825 N.E. Multnomah
Portland, Oregon 97232
(503) 813-5000

PACIFICORP
PACIFIC POWER UTAH POWER

September 1, 2004

Magalie R. Salas, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, DC 20426

E-FILED

Subject: Bear River Hydroelectric Project, FERC No. 20 Article 403 Cove Feasibility Study and Schedule for Compliance with Article 306, as amended

Dear Ms. Salas:

Article 403 of the License Order for the Bear River Hydroelectric Project (FERC No. 20) includes a required study plan evaluating the feasibility of fish passage at the Cove project through modifications to the project, addition of fish passage facilities, and decommissioning of the project. Due to a conflict in schedule requirements of the Cove feasibility study and requirements included in Article 306 (Cove flume rehabilitation), we proposed a modified schedule (letter dated March 16, 2004). Your order issued April 13, 2004 approved the modified schedule, with Cove flume rehabilitation to commence on May 15, 2005 and completion extended to November 30, 2005. We subsequently filed an implementation plan on May 27, 2004, that scheduled the filing of the Cove feasibility study with the Commission on September 1, 2004.

The filing of the Cove feasibility study was to include any recommendation following consultation with signatories to the Bear River Settlement Agreement (Environmental Coordination Committee [the ECC, Article 402]) regarding alternatives presented in the study. The draft Cove feasibility study has been reviewed and discussed with the stakeholders in ECC meetings during July and August, 2004, and there appears to be significant interest in the decommissioning alternative. The ECC stakeholders, representing widely diverse interests, believe decommissioning of the Cove development would benefit Bonneville cutthroat trout restoration and other aquatic resources in the mainstem Bear River, but a decision by the group has not yet been reached. The ECC has therefore requested more time in order to discuss this study alternative with their constituents, especially the manner in which decommissioning could be accomplished. On their behalf, PacifiCorp proposes an additional 90 days from the date of this letter in order to make a recommendation on a Cove feasibility study alternative.

Because the decision may result in a proposal for decommissioning the Cove development, we request that further planning of the Cove flume rehabilitation be deferred until after deliberations regarding the development's decommissioning are completed. Should decommissioning not be recommended after the 90-day period, we will resume the Cove flume rehabilitation process. In such case, PacifiCorp proposes that the schedule for the flume rehabilitation be modified to provide time in 2005 for the design report, contract plans and specifications, Quality Control and Inspection Program (QCIP), cofferdam design and drawings, and the Temporary Emergency Action Plan (TEAP) (License Articles 302-305). Since construction uninterrupted by the winter season will provide significant cost efficiencies for the entire flume rehabilitation project, we also propose a construction period during 2006 with project completion no later than November 30, 2006.

In our letter dated April 13, 2004, we requested that analysis of Cove dam's wing walls presented in FERC's letter dated October 17, 2002, be held in abeyance until after consideration of other activities associated with implementing the new license. FERC Portland Regional Office (PRO) responded on June 18, 2004, granting us a time extension for the dam repair work to accommodate the revised schedule of the Cove flume rehabilitation project. However, during our meeting on August 25, 2004, FERC staff again expressed concerns regarding the safety of Cove dam, indicating that further deferral of dam repair work increases concerns regarding dam safety.

To address these concerns at the Cove dam, we propose the removal of all the stop logs to lower the Cove forebay by approximately 6 feet, thus reducing hydraulic pressure on the dam. Further, we will evaluate the extent of wing wall deterioration and perform a structural analysis to verify the integrity and stability of the wing walls. This analysis will be submitted to the FERC-PRO within 60 days of the date of this letter.

This letter and the Cove Feasibility Study constitute an e-Filing made this date. If you have any questions or need further information, please contact Monte Garrett at 503-813-6629.

Sincerely,

R.A. Landolt
Managing Director, Hydro Resources

RAL:MG:hb

cc (with attachments): Harry Hall
ECC Members (see attached list)

File: Bear River Project, Cove Development, Compliance, FERC, License, Articles, Cove Feasibility Study (with hardcopy attachments)

Blaine Newman
BLM
4350 Cliffs Drive
Pocatello, ID 83204

Deb Mignogno
USFWS
4425 Burley Drive – Suite A
Chubbock, ID 83201

Jim Capurso
USFS
1405 Hollipark Drive
Idaho Falls, ID 83401

Mary Lucachick
IDPR
PO Box 83720
Boise, ID 83720-0065

Warren Colyer
Trout Unlimited
151 North Ridge Ave, Suite 120
Idaho Falls, ID 83402

