Meeting Notes
Lewis River License Implementation
Aquatic Coordination Committee (ACC) Meeting
December 9, 2010
Ariel, WA

ACC Participants Present (13)

Adam Haspiel, USDA Forest Service
David Hu, USDA Forest Service
Eli Asher, Fish Recovery Board (teleconference)
Diana Gritten-MacDonald, Cowlitz PUD
LouEllyn Jones, USFWS (teleconference)
John Weinheimer, WDFW
Shannon Wills, Cowlitz Indian Tribe (teleconference)
Todd Olson, PacifiCorp Energy (teleconference)
Frank Shrier, PacifiCorp Energy
Arianne Poindexter, PacifiCorp Energy
Jeremiah Doyle, PacifiCorp Energy
Nathan Higa, PacifiCorp Energy
Derek Nelson, McMillen LLC

Calendar:

January 13, 2011	ACC Meeting	Merwin Hydro
February 10, 2011	ACC Meeting	Merwin Hydro

Assignments from December 9, 2010 Meeting:	**Status:**
Aquatic Fund 2010/2011 Proposals - The modified matrix will be sent to the ACC members	**Pending**
Aquatic Fund 2010/2011 Proposals - A request for full proposals will be sent to the applicants no later than December 15, 2010	**Pending**
Aquatic Fund 2010/2011 Proposals – Get comments from the Yakama Nation, Cowlitz Indian Tribe and Fish First	**Pending**
Acclimation Pond Plan - Shannon Wills will convey the importance of the Yakama Nation weighing in on this issue to Bob Rose this afternoon.	**Pending**
Acclimation Pond Plan - PacifiCorp will identify 1-2 alternatives with pros and cons and will send via email.	**Pending**

Assignments from November 18, 2010 Meeting:	**Status:**
New Information Regarding Fish Transport into Lake Merwin and Yale Lake - Todd Olson/Frank Shrier will follow-up with Michelle Day, NOAA Fisheries, to discuss the diversion at Speelyai and need for fish passage.	**Pending**

New Information Regarding Fish Transport into Lake Merwin and Yale Lake – PacifiCorp to provide information collected as part of relicensing.	**Complete**
Merwin Upstream Trap and Transport - Frank Shrier will rewrite the October 13, 2010, email directly to the services describing the project delay and requesting approval	**Pending**
Aquatic Fund 2010/2011 Proposals - ACC comments on pre-proposals due	**Complete**
Aquatic Fund 2010/2011 Proposals – Utilities will notify recipients that full proposals will be due in January 2011.	**Due 12/15/10**
Speelyai Diversion Design – The project engineer will discuss the design with the ACC at the December 9, 2010 meeting	**Complete**

Assignments from October 14, 2010 Meeting:	**Status:**
Adam Haspiel will follow-up with John Weinheimer about any regulation changes regarding adding Rush Creek to law enforcement routes. Adam will also discuss regulation changes for Rush Creek and Pine Creek with John to better protect bull trout.	**Complete**
PacifiCorp Energy will send those Aquatic Fund pre-proposals selected for consideration to the ACC group by early November	**Complete**
Eric Kinne will follow-up with Aaron Roberts regarding the *Swift Net Pens* and when the last possible date would be required for their use.	**Complete**

Assignments from April 8, 2010 Meeting:	**Status:**
Haspiel: Present more detailed design of the Pine Creek Instream aquatic fund project to the ACC when available.	**Pending**

Opening, Review of Agenda and Meeting Notes

Frank Shrier (PacifiCorp Energy) called the meeting to order at 9:10 a.m., reviewed the agenda for the day and requested any changes/additions. It was determined that the agenda item Nutrient Enhancement could be removed as Jim Malinowski did not make it to the meeting.

Shrier requested comments and/or changes to the ACC Draft 11/18/10 meeting notes. One change was requested. The meeting notes were approved with the requested change.

Aquatic Fund 2010/2011 Proposals

Todd Olson stated that the Aquatic Fund has sufficient funds to cover the six projects that the Utilities are recommending for full proposals. Comments on the proposals were received from USDA Forest Service, Washington Department of Fish and Wildlife, and Lower Columbia Fish recovery Board. The U.S. Fish and Wildlife Service provided brief oral comments on the proposals. The ACC reviewed and clarified the comment matrix. The ACC would still like to see comments from the Yakama Nation, Cowlitz Indian Tribe and Fish First. The modified matrix will be sent to the ACC members. The ACC agreed to have the Utilities seek full proposals from the following:

USDA Forest Service	Lewis River Side Channel Near Muddy River Instream Habitat Restoration
USDA Forest Service	Muddy River Side Channel Restoration
USDA Forest Service	Muddy River Mainstem Channel Restoration
USDA Forest Service	2011 Pine Creek Nutrient Enhancement by Snowcats and Snowmobiles
Lower Columbia Fish Enhancement Group	NF Lewis RM 13.5 Side-Channel Habitat Enhancement
Cowlitz Indian Tribe	Eagle Island Habitat Enhancement - Sites B and C

A request for full proposals will be sent to the applicants no later than December 15, 2010. The February ACC meeting is available for Applicants to present the projects.

