Treatment Challenges, Realities and Potential Solutions

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Legacy contamination
Groundwater intrusion, broken pipes
Messy neighbors
Close to ‘listed’ receiving waters
Large outside storage areas (raw materials)

Common Issues Needing Treatment

- Typically, High Flow Rates
- High % Fine TSS
- High Range Metals Conc.
- High Dissolved Metal conc.
- Persistent Pollutants (PCBs, PAHs)
- Multiple Outfalls (tally benchmark exceedances

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Considerations for L3 BMP

Offline vs. Online BMPs: Stormwater Management Manual Western Washington (SWMMWW)

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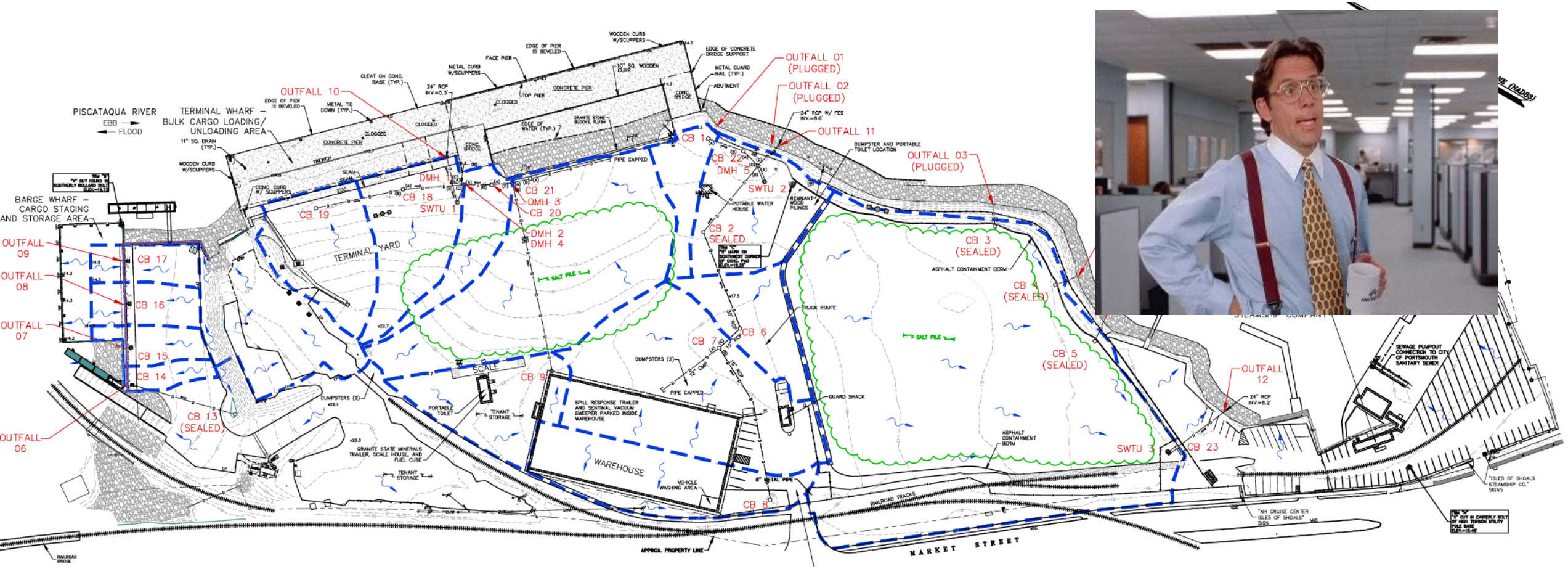
How do we manage sampling and design complexity?



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What questions should we be asking?

START (we've exceeded benchmarks)

Verify data accuracy and trends

Meters calibrated? Representative? Were there other factors? Overflow – higher rain intensity – maintenance issue?

Maximize source control

Cover bulk storage? Replace zinc surfaces? Improve sweeping frequency? Eliminate exposure?

Operational changes?

Increase inspections? Improve housekeeping? Isolate high-risk areas?