Charlie Vincent
American Whitewater
1884 South 1600 East
Sale Lake City, UT 84105

Hunter Osborne
Shoshone-Bannock Tribes
P.O. Box 306 / 29 Shoshone Drive
Fort Hall, ID 83203

Jim Mende
IDFG
1345 Barton Road
Pocatello, ID 83204

Susan Rosebrough
NPS
909 First Ave
Seattle, WA 98104-1055

Lynn Van Every
IDEQ
444 Hospital Way #300
Pocatello, ID 83201

Jenna Borovanski
Idaho Rivers United
PO Box 633
Boise, ID 83701

Marv Hoyt
Greater Yellowstone Coalition
162 North Woodruff
Idaho Falls, ID 83401

Miriam Hugentobler
Consultant to PacifiCorp
338 W. 100 S.
Logan, UT 84321

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PORTLAND, OREGON

GRAVE/COVE HYDROELECTRIC PROJECT
FERC PROJECT NO. 2401

COVE FEASIBILITY STUDY

DECOMMISSION, FISH-FRIENDLY, AND PROJECT INTERCONNECTION ALTERNATIVES

BLACK & VEATCH
Corporation

June 14, 2004

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1.0 Introduction

PacifiCorp recently received a new Federal Energy Regulatory Commission (FERC) license for the Bear River Hydroelectric Project, which includes four dams (i.e. developments) along the Bear River in Southeastern Idaho. A requirement of the new license is an analysis that evaluates specific “fish-friendly” alternatives for the future operation or decommissioning of the Cove development. In 2002, Black & Veatch conducted an analysis that described and estimated costs for decommissioning the Cove development as part of the re-licensing process.

The purpose of this feasibility study is to 1) update the decommissioning costs developed in the previous decommissioning analysis, 2) develop conceptual designs and prepare estimated costs for the construction of upstream and downstream fish passage facilities at the Cove development, and 3) determine on a conceptual basis the modifications and estimated costs necessary to join the Cove development with the upstream Grace development.

The results from the study will give PacifiCorp and external stakeholders (Environmental Coordination Committee [ECC]) basic arrangements and order of magnitude costs with regard to the various alternatives. This may assist them in their decision making process with regard to modifications that may advance conservation goals for native fish. If alternatives are selected for further consideration, additional studies should be conducted to optimize the alternative arrangement and refine the estimated construction cost.

The alternatives studied are listed below and described in the following sections of this report.

- Alternative No. 1 – Project Decommission
- Alternative No. 2 – Cove Dam Fish Ladder
- Alternative No. 3A – Cove Intake Fish Screens (Upstream of Intake)
- Alternative No. 3B – Cove Intake Fish Screens (Downstream of Intake)
- Alternative No. 4 – Grace Tailrace Barrier
- Alternative No. 5 – Cove Tailrace Barrier
- Alternative No. 6 – Grace/Cove Interconnection Canal

2.0 Existing Project Facilities

The Project is located in Caribou County, Idaho, on the Bear River approximately 38 miles north of the Utah border near the town of Grace. An area plan showing the general location of the Project is displayed in Figure 2-1.

The Project consists of the Grace and Cove developments. The Grace development consists of a rock-filled timber crib diversion dam that is 51 feet high and 180 feet long and creates a 320 acre-feet forebay with 250 acre-feet of usable storage; a flowline 26,000 feet long; surge tanks and penstocks; and a powerhouse with three turbine generators rated at 11 MW each for a total plant capacity of 33 MW. The Cove development consists of a concrete diversion dam that is 26.5 feet high and 141 feet long and creates a 60 acre-feet forebay; a concrete and wood flume 6,125 feet long; a 550 feet long steel penstock; and a powerhouse with one turbine generator rated at 7.5 MW. The hydraulic capacity of the Grace powerhouse is 960 cfs, and the hydraulic capacity of the Cove powerhouse is 1,227 cfs. Operation of the Project has not changed appreciably over the past 78 years.

Design and construction of the Project was completed prior to 1920. The original Grace diversion dam and the existing power facilities and other appurtenant structures were constructed shortly after 1910. The existing Grace timber crib dam was constructed in 1951 to replace the original dam located just upstream.

Exhibit F drawings from the FERC license depicting the applicable Project features considered in this study are provided in Appendix A.

