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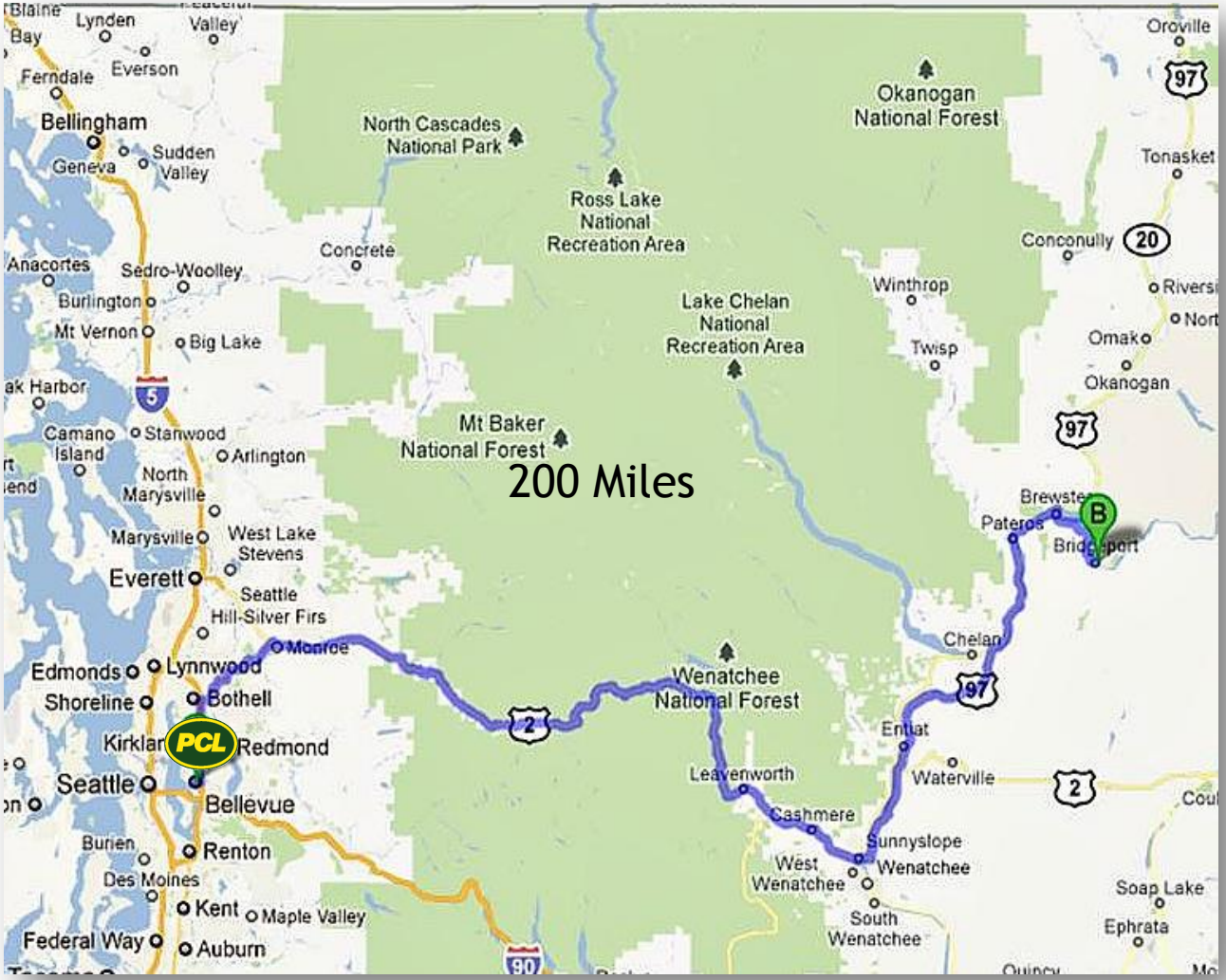
Chief Joseph Fish Hatchery

2013 ASC Student Competition Preconstruction Problem

Chief Joseph Dam – Bridgeport, WA



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Chief Joseph Dam

- ON COLUMBIA RIVER, EAST OF BRIDGEPORT, WA
- 2ND LARGEST POWER PRODUCING DAM IN THE U.S.
- OPERATED BY US Army Corps of Engineers, Power from Dam supplied to BPA

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Chief Joseph Fish Hatchery – Owner Team

- Owner – Bonneville Power Administration
- Designer/Owner's Representative – TetraTech
- End User – Confederated Tribes of the Colville Reservation
- Additional Stakeholders
  - US Army Corps of Engineers
  - Washington State Parks
  - Douglas County PUD
  - Grant County PUD

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Fish Hatchery – History

- Promised to Colville Tribe when Dam System added to Columbia River
- Confederated Tribes of the Colville Reservation will use and operate the Hatchery after completion
- Hatchery intended to produce approx1.9 Million salmon each year

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Fish Hatchery Facility

- Auxiliary Facilities includes:
  - 2 Acclimation Ponds (sites north of the Hatchery)
  - Employee Housing complex
  - Well field northeast of the Hatchery

  - Hatchery complex includes:
    - Office Building, Hatchery Building, Storage Building, Head Box, Raceways, 3 Fish Rearing Ponds, and Fish Ladder/Spawning Facility

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Overall Schedule

- Preconstruction Start January, 2009; Finish June, 2010
- Separate contract for Well Fields
  - Start October, 2009; Finish March, 2010
- Phase I contract originally included Acclimation Ponds and Housing
  - Start June, 2010; Finish February, 2011
- Phase II (Change Order) for Hatchery Facility
  - Start December, 2010; Finish April, 2013

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Budget

- Well Fields – $665,000
- Preconstruction Services – $167,000
- Hatchery Facility –
  - Orig Contract amount – $43 Million
  - Final Contract amount – $51 Million

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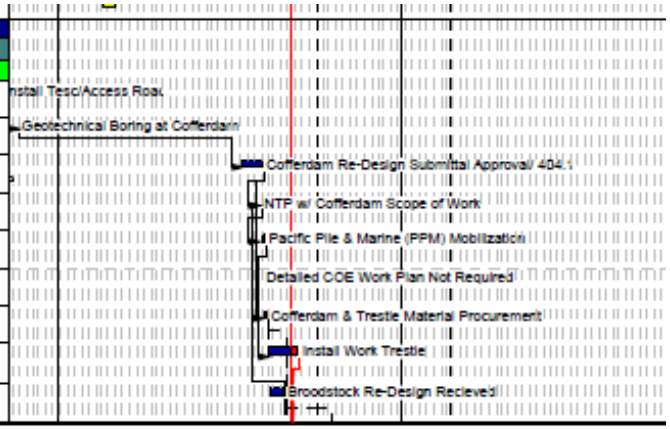
Project Schedule Exercise

