Wastewater Reclamation Division

Kihei Wastewater Treatment Grit System CBS-5026

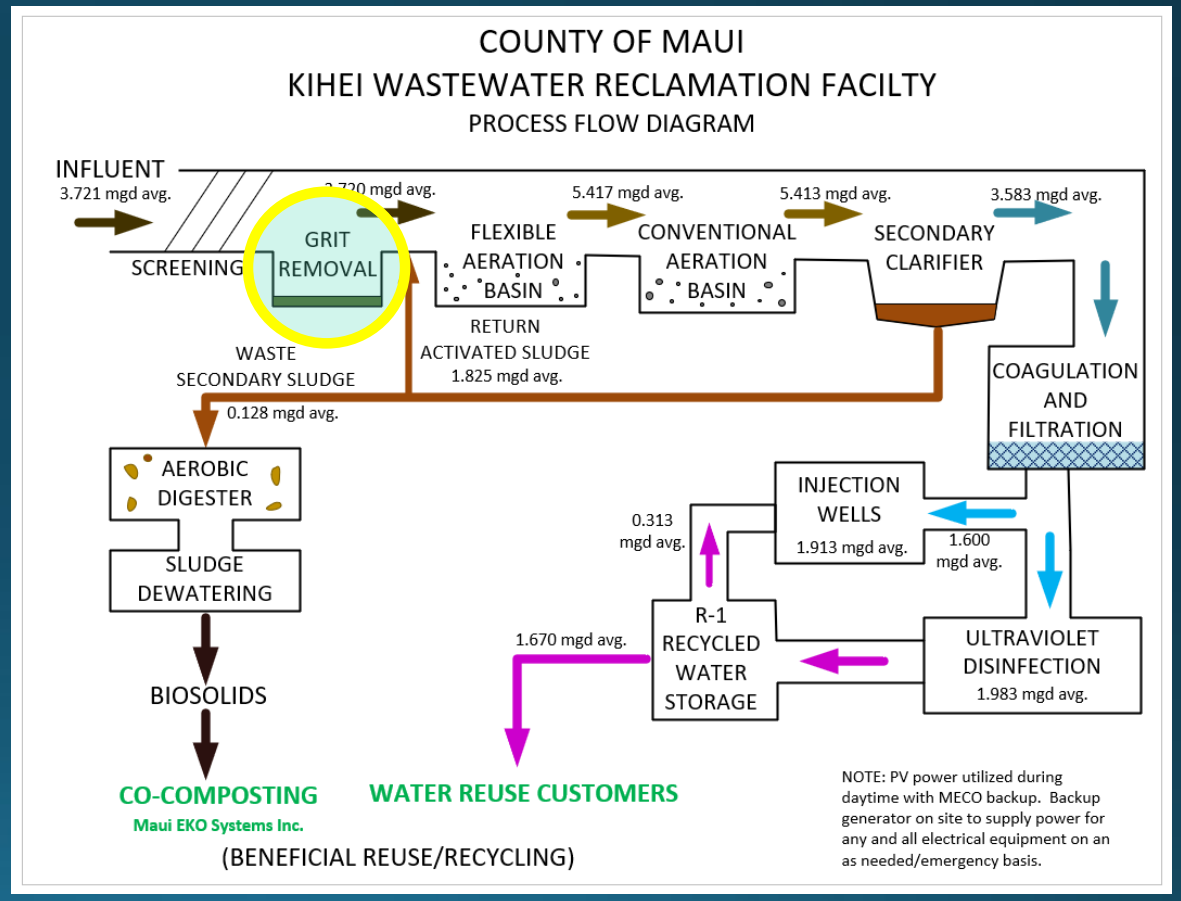
INFRASTRUCTURE AND TRANSPORTATION COMMITTEE MEETING (IT-36)

