

Benicia Refinery
Benicia, California



Refinery Water 102

Melissa Manke Fimbres – December 10th, 2024

Agenda

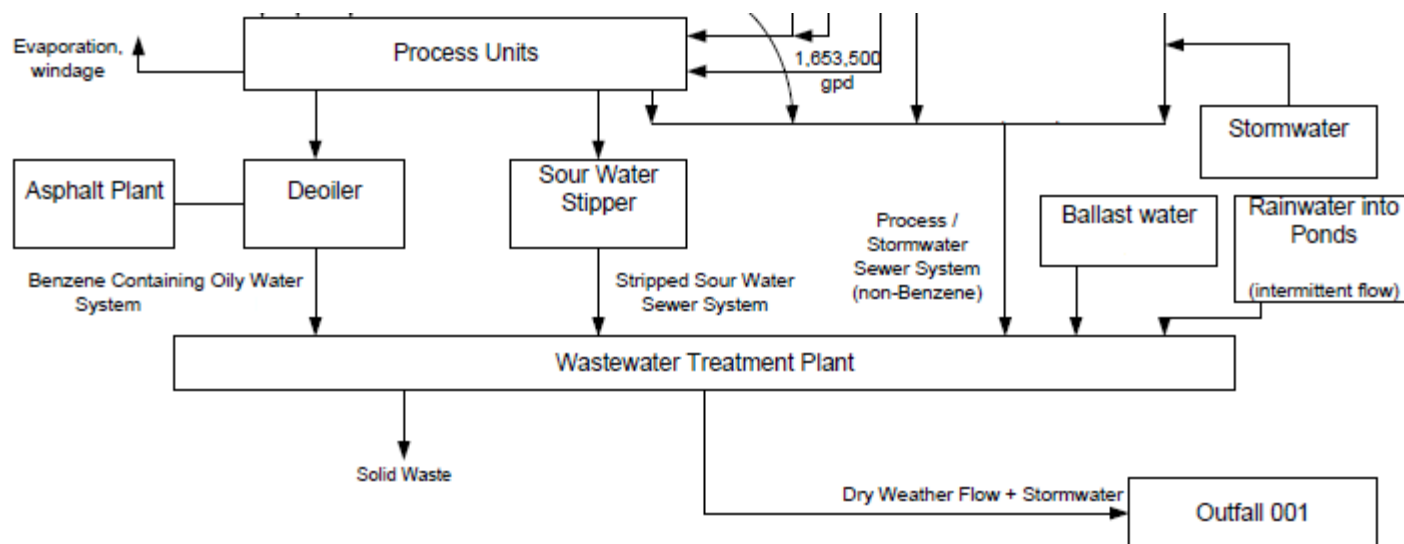
- 1 Refinery Water Sources & Volume - October
- 2 Refinery Water Use 101 – October
- 3 Refinery Water 102 - City Wastewater Treatment Plant (WWTP) – December
- 4 Future Issues - December

Water Use 101 Summary - October

- Water sources and distribution
 - Treatment of Raw Water
- Raw Water uses
 - Cooling Water
 - Boiler Feed Water / Steam production
- Water recovery includes
 - Cooling tower reuse
 - More air cooler / fin fan exchangers
 - Condensate recovery
- Tour
 - Raw water receipt infrastructure

Valero Process Water to WWTP

- Used process water that has been removed of oil in the Deoiler and stripped of H_2S in the sour water stripper towers (and rainwater collected in ponds) is routed via process/stormwater sewer system to diversion tanks and then sent to the Valero Wastewater treatment plant



