



*Reviewer's Report for  
Application for Certification to the  
Low Impact Hydropower Institute  
from PPL Holtwood, LLC*

**Gary M. Franc  
Franc Logic  
6/16/2014**

**Table of Contents**

1. INTRODUCTION ..... 4

2. PROJECT LOCATION..... 4

3. PROJECT DESCRIPTION ..... 6

    3.1 Major Project Works ..... 6

    3.2 Mode of Operation for Power ..... 8

    3.3 Mode of Operation for Upstream Fish Passage ..... 8

    3.4 Mode of Operation for Downstream Fish Passage ..... 8

    3.5 Mode of Operation for Minimum Flow Releases ..... 9

4. REGULATORY STATUS ..... 10

    4.1 Summary of Project Redevelopment and Agency Consultation Process ..... 10

    4.2 Water Quality Certification ..... 10

    4.3 Compliance Issues..... 11

5. PUBLIC COMMENTS RECEIVED ..... 11

6. CONSISTENCY WITH LIHI CRITERIA AND ISSUES IDENTIFIED ..... 13

    6.1 Summary of the Reviewer’s Findings ..... 13

        Criterion A – Flows ..... 13

        Criterion B – Water Quality..... 13

        Criterion C – Fish Passage and Protection..... 14

        Criterion D – Watershed Protection ..... 14

        Criterion E – Threatened and Endangered Species Protection ..... 15

            6.1.1 – Bald Eagle ..... 15

            6.1.2 – Osprey ..... 16

            6.1.3 – Great Blue Heron ..... 16

            6.1.4 – Threatened and Endangered Plants..... 17

        Criterion F – Cultural Resources ..... 17

        Criterion G – Recreation ..... 18

            6.1.5 – Land Based Recreation ..... 18

            6.1.6 – Downstream Recreation..... 19

            6.1.7 – Land Transfer ..... 20

        Criterion H – Dam Removal ..... 20

6.2 Recommendations of the Reviewer ..... 20

7.1 Flows ..... 21

7.2 Water Quality ..... 22

7.3 Fish Passage and Protection ..... 23

7.4 Watershed Protection ..... 25

7.5 Threatened and Endangered Species Protection ..... 26

7.6 Cultural Resources ..... 27

7.7 Recreation ..... 27

7.8 Dam Removal ..... 27

APPENDIX A ..... 28

APPENDIX B ..... 29

# **REVIEW OF APPLICATION FOR CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE HOLTWOOD PROJECT**

*Prepared by:*  
*Gary M. Franc*  
March 14, 2014

## **1. INTRODUCTION**

This report reviews the original application received by the Low Impact Hydropower Institute (LIHI) for Low Impact Hydropower Certification of the Holtwood Hydroelectric Project (Holtwood, or Project). This application was submitted in June 2013 by PPL Holtwood LLC's (PPL or Applicant) Dale Zeisloft, (610.774.7850 - [dmzeisloft@pplweb.com](mailto:dmzeisloft@pplweb.com)). Supporting information was prepared by Kleinschmidt Associates Tim Oakes, (717.687.7211 - [Tim.Oakes@KleinschmidtUSA.com](mailto:Tim.Oakes@KleinschmidtUSA.com)). The Intake Review of this application was requested in November 2013 and was completed on December 13, 2013 by Gary M. Franc, with findings of no significant shortcomings. The complete application was received February 3, 2014.

The Project was granted a license by the Federal Energy Regulatory Commission (FERC) as Project No. 1881 in August of 1980 with a scheduled expiration date of September 1, 2014. In 2009, due to PPL's commitment to redevelop and expand the installed capacity of the Project, the FERC granted a 16-year extension of the license term to August 31, 2030.

Prior to redevelopment, the Project had an installed capacity of 107.2 MW. Additional capacity installed by the expansion project will total 195.5 MW, an increase of about 82%. As stated in the Applicant's LIHI Certification application, the average annual energy (AAE) for the Project from October 2006 through September 2011 was 590.0 GWh. However, as documented in FERC's document entitled, "Order Certifying and Re-Certifying Incremental Hydropower Generation for Production Tax Credit", dated June 16, 2013, the AAE for the Project will increase from 613.2 GWh to about 1,013.7 GWh, an increase of about 65%.

## **2. PROJECT LOCATION**

Holtwood is located on the Lower Susquehanna River at approximately River Mile 25 (39.827N, 76.333W), in Lancaster and York Counties in south-central Pennsylvania. The Project passes inflows from a drainage area of approximately 26,794 square miles and is situated approximately seven miles north of the Pennsylvania/Maryland border, and is one of five hydroelectric projects located along the lower Susquehanna River. Four of these projects are main stem dam projects and one (Muddy Run) is a pumped storage station that uses the Conowingo Pond as its lower storage pond. Moving from downstream to upstream, these Susquehanna River hydroelectric projects are: Conowingo, Muddy Run Pumped Storage Project, Holtwood, Safe Harbor, and York Haven.



Legend	
	FERC Project Boundary
	Major Road
	Railroad

Scale: AS SHOWN	<b>PPL HOLTWOOD, LLC</b> ALLENTOWN, PA <b>HOLTWOOD DAM</b> <b>REDEVELOPMENT PROJECT</b> <b>LIHI APPLICATION</b> <b>PROJECT OVERVIEW</b>	<b>2</b>
Project No: 565-055		
Filename: ProjectOverview		
Drawn By: JJP		
Date Drawn: 11-29-2012 Updated: 01-16-2013	 <small>438 University Dr., PO Box 278                  Greensburg, PA 15729                  Telephone: (717) 687-7211                  Fax: (717) 687-7200                  www.KleinschmidtUSA.com</small>	

### **3. PROJECT DESCRIPTION**

The original facility was placed in commercial service in October 1911 with five units in operation. Between 1912 and 1924, five additional units were installed, raising the station nameplate rating to 108 MW. The final phase of redevelopment construction and turnover of equipment to start-up and commissioning is underway and near completion. The increase in installed capacity required widening and deepening of the existing forebay and tailrace, but no new dams or diversion structures were necessary. Photos 1 through 3 show the dam and powerhouse prior to redevelopment as well as a recent aerial view of construction activities.

#### **3.1 Major Project Works**

The Holtwood dam is an overflow-type structure that consists of a 2,392 foot long by 55 feet high, low hazard, concrete gravity dam with a spillway crest at El. 165.0'. The top of the dam is raised to an effective elevation of 169.75 feet via the use of wooden flashboards and inflatable rubber dam sections. The dam forms an approximately 8-mile long reservoir, Lake Aldred, with a surface area of approximately 2,648 acres and a gross storage of 54,768 acre-feet at the top of the flashboards. A skimmer wall located on the upstream side of the forebay protects the powerhouse from debris. The forebay is being expanded and the skimmer wall is being replaced as part of the redevelopment project.



Photo 1 - EXISTING POWERHOUSE PRE-REDEVELOPMENT



Photo 2 - EXISTING POWERHOUSE AND DAM PRE-REDEVELOPMENT



**Photo 3 - AERIAL VIEW OF NEW POWERHOUSE CONSTRUCTION ON JUNE 15, 2013**

Downstream of the dam, a diversion wall connects the western side of the original powerhouse to a long, narrow river island known as Piney Island, and effectively separates the tailrace from the remainder of the Susquehanna River. Along the western shore of Piney Island, another narrow channel is formed between Piney Island on the east and a series of smaller islands on the west; this channel is referred to as Piney Channel. Excavation in both the tailrace and Piney Channel is underway to reduce backpressure on the generating units and also to improve fish passage. The remainder of the Susquehanna River bed is referred to as the spillway.

The Project powerhouses, including the original powerhouse constructed between 1905 and 1910 as well as the new powerhouse that is currently undergoing construction, are located on the east side of the river along the Lancaster County shoreline.

The original powerhouse contains ten similarly-sized vertical Francis turbines, with a total combined hydraulic capacity of 31,500 cfs. The original powerhouse also contained two smaller, and retired, exciter units. PPL is replacing those with two 1.18-MW vertical Francis turbine generator units, defined as Unit 11 and 13, as part of the redevelopment.

The new powerhouse will contain two 40.3-MW vertical Kaplan turbine/generators, defined as Unit 18 and 19, with a combined hydraulic capacity of 30,500 cfs. All water entering the powerhouse goes to the tailrace with the exception of the westernmost generating unit in the original powerhouse, Unit 1. PPL has rerouted its draft tube so that it flows into Piney Channel.

PPL believes the increased capacity will not include a change in water flow that worsens conditions for fish, wildlife, or water quality. Through rerouting of Unit 1 to flow into the Piney Channel and the changes in minimum flow releases, as authorized by FERC entitled, "Order Modifying And Approving Minimum Stream Flow Operations Procedures Manual Pursuant To Article 51", issued April 19, 2012, flow changes are expected to be an enhancement for fish, wildlife, and water quality.

The fish passage facilities at Holtwood include a tailrace lift with two entrances and a spillway lift for upstream passage, and a pipe built at the west side of the powerhouse for downstream fish passage and debris sluicing. The two upstream lifts have their own fish handling systems that sluice fish into a common flume through which fish swim into Lake Aldred. The lifts or "hoppers" raise the water (and fish) entering the facility about 50 feet to the level of the forebay. Fish swim through the flume and enter the lake outside the plant skimmer wall. PPL is reconfiguring the existing fish lift to improve migratory fish passage. PPL will continue to operate the fish lift. At the western end of the dam is a non-functional fish ladder that was constructed in 1914. At that time fish passage technology was immature and the facility was never successful in passing American shad. The facility was abandoned in place around 1920. PPL is installing new whitewater features immediately below this area.

### ***3.2 Mode of Operation for Power***

The Project operation is coordinated with the other lower Susquehanna River projects. Each project uses its storage capabilities to generate power on a daily and weekly basis, although due to the limited storage ability of Lake Aldred, Holtwood generally operates in a run-of-river mode using flows from the upstream Safe Harbor Project and the approximately 680-square-mile drainage area between the Safe Harbor and Holtwood dams.

Following redevelopment, PPL will continue to operate Holtwood in coordination with the other lower Susquehanna River projects. The generation schedule will continue to be developed on a day-ahead basis. Since the new turbine/generators are more efficient than the existing units, PPL anticipates that the new units will be dispatched first during periods of low flow consistent with satisfying all required environmental measures, such as the minimum flow and fish passage requirements.

### ***3.3 Mode of Operation for Upstream Fish Passage***

PPL has developed a Fishway Operating Plan (FOP) in consultation with agencies for use following completion of construction activities. The plan provides guidance for annual startup, shut-down, measures to be followed in case of emergency or project outages, routine maintenance, and debris management. In addition, it presents measures pertaining to dam and powerhouse operation that PPL will undertake during fish passage season including the use, monitoring and reporting of flows. It also includes fish passage reporting requirements which are required in the final 401 certification.

Under the amended license and 401 Water Quality Certificate (WQC), PPL agrees to successfully pass 75% of the American shad upstream that pass through the Conowingo facility, and that 50% of the shad that pass through the Conowingo facility pass through Holtwood within 5 days of passage at Conowingo. Should Holtwood not meet these targets, PPL agrees to first make operational modifications to enhance fish passage; and, if passage is still below targets, to make physical modifications to enhance fish passage. A detailed plan to measure and evaluate performance and conduct follow-up studies as needed was developed as part of the license amendment process.

### ***3.4 Mode of Operation for Downstream Fish Passage***

PPL will also measure survival of American shad moving downstream past the Project and has agreed to meet a target of 95% survival of juvenile American shad and 80% survival of adult American shad. As is the case with upstream passage, should Holtwood not meet the target survival, there would be operational and potentially physical modifications made to meet the target. In addition to passing anadromous fish, the Holtwood fish lift will begin operating to move resident, or riverine, fish following



the completion of construction. The fish lift will operate during the spring for upstream shad passage and from April 1 through June 30 and from September 1 through October 15 each year, for up to 5 days per week and 6 hours per day.

### **3.5 Mode of Operation for Minimum Flow Releases**

In addition to the proposed facility modifications to enhance fishery resources as discussed Section 3.1, PPL will provide minimum flows as part of an agreement with Exelon, owner and operator of the downstream Conowingo Project, and Federal and State agencies for environmental enhancement.

Prior to the license amendment, Holtwood had no minimum flow requirements. This was due in part to the fact that the tailrace of the project is backwatered by the downstream Conowingo hydroelectric project reservoir and that inflows are almost completely governed by the upstream Safe Harbor hydroelectric project releases.

During the application process, PPL worked with agencies to identify potential impacts that the proposed development may have on downstream flows, as well as the effects that the new flow regime would have on environmental resources. PPL conducted environmental studies downstream of the Holtwood dam to determine what, if any, environmental effects would result from a modified flow regime in the spillway.

Specifically, PPL identified state listed endangered plants in the spillway including sticky goldenrod and White doll's daisy. PPL and the resource agencies determined that white doll's daisy would have the greatest potential to be impacted by a change in flow regime. However, due to the dynamic nature of flows in this region the extent of impact, if any, was difficult to predict. The white doll's daisy thrives in the spillway because of occasional flushing flows in combination with periods of low flow. To maintain a healthy white doll's daisy and sticky goldenrod population, PPL and the agencies developed a plan to release periodic flushing flows into the spillway to protect habitat for white doll's daisy. PPL also agreed to a long-term monitoring plan developed in conjunction with the PA Department of Conservation and Natural Resources (PADCNR) to assess the health of the white doll's daisy population and make adjustments to the flow regime as required.

PPL also conducted a detailed minimum flow study in Piney Channel to determine optimum flows for fishery habitat, water quality, and other purposes. This study showed that a continuous 200 cfs minimum flow<sup>1</sup> to for Piney Channel provides a significant amount of the suitable habitat potentially available for a number of resident fish species and life stages. The continuous 200-cfs minimum flow to Piney Channel is expected to also prevent isolated pools from forming in Piney Channel during the summer months such that depleted DO concentrations can be prevented.

Exelon's downstream Conowingo Project (FERC No. 405) has minimum flow requirements in their FERC license to maintain adequate flows in the river downstream of Conowingo to the Chesapeake Bay. PPL has entered into a settlement agreement with Exelon to provide a continuous base flow<sup>2</sup> of 800 cfs and a daily volumetric flow equivalent to 98.7% of the minimum flow requirements of the Conowingo Project.

All of the these minimum flow procedures are supported by resource agencies, as evidenced by letters submitted in response to the final license amendment application and by the Minimum Stream Flow Operating Plan (MSFOP) developed in conjunction with resource agencies.

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<sup>1</sup> Minimum flow cannot be supplied using any flow through the powerhouse.

<sup>2</sup> Base flow can be supplied from all downstream releases, including powerhouse flows.

## **4. REGULATORY STATUS**

### ***4.1 Summary of Project Redevelopment and Agency Consultation Process***

The Holtwood redevelopment effort started in 2004, with a study of redevelopment options to increase power output at the project while simultaneously improving migratory fish passage. Preliminary plans were shared with resource agencies in early 2005 and a number of baseline environmental studies were conducted to further refine the preliminary redevelopment plan.

On March 3, 2006, PPL officially released an Initial Consultation Document (ICD) to begin the license amendment process for the project expansion. This started a series of meetings with resource agencies, the public and other project stakeholders to develop and conduct additional studies and address issues that were raised. The information gained through this process was used to modify and refine the preliminary plans to avoid and minimize environmental impacts and enhance environmental and recreational resources.

The final proposed project design and agreements made between PPL and the resource agencies (the PA Department of Environmental Protection (PADEP), the Pennsylvania Fish and Boat Commission (PFBC), the Susquehanna River Basin Commission (SRBC), the Maryland Department of Natural Resources (MDNR), the United States Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (USACE)) were established in a Consent Order and Agreement dated November 21, 2007 between the PADEP and PPL, as noted in the final FERC amendment application submitted to FERC on December 19, 2007. This document would form the basis of the Section 401 Water Quality Certification by the PADEP that was ultimately issued on June 15, 2009.

However, due to the economic downturn in late 2008, PPL withdrew their application on December 8, 2008. Tax incentives that were passed in the stimulus bill of 2009 made the project economically viable again and PPL reapplied for the License amendment on April 9, 2009.

The final FERC order amending the Project license was issued on October 30, 2009. The order incorporates conditions from the PADEP Section 401 WQC, and the Department of the Interior's Section 18 Fishway Prescription<sup>3</sup>. The current license will expire on August 31, 2030.

### ***4.2 Water Quality Certification***

A 401 WQC was issued to the Holtwood project on June 15, 2009 and was integrated into the current FERC license.

Field studies by PPL indicate that the lowest dissolved oxygen (DO) levels generally occur in late August and early September, when water temperatures are highest, although generally, DO concentrations fell well within state water quality standards for the river. During testing in 2005, 99.3% of all samples collected in the tailrace during Project generation periods met or exceeded state water quality standards and 100% of the measurements between July 10 and September 7 in 2006 met or exceeded state water quality standards.

Lake Aldred does not thermally stratify and exhibits only a small gradient in DO due its shape and size

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<sup>3</sup> Section 18 Prescription requirements are contained in Section 2.2.6.1 of the "Final Environmental Impact Statement for Amendment to License Holtwood Hydroelectric Project.

relative to flows. Water quality profiles taken at four locations throughout Lake Aldred in the summer of 2006 showed that DO was well above state standards throughout the lake.

However, as documented in section 3.5, areas of the spillway which, when the Project is not spilling, can contain several pools that become isolated and stagnant. These pools are then susceptible to algal processes that can reduce DO concentrations. This is particularly characteristic of the upstream portion of what is known as Piney Channel. The MSFOP is designed to provide a 200 cfs minimum conservation flow in order to protect water quality in the Piney Channel. In addition, a 10-inch pipe through the dam will also continuously deliver water to the spillway area to connect many of these pools, providing a constant source of fresh, oxygenated water.

The upstream Safe Harbor project uses a turbine venting system to add oxygen to the water passing from their project and this appears to result in good DO levels throughout the lake. When the water passes through the Project's older powerhouse, air is aspirated into the turbines due to leakage, and as a result the downstream DO is enhanced.

PPL believes that the new turbines may not aerate the water to the same degree as the older units. To ensure that DO concentrations remain above standards following operation of the new units, PPL and the agencies developed a DO monitoring plan pursuant to Article 53 of the new license. This plan calls for water quality monitors to be deployed in the tailrace, Piney Channel and Lake Aldred for the first 5 years of operation of the amended project. Should DO concentrations fall below standards with the new units, PPL will develop operation protocols or physical modifications to maintain state standards.

#### **4.3 Compliance Issues**

There have been some compliance issues, most notably "minimum flow deviations" and "requests for extension of time" at this project over the last 5 years, but all have been dismissed or otherwise dealt with by FERC. FERC has directed PPL to be sure to comply with all article requirements of the new license issued on October 30, 2009, with emphasis on conditions of the PADEP Section 401 WQC, and the Department of the Interior's Section 18 Fishway Prescription.

## **5. PUBLIC COMMENTS RECEIVED**

LIHI notified and requested public comment on PPL's application for LIHI certification on January 20, 2014. To date, no public comments have been received by LIHI. Public comments must be received on or before 5 pm Eastern time on March 20, 2014 to be considered. All comments will be posted to the web site and PPL will have an opportunity to respond. Any response will also be posted.

The list of resource agency contacts contained within the LIHI certification application that have been acknowledged to be knowledgeable on the operational issues with the Project are:

- Patricia Strong, Ecologist, Army Corp of Engineers  
(410.962.1847 - [Pat.Strong@usace.army.mil](mailto:Pat.Strong@usace.army.mil)),
- Allyson McCollum, Soil Scientist, Pennsylvania Dept. of Environmental Protection  
(717. 705.4808 - [amccollum@pa.gov](mailto:amccollum@pa.gov)),
- Jeremy Miller, Biologist, Pennsylvania Dept. of Environmental Protection  
(717. 705.4777 - [jeremmille@state.pa.us](mailto:jeremmille@state.pa.us)),
- Scott Williams, Program Manager Pennsylvania Dept. of Environmental Protection

- (717. 772.5963 - [scwilliamson@pa.gov](mailto:scwilliamson@pa.gov)),
- Emilie Boyer, Ecological Information Specialist, Dept. of Conservation and Natural Resources (717. 787.7067 - [boyer@state.pa.us](mailto:boyer@state.pa.us)),
- Andy Shiels, Deputy Director, Pennsylvania Fish and Boat Commission (814. 353.2222 - [ashiels@state.pa.us](mailto:ashiels@state.pa.us)),
- Jennifer Siani, Regional Biologist, U.S. Fish and Wildlife Service (814. 234.4090 - [Jennifer\\_Siani@fws.gov](mailto:Jennifer_Siani@fws.gov)),
- Sarah Nystrom, Northeast Region Eagle Coordinator, U.S. Fish and Wildlife Service (413. 253.8592 - [Sarah\\_Nystrom@fws.gov](mailto:Sarah_Nystrom@fws.gov)),
- Olivia Mowery, Environmental Planner, Pennsylvania Game Commission (PGC) (717. 787.4250 - [omowery@pa.gov](mailto:omowery@pa.gov)),
- Tracey Librandi Mumma, Wildlife Biologist, PGC (717. 787.5957 - [tlibrandi@pa.gov](mailto:tlibrandi@pa.gov)),
- Shawn Seaman, Administrator, Maryland Department of Natural Resources, Power Plant Assessment, Division B-3 (410. 260.8662 - [SSeaman@dnr.state.md.us](mailto:SSeaman@dnr.state.md.us)) and,
- Andrew Dehoff, Manager, Project Review, Susquehanna River Basin Committee (717. 238.0423 X 1221 - [ADehoff@srbc.net](mailto:ADehoff@srbc.net)).

On February 5, 2014, this reviewer emailed these individuals the following:

*"I am a LIHI reviewer tasked with determining whether PPL's Holtwood Hydroelectric Project should be LIHI certified. I am emailing you today because you have been identified in the application by the owner as resource agency and non-governmental organization contacts familiar with the project. I would appreciate your perspective regarding the project's proposed operation with regard to satisfying its licensed environmental obligations (FERC articles). Without your input my review can only be based on the documents found in the FERC docket. Thank you for your time in this matter."*

On February 6, 2014, I received the following email response from David W. Sutherland, Fish and Wildlife Biologist, Chesapeake Bay Field Office, 177 Admiral Cochrane Drive, Annapolis, MD 21401, (410.573.4535 Office, 301.887.7603 Mobil - [david\\_sutherland@fws.gov](mailto:david_sutherland@fws.gov)):

*"Gary, I am currently the lead for the Exelon and York Haven relicensing's on the Susquehanna River and was forwarded the message you sent to the USFWS. Just as the Exelon/Conowingo Dam was/is not ready for LIHI certification, neither is Holtwood. The environmental issues are similar at the projects, and we will likely be working on correcting these issues through their relicensing in 2030. Please get back to me if you need other information. David"*

I called Mr. Sutherland to discuss his concerns. Based on our talk, he stated that throughout the construction phase of redevelopment, the percentage of upstream fish passage of American Shad do not meet the agreed to standards of the FOP, as discussed in section 3.3. I stated that the official record does not document this latest USFWS concern. I also stated that I will address their concerns in any LIHI certification approval, such that continued LIHI certification is based on proactive measures and adherence to the FOP by PPL going forward as documented in the annual letter to LIHI.

## **6. CONSISTENCY WITH LIHI CRITERIA AND ISSUES IDENTIFIED**

The application for LIHI certification and the agency communications are relatively well developed. This section summarizes the record for LIHI certification.

### **6.1 Summary of the Reviewer's Findings**

#### **Criterion A – Flows**

Agency recommendations for environmental flow requirements and agreements and coordination with other projects on the Susquehanna River have been well established in the FERC proceedings for this project culminating in the MSFOP developed by PPL in conjunction with resource agencies.

In summary, a continuous 200-cfs minimum flow to for Piney Channel will be maintained to provide suitable habitat potentially available for a number of resident fish species and life stages and to prevent isolated pools from forming in Piney Channel during the summer months such that depleted DO concentrations can be prevented.

To maintain a healthy white doll's daisy and sticky goldenrod population, PPL will release periodic flushing flows into the spillway to protect habitat for white doll's daisy and will monitor the health of the white doll's daisy population and make adjustments to the flow regime as required.

PPL will provide a continuous base flow of 800 cfs and a daily volumetric flow equivalent to 98.7% of the minimum flow requirements of the Conowingo Project.

Despite that flow conditions are well defined and incorporated in the FERC license, the project is still transitioning to its redeveloped configuration. Therefore, PPL should promote a better understanding of the flow conditions in the river and continue efforts to find agreement on the operational coordination during this transitional phase. If flow violations occur, an adequate explanation and recommendation of how to avoid similar violations in the future should be documented in their annual statement to LIHI<sup>4</sup>.

Since PPL is in compliance with the MSFOP, this LIHI criterion is satisfied.

#### **Criterion B – Water Quality**

A 401 WQC was issued to the Holtwood project on June 15, 2009 and was integrated into the FERC license.

