

Cougar Floating Screen Structure Physical Hydraulic Model Study Model Demonstration

Prepared For

CENWP

Prepared By

Justin D. Arnold, PE

Date

May 1, 2019

Agenda

- Introductions / Goals of Meeting (10:00-10:15)
- Model Overview Presentation (10:15-10:30)
- Model Demonstration 1 (10:30 – 11:15)
- Model Demonstration 2 (11:15 – 12:00)
- Lunch (12:00 – 1:00)
- Model Demonstration 3 (1:00 – 2:00)
- Closing Discussions (2:00 – 3:00)

Assembly Points

- In the event of an emergency please exit the building.
- Once outside, proceed to the assembly point where we will meet and do roll call.
- Do not return to building unless the “all clear” is given.



Goals of Meeting

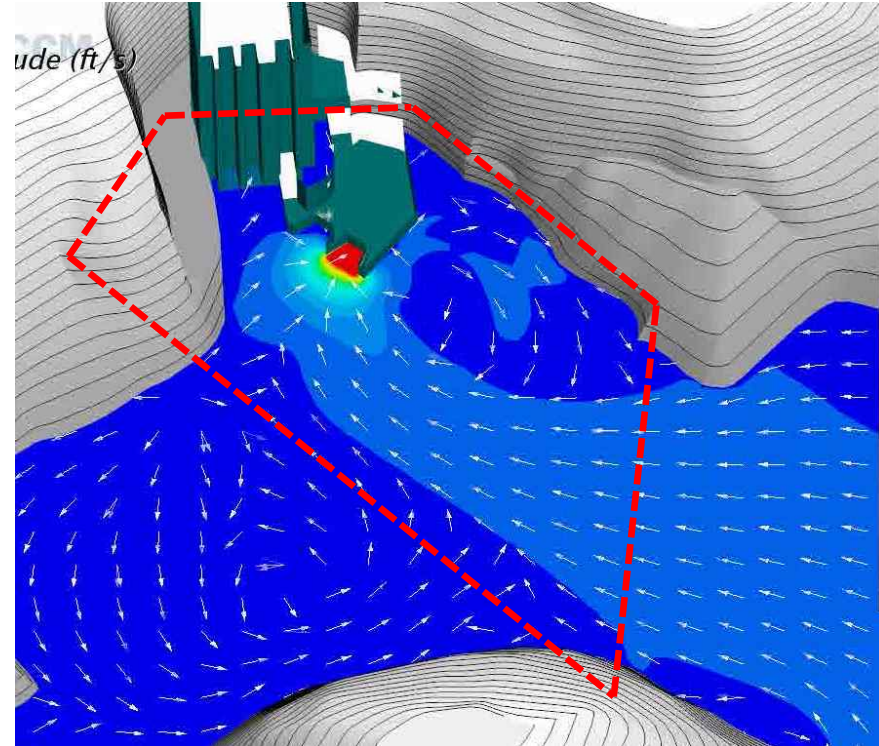
- Observe entrance conditions for representative flow scenarios
- Assess suitability of entrance flow conditions for fish collection
- Identify minor entrance modifications, if needed, for further evaluation