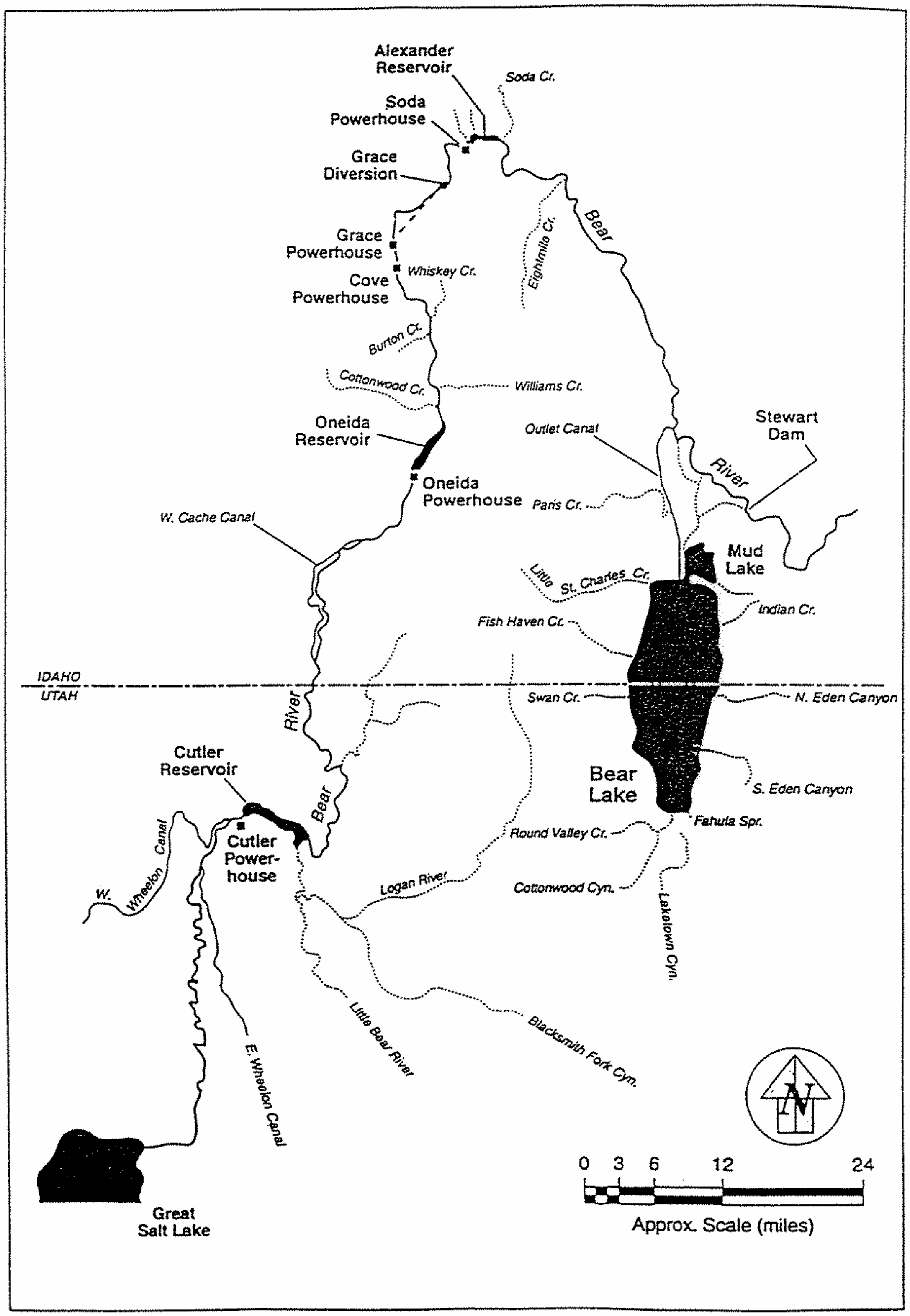


Figure 2-1
Project General Location Plan

3.0 Conceptual Designs and Alternative Descriptions

This section provides a conceptual design and general description of the following decommission, fish-friendly, and Project interconnection alternatives.