In summary, current DO concentrations fall well within state water quality standards for the river. The MSFOP specifies the 200 cfs minimum flow will also protect water quality in the Piney Channel. In addition, a 10-inch pipe through the dam will also continuously deliver water to the spillway area to connect many of these pools, providing a constant source of fresh, oxygenated water.

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<sup>4</sup> Certified facilities must file an annual statement with the Executive Director confirming that in the preceding year, there has been no relevant change in conditions, violations of the LIHI Criteria or LIHI Certification Use Requirements, and no receipt of a relevant notice of violation from a government agency.

The DO monitoring plan pursuant to Article 53 of the new license calls for water quality monitors to be deployed in the tailrace, Piney Channel and Lake Aldred for the first 5 years of operation of the amended project. Should DO concentrations fall below standards with the new units, PPL will develop operation protocols or physical modifications to maintain state standards.

Again, despite that current DO concentrations fall well within state water quality standards for the river, conditions may change since to project is still transitioning to its redeveloped configuration. Therefore, PPL will need to certify in their annual statement to LIHI that they continue to adhere to the DO monitoring plan and will develop operation protocols or physical modifications to maintain state standards should DO concentrations fall below standards.

Since PPL is in compliance with water quality aspects of the 401WQC, this LIHI criterion is satisfied.

### **Criterion C – Fish Passage and Protection**

PPL has developed a Fishway Operating Plan (FOP) in consultation with agencies for use following completion of construction activities.

In summary, PPL agrees to successfully pass 75% of the American shad upstream that pass through the Conowingo facility, and that 50% of the shad that pass through the Conowingo facility pass through Holtwood within 5 days of passage at Conowingo. Should Holtwood not meet these targets, PPL agrees to first make operational modifications to enhance fish passage; and, if passage is still below targets, to make physical modifications to enhance fish passage.

PPL will also measure survival of American shad moving downstream past the Project and has agreed to meet a target of 95% survival of juvenile American shad and 80% survival of adult American shad. Should targets not be meet, operational and potentially physical modifications will be necessary to meet targets.

In addition to passing anadromous fish, the Holtwood fish lift will begin operating to move resident, or riverine, fish following the completion of construction. The fish lift will operate during the spring for upstream shad passage and from April 1 through June 30 and from September 1 through October 15 each year, for up to 5 days per week and 6 hours per day.

A preliminary fishway prescription from the USFWS for American shad, alewife, blueback herring, American eel, and other designated resident riverine fish species is part of the license.

PPL must adhere to the FOP and the USFWS prescription, as documented in its annual statement to LIHI to maintain its LIHI certification.

### **Criterion D – Watershed Protection**

The lands on and immediately surrounding Holtwood are largely wooded but contain recreation areas, scattered residential neighborhoods and farmland. No significant agricultural activities occur on Project lands. PPL owns a majority of the land around Lake Aldred and leases portions of it to individuals and local organizations. Numerous cottages and several businesses have been constructed around the reservoir.

Total land area within the Project boundary is approximately 1,853 acres which is primarily owned by PPL. In about 95% of the shoreline, there is at least a 200-foot forested buffer around the river within

the Project boundary. Through a lands transfer agreement with local conservation groups and a Land and Shoreline Management Plan (LSMP) approved by FERC on January 15, 2013, PPL is committed to continued land preservation and maintenance of this shoreline buffer zone, as well as buffers on a number of tributaries in the immediate project area.

Additionally, PPL proposed to grant to others restrictive deed covenants, via conservation easements for lands that it would continue to own in the event that PPL should ever terminate hydroelectric operations under its FERC license. This policy will ensure the continued preservation and use of these lands in support of regional green space and heritage initiatives.

Specifically under the LSMP, PPL proposed to:

1. transfer to the Lancaster County Conservancy 324 acres of PPL-owned non-project lands,
2. remove approximately 1,700 acres of Holtwood lands from the FERC delineated project boundary and transfer these lands to the Lancaster County Conservancy, York County, and the Conservation Society of York County,
3. grant to the Lancaster County Conservancy, the PADCNr, and York County, conservation easements on approximately 1,400 acres of lands to remain within the FERC delineated project boundary,
4. coordinate the development of a recreation management plan in consultation with the PADCNr to facilitate state management of Project-controlled recreation facilities in order to create enhanced public use opportunities, and
5. coordinate activities with the various recreation providers and municipal governments in the corridor and support efforts to create an appropriate management structure or organization to foster communication and coordination among the organizations planning for the future of the river corridor.

Because there were some concerns raised by FERC about removal of Project lands from the project boundary, PPL withdrew the original request for changes to the Project boundary and reapplied in March 2012. FERC issued public notice of the proposed amendment on May 18, 2012. FERC approved the Project Boundary changes on December 21, 2012. FERC subsequently approved the Land and Shoreline Management Plan on January 15, 2013.

Since there is a buffer zone dedicated for conservation purposes extending 200 feet from the average annual high water line for at least 50% of the shoreline and the project is in compliance with the license approved LSMP regarding protection, mitigation or enhancement of shorelands surrounding the project, the project qualifies for an extended certification term of eight years.

To maintain this extended LIHI certification, it is recommended that PPL documents its continued adherence to the LSMP in its annual statement to LIHI.

### **Criterion E – Threatened and Endangered Species Protection**

The Project's redevelopment efforts have been conducted in and around a number of endangered plant and bird species. PPL has modified project designs and construction schedules and approaches in order to avoid and minimize potential issues with endangered species.

#### ***6.1.1 – Bald Eagle***

There is a bald eagle nest along the York County shore near the Holtwood dam and a nest downstream

of Holtwood dam at the southern end of Piney Island. Both of these nests have moved within the project area since the start of the redevelopment process. The eagle nest on Piney Island, is located in the middle of project construction.

PPL and the USFWS developed a Bald Eagle Management and Monitoring Plan (BEMMP) for Holtwood Redevelopment on August 8, 2008. This adaptive management plan and guidelines for construction allowed for certain activities to take place at varying distances from the nest during nesting season with ongoing monitoring to ensure the nest was not disturbed. PPL installed monitoring equipment and a 120' tower to observe the eagles during construction. Work on this was completed in October 2009. The tower is located on PPL property on the Lancaster County side of the Project tailrace across from the bald eagle nest on Piney Island. Throughout the 2009-2010 and 2010-2011 construction seasons, the management plan worked well and the eagles successfully nested.

In the winter of 2011-2012, however, due to considerable construction delays caused by tropical storms and hurricanes, PPL requested permission from the resource agencies to conduct construction activities in closer proximity to the nest. After monitoring indicated that this activity was potentially disturbing the eagles, the USFWS suggested that PPL apply for an incidental take permit, now an option under the Bald and Golden Eagle Act.

PPL applied for this permit on January 13, 2012. The Bald Eagle Incidental Take Permit (BEITP) was granted by the USFWS on January 26, 2012. This permit requires PPL to conduct research on area eagles. In the spring 2012, research contractors for PPL successfully outfitted two juvenile eagles from the York County nest with radio transmitters that will track the eagle movements for the next several years.

On November 27, 2012, PPL requested amendment of the existing take permit to allow for construction to occur within the 330-foot buffer zone from the York County nest in order to complete the whitewater features. The USFWS and PGC agreed to allow certain activities to occur, with increased monitoring of the nest as well as new mitigation conditions for PPL to provide funding to area bird rescue groups. The amendment to the BEITP was issued on December 4th, 2012.

### **6.1.2 – Osprey**

Osprey is not federally listed, but is listed as threatened in Pennsylvania. Ospreys are large, fish-eating birds of prey. They usually nest in large trees, but may be found nesting on channel markers, telephone poles, chimneys and man-made platforms built specifically for their use.

Several nest sites have been identified in the vicinity of the Holtwood Dam. There are nests within the immediate Project area including just below the dam on transmission towers within the Susquehanna River channel and on the York County shore. PPL and the PGC have established construction buffers around active nests and have monitored nests throughout the nesting season. These measures have been successful in avoiding any impacts to osprey.

### **6.1.3 – Great Blue Heron**

Great Blue Heron, a species of special concern in Pennsylvania, is abundant throughout the project area. In 2012, two small heron rookeries were established below the Project on Oakes and Piney Islands, in the midst of active construction areas. PPL and the PGC developed buffer zones around these rookeries to avoid impacting heron during the active nesting season.



#### **6.1.4 – Threatened and Endangered Plants**

Several state-listed threatened and endangered plants have been identified in the Project area. The primary species of concern with respect to the project redevelopment were American holly, sticky goldenrod, and white doll's daisy.

As part of construction, PPL and the PADCNR developed plans that avoided areas where holly trees were growing. Another approach was to relocate some holly trees for replanting after construction.

Sticky goldenrod is abundant below Holtwood dam while white doll's daisy is found throughout the spillway area. These plants have flourished due to high scouring flows during some times of the year with limited to no flow during the summer months. The PADCNR is concerned that the project redevelopment may change the flow regime below the dam and impact these endangered plant populations. Therefore, PPL and PADCNR developed a program for controlled spills to provide wetting flows to plants as well as a monitoring program that can be implemented over a multi-year period before and after project redevelopment to determine the impact, if any, on plant populations.

With exception to the above agreed to plans to minimize effects on the threatened and endangered species within the project boundary, no formal recovery plans have been requested by resource agencies for the any threatened and endangered species at the Project. Therefore, the project passes this criterion.

#### **Criterion F – Cultural Resources**

In 2006, PPL carried out a preliminary study of the soils and geomorphology of Piney Island and its environs within and adjacent to the Project. The purpose of this geo-archaeological study was to evaluate the potential for the presence of intact, in situ cultural material within the alluvial sediments that might be affected by the proposed construction of a new powerhouse and associated modifications to the tailrace channel.

The investigation showed that the east shore of the Susquehanna River across from Piney Island, the area of a proposed new powerhouse adjacent to the existing powerhouse, the proposed Pequea Boat Landing site, and the southern portion of Piney Island, together with much of the eastern bank of the Island, had been previously disturbed and had no potential for artifact bearing strata. No further investigations were recommended for those areas.

However, the investigations also found that the east edge of the Upper Piney Island contains moderately stable soils, indicating a high potential for the survival of evidence of prehistoric occupation. The study recommended Phase IB testing of this area if the proposed modifications to the Project had the potential to affect it.

PPL submitted the draft report to the SHPO on November 29, 2006. The SHPO issued a letter on January 22, 2007 concurring with the recommendations that the proposed new powerhouse site and boat launch site had no archaeological potential, and that no additional archaeological studies would be required if construction associated with the proposed new powerhouse avoided the areas on Piney Island identified as having archaeological potential. PPL was able to redesign the tailrace excavation plan to avoid the areas where there was potential for archeological resources.

On May 22, 2008, PPL submitted to the SHPO a Pennsylvania Historic Resource Survey Form for the Holtwood Hydroelectric Projects. In this Survey Form, PPL recommended that the Project is eligible for

the National Registry of Historical Places (NRHP). On June 16, 2008, SHPO concurred with this recommendation and determined that the Project, including the powerhouse and the dam, is eligible under Criterion A for its association with the development of hydroelectric power on the Susquehanna River and under Criterion C for its engineering significance as the location of the first Kingsbury thrust bearings, and as an example of the Classical Revival style of architecture.

In December 2009, in compliance with an August 2009 Programmatic Agreement (PA) between FERC and the SHPO, PPL filed a Historic Properties Management Plan (HPMP) with FERC. The HPMP details measures associated with those components outlined in the PA and serves as the day-to-day implementation plan for PPL to use for the management and the reasonable protection of historic properties. The HPMP was approved by FERC on January 11, 2010. PPL is in compliance with the plan and files annual reports of activities under the plan for Commission approval.

Holtwood is in compliance with all requirements regarding cultural resource protection, mitigation or enhancement that are included in its FERC license and the HPMP. Therefore, the project passes this criterion.

### **Criterion G – Recreation**

PPL provides recreational opportunities throughout the Project including flat-water boating access, whitewater boating access, angling access, camping areas and hiking trails.

PPL has identified recreational facilities that would be impacted by the new development and has proposed mitigation. Recreational access improvements to the redeveloped Project include:

1. improved flat-water boating access at two boat launches on Lake Aldred,
2. the launch at Pequea will have a new Americans with Disabilities Act (ADA) accessible fishing pier, a new ADA accessible fishing pier at the Project tailrace,
3. a new water level gaging system on Lake Aldred that will provide real-time data to the public and,
4. whitewater boating features downstream of the dam.

All recreation is open to the public and free of charge, other than some fees associated with use of the campground facilities.

#### ***6.1.5 – Land Based Recreation***

Land-based recreation activities within the Project boundary include hunting, hiking, sightseeing and wildlife watching, camping, and picnicking, among others. Hunting for waterfowl, pheasant, rabbit, squirrel and deer is permitted on land surrounding the Project. Several long-distance hiking trails cut through the Project area.

Most recreational use of the Project occurs at formal access sites. Shoreline anglers and whitewater boaters appear to be the two unique user groups that regularly access the Project using informal trails, generally in the area of the spillway on the western shore downstream of the dam.

The 2,400-acre Lake Aldred is popular for boating, angling and, to a lesser extent, water-skiing. Lake Aldred provides opportunities for walleye, bass, catfish, panfish and muskellunge angling. Formal public boat access to the lake is provided at York Furnace and Pequea Creek boat launches and shoreline access is available at these sites, as well as Otter Creek Recreation Area.

To enhance boating access to Lake Aldred year-round, PPL is modifying the York Furnace and Pequea boat launches. At the York Furnace boat launch, PPL is extending the existing ramp so that it will be useable at all normal water surface elevations. At Pequea, PPL is installing a new boat ramp and an ADA accessible fishing platform and dock in and adjacent to the Susquehanna River.

Portage services are provided by PPL for through-boaters at Holtwood. PPL personnel transport boaters and their craft around Holtwood Dam to the Muddy Creek Boat Access. Islands within the Project boundary are maintained by PPL for informal recreational use. Primarily for reasons of health and safety, swimming is not allowed at Holtwood recreation areas.

#### **6.1.6 – Downstream Recreation**

Tailrace fishing and whitewater boating are recreational activities typically found below the dam.

The tailrace channel is located between the Lancaster County shore and the eastern shore of Piney Island and remains fully wetted by backwater from Conowingo Pond, regardless of Project operations.

Access to the Holtwood Tailrace Fishing Area is prohibited during construction of the new powerhouse; however, on a permanent basis, PPL is improving and relocating the Holtwood Tailrace Fishing Area slightly further downstream of the existing site. The new fishing platform will be ADA-accessible and will be accessible from a new parking area.

Whitewater Boating occurs year-round below the Project when flows are available. Most of the whitewater features downstream of the dam are dependent upon spillage from the Project (i.e. flows in the spillway). Prior to redevelopment, whitewater features were generally available at total river flows of 50,000 cfs or greater. Diversion of water to the new powerhouse and excavation of Piney Channel will reduce the frequency of flow to the whitewater features in the channel and other areas of the spillway resulting in a reduction in the number of days with suitable flow available.

In 2009, PPL proposed to address concerns raised by whitewater boaters by entering into an agreement with the American Whitewater Association (AWA) to fund the design, construction and maintenance of alternative whitewater features in Piney Channel. Features of the agreement were meant to compensate for the reduced frequency and quality of existing whitewater boating opportunities that would result from the expansion project. However, conflicts with fish passage criteria and agencies concerns that the features would by their nature serve as an impediment to fish passage required modifications to the plan. PPL proposed new features in a filing with FERC on December 15, 2011 which would construct new features on the west side of the river, downstream of the dam.

FERC approved the plan on July 10, 2012. PPL began construction of these features in 2012 and is expected to complete, test, and allow public access to them in 2013. PPL also is enhancing an existing, informal parking area near the proposed features to improve access.

In accordance with the AWA agreement, releases will be scheduled for 264 hours per year to activate the new features. Initially releases will not be scheduled during the spring during the American Shad migration period so that PPL can assess whether the spill for whitewater features would provide an undesired fish attraction flow. Discussions with the USFWS and Pennsylvania Fish and Boating Commission (PAFBC), and their concurrence with the proposed course of action, would precede any decision to schedule some of the releases during subsequent upstream migration periods of the American Shad. Flows also will not be scheduled when river flows are below 31,000 cfs between June

and September for protection of endangered plant species pending further consultation with the PADCNR.

### **6.1.7 – Land Transfer**

PPL has proposed to remove from the Project boundary approximately 1260 acres that are not necessary for Project purposes so that those areas may be transferred to Lancaster County Conservancy (LCC) for long-term preservation and public use. The lands to be removed from the Project boundary are outside the 200-ft shoreline buffer and are not otherwise needed for Project purposes. PPL will use the proceeds from that transfer to create a sustainable endowment fund for lands maintenance and for future recreational development to complement regional conservation and developmental initiatives.

The project is currently in compliance with all FERC requirements related to recreational use and allows access to the reservoirs and downstream reaches without fees or charges. Therefore, the project passes this criterion.

### **Criterion H – Dam Removal**

No state or federal agencies have recommended that dam at the Holtwood be removed. Therefore, the project passes this criterion.

## **6.2 Recommendations of the Reviewer**

Based on my review of information submitted by the applicant, the additional documentation noted herein, the public comments submitted in writing or other communications with resource agencies and other entities, I find that the project conforms to current LIHI criteria. I recommend that the Holtwood project be conditionally certified, with a certification term of eight years.

The Project is still transitioning to its redeveloped configuration and will start operating in its final configuration shortly. Mr. David W. Sutherland, Fish and Wildlife Biologist at the Chesapeake Bay Field Office, is the current lead for projects on this section of the Susquehanna River. He has expressed concern with Holtwood's underperformance with regard to meeting upstream fish passage percentage as defined in the FOP. He states that the agreed to successfully passage of 75% of the American shad upstream that pass through the Conowingo facility, and that 50% of the shad that pass through the Conowingo facility pass through Holtwood within 5 days of passage at Conowingo is not close to being met. Procedures are in the FOP to address this outcome.

Therefore, two conditions are recommended for inclusion in the certification, as follows:

1. In its annual compliance statement to LIHI, PPL-Holtwood shall provide a summary report on the status of all fish passage and protection efforts over the prior year and shall certify that the state and federal fisheries management agencies agree that these monitoring efforts are progressing toward achievement of the standards-based goals of the FOP. If annual improvement toward the standards-based FOP goals is not happening, PPL shall propose solutions. In 2018, after three years of fish monitoring has been completed, LIHI shall evaluate overall progress on upstream fish passage and protection. LIHI certification may either be suspended or terminated, if the state and federal fish management agencies do not agree that long-term progress is being made. This decision would be at the sole discretion of LIHI.

2. PPL-Holtwood shall work to establish improved information sharing and understanding of on-going monitoring results for flows, water quality, and fish passage at their facility and others along the lower Susquehanna River, to the extent possible. Temporal resolution of data shared shall be sufficient to resolve sub daily fluctuations (e.g., hourly or instantaneous) in each Holtwood dam release and upstream reservoir elevations. This reporting work will begin with development of a draft plan for an annual “Integrated Monitoring Report (IMR) for Flows and Fish Passage” that will focus on existing environmental monitoring activities. The purposes of this new, annual IMR will be to synthesize monitoring results for the previous year at Holtwood in a format compatible with results from other FERC licensed projects on the river, promote understanding among relevant stakeholders, and provide easy access to Holtwood’s monitoring data. The IMR may be implemented either in an annual meeting (virtual or in-person) or a paper report, or both. The IMR will include evaluation of progress made relative to flow and fish goals established for the river. If agencies believe this IMR would be redundant with other reporting requirements already in place under FERC licenses, then PPL-Holtwood may explain how the IMR purposes will already be achieved by means other than a new IMR and propose dropping this LIHI condition.

A draft plan for the IMR will be circulated to LIHI and to the USFWS, the PFBC, and the MDNR within 60 days of LIHI certification for review and comment. The draft IMR plan will summarize current reporting requirements under the amended license and explain how monitoring data will be made electronically accessible to resource agency and LIHI staff, if so requested. Within 120 days of LIHI certification, the final plan for an annual IMR will be distributed to LIHI and the agencies, including response to comments received on the draft. The IMR will then be produced annually. Holtwood will report back to LIHI annually on the results of discussions and comments on the IMR in their annual compliance report for LIHI certification.

## 7. DETAILED CRITERIA EVALUATION

### 7.1 Flows

<b>LIHI Goal:</b> The Flows Criterion ensures that healthy flows for fish, wildlife and water quality are provided downstream of the project and in all bypassed reaches, including, where appropriate, seasonal flow fluctuations characteristic of a natural system.	
<b>A.1</b>	<i>Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations)</i>
	<p><b>Reviewer Analysis:</b> PPL is in compliance with flow conditions at the Project as defined in the MSFOP. Some of the flow provisions do not take effect until after the Project is operational.</p> <p><b>Conclusion:</b> Pass A.1; go to the Water Quality Criterion.</p>
<b>A.2</b>	<i>If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or “good” habitat flow standards calculated using the Montana-Tennant method?</i>
	<b>Reviewer Analysis and Conclusion:</b> N/A.

<b>A.3</b>	<i>If the Facility is unable to meet the flow standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife, and water quality?</i>
	<b>Reviewer Analysis and Conclusion:</b> N/A.