Scale Ratios & Model Limits

Model:Prototype Scale of 1:10 Selected

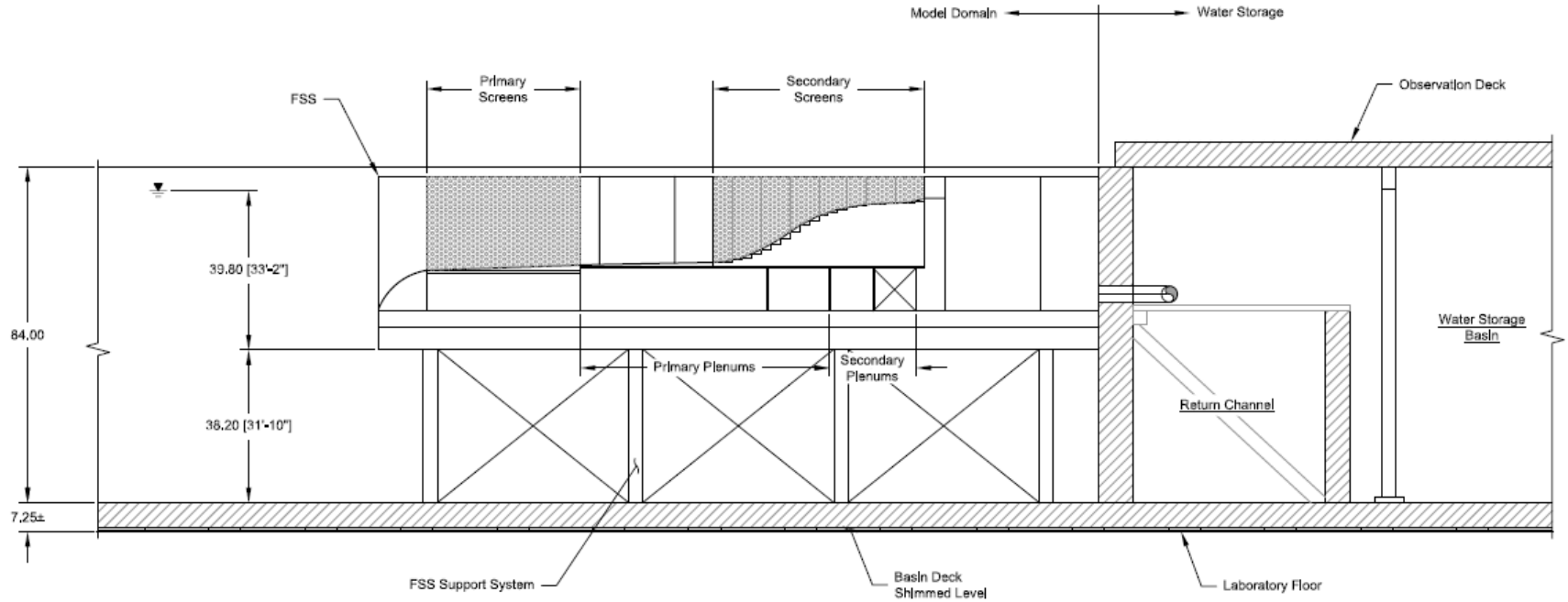
- Geometric Scale
1 model unit = 10 prototype units
- Velocity Scale
1 model unit = 3.16 prototype units
- Flow Scale
1 model unit = 316 prototype units