- Alternative No. 1 – Project Decommission
- Alternative No. 2 – Cove Dam Fish Ladder
- Alternative No. 3A – Cove Intake Fish Screens (Upstream of Intake)
- Alternative No. 3B – Cove Intake Fish Screens (Downstream of Intake)
- Alternative No. 4 – Grace Tailrace Barrier
- Alternative No. 5 – Cove Tailrace Barrier
- Alternative No. 6 – Grace/Cove Interconnection Canal

The conceptual designs presented in the following articles provide order of magnitude level information to assist PacifiCorp and the ECC in their decision making process with regard to modifications to the development that may advance conservation goals for native fish. If alternatives are selected for further consideration, additional studies should be conducted to optimize the alternative arrangement, finalize design criteria, and refine the estimated construction cost. For example, other Cove intake fish screen arrangements and configurations may offer technical and cost advantages.

3.1 Alternative No. 1 – Project Decommission

3.1.1 Project Decommission Description

Alternative No. 1 includes removing all the major structures associated with the Cove development, except the powerhouse and intake structure. This is considered a "fish friendly" alternative because it would return the Bear River between the Cove Tailrace and the Cove Forebay to a free flowing natural state. This option eliminates the need for a fish ladder at Cove Dam, fish screens at the Cove Intake, and a barrier at the Cove Tailrace. A barrier at the Grace tailrace may still be necessary to prevent delay of fish movement. The major components of this option include the following.

- Demolition and removal of the 141-foot long concrete portion of the dam.
- Removal of the embankment section of the dam on the right abutment.
- Grade and seed the accumulated silt in the Cove Forebay area.
- Demolition of the concrete intake superstructure building, intake trashracks, and stoplogs.
- Installation of the reinforced concrete bulkhead walls across the five intake openings.
- Demolition of the tainter gate superstructure building.

- Demolition of the 425 feet of concrete flume and 5,700 feet of wood flume, except foundations.
- Demolition of the concrete pressure box, superstructure building, tainter gate, and bar screens.
- Plugging of both ends of the buried penstock with concrete and grading as necessary.
- Plugging of the draft tube with concrete.
- Stabilization of the rock berm levee for tailwater level control at the Grace development.

The major demolition and restoration areas are shown on Figure 3-1. The major structures that would be left are the powerhouse and intake substructure.

The major advantage of this alternative is the reconnection of over 1.5 miles of the Bear River from the Cove Tailrace through the Cove Forebay. However, at the upstream end of the forebay and just upstream of the Grace Tailrace channel, there would still exist a fish passage barrier at the Gentile Valley Diversion, which redirects water into an irrigation canal, that would prevent upstream migrants from continuing upstream.

The major disadvantage of this alternative is the lost generation from the Cove Powerhouse. Cove has a single turbine-generator unit rated at 7.5 MW, that is estimated to provide approximately 28,000 Mwh/yr.

3.2 Alternative No. 2 – Cove Dam Fish Ladder

3.2.1 General

A ladder to facilitate upstream fish passage at the Cove Dam is a “fish-friendly” alternative under consideration for the future operation of the Cove development. The existing dam has a fish ladder located on its right abutment. This ladder is currently inoperable because a major portion of the ladder has been demolished and removed. It is not known when the existing ladder was taken out of service, or whether or not it was effective in the passage of fish. However, based on observation of the existing fish ladder remnants, it probably would not have met current ladder design criteria and, most likely, would not have been effective in the passage of fish.

