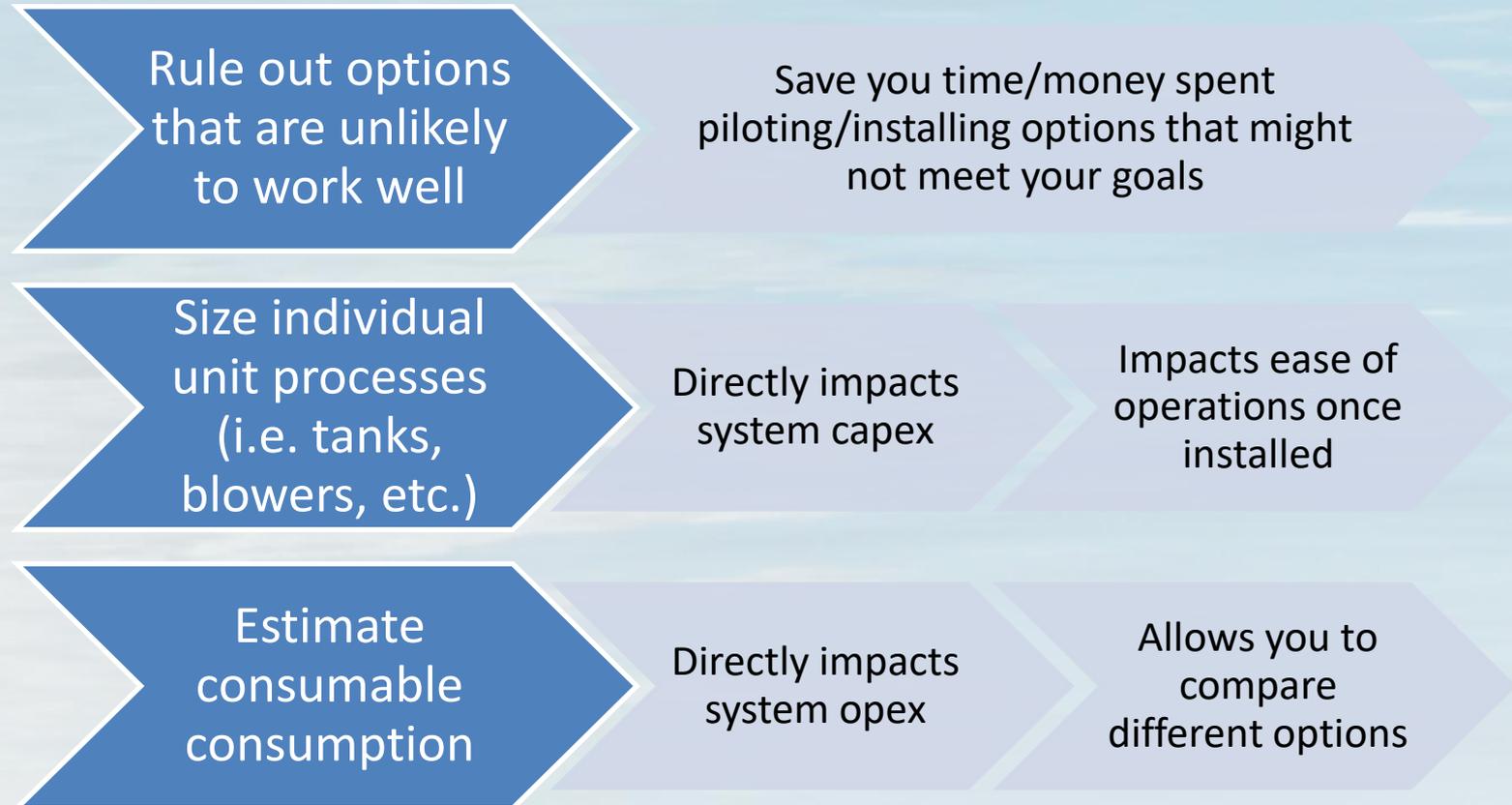
Treatability testing simulates full-scale treatment on a small, representative sample of water in a controlled lab environment.

