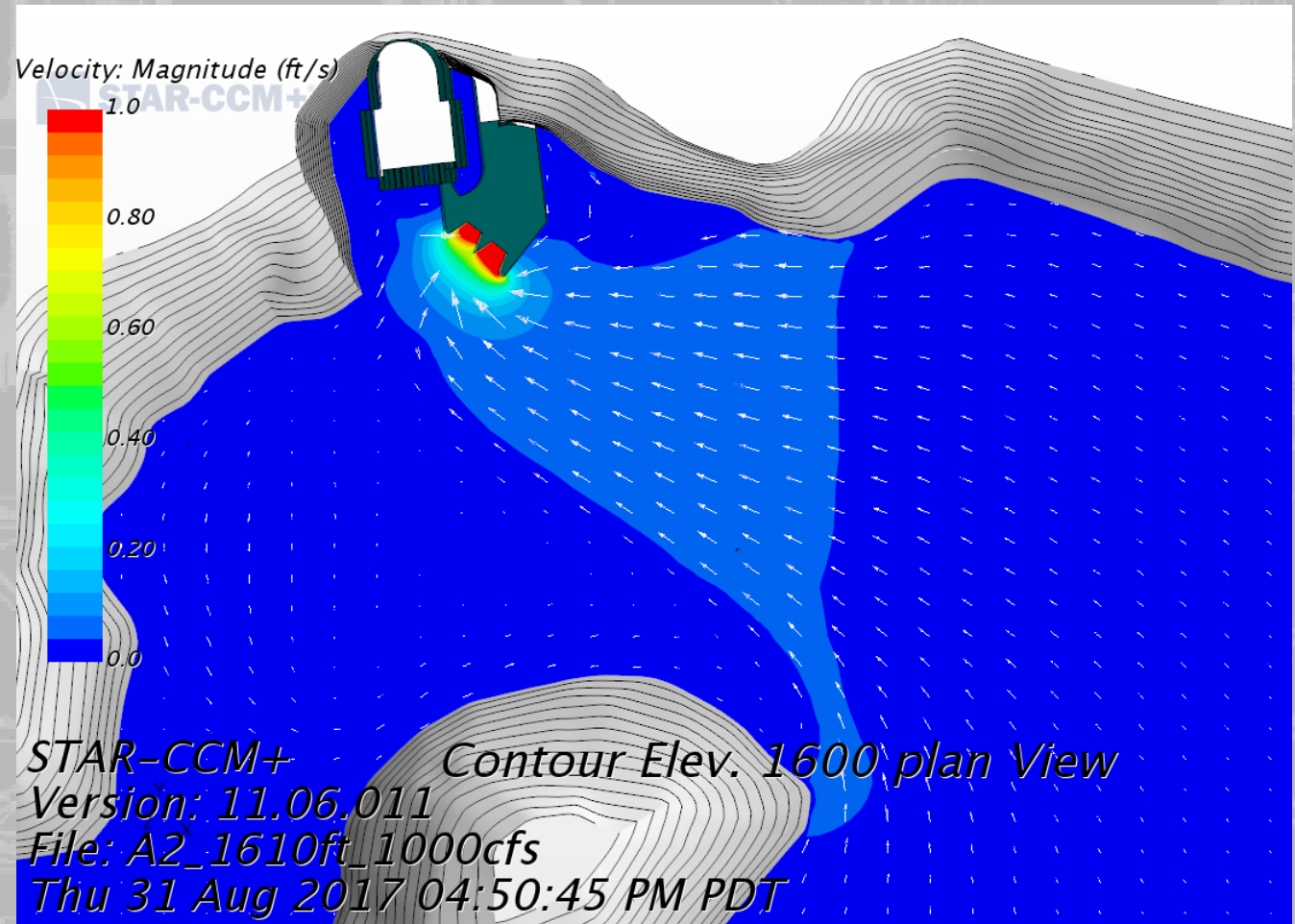


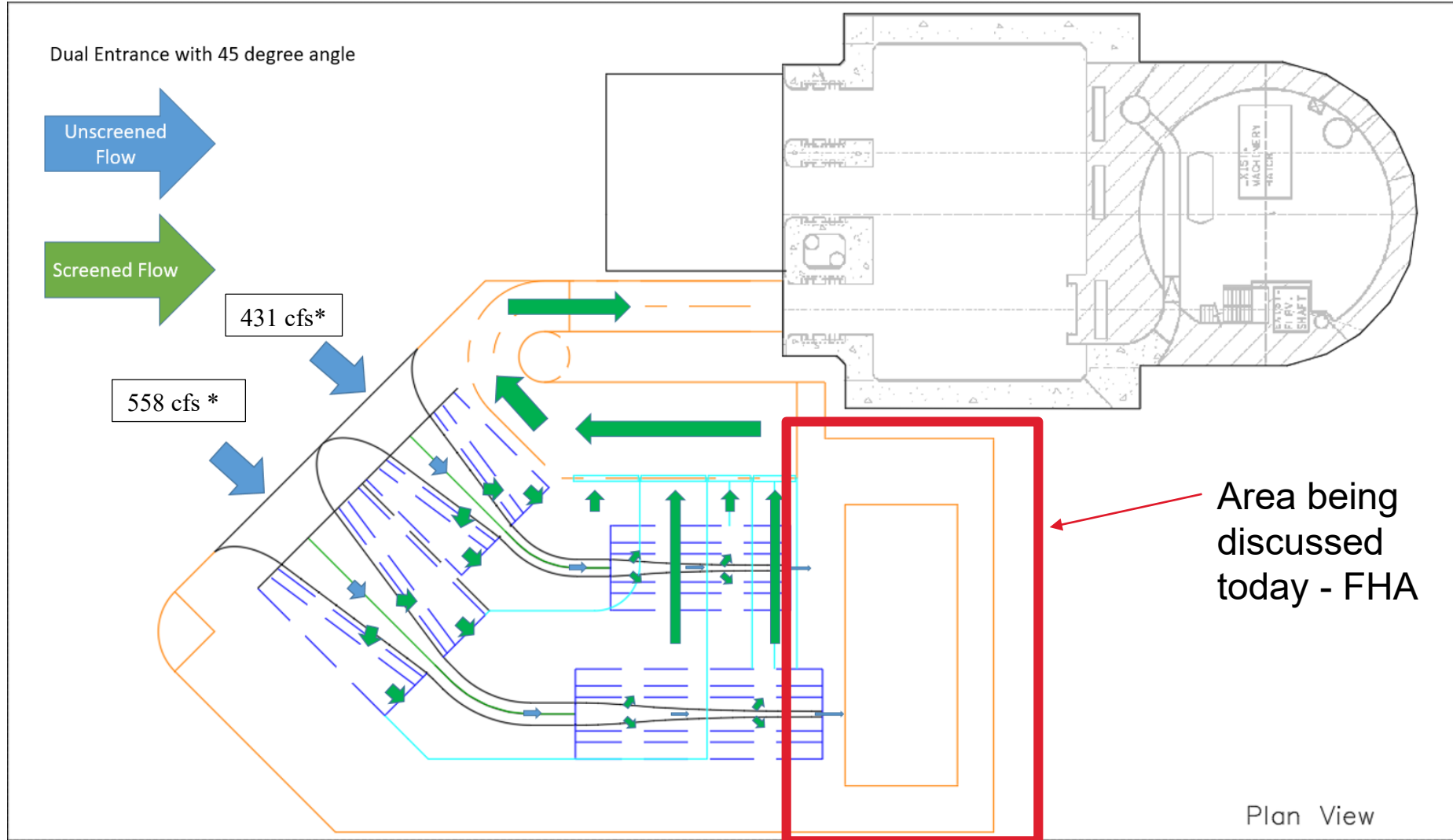
COUGAR DOWNSTREAM PASSAGE – WFFDWG UPDATE

