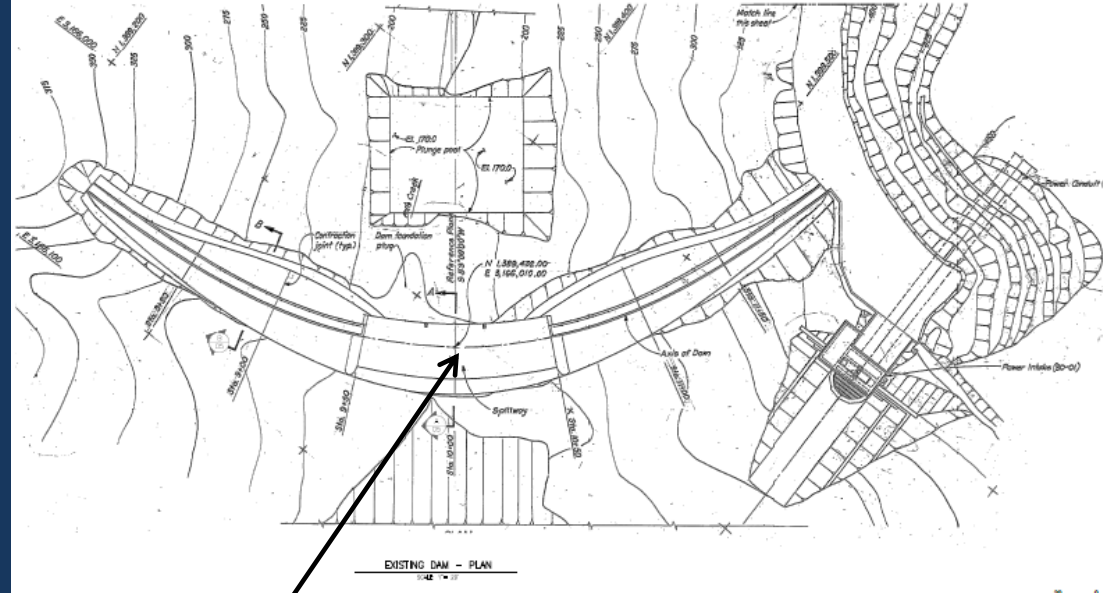


Special Projects Report February 2015

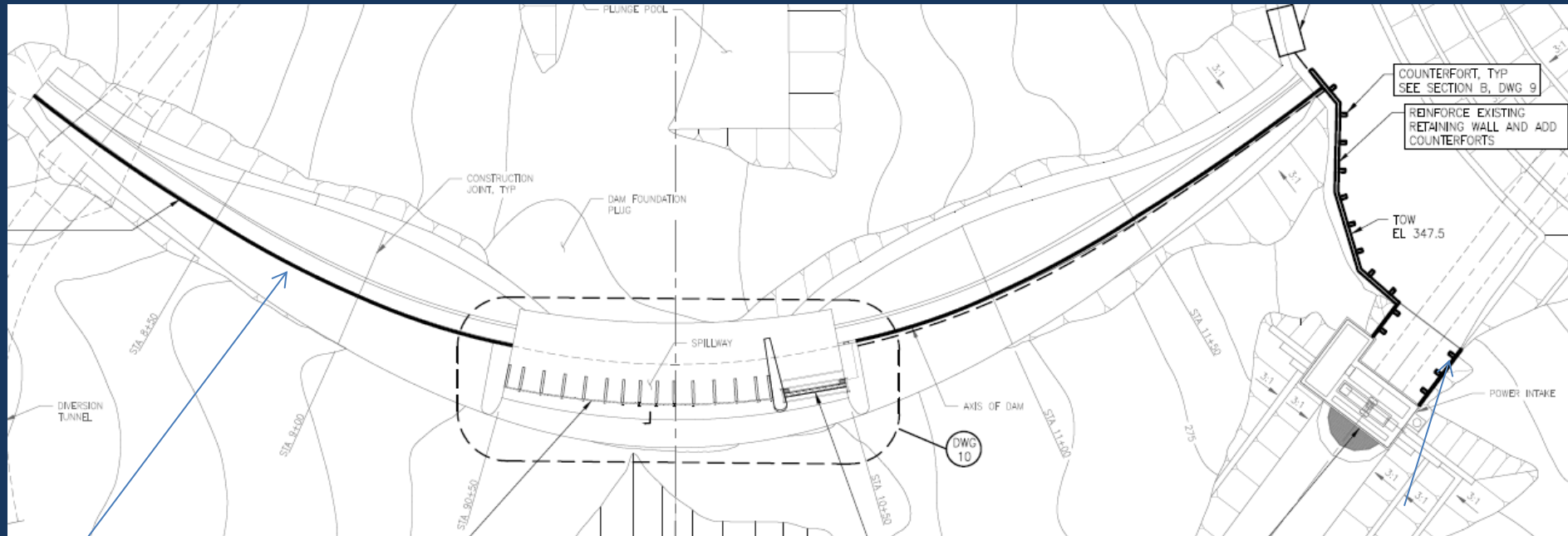


Swan Lake Reservoir Expansion

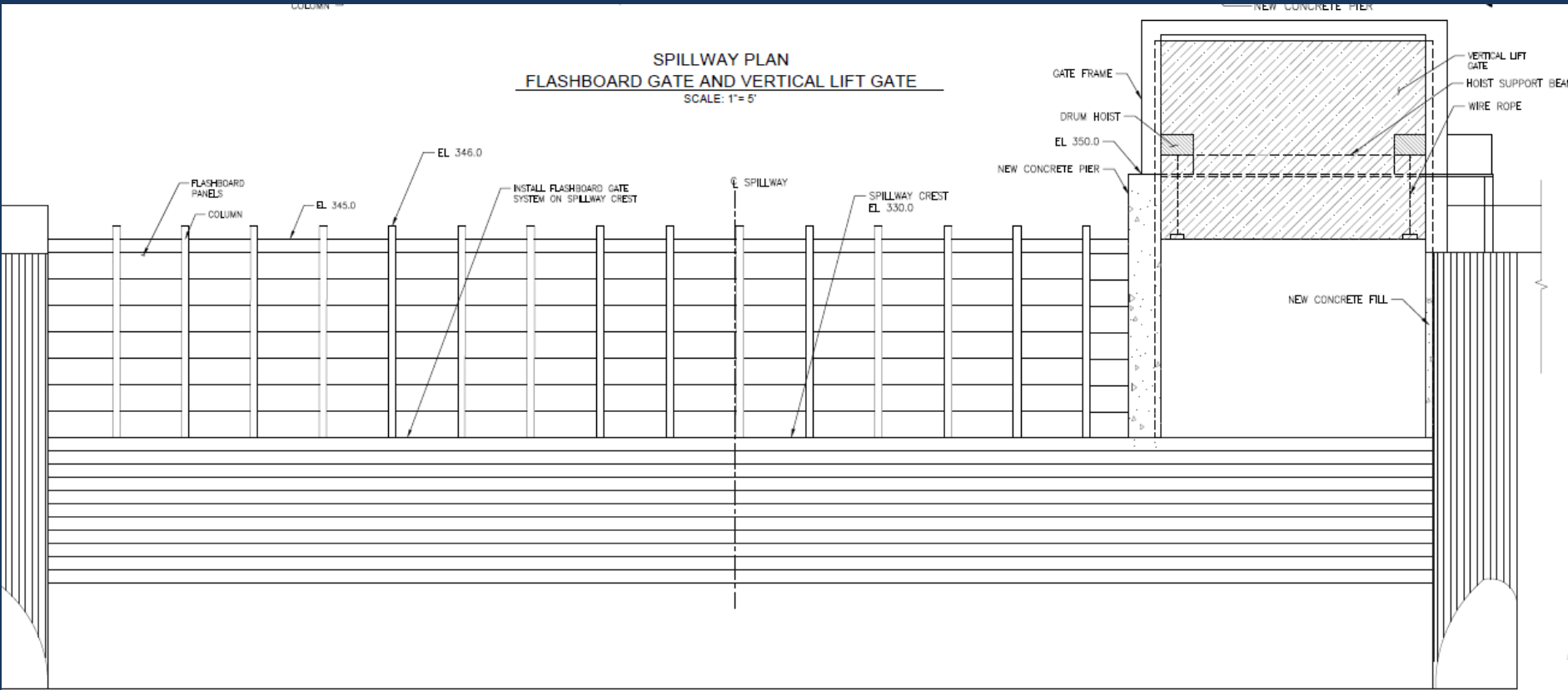


Put a spillway plug here, get a 25% increase in active storage!

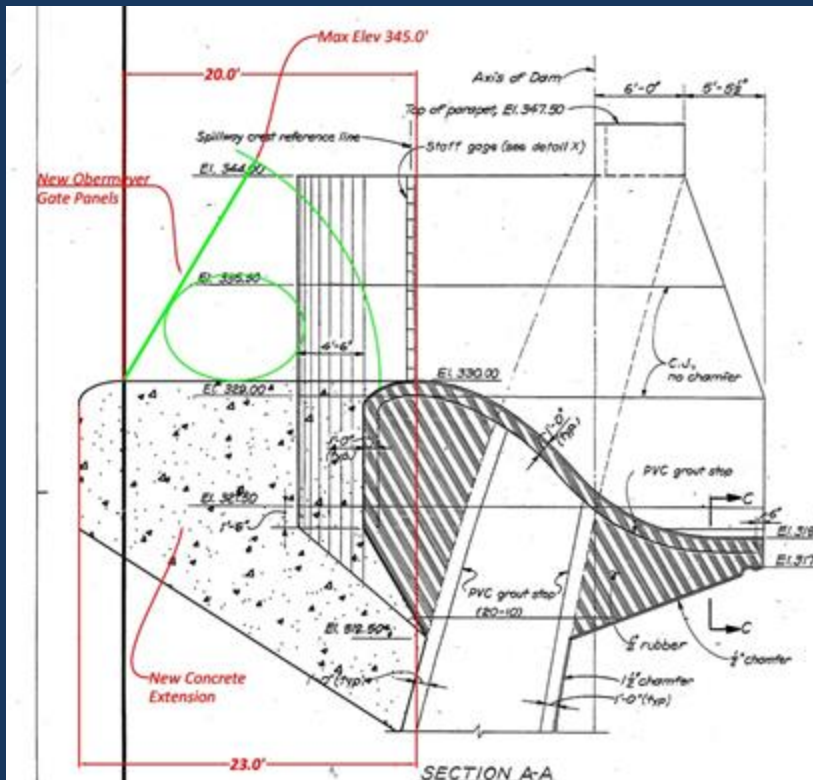