Brood Stock

Site Work

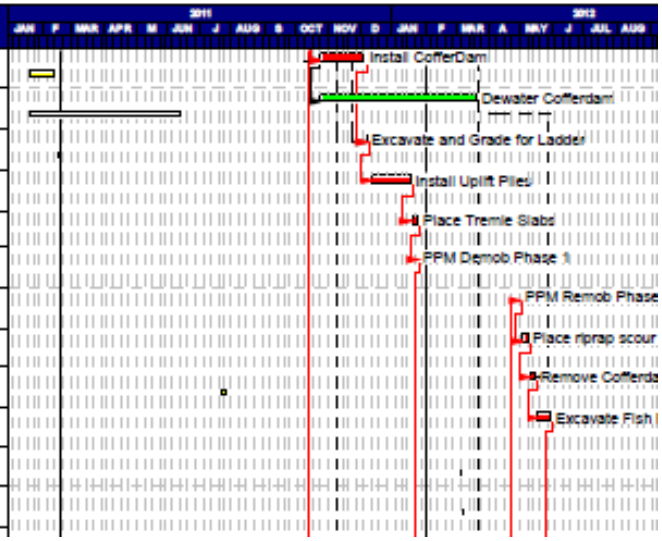
HAT-2210	Install Tesc/Access Road	5	0	13DEC10 A	23DEC10 A
HAT-2265	Geotechnical Boring at Cofferdam	1	0	10JAN11 A	10JAN11 A
HAT-2285	Cofferdam Re-Design Submittal Approval 404.1	11	0	24AUG11 A	14SEP11 A
HAT-2315	NTP w/ Cofferdam Scope of Work	0	0	12SEP11 A	12SEP11 A
HAT-2515	Pacific Pile & Marine (PPM) Mobilization	10	0	12SEP11 A	16SEP11 A
HAT-2555	Detailed COE Work Plan Not Required	0	0	15SEP11 A	14SEP11 A
HAT-2545	Cofferdam & Trestle Material Procurement	10	0	16SEP11 A	19SEP11 A
HAT-2525	Install Work Trestle	17	7	20SEP11 A	21OCT11
HAT-2535	Broodstock Re-Design Recieved	1	0	22SEP11 A	05OCT11 A



Start date	25OCT10
Finish date	31DEC12
Data date	13OCT11

CHIEF JOSEPH HATCHERY - PHASE 2

Act ID	Description	Orig Dur	remaining Dur	Early Start	Early Finish
HAT-2215	Install CofferDam	30	30	24OCT11	06DEC11
HAT-2220	Dewater Cofferdam	103	103	24OCT11	22MAR12
HAT-2226	Excavate and Grade for Ladder	3	3	07DEC11	09DEC11
HAT-2290	Install Uplift Piles	25	25	12DEC11	18JAN12
HAT-2330	Place Tremie Slabs	5	5	19JAN12	25JAN12
HAT-2500	PPM Demob Phase 1	2	2	26JAN12	27JAN12
HAT-2510	PPM Remob Phase 2	2	2	02MAY12	03MAY12
HAT-2520	Place riprap scour protection	5	5	04MAY12	10MAY12
HAT-2261	Remove Cofferdam	3	5	11MAY12	17MAY12
HAT-2271	Excavate Fish Processing Slab	10	10	18MAY12	01JUN12
HAT-2266	Finsh Grade Brood Stock Area	4	4	06DEC12	11DEC12
HAT-2271	Asphalt paving	1	1	12DEC12	12DEC12



Actual Broodstock Schedule

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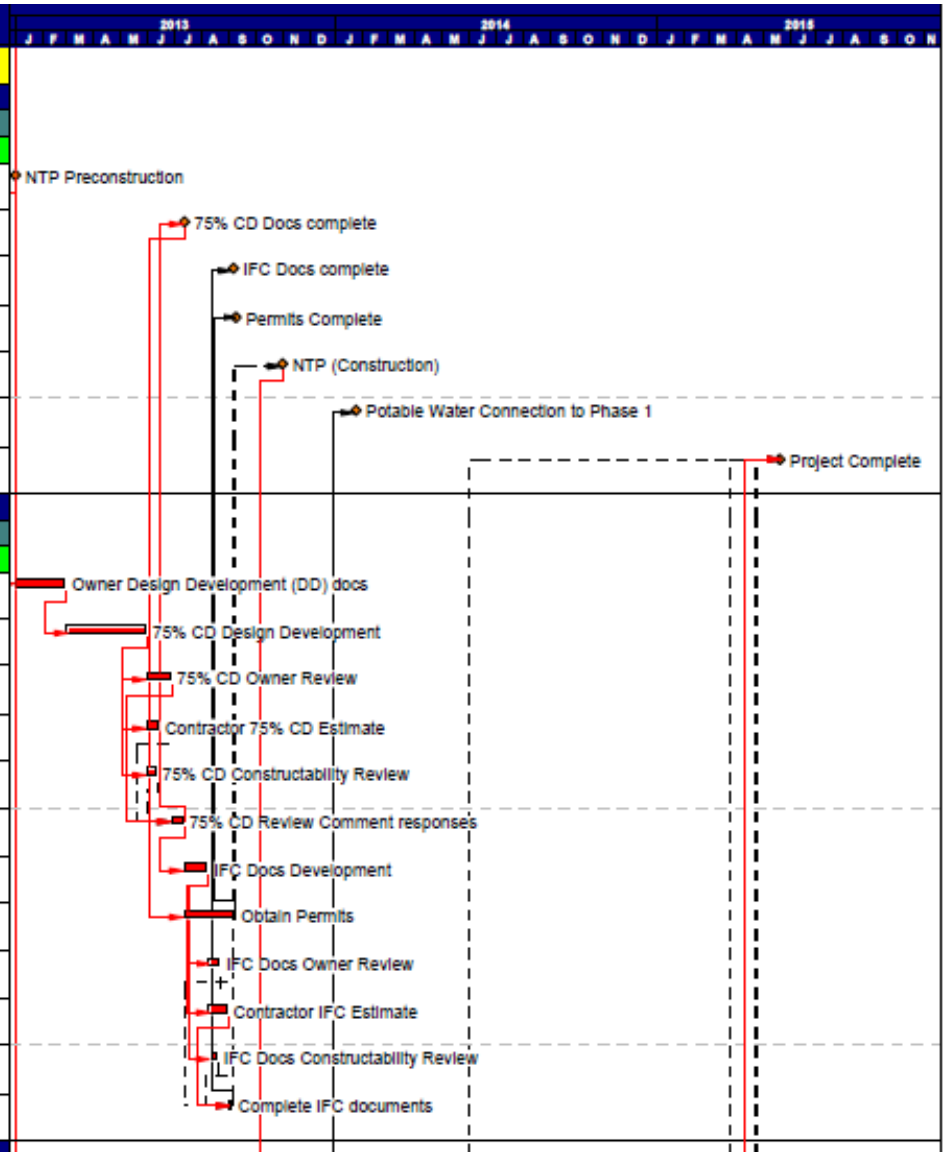
The Pacific NW Project SOLUTION

Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish
Milestones					
MIL-1011	NTP Preconstruction	0	0	01JAN13 *	
MIL-1075	75% CD Docs complete	0	0		11JUL13
MIL-2000	IFC Docs complete	0	0		06SEP13
MIL-2010	Permits Complete	0	0		09SEP13
MIL-1001	NTP (Construction)	0	0	01NOV13 *	
MIL-3140	Potable Water Connection to Phase 1	0	0		23JAN14
MIL-1006	Project Complete	0	0		21MAY15
Preconstruction					
PREC-0100	Owner Design Development (DD) docs	60	60	01JAN13	01MAR13
PREC-0110	75% CD Design Development	90	90	02MAR13	30MAY13
PREC-0120	75% CD Owner Review	28	28	31MAY13	27JUN13
PREC-0170	Contractor 75% CD Estimate	14	14	31MAY13	13JUN13
PREC-0180	75% CD Constructability Review	8	8	31MAY13	11JUN13
PREC-0130	75% CD Review Comment responses	14	14	28JUN13	11JUL13
PREC-0140	IFC Docs Development	30	30	12JUL13	10AUG13
PREC-0230	Obtain Permits	60	60	12JUL13	09SEP13
PREC-0150	IFC Docs Owner Review	14	14	11AUG13	24AUG13
PREC-0160	Contractor IFC Estimate	21	21	11AUG13	31AUG13
PREC-0190	IFC Docs Constructability Review	8	8	12AUG13	21AUG13
PREC-0200	Complete IFC documents	5	5	02SEP13	06SEP13



Precon Activities

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Bid Recap Exercise

- PCL developed Bid Scope packages during preconstruction. Worked with Owner on Subcontractor selection
- TERO bid preferences – sliding scale
- All trades hiring through TERO office

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Freezer Bid Recap Exercise

11-01 Bid Recap: Walk-In Freezer and Cooler

Sec	Description	Quantity	UOM	Unit Cost	Total Cost	Larry's Mechanical	Omak HVAC	ABC Sheetmetal
			Contractor Total:					
		Contractor Estimated Costs:						
						Larry Mitchell	Jim Hayes	Doug Thompson
	Spec 114006 - Walk-In Freezer and Cooler							
	Walk-In Freezer and Cooler Scope	1.00	LS	75,000.00	75,000.00	$59,550.36	$70,441.00	$69,909.00
	Addendum 1 (9/14/12) Acknowledged				Inc.	Inc	Inc	Inc
	Addendum 2 (9/17/12) Acknowledged				Inc.	Inc	Inc	Inc
	Addendum 3 (10/24/12) Acknowledged				Inc.	Inc	Inc	Inc
	Per Plans and Specs				Inc.	Inc	Inc	Inc
	Davis Bacon Wage Rates				Inc.	$5,385.00	Inc	Inc
	Taxes				Inc.	Inc	Inc	Inc
	Bond Included?				No/Ok	No/Ok	No/Ok	No/Ok
	TERO Bidding "Discount"				NA	No	($7,044.10)	No
	Subtotal (Determination of Selected Bidder)					$84,935.36	$63,396.90	$69,909.00
	TERO Bidding "Discount"				NA	$0.00	$7,044.10	$0.00
	Total Cost to Owner					$84,935.36	$70,441.00	$69,909.00

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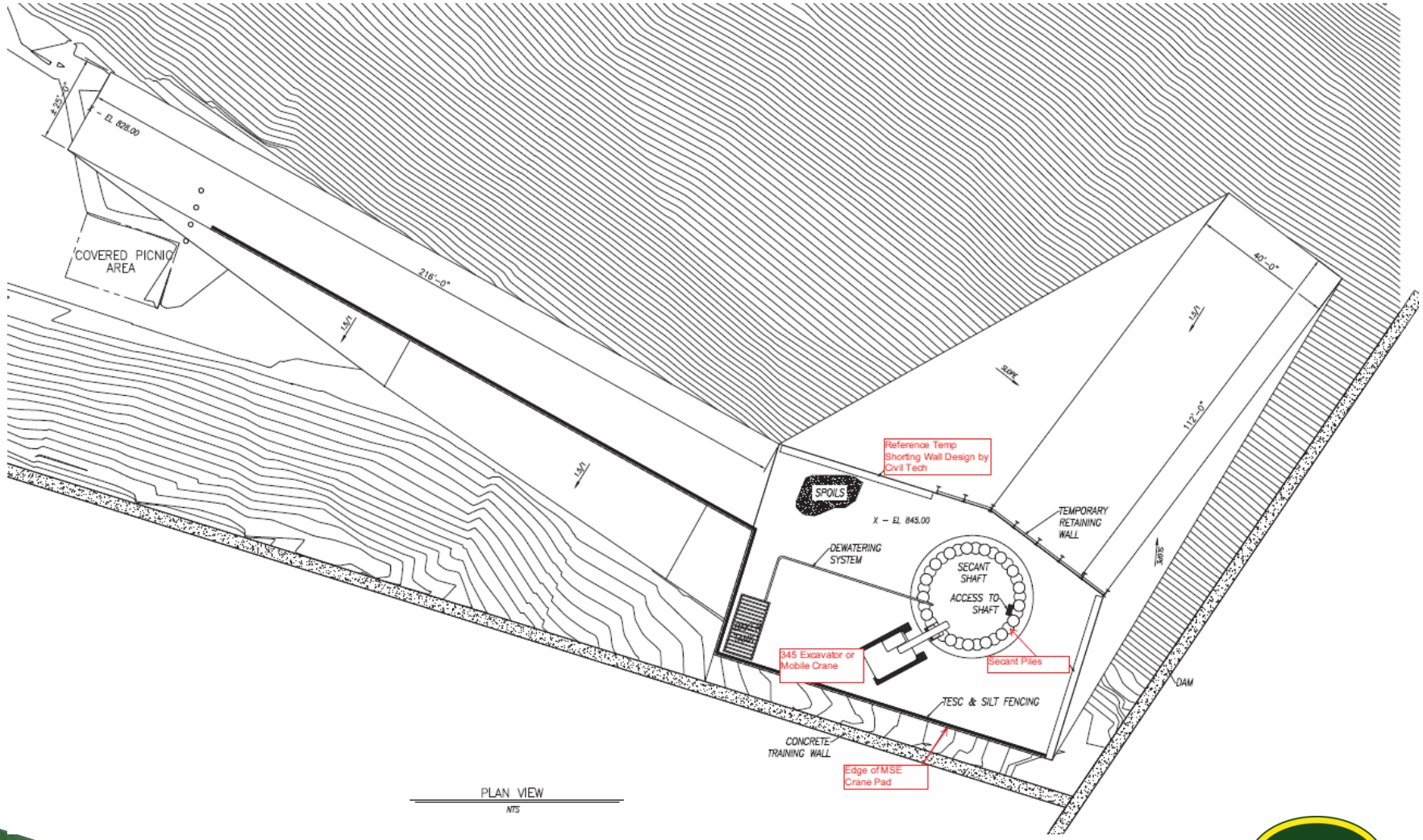
Relief Tunnel Crane Pad Exercise



