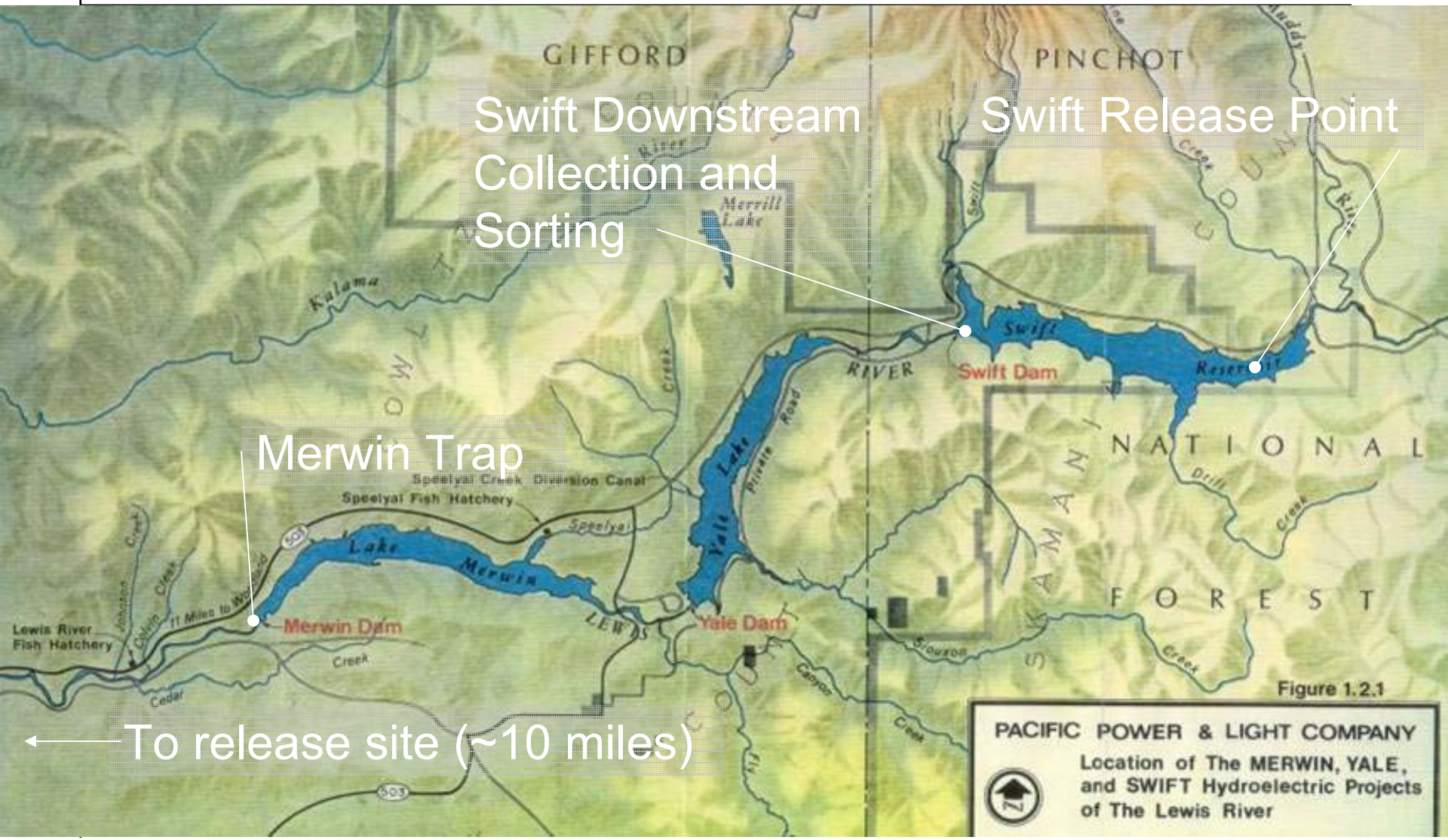
Swift Downstream Passage (SA 4.4.1)
ACC Meeting

March 8, 2007

PACIFICORP ENERGY
A PACIFICORP COMPANY

Lewis River Re-introduction Program



PACIFICORP ENERGY
A PACIFICORP COMPANY

0 2 4
miles

Settlement Agreement Requirements

– *4.4.1 Modular Surface Collector. By **six months after the fourth anniversary** of the Issuance **of the New License** for the Swift No. 1 Project or the Swift No. 2 Project, whichever is later, **PacifiCorp shall construct and provide for the operation of a passage facility** at the Swift No. 1 Dam, **including a modular surface collector**, to collect, sort, tag, and transport downstream migrating Transported Species.*

Key Questions

1. Where can we catch the fish?
2. How do we catch them?
3. How do we sort and transfer them?
4. How do we moor and service the facility?

Design Efforts to Address Key Questions

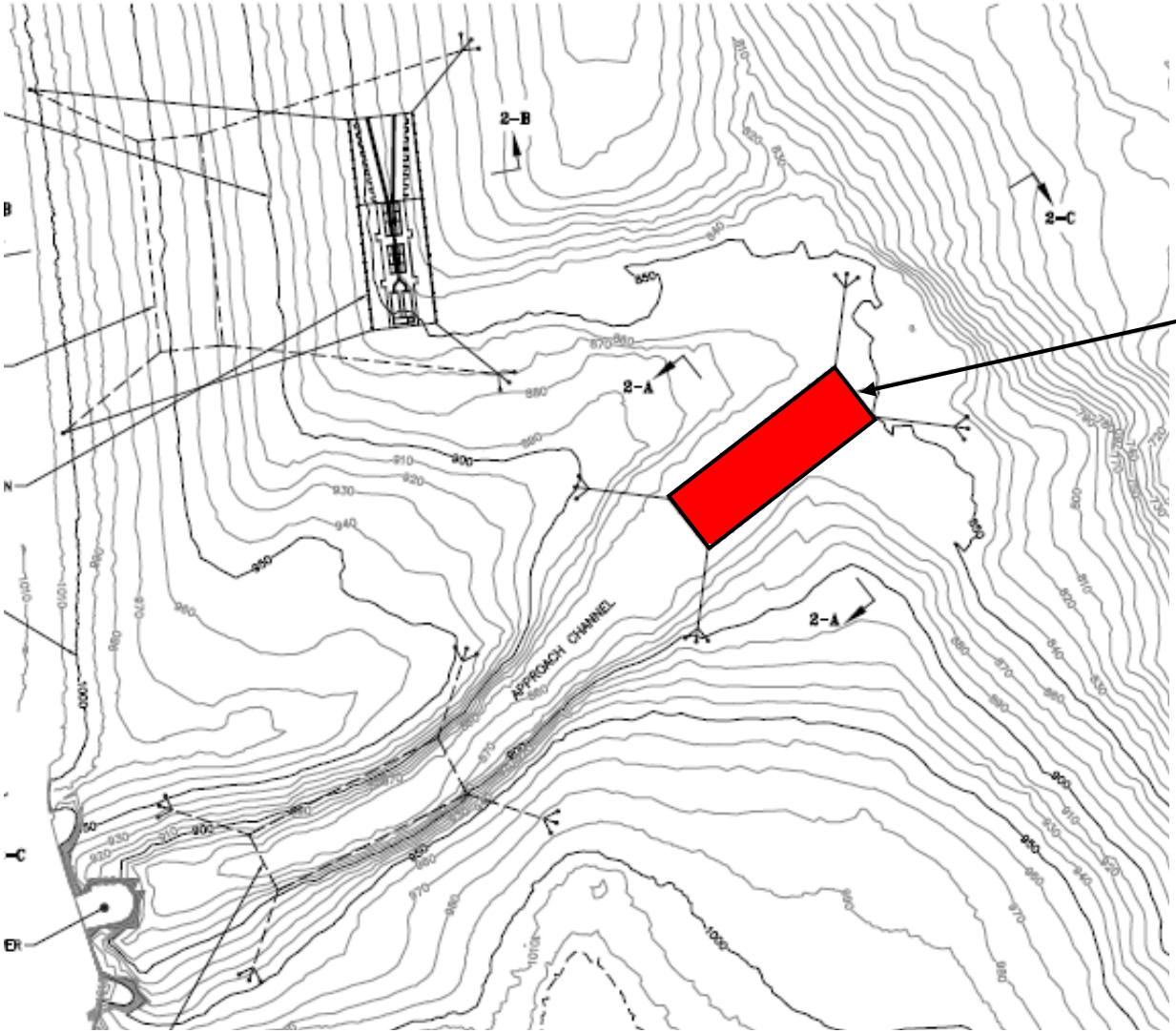
1. Collection Location
2. Collector Design
3. Fish Sorting & Transfer
4. Facility Mooring & Access