7.2 Water Quality

<b>LIHI Goal:</b> The Water Quality Criterion ensures that water quality in the river is protected.	
<b>B.1</b>	<p><i>Is the Facility either:</i></p> <p><i>a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or</i></p> <p><i>b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?</i></p>
	<p><b>Reviewer Analysis:</b> A 401 Water Quality Certificate was issued to the Holtwood project on June 15, 2009 and was integrated into the current FERC license.</p> <p><b>Conclusion:</b> YES, Pass B.1(a); Go to B.2</p>
<b>B.2</b>	<p><i>Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?</i></p>
	<p><b>Reviewer Analysis:</b> To ensure that DO concentrations remain above standards following operation of the new units, PPL developed a Dissolved Oxygen Monitoring Plan (DOMP) in consultation with agencies and pursuant to Article 53 of the new license. This plan calls for water quality monitors to be deployed in the tailrace, Piney Channel and Lake Aldred for the first 5 years of operation of the amended project. Since PPL is in compliance with water quality aspects of the 401WQC, this LIHI criterion is satisfied.</p> <p><b>Conclusion:</b> YES; Go to B.3</p>
<b>B.3</b>	<p><i>If the answer to question B.2 is yes, has there been a determination that the Facility does not cause, or contribute to, the violation?</i></p>
	<p><b>Reviewer Analysis:</b> An answer to this question will be determined after the DOMP monitoring results are evaluated after 5 years of operating the redeveloped Project.</p> <p><b>Conclusion:</b> YES; Pass on B.3; Go to Fish Passage Criterion.</p>

7.3 Fish Passage and Protection

<p><b>LIHI Goal:</b> The Fish Passage and Protection Criterion ensure that, where necessary, the Facility provides effective fish passage for Riverine, anadromous and catadromous fish, and protects fish from entrainment.</p>	
<p><b>C.1</b></p>	<p><i>Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?</i></p> <p><b>Reviewer Analysis:</b> On April 16, 2008, the USFWS filed a preliminary fishway prescription (PFP) for American shad, alewife, blueback herring, American eel, and other designated resident riverine fish species. On September 3, 2009, the USFWS issued the PFP which is incorporated into the current FERC license (Appendix B). The Holtwood Project is in compliance with a Mandatory Fish Passage Prescription in the PFP.</p> <p>A Fishway Operating Plan (FOP) will be used following completion of construction activities. In summary, PPL agrees to successfully pass 75% of the American shad upstream that pass through the Conowingo facility, and that 50% of the shad that pass through the Conowingo facility pass through Holtwood within 5 days of passage at Conowingo. Should Holtwood not meet these targets, PPL agrees to first make operational modifications to enhance fish passage; and, if passage is still below targets, to make physical modifications to enhance fish passage. PPL will also measure survival of American shad moving downstream past the Project and has agreed to meet a target of 95% survival of juvenile American shad and 80% survival of adult American shad. Should targets not be met, operational and potentially physical modifications will be necessary to meet targets.</p> <p>In addition to passing anadromous fish, the Holtwood fish lift will begin operating to move resident, or riverine, fish following the completion of construction. The fish lift will operate during the spring for upstream shad passage and from April 1 through June 30 and from September 1 through October 15 each year, for up to 5 days per week and 6 hours per day.</p> <p><b>Conclusion:</b> Yes; go to C.2</p>
<p><b>C.2</b></p>	<p><i>Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct)?</i></p> <p><b>Reviewer Analysis:</b> No historical records were found of migratory fish in the project vicinity prevented from passage due to downstream blockage of fish extinction.</p> <p><b>Finding:</b> NO; Go to C.3</p>
<p><b>C.3</b></p>	<p><i>If, since December 31, 1986:</i></p> <p>a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory</p>

	<p>Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a above), and</p> <p>b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,</p> <p>c) Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?</p> <p><b>Reviewer Analysis:</b> The agencies have issued a prescribe fish passage as discussed in C.1. None of the C.3.b or C.3.c factors apply to this Facility.</p> <p><b>Conclusion:</b> N/A; Go to C.4</p>
<p><b>C.4</b></p>	<p><i>If C3 was not applicable:</i></p> <p>a) are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? OR</p> <p>b) If the Facility is unable to meet the fish passage standards in 4.a, has the Applicant either i) demonstrated, and obtained a letter from the U.S. Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource, or ii) committed to the provision of fish passage measures in the future and obtained a letter from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service indicating that passage measures are not currently warranted?</p> <p><b>Reviewer Analysis:</b> The FOP is designed to take affect once construction is completed. It contains procedures to follow if upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam are documented as not meeting the standards in C.4.a.</p> <p><b>Finding:</b> YES; Go to C.5</p>
<p><b>C.5</b></p>	<p><i>Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?</i></p> <p><b>Reviewer Analysis:</b> The PFP addresses design populations of anadromous and catadromous fish only. However, the 401 WQC requires operation of the Project to allow for passage of riverine fish. No compliance issues are documented.</p> <p><b>Finding:</b> N/A; Go to C.6</p>
<p><b>C.6</b></p>	<p><i>Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?</i></p> <p><b>Reviewer Analysis:</b> The USFWS has reserved their authority to set mandatory conditions for migratory fish entrainment protection measures under the PFP.</p> <p><b>Finding:</b> N/A; PASS and go to the Watershed Protection Criterion.</p>



7.4 Watershed Protection

<p><b>LIHI Goal:</b> The Watershed Protection criterion is designed to ensure that land resources are being protected within and around the facility boundary. The term of certification is extended from five to eight years for projects that have either a shoreline buffer zone or a watershed enhancement fund.</p>	
<p><b>D.1</b></p>	<p><i>Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the high water mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline?</i></p>
	<p><b>Reviewer Analysis:</b> The project's Land and Shoreline Management Plan specifically calls for maintaining an undeveloped zone of 200-ft or greater around 95% of the reservoir as a buffer for conservation purposes. PPL is requesting that their application be granted for 8 years versus the standard 5 years of LIHI certification.</p> <p><b>Conclusion:</b> Yes, qualifies for extension of the certification term, Go to D.3</p>
<p><b>D.2</b></p>	<p><i>Has the facility owner/operator established an approved watershed enhancement fund that:</i>  <i>a) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1., and</i>  <i>b) has the agreement of appropriate stakeholders and state and federal resource agencies?</i></p>
	<p><b>Reviewer Analysis/Conclusions:</b> N/A.</p> <p><b>Conclusion:</b> Go to D.3</p>
<p><b>D.3</b></p>	<p><i>Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreline buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation).</i></p>
	<p><b>Reviewer Analysis:</b> The project's Land and Shoreline Management Plan cover these concerns.</p> <p><b>Conclusion:</b> YES, Go to D.4</p>
<p><b>D.4</b></p>	<p><i>Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreline management plan regarding protection, mitigation or enhancement of shoreline surrounding the project?</i></p>
	<p><b>Reviewer Analysis:</b> The project's Land and Shoreline Management Plan cover these concerns. No agency concerns have surfaced.</p> <p><b>Conclusion:</b> YES; pass D.4 and Go to Threatened/Endangered Species Criterion.</p>

**7.5 Threatened and Endangered Species Protection**

<p><b>LIHI Goal:</b> The Threatened and Endangered Species Protection Criterion is designed to ensure that the Facility does not negatively impact state or federal threatened or endangered species.</p>	
<p><b>E.1</b></p>	<p><i>Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?</i></p> <p><b>Reviewer Analysis:</b> Bald Eagles and Ospreys are listed as threatened in Pennsylvania. The red-bellied turtle and rough green snake are both listed as state-threatened, but are not listed at the federal level. Four state-listed plant species are on Project property: scarlet ammannia, American holly, sticky goldenrod, and white doll's daisy.</p> <p><b>Conclusion:</b> YES; Go to E2.</p>
<p><b>E.2</b></p>	<p><i>If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?</i></p> <p><b>Reviewer Analysis:</b> There are no formal recovery plans for the threatened and endangered species at the Project.</p> <p><b>Conclusion:</b> N/A; Go to E3.</p>
<p><b>E.3</b></p>	<p><i>If the Facility has received authorization to incidentally Take a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authorization pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authorization?</i></p> <p><b>Reviewer Analysis:</b> The Project has an incidental take permit for bald eagle at the Project under the Bald and Golden Eagle Act as it relates to the ongoing construction of the new powerhouse. are no formal recovery plans for the threatened and endangered species at the Project.</p> <p><b>Conclusion:</b> YES; Go to E4.</p>
<p><b>E.4</b></p>	<p><i>If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that the biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan?</i></p> <p><b>Reviewer Analysis:</b> There has been no biological opinion issued applicable to the Facility.</p> <p><b>Conclusion:</b> NO; Since there is an incidental take permit for bald eagle at the Project E.5 does not apply- PASS; Go to Cultural Resource Protection Criterion.</p>

**7.6 Cultural Resources**

<b>LIHI Goal:</b> The Cultural Resource Protection Criterion is designed to ensure that the Facility does not inappropriately impact Cultural Resources.	
<b>F.1</b>	<i>If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?</i>
	<b>Reviewer Analysis:</b> The Project follows a Historic Properties Management Plan that requires annual reports pertaining to its compliance conflicts were identified in the record. <b>Finding:</b> YES; PASS and go to Recreation Criterion.

**7.7 Recreation**

<b>LIHI Goal:</b> The Recreation Criterion is designed to ensure that the Facility provides access to the waters and accommodates recreational activities.	
<b>G.1</b>	<i>If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?</i>
	<b>Reviewer Analysis:</b> PPL adheres to a Recreation Use Monitoring Plan as authorized in license article 59, a Long-Term Recreation Use Plan and a Whitewater Boating Plan in accordance with license article 60. <b>Finding:</b> YES; Go to G.3
<b>G.3</b>	<i>Does the Facility allow access to the reservoir and downstream reaches without fees or charges?</i>
	<b>Reviewer Analysis:</b> Access is provided without charge within the limited Project boundaries. <b>Finding:</b> YES; PASS and go to Dam Removal Criterion.

**7.8 Dam Removal**

<b>LIHI Goal:</b> The Dam Removal Criterion is designed to ensure that the Facility is not certified if a Resource Agency has recommended that a dam associated with the Facility should be removed.	
<b>H.1</b>	<i>Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?</i>
	<b>Reviewer Analysis:</b> There is no evidence that any agencies have requested that the Project dam be removed. <b>Conclusion:</b> NO, pass H.1 and pass on all LIHI criteria.

APPENDIX A  
**CORRESPONDENCE**

ORIGINAL

*Project Manager - Holtwood Licensing  
PPL Generation, LLC  
Two North Ninth Street (GENPL6)  
Allentown, PA 18101*

ppl

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March 3, 2006

**PPL HOLTWOOD, LLC  
HOLTWOOD HYDROELECTRIC STATION  
FERC PROJECT 1881  
NOTICE OF PROJECT REDEVELOPMENT PLAN AND PUBLIC MEETING**

PPL Holtwood, LLC (PPL) invites you to attend a tour of the Holtwood Hydroelectric Station on April 18, 2006, to be followed by an evening public meeting to be held at the Willow Valley Resort and Conference Center located south of Lancaster, PA. We will be discussing a proposed new project redevelopment plan with significant environmental benefits. A schedule of the planned day's events is attached for your information.

For nearly a century, the Holtwood hydroelectric plant has generated renewable, clean energy and provided recreational opportunities for people in the lower Susquehanna River valley. As we approach the plant's 100<sup>th</sup> anniversary, PPL is preparing to launch an exciting new project to start Holtwood's second century. I hope you will join us to learn more about a proposal that PPL is developing to improve the plant's lift facility for migratory fish, increase the plant's generating capacity and extend the plant's operating license.

Since early 2005 PPL has been working collaboratively with key state and federal regulatory agencies to formulate a redevelopment plan for the Holtwood project that responds to agency concerns regarding migratory fish passage, creates new environmental and recreational opportunities, and provides the opportunity to expand the station's generating capacity to create additional clean and renewable energy generation for the 21<sup>st</sup> century.

This redevelopment plan is briefly summarized below, and more extensively in an Initial Consultation Document (ICD) that has been prepared by PPL and provided to federal and state resource agencies, county level administrators and planners, and other public officials. The ICD and additional information on this redevelopment proposal has also been placed on a PPL Web site at [www.holtwood2010.com](http://www.holtwood2010.com). A CD or hardcopy of the ICD is also available by writing to me at the address above.

The overall proposed redevelopment plan for Holtwood is shown in the attached drawing and includes the construction of a new 125 megawatt hydroelectric generating plant adjacent to the existing Holtwood hydroelectric plant along the eastern shore of the Susquehanna River in Martic Township, Lancaster County along with installation of a new ice skimmer wall upstream of the new plant. The new plant as proposed will be constructed within the fence line of the old Holtwood anthracite power plant which was demolished by PPL in 1999. Because of this, and the fact that project design and preliminary construction plans have been tailored to enhance the environmental resources in the area, PPL believes project construction will qualify as a "Tier 1-Low-Impact Hydro" generation source under Pennsylvania's Alternative Energy Portfolio standards.

In addition to the proposed new generating station, the project as proposed will also include several components all conceived to complement and enhance migratory fish passage and recreational uses of the land areas and waters around the Holtwood dam. These include extensive in-river excavation to create enhanced routes for American shad passage; the replacement of the dam's wooden flashboards with new inflatable rubber dam segments for enhanced flow and lake level control; and the construction of a new low-height fish barrier dam immediately downstream of the existing Holtwood dam.

As part of the overall redevelopment plan PPL also expects in 2006 to seek broad public input on other measures and project operational and management plans that will establish the framework for the next century of Holtwood operations. Measures currently under consideration by PPL include potential changes to operational lake levels, enhancements to recreational access points on the lake, and additional steps that may be taken with respect to project lands and waters that can or should be undertaken to ensure the long-term preservation of the Susquehanna Gorge riverlands area. Before these measures are proposed it is critically important that those who have a direct stake in the management of the river resource have an adequate opportunity to express their views, interests and concerns.

This process begins with the plant tour and public meeting on April 18<sup>th</sup> and will continue with a series of monthly project meetings to be held from April through August of 2006. More information on this project and the planned project schedule is available on the Holtwood 2010 Web site, by contacting me at the above address, or by calling me at 610-774-5996.

I hope to meet you to meet you on April 18<sup>th</sup> and on behalf of PPL I invite you to actively participate in the additional planning of this important project over the coming months.

Sincerely,



Gary Petrowski, PE  
Project Manager - Holtwood Licensing

**HOLTWOOD REDEVELOPMENT PLAN  
FERC PROJECT NUMBER 1181**

**APRIL 18, 2006  
PLANT TOUR AND PUBLIC MEETING AGENDA**

**9:00 AM to 1:00 PM**

Tours of the existing Holtwood hydroelectric generating plant and fish lift will be provided on the hour beginning promptly at 9:00 AM, 10:00 AM, 11:00 AM and at 12:00 Noon. Reservations are not required, however, please plan on arriving at the plant at least 15 minutes prior to the tour departure time.

The tours will begin from the plant parking area outside the plant security gate. Following the tour snacks and drinks will be provided at the Holtwood Tour Building located on the plant grounds. PPL's Project Manager for the licensing effort will also be available to answer any questions regarding the Redevelopment plan.

**6:00 PM to approximately 9:00 PM**

A public meeting to discuss the Redevelopment project will be held at the Willow Valley Resort and Conference Center, Willow Street, PA. The planned schedule for the public meeting is as follows:

- |                |   |
|----------------|---|
| <b>6:00 PM</b> | <b>Attendee Registration</b>  |
| <b>6:30 PM</b> | <b>Welcome and Introduction – Robert J. Barkanic, Director – Environmental Management, PPL Services Corporation</b>   |
| <b>6:40 PM</b> | <b>Overview of Project Redevelopment Plan – Gary Petrewski, Senior Engineer, Project Manager – Holtwood Licensing</b> |
| <b>7:15 PM</b> | <b>Public Comment Period</b>  |

Directions to the Holtwood plant and Willow Valley Resort and Conference Center are attached.

**Directions to Holtwood Plant**

From Lancaster: Take Route 272 south to Route 372. Turn right and follow Route 372 for six miles to River Road. Turn right on River Road and go a half mile to Old Holtwood Road. Turn left and follow Old Holtwood Road for a one and a half mile to the bottom of the hill at the railroad tracks. Park in the parking area for Holtwood Plant and walk to the main gate.

From York: Take Route 74 south to Route 372. Turn left and follow Route 372 across the Susquehanna River. After crossing the bridge, stay on Route 372 for two miles to River Road. Turn left on River Road and go a half mile to Old Holtwood Road. Turn left and follow Old Holtwood Road for a one and a half mile to the bottom of the hill at the railroad tracks. Park in the parking area for Holtwood Plant and walk to the main gate.

**Directions to Willow Valley Resort and Conference Center**

From Lancaster proceed south on Rt. 222 for 4 miles. You will see Willow Valley Resort on your right. At the stop light turn right, go a short distance and turn right into the Willow Valley Resort parking area.

From the south proceed north on Rt. 272 to the Kendig Square intersection. Go straight, road becomes Rt. 222. Go one mile, you will see Willow Valley Resort on your left. At the stop light turn left, go a short distance and turn right into the Willow Valley Resort parking area.



**PUBLIC**

**ORIGINAL**

**DEWEY & LEBOEUF**

Dewey & LeBoeuf LLP  
1101 New York Avenue, NW  
Suite 1100  
Washington, DC 20005-4213

FILED  
OFFICE OF THE  
SECRETARY

2007 DEC 20 A 11:45

tel +1 202 986 8039  
+1 202 956 3237  
dpo@dl.com

FEDERAL ENERGY  
REGULATORY COMMISSION

**P-1881-050**

December 19, 2007

Hon. Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

Re: P-1881- Holtwood Project – Application for Capacity Related License Amendment

Dear Secretary Bose:

On behalf of PPL Holtwood, LLC ("PPL"), please find enclosed for filing an Application to Amend the License of the Holtwood Project, P-1881. This application for a capacity related amendment has been prepared according to the requirements of 18 CFR Section 4.201(b)(1), including consultation with relevant federal and state resource agencies as required by 18 CFR Section 4.38.

The purpose of the license amendment is to redevelop the Holtwood Project, located on the lower Susquehanna River, by constructing a new powerhouse and installing 83 MW of new generation. Importantly, this new construction will result in a reconfiguration of the project in a manner designed to accomplish very specific and ambitious goals for upstream fish passage, particularly for American Shad. PPL has been engaged in extensive discussions with federal and state resource agencies for more than 3 years regarding this redevelopment of the project, and these discussions have resulted in agreements that, when finalized, will represent a settlement of the federal and state environmental and recreational issues identified regarding redevelopment. As noted in the Application, PPL already has entered into a Consent Order Agreement with the Pennsylvania Department of Environmental Protection ("PADEP") which took the lead role in negotiations among the resource agencies and PPL. The Consent Order specifies the minimum flow and fish passage provisions that are proposed to be inserted into PADEP's certification of the project redevelopment under Section 401 of the Clean Water Act. A settlement that includes essentially the same terms and conditions regarding fish passage and minimum flow is expected to be finalized with the remaining interested federal and state resource agencies, including those with prescriptive authority under Section 18 of the Federal Power Act, within the next few months.

Hon. Kimberly D. Bose  
December 19, 2007  
Page 2

PPL believes that all of the major stakeholders support the redevelopment of the Holtwood Project in the manner proposed in this license amendment application and PPL has been informed that the resource agencies will be filing letters of support shortly after PPL files this application. With no expansion of Lake Aldred, the impoundment behind Holtwood Dam, the proposed redevelopment will result in additional average annual generation of 360,834 MWh, all of which PPL believes will qualify for certification by the Low Impact Hydro Institute as energy produced with minimal incremental environmental impact. PPL expects to spend approximately \$300 million on this redevelopment project

The existing license for the Holtwood Project expires on September 1, 2014. As part of this license amendment application and in recognition of the amounts it expects to invest in the redevelopment, PPL respectfully requests that the license term be extended by an additional 16 years, through August 31, 2030, which would result in a 50 year license term for the existing license, the maximum permitted under the statute.

PPL believes that the information supplied herein is sufficient to permit the Commission to consider and rule upon the license amendment being proposed. Accordingly, PPL respectfully request that to the extent that others of its regulations are possibly implicated by this application, that those regulations be waived. To the extent that the Commission determines that additional information is required in order to process the application, PPL pledges to cooperate to the fullest extent.

Exhibit F consists of detailed drawings of the proposed project addition, and a Supporting Design Report for which CEII status is respectfully requested. In accordance with §388.112(b)(2)(ii), an original and two paper copies of this material has been provided and are marked as "Contains Critical Energy Infrastructure Information". Also enclosed are three electronic copies of this information, marked as CEII.

Pursuant to the Commission's Guidelines For Submission of CDs, DVDs, and Other Electronic Media, issued April 12, 2007 and updated as of June 14, 2007 as reflected on the Commission's web site, an original and two paper copies of the public version of the application (i.e., minus the CEII material in Exhibit F) are being submitted for filing together with an original and 8 copies on CD. CD or hard copies of the public version of the application will be served on all entities on the Commission's the official service list and those individuals or entities required to be served pursuant to 18 CFR Section 4.32(a).

Please direct any questions to the undersigned.

Respectfully submitted,



David R. Poe  
Counsel for PPL Holtwood LLC

# DEWEY & LEBOEUF

Dewey & LeBoeuf LLP  
1101 New York Avenue, NW  
Suite 1100  
Washington, DC 20005-4213

tel +1 202 346 8039  
fax +1 202 956 3237  
dpoe@dl.com

December 8, 2008

Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, DC 20426

Re: *Holtwood Hydroelectric Project, No. 1881-050*  
Withdrawal of License Amendment Application

Dear Secretary Bose:

For various business reasons, PPL Holtwood, LLC (“PPL”) hereby withdraws its application for amendment of the license for the Holtwood Hydroelectric Project, P-1881, filed on December 20, 2007. We respectfully request that the Federal Energy Regulatory Commission immediately cease processing that application.

As a matter of information, please be advised that PPL is also simultaneously withdrawing all related applications that are pending before other federal or state agencies.

Please contact the undersigned if you have any questions.

Respectfully submitted,

/s/ David R. Poe

David R. Poe  
*Counsel for PPL Holtwood, LLC*

cc: P-1881 Mailing List



(a) incorporate by reference the record fully developed and considered in FERC Docket No. P-1881-050, the subdocket in which the 2007 Application was considered; and (b) once appropriate Section 401 certification is received from the Commonwealth of Pennsylvania, approve this Renewed Application based on such record. PPL respectfully submits that this subdocket (1) contains all information that was needed to make a determination on PPL's request to amend the Holtwood Project license as set forth in the 2007 Application and (2) evidences the thorough vetting of PPL's proposed Holtwood Project Expansion by FERC Staff, federal and state resource agencies, and stakeholders. The license amendment requested in this Renewed Application is virtually the same as that requested in the 2007 Application.<sup>2</sup> Thus, the record regarding the 2007 Application, which resulted in FERC Staff recommending that the Commission approve PPL's proposed license amendment with certain modifications in the Final Environmental Impact Statement ("FEIS") issued in November 2008, is fully applicable and supports Commission approval of the Renewed Application.

As demonstrated below, the Commission has plenary authority to approve this Renewed Application based on the entirety of the record in FERC Docket No. P-1881-050, provided (1) that the Commission complies with the requirement in Section 6 of the FPA that the public receive 30 days' notice of this Renewed Application prior to issuance of a determination to amend the Project license, and (2) that a timely Section 401 certification is filed with the Commission. Having contacted all major stakeholder groups regarding this Renewed Application, PPL believes that the project expansion still retains broad support among environmental agencies and other stakeholders, who in any

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<sup>2</sup> As explained in Section III of this Renewed Application, the only differences are in certain milestone dates, predominantly due to the four-month delay since the withdrawal of the 2007 Application.

event will have an opportunity to be heard regarding the instant application. PPL thus respectfully requests that the Commission approve this Renewed Application and issue its determination on an expedited basis. Expedition is warranted (a) to ensure that PPL may qualify for economic incentives in the American Recovery and Reinvestment Act of 2009 and (b) in light of the need to begin relicensing activities in the near future given the August 31, 2014 expiration date of the existing project license.

#### **I. PROCEDURAL BACKGROUND: THE 2007 APPLICATION**

In 2004, PPL began a process to amend the Holtwood Project license to provide for increased generating capacity, improved fish passage and other environmental enhancements, and an extension of the license term commensurate with the proposed modifications to the Project. The existing Holtwood Project consists of a 3,075-foot-long by 55-foot-high dam on the lower Susquehanna River in Lancaster and York counties, Pennsylvania, and a powerhouse housing ten turbines with a total installed capacity of 107.2 MW. Specifically, in the 2007 Application, PPL proposed to (1) construct a new powerhouse and install new turbines that would increase total installed capacity to 195.5 MW; (2) construct a new skimmer wall and larger forebay; (3) reconfigure the existing fish lift, reroute the discharge of Unit 1 in the existing powerhouse, and excavate in the Project's tailrace and in Piney channel to improve migratory fish passage; (4) provide minimum flows and conduct studies of the effectiveness of the modified fish passage facilities and flow releases; (5) improve existing and construct new recreational facilities; and (6) establish protocols to ensure protection of special status plants, wildlife, and cultural resources during the construction process. Completion of these improvements would require a substantial monetary investment over several years, so PPL also

proposed an extension of the existing PPL Holtwood license to a full 50-year term ending on August 31, 2030.

In anticipation of its request to amend the Holtwood Project license, PPL spent over three years conducting pre-filing consultation with federal and state resource agencies and stakeholders, a process in which the Pennsylvania Department of Environmental Protection (“DEP”) took a leading role on behalf of the federal and state resource agencies. As a result of those consultations, PPL and DEP entered into a Consent Order and Agreement on November 21, 2007 that provided for DEP concurrence on PPL’s proposed capacity upgrades and fish passage improvements and set forth provisions that would become conditions of DEP’s required Section 401 certification for the amended license.

Having complied with the pre-filing consultation requirements under Section 4.38 of the Commission’s regulations (18 C.F.R. § 4.38), PPL filed a formal application to amend the Holtwood Project license on December 19, 2007 in conformance with the requirements for license amendment applications under Section 4.201(b)(1) (18 C.F.R. § 4.201(b)(1)). The 2007 Application contained proposals for all of the aforementioned Project modifications and environmental enhancements and included PPL’s request to extend the license to a 50-year term ending on August 31, 2030.

The Commission commenced an extensive review process pursuant to its regulations implementing Part I of the FPA and the National Environmental Policy Act (“NEPA”). FERC Staff issued a Scoping Document to all interested parties on March 17, 2008, requesting comments on PPL’s proposed license amendment. FERC Staff then held two scoping meetings in Holtwood and Lancaster, Pennsylvania on April 17, 2008.

The Commission issued a notice that the license amendment application was ready for environmental analysis on February 21, 2008, and sought comments recommending terms and conditions for the proposed amended license. The Commission extended the deadline for those comments by request of PPL and Exelon Corporation, and provided for the filing of reply comments by June 19, 2008.

While the environmental review and notice and comment processes took place, PPL continued to communicate with stakeholders, resource agencies and FERC Staff about the proposed license amendment. On June 13, 2008, PPL reached an agreement with local boating organizations on the preservation and enhancement of whitewater boating opportunities within the Holtwood Project area. PPL, the U.S. Fish and Wildlife Service, DEP, the Pennsylvania Fish and Boat Commission, the Maryland Department of Natural Resources, and FERC Staff participated in a meeting on September 3, 2008 regarding fish and wildlife protection pursuant to Section 10(j) of the FPA. PPL held meetings with FERC Staff and representatives of the Commonwealth of Pennsylvania regarding potential transfers of Holtwood Project land following the amendment of the Project license. PPL also received requests for additional information from FERC Staff regarding the proposed license amendment, to which PPL provided responses on June 19, July 7, August 27, and October 3, 2008.

On July 18, 2008, FERC Staff issued a Draft Environmental Impact Statement (“DEIS”) that thoroughly analyzed the direct and indirect effects of the license amendment as proposed by PPL and of the alternatives to PPL’s proposal. FERC Staff sought public comment on the DEIS for a period of 30 days from the publication of notice in the *Federal Register*. Numerous federal and state agencies, stakeholders, and



PPL filed comments in response to the DEIS, providing suggestions for the license amendment proposal to be considered by FERC Staff.

After considering those comments and the information in the record before it, FERC Staff issued a FEIS on November 14, 2008. In the FEIS, FERC Staff concluded that,

[b]ased on our analysis, we recommend approving the amendment as proposed by PPL with some staff modification and additional measures. The recommended staff modifications include, or are based in part on, recommendations made by the federal and state resources agencies that have an interest in the resources that may be affected by the reconfiguration of the project.