What is the big deal about Storage?.....



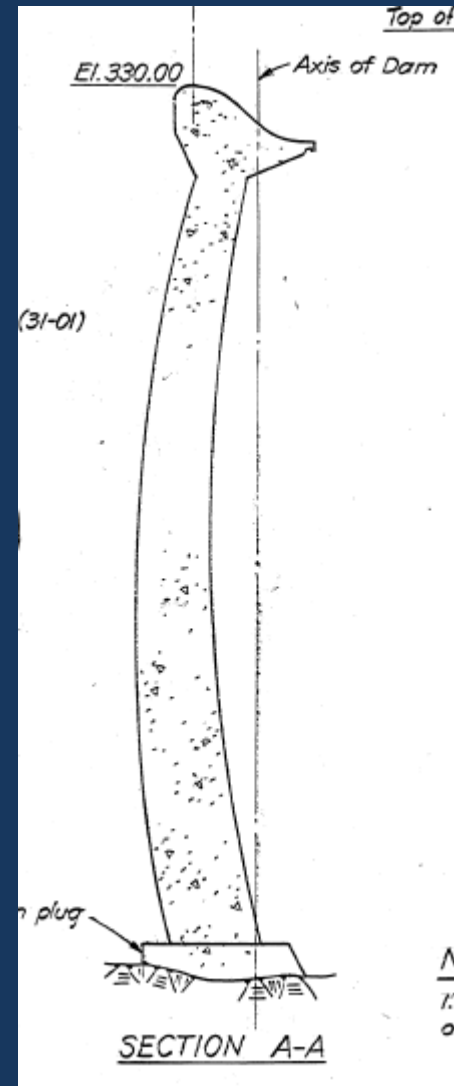
- Parapet Walls along Crest & 5" base slab
- Right Abutment wall
- Raise floor of gate house control room
- New jib crane for logging & on-going log removal
- 20 ft wide vertical control gate
- 78 ft wide, 15' tall fused panel wall