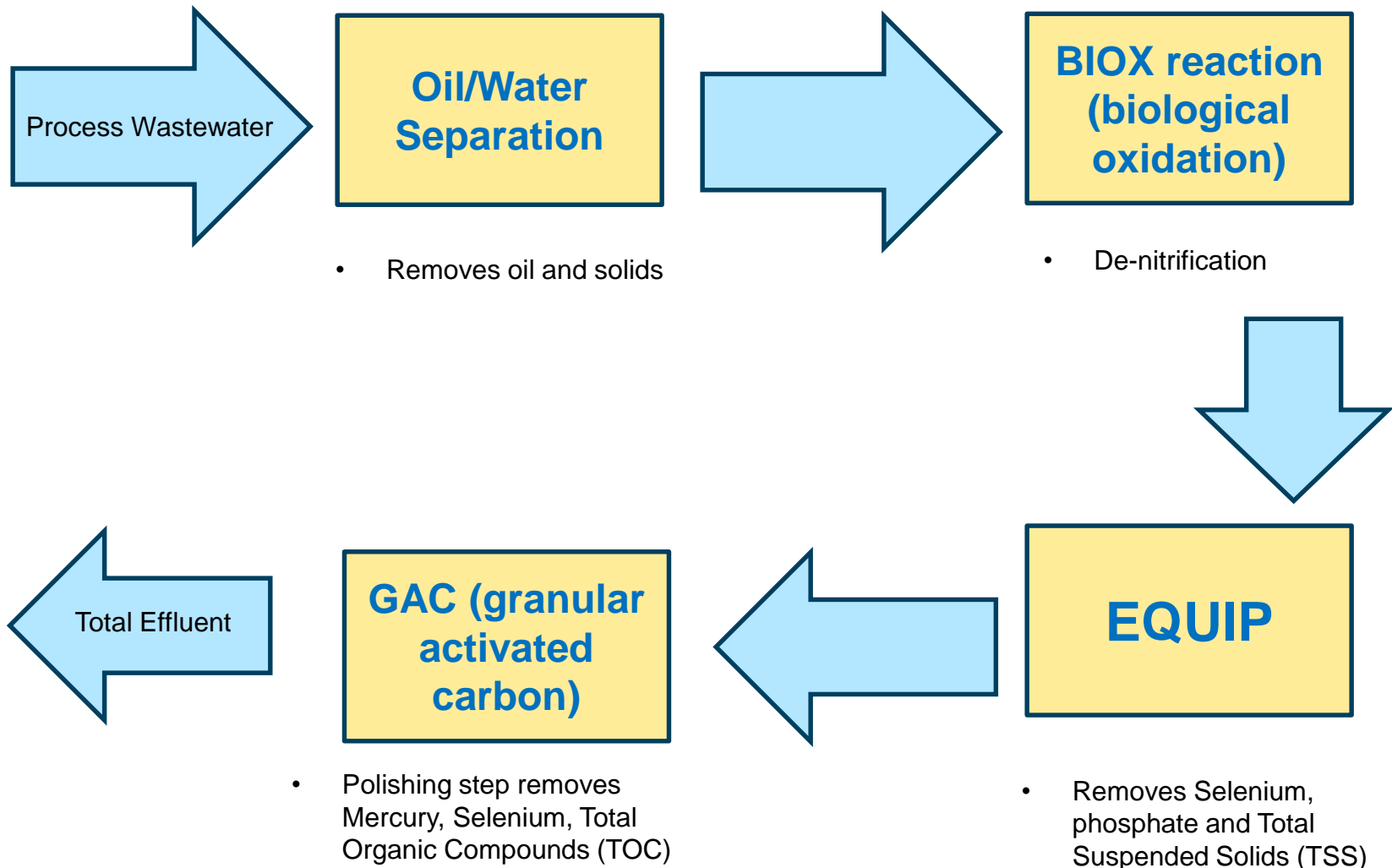
Valero WWTP effluent specifications

- Strict State and EPA Specifications
 - Ammonia: NH_3
 - Phenols
 - Neutral pH
 - Selenium
 - Mercury
 - Effluent Toxicity
 - Chemical Oxygen Demand (COD)
 - Total Suspended Solids (TSS)
 - Biochemical Oxygen Demand (BOD)