Fish Handling Area (FHA) Overview
Date: 02 June 2020



US Army Corps
of Engineers®
Portland District

OVERALL SUMMARY



*Continuing to be updated

FLOW TO BACK OF VESSEL



US Army Corps
of Engineers®
Portland District

3

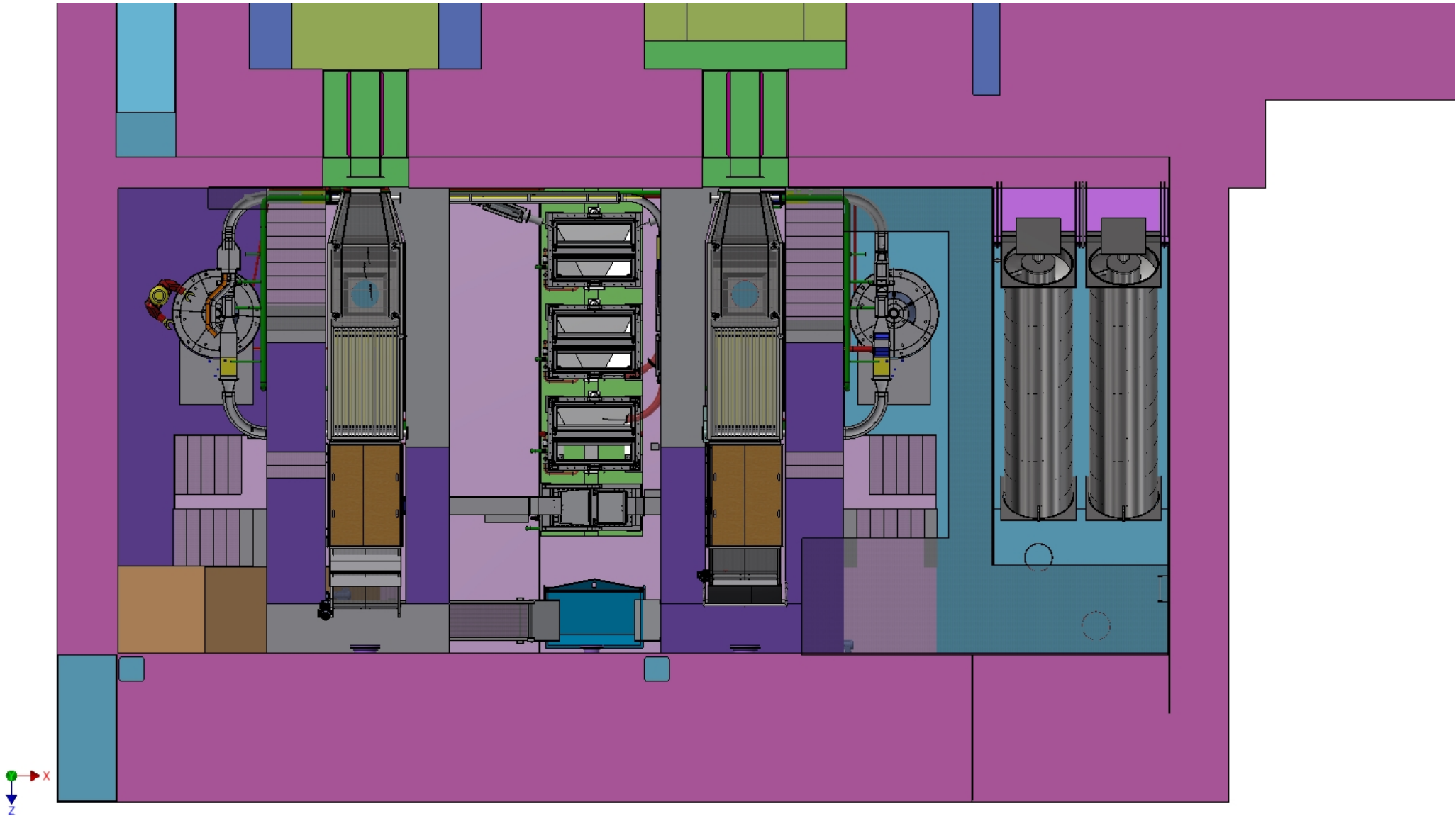
- 12 cfs per channel if barrel is operating
 - Equal to 5,386 gpm
 - It's like 56 toilet-flushes worth of water rushing by every second, per barrel
 - IT'S A LOT OF WATER!
- Main goal is to dewater this flow down to a small amount that will carry fish through system and into pods for transport
- Due to space limitations, dewatering at beginning of FHA planned to be done supercritically (higher velocities through the system)