Swift Reservoir

PACIFICORP ENERGY
A PACIFICORP COMPANY

Swift Reservoir Forebay Area

Collector Location



Location 1

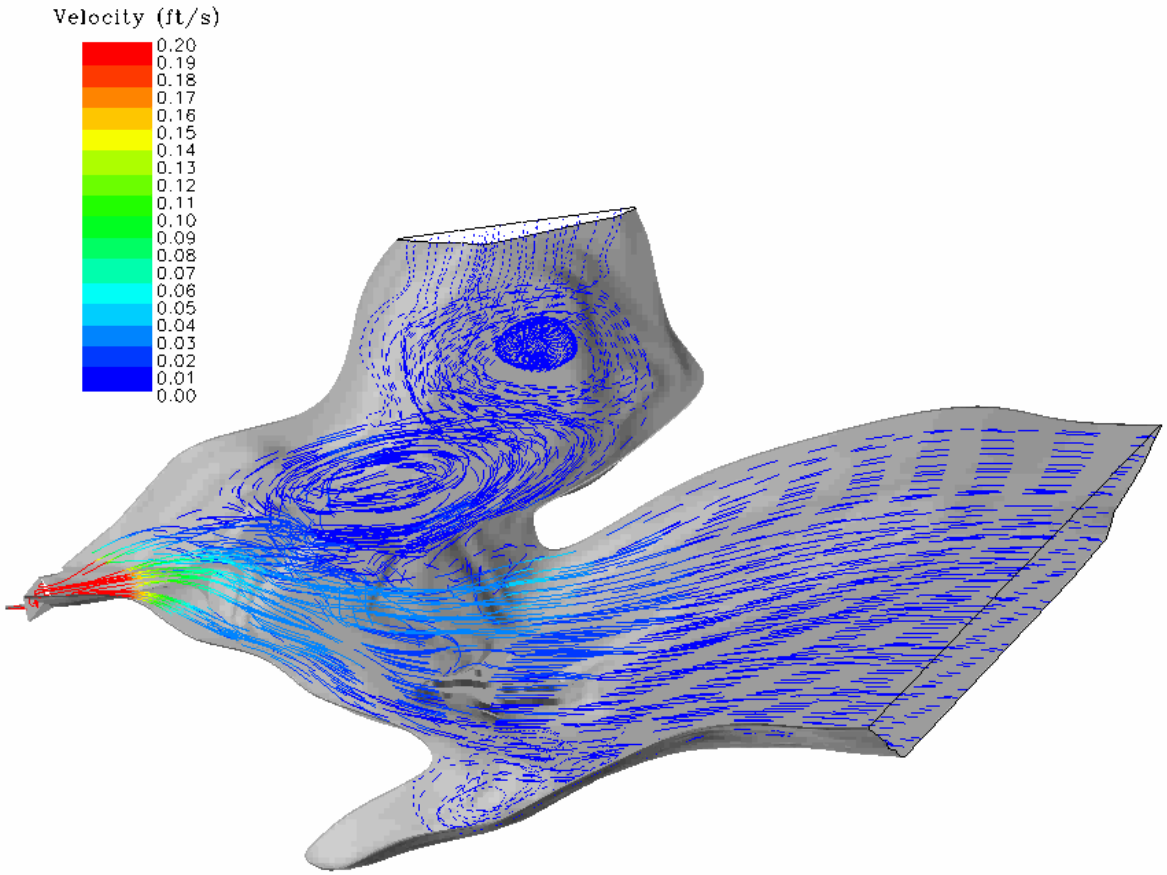
PACIFICORP ENERGY
A PACIFICORP COMPANY

Intake Channel Characteristics

Collector Location Factors

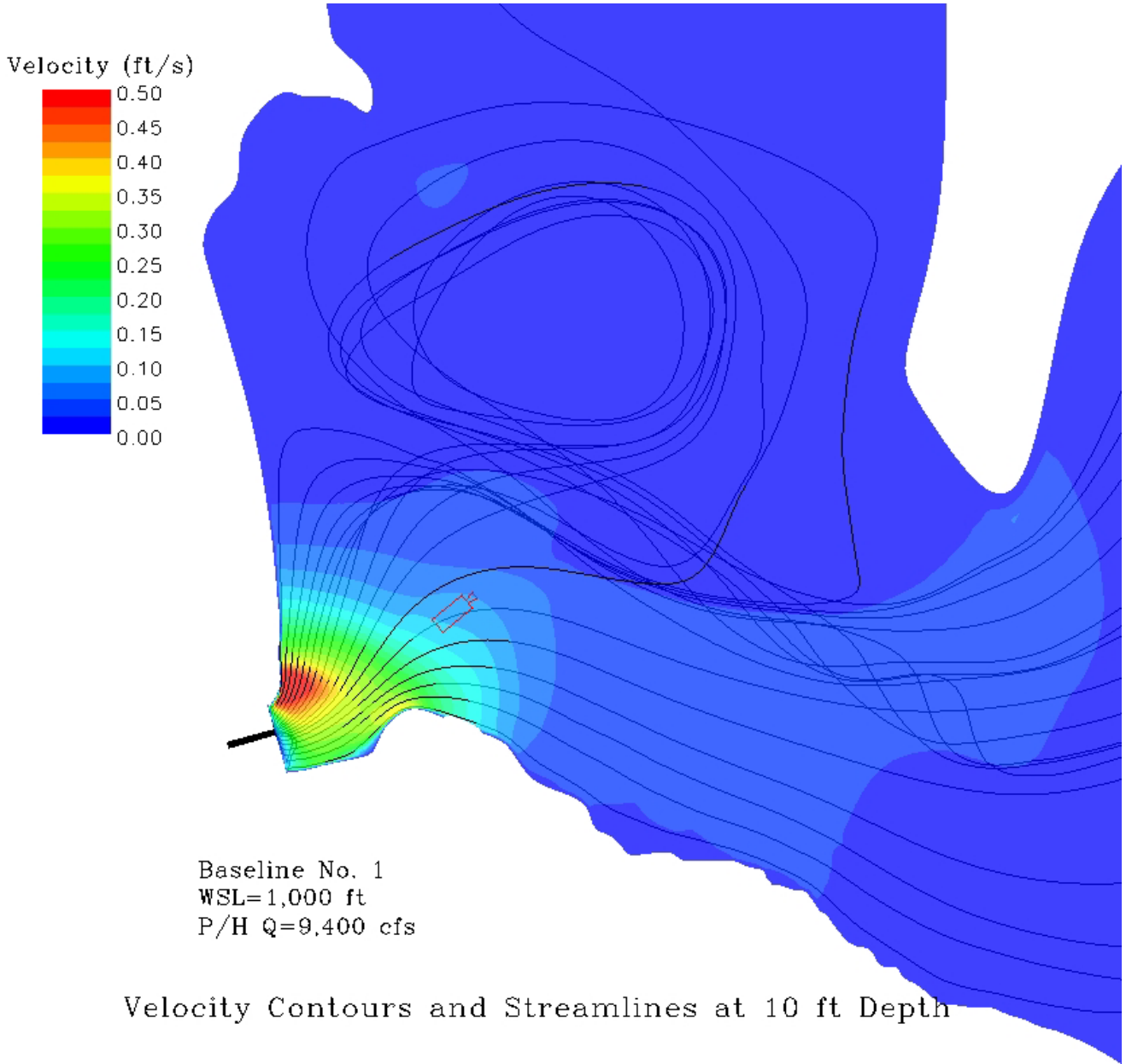
- Fish Behavior
  - Relicensing studies show fish find the intake area
- Flood Passage/Dam Safety
  - Must maintain existing spillway capacity
- Reservoir Fluctuation
  - Operational for 100-ft reservoir fluctuations
- Reservoir Flow Patterns
  - Use Computational Fluid Dynamic (CFD) modeling to simulate reservoir flow characteristics under different powerhouse flows and reservoir levels
  - Modeling is an indicator – does not simulate: Non-steady flow, Temperature stratification, Wind, Etc.

Full Reservoir, Maximum PH Flow, No Collector



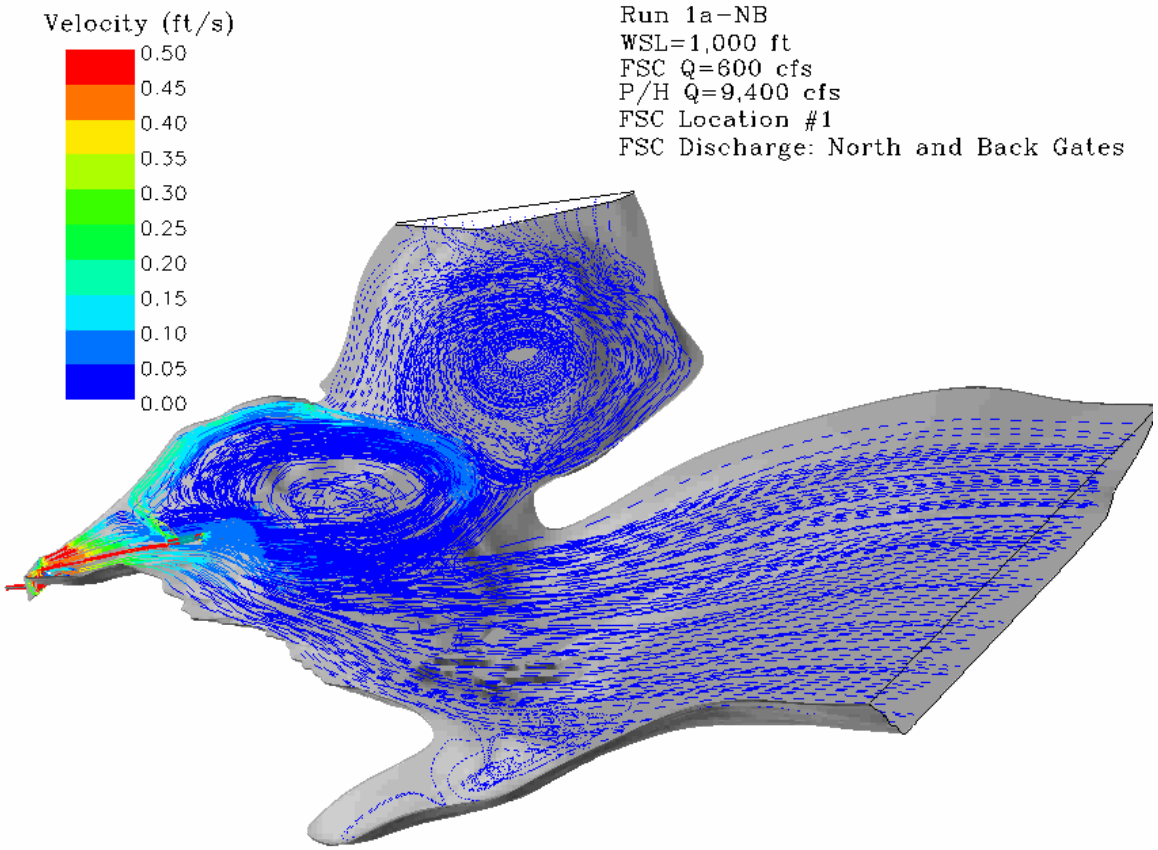
Streamlines Illustrating Flow Pattern
(Reservoir Elevation: 1,000 ft, Q=9,400 cfs, 5% Flow through Swift Creek)