FEIS at xxii.

The FEIS was the last step in the license amendment application review process before the Commission could make a determination to approve the license amendment, provided that DEP would issue a timely Section 401 certification. As is clear from the record in FERC Docket No. P-1881-050 and the FERC Staff's conclusions in the FEIS, the license amendment proposed by PPL, which is the same as proposed in this Renewed Application, was thoroughly vetted through all necessary and interested parties and FERC complied with all requirements of the FPA, NEPA, and other applicable statutes and regulations. However, shortly after the time FERC issued the FEIS, PPL decided that it had to withdraw its 2007 Application, and filed a letter to that effect with the Commission on December 8, 2008.<sup>3</sup>

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<sup>3</sup> Concurrent with the withdrawal of the 2007 Application, PPL was required to terminate certain agreements that it had executed with other parties in connection with the proposed license amendment. PPL is attempting to execute agreements on the same or substantially similar terms as the terminated agreements in connection with this Renewed Application.

Recent economic events have positively affected PPL's ability to undertake the Holtwood Project investments that it proposed in the 2007 Application. Most importantly, the recently enacted American Recovery and Reinvestment Act of 2009 provides significant economic incentives for hydroelectric project owners that complete incremental increases in project capacity. As a result, PPL is now in a position to pursue through this Renewed Application the same license amendment that it sought in the 2007 Application, which is fully supported by the record in Docket No. P-1881-050.

## **II. INCORPORATION OF ALL SUBMISSIONS AND ISSUANCES RELATED TO THE 2007 APPLICATION**

PPL seeks Commission approval of this Renewed Application based on the entirety of the record established for the 2007 Application, considering the minor changes specified in Section III herein. Accordingly, PPL respectfully requests that the Commission permit PPL to incorporate by reference the entirety of the record pertaining to the 2007 Application in FERC Docket No. P-1881-050, which formed the basis for FERC Staff's recommendation that the Commission approve PPL's request for a license amendment and, therefore, supports the issuance of a license amendment on the same terms and conditions.

## **III. SCHEDULE CHANGE IN RENEWED APPLICATION**

PPL seeks to amend the Holtwood Project license exactly as set forth in the 2007 Application, with only a change to the proposed construction schedule that does not affect the basis upon which FERC Staff recommended that the Commission grant PPL's request to amend the Holtwood Project license. The current proposed construction schedule is provided as Attachment A to this Renewed Application, and should replace the schedule previously provided in Exhibit C, Appendix A of the 2007 Application.

**IV. THE COMMISSION SHOULD APPROVE THE RENEWED APPLICATION BASED ON THE RECORD FOR THE 2007 APPLICATION**

PPL respectfully requests that the Commission issue an amended license for the Holtwood Project (including extension of the license to a 50-year term) that is based on the amendments proposed in the 2007 Application, the full vetting of the 2007 Application by all necessary and interested parties as evidenced in the record, and FERC Staff's conclusions in the FEIS for the 2007 Application.

It is appropriate for the Commission to issue a determination on this Renewed Application based on the existing record in FERC Docket No. P-1881-050 because: (1) PPL's request to amend its license is the same in the instant Renewed Application as in the 2007 Application; (2) all of the issues that may be presented by the Renewed Application are the same as were presented in the 2007 Application proceeding; (3) all of the issues that may be presented by the Renewed Application have been fully vetted in Docket No. P-1881-050; (4) FERC Staff prepared a DEIS and FEIS for the 2007 Application, which are equally applicable to the Renewed Application and that were subject to public comment and resulted in FERC Staff's recommendation to approve the license amendment; and (5) the information in the record and licensing recommendation from FERC Staff have not been adversely affected in any material way by any events or circumstances in the short time that has elapsed since PPL withdrew the 2007 Application on December 8, 2008.

There are only two conditions precedent to the Commission issuing an order approving this Renewed Application based on the record incorporated from the 2007 Application proceeding in FERC Docket No. P-1881-050. First, Section 6 of the FPA, 18

C.F.R. § 799, requires that the Commission provide a 30-day public notice period prior to altering a project license. To satisfy this requirement, PPL requests that the Commission issue a notice of this Renewed Application that (a) states that PPL has filed a new request for a license amendment that shall be evaluated based upon the entirety of the record in FERC Docket No. P-1881-050 that has been incorporated by reference in its entirety into the instant proceeding; and (b) provides a 30-day period for the public to submit comments on the Renewed Application.

Second, Section 401 of the Clean Water Act requires FERC to accept any conditions included in a timely filed certification from DEP. DEP did not issue a Section 401 certificate by the time PPL withdrew the 2007 Application and thereafter the corresponding Section 401 was likewise withdrawn. PPL will file a new Section 401 application with DEP, similarly seeking to incorporate and build upon the prior record. Based on informal consultation with DEP, PPL believes that DEP is likely to reach an expedited decision on the Section 401 certification for the Renewed Application, hopefully by the end of the second quarter of 2009. Once that occurs, PPL respectfully requests that the Commission thereafter expeditiously issue a decision on this Renewed Application.

**V. EXPEDITED CONSIDERATION OF THE RENEWED APPLICATION IS APPROPRIATE**

PPL respectfully requests that the Commission expedite its approval of PPL's requested license amendment and issue an order approving the Renewed Application as soon as practicable following timely receipt of DEP's Section 401 certification.

Expedited action is critical for PPL to meet construction commencement and in-service deadlines specified in the American Recovery and Reinvestment Act of 2009, which has

enabled PPL to pursue this Renewed Application. Moreover, expedited action is required to facilitate PPL's timely performance of relicensing activities in the event that the Commission denies PPL's request to amend its license and extend the license term through August 31, 2030.

## **VI. CONTINGENT REQUEST FOR WAIVERS**

Given the identity between the 2007 Application and this Renewed Application, and the full development of the record in the P-1881-050 subdocket that is to be incorporated by reference into the instant proceeding, there is no need for any of the other record development that normally would be required in a license amendment proceeding. Thus, to the extent necessary, PPL requests that the Commission waive any other requirements set forth in 18 C.F.R. §§ 4.34, 4.35, 4.38, 4.51, 4.201, and 4.202(b), or any other FERC requirement promulgated pursuant to Part I of the FPA, NEPA, or other federal statute that would otherwise prevent the expedited issuance of an amended license for the Holtwood Project.

## CONCLUSION

For the reasons set forth above, PPL respectfully requests that the Commission issue an amended license, as described above, for the Holtwood Project (No. P-1881) with a term ending on August 31, 2030, as soon as practicable following the issuance of a Section 401 certificate from the Pennsylvania Department of Environmental Protection.

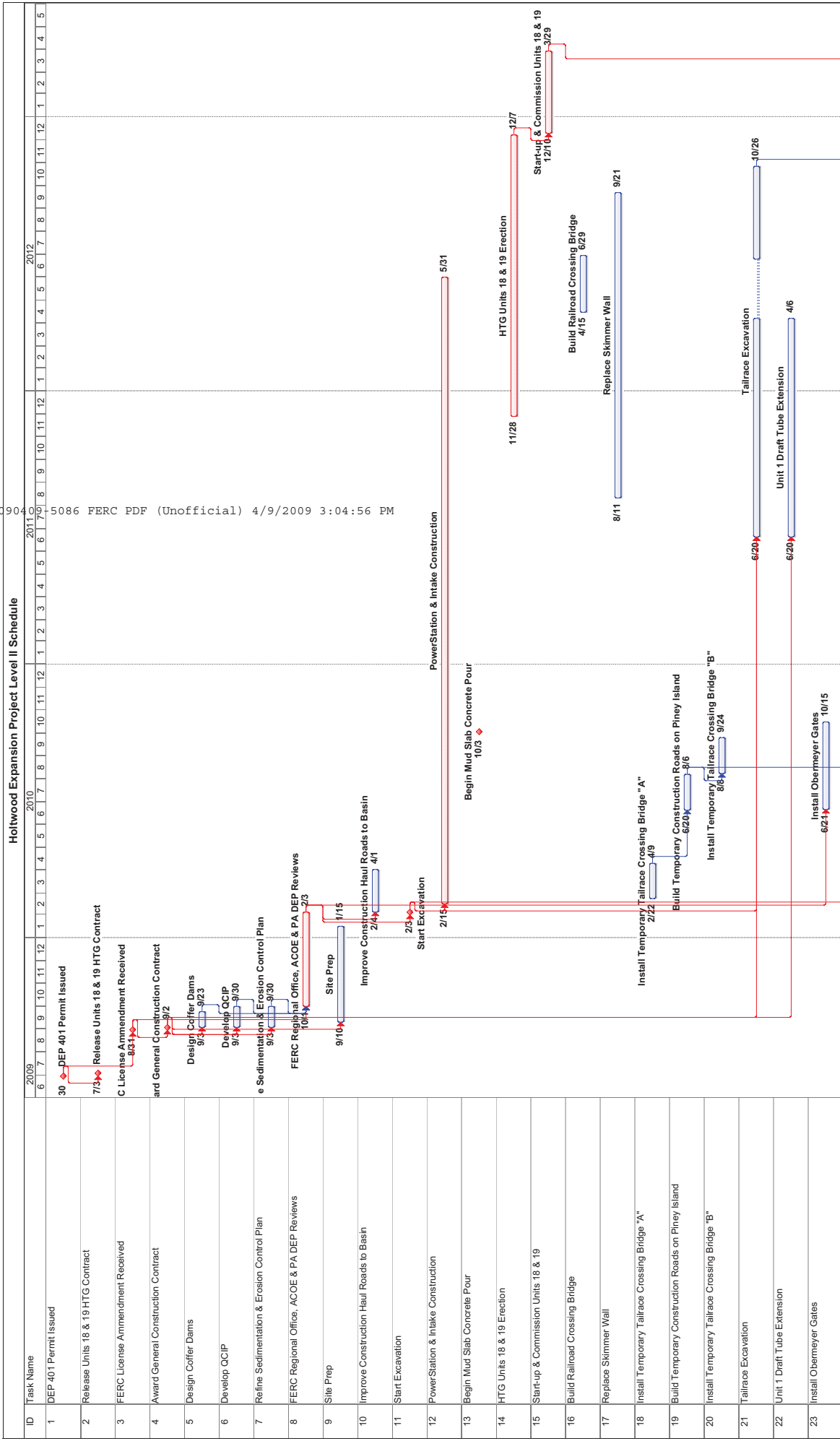
Respectfully submitted,

/s/ David R. Poe

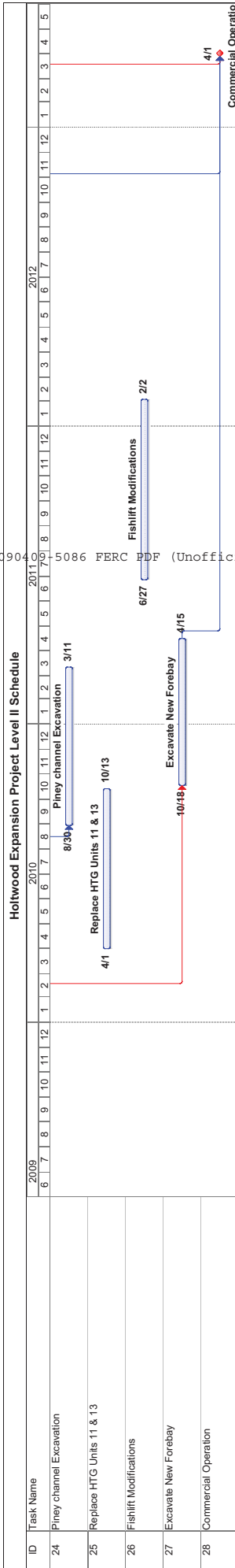
David R. Poe  
Ahren S. Tryon  
Dewey & LeBoeuf LLP  
1101 New York Avenue NW  
Washington, DC 20005-4213  
202-346-8000  
202-346-8102 (facsimile)

*Counsel for PPL Holtwood, LLC*

# Attachment A



# Attachment A



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Split

External Tasks

External MileTask

Summary

Project Summary

Progress

Milestone

Task

Split

Task

Split

Task

Split

Task

Split

Task



**CERTIFICATE OF SERVICE**

I hereby certify that I have this 9th day of April, 2009, served the foregoing document upon each person designated on the official service list compiled by the Secretary in FERC Docket No. P-1881-000 in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

*/s/ Ahren S. Tryon*

\_\_\_\_\_  
Ahren S. Tryon



Pennsylvania Department of Environmental Protection

909 Elmerton Avenue  
Harrisburg, PA 17110-8200

June 15, 2009

Southcentral Regional Office

717-705-4707  
FAX - 717-705-4760

CERTIFIED MAIL NO. 7005 3110 0000 0792 4300

Mr. Dennis Murphy  
VP/COO PPL Holtwood, LLC  
Two North Ninth Street  
Allentown, PA 18101

P-1881-054

FILED  
SECRETARY OF THE  
COMMISSION  
2009 JUN 22 P 2:22  
FEDERAL ENERGY  
REGULATORY COMMISSION

Re: 401 Water Quality Certification  
PPL Holtwood  
Application No. EA 36-018  
APS ID No. 636641  
Martic Township, Lancaster County

Dear Mr. Murphy:

Enclosed is your Section 401 Water Quality Certification for the proposed upgrades at the Holtwood Dam. Please review the certification so that you are aware of all its terms and conditions. These conditions will become part of the FERC license for this project.

Please be advised that you do not have federal authorization for this project and such authorization is required prior to starting your project. In accordance with procedures established with the U.S. Army Corps of Engineers, you will be contacted directly by the Corps regarding federal authorization.

Any person aggrieved by this action may appeal, pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.S. Section 7514, and the Administrative Agency Law, 2 Pa. C.S. Chapter 5A, to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, 400 Market Street, PO Box 8457, Harrisburg, PA 17105-8457, 717-787-3483. TDD users may contact the Board through the Pennsylvania Relay Service, 800-654-5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in braille or on audiotape from the Secretary to the Board at 717-787-3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

IF YOU WANT TO CHALLENGE THIS ACTION, YOUR APPEAL MUST REACH THE BOARD WITHIN 30 DAYS. YOU DO NOT NEED A LAWYER TO FILE AN APPEAL WITH THE BOARD.

UNITED STATES OF AMERICA 134 FERC ¶ 62,051  
FEDERAL ENERGY REGULATORY COMMISSION

PPL Holtwood, LLC

Project No. 1881-067

ORDER APPROVING DISSOLVED OXYGEN MONITORING PLAN PURSUANT TO  
ARTICLES 47A AND 53

(Issued January 19, 2011)

1. On October 29, 2010, PPL Holtwood, LLC, licensee for the Holtwood Hydroelectric Project FERC No. 1881, filed its Holtwood Redevelopment Dissolved Oxygen Monitoring Plan pursuant to license articles 47A and 53.<sup>1</sup> The Holtwood Project is located on the Susquehanna River in Lancaster and York counties, Pennsylvania.

LICENSE REQUIREMENTS

2. License article 47A requires the licensee to implement the mandatory conditions of the license found in the Pennsylvania Department of Environmental Protection's (PADEP) final section 401 Water Quality Certification (WQC) as found in Appendix A to the license amendment order. These conditions require, in part, that the licensee prepare certain plans and reports, in consultation with other entities, for approval by the PADEP. These plans are required to also be filed with the Federal Energy Regulatory Commission (Commission) for approval, and implemented following Commission approval. Condition VI.A.2 of the WQC requires the licensee to file a plan and schedule for continuous monitoring of dissolved oxygen (DO) in the forebay, tailrace and Piney Channel.

3. License article 53 requires the licensee to conduct a DO monitoring program in the project tailrace once the amended project begins operation. Article 53 also requires the licensee to file its plan for the DO monitoring program with the Commission for approval. The plan is required to include a monitoring schedule, a schedule for filing results with the Commission that will describe whether state standards are being maintained, and a description of measures that would be implemented if state standards are not maintained. The licensee must develop the plan in consultation with the PADEP, Pennsylvania Fish and Boat Commission (PAFBC), and the U.S. Fish and Wildlife Service (USFWS). The plan must include documentation of consultation, copies of

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<sup>1</sup> See Order Amending License and Revising Annual Charges, issued October 30, 2009. 129 FERC ¶ 62,092 (2009).

agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

#### LICENSEE'S PLAN

4. The licensee's plan notes that water quality monitoring at the project will consist of recording water temperature and dissolved oxygen concentrations upstream and downstream of the Holtwood dam. The schedule for monitoring will occur from April through September, each year, for five years following the start of operation of the new station. Continuous monitors will be used and programmed to measure DO and temperature at 30-minute intervals regardless of river flows. Monitoring will be done in three locations as required in the WQC and include the Holtwood forebay, the tailrace and Piney Channel. The forebay water quality monitoring instrument will be secured to the new skimmer wall and will record data at approximate mid-depth of the water column. In the tailrace, a monitor will be placed in an area subject to turbine discharge flows. In Piney Channel, the monitoring instrument will be located downstream of the new Unit 1 release. To the extent possible, this equipment will be positioned so that minimum flow releases will be monitored. Monitoring will be done using a Hydrolab DataSonders® or comparable instrumentation and will be maintained and calibrated regularly. The licensee will use United States Geologic Survey 2006 guidelines for operating, computing and data recording for continuous water quality monitors.

5. By December 31 following each testing season, the licensee will file with the PADEP and the Commission a water quality report for the year. If during the season, DO concentrations were not meeting the State of Pennsylvania water quality standards, the licensee will inform the PADEP within 30 days of any occurrence. Within 90 days the licensee would submit a plan to resolve additional incidents. The plan also proposes several measures to be taken in the event that DO standards are not met. In the forebay the plan notes that low season DO conditions are known to occur presently. The licensee proposes to work with the hydro operators at the upstream Safe Harbor Project (FERC No. 1025) if low DO levels are shown to be result of low DO levels in the flows released by that project. The plan also outlines several possible measures to be undertaken when low DO levels are detected in the tailrace or Piney Channel areas.

#### CONSULTATION

6. The licensee distributed the plan to the USFWS, the PAFBC, and the PADEP for review by email communication dated May 4, 2010. A reminder email communication

Project No. 1881-067

- 3 -

was sent on September 10, 2010. No comments were received prior to the licensee filing the plan with the Commission. Since that date, no comments have been received by the Commission.

## DISCUSSION AND CONCLUSION

7. Redevelopment of the project would result in a major re-distribution of flows from the bypassed reach into the tailrace. As the licensee notes in the plan, the new units, which would be of a modern design and more efficient, would not likely provide any aeration through the units. Assuming these units would be preferentially operated during the low-flow summer months, their operation could result in reduced dissolved oxygen levels in the tailrace compared to existing conditions. The plan, as developed, addresses these potential impacts. The licensee, however, specifies that deficiencies will be reported only to the PADEP within 30 days. We will require that the licensee report any deficiency in water quality standards to the Commission as well. With that addition, we conclude that the plan addresses the concerns of the PADEP regarding the impacts to water quality as a result of the redevelopment of the Holtwood Project, meets the requirements of articles 47A and 53 and the PADEP's WQC, and, therefore, should be approved.

### The Director orders:

(A) PPL Holtwood LLC's (licensee) dissolved oxygen monitoring plan, filed on October 29, 2010, for the Holtwood Project (FERC No. 1881), pursuant to license articles 47A and 53, is approved.

(B) If monitoring reveals any deviations from dissolved oxygen standards, the licensee shall file a report with the Commission within 30 days of the incident. The report shall, to the extent possible, identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental impacts resulting from the incident. The report shall include, at a minimum: (1) any operational data necessary to determine compliance with Articles 47A and 53; (2) a description of any corrective measures implemented at the time of occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and (3) comments or correspondence received from the Pennsylvania Department of Environmental Protection regarding the incident. Based on the report and the Commission's evaluation of the specific incident, the Commission reserves the right to require modifications to project facilities and operations in order to ensure future compliance.

Project No. 1881-067

- 4 -

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 8251 (2006), and the Commission's regulations at 18 C.F.R. § 385.713 (2010). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Steve Hocking  
Chief, Biological Resources Branch  
Division of Hydropower Administration  
and Compliance

# **HOLTWOOD REDEVELOPMENT PROJECT**

*FERC PROJECT No. 1881*

# **FISHWAY OPERATING PLAN**

**DECEMBER 2011**

**PREPARED BY:**

**PPL HOLTWOOD, LLC  
ALLENTOWN, PENNSYLVANIA**

**AND**

**KLEINSCHMIDT ASSOCIATES  
STRASBURG, PENNSYLVANIA**



**HOLTWOOD REDEVELOPMENT PROJECT**  
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# HOLTWOOD REDEVELOPMENT PROJECT

## FISHWAY OPERATING PLAN

### TABLE OF CONTENTS

1.0	INTRODUCTION .....	1
2.0	BACKGROUND .....	1
3.0	SITE AND PROJECT OPERATIONAL DESCRIPTION .....	3
4.0	FISHWAY OPERATION.....	5
4.1	FISHWAY OPERATION .....	9
4.1.1	STAFFING .....	9
4.1.2	OPERATION .....	9
4.1.3	FISHING TIME AND HOURS OF OPERATION.....	11
4.1.4	DEBRIS MANAGEMENT .....	11
4.1.5	FISH COUNTS .....	12
4.1.6	OUTAGE PROTOCOL.....	12
5.0	FISHWAY MAINTENANCE .....	13
6.0	ATTRACTION FLOW AND OPERATION FLOW REQUIREMENTS .....	14
7.0	DATA RECORDING AND REPORTING .....	20
8.0	POST CONSTRUCTION STUDIES AND MONITORING.....	21
8.1	PLAN AND SCHEDULE TO VALIDATE FISHWAY UPGRADES AND OTHER PROJECT COMPONENTS .....	21
8.2	PLAN AND SCHEDULE FOR MONITORING EFFECTIVENESS OF UPSTREAM SHAD PASSAGE .....	22

### LIST OF FIGURES

FIGURE 1.	HOLTWOOD TAILRACE AND SPILLWAY .....	4
FIGURE 2.	FISH LIFT PASSAGE FACILITY.....	8
FIGURE 3.	MONTHLY FLOW DURATION CURVES OF THE SUSQUEHANNA RIVER MEASURED AT HOLTWOOD (APRIL 1917 TO 2006 INCLUSIVE) .....	17
FIGURE 4.	MONTHLY FLOW DURATION CURVES OF THE SUSQUEHANNA RIVER MEASURED AT HOLTWOOD (MAY 1917 TO 2006 INCLUSIVE).....	18
FIGURE 5.	MONTHLY FLOW DURATION CURVES OF THE SUSQUEHANNA RIVER MEASURED AT HOLTWOOD (JUNE 1917 TO 2005 INCLUSIVE) .....	19

## LIST OF APPENDICES

APPENDIX A: FISHWAY OPERATING MANUAL

APPENDIX B: HOLTWOOD FISH PASSAGE FACILITY MAINTENANCE, INSPECTION PROCEDURES,  
AND GUIDELINES

APPENDIX C: PFBC TABLE

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## **HOLTWOOD REDEVELOPMENT PROJECT**

### **FISHWAY OPERATING PLAN**

#### **1.0 INTRODUCTION**

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This plan sets forth how PPL Holtwood, LLC (PPL) will operate the Holtwood Fishway after Project redevelopment has been completed. It includes guidance for annual start-up, shut-down, measures to be followed in case of emergency or project outages that may potentially affect fishway operation, routine maintenance and debris management. In addition, it presents measures pertaining to dam and powerhouse operation that PPL will undertake during fish passage season including the use, monitoring and reporting of flows. It also includes fish passage reporting requirements which are required in the final 401 certification.

#### **2.0 BACKGROUND**

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PPL is constructing two new generating units at the Holtwood project, replacing two retired water-driven exciter units in the existing plant, and to undertaking additional construction for the purpose of enhancing migratory fish passage and recreational boating. PPL has been consulting with the Federal, state, and local agencies and other project stakeholders since 2006 to formulate project components and to develop a protection, mitigation, and enhancement plan.

An application to amend the license for the hydroelectric project was submitted to the Federal Energy Regulatory Commission in December 2007. An application for state water quality certification under Section 401 of the Clean Water Act, and an application for a 404 dredge and fill permit was jointly filed with the PADEP and the Army Corps of Engineers in January 2008.

In addition to consultation with the resource agencies regarding migratory and resident fish passage, PPL has consulted with other project stakeholders on other project operational flows. Specifically, PPL and Exelon Generation, LLC, who own and operate the downstream Conowingo and Muddy Run projects, have reached a written settlement agreement with respect

to Holtwood operations and flow releases. PPL has also consulted with the American Whitewater Affiliation and local boating interests for the purpose of developing a mitigation package to provide for continued whitewater boating use below the project.