FISH HANDLING AREA



US Army Corps
of Engineers®
Portland District



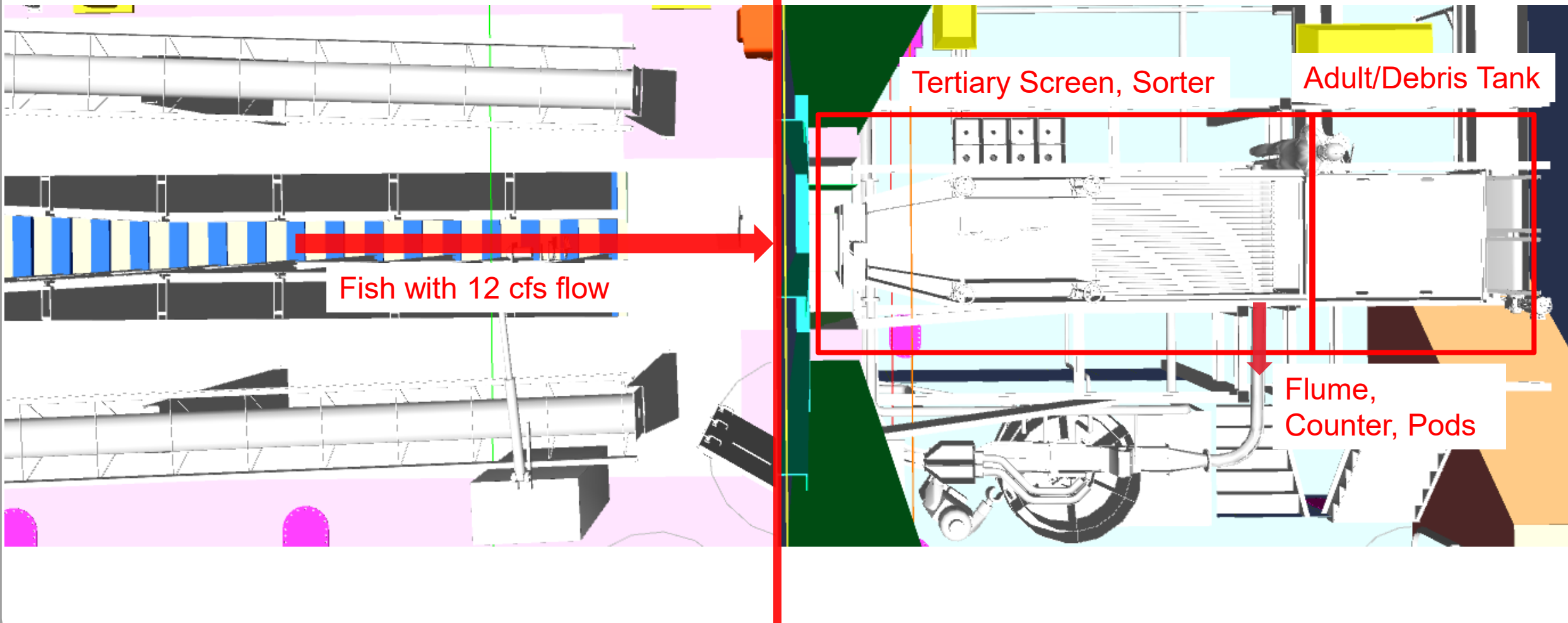
MAIN CHANNELS -> FISH HANDLING AREA (FHA)



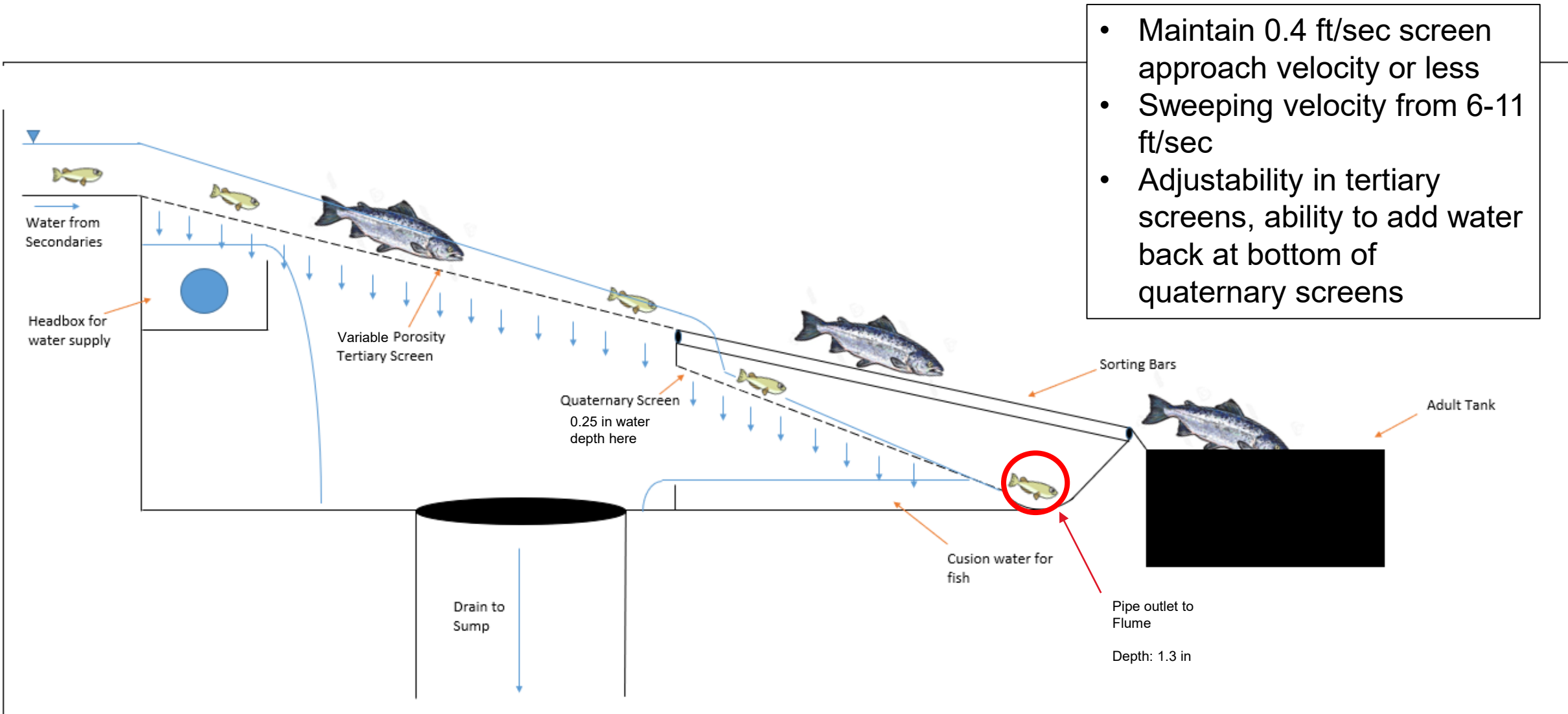
US Army Corps
of Engineers®
Portland District