Full Reservoir, Maximum PH Flow, No Collector



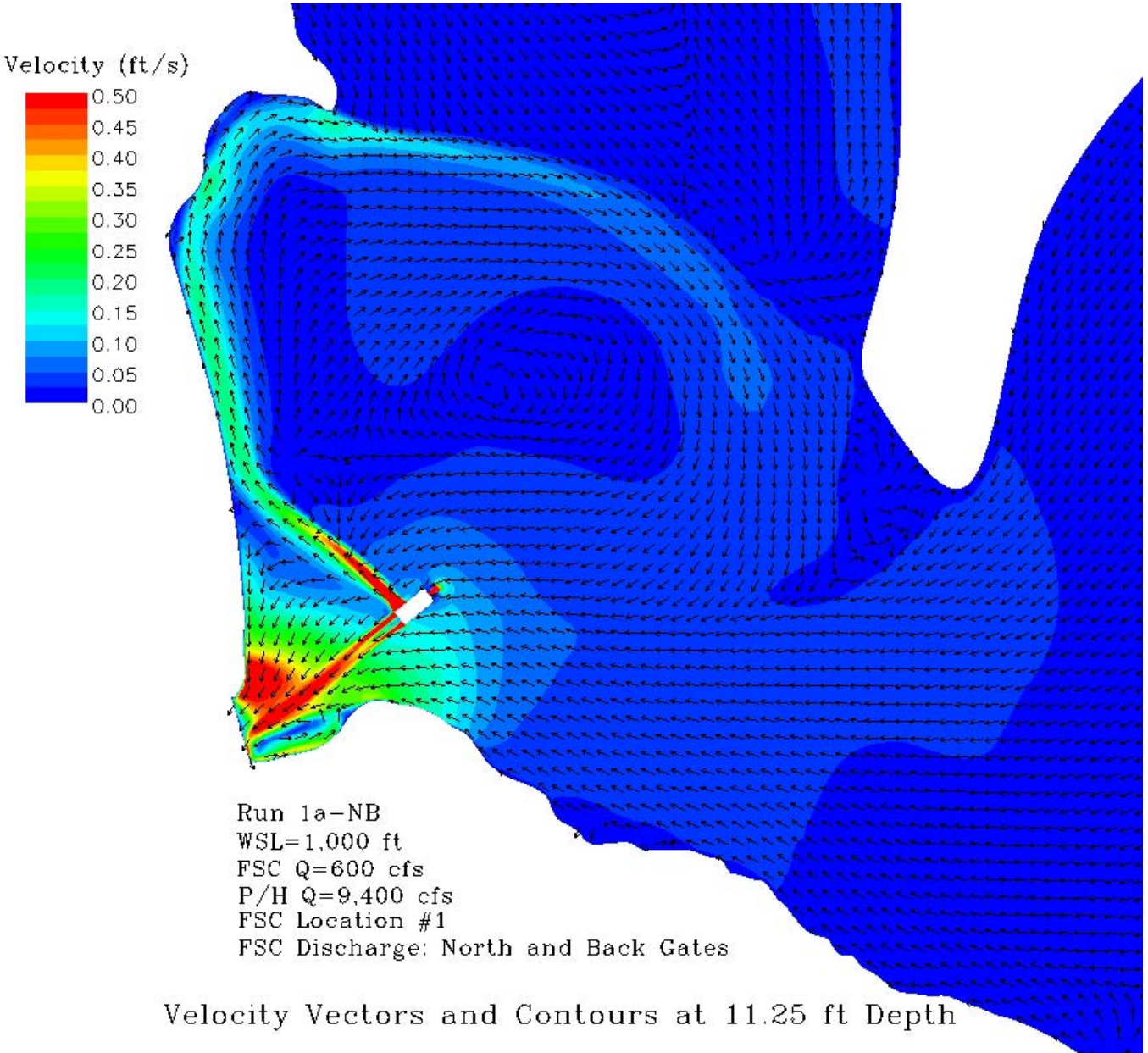
Velocity Contours and Streamlines at 10 ft Depth