June 6, 2022

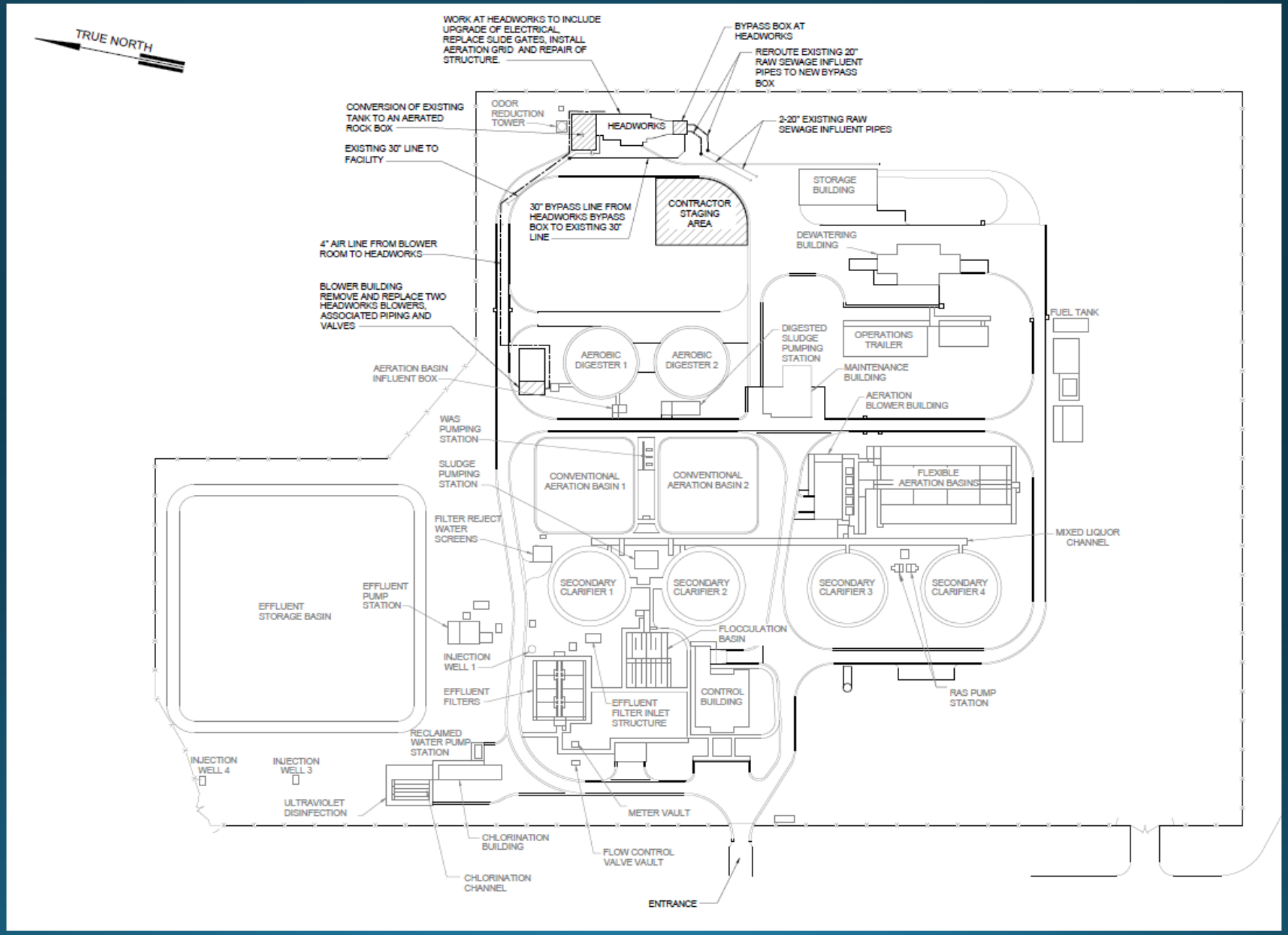
Received at IT meeting on 06/06/2022

Kihei WWRF Process

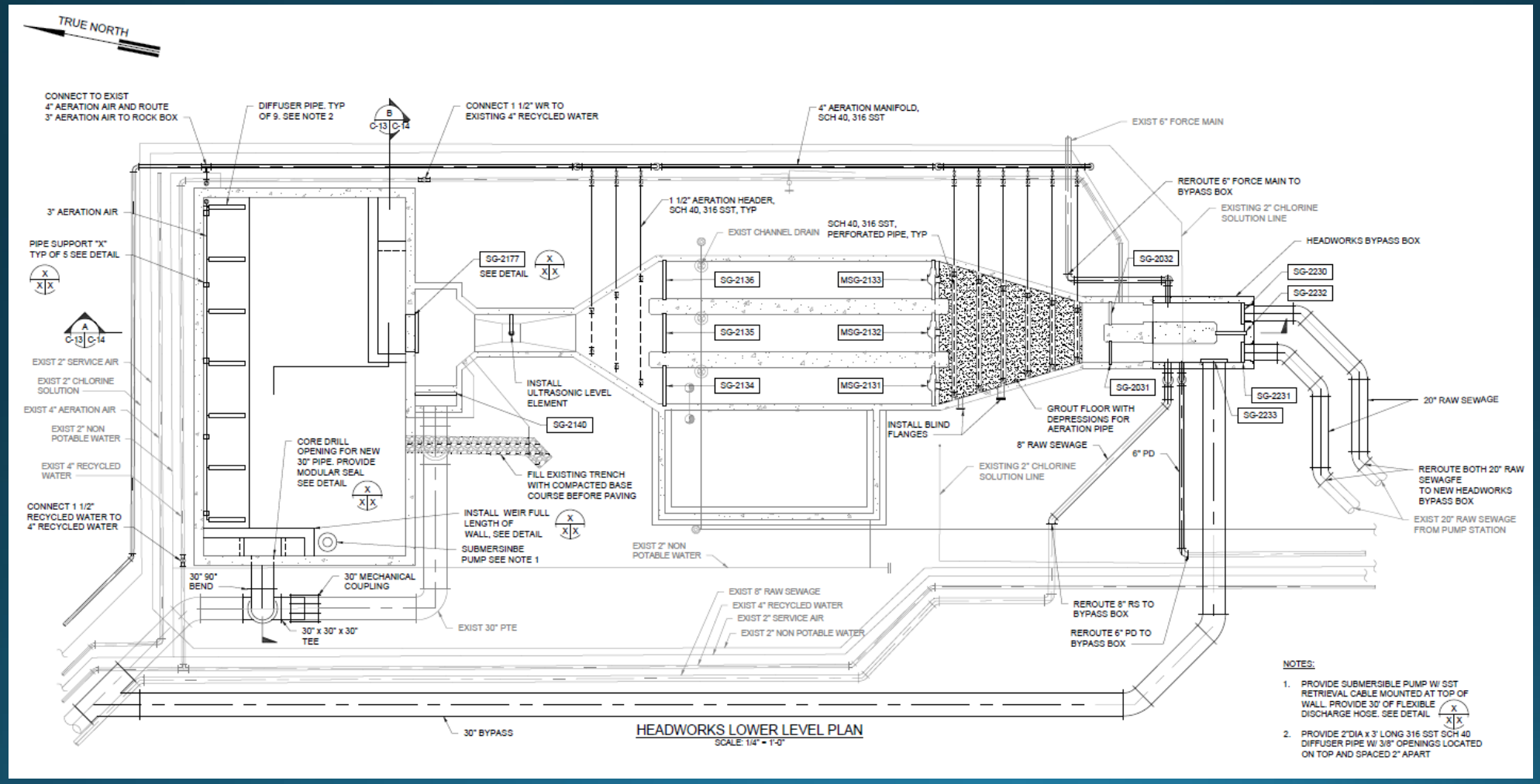
- Grit Removal is the second stage of wastewater treatment following screening for large debris/paper products.
- Grit includes solid materials that are "heavier" (higher specific gravity) than the organic biodegradable solids in the wastewater . It includes sand, gravel, cinder, rock, eggshells, bone chips, seeds, coffee grounds, and large organic particles, such as food waste.
- There is currently not an operating system in the grit chamber in Kihei resulting in nearly 100% passing thru to downstream basins.
- Accumulated grit in aeration basins is difficult to clean, causes additional energy usage when it covers diffusers and makes the biological process less efficient.