Secondary Screen Channel

Fish Handling Area



FHA – TERTIARY SCREEN AND SORTER DIAGRAM



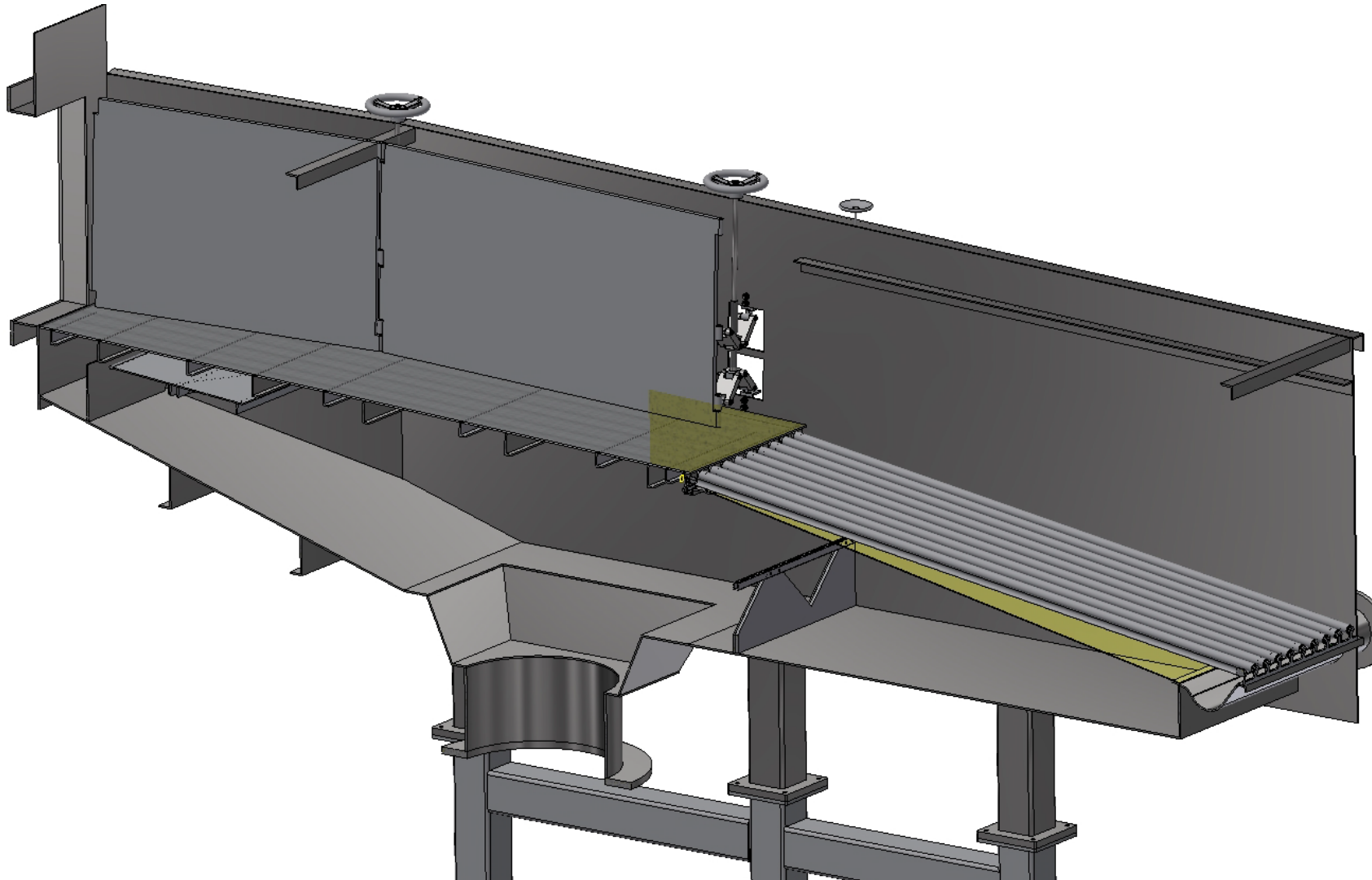
- Maintain 0.4 ft/sec screen approach velocity or less
- Sweeping velocity from 6-11 ft/sec
- Adjustability in tertiary screens, ability to add water back at bottom of quaternary screens

FHA – TERTIARY SCREEN AND SORTER CROSS SECTION



US Army Corps
of Engineers®
Portland District

7



Features that can be adjusted:

- Occlusion plate at top
- Scissor plates on sides
- Height of sorter bars to adjust slope
- V-notched weirs to control water moving off end of sorter
- Flushing flow amount
- Two sets of sorting bars

TERTIARY/QUATERNARY SCREEN AREAS



US Army Corps
of Engineers®
Portland District

8

- Using active screen criteria to dewater as quickly as possible
 - Manual cleaning via brush readily available and accessible
 - Ratio of sweeping velocity to approach screen velocity very large (15-27.5:1)
- Using a maximum of 63% porosity on screens
 - Off-shelf porosity plates don't have 63% opening with 3/32" dia holes (11.7.1.1, pg. 94)*
 - Planning to have custom-made plates that vary porosity as you move down the screen to maintain 0.4 ft/sec approach screen velocity
- Flushing flow of 65 gpm used to move fish into start of flume system