Future Fish Passage – Process and Study Identification

On December 8, 2010, Frank Shrier sent the ACC group an email containing links to previously collected aquatic study information. Todd Olson/Frank Shrier will follow-up with Michelle Day (NOAA Fisheries) to discuss the need for fish passage at the Speelyai hatchery diversion. The ACC will continue discussions at future meetings.

Acclimation Pond Plan

The "Lewis River Acclimation Pond – Crab Creek Evaluation" memo by McMillen, LLC was distributed to the group for discussion. This memo provides an evaluation of required flows if fish capacity is reduced from the original plan of 33,000 down to 15,000. The following are overall notes:

- The Crab Creek site is questionable due to flow requirements
- Expanding the Clear Creek and Muddy River ponds are viable options
- If Crab Creek were removed there would be no mainstem release site
- The 1957 Chambers report suggested that the most habitat is located on the Muddy.
- Concern that directing fish to Muddy and Clear Creek will eventually result in no fish finding Crab Creek

Shannon Wills will convey the importance of the Yakama Nation weighing in on this issue to Bob Rose this afternoon.

PacifiCorp will identify 1-2 alternatives with pros and cons and will send via email. As time is running out a decision will have to be made at the January 2011 meeting. PacifiCorp would like to see written responses from USFWS, NOAA, Cowlitz Tribe and Yakama Nation.

Speelyai Intake Engineering Design

Nathan Higa discussed the conceptual report and memo. This project will be completed in two phases. Phase One is scheduled to begin in 2012. Concurrence from the ACC that the concrete does not need replaced. Any future passage can be addressed in the future and the nature of the current project can accommodate.

Nutrient Enhancement

A meeting with Fish First and other has been scheduled.

Merwin Upstream Trap and Transport Status

No questions regarding the revised schedule.

Study Updates

Nathan Higa and Frank Shrier (PacifiCorp Energy) provided the following study updates:

Hatchery Upgrades –

Lewis River Hatchery Ponds 13, 14 & 16 – Pond 14 is finished and fish are being loaded this week. Pond 13 should be finished by December 15. 2010. Pond 16 is going out for bid soon.

Downstream intake at Lewis River – At the November 2010 meeting there were no objections from the ACC regarding the proposal to move this project to 2012. FERC will be notified of the schedule change via the annual report.

Speelyai Burrows Pond – Ponds are watered up, walkways and safety railing needs to be secured.

Merwin Rearing Ponds – Two ponds are operational. Remaining two ponds will be completed in 2011.

Merwin Adult Holding Ponds – Delays with respect to retaining wall construction, but project will be completed this year. No holding of fish needed until June or July of 2011.

Speelyai Intake – See discussion above.

Speelyai Kokanee Weir – Scheduled for completion in 2011. Permitting has begun for this project.

Hatchery & Supplementation Plan – Draft Erik Lesko submitted a draft 2011 AOP to the subgroup on November 24, 2010 and requested comments. Approval of the H&S plan is pending at FERC.

Swift Downstream Collector – Work is scheduled to begin at the end of January 2011. Activities planned for 2011 include: mobilization to project area, construct barge shell and move to dam, and construct trestle. Project is on schedule.

Release Ponds Status

FERC has extended the deadline for final design to the end of March 2011. PacifiCorp located a potential piece of property for this project and is working with the realtor to secure an option with the landowner. Once the option is secured the designs will be finalized and submitted to FERC, after which the property will be purchased assuming that price is comparable to assessed value.

New Topics

- None

Agenda items for January 13, 2011

- Review November 18, 2010 Meeting Notes
- Acclimation Ponds Update and Discussion of Crab Creek
- Speelyai Intake discussion re: fish passage
- Nutrient Enhancement – report on meeting between WDFW, FishFirst, and PacifiCorp
- Study/Work Product Updates

Public Comment
None

Next Scheduled Meetings

January 13, 2011	February 10, 2011
Merwin Hydro Control Center	Merwin Hydro Control Center
Ariel, WA	Ariel, WA
9:00am – Noon	9:00am – Noon

Meeting Adjourned at 11:30 a.m.

Handouts/Summary Attachments

- Final Agenda
- Draft ACC Meeting Notes 11/18/2010
- "Lewis River Acclimation Pond – Crab Creek Evaluation" memo by McMillen, LLC
- Speelyai Intake Engineering Design - Nathan Higa discussed the conceptual report and memo.