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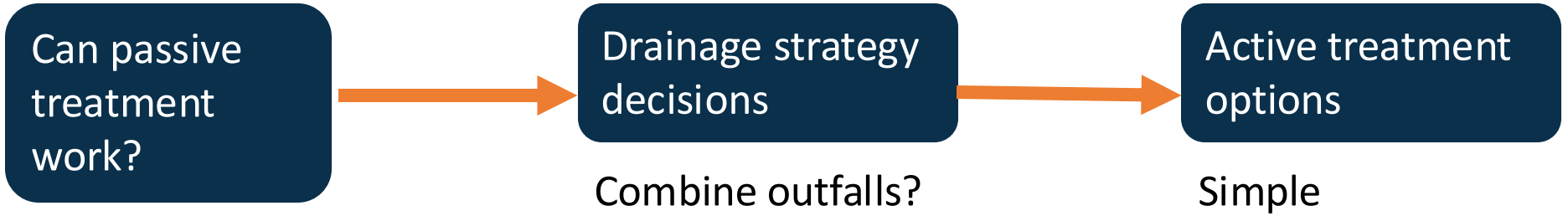
What questions should we be asking?



Media inserts?
Biofiltration?
Solids settling?
Media boxes?

Combine outfalls?
Reroute flows?
Decentralized systems?
Is underground contamination an issue?

Simple
Robust
Redundant

BUT if we NEED treatment, some considerations…

Treatment Design (SWMMWW)

Hydrologic reality

Climate variability

Rainfall intensity shifts

Groundwater Intrusion

Seawater influence

Seasonal Operational differences

Final system design

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Added complexities

Final system design

Site Factors / Reality

Existing / New Conveyance?

Site Power

Available Footprint

Solids Loading / Sludge Plan?

System Performance!!!

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All Known, Available, and Reasonable methods of prevention, control, and Treatment (AKART)

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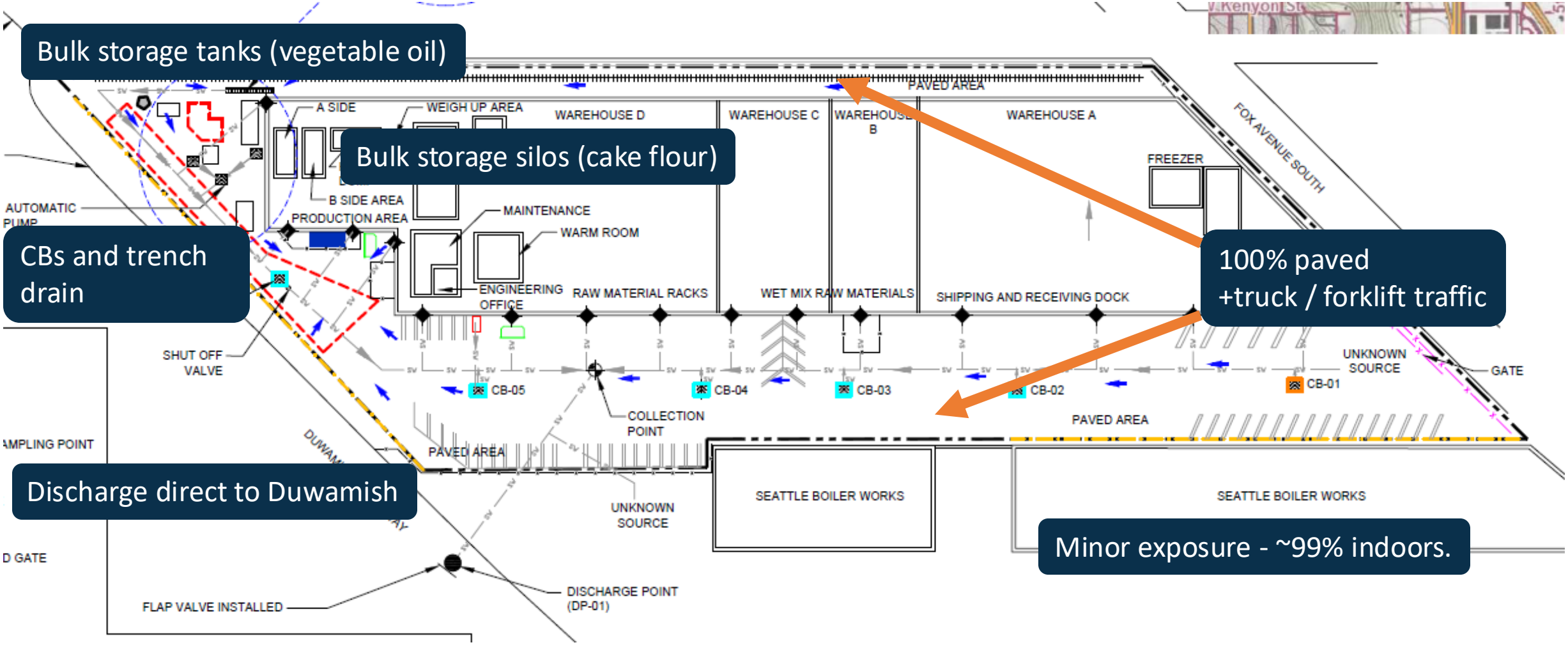
Treatment “simple”