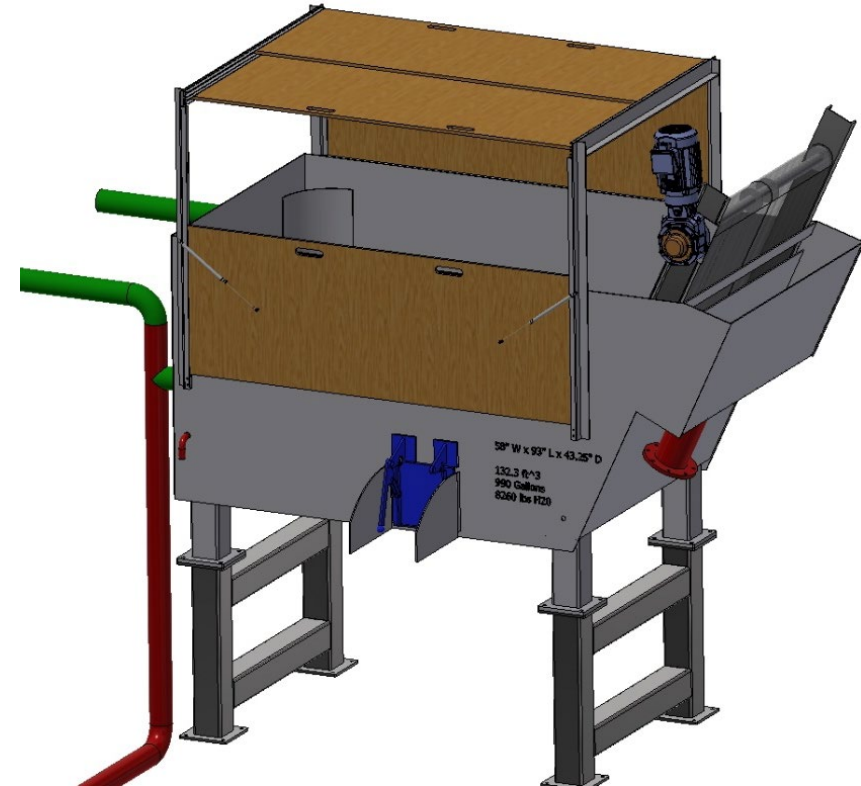
ADULT TANK/DEBRIS TANK



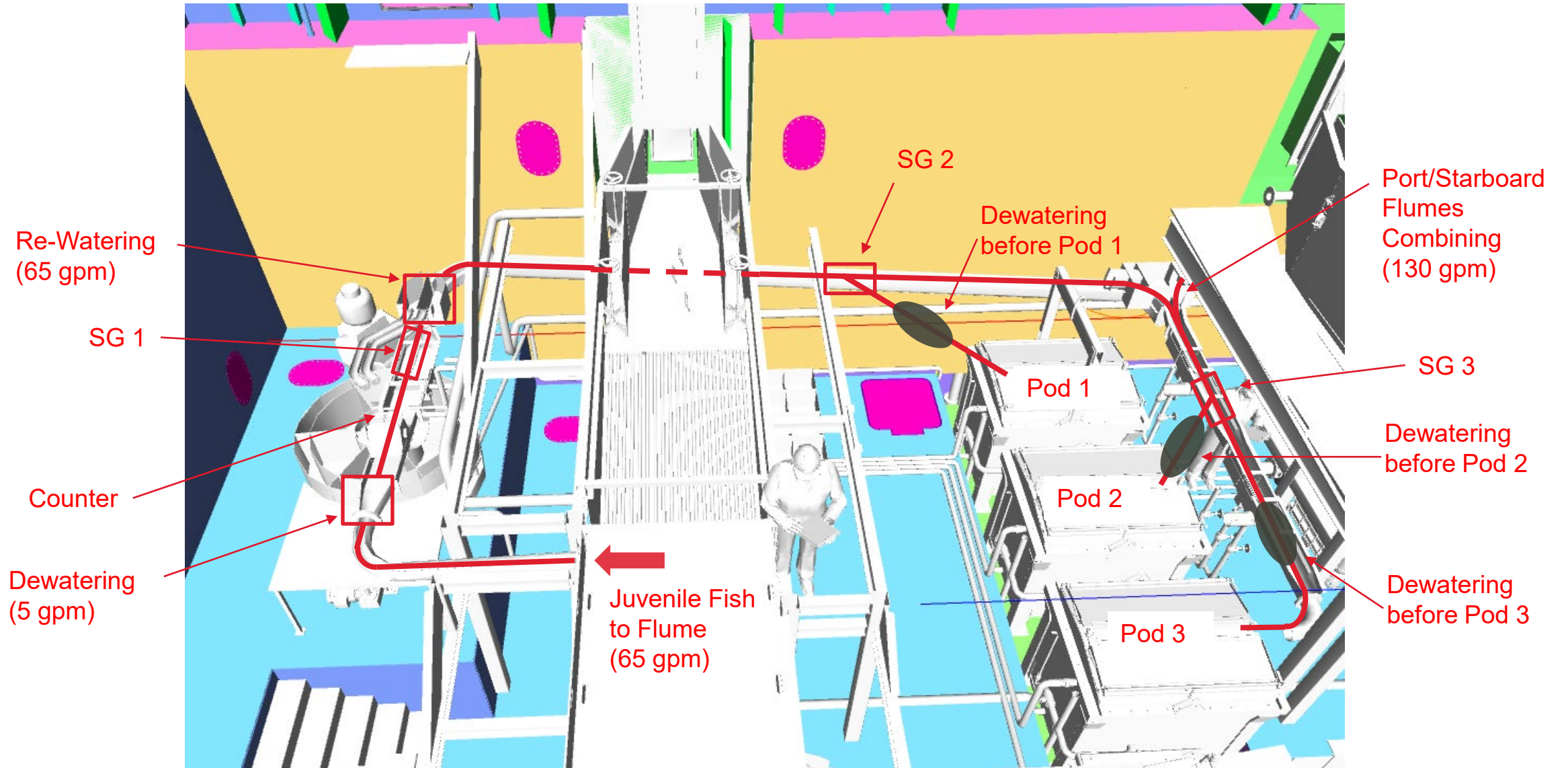
US Army Corps
of Engineers®
Portland District

9

- Angled Traveling screen to remove debris
- Ability to close top to prevent jumping
- Can draw water level down to transfer fish out of tank (down to 1ft min)
- Bottom of tank is sloped towards outlet door
- Exploring options to allow tank to continue to operate when transferring adult fish