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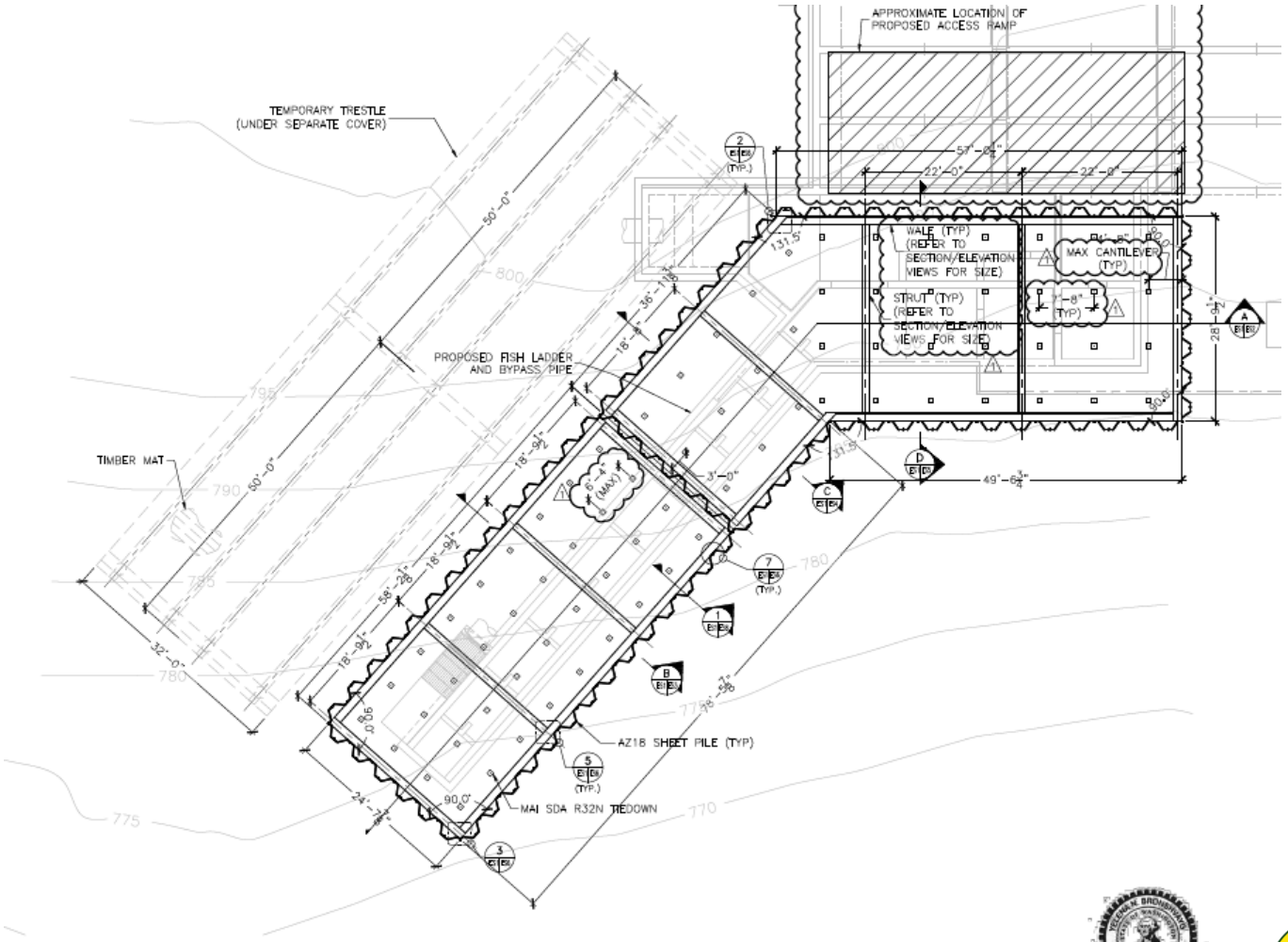
Brood Stock Cofferdam Exercise



TEMPORARY SUPPORT OF EXCAVATION PLAN

SCALE: 1/8" = 1'-0"