Relative to fish passage, PPL has provided a modeling plan for near field areas of the existing fish passage at the Holtwood Dam to evaluate the impact of flow characteristics on fish passage to the Pennsylvania Fish and Boat Commission (“PFBC”), the United States Fish and Wildlife Service (“USFWS”), Susquehanna River Basin Commission (“SRBC”), Maryland Department of Natural Resources (MDNR) and the Department of Environmental Protection (“DEP”) (collectively referred to herein as “resource agencies”) for review and approval. In addition, PPL has provided results of this modeling as well as preliminary and/or final design plans and a schedule for all structures, facilities, excavation and other fish passage system modifications to the resource agencies for review and approval.

As part of its redevelopment of the Holtwood Project, and contemporaneous with the construction of the new powerhouse, PPL is providing several improvements to fish passage measures currently in place. These include:

1. Modifications to the existing Fishway, including changes to the attraction water inlet piping and the addition of a valve, relocation of the tailrace crowder drive, and a modification and repair of entrance C designed to prevent damage during periods of heavy spill;
2. Development of improved debris management and removal capabilities including a full-length roadway for improved access along the wall and the upper end of the fish passage facility. The new roadway deck on top of the skimmer wall provides access for a new mobile Material Handler that will be capable of removing up to 12-ton logs and debris from upstream of the new skimmer wall and in front of the Fishway exit;
3. Redirection of discharge flows from Unit 1 through the skimmer wall and into Piney Channel in a manner consistent with minimum stream flow and recreational boating; and
4. An excavation plan in the tailrace and Piney Channel that eliminates velocity barriers in the tailrace and downstream from the tailrace and in Piney Channel in a manner consistent with minimum stream flow and recreational boating commitments. An

excavation scheme was developed with the resource agencies to meet the following criteria in order to enhance shad passage: a minimum of three (3') feet of water over a 12-foot wide area, with maximum point velocities no greater than 6 ft/sec.

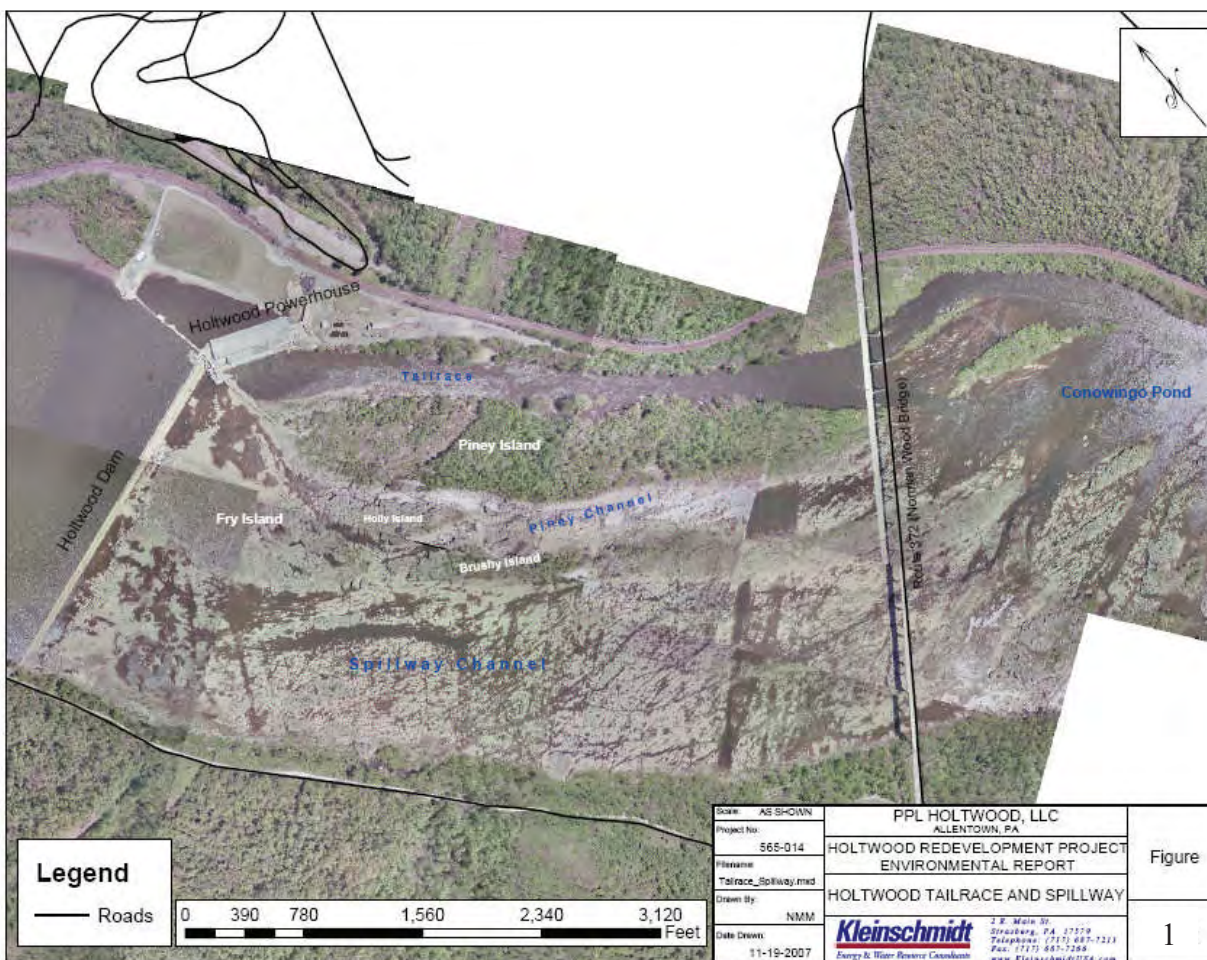
PPL shall complete the enhancements to the fish passage system described above with the construction of the new hydroelectric generation facilities, on a schedule so they are operational no later than the time that the new hydroelectric generation facilities begin operation.

### **3.0 SITE AND PROJECT OPERATIONAL DESCRIPTION**

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A site map of the Holtwood project area is shown in Figure 1. The Holtwood project is located on the Susquehanna River in Lancaster and York Counties, Pennsylvania. The River at the project is approximately a half-mile wide and is divided by in-stream islands into a deep channel along the eastern Lancaster shore (tailrace); an intermediate channel situated below the eastern end of the Holtwood dam (Piney Channel); and an approximate 1,500 ft wide river area below the western end of the Holtwood dam (spillway area). The tailrace is a deep wetted channel at all river flows due to backwater from the downstream Conowingo pond. The existing Holtwood powerhouse discharges into the tailrace. At a full plant discharge of approximately 31,500 cfs, the water surface elevation in the tailrace increases by approximately 10 feet. Due to the steep banks in the tailrace this water level change is retained within the banks and very little watering/dewatering of habitat occurs as a result of cyclic hydroelectric operations. In contrast, the spillway area and Piney Channel are subject to dewatering (with the exceptions of local inflows and dam leakage). These areas only become inundated upon project spills when River flow is in excess of 31,500 cfs.

Under the proposed development, PPL is constructing a second powerhouse along the Lancaster County shore that will discharge into the existing tailrace area. The new plant will have a hydraulic capacity of 30,000 cfs. Two new exciter replacement units with a total installed hydraulic capacity of 600 cfs will also be installed in the existing plant. Once constructed, tailrace elevation is expected to remain unchanged due to extensive excavation planned in the tailrace to eliminate any increase in tailrace water level, and to minimize tailrace velocities for migratory fish passage.



**FIGURE 1. HOLTWOOD TAILRACE AND SPILLWAY**

Coincident with the construction of these new units PPL will reroute the discharge from Unit 1 from the tailrace to the Piney Channel for the purpose of creating an enhanced secondary passage route for migratory fish. As a result of the proposed development, spills over the main dam and into the spillway area will not occur until the total river flow exceeds approximately 61,500 cfs. The Piney Channel will receive flow from Unit 1 during a portion of the day, during daily peaking operations of the unit. Generally, Unit 1 will operate only periodically and for short durations when river flow is less than approximately 10,000 cfs, but will operate more frequently and for longer durations during the day when River flow increases. This operation will result in periodic wetting of the Piney Channel. To protect channel habitat from this variable flow PPL will implement a minimum continuous flow release of 200 cfs which will be subject to change based upon studies to be conducted and in accordance with the final 401 state water quality certification for the project.

## 4.0 FISHWAY OPERATION

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This document provides guidance for the operation of the Holtwood Fishway and monitoring of anadromous, diadromous and resident fish passage into Lake Aldred. Specifically, this section covers the schedule for resident and migratory fishway operation, river flow operational constraints, design criteria, a description of the facility, operating procedures and schedules, debris management, and fish counts. PPL will ensure that daily Fishway operation will follow guidelines presented in the approved Fishway Operation Plan (FOP).

The Fishway shall be operated daily in the spring as River flow and equipment permit. For purposes of resident fish species passage, the seasonal fishway operation period will start April 1 each year (river conditions permitting) and run through the annual migratory fish passage season (nominally April 15 – June 15), and continue operation beyond the migratory fish passage season until June 30.

During the anticipated period of operation, 1 April to 30 June, the Fishway will be operated daily when river flows are less than 100,000 cfs (USGS Gage at Marietta, Station #01576000). Due to unexpected situations caused by high flows and/or flooding, the possibility exists that Fishway operation may be delayed past the anticipated start date. When flooding and/or high flows delay the start date for Fishway operations, the resource agencies will be notified and every effort will be made to complete Fishway preparations quickly allowing operation to begin as soon as possible.

A copy of the Fishway operating manual developed and used to guide lift operation is provided in Appendix A. It includes: drawings of the facility, an overview of PLC screens, schematic diagrams of tailrace and spillway control panels, attraction water supply system information and schematic diagrams of Motor Operated Valves (MOVs), operation guidelines (for entrances A, B, and C; A and B; A, B, and C; A and C; and B and C), flow matrix tables, and gate setting matrix tables.

The Fishway design incorporated numerous criteria established by the USFWS and the resource agencies. Physical design parameters for the facility include:

1. Tailrace and spillway lifts with a cycle time of 10 minutes;
2. Operation of the tailrace lift at tailwater elevations between 104 ft to 120 ft and spillway operation at tailwater elevations between 112 ft and 135 ft (Note: Lower spillway elevation is based on a reduction in the tailwater level following excavation in Piney Channel associated with the rerouting of Unit 1 through the skimmer wall);
3. Three adjustable entrances (entrances A, B and C) from which water velocity is adjustable to 5 to 6 ft/sec;
4. A total of 800 cfs attraction flow (300 cfs each to entrances A and B, and 200 cfs to entrance C);
5. A River flow operating limit of 100,000 cfs; and
6. Operation at forebay water elevations between 164.5 ft and 174 ft.

In addition, the Fishway was sized to pass a design population of 2.7 Million American shad and 10 million river herring.

The Fishway at Holtwood is comprised of a tailrace and spillway lift (Figure 2). The tailrace lift has two entrances (Gates A and B) and the spillway lift has one entrance (Gate C). Each lift has its own fish handling system which includes a mechanically operated crowder, picket screen(s), hopper and hopper trough gate. Attraction water, in, through, and from the lifts is supplied through a water piping system and five diffusers that are gravity fed. Originally this system was fed by two trough intakes. As part of the redevelopment, PPL will install an additional water inlet ensuring 800 cfs of attraction water is available. Generally, water conveyance and attraction flow shall be controlled by regulating the three entrance gates and 8 MOVs. Fish that enter the tailrace and/or the spillway entrances are attracted by water flow into the mechanically operated crowder chambers. Once inside, fish are crowded over the hopper(s). Fish are then lifted in the hoppers(s) and sluiced into the exit trough. Fish swim upstream through a counting facility and into Lake Aldred through a pre-existing 14 ft wide debris chute. Since the trough was attached to the debris chute it was designed with debris sluicing capabilities.

Conceptual design guidelines for fishway operation included three entrance combinations. They were: entrances A, B and C; entrances A and B; and entrance C. However, since 1997, the year



the Fishway was initially placed in service, PPL has taken advantage of the operational flexibility incorporated into the design that enables individual operation of each entrance (entrances A, B or C) and/or a combination of entrances A and B, A and C, or B and C. This flexibility enables the Fishway to operate during periods when equipment problems may affect operation.

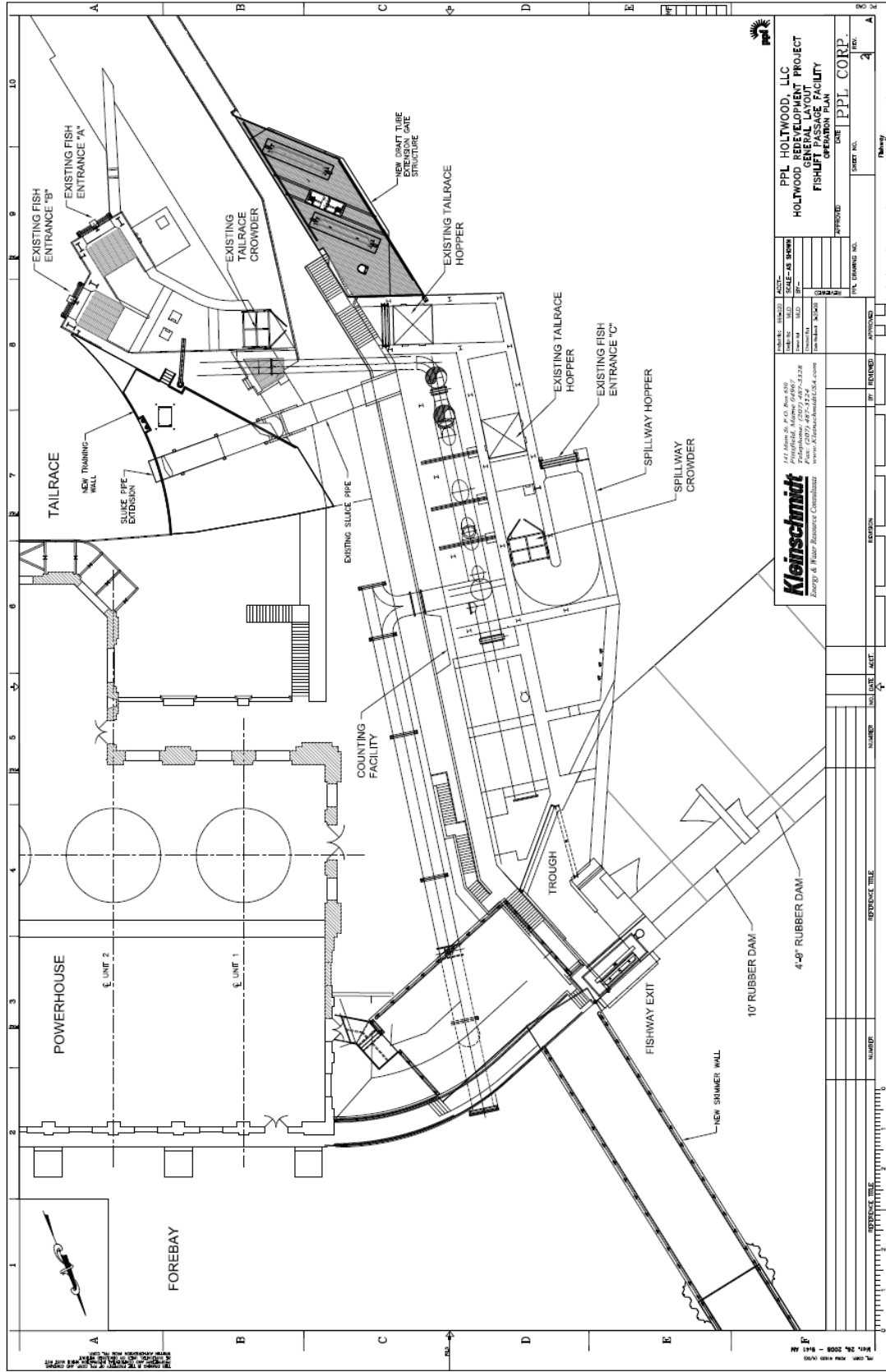


FIGURE 2. FISH LIFT PASSAGE FACILITY

## **4.1 FISHWAY OPERATION**

### **4.1.1 STAFFING**

Each day trained and qualified team members will be on site to operate the Fishway. The lift shall be operated by a three-person crew including a supervising biologist, lift operator, and technician. PPL shall maintain written documentation that all Fishway operational personnel have reviewed and understand the FOP.

The lift operator will be the individual with primary responsibility to operate any and all mechanical and electrical equipment associated with the lifts. He will set the equipment as directed by the supervising biologist or per the operational matrix, which has been developed and matched to hydraulic conditions at the dam. He will adjust equipment settings throughout the course of each day as hydraulic conditions change so attraction flows from, and in, the lift(s) are optimized.

The technician's primary responsibility will be to man the viewing room to identify and count fish and to accumulate fish passage data. In addition, the technician will clean debris from screens and other water supply areas on an as needed basis throughout the course of each day.

Each day the project manager or supervising biologist will be responsible for daily lift operation. They shall provide supervision and technical guidance on all aspects of daily operation and are charged with fine tuning the operation to assure maximum efficiency. In addition, the supervising biologist is responsible for establishing fishing time and/or lift frequency which is based on fish abundance that normally changes throughout the day and the season.

These individuals will meet informally with the Holtwood staff, report daily catch information to the resource agencies, and ensure coordination with Conowingo and Safe Harbor lift operations.

### **4.1.2 OPERATION**

Operation of the Fishway's two main systems, the attraction water and fish handling systems are controlled by two Programmable Logic Controllers (PLCs). The attraction water system (eight MOVs and three entrance gates) shall be operated in either manual or remote mode. The fish handling systems for both lifts, including the hopper, crowder, separation screen, and a

telescoping trough gate normally maintained approximately 1 ft above forebay elevation to facilitate sluicing of fish into the trough, shall be operated in the automatic or manual mode.

Hydraulics in the lift is generally a function of forebay and tailwater elevation, position of valves and depth of entrance gates. A schematic diagram of the Fishway attraction water system is provided in Appendix A. Eight MOVs control the distribution, volume and velocity of water in the Fishway. Flow control in and from the Fishway shall be accomplished by adjusting the position of valves and three entrance gates. Valves 1, 7, and 8 shall be used to control the total volume of water in the Fishway. Valves 1 and 7 shall be used to control the velocity of water in the trough. Valve 1 shall be used to control the velocity (range of 0.75 ft/sec to 1.5 ft/sec) in the downstream portion of the trough. Valves 7 and 8 shall be used to control the supply of water to the main attraction water supply distribution pipe. Valve 7 shall be used to control the velocity ( $\leq 3$  ft/sec) in the Fishway exit. Control of hydraulics in the tailrace crowder channel and from entrances A and B are based on the operation/position of MOVs 2, 3 and 4 and gates A and B. The velocity (0.75 to 1.5 ft/sec) and flow through the tailrace crowder channel is controlled by MOV 4. MOVs 2 and 3 control the flow of water from diffusers located upstream of each entrance. The position of entrance gates is used to control the velocity of water (4 to 6 ft/sec) from entrance A and B. MOVs 5 and 6 and entrance gate C control hydraulics of the spillway lift. MOV 5 controls flow of water (0.75 to 1.5 ft/sec) through the crowder channel. MOV 6 regulates the volume of attraction water to a diffuser upstream of entrance C. The position of the entrance gate is used to control the velocity of water (4 to 6 ft/sec) from entrance C.

Controlled experimentation of velocities (*i.e.* 0.75 ft/sec, 1.0 ft/sec, and 1.5 ft/sec) in the crowder channel will be developed and reviewed with members of the Holtwood FPTAC. Controlled experimentation will be undertaken as necessary after monitoring and review of daily and seasonal shad passage statistics and after PIT tag data is available.

Water velocity in the Fishway is a function of the total volume of water utilized, project hydraulics (*i.e.*, tailwater and forebay elevation) and MOV and gate position. PPL shall have operating staff maintain velocities at the Fishway exit, in the trough, crowder channels and each entrance at approximately 3.0, 1.0, 1.0, and 6 ft/sec, respectively.

### 4.1.3 FISHING TIME AND HOURS OF OPERATION

Fishing time and/or lift frequency is determined by fish abundance and/or fish handling equipment availability. The hours of operation are typically 0800 hrs to 1800 hrs during the anadromous fish passage season. Operation and counting will continue on an hourly basis to 2000 hrs if the fish passage count during the previous hour, is 100 shad or greater. During the resident fish passage time frames, hours of operation are expected to be from 0900 hrs to 1500 hrs. If all the equipment is available, the fish handling system for each lift may be operated in either the automatic mode or manually. To conduct a lift in the automatic mode, the equipment shall be set in the “fish position”. Equipment is considered in the “fish position” when: (1) the crowder is parked and the doors are set in the trap position; (2) the separation screen is up (3) the hopper is fully lowered; and (4) the trough gate is positioned 1 ft above forebay elevation. Once the equipment is positioned, operating personnel shall enter the desired fishing time (10 to 60 minutes) into the PLC. When the fishing time ends, the equipment is cycled. This includes raising the separation screen, closing the crowder doors, crowding fish over the hopper and sluicing fish into the trough. Generally, manual operation occurs when difficulties with the crowder are encountered. Manual cycling of the fish handling system includes raising and lowering the separation screen, raising the hopper, and sluicing of fish into the trough. Typically the lift shall be cycled at least hourly in the automatic mode and more frequently (*i.e.*, every half hour) in the manual mode.

### 4.1.4 DEBRIS MANAGEMENT

Debris management was considered during initial design of the Fishway. Capabilities were designed into the Fishway to sluice debris at two locations, the exit/entrance of the trough and the downstream end of the trough. Small floating debris that enters the Fishway shall either be sluiced out of the trough through gate 6 into the tailrace or manually removed by netting on an as-needed basis throughout the operation each day. Large woody debris that accumulates at the exit of the fishway on the 4-inch adjustable trash screen and/or the 12-inch fixed trash screen is sluiced into Piney Channel through a combination of gates 7 and 9. Normally sluicing debris from the exit/entrance of the Fishway shall be conducted on an as-needed basis every few days prior to the start of lift operation. The development of improved debris management and removal capabilities associated with the project including the new roadway deck on top of the

skimmer wall and the mobile Material Handler also provide PPL the ability to remove debris from the exit/entrance of the Fishway on an as-needed basis.

#### 4.1.5 FISH COUNTS<sup>1</sup>

During the spring fish passage season the number of American shad captured in the tailrace and spillway lifts will be estimated as the fish are sluiced into the trough. In addition, all fish (including anadromous, catadromous (if any) and resident fish) that are lifted and sluiced into the trough shall be identified by species and counted as they pass the counting window by a biologist and/or technician. The counting area is located immediately downstream of the main attraction water supply area in the trough (Figure 2). As the fish swim upstream and approach the counting area they are directed by a series of fixed screens to swim up and through a 3 ft wide and 12 ft long channel on the west side of the trough. The channel is adjacent to a 4 ft by 10 ft window located in the counting room where fish are counted prior to passage from the Fishway.

Passage from the Fishway is controlled by two different gates. Generally, during the day fish passage shall be controlled by the technician who opens/closes a set of gates downstream from the viewing window from a controller in the counting room. This gate may be used to deny fish upstream passage for short periods of time. However, should it be necessary to deny fish upstream access for a long period of time during daily operation (*i.e.*, 2 or more hours), a gate located approximately 2 ft upstream of the window is closed. This gate shall be closed each evening to limit potential damage to the viewing window from debris that enters the trough each evening.

#### 4.1.6 OUTAGE PROTOCOL

Based on over 10 years of operating experience, PPL has established protocols so that interruptions to Fishway operation caused by electrical and/or mechanical failures and project outages (*i.e.*, flashboard failures, rubber dam failures, etc.) are minimized. Daily management of Fishway operation by PPL ensures that the tailrace and spillway lifts are operated in the most efficient manner whenever possible around problems encountered to minimize downtime and maximize the catch. All problems encountered are reported, whether it is in daily reports and/or

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<sup>1</sup> A monitoring plan with respect to PIT tagging will be provided to the DEP. Agreed-to provisions of this plan will be incorporated in this FOP at a later date.

in the annual report issued to the resource agencies. Should a problem and/or failure result in an unscheduled outage of the Fishway during the spring spawning season, PPL shall notify resource agency members of the outage electronically. Notification will occur the day the outage occurred; however, depending upon the nature of the outage PPL will need time to evaluate the outage and develop a repair plan. PPL's evaluation and repair plan shall be coordinated with the agencies as soon as practical.

Fishway operations may also be affected by high river flow conditions. When river flows are expected to exceed 150,000 cfs PPL will take steps to secure fishway equipment to prevent potential damage to Fishway components. Upon the cessation of flooding, PPL will notify the resource agencies as soon as feasible of any flood damage to the fishway that would prevent its return to operation, and will take steps as necessary in consultation with the resource agencies to correct any damage due to flooding and restore equipment to operation.

## **5.0 FISHWAY MAINTENANCE**

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It shall be the goal of PPL Holtwood to achieve a Fish Passage Facility equipment operating availability that is greater than 95% during any fish passage season. Achievement of this level of reliability requires a comprehensive pre-season and post-season maintenance program designed to minimize in-season operational issues.