Swan Lake Reservoir Expansion

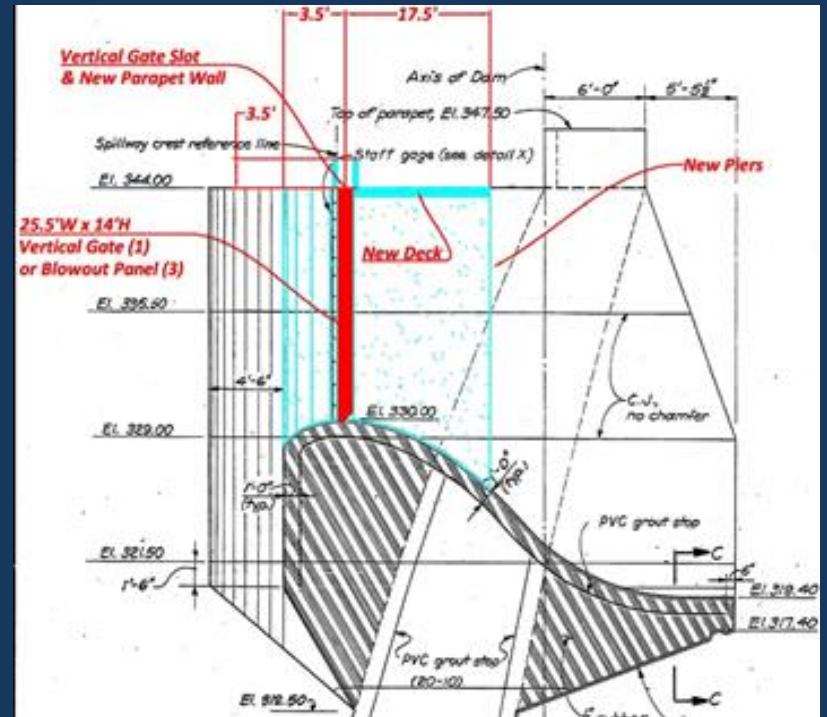
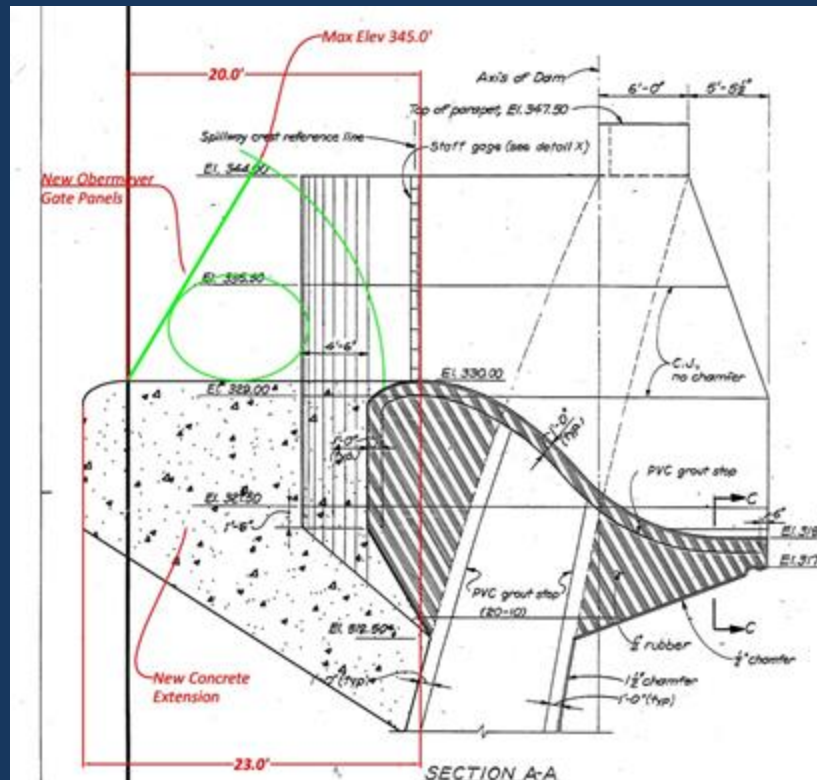


Upstream-downstream acceleration



The original feasibility report placed Obermeyer Gates upstream of the existing Ogee spillway section, this was done for control of any spill situation, 200 cfs up to 20,000 cfs (PMF routing). But this added a large mass at the top of the dam which presented seismic response concerns