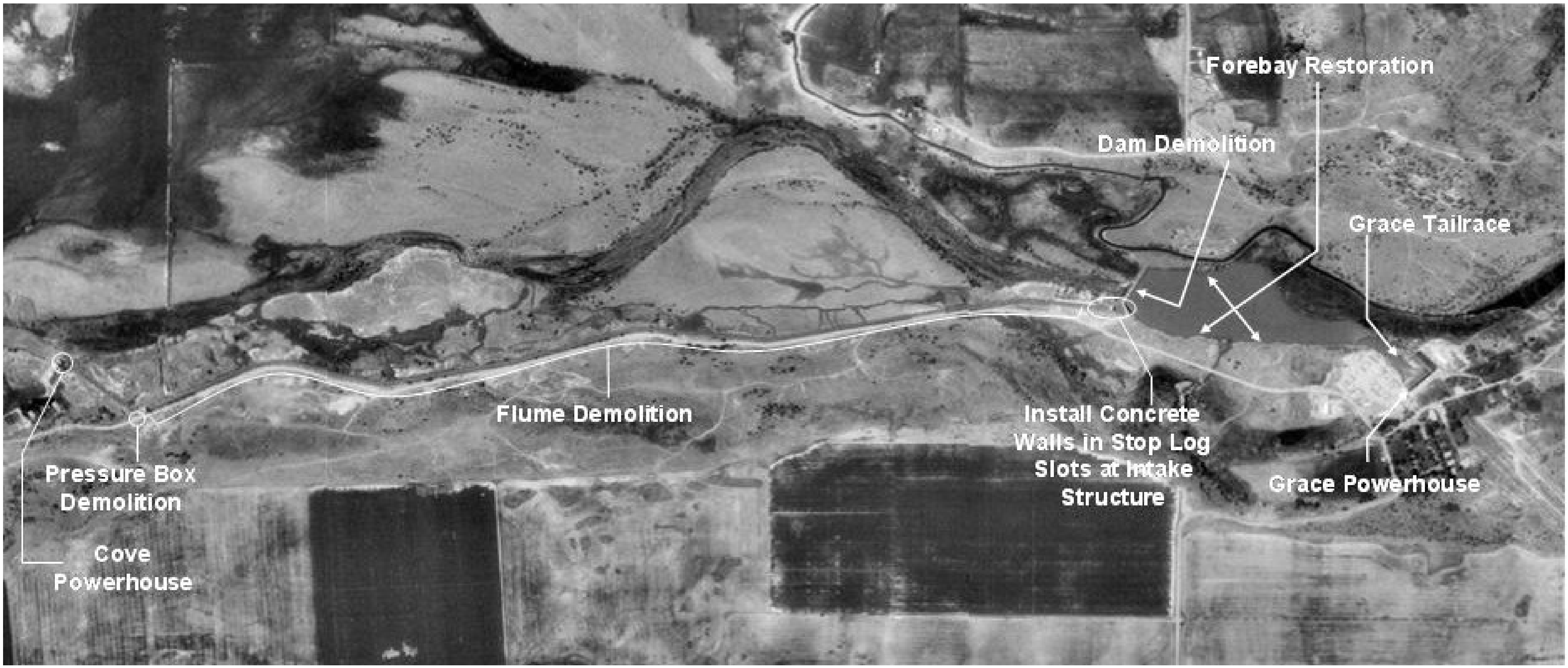


Figure 3-1
Alternative No. 1 - Project Decommission Plan

3.2.2 Ladder Conceptual Design

3.2.2.1 Location. A new fish ladder at the Cove Dam could be located on either abutment. A ladder on the left abutment would have difficult construction access. Thus, its cost would probably be somewhat higher than the cost of a ladder on the right abutment. Also, its exit location would be immediately adjacent to the Cove Intake, which would tend to attract upstream migrates into the intake versus going upstream. Therefore, a ladder on the right abutment at the location of the existing fish ladder would be preferred because of its easy construction access and exit location away from the Cove Intake.

3.2.2.2 Design Considerations. Key conceptual design considerations for the fish ladder would include the following:

- Flows. Licensed instream flows at the Cove Diversion Dam are 10 cfs from October 1 through March 31 and 35 cfs during April 1 through September 30. Therefore, for the conceptual ladder design, it was assumed that the ladder would be designed to provide these instream flows.
- Height. The height the ladder would need to transcend would be from the dam's tailwater to the headwater in the Cove Forebay. The dam's tailwater level for nominal flow conditions would be at EL 5004, the spillway discharge slab's invert elevation. The normal headwater level with flashboards in place would be at EL 5030, which would result in a ladder height requirement of 26 feet. However, the project could be operated without the flashboards, which would result in a headwater level at the existing spillway crest of EL 5025 and a ladder height requirement of 21 feet. Thus, the ladder would need to accommodate the two operating water levels of the Cove Forebay.
- Type. PacifiCorp has a fish ladder on Big St. Charles Creek, which is working well and effectively passing fish species similar to those found at Cove. This existing ladder is of the vertical slot type. Because of its successful results, the conceptual fish ladder at Cove Dam was tailored after the Big St. Charles Creek ladder.
- Hydraulic head. Fish ladders with 1-foot steps are normally used. However, for the fish species found at Cove, ladder steps of 0.75 to 0.5 feet are more typical. The step height relates directly to the hydraulic head and the velocity of the water at each step that the swimming fish would need to overcome. For this conceptual design, steps at 0.75 feet were used, which would also be similar to the existing fish ladder at Big St. Charles Creek that is producing successful results. This would also agree with ladder design criteria for trout species that are being established for the re-licensing of PacifiCorp's Prospect Hydroelectric Project in south-central Oregon.