Appendix B contains the "*Holtwood Fish Passage Facility Maintenance and Inspection Procedures and Guidelines*". The purpose of this manual is to provide direction and guidance for seasonal inspection and maintenance activities of the fish passage facility equipment based on ten or more years of experience. This manual shall be used in conjunction with the equipment drawings and operating and maintenance manuals provided by the various equipment suppliers.

This document contains:

1. Important safety and operational information,
2. Pre-season spillway and tailrace maintenance,
3. Pre-season equipment check list,
4. Post-season maintenance,

5. Post-season equipment check list,
6. Periodic maintenance procedures, and
7. Drawing lists.

As set forth in the manual, major maintenance on Fishway equipment shall be completed following the spring fish passage season. Such maintenance shall include correction and repair of items identified during the seasonal operation of the equipment that could affect equipment reliability. The intent is to correct such items so that pre-season activities can focus on equipment preparation, lubrication, start-up and test after equipment idle time over the winter months. In-season equipment problems will be addressed as they occur to restore operation expeditiously. Copies of completed pre-season and post-season checklists will be maintained at the power station and will be made available should they be requested by the resource agencies.

## **6.0 ATTRACTION FLOW AND OPERATION FLOW REQUIREMENTS**

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As previously described in Section 5, hydraulics in the Fishway are generally a function of forebay and tailwater elevation, position of MOVs, and depth of entrance gates. A schematic diagram of the Fishway attraction water system is provided in the fishway operating manual in Appendix A. In order to provide the 800 cfs Fishway design flow, PPL will install a new water inlet structure that includes a valve (MOV 8). Once the new inlet and MOV is installed, eight MOVs shall be used to control the distribution, volume and velocity of water in the Fishway. Flow control in and from the Fishway shall be accomplished by adjusting the position of the MOVs and three entrance gates. The design flow target for the new inlet structure and MOV 8 is based on: (1) supplying up to 800 cfs attraction flow at a headpond elevation of 164.5 ft when entrance A, B and C are in use and (2) limiting flow through MOVs 1 and 7 so velocity in the trough in the exit/entrance portion of the trough (*i.e.*, upstream of the counting window) is  $\leq 3$  ft/sec to prevent formation of a vortex.

Entrance attraction water will total 300 cfs for entrance A and B, and 200 cfs for entrance C when these entrances are operated. Experience has shown little need to operate tailrace entrance B, as better passage performance has been achieved with only entrance A in operation. Upon operation of the new generating units PPL intends to assess, in consultation with the resource agencies, the desirability and timing of entrance B operations. Absent entrance B



operations, PPL will have the capability to provide additional attraction water through entrances A and C, if desired for effective passage.

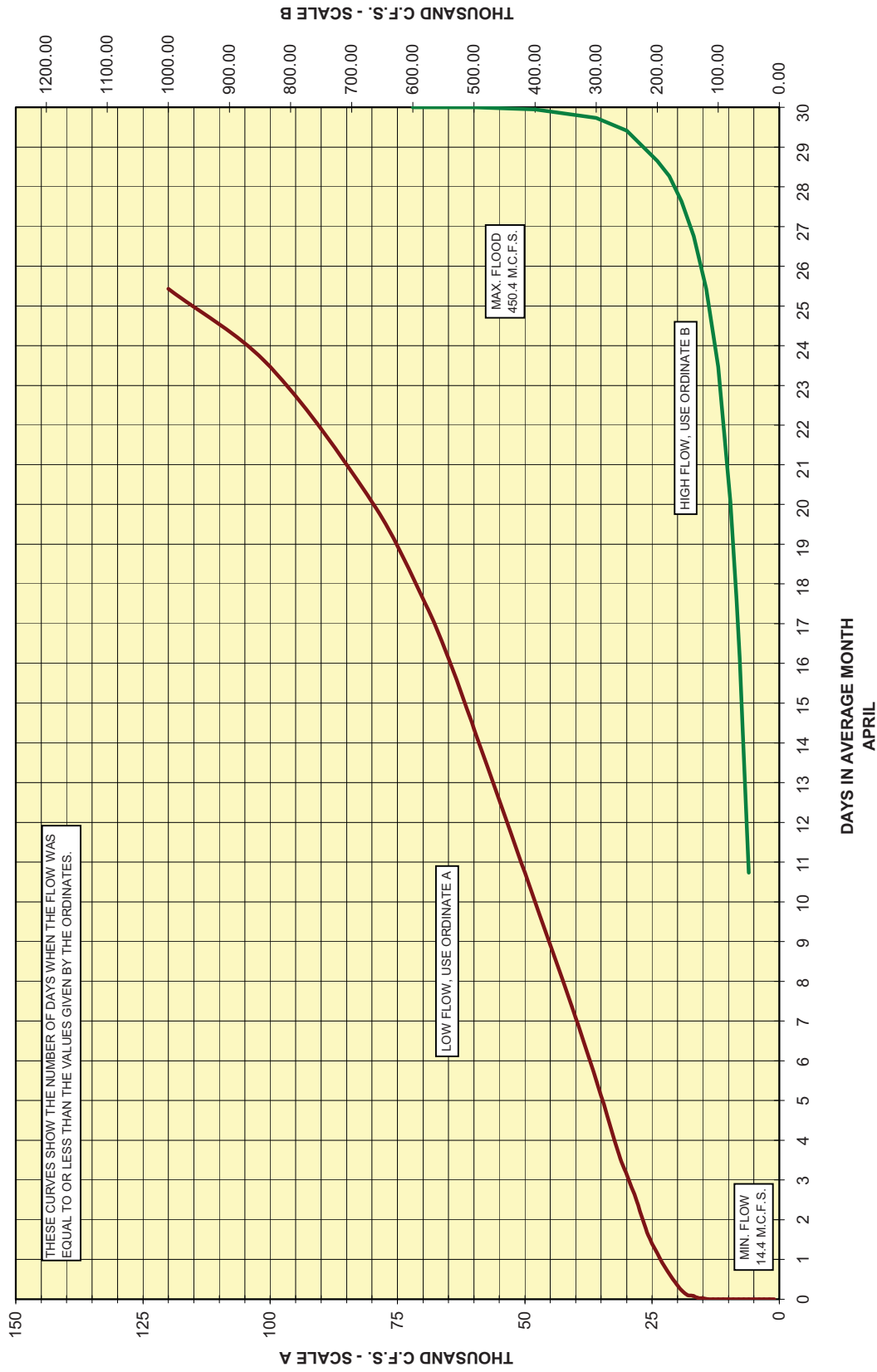
There are currently no separate project operational requirements established for fish attraction purposes. Historical flow duration curves for April, May, and June are provided in Figures 3, 4, and 5, respectively. Median flows during these months are approximately 66,000 cfs in April, 41,000 cfs in May and 21,000 cfs in June. River flows less than 10,000 cfs have never been experienced in April, occur approximately 1 percent of the time in May, and approximately 15% of the time in June. As a result, unit operations at the existing plant, even when river flow is as low as 10,000 cfs will span the entire fishway operating period from 0800 hrs through 1800 hrs. This period of daily operation is not expected to change when the new units are placed in service.

As an initial plan of operation, and based on communications with the USFWS, during the upstream migratory passage season (nominally April 15 to June 15) PPL will selectively operate Units 1 through 3 to provide necessary attraction waters to assist upstream migrants to locate both the tailrace and Piney Channel fish lift entrances. Specifically Units 1, 2, and/or 3 will typically be the first units on and last units off during daily generation cycling. Furthermore, PPL will dispatch units in the new and existing powerhouse to ensure that approximately 40% of total discharge is provided from the existing hydro station during fish lift operating periods. Some variation from this approximate flow proportioning will be inevitable due to the difference in unit sizing between the existing and new powerhouse and available river flow.

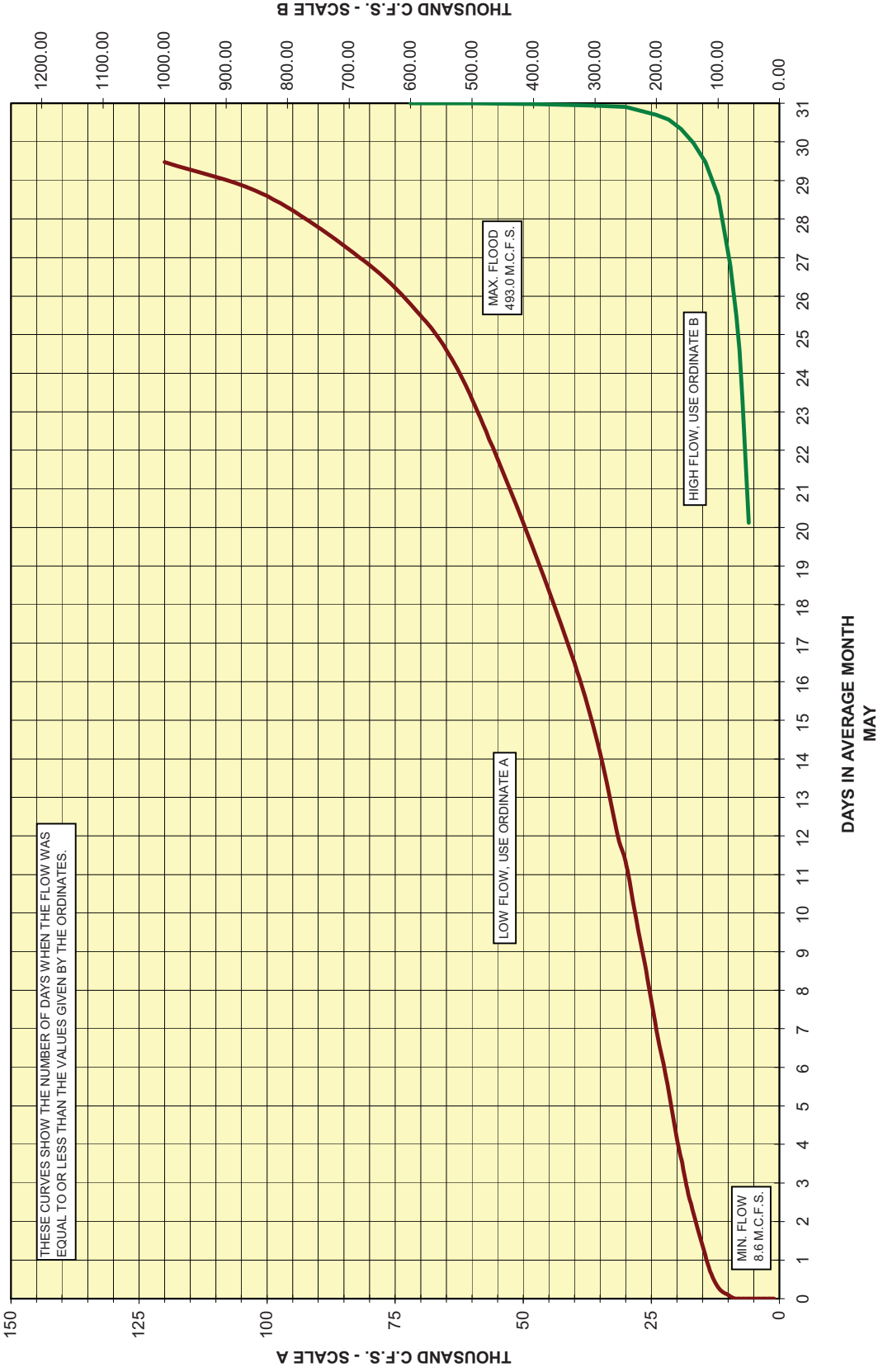
Upon completion of the project redevelopment, initial project spills totaling up to 14,000 cfs at Holtwood that are in excess of available hydraulic capacity will be released into Piney Channel. This will result in a nominal flow into Piney Channel of approximately 14,000 cfs.

With the rerouting of Unit 1 to the Piney Channel, which is expected to become operational prior to the 2011 migratory passage season, it is PPL's intent to begin assessing Piney Channel versus tailrace passage performance. When river flows is as low as 10,000 cfs both the tailrace and Piney Channel routes could be available for migratory fish passage. At lower river flows Unit 1 operations and the availability of Piney Channel may or may not be advantageous in terms of meeting fish passage goals. During low flow periods either the Piney Channel or the tailrace

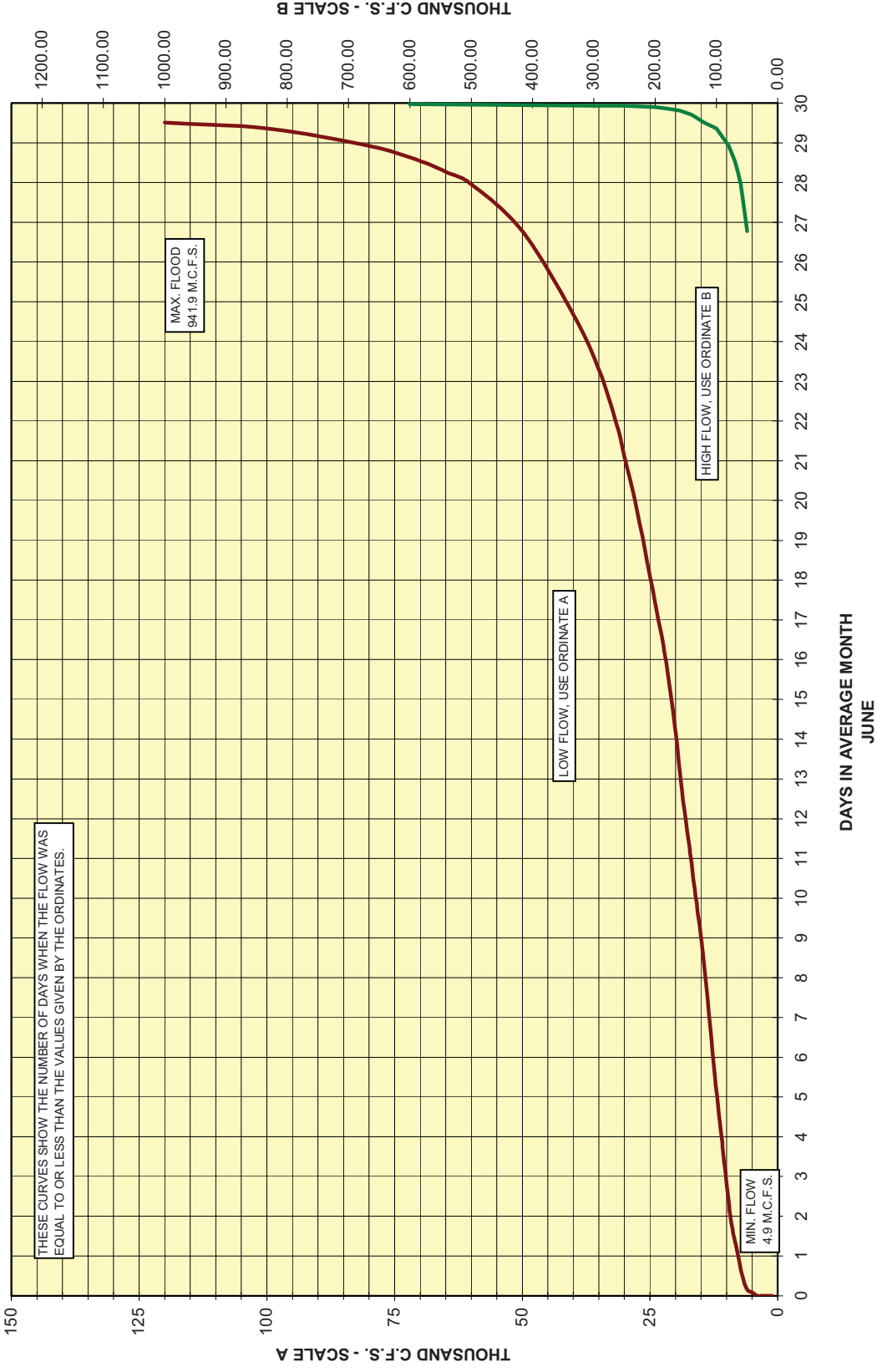
may be the most efficient passage route. PPL intends to begin assessing passage performance in 2011, depending on construction activities, to determine if the preferential operation of Unit 1 during the spring passage period is most advantageous in terms of meeting passage performance goals, or whether concentrating low river flow into the tailrace is preferred for fish passage. Should such studies reveal that an alternative operating plan would be advisable to maximize the opportunity for successful migratory fish passage, PPL shall submit any proposed modifications to the DEP and Resource Agencies for review and approval.



**FIGURE 3. MONTHLY FLOW DURATION CURVES OF THE SUSQUEHANNA RIVER MEASURED AT HOLTWOOD (APRIL 1917 TO 2006 INCLUSIVE)**



**FIGURE 4. MONTHLY FLOW DURATION CURVES OF THE SUSQUEHANNA RIVER MEASURED AT HOLTWOOD (MAY 1917 TO 2006 INCLUSIVE)**



**FIGURE 5. MONTHLY FLOW DURATION CURVES OF THE SUSQUEHANNA RIVER MEASURED AT HOLTWOOD (JUNE 1917 TO 2005 INCLUSIVE)**

If the passage goals discussed in Section 8.0 are not met during the initial years of operation, additional operational requirements may be needed. Future versions of the FOP would detail these requirements if they are established.

## **7.0 DATA RECORDING AND REPORTING**

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In order to assess the effectiveness of the Fishway, PPL shall record passage data on a daily, weekly and annual basis, operational conditions and passive integrated transponder (PIT) tagging monitoring (or other study methodology approved by the resource agencies) of upstream American shad passage.

Passage and operational data that shall be recorded include:

1. Qualitative estimate of the number of shad/lift (tailrace and spillway),
2. Hourly species counts passing viewing window,
3. Station discharge data logs,
4. Tailwater, spillway, and forebay elevation data logs,
5. Flow recording per the Minimum Stream Flow Monitoring Plan,
6. Weir gate and MOV settings,
7. Pertinent observations on fish behavior in and around the Fishway, and
8. Equipment malfunctions and/or maintenance issues.

All fish passing through the Fishway, including anadromous, catadromous, and resident fishes, shall be counted during the upstream shad passage season. Fish passage data will be entered on a field data sheet and uploaded into a computer. Files will be uploaded each evening, checked and corrected as necessary. Data reporting will be PC-based and accomplished by program scripts, or macros, created within a Microsoft Excel spreadsheet. After corrections are made, a daily summary of fish passage through the Fishway will be produced. The daily report will include the total number of migratory fish passed by species, hours of fishway operation, water usage, flow rates, entrance gate settings, MOV settings, and identification and documentation of any problems encountered. PPL shall provide daily and weekly updates electronically to the resource agencies that summarize passage results. PPL shall also keep resource agencies apprised of modifications or interruptions to Fishway operation if they occur.

PPL shall provide the resource agencies an annual monitoring report by December 1 of each year. The report shall include numbers of fish passed through the fishway. Specifically, it will include the number of shad passed by the tailrace and spillway lifts; results of PIT tag monitoring data of upstream passage of American shad passage; a matrix to examine fish passage data and compare it to pertinent data including date, water temperature, gate settings, pond elevation, river flows, attraction flow, and hydro station operations and other pertinent factors, a summary of visual observations in the Fishway, tailrace, Piney Channel, and spillway below the Main Dam; a summarization of mechanical/electrical components and hydraulic conditions during daily operation; and actions taken to enhance operation efficiency and/or effectiveness as it relates to anadromous and resident fish passage. Once data is synthesized the results will be utilized to further refine and enhance future fish lift operational plans.

PPL shall provide an annual report detailing the implementation of the Fishway Operation Plan (FOP) including deviations from the FOP and a process to prevent those deviations in the future to the resource agencies by December 31 of each year. It shall also include a summary of any recommendations regarding operational changes or improvements that should be considered for implementation in subsequent seasons, and if any emergencies or project outages occurred, the steps PPL took to minimize adverse effects on Fishway operation or fish passage measures. PPL shall meet with the resource agencies upon request of the resource agencies to discuss the FOP and the annual report.

Based on annual operating experience, amendments to the FOP may be needed. PPL shall submit all amendments to the resource agencies for review and approval. PPL shall implement any amendments to the FOP according to a mutually agreeable schedule developed with the resource agencies.

## **8.0 POST CONSTRUCTION STUDIES AND MONITORING**

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### **8.1 PLAN AND SCHEDULE TO VALIDATE FISHWAY UPGRADES AND OTHER PROJECT COMPONENTS**

Certain studies will be required following initial start-up and completion of Fishway upgrades (entrance C, fish lift attraction water piping, and tailrace crowder) or installation of other project

components (mobile trash rake) to validate performance ratings as developed during design, or provided by the equipment manufacturer. These studies will be needed to ensure that each of the Holtwood discharge components is being accurately measured. PPL will undertake the following validation studies after the new project components are installed:

- Entrance C travel,
- Discharge measurements at each of the fish lift entrances to validate revised MOV rating tables,
- Tailrace crowder travel and door function, and
- Mobile Material Handler performance.

Each of these tests will be scheduled as soon as reasonably feasible following the completion of construction. Until test completion PPL will use the best available design or manufacturer provided data to determine MOV settings. Any deviations from expected values will be reported to the resource agencies.

## **8.2 PLAN AND SCHEDULE FOR MONITORING EFFECTIVENESS OF UPSTREAM SHAD PASSAGE**

One year prior to the anticipated date of entry into operation of the new powerhouse, PPL shall submit for approval by the resource agencies a plan to monitor the effectiveness of upstream anadromous fish passage at the facility and inform the resource agencies of the results on a daily, weekly and annual basis (as is now the practice). The plan, based on the PFBC Table provided in Appendix C, shall include annual fish counts and passive integrated transponder (PIT) tagging monitoring (or other study methodology approved by the resource agencies) data of upstream American shad passage.

Following the entry into operation of the new powerhouse, PPL shall annually, for the term of the license, monitor the effectiveness of upstream fish passage measures in accordance with the approved plan by comparing passage counts of anadromous fish at the Project to results at Conowingo. PPL shall also monitor the time taken for fish to pass from Conowingo to the Project by conducting PIT tag studies (or other study methodology approved by the resource agencies) of American shad or any equivalent study approved by the resource agencies.



PPL and the resource agencies will examine the results of this monitoring to determine whether the fish passage goals established in the 401 Certification and FERC license have been attained.

**APPENDIX A**

**FISHWAY OPERATING MANUAL**

**APPENDIX A**

**HOLTWOOD FISH PASSAGE FACILITY  
OPERATING MANUAL**

## **APPENDIX A**

# **HOLTWOOD FISH PASSAGE FACILITY OPERATING MANUAL**

### **CONTENTS**

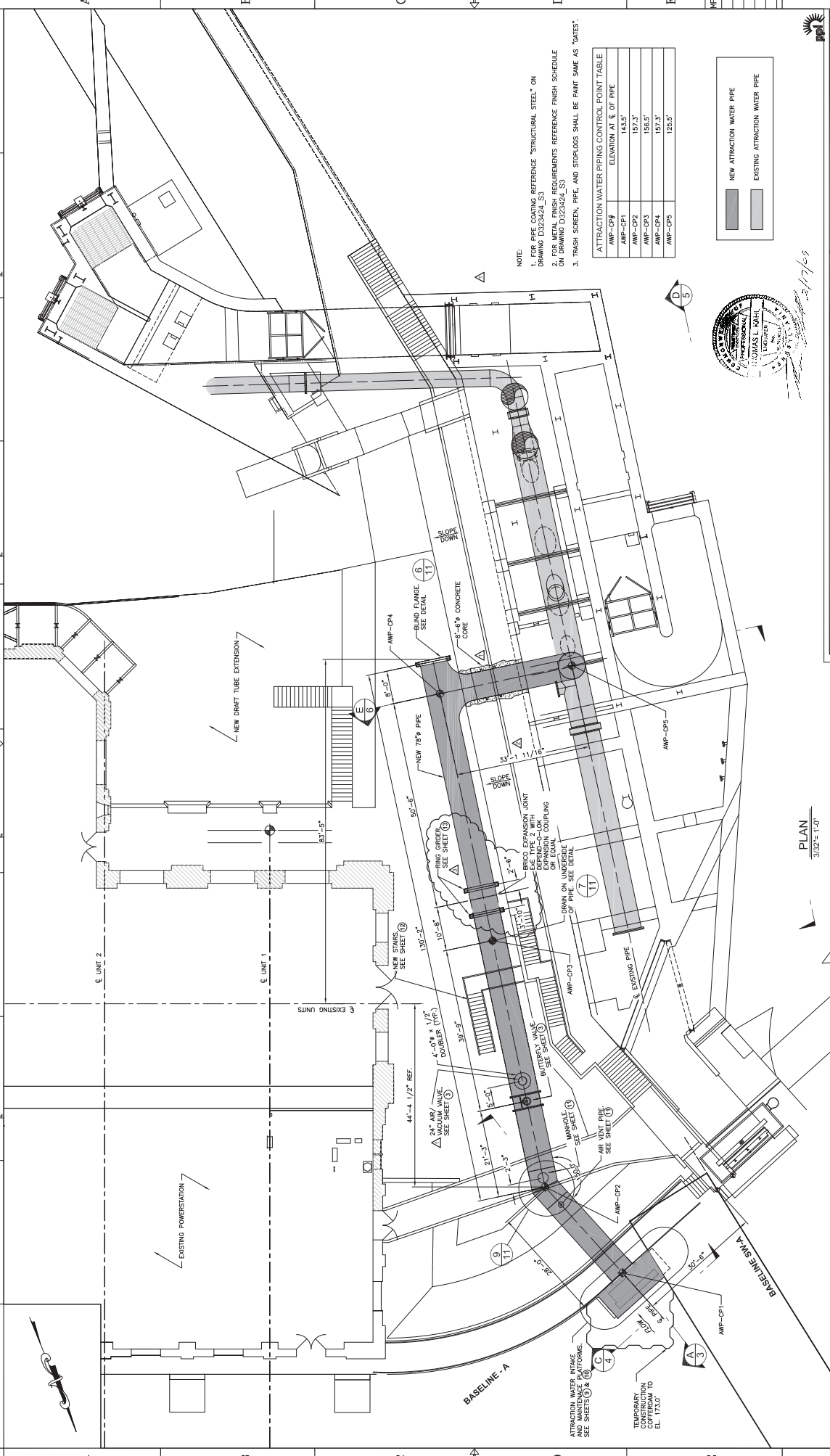
- 1. Plans**
- 2. Screens**
- 3. Control Panel**
- 4. Flow Diagram**
- 5. Guidelines**
- 6. MOV and Flow Tables**

**HOLTWOOD FISH PASSAGE FACILITY  
OPERATING MANUAL**

**1. PLANS**

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- NOTE:
- FOR PIPE COATING, REFERENCE "STRUCTURAL STEEL" ON DRAWING D323424\_S3
  - FOR METAL FINISH REQUIREMENTS, REFERENCE FINISH SCHEDULE ON DRAWING D323424\_S3
  - TRASH SCREEN, PIPE, AND STOPLOGS SHALL BE PAINT SAME AS "GATES".