Full Reservoir, Maximum PH Flow, Collector with North and Back Discharge Gates

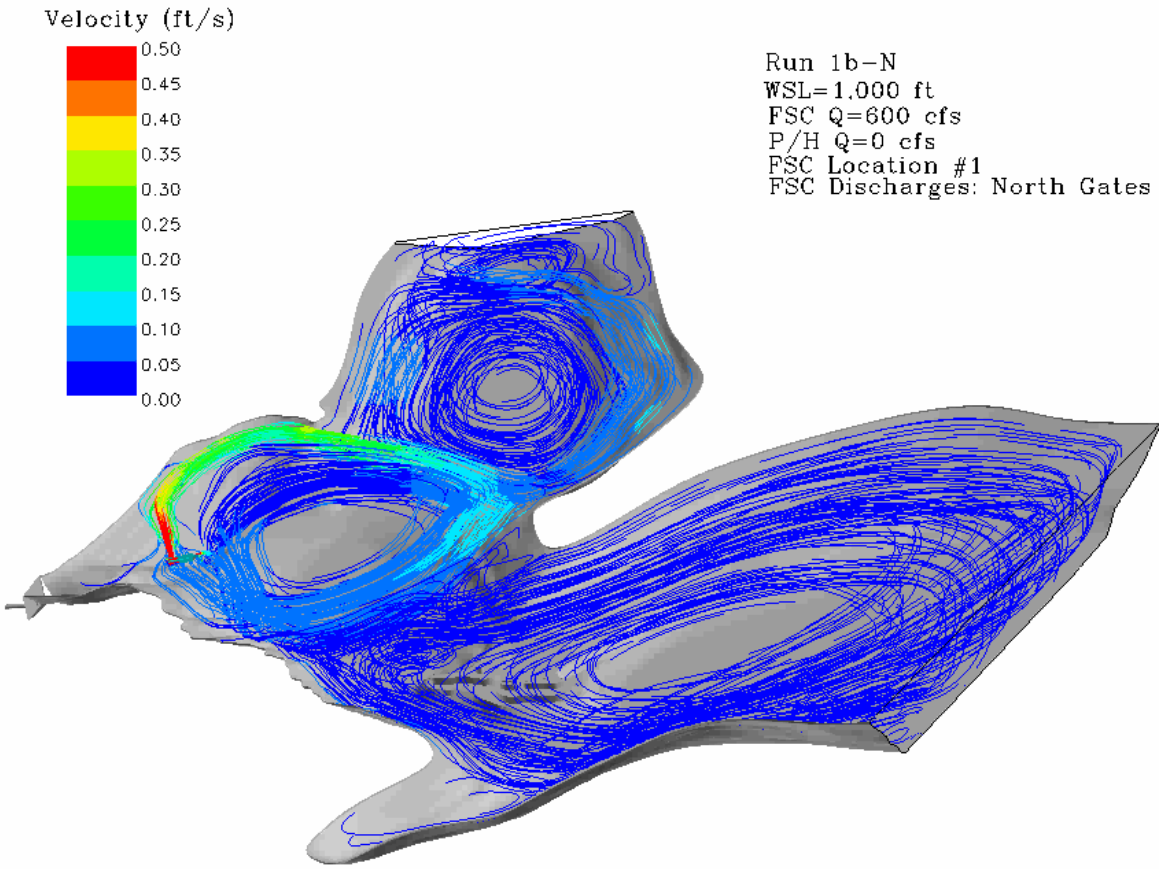


Streamlines Illustrating Flow Pattern

Full Reservoir, Maximum PH Flow, Collector with North and Back Discharge Gates



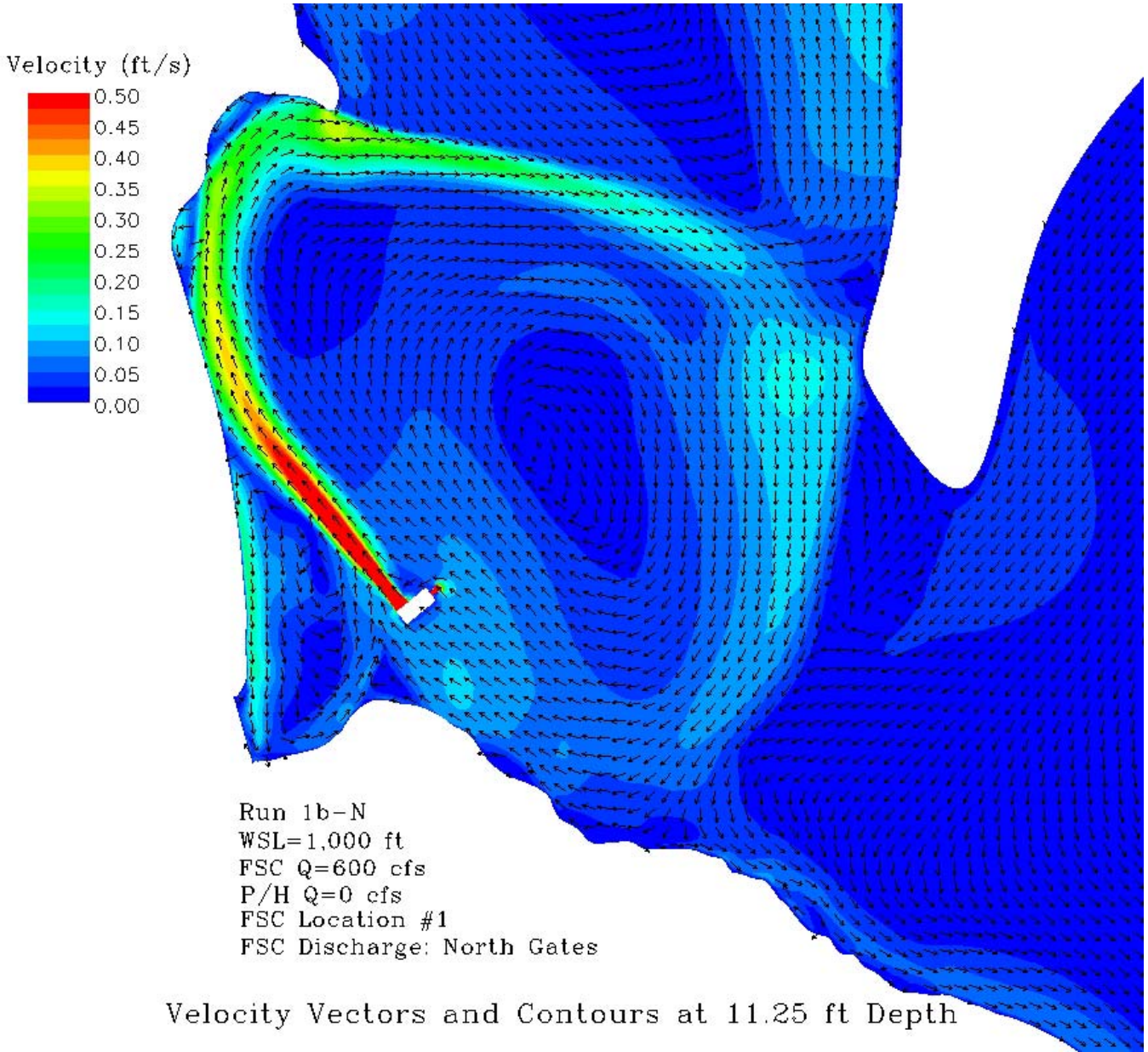
Full Reservoir, No PH Flow, Collector with Back Discharge Gates



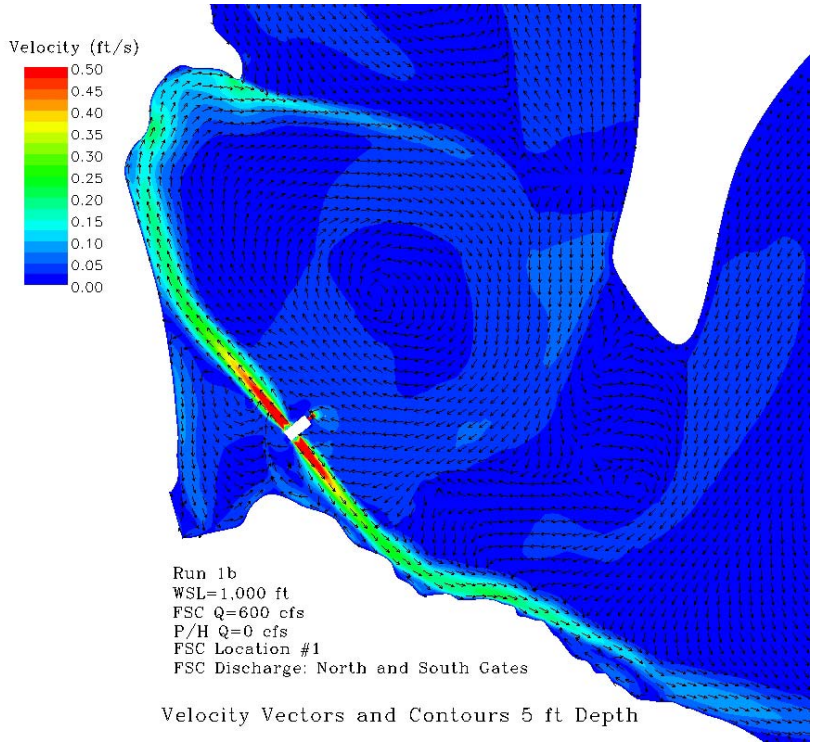
Streamlines Illustrating Flow Pattern

PACIFICORP ENERGY
A PACIFICORP COMPANY

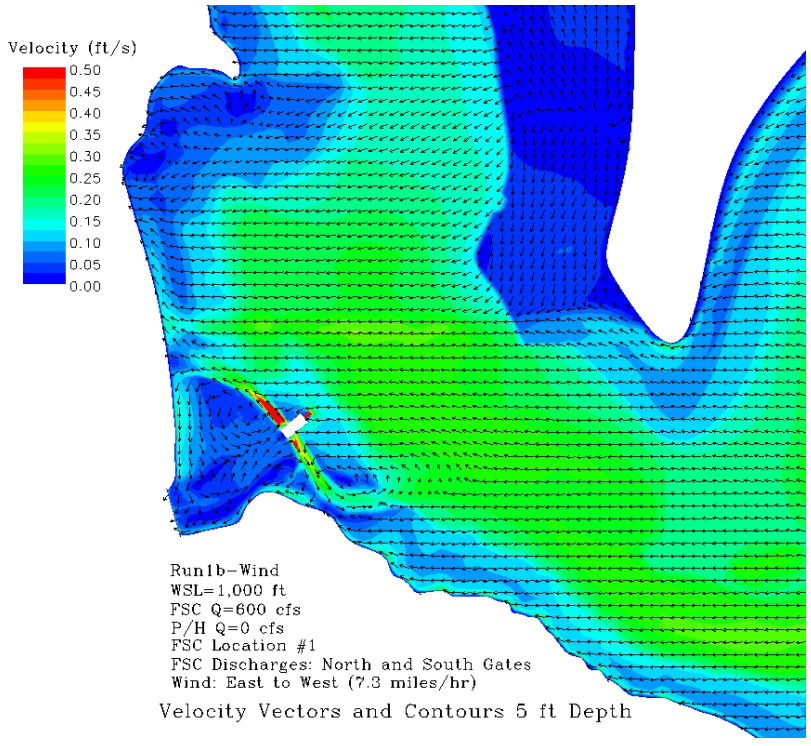
Full Reservoir, No PH Flow, Collector with Back Discharge Gates



Wind Analysis - 7.3 mph applied from east to west



No Wind



7.3 mph Wind

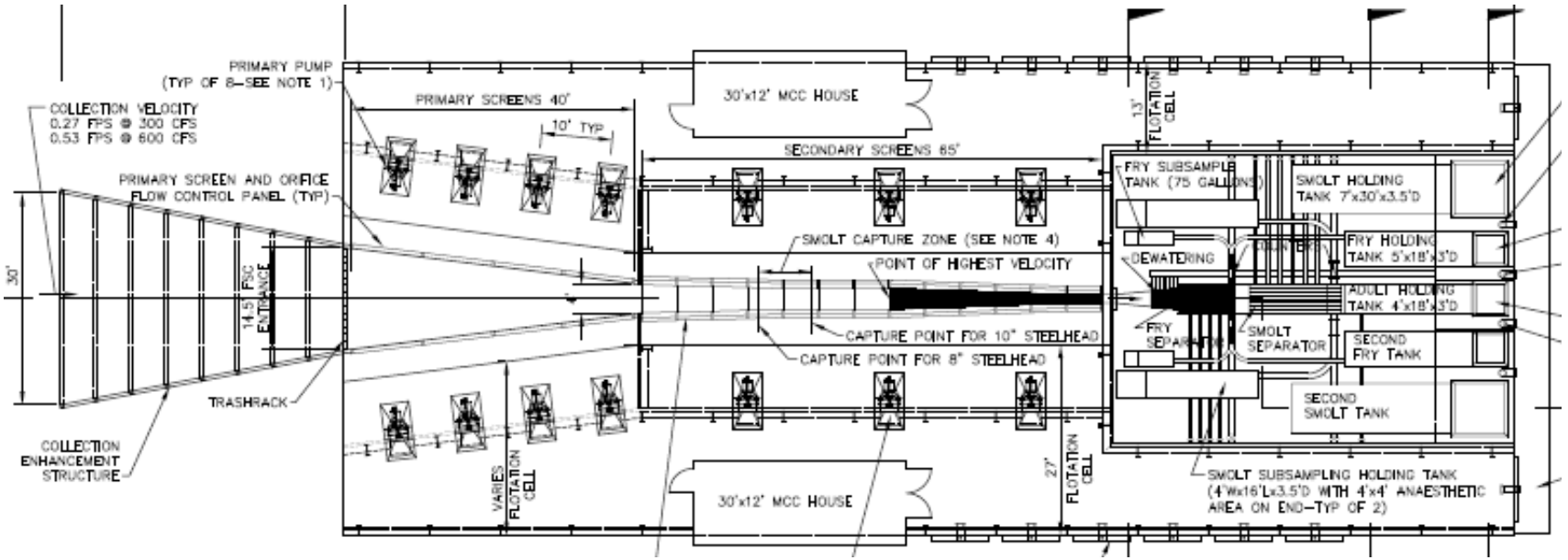
Collector Location Status

- Location at channel entrance
- Discharge to reinforce existing reservoir patterns
- Modeling is just an indicator of reservoir conditions.
- Discharge design will be flexible to avoid flow pattern that deter fish collection