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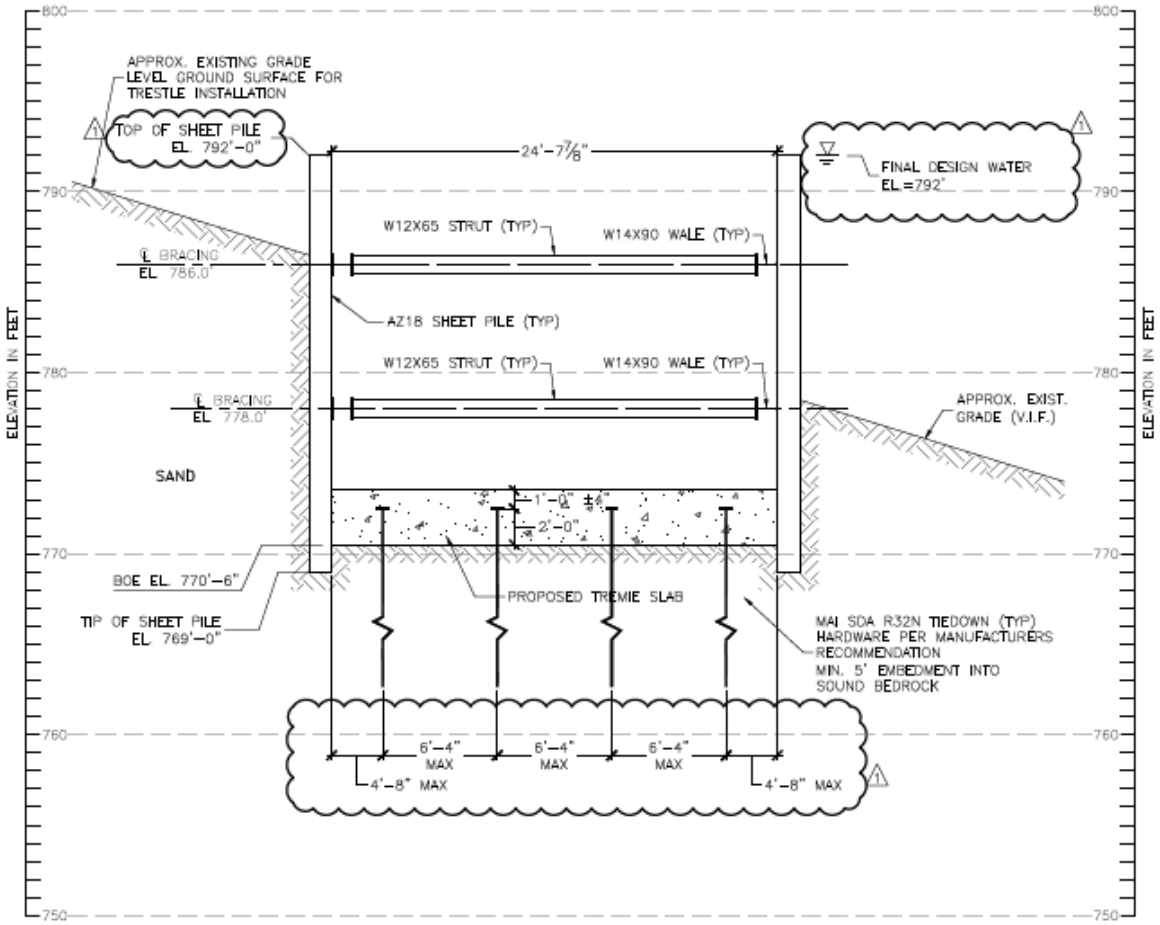
Brood Stock Cofferdam Exercise



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ES1 ES3
SUPPORT OF EXCAVATION SECTION
SCALE: 1/4" = 1'-0"

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Cofferdam Solutions

- 3 Sided Cofferdam w/Brace Frame – Water Elevation 784'
  - Costs – $517K, Schedule – 2 Week impact
  - Assume no ground water migration
- 4 Sided Cofferdam w/Brace Frame and Work Tressle – Water Elevation 795'
  - Costs – $2M ($1.2M cofferdam & $900K Schedule)
  - Schedule – 14 Week impact
  - Seal slab and uplift piles required

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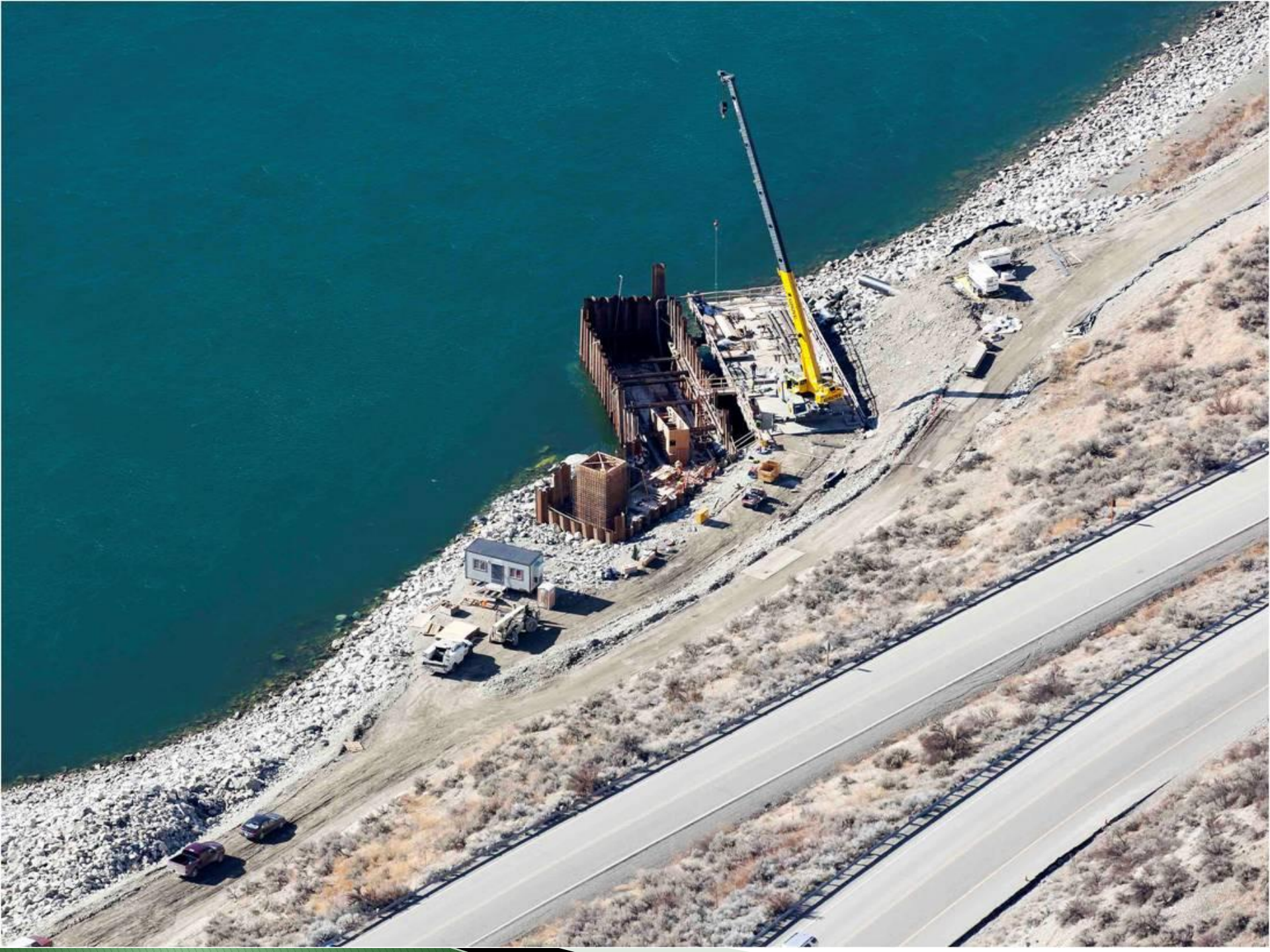