“Pilot Testing”

We ship system to client
5-100gpm avg.
Typical cost = \$20-200k



How Can Treatability Testing Help?



Treatability Benefits By Stormwater Permit

Municipal

- Most of the “treatability testing” for treatment systems in this application happens prior to systems coming to the broader market (TAPE, NJCAT, etc.)
- Some site-specific testing is done for larger outfalls and unique cases
- Monitoring and enforcement can be less stringent

Construction

- Some of the “treatability testing” for treatment systems in this application happens prior to systems coming to market (TAPE, etc.)
- Site-specific testing is most often used for sites with known background contamination
- Treatment needs are temporary, so risk profile is different and treatment is often done through third parties

Industrial

- Most “pre-validations” in this area are case studies from other sites
- Site-specific treatability testing is most common here because facilities have the highest individual risk (long-term capex purchase, ongoing monitoring, TMDLs, third party lawsuits, etc.)

What is a “Representative Sample”?

- Simplest scenario = 1 outfall, consistent water quality, consistent flows
- Considerations:
 - If you installed treatment, would your number of outfalls or infrastructure change?
 - If you have multiple outfalls, would you want to combine them?
 - What else could impact the likely water quality to be fed to a system?
 - Seasonality (first flush, etc.)
 - Storm intensity
 - Site operations that day
 - Etc...



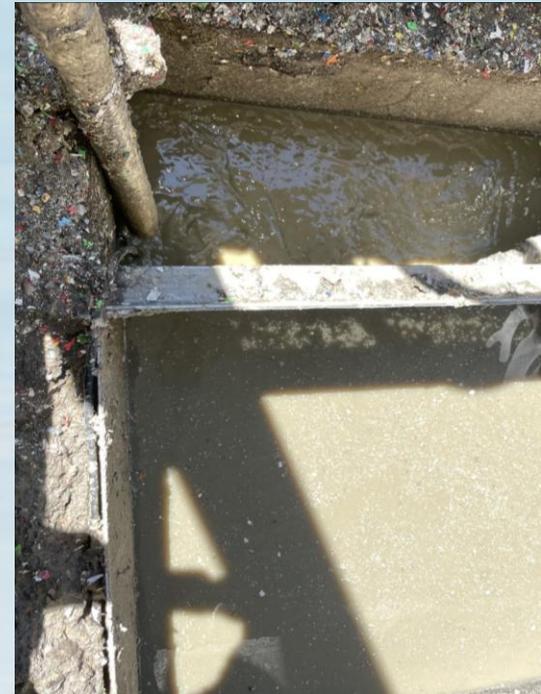
What is a “Representative Sample”?

Parameter	Units	Historical Average	Historical Max	Treatability Sample
TSS	mg/L	50	2,000	25
pH	s.u.	6.5	9.2	8.2
Copper	µg/L	50	200	250
Zinc	µg/L	300	900	100
Oil & Grease	µg/L	10	20	ND

How to Collect a Sample?

- **Sheet Flow**
 - Option A: Dam up a spot, so you can fill up a bucket (not recommended)
 - Option B: Install a sump
- **Sump**
 - Option A: Attach a rope to a bucket, lower into sump, lift out
 - Option B: Drop a pump into the sump, pump out into bucket

**In all cases, make sure to wear proper PPE and be safe!*



What Do I Have to Report?

- Do I have to submit the results of a sample collected for a treatability study? It typically depends on...
 - Where you collect the sample
 - Whether you are currently discharging or not
 - What your permit says
- Do I have to submit the findings of the study to my regulator? It typically depends on...
 - Whether you said you would as part of a response plan
 - What your permit says



Is treatability testing the “be all end all”?

- **No!**
- It's one input in a decision. Other considerations are:
 - Available space
 - How quickly equipment is needed
 - Purchase or rent
 - Preference for capex vs. opex trade-offs
 - Options for waste disposal (sludges, medias, brines, etc.)
 - These things can and often do change all the time and up until the moment of a decision...