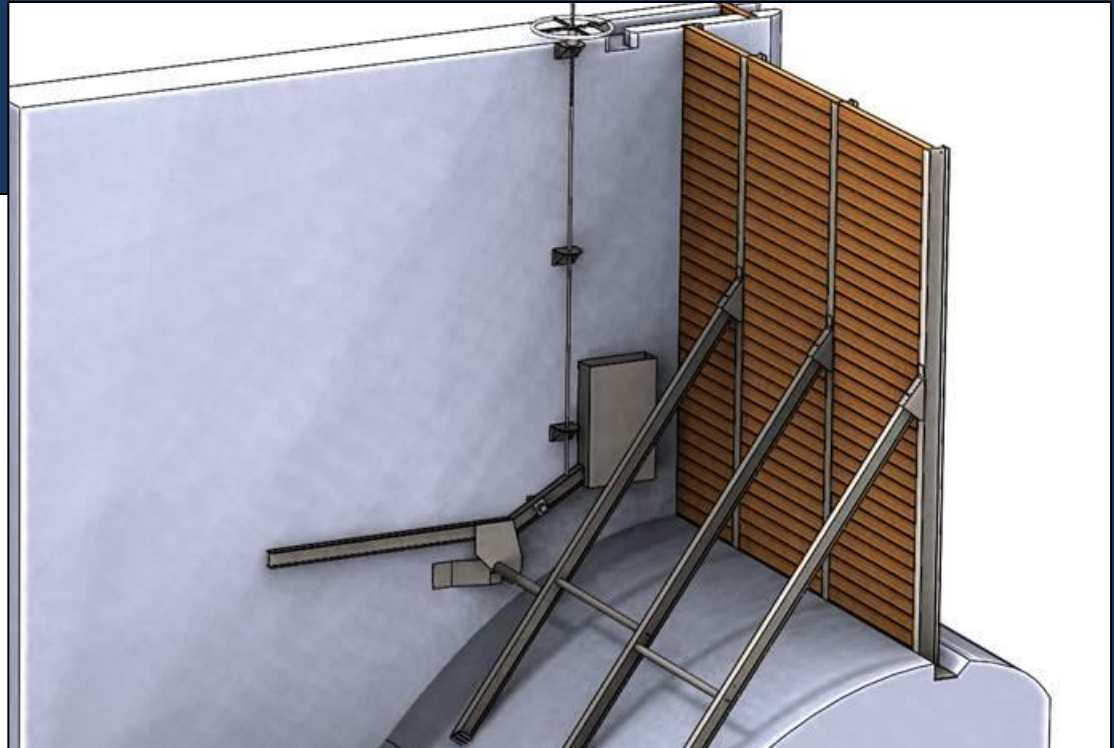
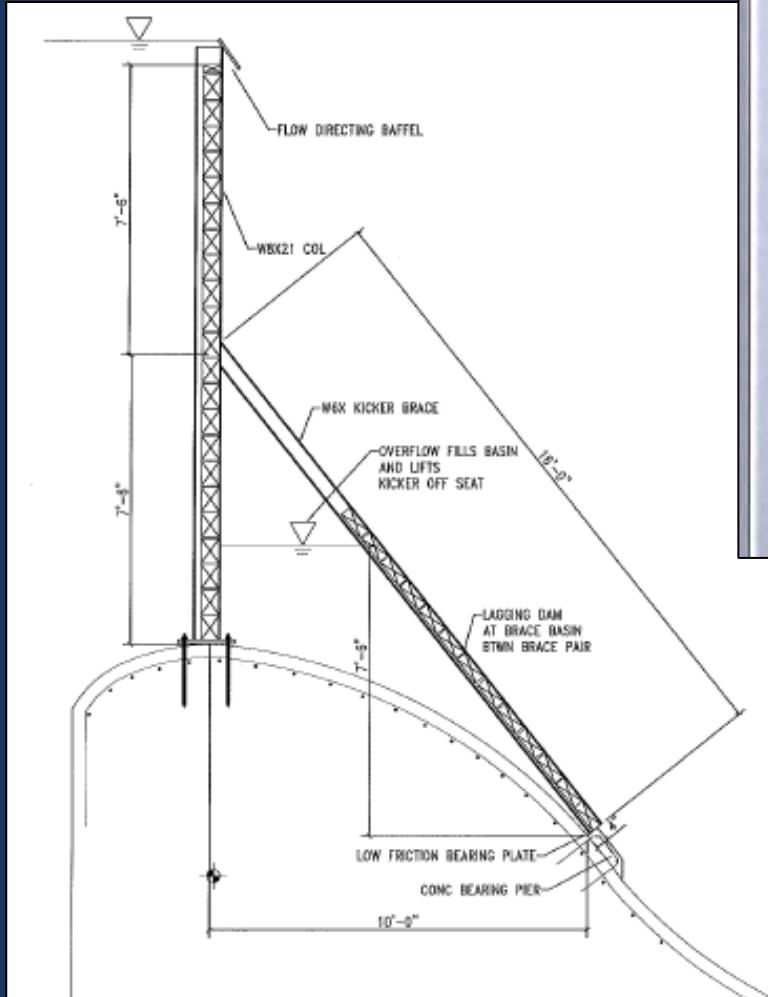
Swan Lake Reservoir Expansion