MEMORANDUM

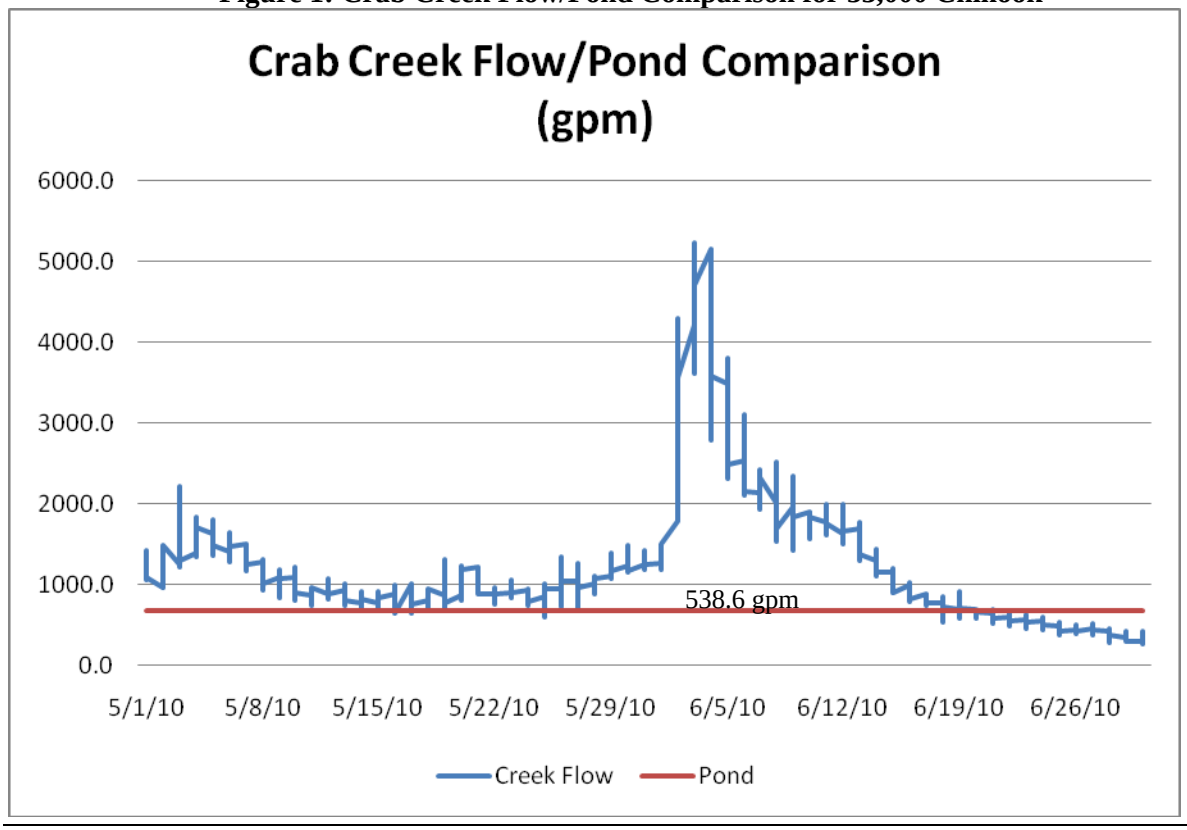
McMILLEN, LLC

To:	Frank Shrier, PacifiCorp	Project:	Lewis River Acclimation Ponds
From:	Derek Nelson, PE	Cc:	Nathan Higa, Mort McMillen, File
Date:	December 8, 2010	Job No:	1039.05
Subject:	Lewis River Acclimation Pond – Crab Creek Evaluation		

1.0 INTRODUCTION

The purpose of this memo is to provide an evaluation of required flows for the reduction in fish capacity at the Crab Creek acclimation pond site. Initially the intent of the Crab Creek acclimation pond site was to acclimate 33,000 juvenile Chinook salmon from water flows in Crab Creek. The design critera for the acclimation pond is 1.2 cubic feet per second (cfs)(538.6gpm). The flow in Crab Creek was evaluated in 2010 by PacifiCorp. Figure 1 below illustrates the flow in Crab Creek and the amount of flow removed from Crab Creek for the acclimation pond during the normal acclimation pond operation period from May 1 through June 30.