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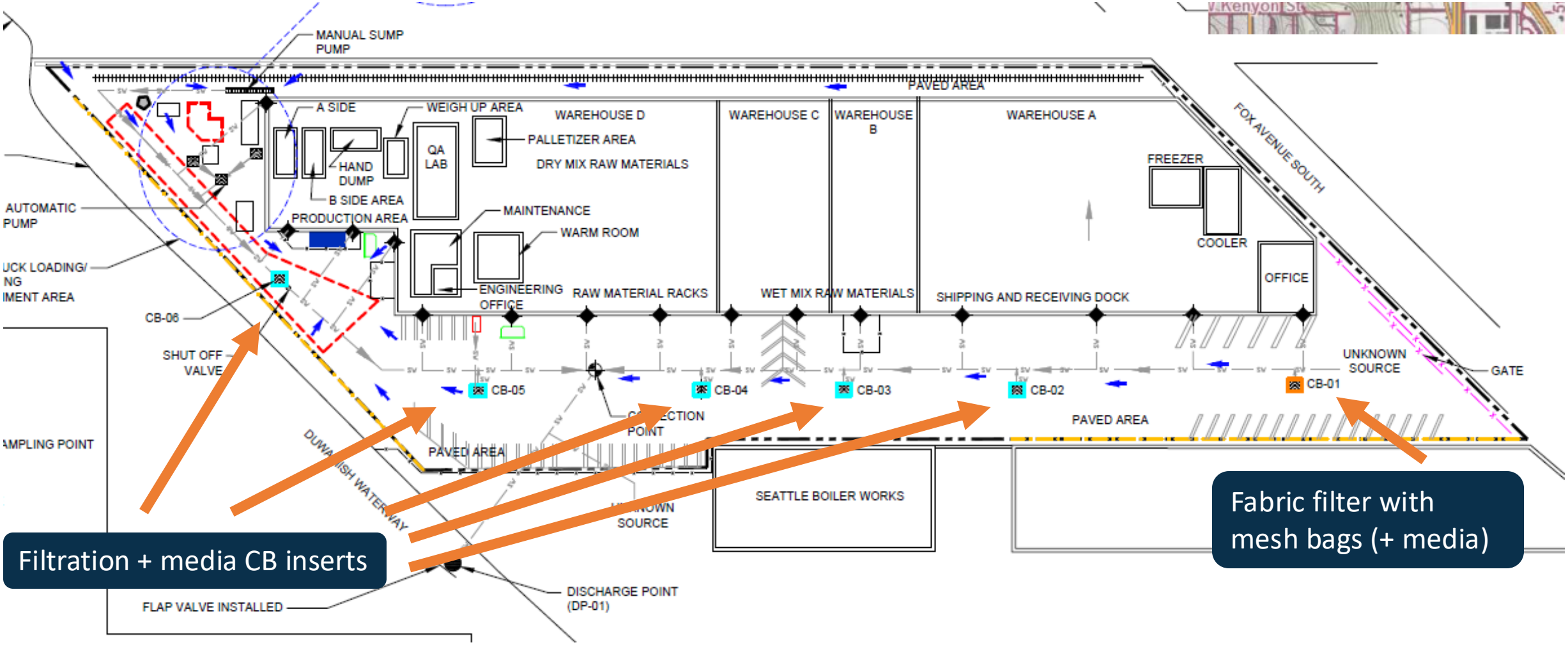
Treatment “simple”