Collector Design Factors

- Hydraulic Conditions
  - Favorable for fish collection
  - Gradual increase in velocity until fish are captured
- Floatation
  - Facility must stay level to achieve the design velocities

Collection Hydraulics



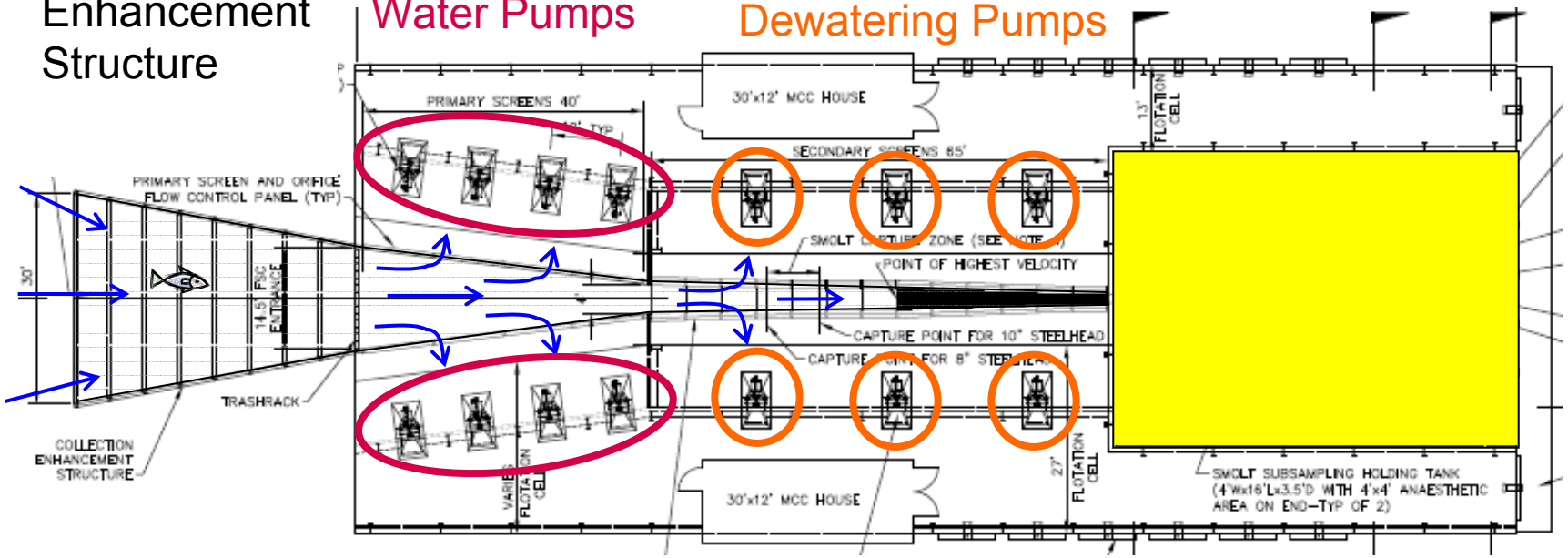
Collection Hydraulics

Collection Enhancement Structure

Primary Attraction Water Pumps

Secondary Dewatering Pumps

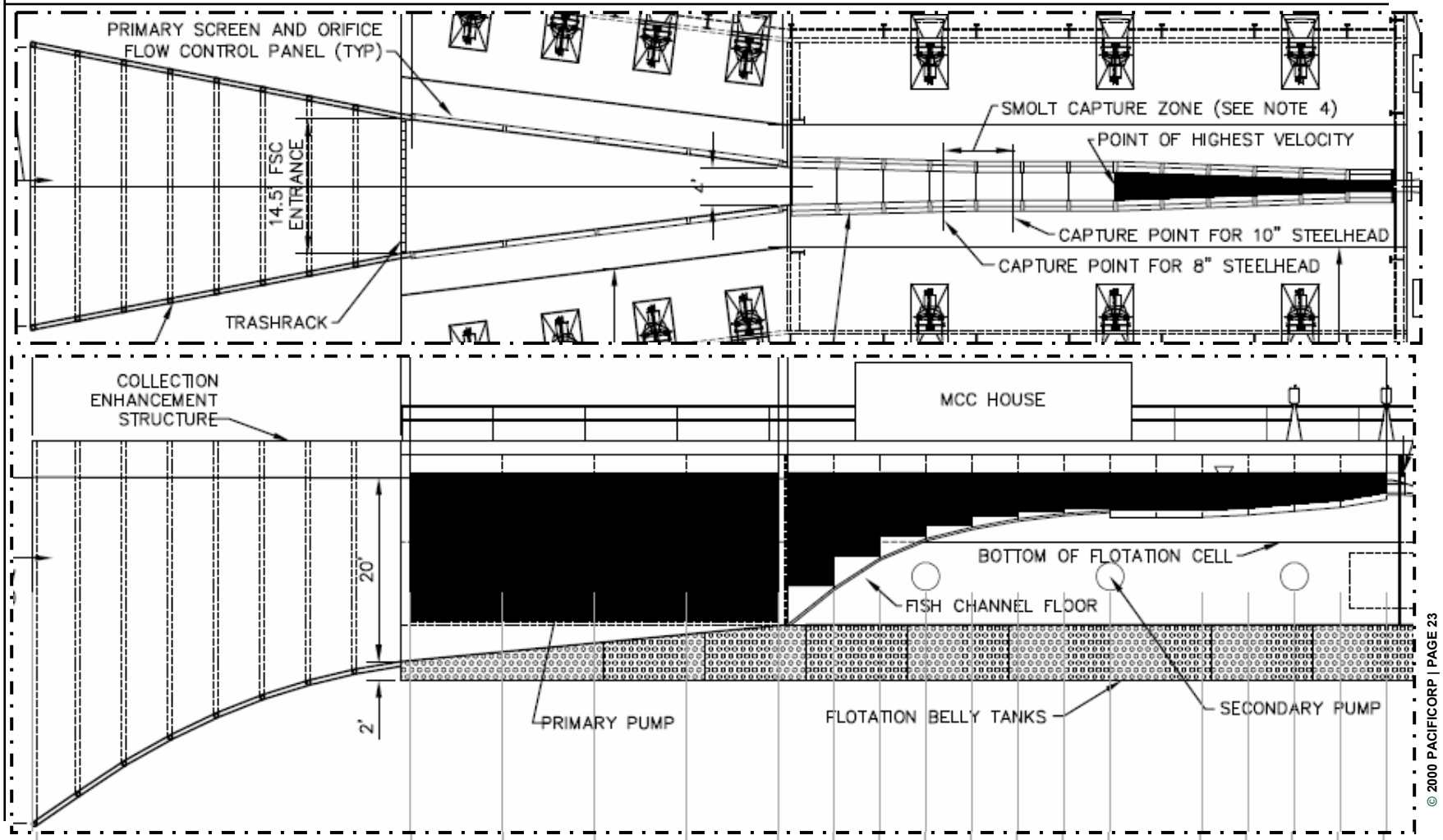