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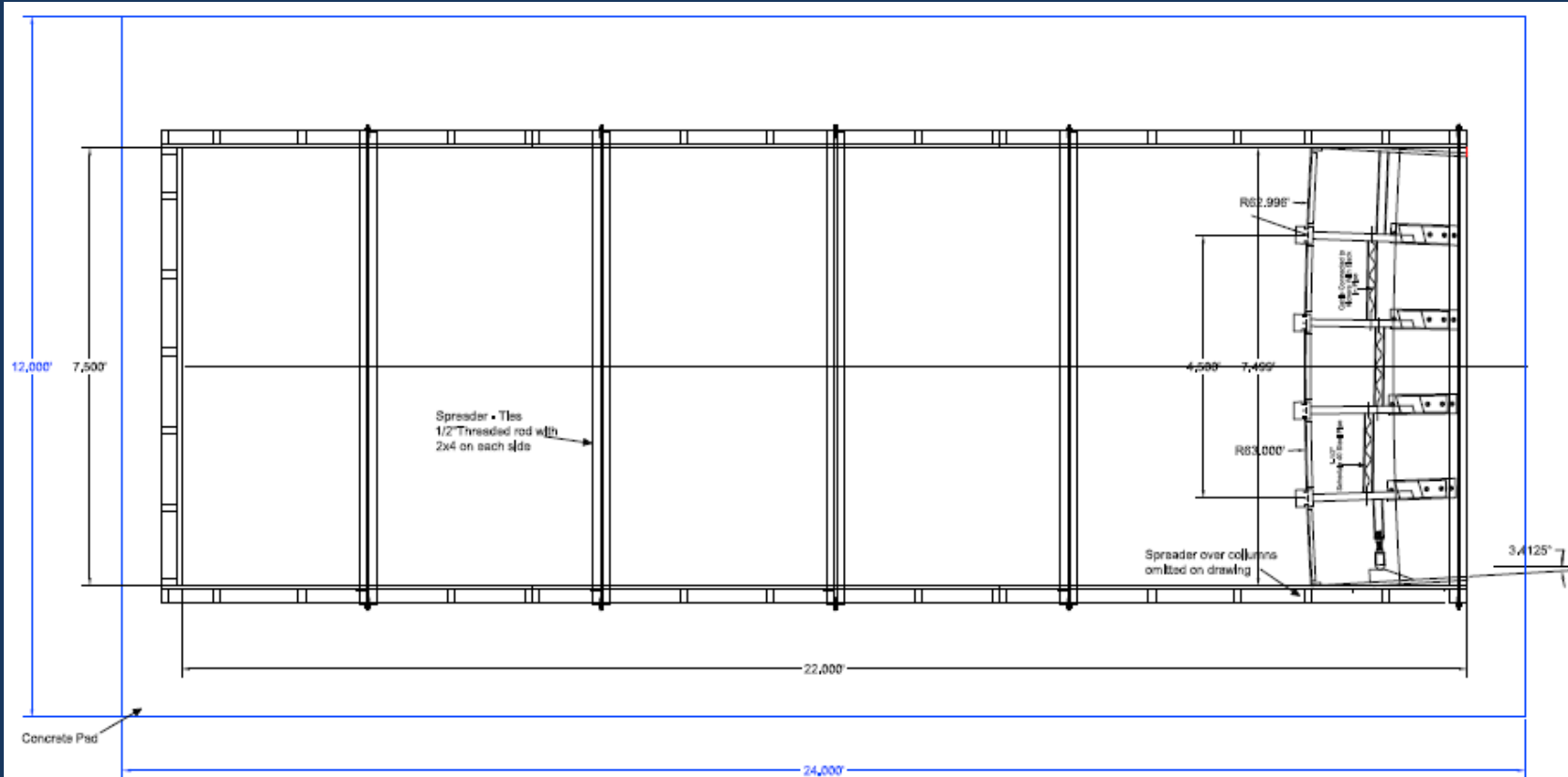
We changed the design criteria to remove all the added mass because of seismic considerations, simplified the control to just open or closed for $\frac{3}{4}$ of the gates, and removed one Obermeyer and added a more easily controlled and more robust vertical gate.....maintenance considerations, operational considerations.

Swan Lake Reservoir Expansion



BOC driven request for detailed modeling has delayed issue for request for proposals, but the flip side is that less and less design engineering will be required, a 1/4 scale model of 5 bays and a full scale trigger model have been built