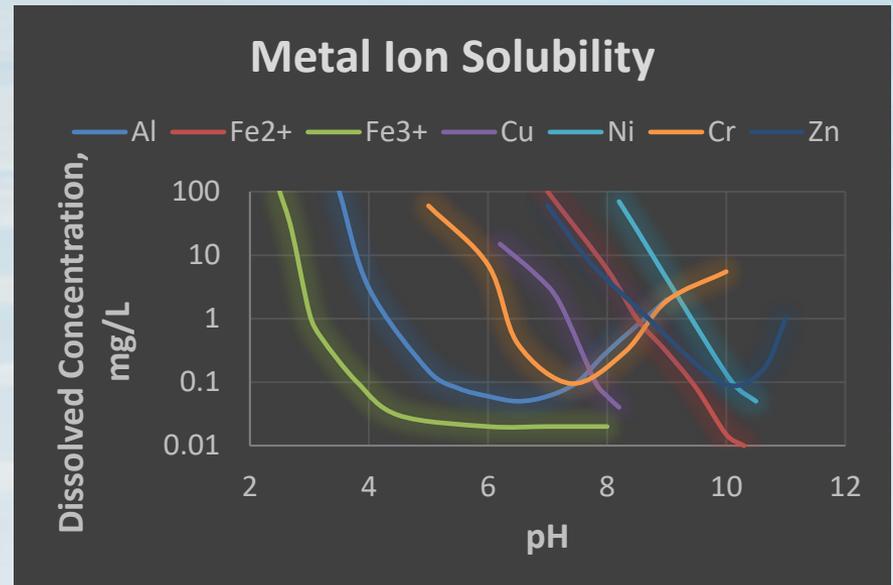
TSS: What To Know!

- What particle size is the TSS?
 - Particle size distribution analysis
- How fast will it settle?
 - Settling rate study
- What size filtration is needed?
 - Filtration studies
- If settling, how well does the sludge compact?
 - Visual observation
- How much sludge will be generated in a treatment process?
 - Calculate based on volume and TSS level
 - Can improve estimate with observing settling and compaction rates



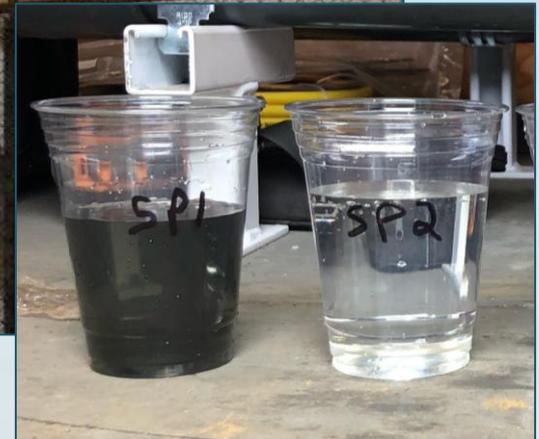
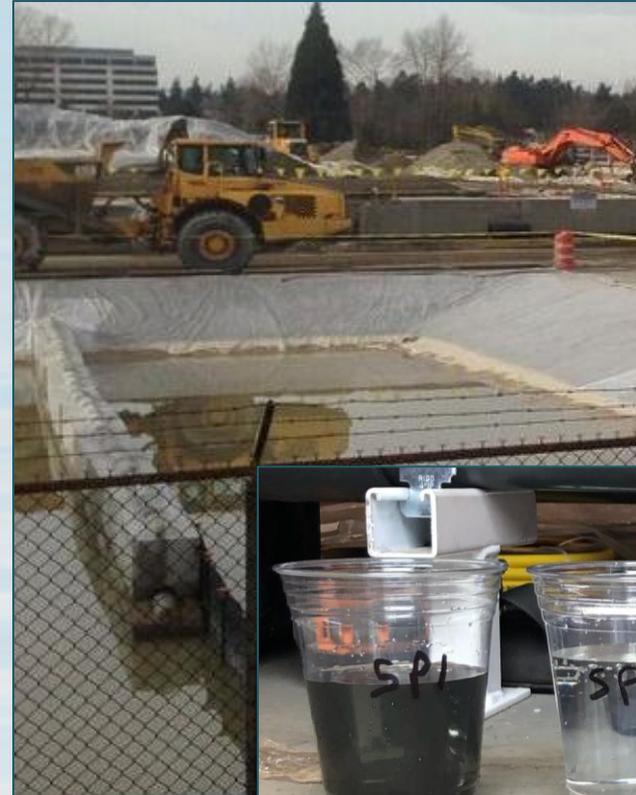
Metals: What To Know!