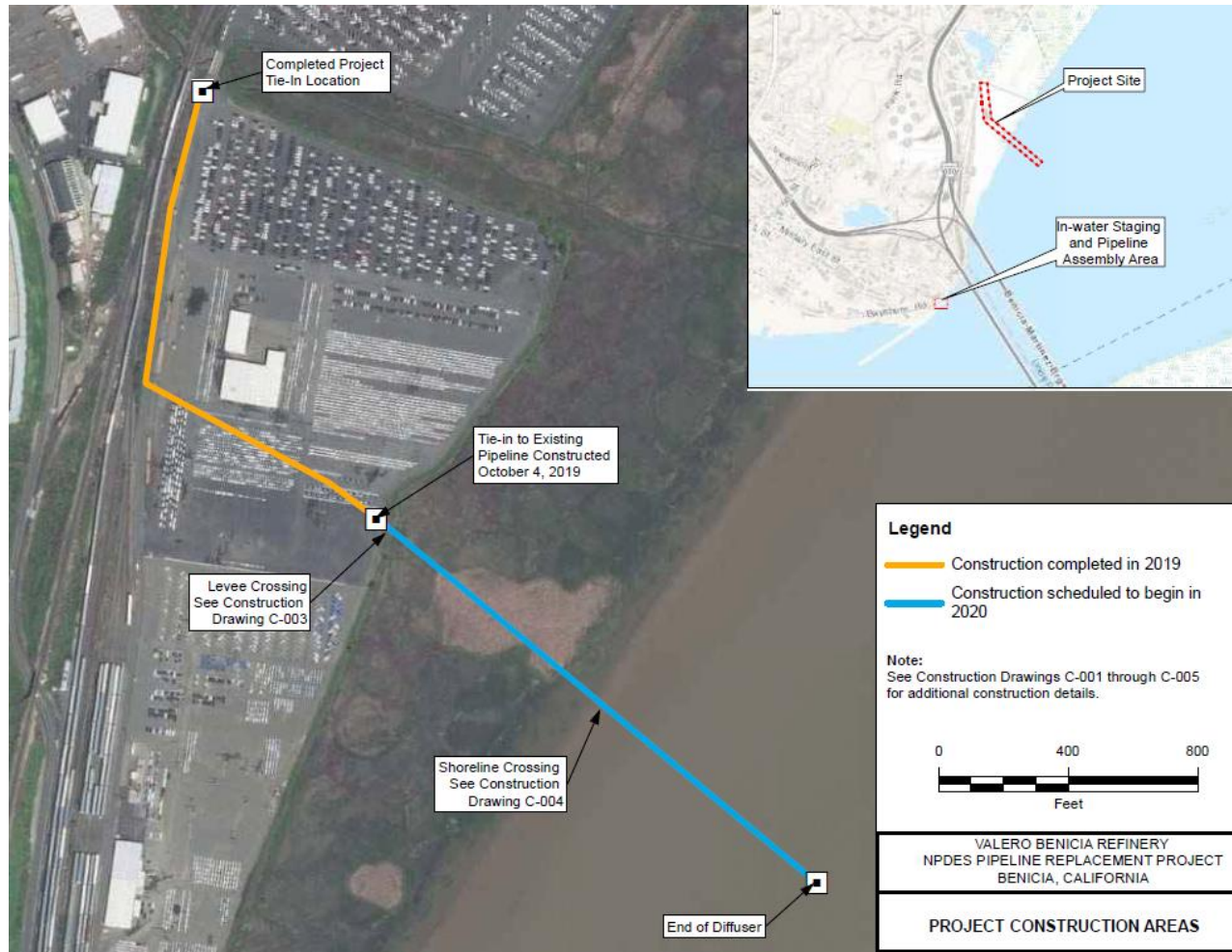
City and Benicia WWTP Effluent comparison

- Refinery specification requirements can differ between sites
- Even in the same location, Valero standards are different than the City's
 - Valero does daily fish testing (bioassay and effluent toxicity)
 - City does quarterly testing
- City and Valero WWTP effluent are considered high quality
 - High levels of Total Suspended Solids (TSS) prevent immediate reuse
- WWTP effluent volumes at City & Valero are comparable