FISH FLUME – PORT BARREL



FISH FLUME PARTS

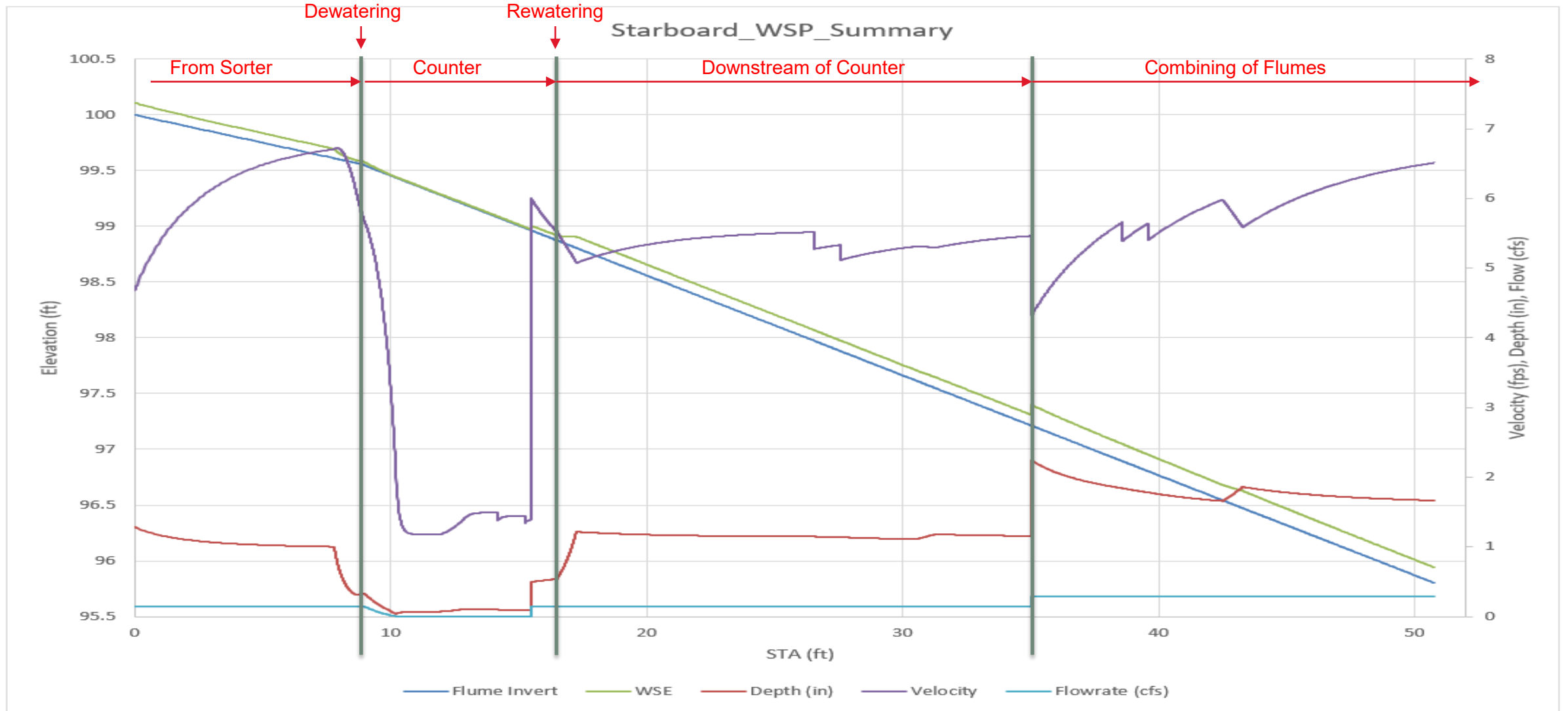


US Army Corps
of Engineers®
Portland District

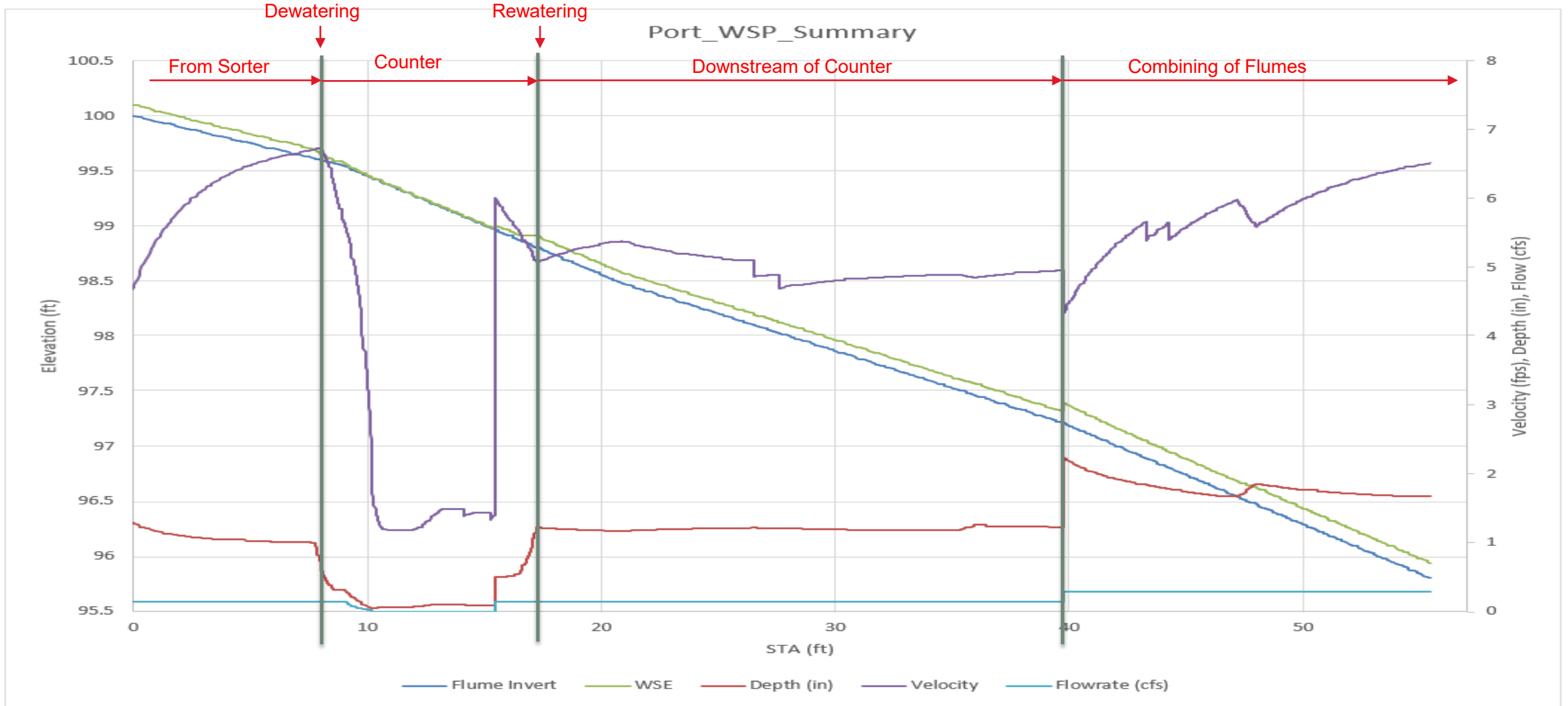
11

- 6in diameter U-Shaped Flume
- Goals:
 - Maintain 4-6 ft/sec velocity through flume
 - Maintain 1-2 inches of water through flume system
- Transitions to rectangular flume (11in wide) for Counter
 - Dewaterers from 65 gpm to 5 gpm for sheeting action, required by Counter
 - Fish should maintain velocity through this portion of system
 - Short distance, fish moving >6fps up to dewatering, on slope
 - Switch Gate 1 to sampling tank – on PLC to sample at desired rate
 - Reintroducing flow after counter, transition back to U-Shaped Flume
- Flume turns corner, moves underneath Tertiary Screen area
 - Switch Gate 2 located here to transport fish to Fish Pod 1
- Port and Starboard Flumes joining (if both flowing, 130 gpm)
 - Switch Gate 3 downstream of joining, to Fish Pod 2
 - Remaining flow/fish move towards Fish Pod 3
- Will need to dewater before fish pods