Model Layout – Plan View



Model Layout – Section View



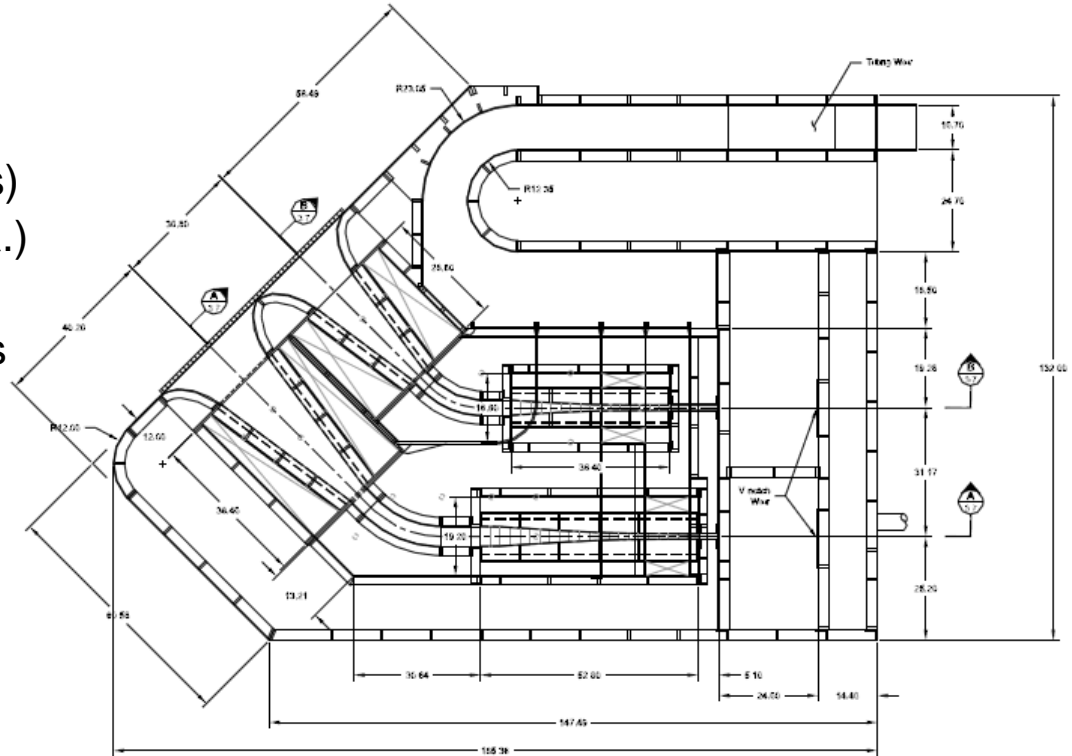
Model Overview



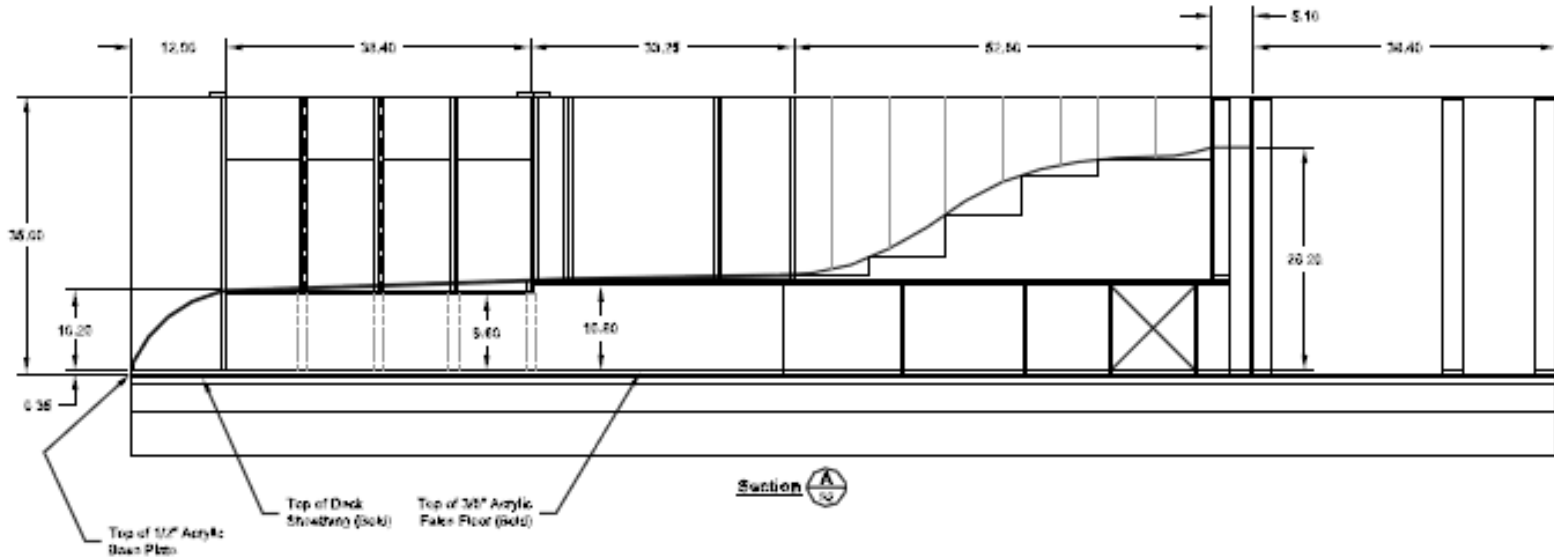
Model FSS – Plan View

Modular Construction

- Trashracks (2 pieces)
- Bellmouth Entrances (5 pieces)
- Primary Screen Modules (2 ea.)
- Channel Bends (2 ea.)
- Secondary Screen Assemblies (14 pieces)
- Plenum (2 lid pieces; 8 wall pieces; Individual columns)
- Exterior/Interior Wall (17 pieces)
- Exit Weir (1 piece)
- Base Plates (6 pieces)