- Correlated with TSS?
 - Look at data
- Total or dissolved?
 - Lab analysis
- Sensitive to pH?
 - Zinc, Copper, Lead, etc.
- Sensitive to oxygen?
 - Iron, etc.
- Ultra low limit?
 - What constitutes “ultra low”?
 - Need for polishing?



Other: What To Know!

- Organics (PCB, PAH, etc.)
 - Usually like carbon
- Nitrogen Compounds (NO₃, NO₂, NH₃, etc.)
 - Typically highly soluble and requires targeted treatment
- Phosphorus Compounds
 - Can be easy if high (2mg/L) and very difficult if low (0.1mg/L)
- Bacteria (Total, Fecal, Enterococcus)
 - Lots of treatment options, but can be difficult to manage growth in between storm events and balance that with not creating a toxic condition on discharge

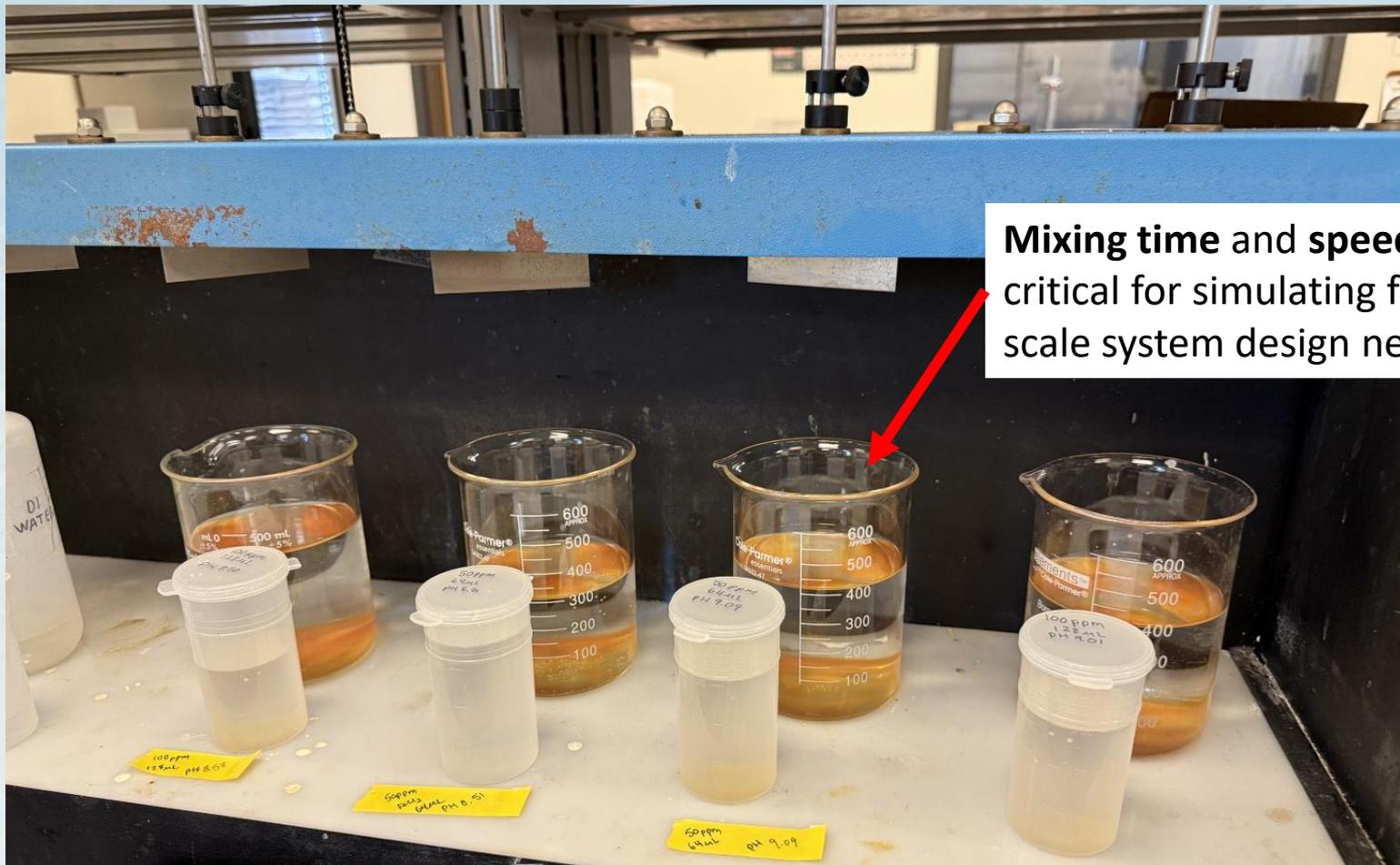


Emerging Contaminants: What To Know!

- PFAS
 - GAC, IX, RO, Foam Fractionation work
 - Waste disposal and opex are typically biggest considerations
- 6-PPDQ
 - Most treatment evaluations currently focused on bioretention medias due to roadway runoff sources
- Microplastics
 - No EPA approved method to test “microplastics” – more of a visual, aesthetic risk at the moment – but real legal action can be brought (recent \$50M settlement in Texas)