Figure 1: Crab Creek Flow/Pond Comparison for 33,000 Chinook

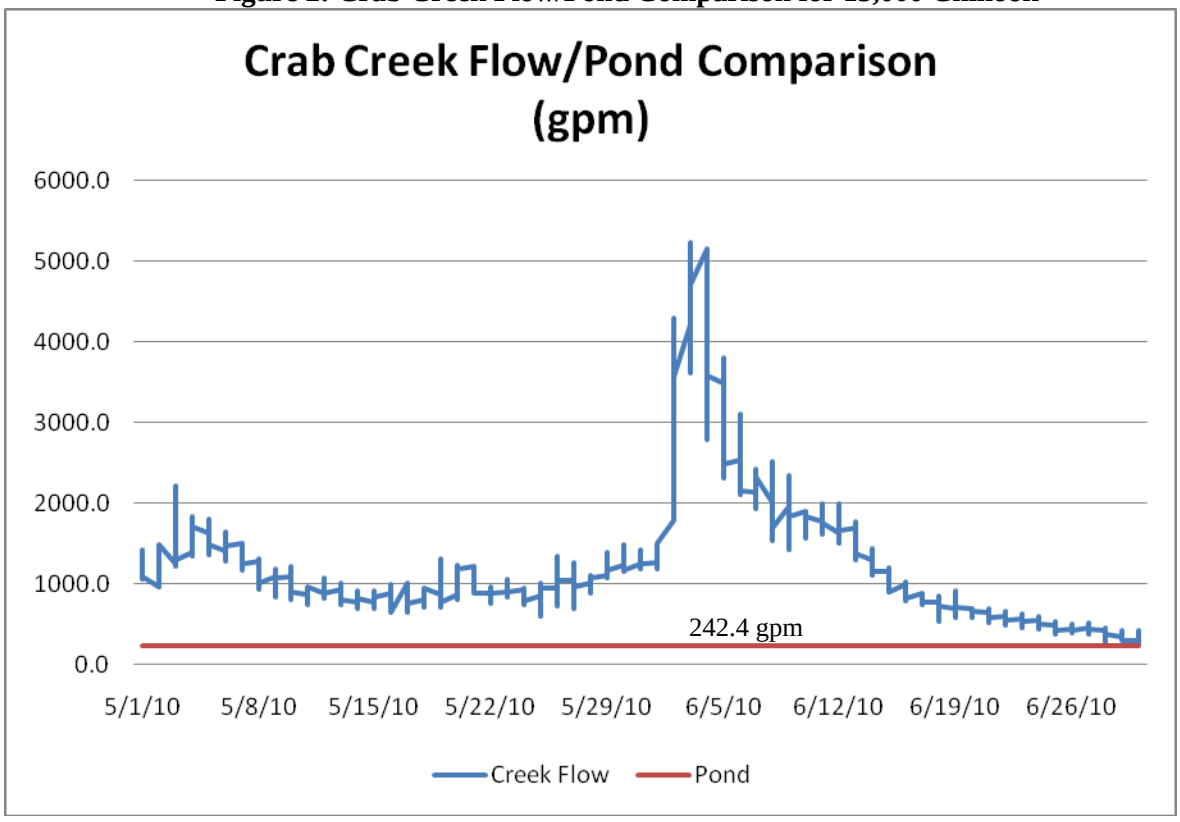


As is illustrated in Figure 1, the acclimation pond would remove more than 50% of the Crab Creek flows for most of the month of May as well as potentially 100% of the flow at the end of June. PacifiCorp has requested McMillen to determine the flows required to be diverted from Crab Creek if the acclimation population was reduced to 15,000 spring Chinook.

2.0 EVALUATION

The initial flow and number of fish for the Crab Creek acclimation pond site were analyzed to determine the flow index for the site. With a flow of 1.2 cfs, 33,000 fish at 25 fish/lb, and a total length per fish of 4.5 inches, the flow index is 0.55. Calculations of the flow index are described in the attached flow and density indexes. Utilizing the calculated flow index of 0.55, 15,000 fish with the same physical characteristics were evaluated resulting in a required flow of 242.4 gpm or 0.54 cfs. The attached calculations sheet illustrates the steps on calculating the flow index based on the PacifiCorp criteria. Figure 2 illustrates the required flow for 15,000 Chinook in relation to the 2010 Crab Creek flows.

Figure 2: Crab Creek Flow/Pond Comparison for 15,000 Chinook



Lowering the number of fish to 15,000 results in diverting between 15% and 30% of the Crab Creek flows during May. During June the percent diverted from Crab Creek ranges from 15% to 80%. Based on this evaluation, Crab Creek acclimation pond site may divert all of the flows near the end of June during low flow years.

McMillen Engineering				
	Project:	Acc Pond: Crab Creek	**Page:**	**1 of 3**
	Description:	Flow and Density Indexes	**Date:**	**12/8/10**
	Prepared By:	DSN	**Checked:**	
			Job No.:	

Purpose:

Determine a flow index for the Crab Creek acclimation ponds for 33,000 spring Chinook
Determine the density index.
Determine potential raceway volumes.
Determine modified flow index based on 15,000 spring Chinook at 25 fish/lb.

References:

1 Fish Hatchery Management, Second Edition, Gary Wedemeyer, editor, American Fisheries Society; 2001

2 "Trout Production", Aquaculture Technical Series , James L. Shelton
"Trout Culture in the North Central Region", North Central Regional Aquaculture Center, COOP with
3 USDA
4 Fisheries Technologies - http://fisheries.btc.ctc.edu/Handout/Handout.htm
5 NOAA Web Site Document " A Review of Rearing Density Experiments: Can Hatchery Effectiveness be improved?", http://www.nwfsc.noaa.gov/publications/techmemos/tm187/banks.htm

6 Fish Size Conversion Chart, http://www.nmt-inc.com/products/cwt/headmold/conversion.htm

Assumptions:

Water quality:
Temperature less than 55°F
Dissolved oxygen near 100% saturation

Known:

Rearing Species
Spring Chinook
Total production is 33,000 fish
25 fish to the pound = 1,320 pounds
Total flow per acclimation site as per PacifiCorp design criteria is 1.2 cfs. (538.6 gpm)

Equations:

Flow Index

$$W = F * L * I$$

W =	Maximum allowable weight of fish	lbs	
F =	Flow Index		
L =	Length of Fish	inches	Ref 6
I =	Water Inflow	gallons per minute	

Density Index

$$W = DI * V * L$$

W =	Maximum allowable weight of fish	lbs	
DI =	Density Index 0.2		Ref 4, 5
V =	Rearing unit volume	cubic feet	
L =	Length of Fish	inches	

McMillen Engineering				
	Project:	Acc Pond: Crab Creek	**Page:**	**2 of 3**
	Description:	Flow and Density Indexes	**Date:**	**12/8/10**
	Prepared By:	DSN	**Checked:**	
			Job No.:	

Solution:

Flow Index

Utilize the production goals of 1,320 pounds (**33,000 fish**) of average 4.5 inch fish
Calculate the flow index based on the PacifiCorp given flow.