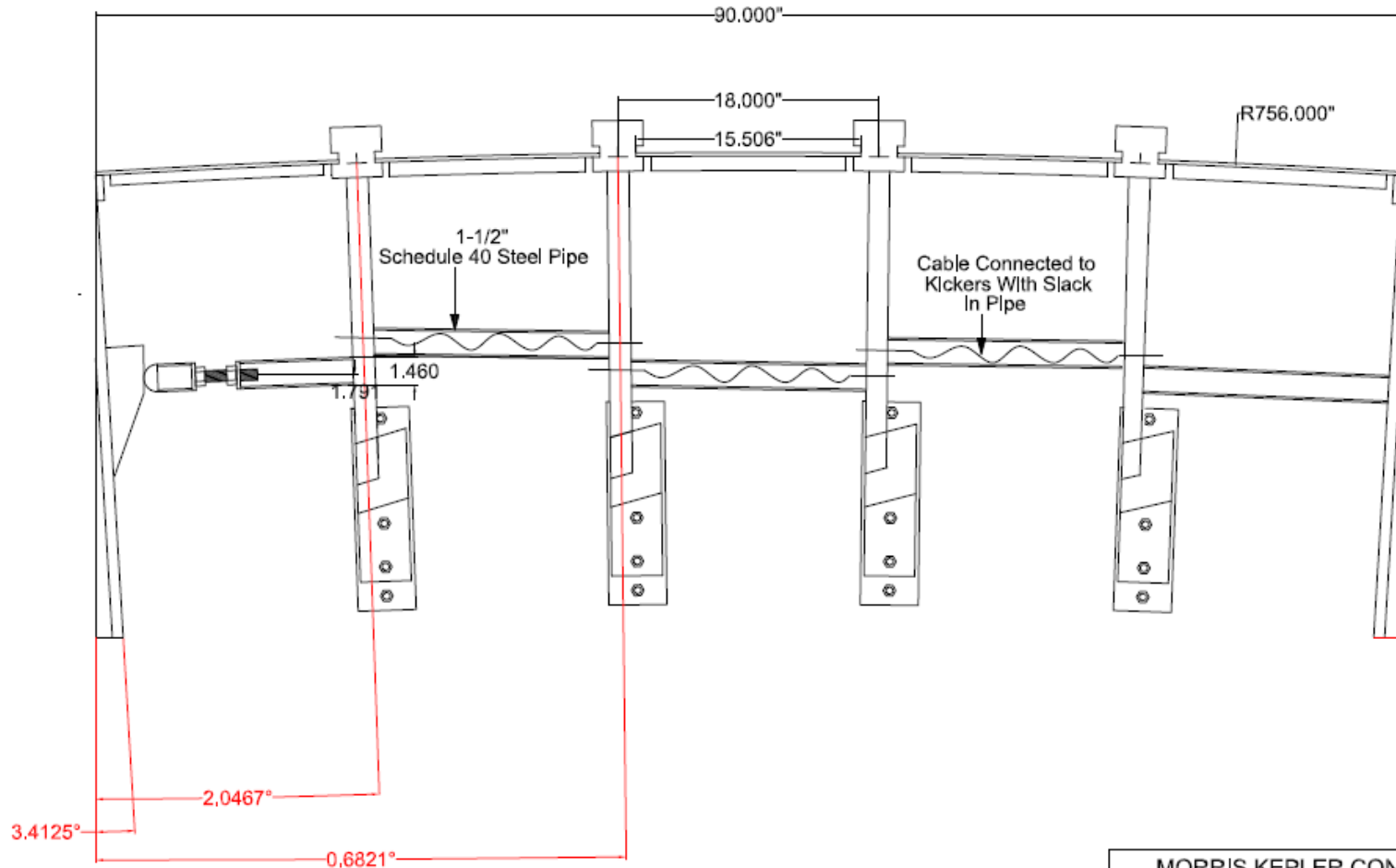
SWL Expansion- ¼ scale Model



MORRIS KEPLER CONSULTING LLC

We either had to contact Alden Labs at \$250 minimum, or build it ourselves

SWL Expansion- 1/4 scale Model



SWL Expansion- ¼ scale Model

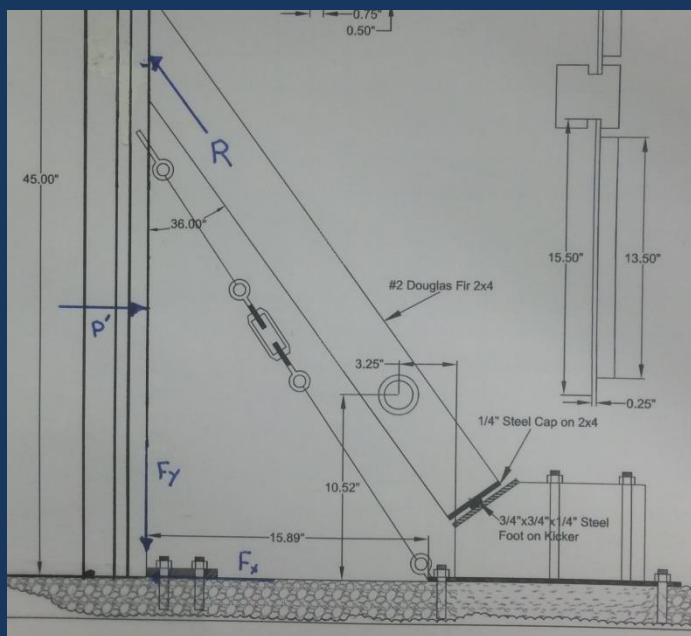
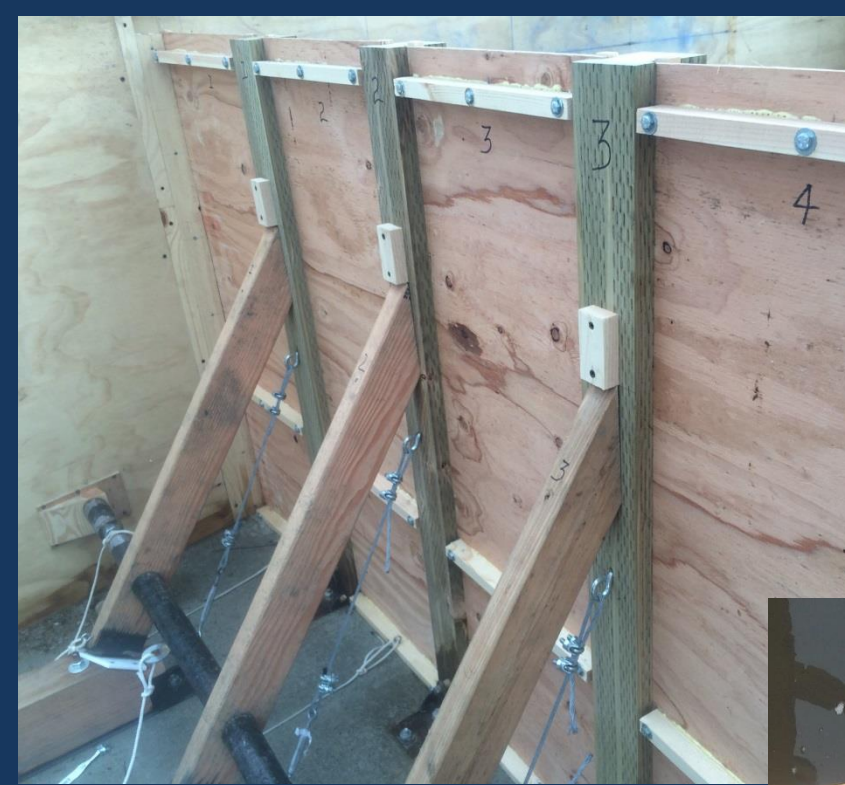


SWL Expansion- ¼ scale Model

Why Model Again?

FERC DHAC raised the concern of Arch Action and the pinch in at the flow passage preventing failure of the flashboards