Model FSS – Section View

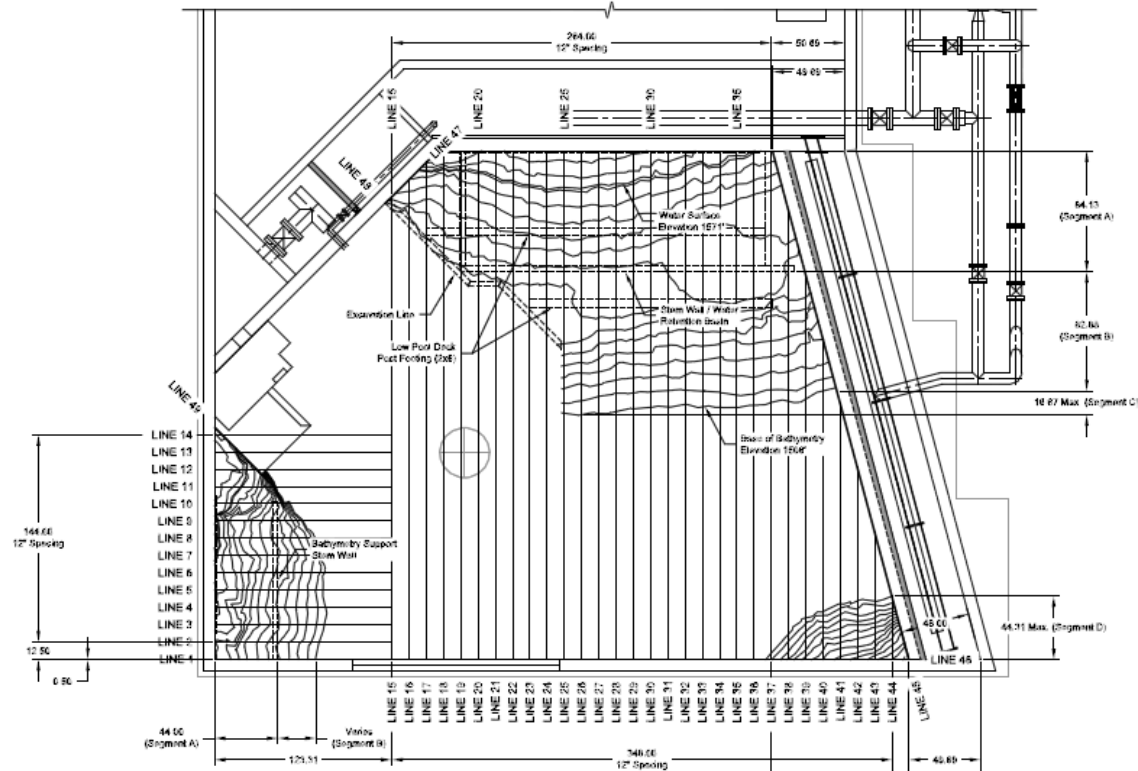


FSS Overview



Model Bathymetry

- Two Sets of Bathymetry
 - High Pool (Fixed)
 - Low Pool (Removable Modules)
- Construction Method
 - Plywood templates of 1-ft spacing
 - 2 layers of hardware cloth
 - 5 mm concrete cloth