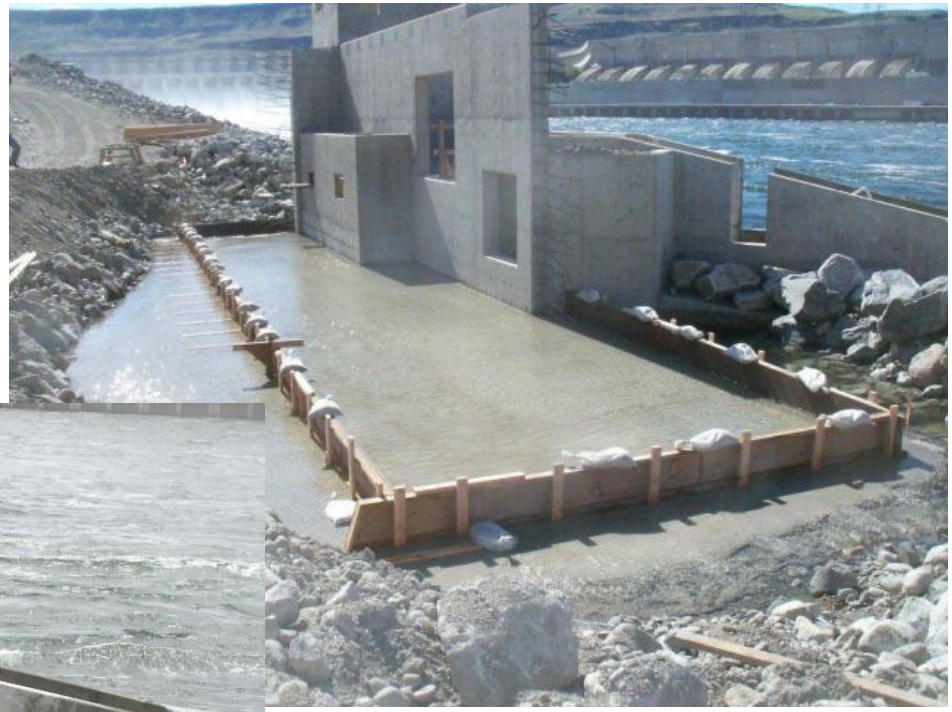

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Raceway Wall Finish Exercise

- PCL used conventional Peri panelized forms
- Engaged Hatchery Manager late in the process – Discovered wall finish was susceptible to spreading bacteria between sections
- Result was extensive sacking and patching of Raceway walls

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Raceway Wall Exercise Solution

- Raceway Wall Finish Option # 1A

- **Formwork Type / Summary:**
- Steel Forms
- Rental of two bays of formwork for duration
- Assume 75% crane support for activities
- Schedule/manpower limited by labor available in remote area

- **Finish Type / Level of Finish Expected:**
- Sack and Patch walls after stripping
- Allows 24 cure required by specifications
- Bug holes and joints filled to prevent areas for disease to build-up
- Eliminates ridges/sharp transitions for fish

- **Engineering/Constructability Considerations:**
- Fewer and smoother joint transitions than most panelized systems
- Forms more susceptible to heat during hot summers
- Less adaptable to changes
- Heavy crane useage
- Maintenance required long term for finish/cement that eventually will flake off at joints

- **Cost*: See Attached**

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Raceway Wall Exercise Solution

Wall Finish Option #1a

Description			Labor				Equipment		Material		Total	
	Quantity	UOM	MH/Unit	Hours	$/Hr	Total	$/Hr	Total	$/Unit	Total	$/Unit	Total
Form/strip walls (steel forms)	61,000	SF	0.080	4,880	$ 49.46	$ 241,365		$0		$ -		$ 241,365
Formwork rental *(3,000SF for 4.5 mo)*	13,500	SF-MO				$ -		$0	$ 2.00	$ 27,000		$ 27,000
Curing (water)	61,000	SF	0.015	915	$ 38.65	$ 35,365		$0	$ 0.20	$ 12,200		$ 47,565
Crane Support *(75% use to forming)*	4.50	mo	130	585	$ 48.80	$ 28,548	$ 154.32	$90,277		$ -		$ 118,825
Finish Walls (Sack and Patch)	57,000	SF	0.045	2,565	$ 45.51	$ 116,733		$0	$ 0.30	$ 17,100		$ 133,833
TOTAL						$422,011		$90,277		$56,300		$568,588

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Raceway Wall Exercise Solution cont.

Wall Finish Option #2a

Description			Labor				Equipment		Material		Total	
	Quantity	UOM	MH/Unit	Hours	$/Hr	Total	$/Hr	Total	$/Unit	Total	$/Unit	Total
Form/strip walls (panelized)	61,000	SF	0.070	4,270	$ 49.46	$ 211,194		$0		$ -		$ 211,194
Formwork rental *(3,000SF for 4.5 mo)*	13,500	SF-MO				$ -		$0	$ 1.50	$ 20,250		$ 20,250
Curing (water)	61,000	SF	0.015	915	$ 38.65	$ 35,365		$0	$ 0.20	$ 12,200		$ 47,565
Crane Support *(75% use to forming,*	4.50	mo	130	585	$ 48.80	$ 28,548	$ 154.32	$90,277		$ -		$ 118,825
can cut down on craneage, but productivity would increase)												
Finish Walls (Sack and Patch)	57,000	SF	0.060	3,420	$ 45.51	$ 155,644		$0	$ 0.30	$ 17,100		$ 172,744
TOTAL						$430,751		$90,277		$49,550		$570,578

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Project Debrief – Tyler Kautz