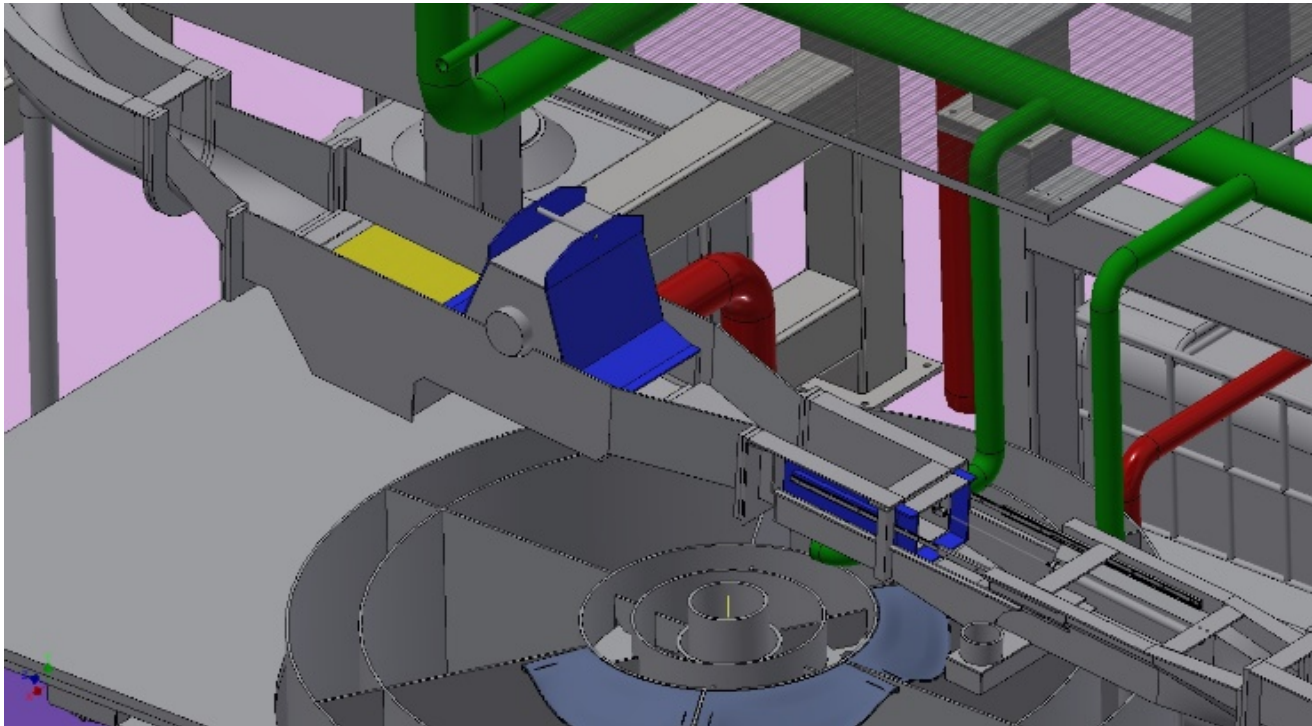
FLUME SYSTEM WSP - STARBOARD



FLUME SYSTEM WSP - PORT

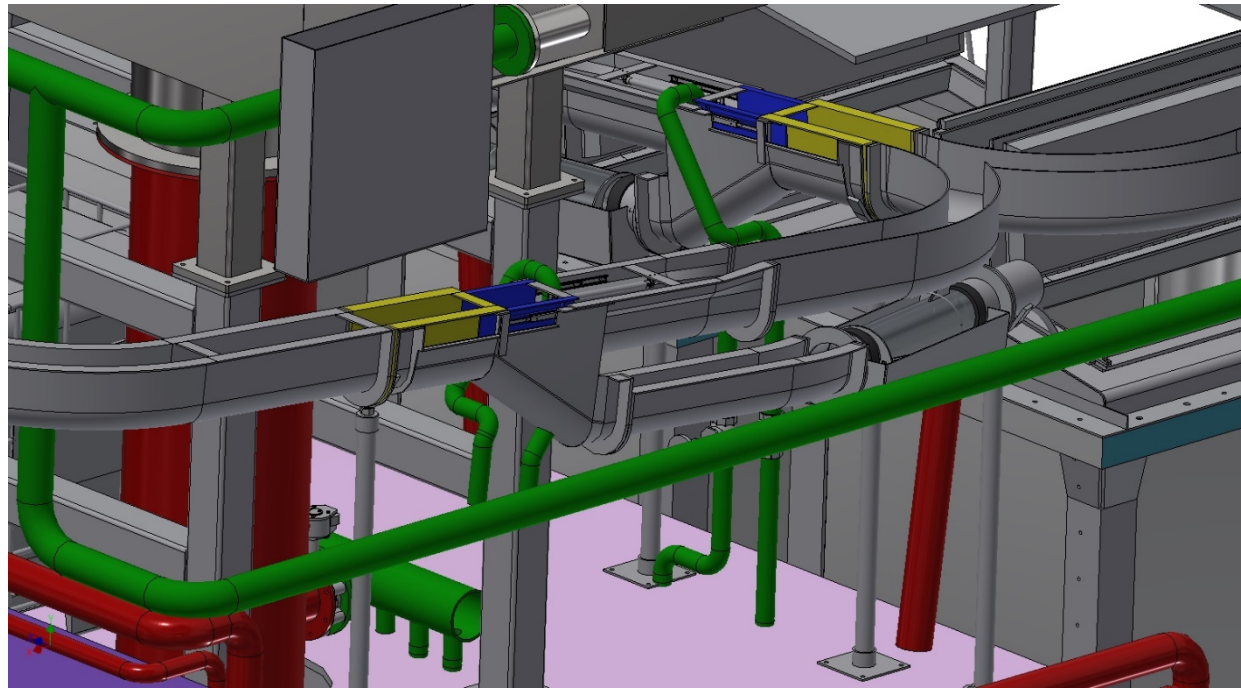


COUNTER

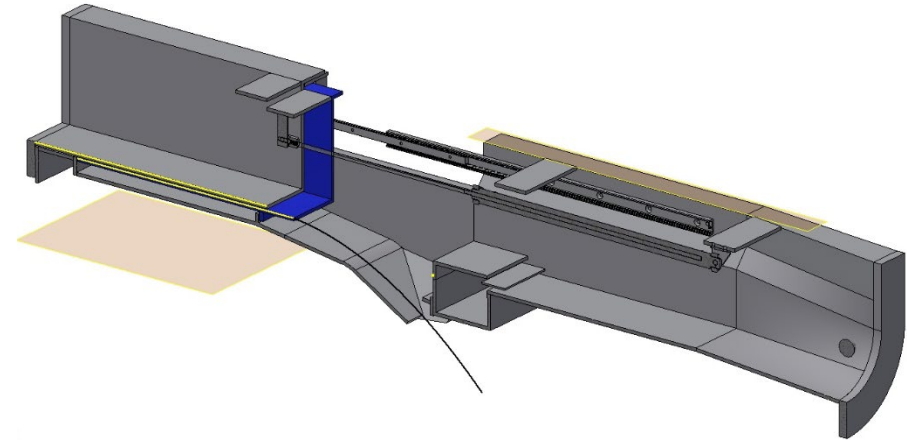


- Aqua Scan Fish Counter (CSW28002)
- 5 gpm of sheeting-action flow
- Idea is that fish continue at near-constant velocity through counter, even though water is decreased/slowed down
- Rewatering back to 65 gpm afterwards before continuing down flume