W = F * L * I

W =	1320	lbs	
I =	538.6	gpm	PacifiCorp Design flow criteria
L =	4.5	in	
F=	0.55		

Density Index

Calculate the volume required for the production goal.

W = DI * V * L

W =	1320	lbs	
DI =	0.2	for Chinook	Ref 4
L =	4.5	in	
V =	1467	cf	

Exchange Rate

Determine the exchange rate in times per hour (number of times volume replaced in an hour)
Convert flow rate to cubic feet per second 1cfs = 448.8 gpm

I = 539 gpm or 1.20 cfs

R = V/(I*3600) R = Exchange Rate 3600seconds/hour

R = 2.9 exchanges per hour with a flow index of 0.49

McMillen Engineering				
	Project:	Acc Pond: Crab Creek	**Page:**	**3 of 3**
	Description:	Flow and Density Indexes	**Date:**	**12/8/10**
	Prepared By:	DSN	**Checked:**	
			Job No.:	

Solution:

Determine water inflow required for **15,000** juvenile Chinook, 4.5 inches long, 25 fish/lb.
Set flow index to 0.55 as determined above.
Determine volume required

Water Inflow

$W = F * L * I$

W =	600	lbs		
F =	0.55			
L =	4.5	in		
I =	242.42	gpm	0.54	cfs

Density Index

$W = DI * V * L$

W =	600	lbs		
DI =	0.2	for Chinook		Ref 4
L =	4.5	in		
V =	667	cf	Volume required for 15,000 fish	

McMillen, LLC

Transmittal

Attention: Nathan Higa | Date: December 8, 2010 | Job No: 1039.13

To: Hydro Resources
PacifiCorp Energy
825 NE Multnomah, Suite 1500
Portland OR 97232

Phone: (503) 813-5753

Regarding: Speelyai Intake: Assessment Report and Concept Design

We are sending you: X Attached ☐ Under separate cover via _____ the following items

☐ Shop drawings ☐ Prints ☐ Meeting Minutes ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change Order ☐ Invoice

Copies	Date	No.	Description
1	12/08/10		Assessment Report and Figure

These are transmitted as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review/comment ☐ Other _____

☐ For bids due _____ ☐ Prints returned after loan to us

Remarks		
Copy to	File.	Signed

If enclosures are not as noted, please notify us at once.

TECHNICAL MEMORANDUM 001

McMILLEN, LLC

To:	Nathan Higa PacifiCorp	Project:	Speelyai Hatchery Water Intake Design Project
From:	Derek Nelson	Cc:	Mort McMillen, McMillen LLC Chris Boyd , McMillen LLC
Date:	December 8, 2010	Job No:	Contract No. 3000067697
Subject:	Speelyai Intake Assessment		

1.0 INTRODUCTION

PacifiCorp has retained McMillen, LLC (McMillen) to provide a condition assessment, a conceptual design alternative, final design, permit assistance, bidding/construction assistance, and project management and coordination for the Speelyai Hatchery Intake on Speelyai Creek in Washington. The purpose of this memorandum is to document the assessment of the Speelyai Hatchery water intake and sheet pile dam. The assessment will focus on the following:

- Structural stability, overturning and sliding
- Sedimentation
- Debris loading and handling
- Hydraulic Performance
- Personnel Safety
- Concept alternative

2.0 BACKGROUND

Under its license with the Federal Energy Regulatory Commission (current and future) and agreements with the State of Washington, PacifiCorp is obligated to provide mitigation for fish losses created by the construction and operation of the Merwin, Swift No. 1, and Yale Hydroelectric Projects. These requirements have made PacifiCorp a party to a long-term obligation under which it pays most of the capital, operating and maintenance costs for the Lewis Hatchery Complex (LHC) which consists of the Lewis River, Speelyai and Merwin Hatcheries.

Specifically, PacifiCorp is required to replace/repair the existing intake dam in order to stabilize it, eliminate the uncontrolled and unmeasured leakage around the dam, and to address the safety deficiencies particularly with respect to access and trash handling.

2.1 Speelyai Intake

Speelyai Creek is divided into two reaches, Upper and Lower. Lower Speelyai Creek is fed from the local watershed and flows to Speelyai Bay where a small concrete intake and sheet pile dam is located that supplies water to the hatchery. The intake consists of a concrete structure with trash rack, a sluice channel, and a flashboard controlled overflow section. Flow is conveyed from the intake to the hatchery ponds by a pair of steel pipelines, one 20 inch and one 30 inch, each approximately 860 feet long.