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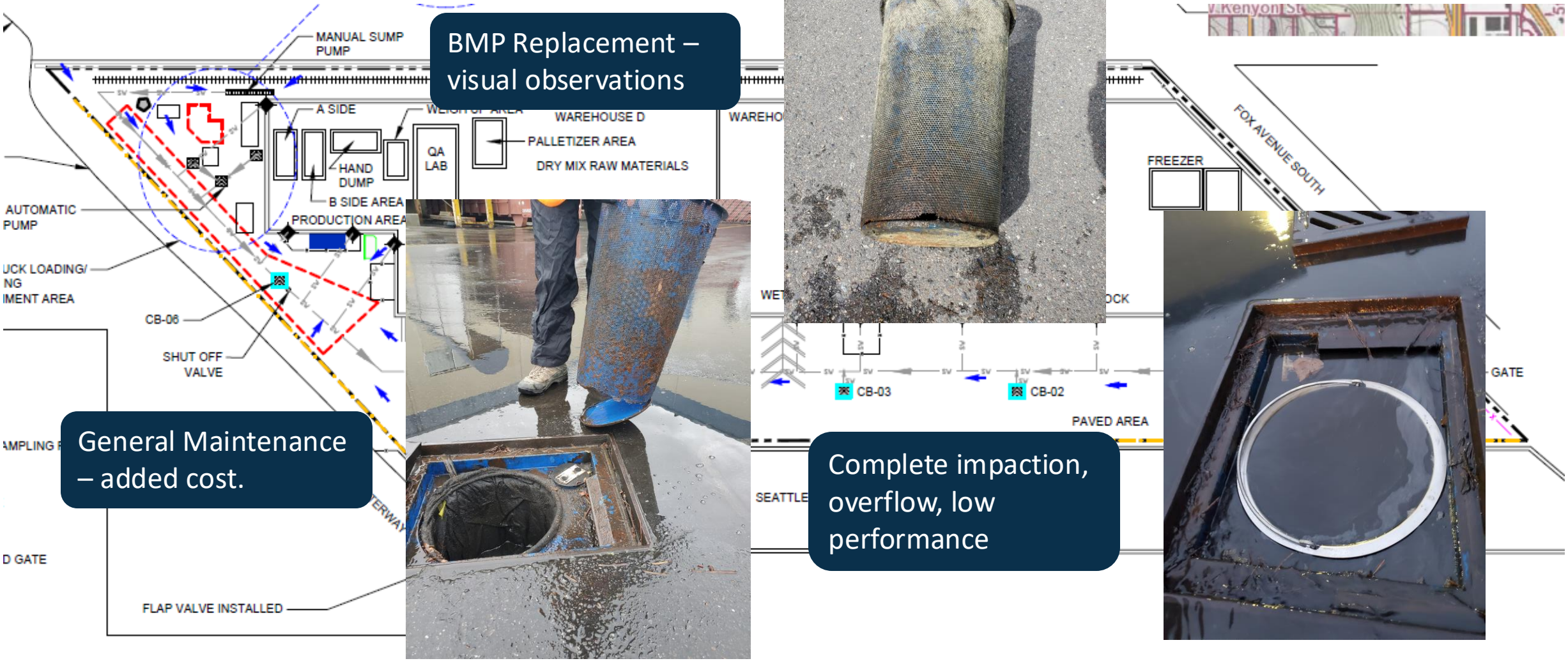
Treatment “simple”



BMP Replacement – visual observations

General Maintenance – added cost.