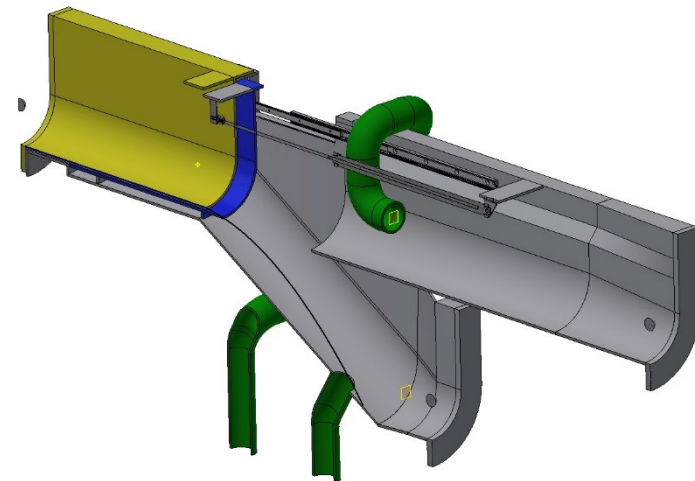
SWITCH GATES



Switch Gate to Sampling Tank



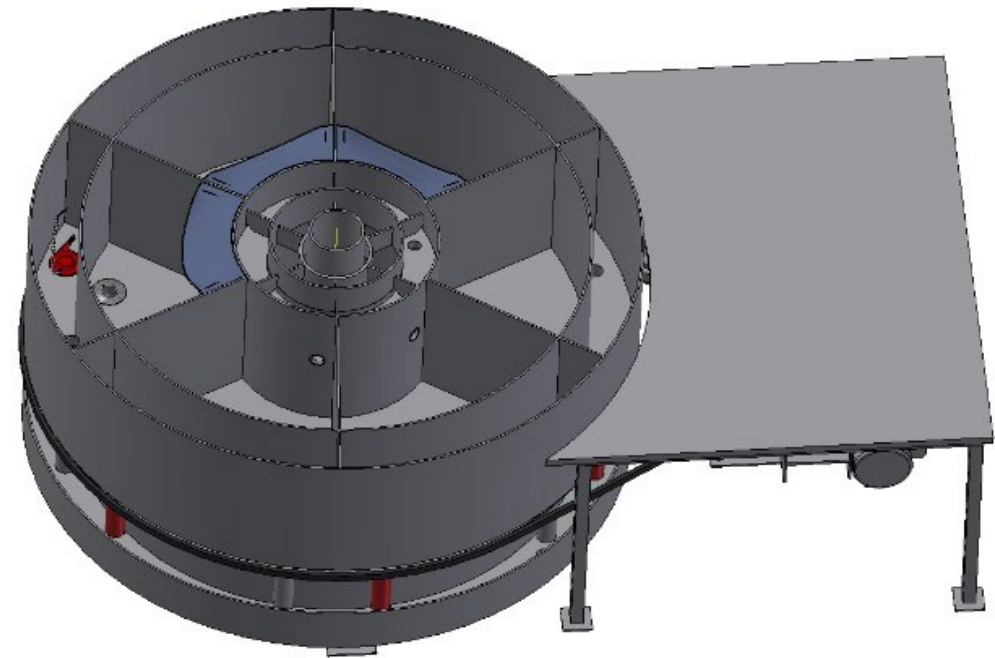
Switch Gate to Pods



SAMPLING TANK



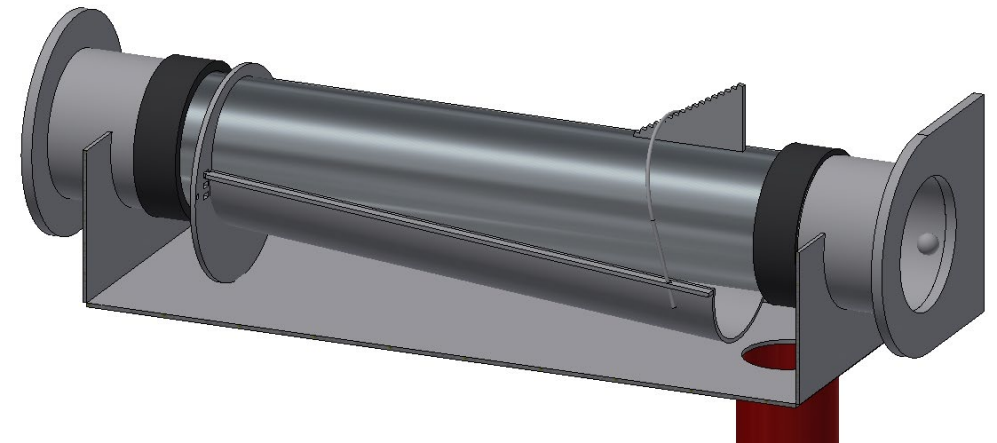
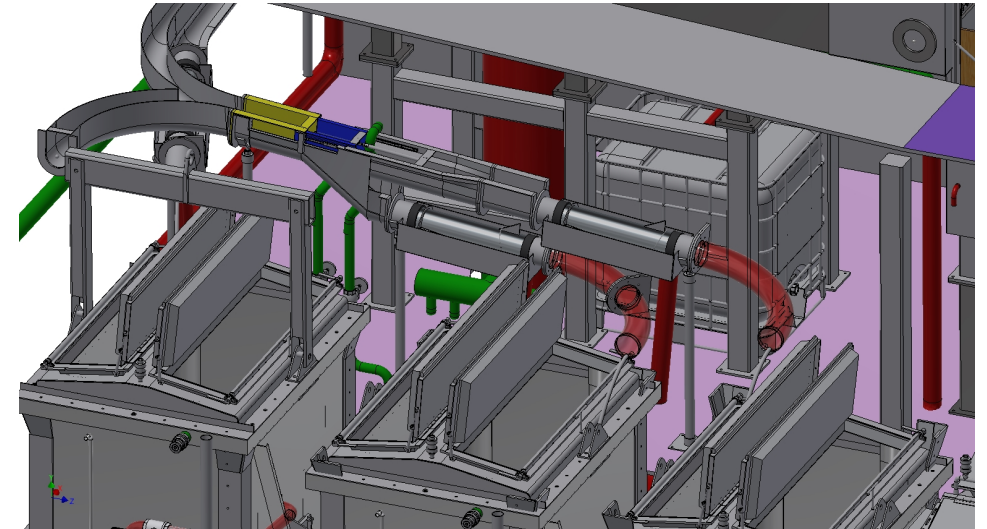
- 20 gallon Chambers
- 6 Chambers
- Outer ring – Overflow and Drains
- Inner ring - Water Supply



DEWATERING BEFORE FISH PODS



- Dewatering needed before fish pods, especially if both barrels are on (130 gpm)
- Previous concept (shown) was to use porous pipe
 - Moving towards using a U-shaped flume for debris management
- Will have adjustment underneath (shown)
- Perf plate with round openings for dewatering
 - Circular openings 0.117 in diameter
 - Slightly larger than NMFS criteria 3/32” (0.09375 in)
 - 51% porosity
- Still updating this design



QUESTIONS?



US Army Corps
of Engineers®
Portland District