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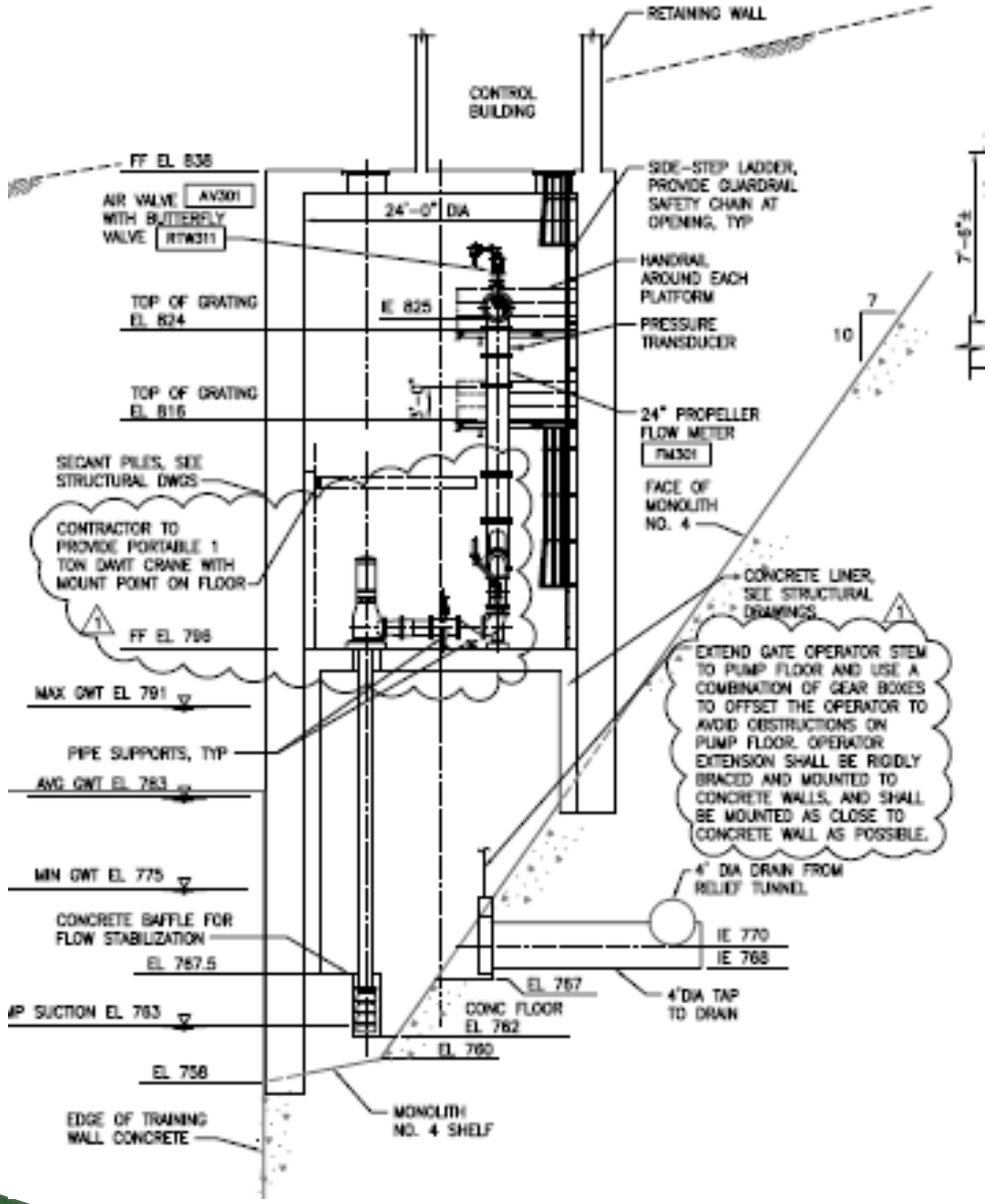

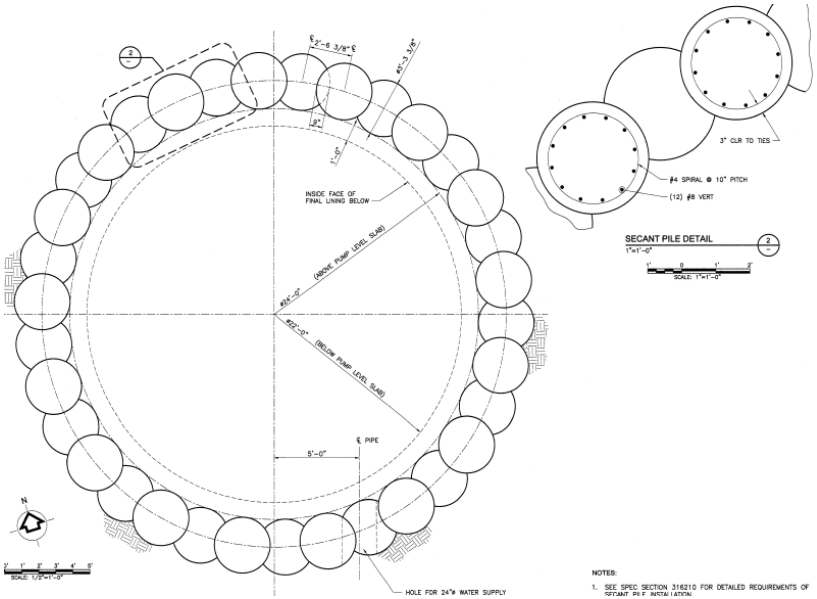

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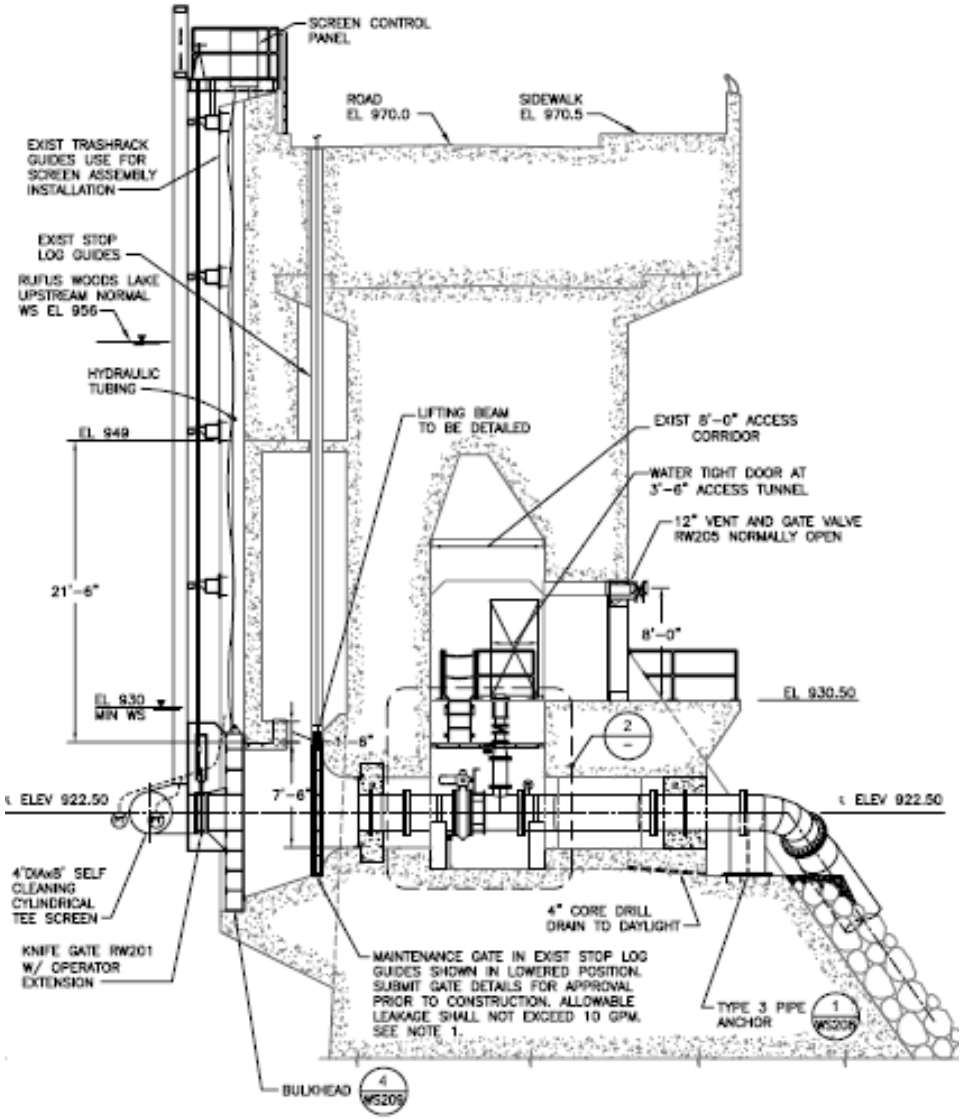