Photograph 1. Downstream View of the Intake

Photograph 2. Upstream View of the Intake

In 2008, a landslide damaged the sheet pile dam and walkway across Speelyai Creek. The slide occurred on the steep slope south of the intake structure and dam. The slide filled the forebay with soil, rock and debris. The slide restricted creek flow causing the creek to discharge on the north side of the intake structure. Speelyai Creek eroded several feet of backfill, exposing the water supply pipes. The backfill was replaced with a mixture of rip rap and soil.

3.0 STRUCTURAL STABILITY

The following section discusses the structural stability of the concrete intake structure. The geotechnical report was composed by the Wallace Group and is submitted as a separate document attached to this report.

3.1 Geotechnical

The geotechnical information used in the structural analysis is summarized in the table below.

Table 3-1. Geotechnical Information

Description	Units	Value
Dry Soil Unit Weight	pcf	116
Saturated Soil Unit Weight	pcf	127
Buoyant Soil Unit Weight	pcf	80
Allowable Bearing Pressure	psf	3,000
Unfactored sliding friction coefficient		0.5

Table 3-2. Earth Loading

Earth Pressure Loading Condition	Equivalent Fluid Density (pcf)	
	Drained	Submerged
Active	35	80
At-Rest	54	89
Passive	430	275
Seismic	15	15

3.2 Stability Analysis

The existing intake consists of a concrete intake structure, a trash rack at the upstream end, stop log slots immediately downstream from the trash rack, and flow control gates in the downstream wall of the intake. A sheet pile dam is installed on the left side looking downstream of the intake with concrete wingwalls and an earthen embankment on the right. The top of the intake elevation is 137.25 and the floor slab varies from 130.0 feet to 128.7 feet.

Within the intake structure flow is diverted through two travelling screens to one 20-inch and one 30-inch intake pipe which supply the Speelyai Hatchery. Under normal operation the maximum water surface elevation provided by the sheet pile dam is approximately 135.5 feet.

Based on the configuration of the existing intake structure, four potential failure scenarios were evaluated based on two key assumptions; Whether the water surface is at the typical operating elevation of 135.5 or the overtopping elevation of 137.25, and whether the intake is closed at the downstream closure gates, or whether it's blocked at the stop logs at the upstream end of the intake.

- Water surface elevation – The intake was evaluated for the normal operating condition with the upstream water surface elevation of 135.5 feet. This represents the typical operating condition. The intake was also evaluated for an overtopping condition with the water surface elevation of 137.25 feet. In order for this to happen the sheet pile overflow crest would either need to be blocked, or the flow in Speelyai Creek exceeds the capacity of the overflow crest and the intake gates.
- Location of flow blockage – The intake was analyzed assuming that the flow could be blocked at the control gates in the downstream wall of the intake which is the typical operating condition, or it could potentially be blocked by installation of stop logs in the slots behind the trash rack. For the case where the flow is blocked by the stop logs, it was assumed that the rest of the intake structure downstream is completely dewatered creating a significant buoyant force on the structure.

The intake was analyzed for stability to resist sliding and overturning. The structure self weight was estimated based on the major structural elements, including the concrete walls, structural steel members, and steel walkway grating. The weight of the travelling screens, intake gates, and intake pipes were conservatively neglected. In addition, the as-built drawings show a concrete cutoff wall at the upstream edge of the intake. They do not show any reinforcing between the intake slabs and the cutoff wall, so the cut off wall contribution to resist sliding was neglected.

The buoyant force was estimated by assuming that the hydraulic grade line varies linearly from the assumed location of the flow blockage (upstream stop logs or downstream control gates) and the downstream end of the intake. The hydraulics associated with water being diverted down and to the sides of the intake along the cutoff wall was also neglected. The cutoff wall will reduce the buoyant force on the intake by reducing the pore water pressure immediately below the slab increasing the resistance to sliding. Live loads were neglected in the stability analysis because it is unlikely that people or equipment would be operating the intake during an extreme flood event.

3.3 Analysis Results

Based on the assumptions listed above, Table 3-3 below lists the results of the intake stability assessment:

Table 3-3. Intake Stability Assessment

Water Surface Elevation, Feet	Location of Blockage	Factor of Safety	
		Sliding	Overturning
135.50	Upstream	1.33	7.69
135.50	Downstream	1.65	11.16
137.25	Upstream	0.77	3.14
137.25	Downstream	1.04	5.50

As shown on the table above, the assumption of whether the intake flow is blocked at the upstream face or the downstream face has a significant impact on the stability of the intake. If the intake is blocked at the upstream face and the water level within the intake drops, a significant buoyant force is developed which reduces the friction force to resist sliding.

The Speelyai Intake recently experienced a landslide causing a blockage at the dam. The creek discharged to the right of the intake structure eroding the backfill embankment around the structure and water supply pipes. The embankment on the right side is approximately the same height as the top of the intake, so in order for the soil to wash out, the intake experienced an overtopping flow, or very near to it. No noticeable movement was observed as a result of the overtopping indicating that the intake can remain stable even under those adverse conditions. Because the intake flow was controlled by the gates in the downstream wall, it was likely that the intake remained full of water during the overflow event. The fact that the intake did not move confirms the analysis which indicates a factor of safety of 1.04 to resist sliding in an overtopping condition.