Kihei WWRF


TRUE NORTH
WORK AT HEADWORKS TO INCLUDE UPGRADE OF ELECTRICAL, REPLACE SLIDE GATES, INSTALL AERATION GRID AND REPAIR OF STRUCTURE.
BYPASS BOX AT HEADWORKS
REROUTE EXISTING 20" RAW SEWAGE INFLUENT PIPES TO NEW BYPASS BOX
CONVERSION OF EXISTING TANK TO AN AERATED ROCK BOX
ODOR REDUCTION TOWER
HEADWORKS
2-20" EXISTING RAW SEWAGE INFLUENT PIPES
EXISTING 30" LINE TO FACILITY
STORAGE BUILDING
30" BYPASS LINE FROM HEADWORKS BYPASS BOX TO EXISTING 30" LINE
CONTRACTOR STAGING AREA
DEWATERING BUILDING
4" AIR LINE FROM BLOWER ROOM TO HEADWORKS
BLOWER BUILDING REMOVE AND REPLACE TWO HEADWORKS BLOWERS, ASSOCIATED PIPING AND VALVES
FUEL TANK
DIGESTED SLUDGE PUMPING STATION
OPERATIONS TRAILER
AEROBIC DIGESTER 1
AEROBIC DIGESTER 2
MAINTENANCE BUILDING
AERATION BASIN INFLUENT BOX
AERATION BLOWER BUILDING
WAS PUMPING STATION
SLUDGE PUMPING STATION
CONVENTIONAL AERATION BASIN 1
CONVENTIONAL AERATION BASIN 2
FLEXIBLE AERATION BASINS
FILTER REJECT WATER SCREENS
MIXED LIQUOR CHANNEL
SECONDARY CLARIFIER 1
SECONDARY CLARIFIER 2
SECONDARY CLARIFIER 3
SECONDARY CLARIFIER 4
EFFLUENT PUMP STATION
EFFLUENT STORAGE BASIN
FLOCCULATION BASIN
INJECTION WELL 1
EFFLUENT FILTERS
EFFLUENT FILTER INLET STRUCTURE
CONTROL BUILDING
RAS PUMP STATION
RECLAIMED WATER PUMP STATION
INJECTION WELL 4
INJECTION WELL 3
ULTRAVIOLET DISINFECTION
METER VAULT
CHLORINATION BUILDING
FLOW CONTROL VALVE VAULT
CHLORINATION CHANNEL
ENTRANCE

Kihei WWRF Headworks



Getting Grit Out

- Grit is going to settle somewhere
- We can attempt to grab it at the beginning, or
- Empty larger aeration basins down stream that are more complicated to clean due to aeration piping, diffusers and their size
- Taking down large basins is more difficult as flow continues to grow and wastewater needs to be treated
- Dry the grit before transporting to landfill

Table 2-1. Grit Classification with Settling Velocity and Flow

Grit Classification	Grit Particle Size (Ps) (micron)	Settling Velocity (Vs) (fpm)
Very Light	75	$Vs \leq 0.97$
Light	110	$0.97 < Vs \leq 1.60$
Medium - Light	150	$1.60 < Vs \leq 3.00$
Medium – Heavy	210	$3.00 < Vs \leq 4.30$
Heavy	330	$4.30 < Vs \leq 6.00$
Very heavy	$Ps > 330$	$Vs > 6.00$

fpm=feet per minute

Basin Cleaning Considerations

- Volume of removal
- Manpower requirement
- Safety considerations
- Time to complete
- Equipment used
  - Vactor Trucks
  - Shovels
  - Conveyors
- Frequency
- Maintenance Priorities
- Displaced Wastewater Flow

Project Time Line

Cost of Construction

- Demolition of Existing Equipment
- Structural Repairs to Existing Basin
- New Blowers/Airline to Headworks
- Piping Modifications
- Modifications to Blower Building
- Construction of Grit System Bypass
- Electrical and Instrumentation Upgrades

KIHEI WWRF GRIT SYSTEM REPLACEMENT - 50% SUBMITTAL

PROJECT TITLE
KIHEI WWRF GRIT SYSTEM REPLACEMENT

ACTIVITY
County of Maui

PREPARED BY (Name)
HDR

DATE
August 2021

ACF

CATEGORY CODE

KIHEI WWRF GRIT SYSTEM REPLACEMENT - 50% SUBMITTAL

		$/SYS	SYS QUAN (UM)	TOTAL
001	Mobilization	$ 103,128	1	$ 103,128
002	Field Office	$ 70,540	1	$ 70,540
003	Headworks Demolition	$ 186,566	1	$ 186,566
004	Blower Building Demolition	$ 16,268	1	$ 16,268
005	Site Piping	$ 258,807	1	$ 258,807
006	Headworks Modifications	$ 1,832,836	1	$ 1,832,836
007	Blower Building Modifications	$ 63,302	1	$ 63,302
008	Structural Repairs	$ 435,889	1	$ 435,889
009	Electrical and Instrumentation	$ 614,645	1	$ 614,645
	TOTAL			**$ 3,581,980**

Thank you, Questions?