BOC raised the concern of the sequential Trigger



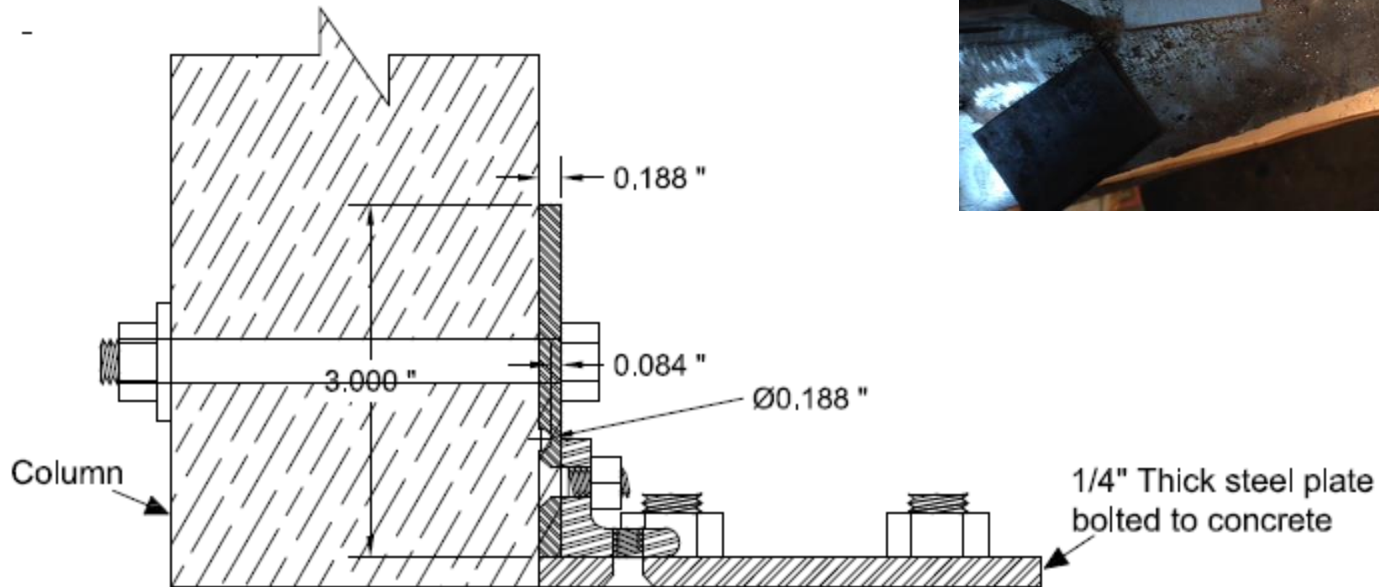
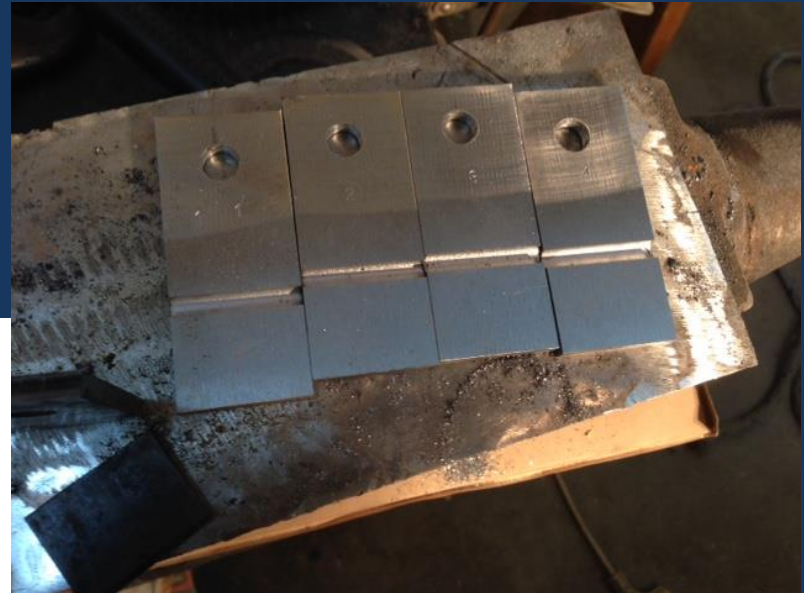
SWL Expansion- $\frac{1}{4}$ scale Model