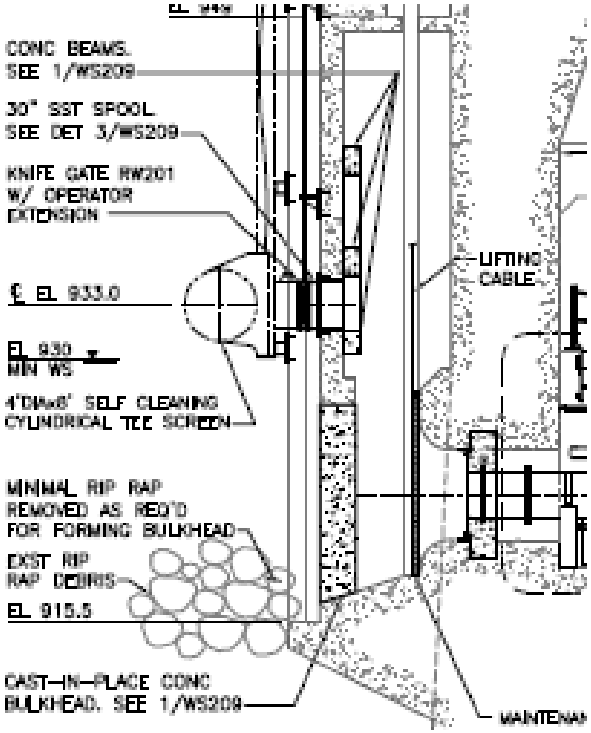

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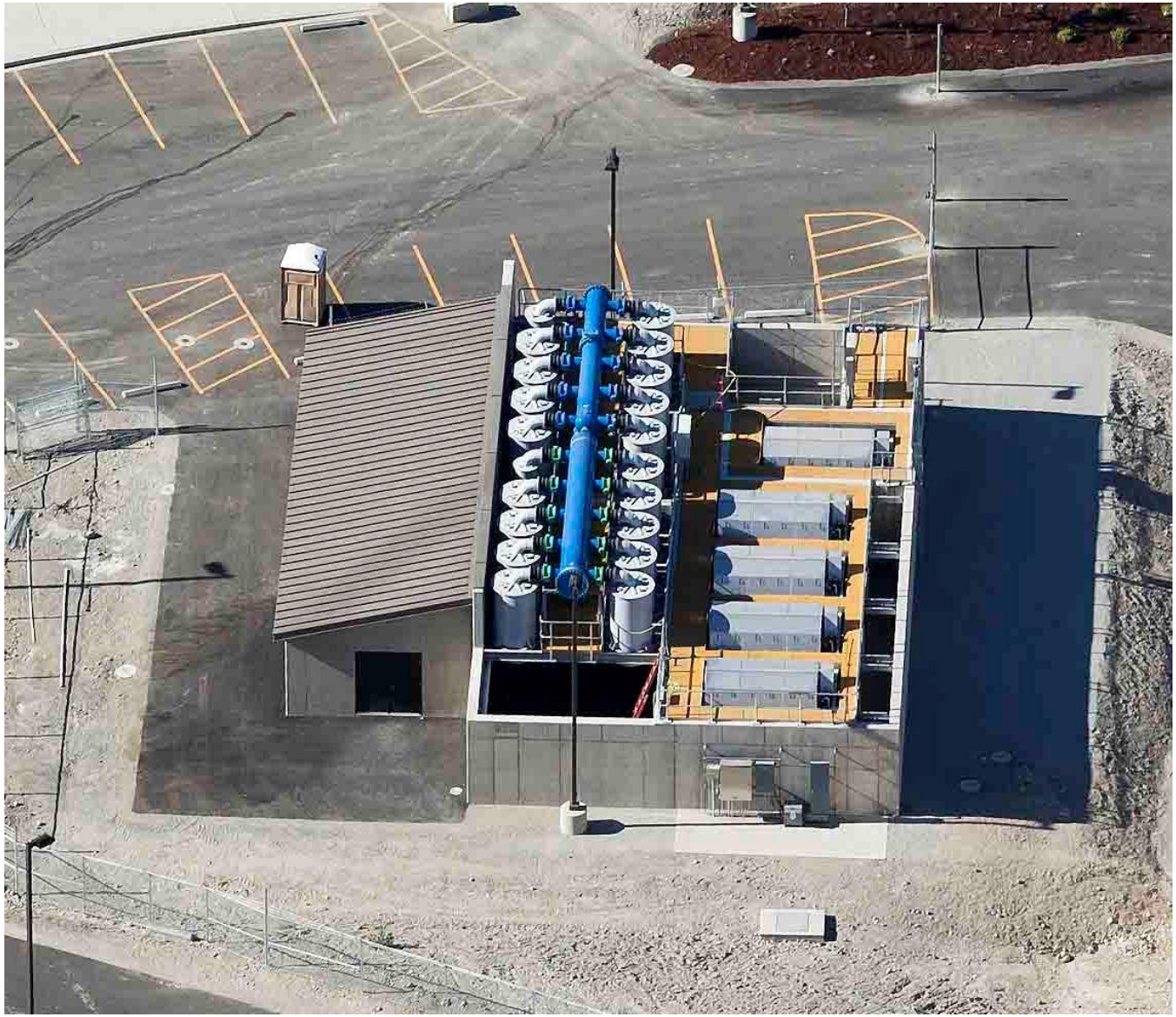

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Thank You for your Participation

Questions?