Because of the size and volume of material carried by Speelyai Creek during a flood event it is reasonable to assume that the existing trash rack could become plugged with debris. In this event, the intake could become dewatered and unstable.

4.0 SEDIMENTATION

The intake and sheet pile dam forebay, experience minor sedimentation issues. Periodic maintenance is required to remove the sedimentation and maintain a pool depth of 4 to 5 feet. A landslide occurring in 2008 damaged the sheet pile dam and filled the forebay with rock, soil, and debris. The project design will include measures to remove the slide material and restore the pool to normal operating depth. Some of the slide material will be utilized as an earthen deflector to aid in directing any future slides away from the sheet pile dam and pool. The remaining material will be removed and disposed of at an approved facility.

5.0 DEBRIS LOADING AND HANDLING

The existing intake structure trash rack is positioned perpendicular to the stream flow. Floating debris and material are conveyed onto the trash rack where manual removal is required. Additional debris is trapped by the sheet pile dam and depending on the size does not get flushed over the dam. One goal of the project is to decrease the amount of debris loading and accumulation. Providing a trash rack that is parallel to the creek flow would allow a sweeping flow across the front of the trash rack aiding in transporting debris downstream relieving manual removal. In addition, a spillway section in the sheet pile dam will allow the debris to pass over the dam and continue downstream. These components will be included in the modifications to the intake structure and to the dam.

6.0 HYDRAULIC PERFORMANCE

Currently the intake provides the required 20.5 cfs to the hatchery. To improve water intake and establish greater flow to the hatchery would require that the sheet pile dam be raised to increase the hydraulic head available to drive the flow to the hatchery. Increasing the height of the dam may require a permit with the Washington Department of Ecology Dam Safety. Maintaining the existing height of the dam will maintain the impoundment to less than 10 acre feet. The dam is less than 6 feet in height making it a candidate for a Dam Safety Office exemption.

For purpose of analysis, it was assumed that the dam would meet the exempt status and would be replaced with a new sheet pile dam of the same dimensions as the existing dam maintaining the normal operating water surface level. The existing water surface level provides sufficient head to supply the 20.5 cfs to the hatchery through the existing valves. To provide hydraulic improvement to the intake structure the existing valves will be replaced to provide minimal head losses across the pipeline entrance.

7.0 PERSONNEL SAFETY

The existing grating and handrail will be replaced to provide added safety for personnel when accessing the intake and dam. Handrail and grating will be designed to meet the 2009 International Building Code.