Complete impaction, overflow, low performance

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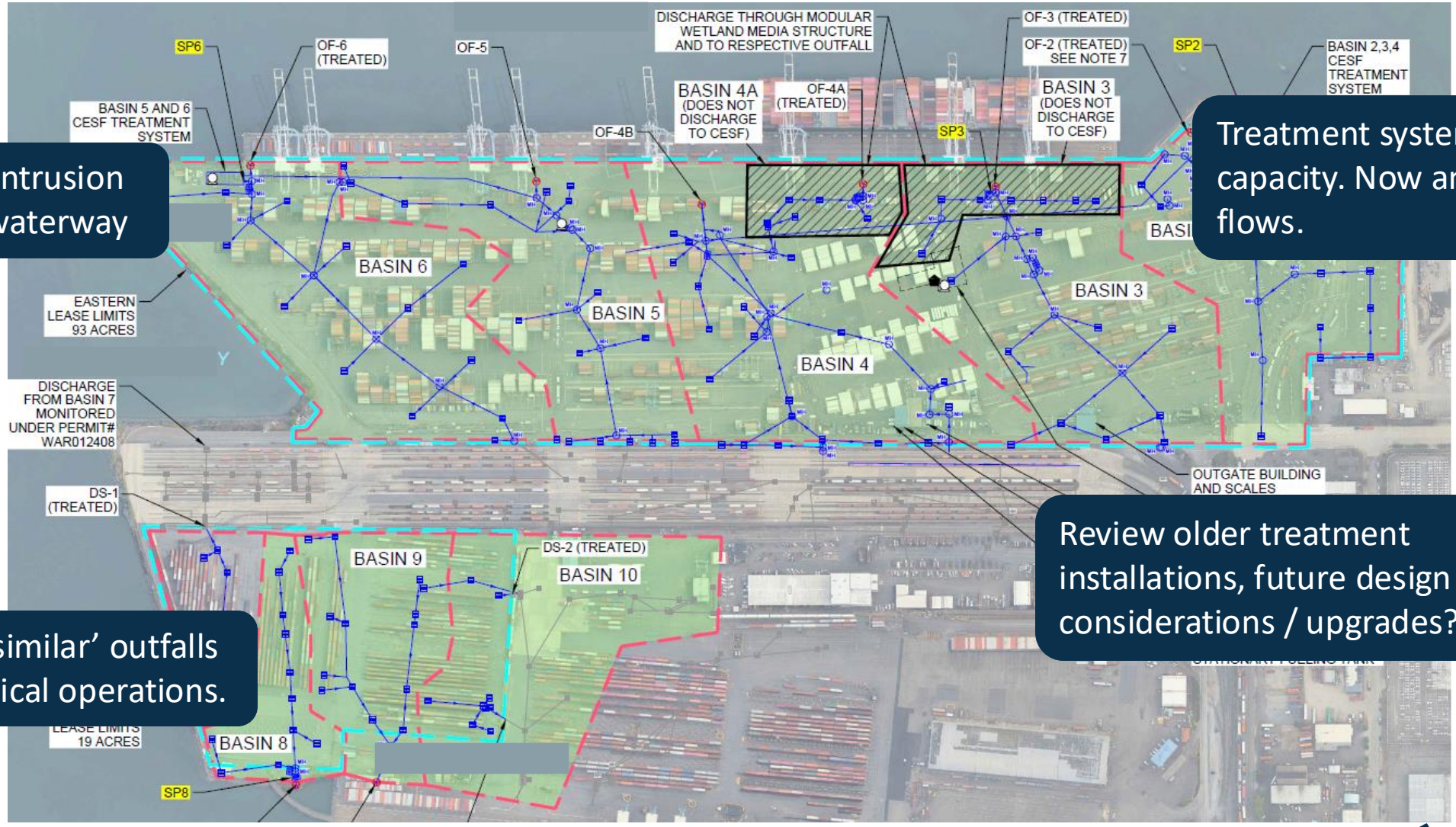
Treatment “advanced”



Seawater intrusion from the waterway

Treatment system design capacity. Now and future flows.

Review older treatment installations, future design considerations / upgrades?

Multiple ‘similar’ outfalls with identical operations.