Sorting Area

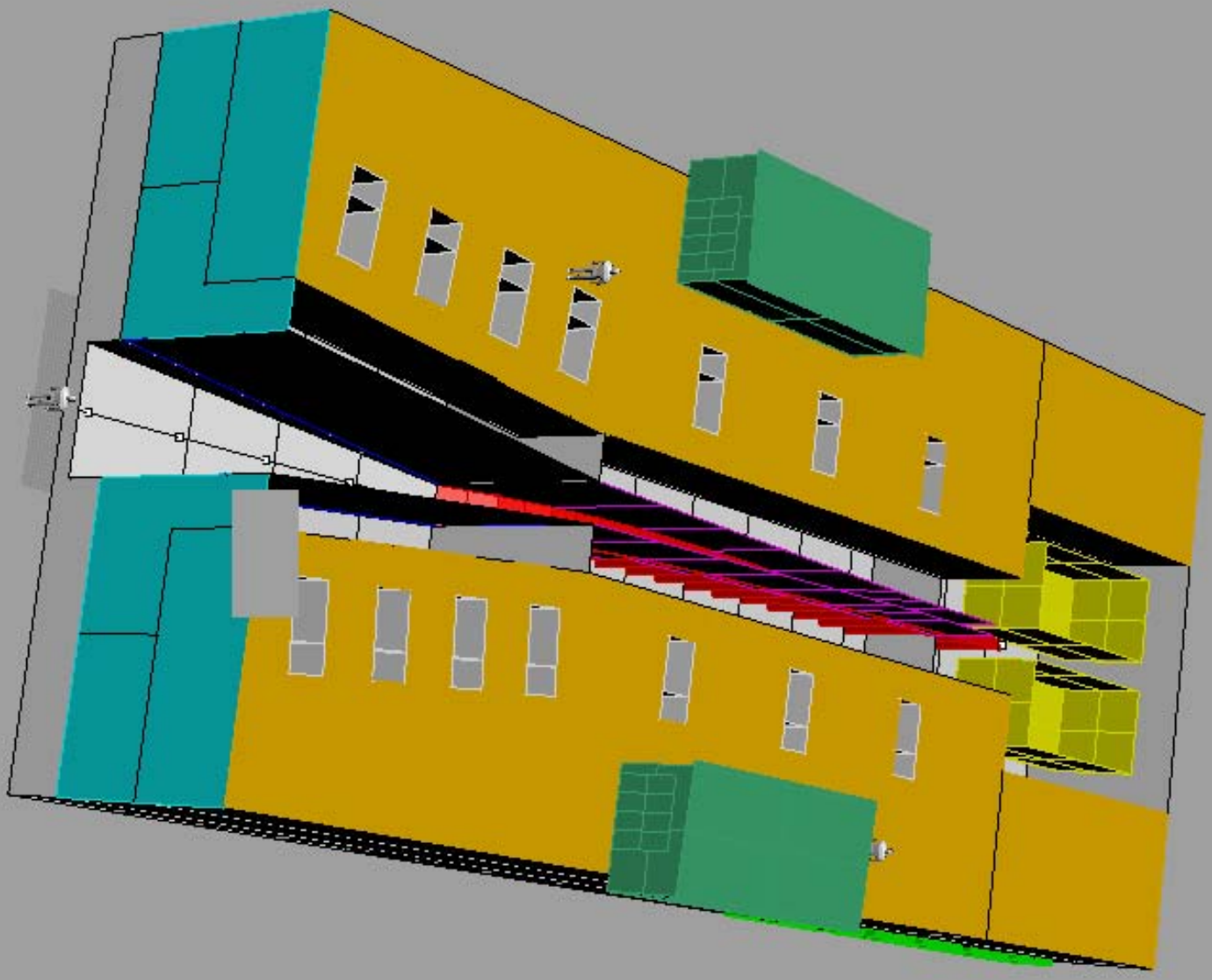


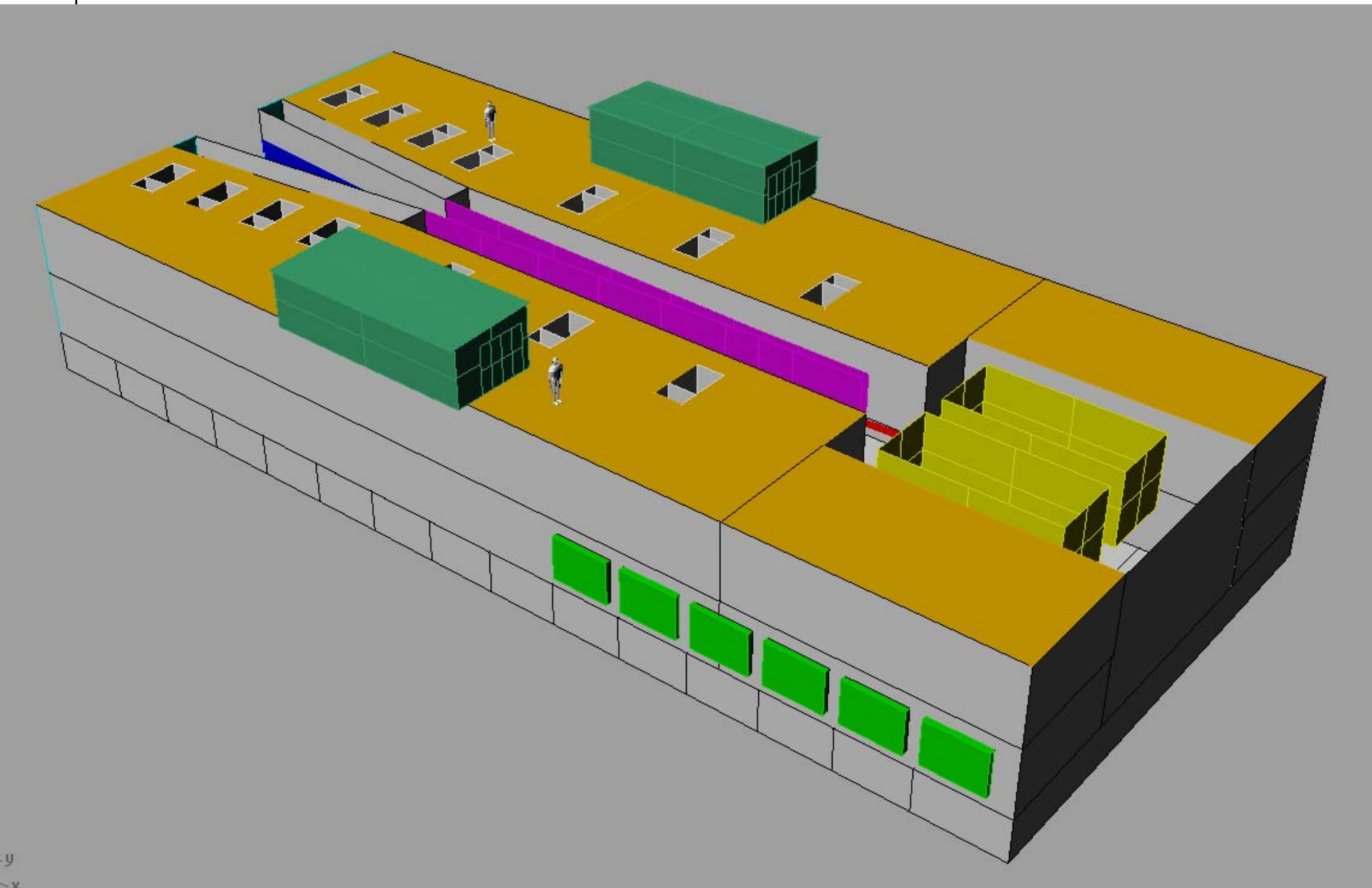
600 cfs → **200 cfs** → **7 cfs**

PACIFICORP ENERGY
A PACIFICORP COMPANY

Collection Hydraulics







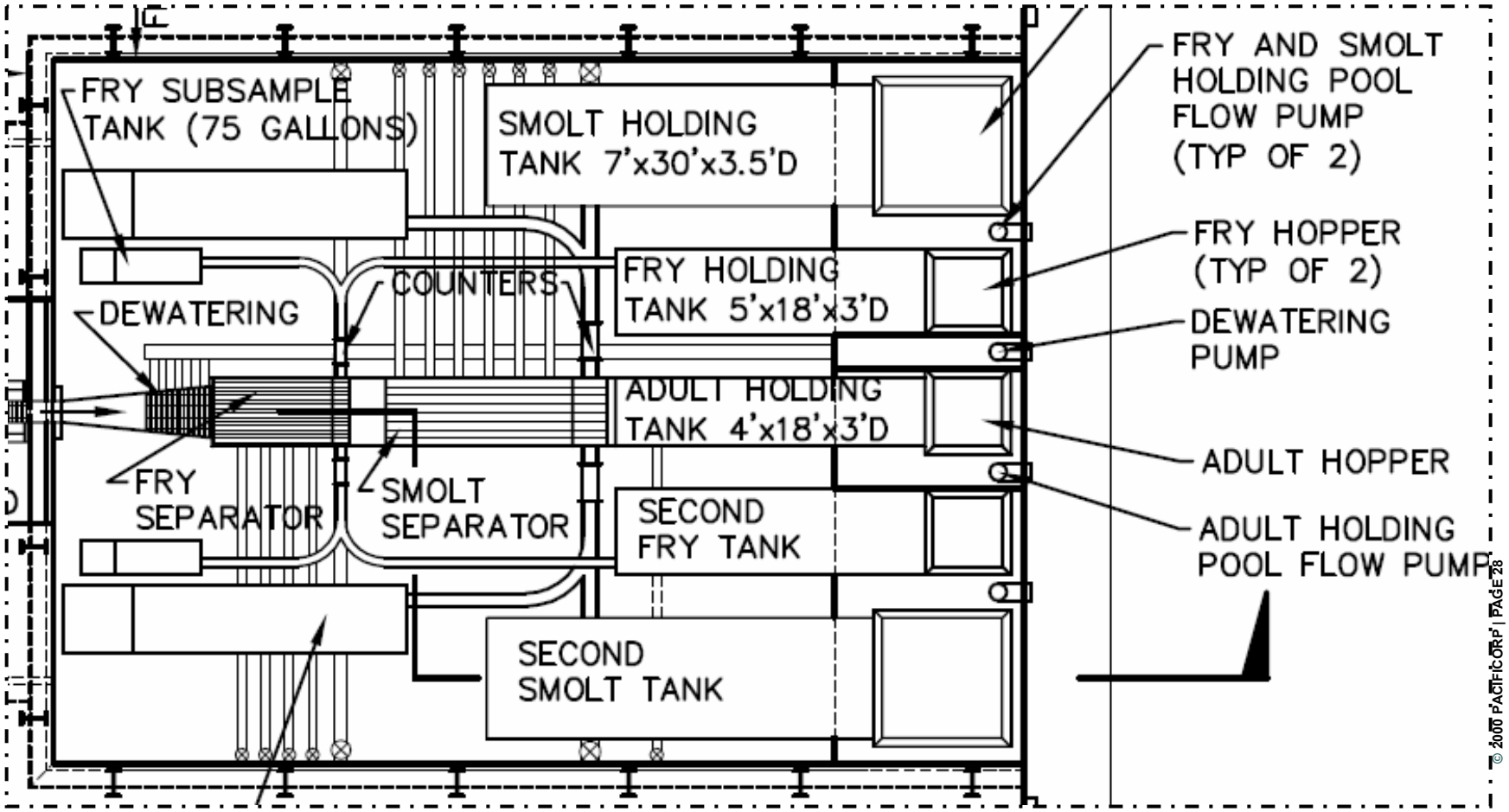
Collector Design Status

- Fish channel hydraulics well understood
- Next Steps:
  - Hydraulics inside collector
  - Discharge configuration
  - Collector structural design and marine architecture