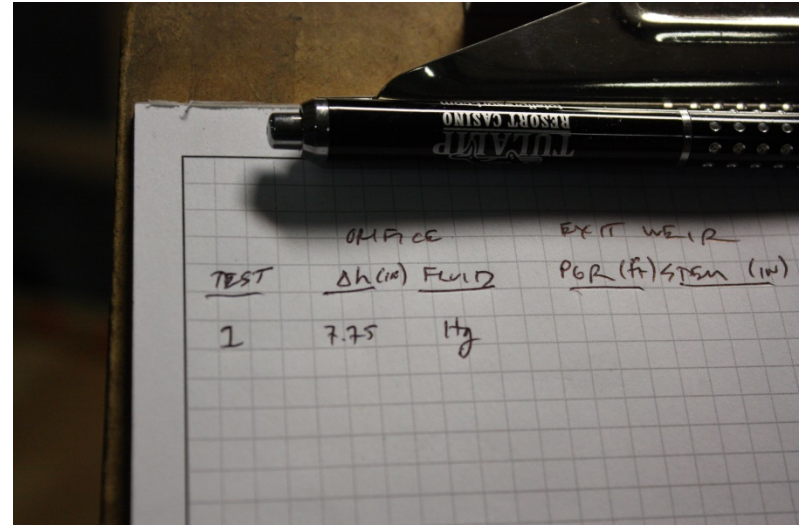


Bathymetry Overview



Testing Phases

- Calibration
 - Reference instruments to model elevation datum
 - Rate tertiary & return channel weirs
 - Assess flow patterns at upstream model domain
- Flow Establishment Tests
 - Set screen weirs to produce desired flow split
- Baseline Testing (High Pool)
 - Assess FSS entrance conditions
 - Quantify FSS approach flow velocity field
 - Measure headloss
- Entrance Modification Testing
 - Revise entrance geometry to improve fish attraction/entry
- Documentation Testing (High & Low Pool)
 - Document performance after incorporation of any modifications