ATTRACTION WATER PIPING CONTROL POINT TABLE

AMP-CP#	ELEVATION AT 0' OF PIPE
AMP-CP1	143.5'
AMP-CP2	157.3'
AMP-CP3	156.6'
AMP-CP4	157.3'
AMP-CP5	126.5'



12/17/11

PLAN  
3/32" = 1'-0"

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**PPL HOLTWOOD, LLC**  
HOLTWOOD REDEVELOPMENT PROJECT  
FISHLIFT MODIFICATIONS  
ATTRACTION WATER PIPING  
OVERALL PLAN VIEW

PROJECT NO. 032397	SCALE - AS SHOWN	DATE 12/17/11	SHEET NO. 2
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DESIGNED BY: JLD	DATE: 09/28/10	DATE: 09/28/10	REV. 2
DATE: 09/28/10	DATE: 09/28/10	DATE: 09/28/10	REV. 3

D-4 MOVED RING GRATES TO NORTH PERAP-275  
UPDATED DIMENSION PERAP-427  
D-1 DELETED EXTERNAL LUBRICATOR/RELEASE VALVE/LOCKING DEVICE

NO.	DATE	ACT.	LOCATION CODES
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2	09/28/10		
3	09/28/10		

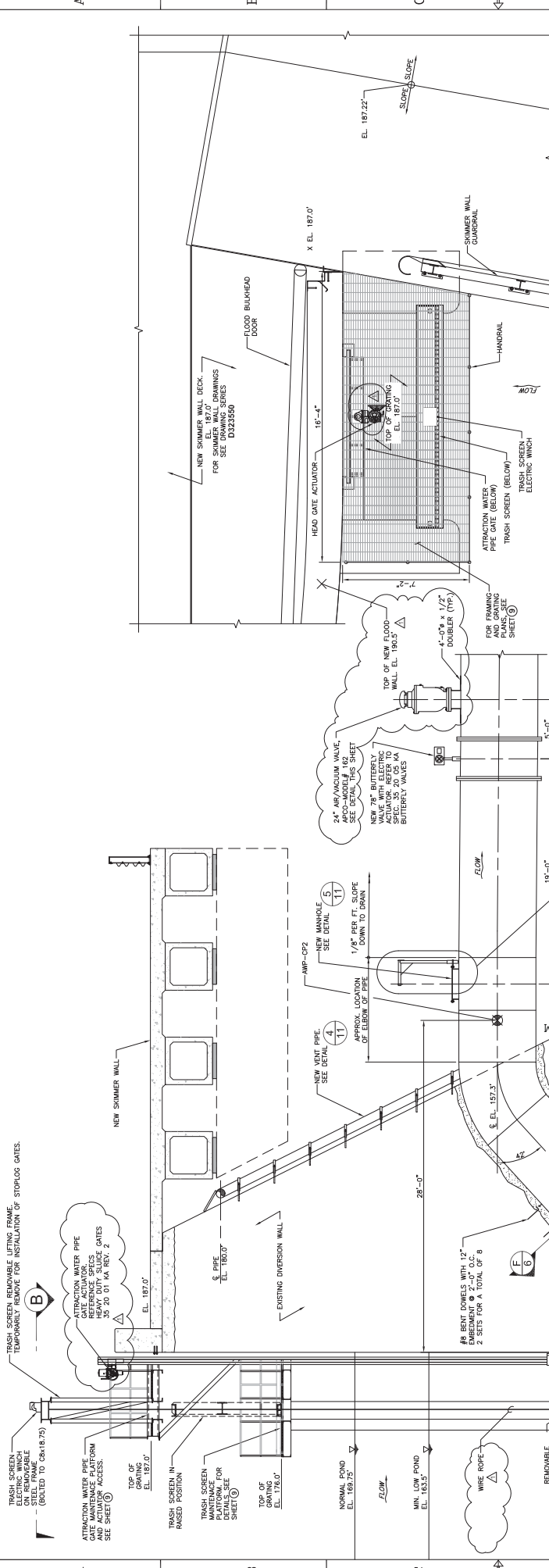
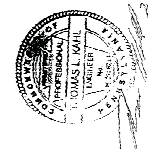
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 FISHLIFT MODIFICATIONS  
 INTAKE WATER PIPING  
 INTAKE PLAN AND SECTION VIEW

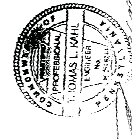
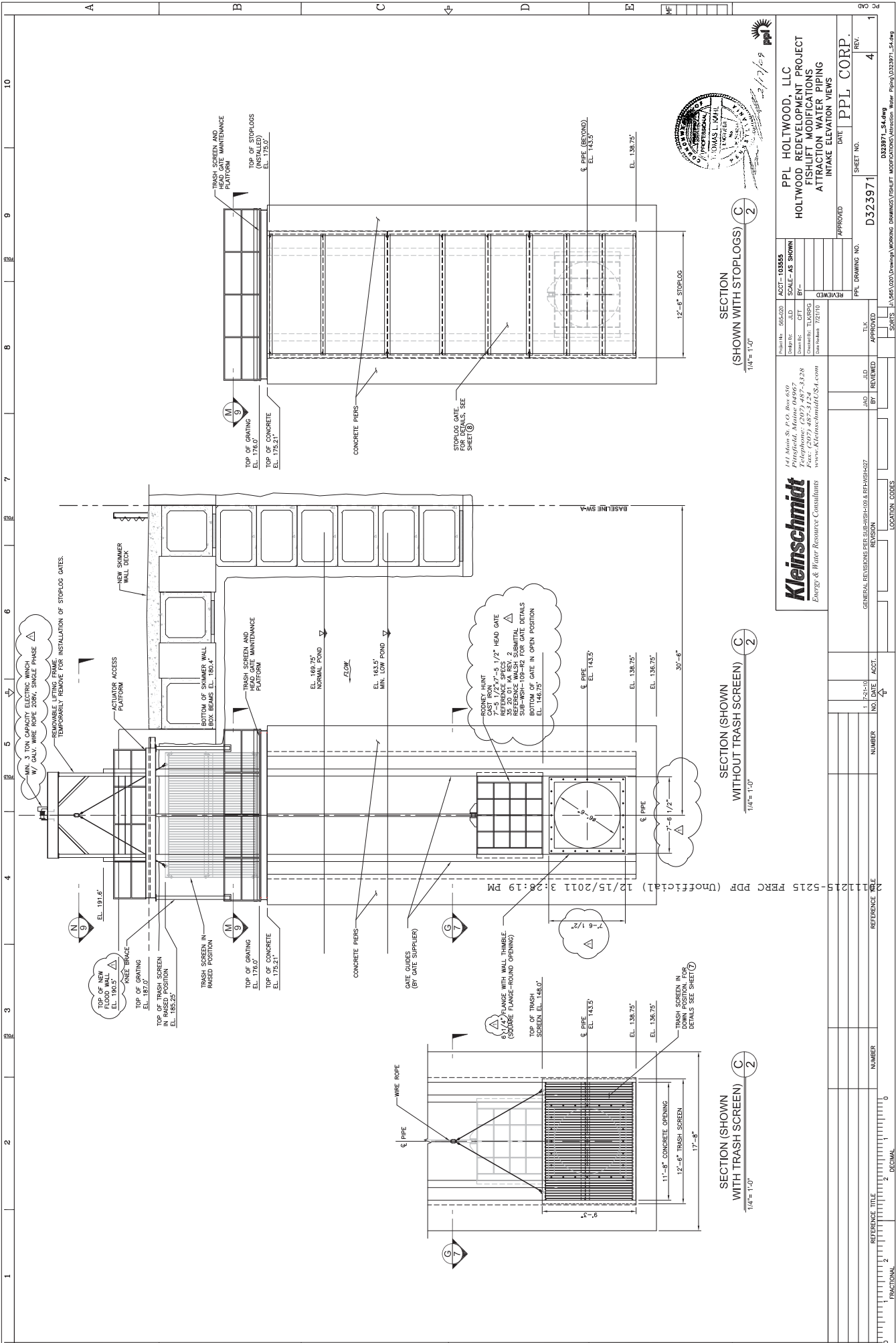
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 SHEET NO.: 3



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 HOLTWOOD REDEVELOPMENT PROJECT  
 FISHLIFT MODIFICATIONS  
 ATTRACTION WATER PIPING  
 INTAKE ELEVATION VIEWS

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SCALE: AS SHOWN	BY: CFT
DESIGNED BY: TLAB/REG	CHECKED BY: TLAB/REG
DATE: 03/14/09	DATE: 03/14/09

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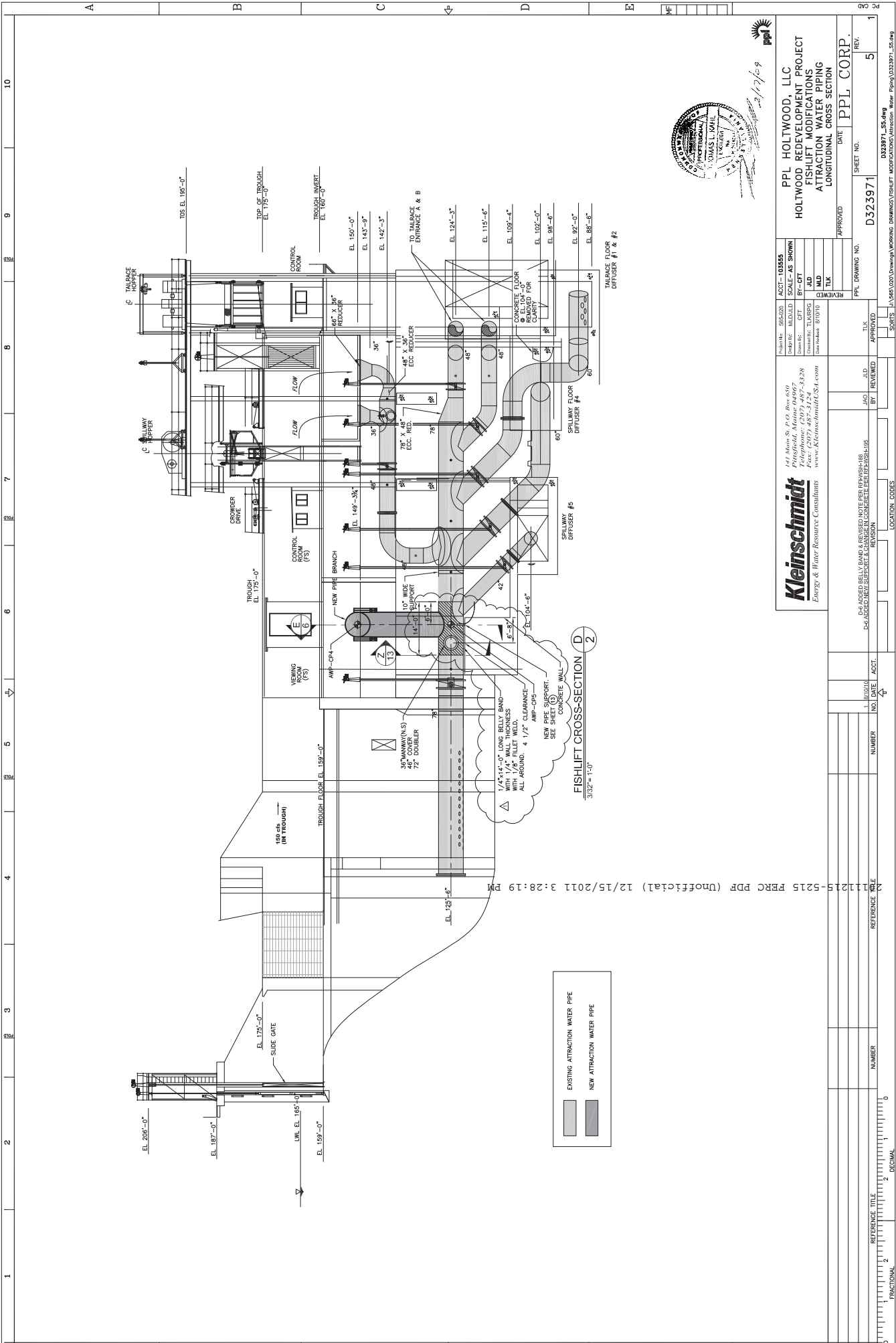
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 ATTRACTION WATER PIPING  
 LONGITUDINAL CROSS SECTION

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DESIGNED BY	CHKD BY	DATE	APPROVED
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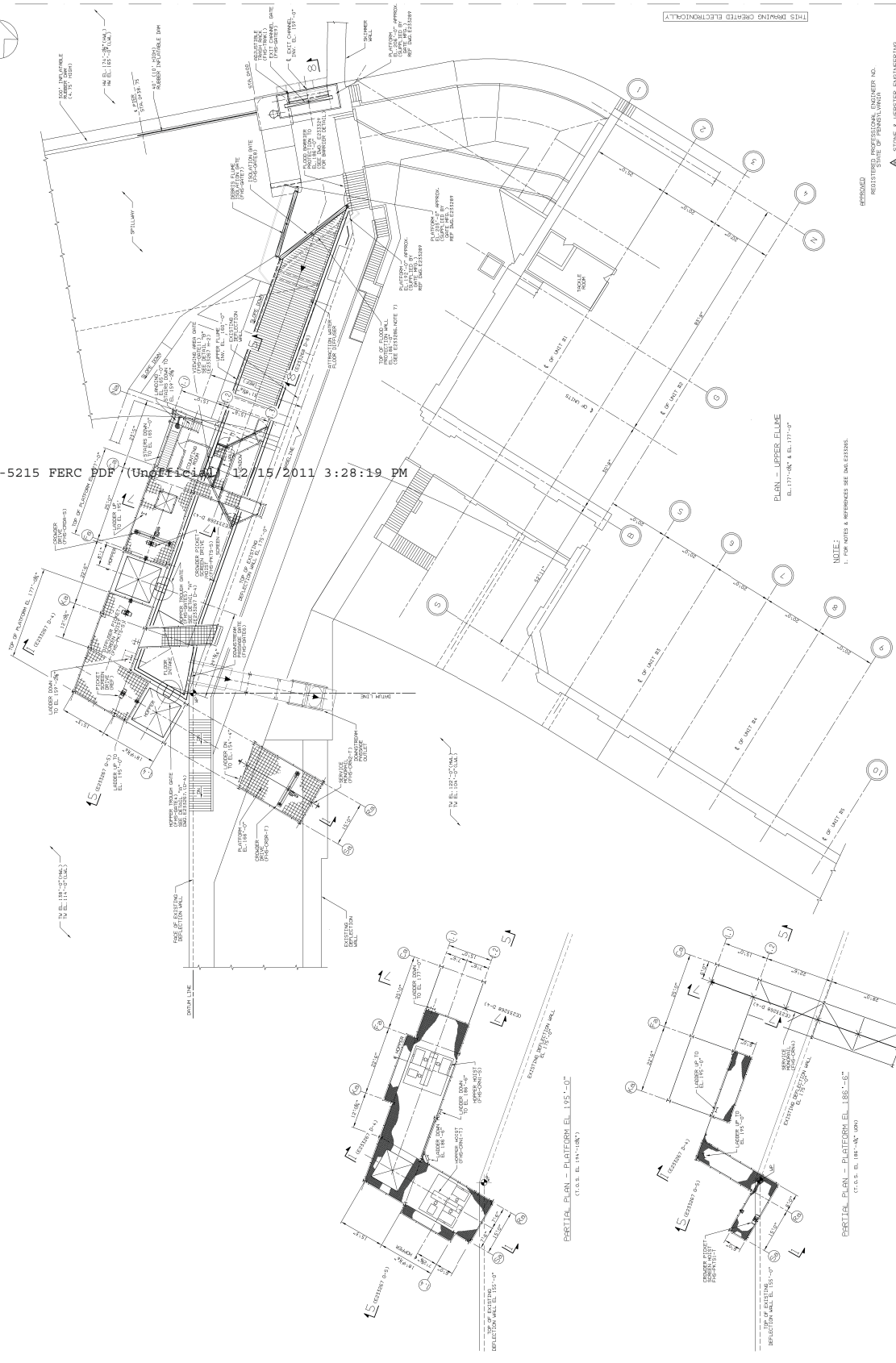
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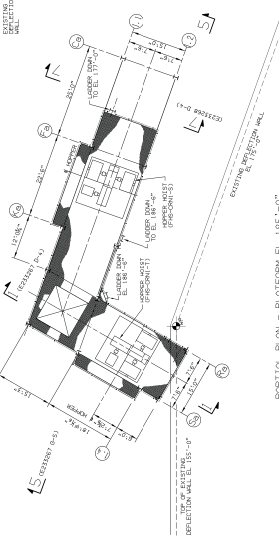
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 JOHN A. HARRIS, P.E.

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 FISH PASSAGE FACILITY  
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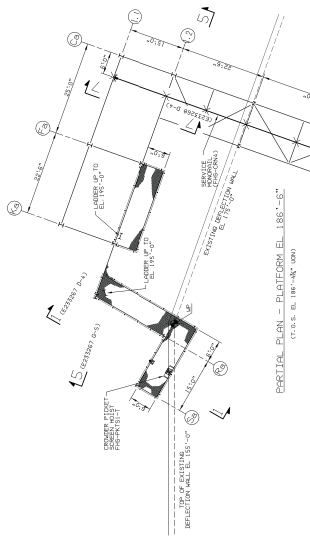


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10	ISSUED FOR CONSTRUCTION	11/15/11

NOTE:  
 1. FOR NOTES & REFERENCES SEE DIMENSIONS.



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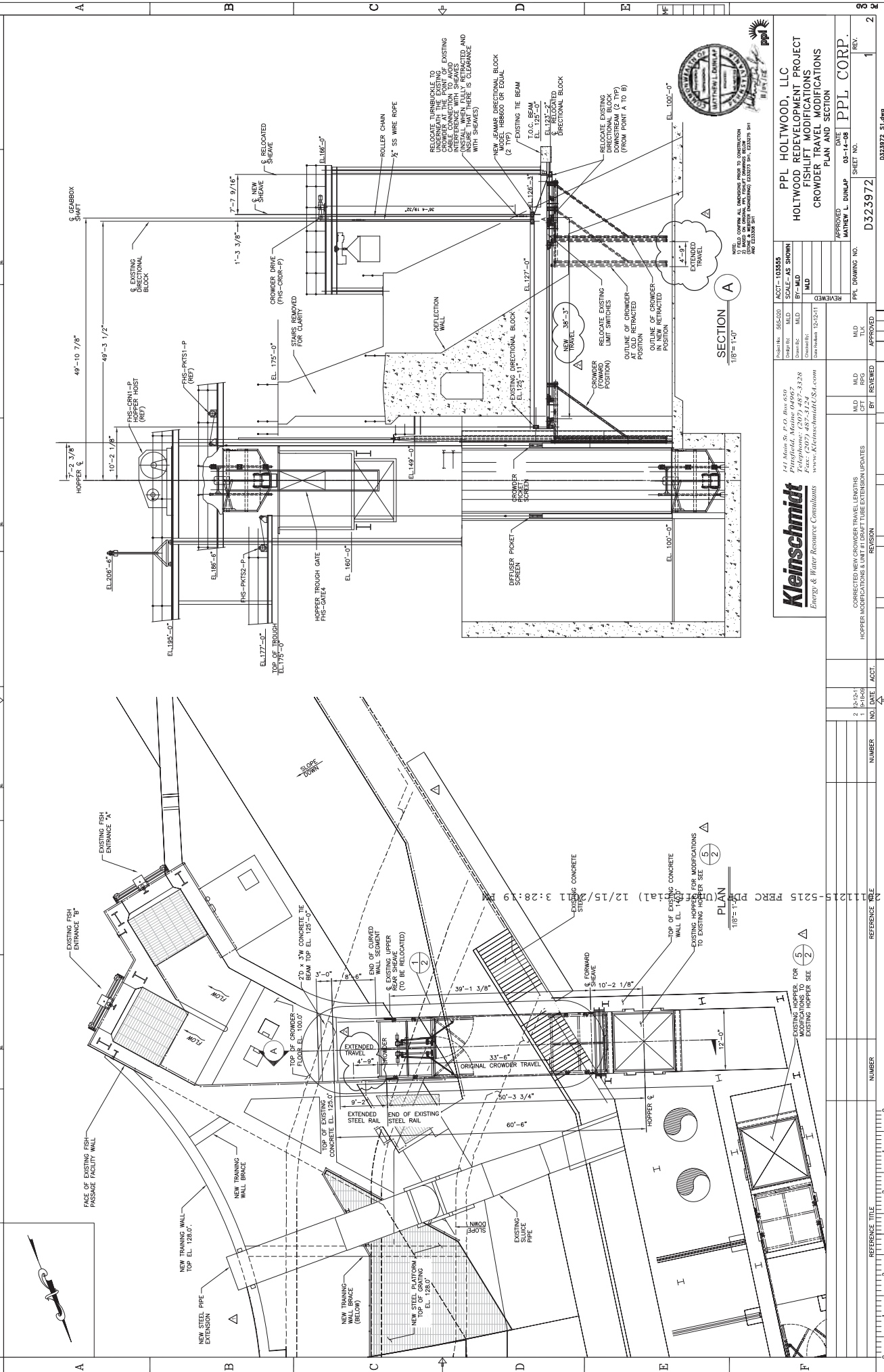