3.2.2.3 Arrangement and Design. The conceptual fish ladder arrangement is shown on Figures 3-2 through 3-4.

The base ladder flow would be 10 cfs to provide the instream flow during the October through March period. For this flow, a 9-inch vertical slot would be used, which would result in an upstream pool water depth of approximately 2.67 feet and a velocity through the slot of approximately 5 fps. Normally, a 6-inch sill is placed at the bottom of the slot to improve the pool hydraulics, which would result in a total water depth of approximately 3.25 feet in each pool. The resulting pool volume would be more than sufficient for fish capacity (i.e. accommodate large runs of fish) and energy dissipation, based on a maximum energy dissipation of 4 foot-pounds of energy per second per cubic foot of volume. A typical ladder pool is shown on Figure 3-4.

With this base ladder flow configuration (i.e. 9-inch slot width), the larger 35 cfs requirement during the April through September period would result in a total pool water depth of 9 feet. This large difference in pool water depth would substantially increase the cost of the ladder. Therefore, it was assumed that the 35 cfs would be provided with the base ladder flow of 10 cfs, and 25 cfs would be provided by an auxiliary water supply (AWS) system and used for attraction flow at the entrance of the ladder. The AWS system would be designed to provide the full 35 cfs during periods when the fish ladder is out of service for maintenance. The AWS system would include a trashrack with 1/2-inch clear bar spacing and an approach velocity less than 0.8 fps, a 24-inch diameter pipe with an inlet gate for flow control, and an overflow weir discharge structure located at the ladder entrance.

The entrance to the fish ladder would be located at the downstream end of the existing right spillway abutment wall. This entrance location would be outside of the discharge profile of the spillway and would eliminate possible damage to the ladder from spillway flood discharges. An open, riprap lined, channel would extend from the ladder entrance to the main channel of the Bear River. The existing downstream right spillway training wall, that lies just upstream of channel, would protect the channel from spillway discharges. This existing training wall is in poor condition and would need to be repaired to adequately protect the fish ladder entrance channel from spillway discharges.

The conceptual fish ladder arrangement would include a trashrack at the ladder exit to keep debris from entering the ladder and AWS system. This trashrack would be automatically cleaned with a trashraking machine.

Manually operated slide gates would be provided to control the flow to the ladder, including an interior ladder gate that would divert flow to a lower portion of the ladder during low forebay level periods. The AWS system inlet slide gate would be motor operated with automatic control to assure that downstream instream flow requirements are met.