Measurements / Instrumentation – Total Flow

- Orifice plate in pump discharge piping



Measurements / Instrumentation – Screened Flow

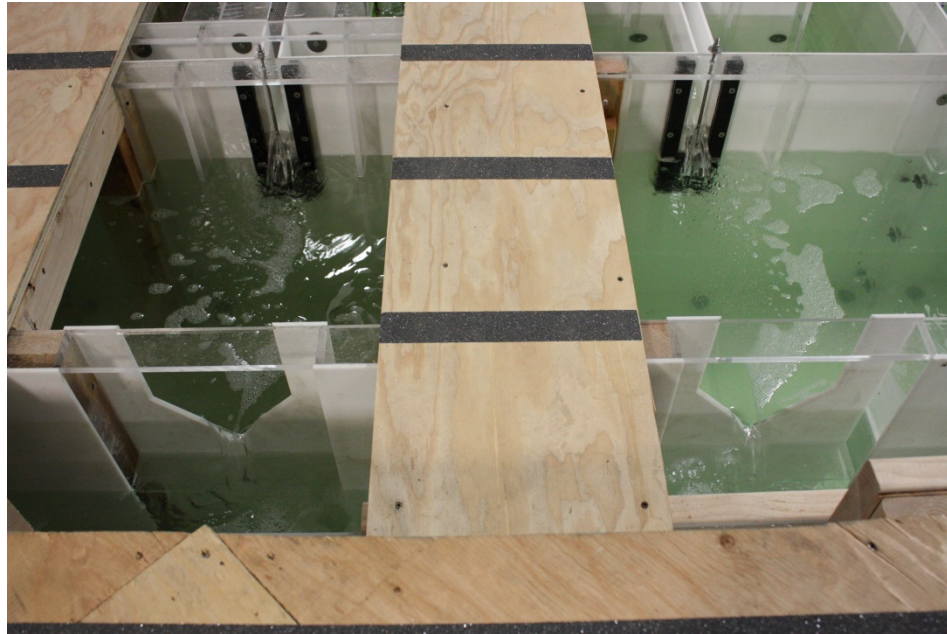
- V-Notch weir in return channel





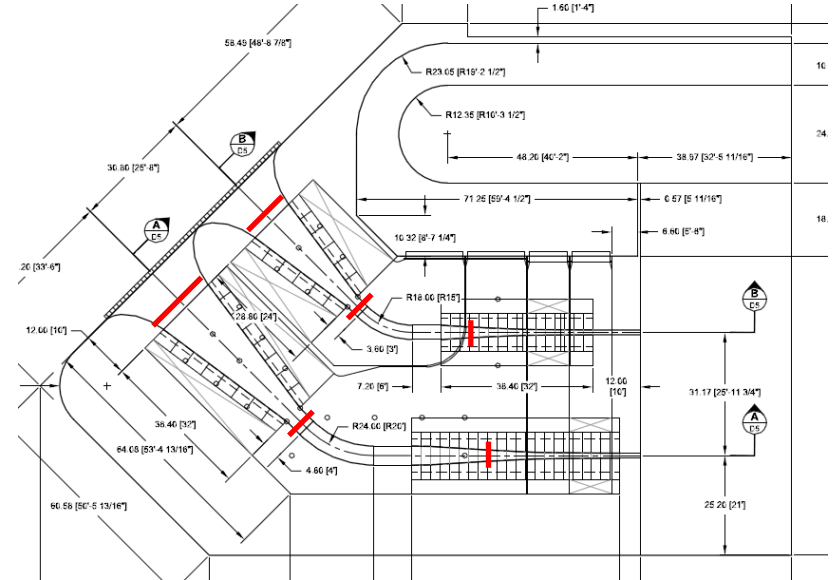
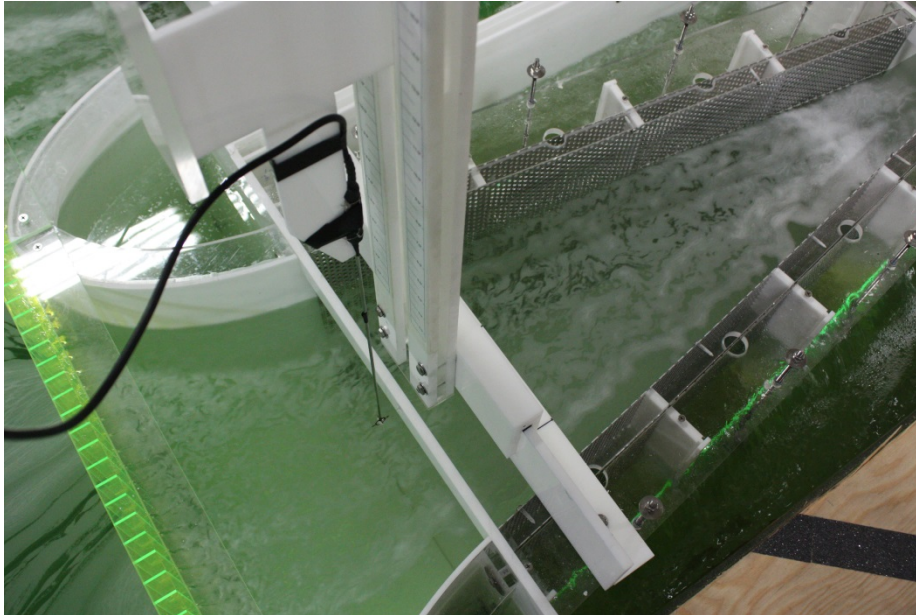
Measurements / Instrumentation – Tertiary Flow

- V-Notch weir D/S from tertiary channel



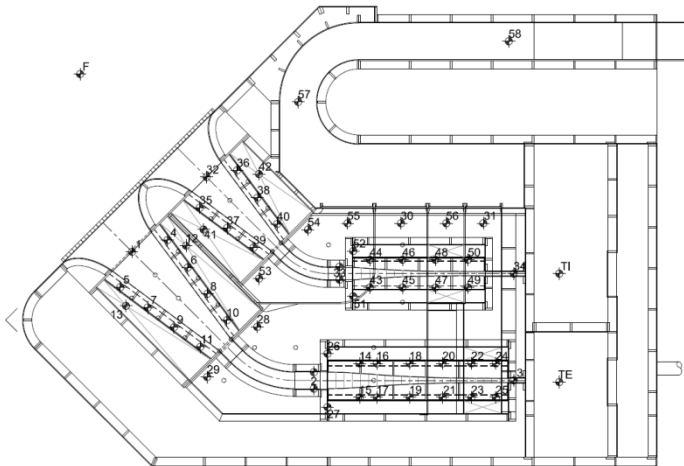
Measurements / Instrumentation – FSS Flow Distribution

- Integrated channel velocity measurements
- Miniature rotor velocity meter



Measurements / Instrumentation – Water Surface/Differentials

- Water Surface Differentials
 - Piezometric taps with flexible tubing leading to staff gauge & differential manometer
- Water Surface Elevation
 - Precision point gauge & stilling well





Model Demonstration