SWL Expansion- $\frac{1}{4}$ scale Model



SWL Expansion- ¼ scale Model



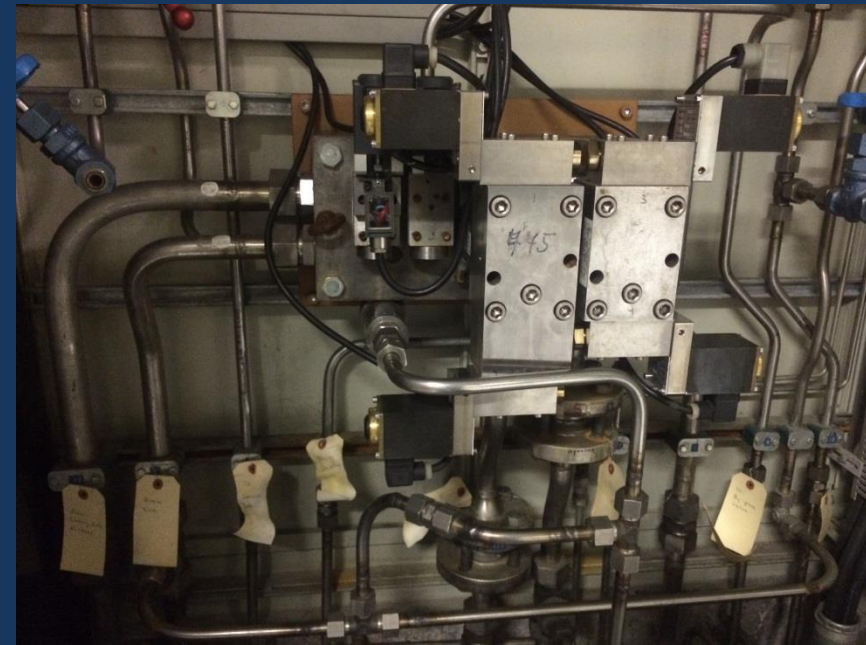
SWL Expansion- Full Scale Trigger Model



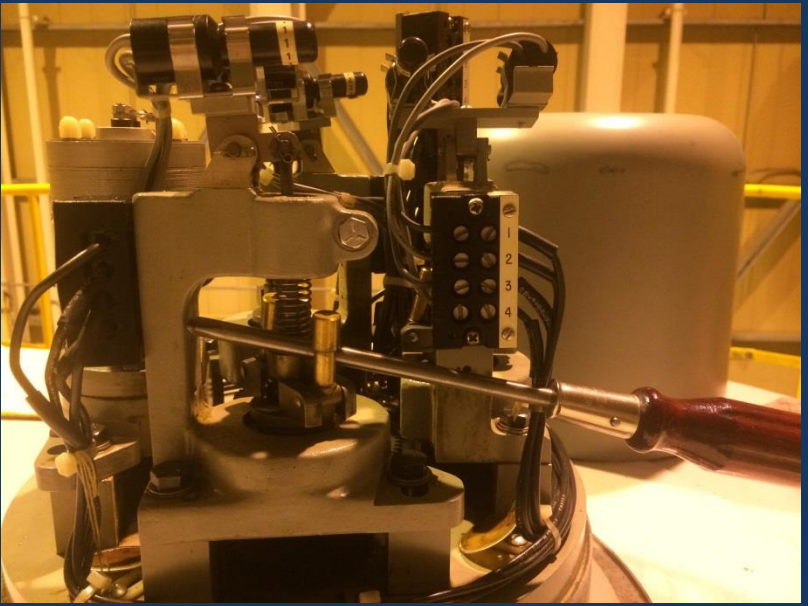
Swan Lake Raise- Schedule

	Traditional		New Common	
	Design-Then		Approach	
	Construct		EPC	
	start	finish	start	finish
Modeling Effort	11/15/14	2/27/15	11/15/14	2/27/15
Complete 30% design & BOC Review	2/6/15	3/6/15	2/6/15	3/6/15
Issue RFP for design or EPC based on 30% Design	3/2/15	3/20/15	3/2/15	4/10/15
Conform Contract	4/22/15	5/1/15	6/12/15	7/3/15
Design Project	5/4/15	12/28/15	7/6/15	12/21/15
Gain License Amendment	3/20/15	9/25/15	3/20/15	9/25/15
Apply for Construction permits	6/15/15	9/25/15	7/17/15	9/25/15
Bid then Order Equipment	8/14/15	10/23/15	10/14/15	12/23/15
Issue RFP For Construction	10/9/15	10/29/15	-	-
Conform Construction Contract	12/28/15	1/15/16	-	-
Equipment Delivery	4/20/16	6/4/16	6/16/16	7/31/16
Construction	3/25/16	9/30/16	12/15/15	9/30/16
Commissioning	10/3/16	11/18/16	10/3/16	11/18/16
Timber Harvest & Removal	4/17/17	10/27/17	4/17/17	10/27/17

Tyce CW & TSV

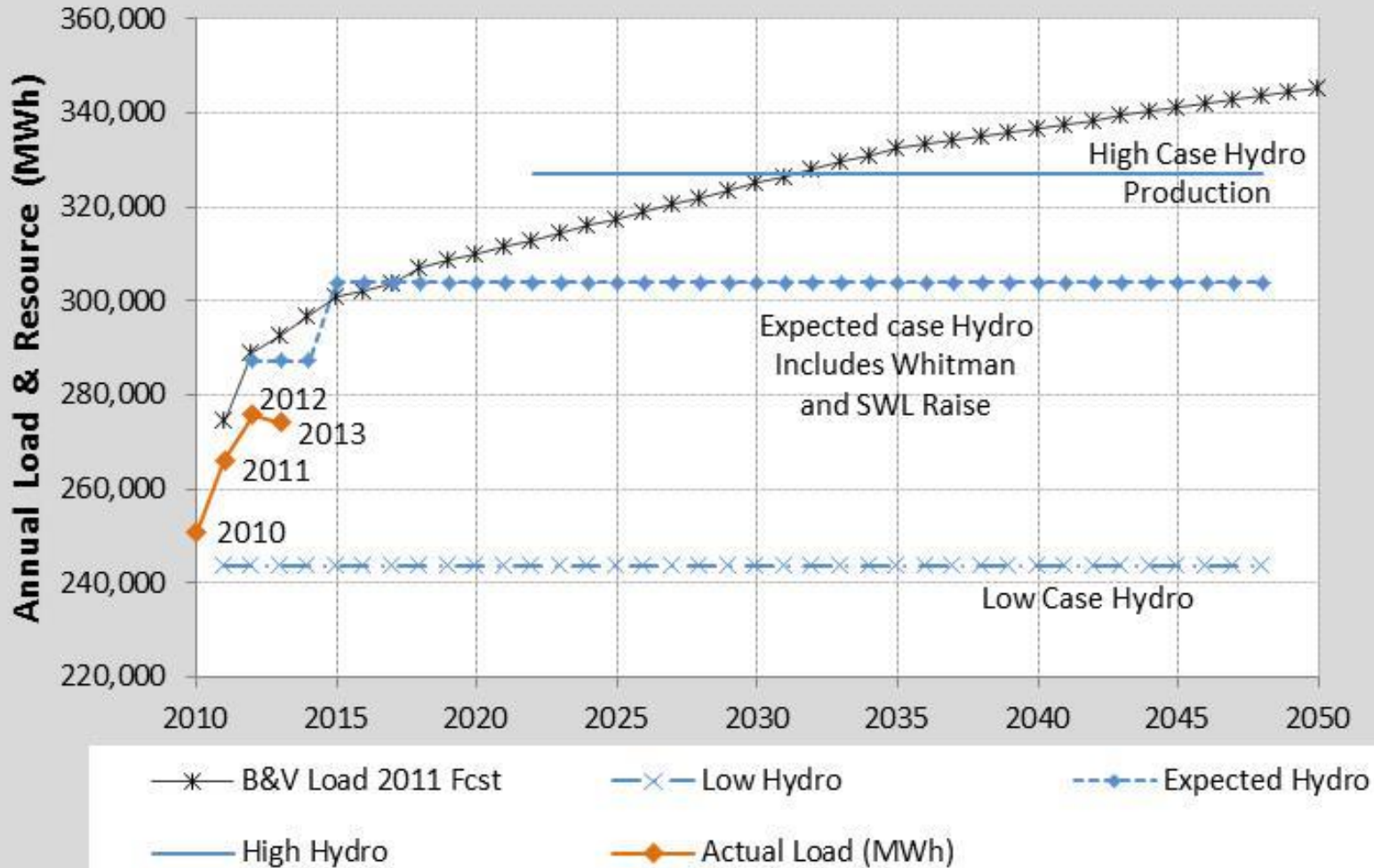


Tyee CW & TSV



Resource Planning

SEAPA Control Area - Annual Resource-Load Balance



Resource Planning-

Short Term- Swan Lake Raise- in a nut shell this project helps us get the most out of our existing resources on a system basis (a 100% renewable hydro system) at the lowest cost

Mid term Renewable - in conjunction with future Relicensing Effort- wind tidal or geothermal, but only if it makes sense.....loaded statement

Long Term Renewable -in conjunction with future Relicensing Effort..... Hydro

Hydro Site Analysis- Long Term

Despite the rhetoric of the SEIRP, which is to bring all sites up to a standard level of comparable information, we are not doing that. Some sites get to level 1, and we document why, some sites get to level 2, and we document that, and some sites get to level 3, next year we will increase the list and carry some sites to level 3-4



Working on filling in missing data of sites according to the process at right