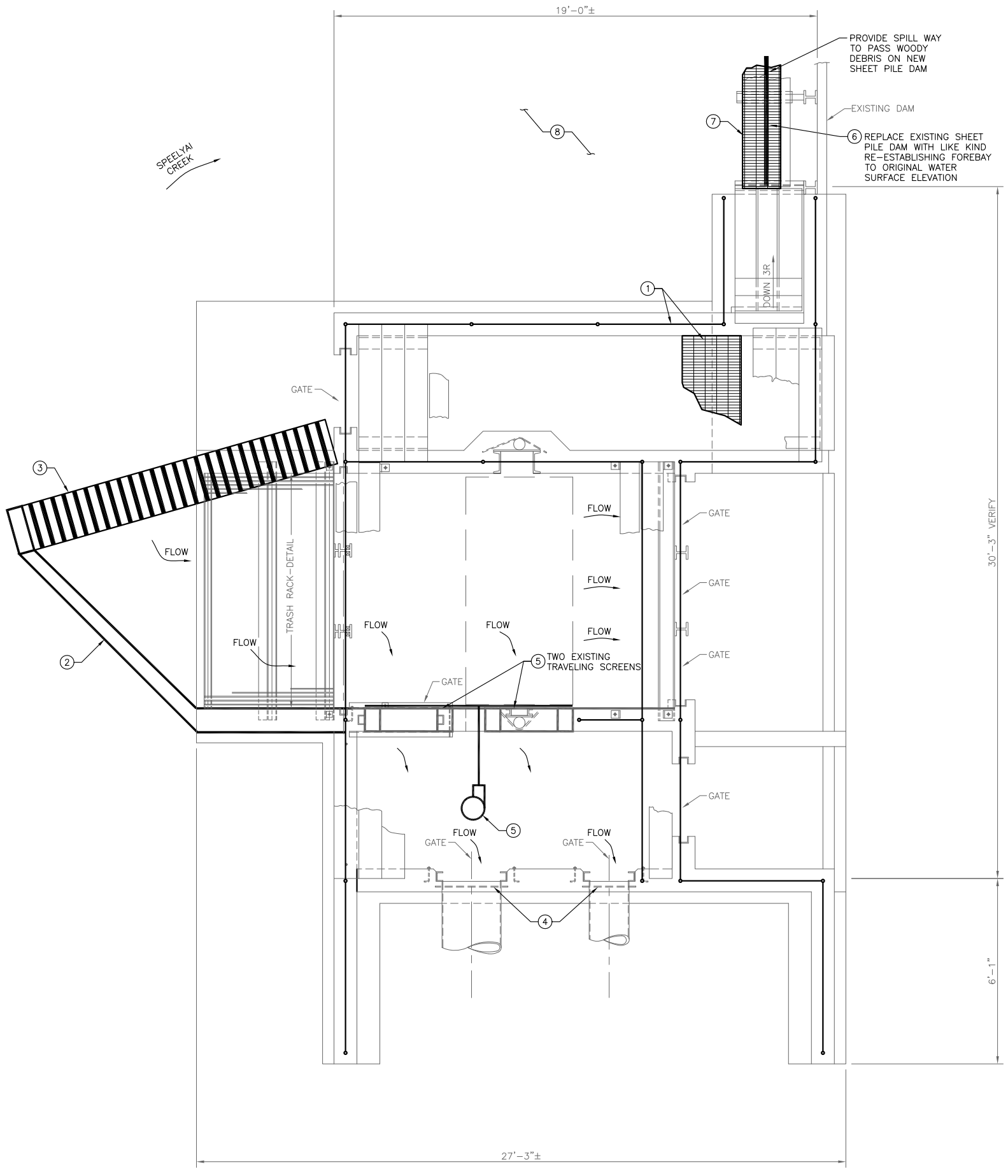
8.0 CONCEPT ALTERNATIVE

The intake will be modified to allow for a larger trash rack to be installed parallel with Speelyai Creek flow. The existing trash rack will be removed along with the adjoining wall. A new wing wall will be constructed from the corner of the existing structure out into Speelyai Creek to support the new larger trash rack as illustrated in Figure 1. The backwash system will be modified to provide protection for the system pump from spray and other environmental impacts to improve pump longevity. The handrail and grating will be modified to provide safe access for personnel to the trash rack, screens, gates, and the dam.

The dam will be replaced with a new sheet pile dam directly in front of the existing sheet pile dam. The existing dam will then be cut just below the substrate elevation and the top portion removed. The lower portion will be left in place. The new sheet pile will be designed with a spill way/debris passage section to allow floating debris to be transported downstream.

9.0 RECOMMENDATIONS

The Speelyai Intake has withstood flooding and the land slide in 2008. The structural analysis determined that the structure is stable in the normal operating condition. The existing structure has the potential to slide if a blockage occurs at the upstream side of the structure and the intake is dewatered due to the blockage. The recommended modifications will provide a more sweeping flow past the intake versus a direct impact from the flow. McMillen recommends that the intake structure be modified as per Section 8.0 and not completely replaced. It is also recommended that a new sheet pile dam be constructed just upstream of the existing sheet pile dam that was damaged during the 2008 slide. Modifying the intake and replacing the dam will provide increase personnel safety, decrease maintenance and cleaning, and improve overall functionality of the intake and dam structure.



INTAKE PLAN

SCALE: 3/8" = 1'-0"

PROPOSED DESIGN ITEMS:

INTAKE:

1. MODIFY THE EXISTING INTAKE GRATING AND HANDRAILS TO IMPROVE PERSONNEL SAFETY DURING MAINTENANCE AND OPERATION.
2. CONSTRUCT NEW WING WALL TO PROVIDE SUPPORT FOR NEW TRASHRACK AND TRAVELING SCREEN.
3. MODIFY TO EXISTING INTAKE TRASH RACK TO PROVIDE AN ENTRANCE THAT IS PARALLEL TO SPEELYAI CREEK FLOWS AND PROVIDES IMPROVED CLEANING MAINTENANCE.
4. REPLACE THE TWO ISOLATION VALVES AT THE ENTRANCE TO THE MAIN WATER SUPPLY PIPES.
5. MODIFY THE SCREEN SPRAY/WASH SYSTEM TO IMPROVE PUMP LONGEVITY.

DAM:

6. REPLACE THE EXISTING DAM SECTION WITH A NEW SHEET PILE DAM INCLUDING A SPILL WAY SECTION TO PASS LOGS AND LARGE DEBRIS.
7. PROVIDE SAFE ACCESS ACROSS THE DAM AND TO THE SPILLWAY FOR MAINTENANCE AND OPERATION.
8. REMOVE THE MATERIAL DEPOSITED IN THE FOREBAY FROM JANUARY 2009 SLIDE EVENT.

McMILLEN, LLC
THE SONNA BUILDING
1401 SHORELINE DRIVE
BOISE, ID 83702
OFFICE: 208.342.4214
FAX: 208.342.4216

SAP#			
PL#			
DATE	12/8/10		
ENG	DSN	DES	DSN
DR	RLG	CH	MDM
APPROVAL			

SPEELYAI HATCHERY
INTAKE PROPOSAL
CONCEPTUAL PLAN

PACIFICORP ENERGY
A PACIFICORP COMPANY
HYDRO

SCALE: AS NOTED | SHEET FIG 1 | REV. A

No.	DATE	REVISION	BY	CHK	APP
A	12/8/10	CONCEPTUAL PLAN	RG	DSN	

REFERENCE DRAWINGS	DRAWING No.

REFERENCE DRAWINGS	DRAWING No.

PLOT SCALE: 1 =