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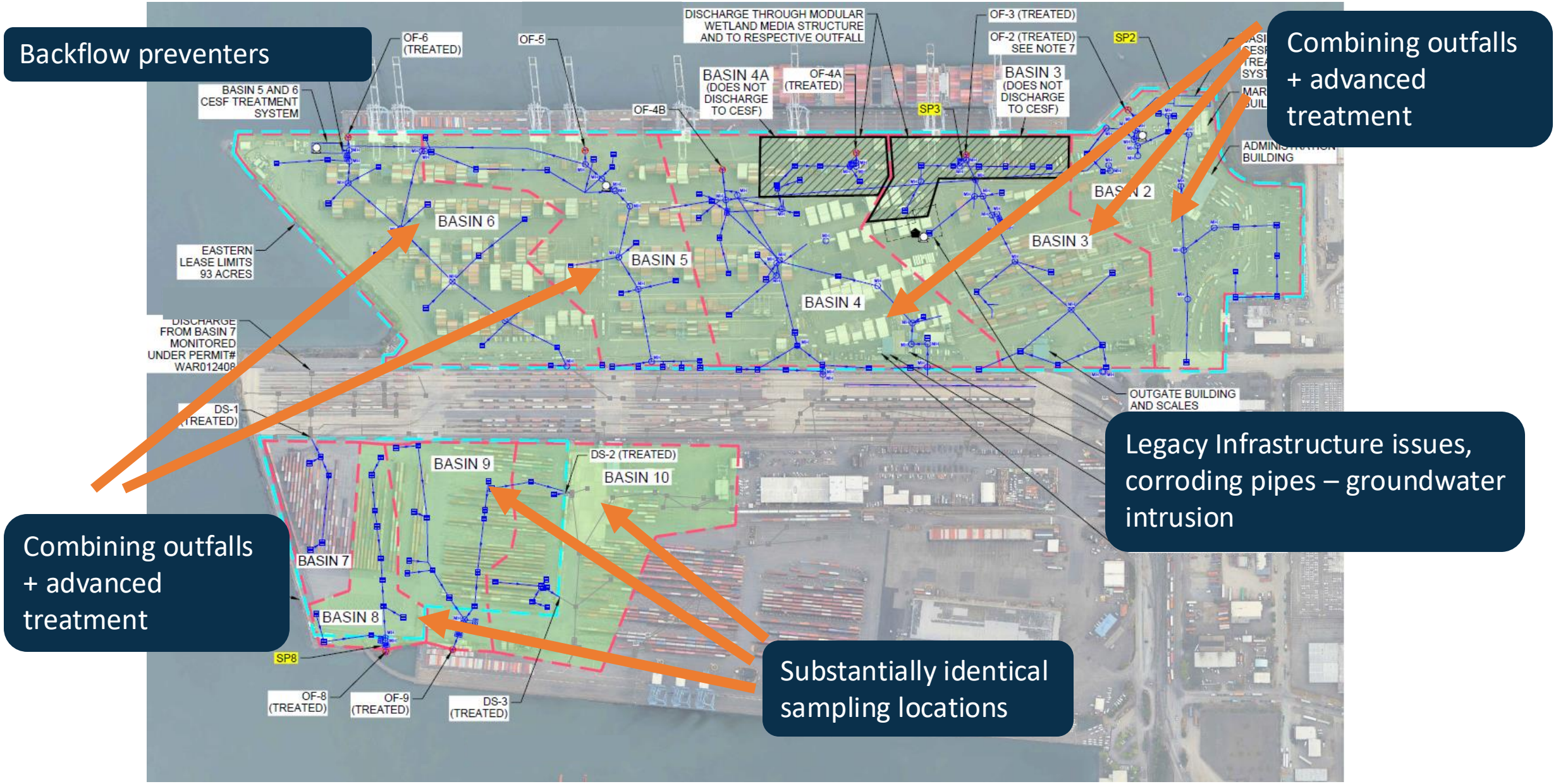

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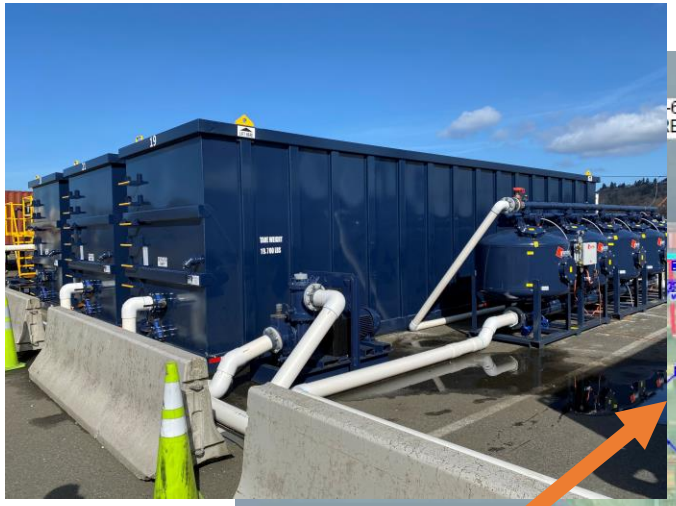