PARTIAL PLAN - PLATFORM EL. 185'-0"  
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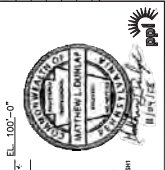
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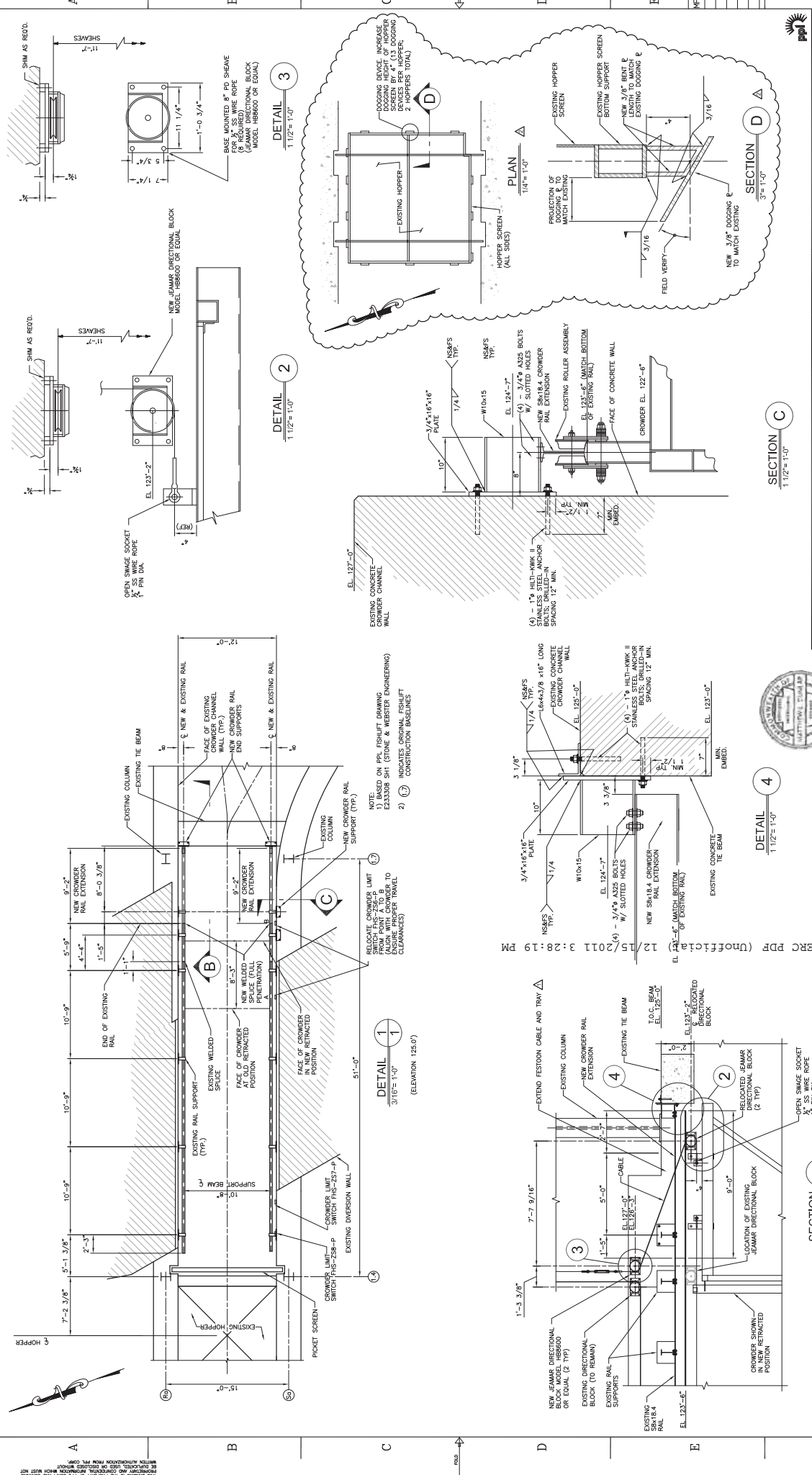
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**PPL**  
 PPL HOLTWOOD, LLC  
 HOLTWOOD DEVELOPMENT PROJECT  
 FISHLIFT MODIFICATIONS  
 CROWDER TRAVEL MODIFICATIONS  
 PLAN AND SECTION

DATE: 02-14-08  
 APPROVED: MATHIEW L. DUNLAP  
 SHEET NO.: D323972  
 REV. 1



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FISHLIFT MODIFICATIONS  
TRAVEL MODIFICATIONS  
SECTIONS AND DETAILS

APPROVED: **MATTHEW L. DUNLAP** DATE: 03-14-08  
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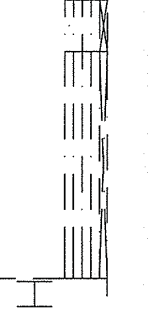
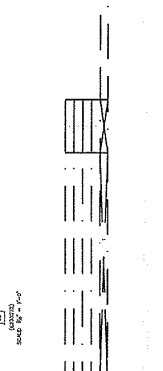
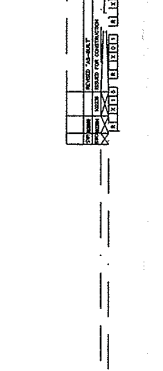
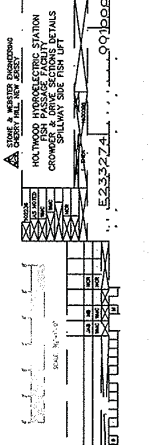
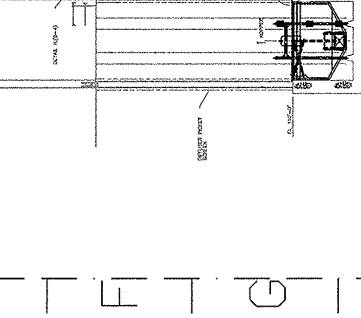
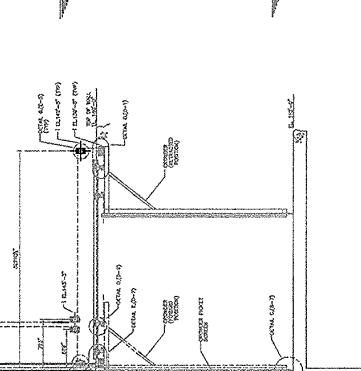
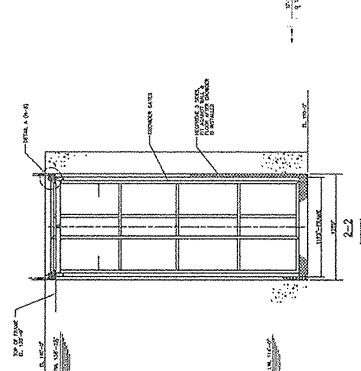
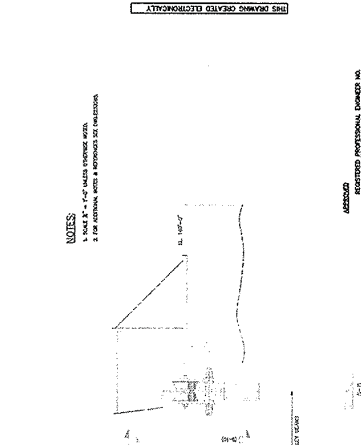
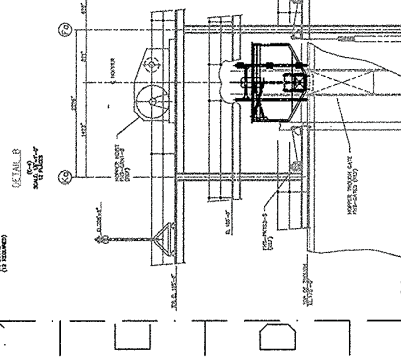
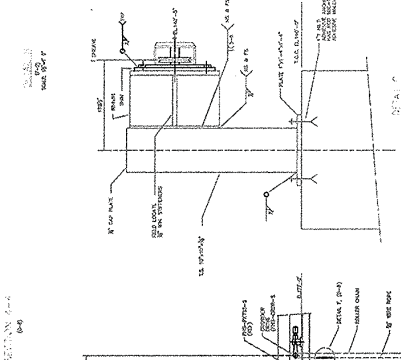
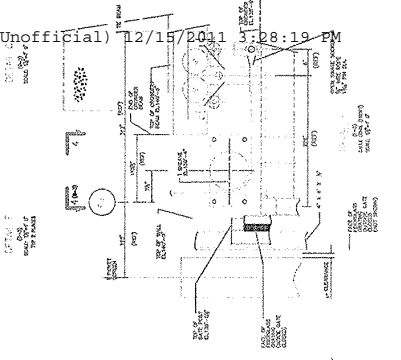
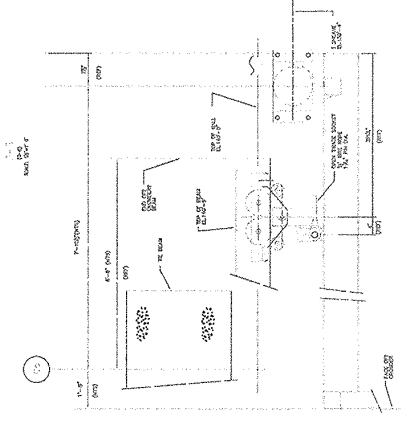
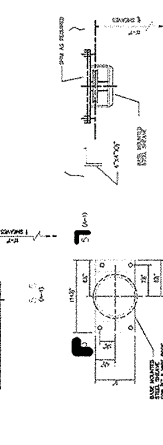
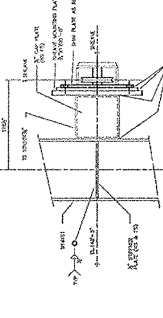
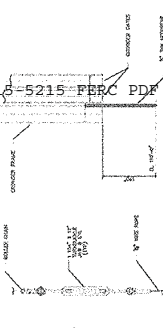
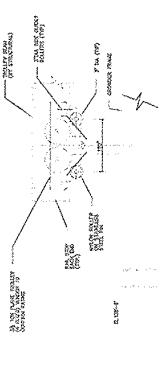
PPL CORP.

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Sep. 17, 2009 - 3:53 PM  
 PPL CORP. FROM 14320 (4/00)

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 1 2 3 4 5 6 7 8 9 10

20111215-5215-PRC-PDF (Unofficial) 12/15/2011 3:28:19 PM



NOTES  
1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
2. ALL DIMENSIONS ARE TO UNLESS OTHERWISE SPECIFIED.

EXEMPTED BY FEDERAL GOVERNMENT  
HOLYOKE HYDROELECTRIC STATION  
FISH LIFT AND FISH PASSAGE SYSTEM  
GROUNDS & DRIVE SECOND STATION  
SALLYWAY SIDE FISH LIFT

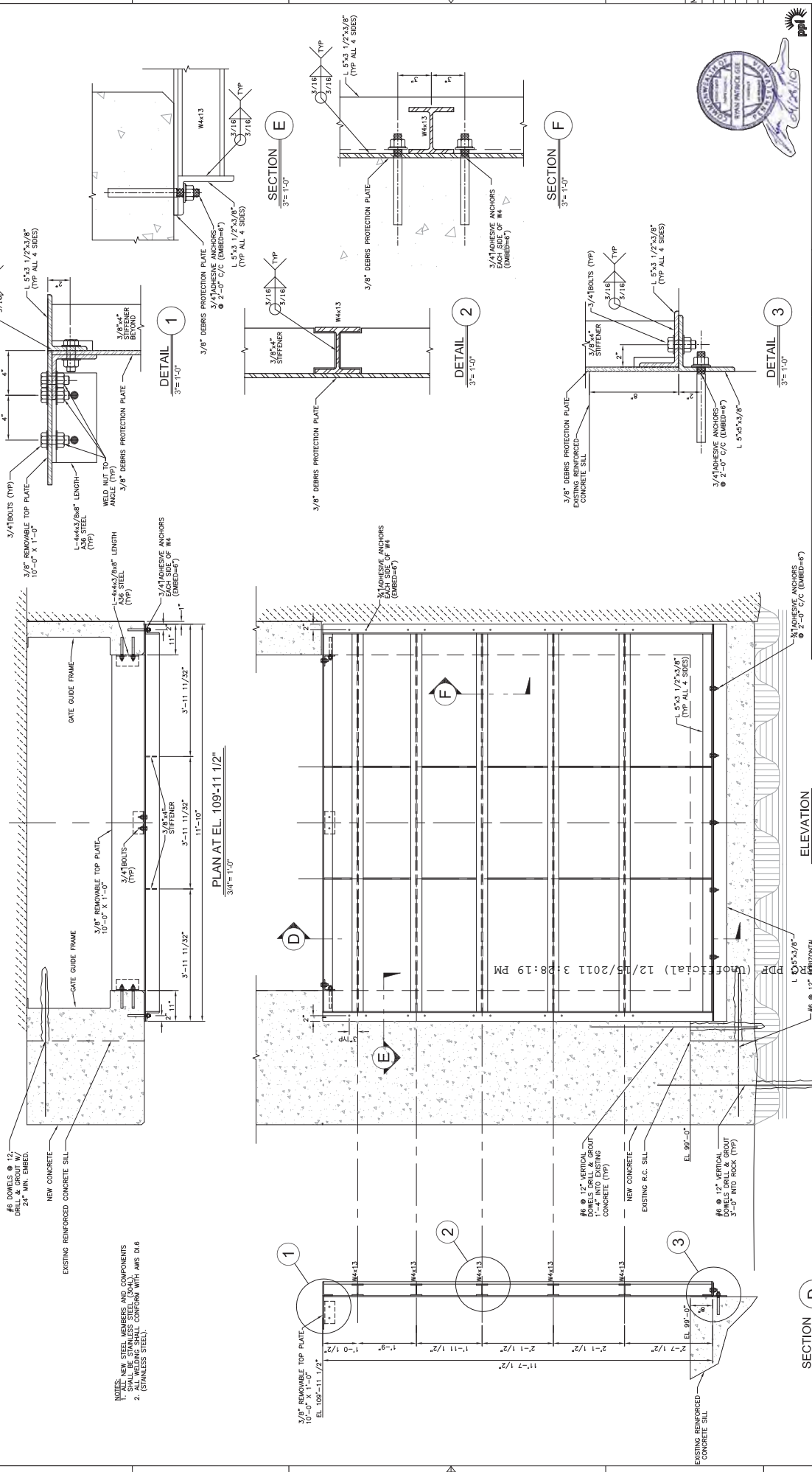
DATE: 12/15/2011  
TIME: 3:28:19 PM



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PPL 0904 - FISHLIFT MODIFICATIONS  
 DATE: 12/15/2011  
 TIME: 3:24 PM

NOTES:  
 1. ALL WELDING SHALL CONFORM WITH AWS D1.6 (STEEL WELDING).  
 2. ALL WELDING SHALL CONFORM WITH AWS D1.1 (WELDING OF ALUMINUM).



**PPL HOLTWOOD, LLC**  
 HOLTWOOD REDEVELOPMENT PROJECT  
 FISHLIFT MODIFICATIONS  
 ENTRANCE C GATE  
 PLAN, SECTIONS AND DETAILS

DESIGNED BY	SCALE	AS SHOWN
DRAWN BY	JAD	BT
CHECKED BY	TEL	
DATE	REVISED	
DATE	REVISED	

141 Main St., P.O. Box 659  
 Portland, Maine 04109  
 Tel: (207) 487-3328  
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**Kleinschmidt**  
 Energy & Water Resource Consultants

APPROVED BY: RYAN GEE  
 DATE: 05-10-10  
 SHEET NO.: D323973  
 OF 2

ALL ELEVATIONS IN POWERHOUSE DATUM = NAVD 88 ELEVATION + 0.06 FT.

NO.	DATE	ACCT.	REVISION

REFERENCE TITLE	NUMBER	NO.	DATE	ACCT.

REFERENCE TITLE	NUMBER	NO.	DATE	ACCT.

SCALE: 3/4" = 1'-0"

**HOLTWOOD FISH PASSAGE FACILITY  
OPERATING MANUAL**

**2. SCREENS**



*This section will be updated once construction is completed.*

**HOLTWOOD FISH PASSAGE FACILITY**

**OPERATING MANUAL**

**3. CONTROL PANEL**

*This section will be updated once construction is completed.*

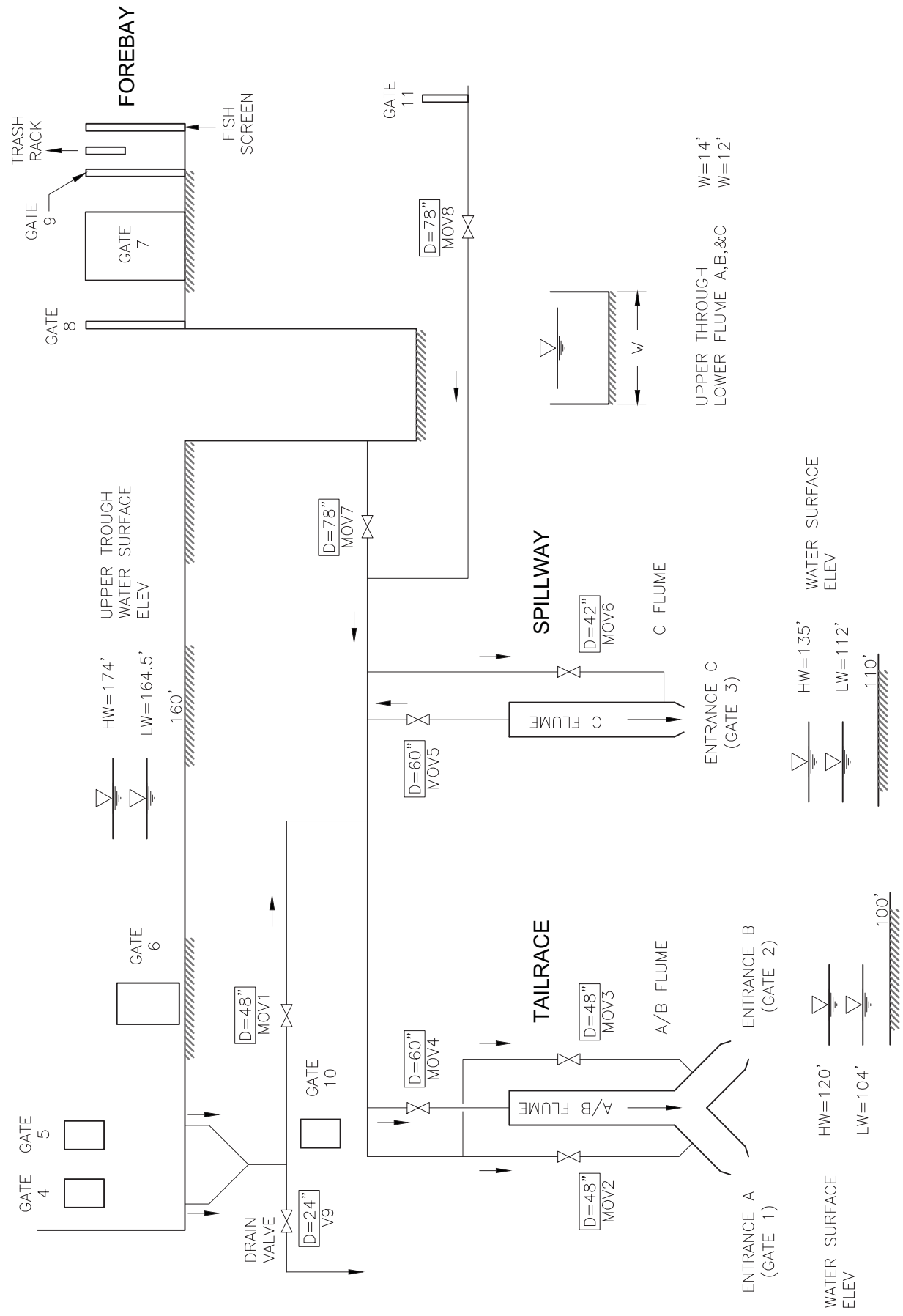
**HOLTWOOD FISH PASSAGE FACILITY**

**OPERATING MANUAL**

**4. FLOW DIAGRAM**

# HOLWOOD DAM FLOW DIAGRAM FISH ATTRACTION WATER SYSTEM

A, B, C

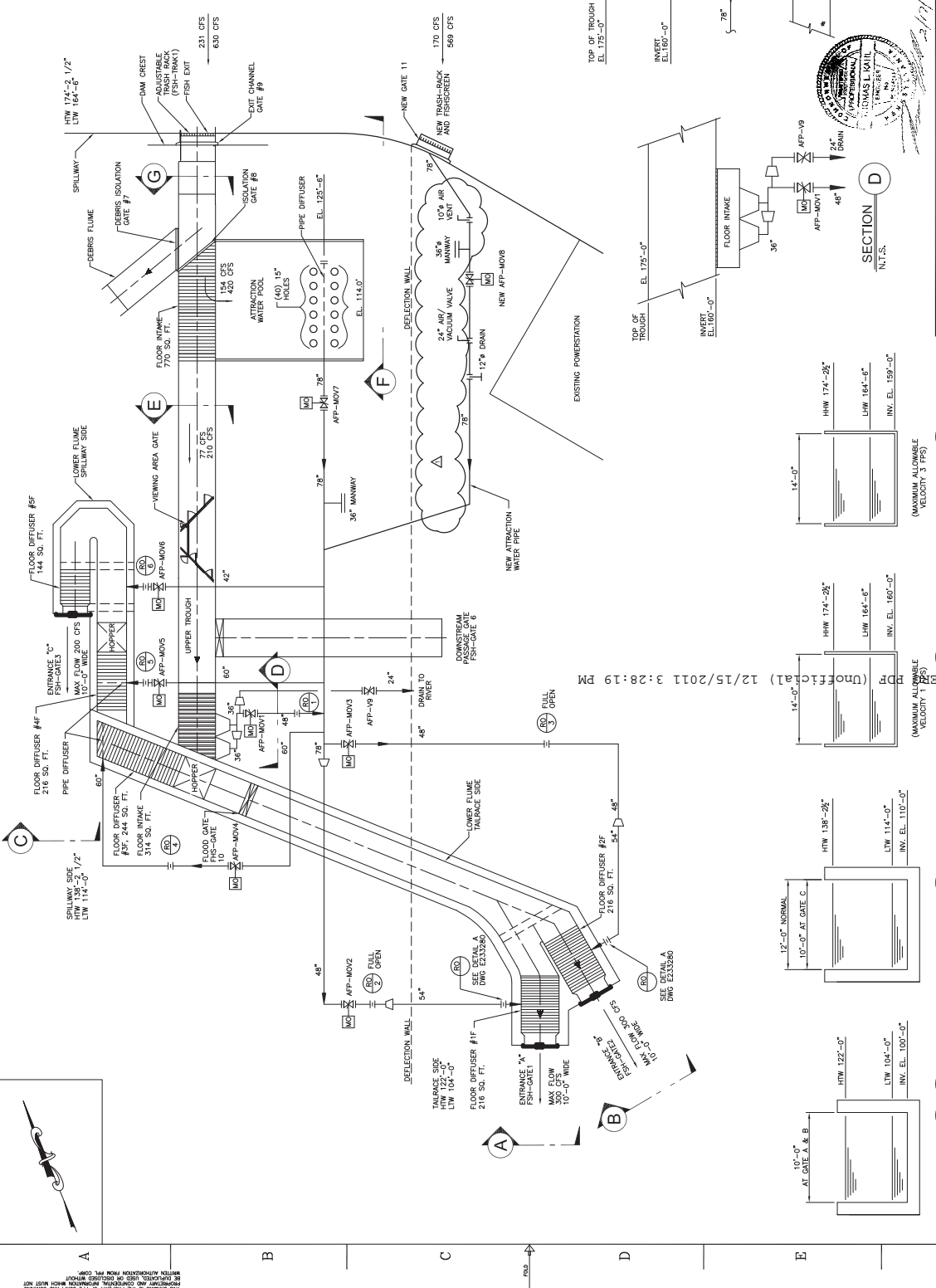


10 9 8 7 6 5 4 3 2 1

PPAL VALVE I.D. (IN.)	VALUE I.D. NO.	DESCRIPTION	QTY	SIZE
HF1	AFP-MOV1	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	48"150 PSI
HF2	AFP-MOV2	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	48"150 PSI
HF3	AFP-MOV3	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	48"150 PSI
HF4	AFP-MOV4	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	60"150 PSI
HF5	AFP-MOV5	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	60"150 PSI
HF6	AFP-MOV6	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	42"150 PSI
HF7	AFP-MOV7	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	78"150 PSI
HF8	AFP-MOV8	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	78"150 PSI
HF9	AFP-MOV9	BUTTERFLY VALVE-FLANGED WITH MOTOR OPERATOR	1	24"150 PSI

HW LEVEL (FT)	FSH VELOCITY (CFS)	HYDRAULIC CHARACTERISTICS
164.5	231	3.0
166.0	284	3.0
171.0	504	3.0
174.0	360	3.0

- NOTES:
- FOR ADDITIONAL NOTES AND REFERENCES SEE DWG.E233265.
  - FOR OFFICE DETAILS SEE DWG.E233266.
  - MAXIMUM SYSTEM FLOW 800 CFS WITH NEW BYPASS PIPE.



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**PPL HOLTWOOD, LLC**  
HOLTWOOD REDEVELOPMENT PROJECT  
FISHLIFT MODIFICATIONS  
ATTRACTION WATER PIPING  
FLOW DIAGRAM

PROJECT NO.	666269	DATE	03/28/14
DRAWN BY	CFE	SCALE	AS SHOWN
CHECKED BY	MLD	DATE	12/12/11
DESIGNED BY	MLD	DATE	12/12/11

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

REVISIONS:

NO.	DATE	DESCRIPTION
1	12/15/2011	FOR REVIEW
2	12/15/2011	FOR REVIEW

PROJECT NO. D323971

SHEET NO. 1

TOTAL SHEETS 2

Dec. 12, 2011 - 11:16 AM

PROJECT: PPL 1420 (6/00)

FILE: D:\1420\Drawings\Working DRAWINGS\FISHLIFT MODIFICATIONS\Attraction Water Piping\0323971\_S1.dwg

NO.	DATE	DESCRIPTION
1	12/15/2011	FOR REVIEW
2	12/15/2011	FOR REVIEW

**HOLTWOOD FISH PASSAGE FACILITY  
OPERATING MANUAL**

**5. GUIDELINES**