Fish Sorting & Transfer Factors

- Wetted Separator
  - Sort by size class
  - Prevent injury
- Storage Capacity
  - Sized to hold anticipated runs with efficient offloading
- Subsampling
- Limited handling

Sorting



Sorter at Cowlitz Falls

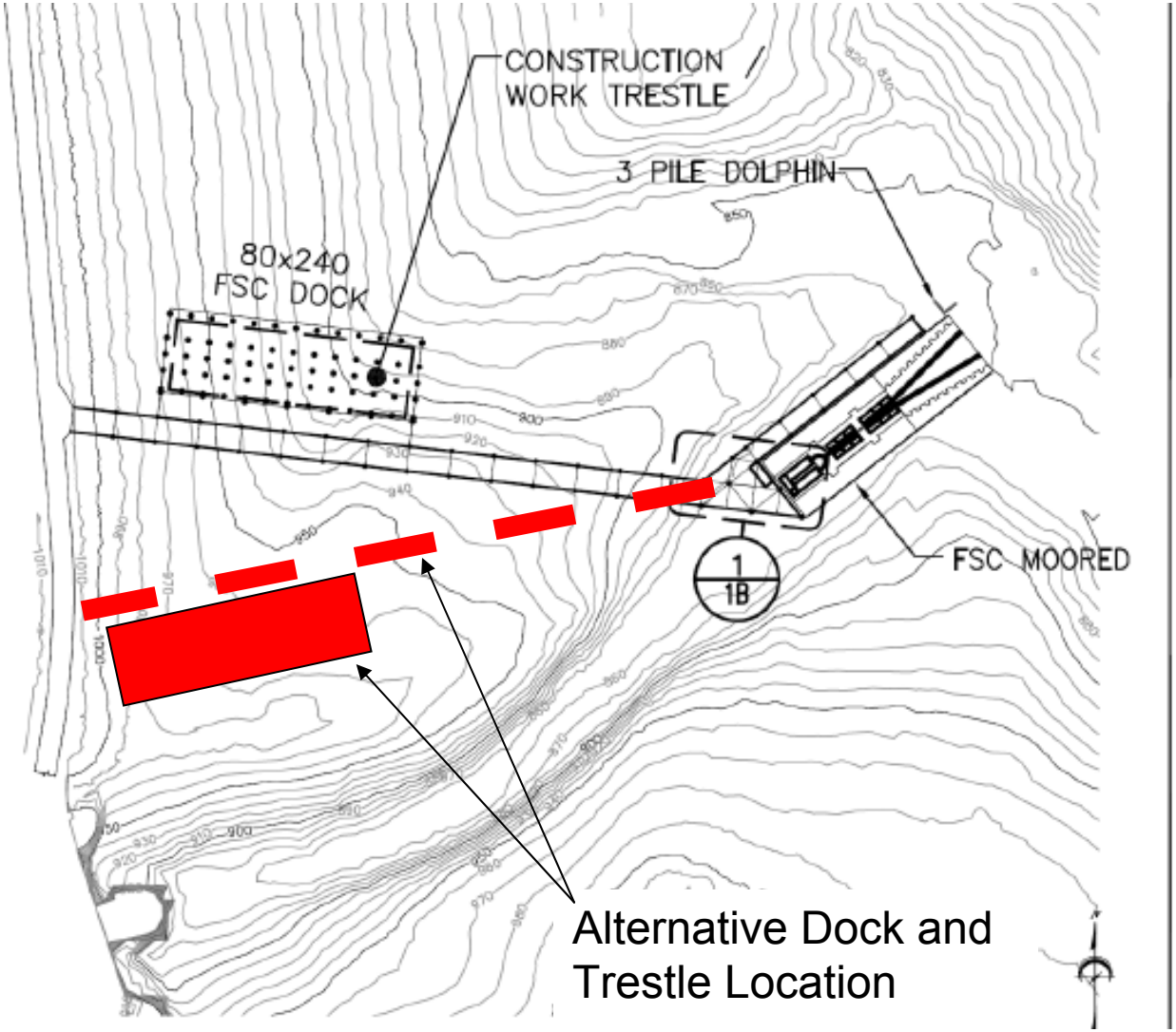
Fish Sorting & Transfer Status

- Wetted Separator system is proven technology and can be installed on the collector.
- Refining configuration
- Transfer system is dependent on which mooring is selected