Valero WWTP process



Valero WWTP Effluent line to the Bay - New



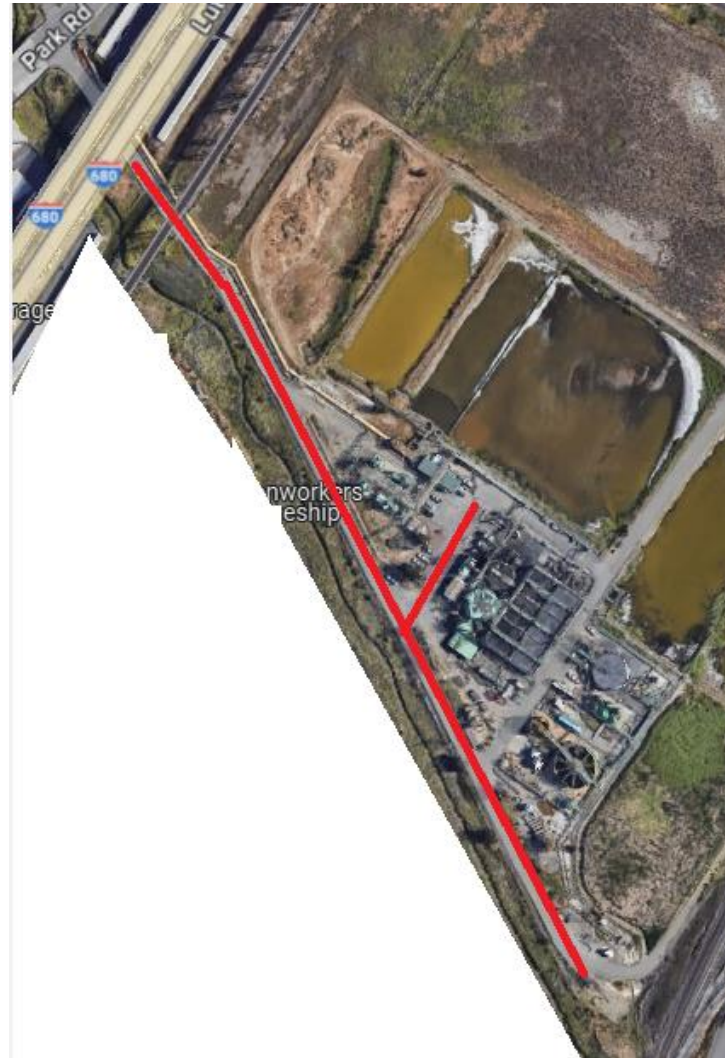
Future Issues: Nutrient discharge limits

- Per Water Code section 13383, Regional Water Control Board (RWCB) is requiring discharges is requiring monitoring for total inorganic nitrogen and phosphorus
 - To prevent algae blooms
- As of 2024, Bay Area Cities and refineries are monitoring for nutrients monthly and providing data
 - Nitrate-nitrite: Total is TIN
 - Inorganic Nitrogen
 - Phosphorus (very low for VLO BN)
- Have to provide study to RWCB in 2026-2027 to manage potential new limits
 - Expect Cities to be most affected due to volume and could affect processing rates
 - Bay Area refineries wastewater help with dilution (2012 data survey indicated insignificant nitrogen)

City of Benicia WWTP Effluent Reuse Project

- In 2015-2016 City retained Brown and Caldwell (BC) to complete a Feasibility Study of WWTP effluent reuse in Refinery's cooling tower
- Purpose was to define project in sufficient detail to support state/federal funding requests
 - Final BC report issued June 2017
 - City unable to obtain state funding & project on hold
- Use of reclaimed water in Refinery cooling tower is technically feasible
- City's plan to supply reclaimed water to Valero cooling tower is the most economically viable water conservation option identified to date if state/federal grants & loans can be obtained
 - Refinery will continue to support City's efforts until it is clear that state/federal funding is unrealistic

Map for tour



Questions?



Valero Detailed WWTP PFD

Valero Benicia Refinery
Valero Refining Company-California

Order R2-2020-0033
NPDES CA0005550

Benicia Refinery Wastewater Treatment Scheme