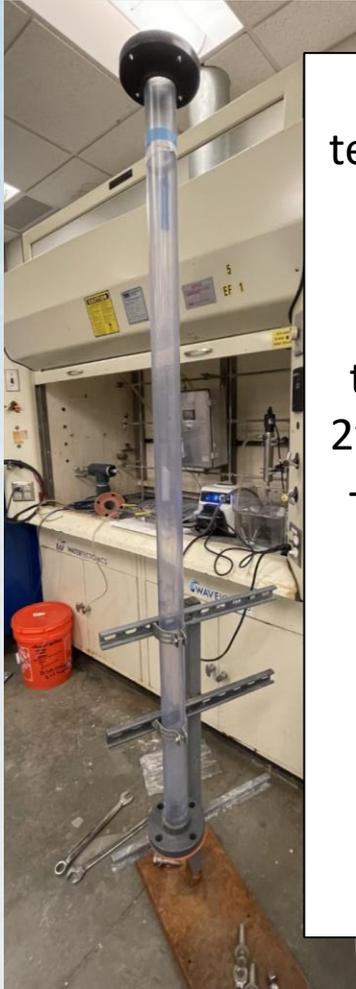


Bench Scale Treatment – Chemicals



Mixing time and speed are critical for simulating full-scale system design needs

Bench Scale Treatment – Special Medias

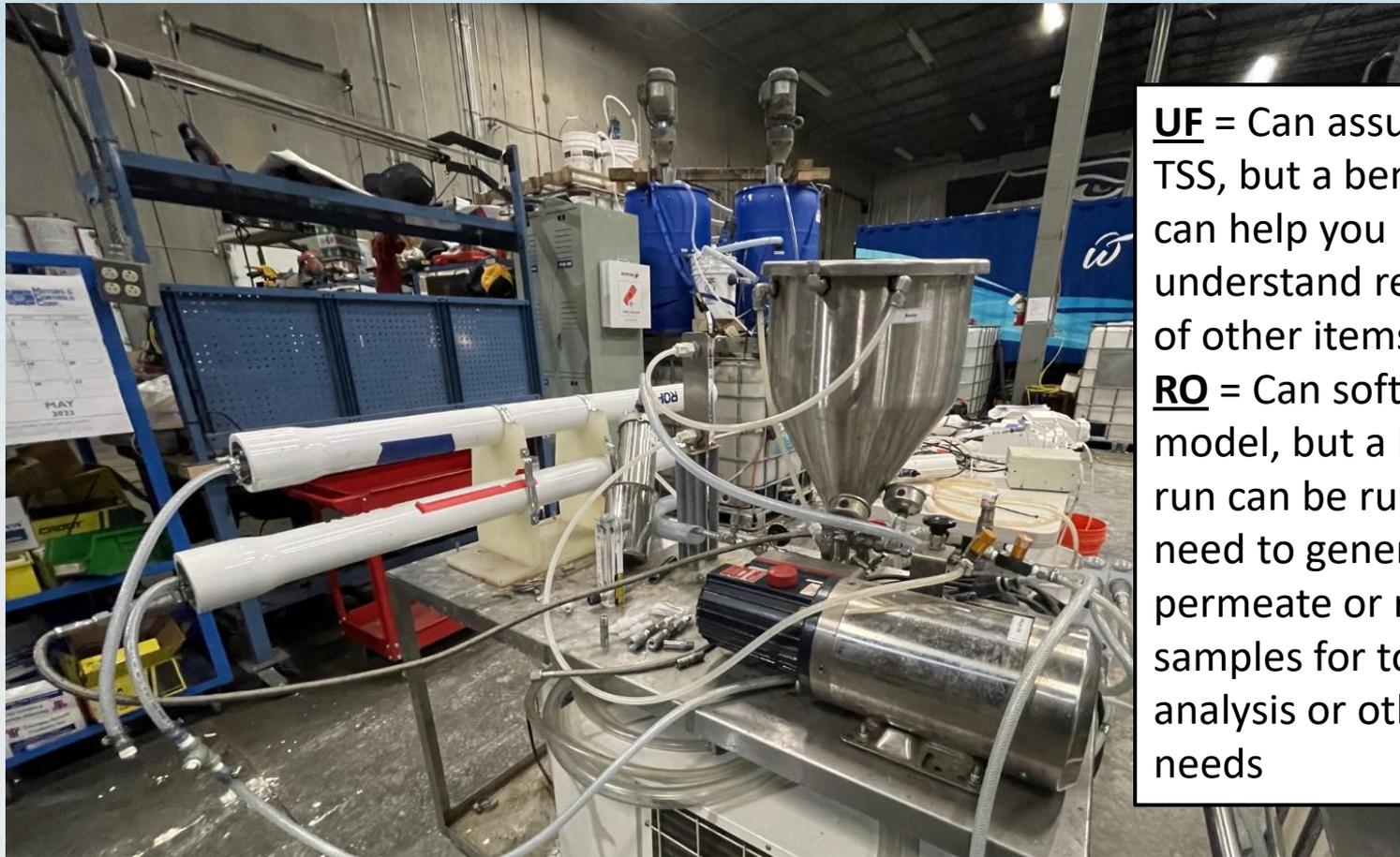


Normal column tests use GAC, IX, or other specialty **media in their original forms** – typically in a 1” or 2” diameter column – inexpensive and can answer the question – *will water meet my goals when I first start running it through the column?*



Rapid small scale column test (RSSCT) uses **ground up media** and runs sample through a very small diameter column – more expensive but can answer the question – *how long will my media last before my target compounds “breaks through” the media?*

Bench Scale Treatment – Membranes



UF = Can assume ND TSS, but a bench run can help you understand removal of other items

RO = Can software model, but a bench run can be run if you need to generate permeate or reject samples for toxicity analysis or other needs

Thank You!



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