Mooring and Access Factors

- Constructability
- Safety
- Efficiency of operations

Mooring & Access: Trestle

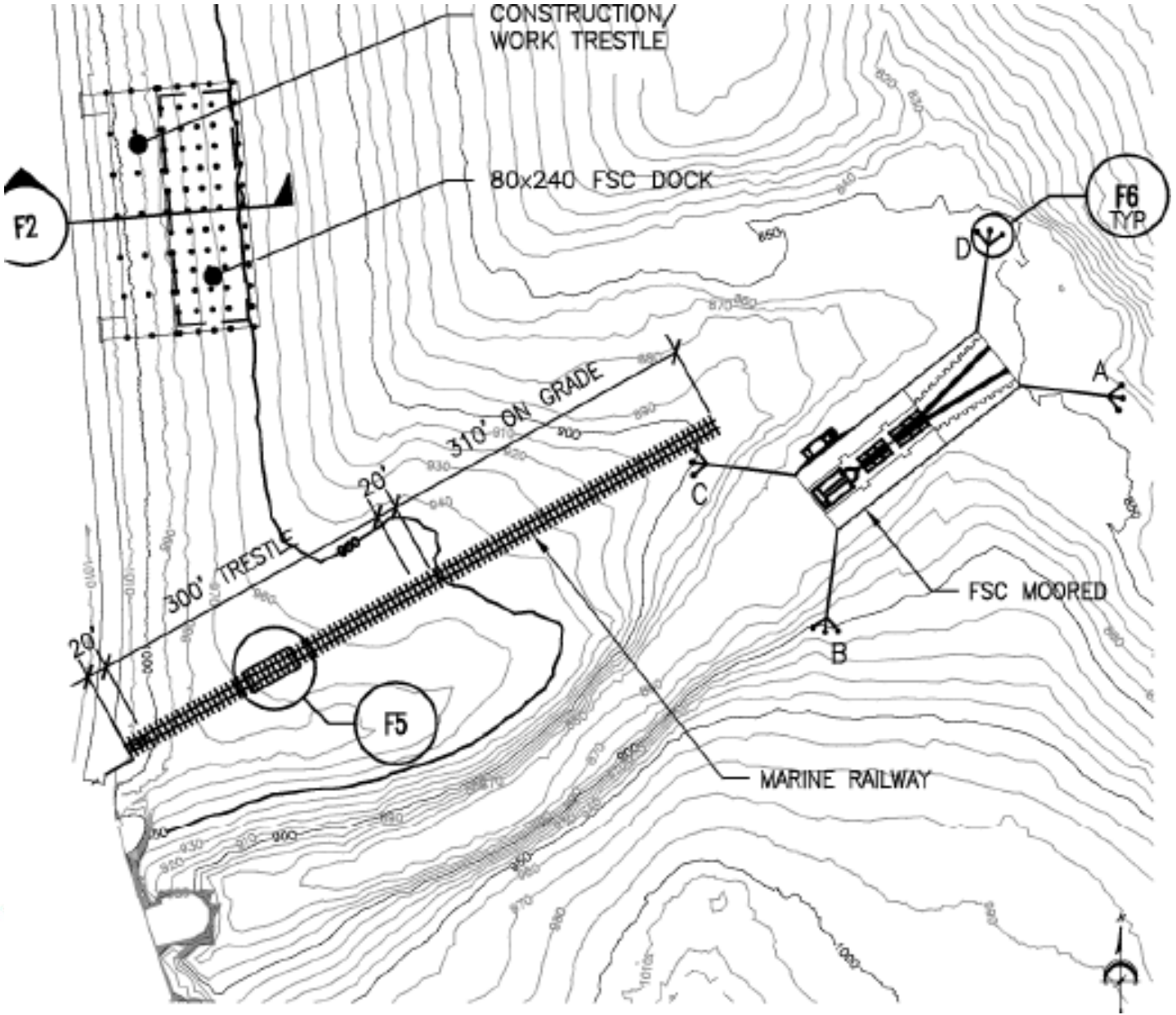


PACIFICORP ENERGY
A PACIFICORP COMPANY

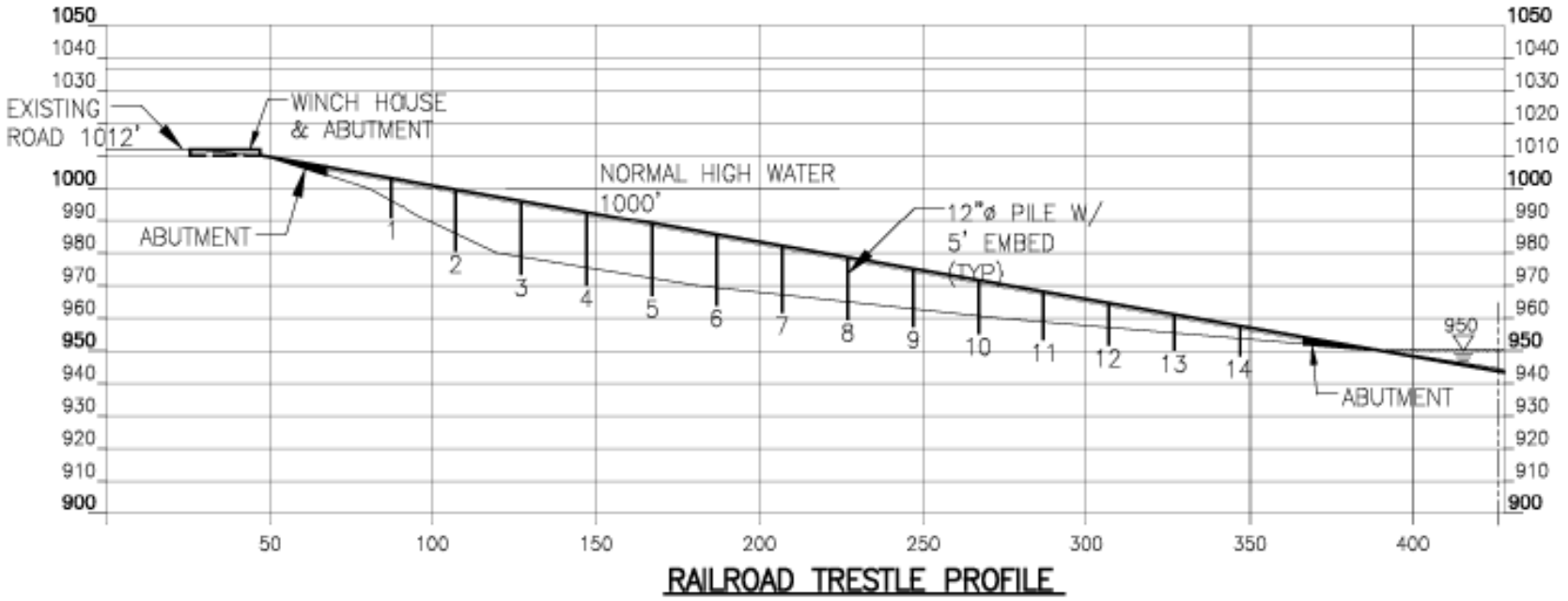
Trestle Example

PACIFICORP ENERGY
A PACIFICORP COMPANY

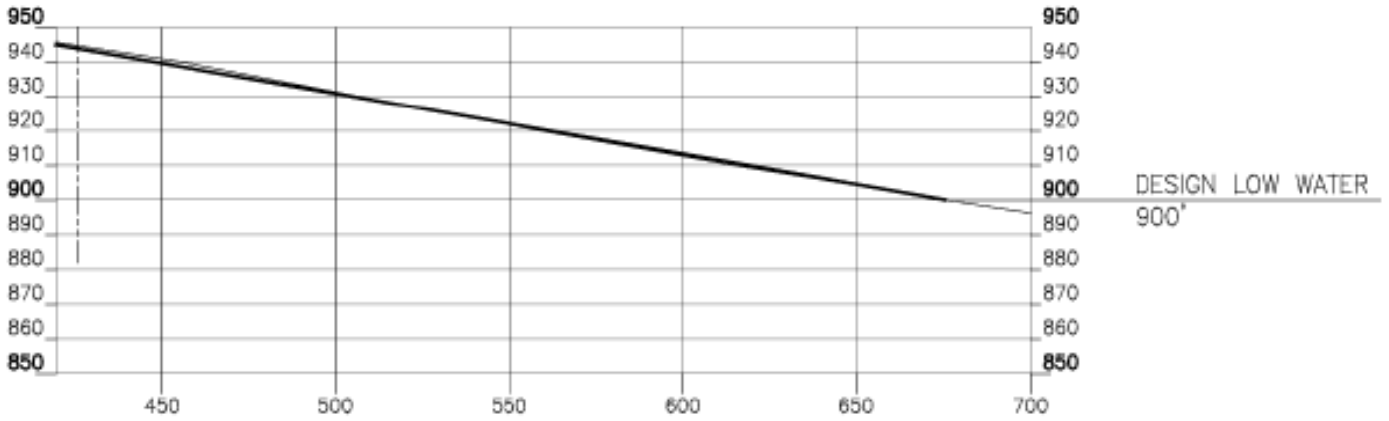
Mooring & Access: Marine Railway



Mooring & Access: Marine Railway

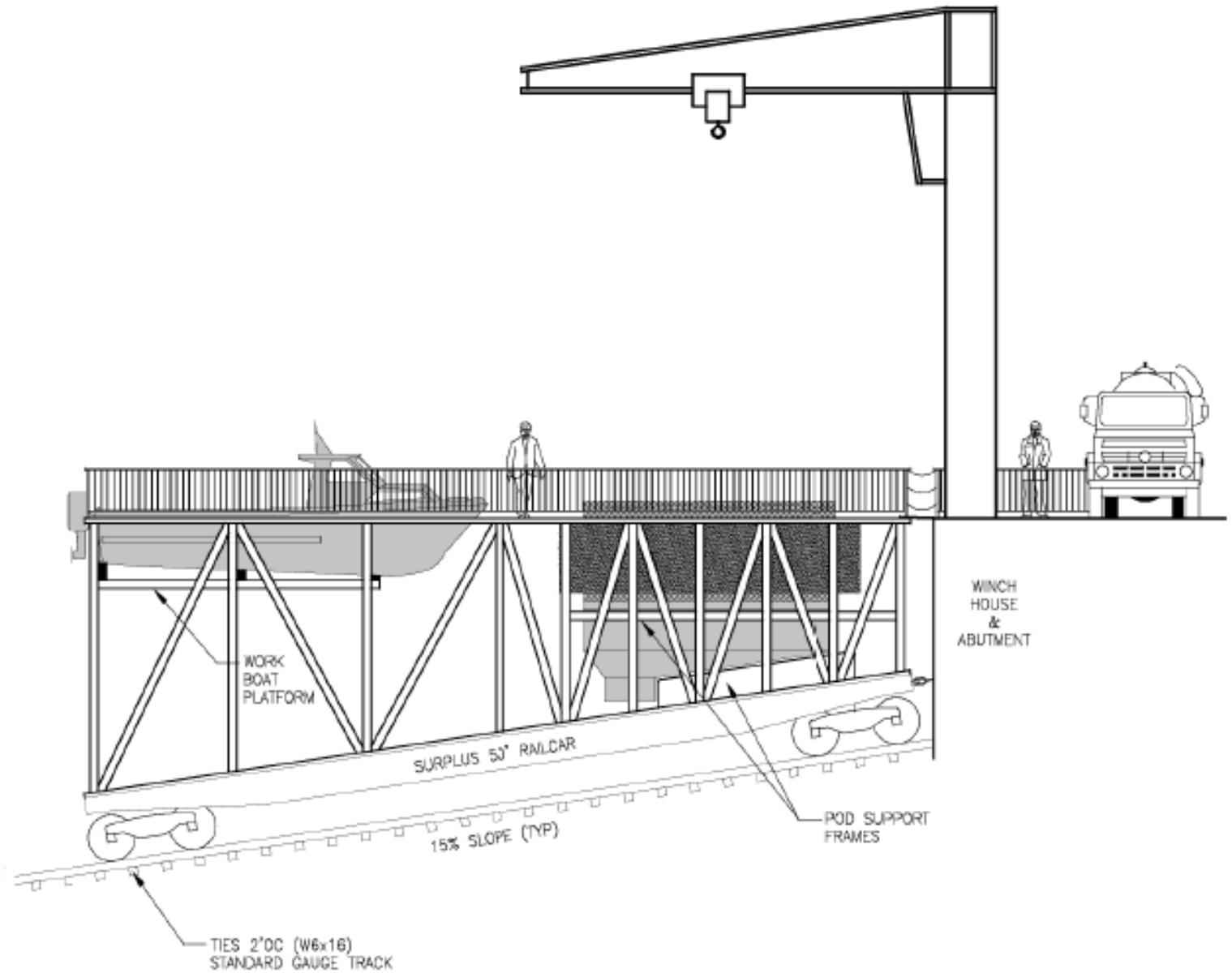


RAILROAD TRESTLE PROFILE



ON GRADE PROFILE

Mooring & Access: Marine Railway



Mooring and Access Status

- Performing constructability evaluation
- Evaluating safety and operations processes

Next Steps

- Begin preparation of 30% design package
- 60% Design Effort
  - Sorting design to incorporate mooring approach
  - Structural design of collector
  - Evaluation of measures that would be phased in based on collector performance

End

PACIFICORP ENERGY
A PACIFICORP COMPANY