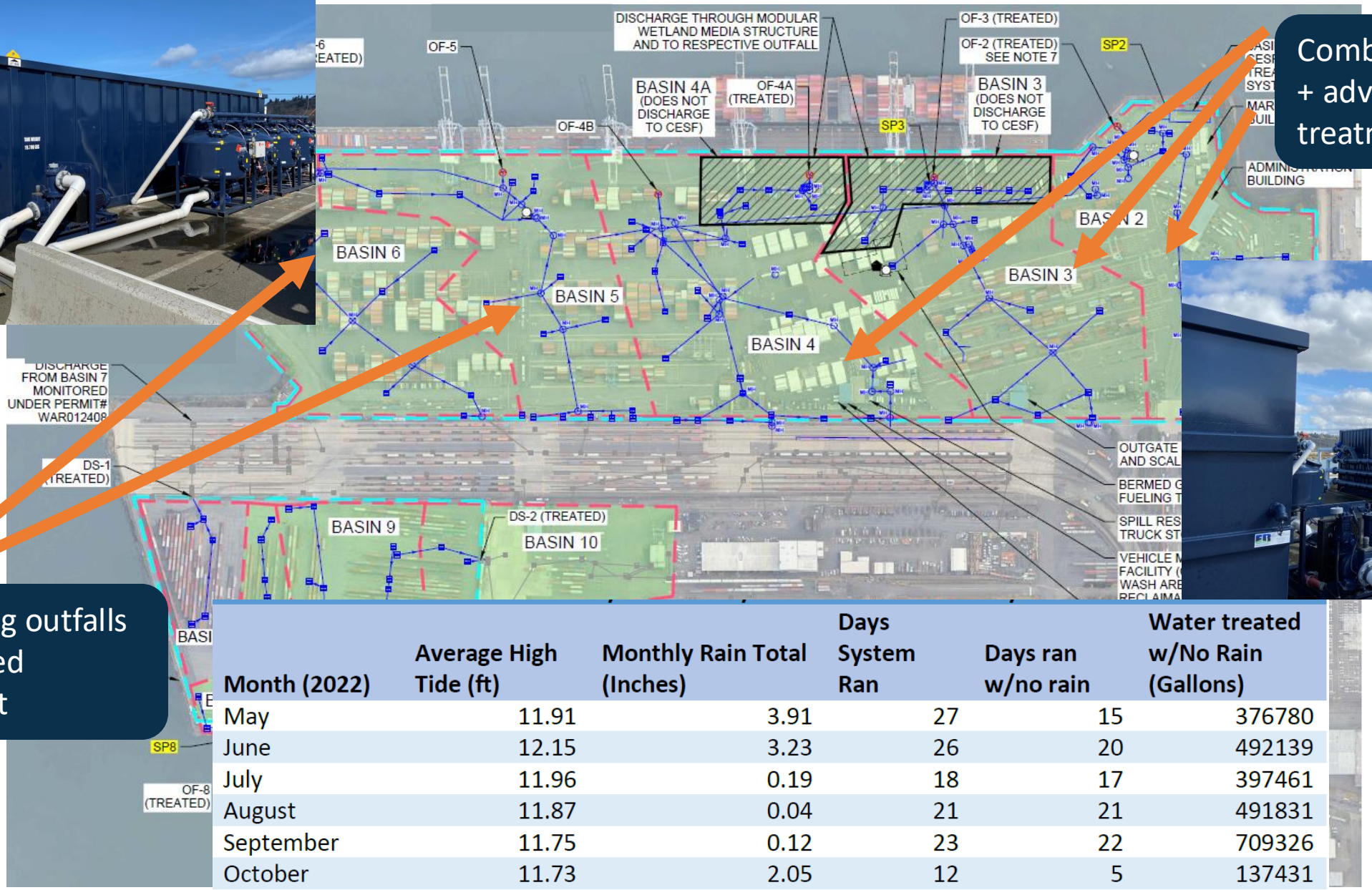

Combining outfalls + advanced treatment

Combining outfalls + advanced treatment

Month (2022)	Average High Tide (ft)	Monthly Rain Total (Inches)	Days System Ran	Days ran w/no rain	Water treated w/No Rain (Gallons)
May	11.91	3.91	27	15	376780
June	12.15	3.23	26	20	492139
July	11.96	0.19	18	17	397461
August	11.87	0.04	21	21	491831
September	11.75	0.12	23	22	709326
October	11.73	2.05	12	5	137431
November	12.26	5.84	25	14	496122
Totals/Average	**11.95**	**15.38**	**152**	**114**	**3101090**

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But… WHAT ABOUT BYPASS

Ecology Expectation:

- *Note: "Bypass" is defined in the ISGP as the "intentional diversion of waste streams from any portion of a treatment facility" and is prohibited (see Schedule G.25).*
- Different than flows exceeding 91% of long-term runoff volume.
- How do we know bypass is occurring?
- Is visual confirmation acceptable?
- What if it happens at 2:00 am?
- Do we require?
  - Flow meters?
  - Tank level sensors?
  - Auto samplers triggered by discharge?
  - SCADA alarms?

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Final Thoughts.

Are we solving for minimum compliance?

Or are we designing for long-term regulatory stability?

Are we optimizing for lowest upfront cost?

Or lowest lifecycle risk?

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Thank you.

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