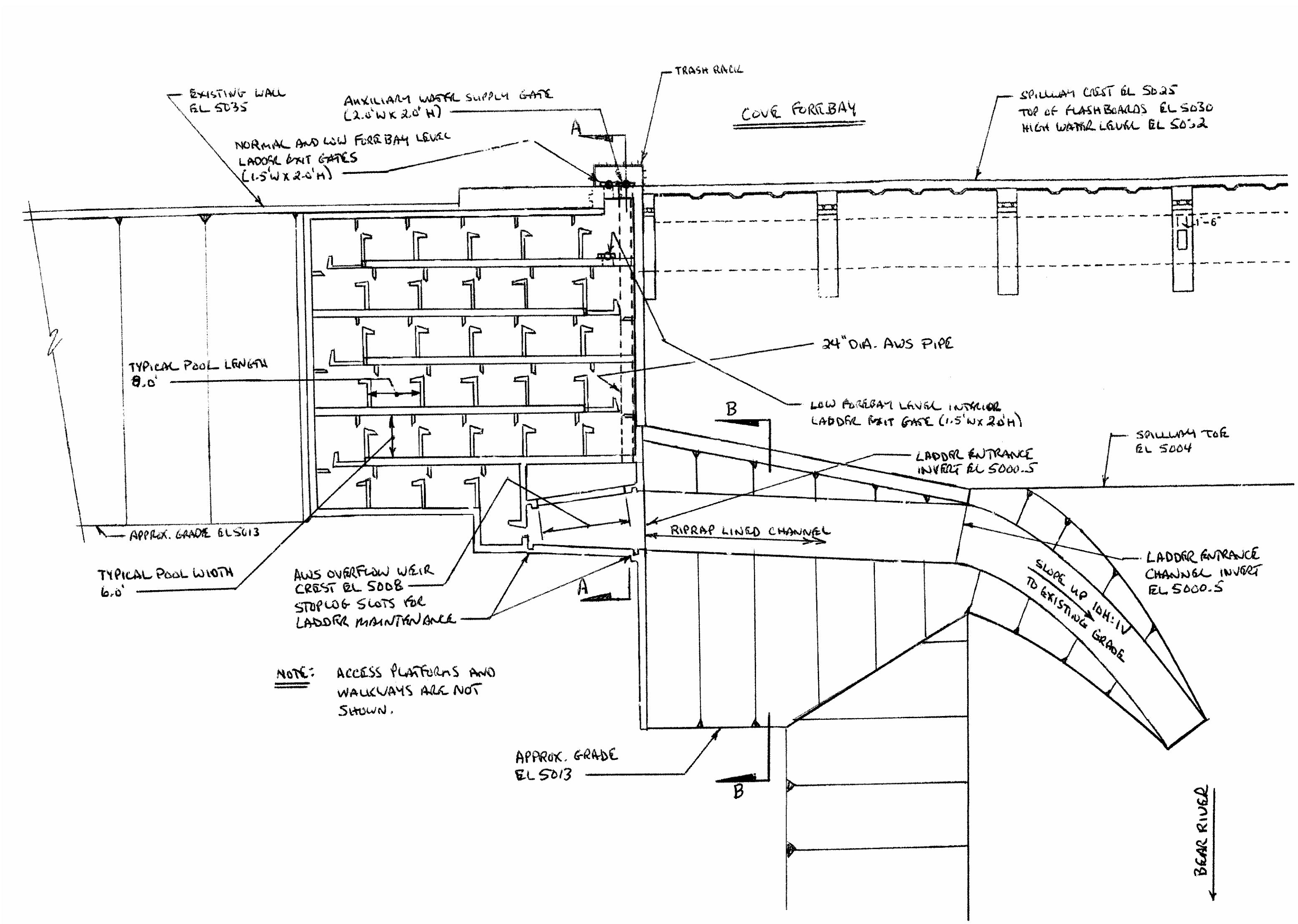


Figure 3-2
Alternative No. 2 – Cove Dam Fish Ladder Plan

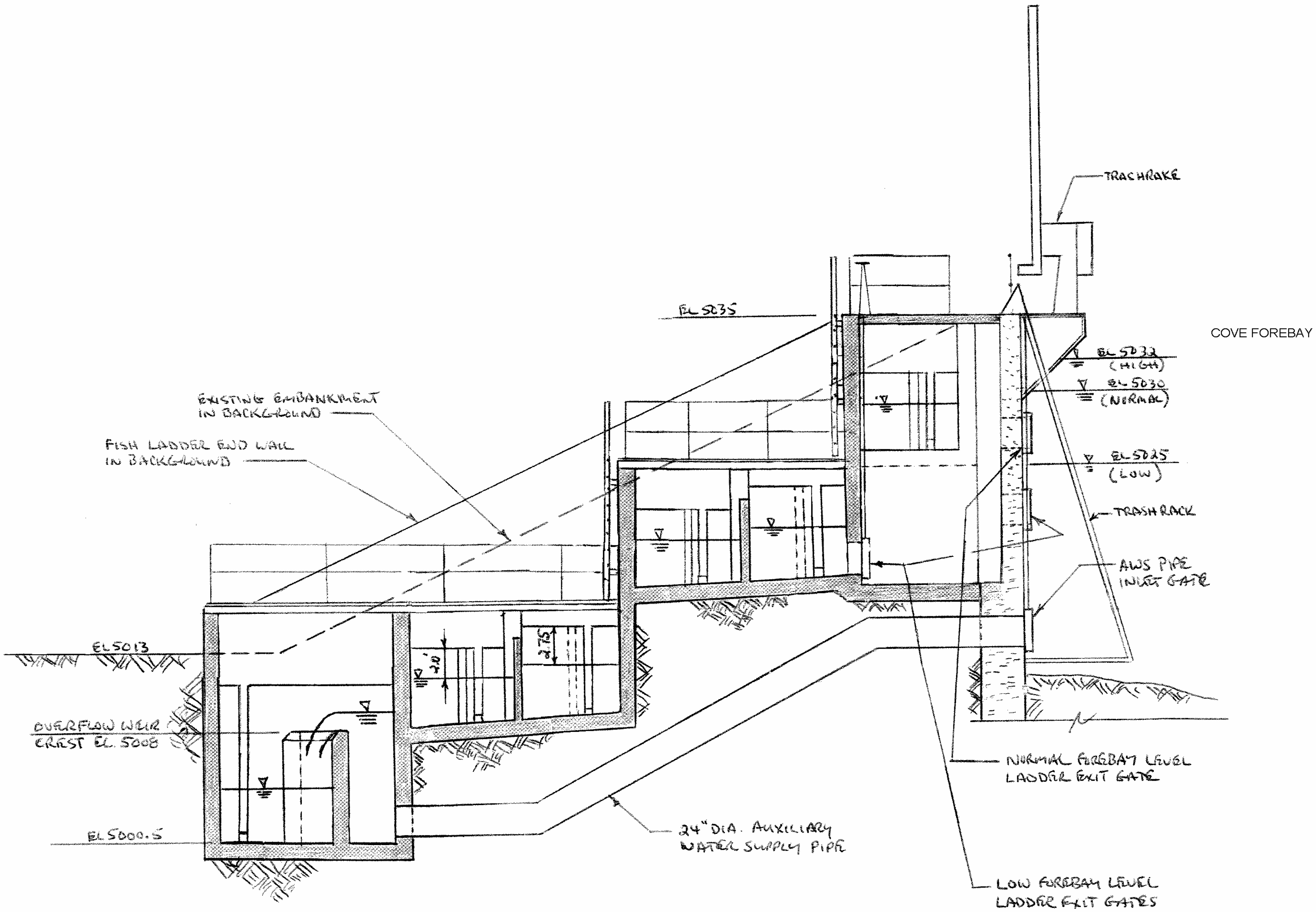
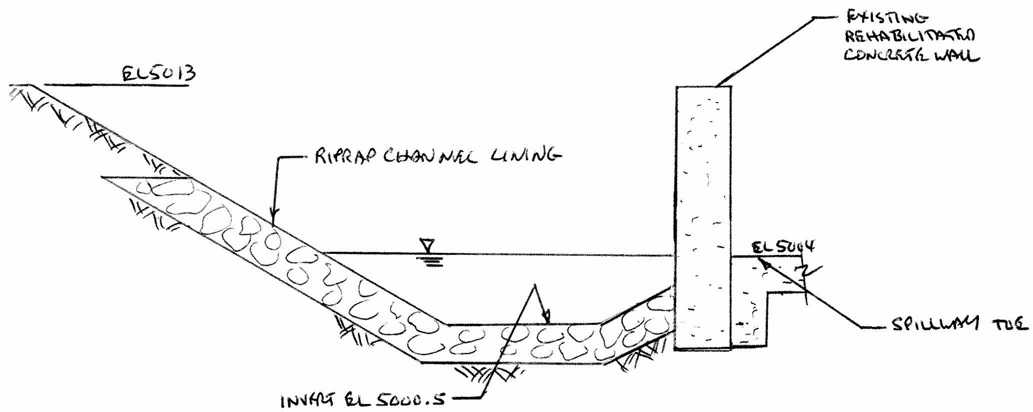
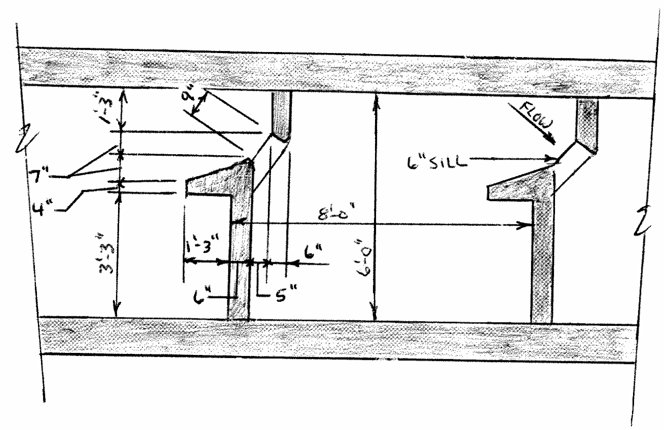


Figure 3-3
Alternative No. 2 – Cove Dam Fish Ladder Section A-A



Section B-B
(No Scale)



Typical Ladder Pool Detail
(No Scale)

Figure 3-4
Alternative No. 2 – Cove Dam Fish Ladder Section B-B and Typical Ladder Pool Detail

Access platforms and walkways would also be provided for operation and maintenance of the fish ladder.

Construction of the fish ladder would not result in any lost generation at the Grace and Cove Powerhouses.

3.3 Alternative No. 3A - Cove Intake Fish Screens (Upstream of Intake)

3.3.1 Fish Screen Conceptual Design

3.3.1.1 Location. This alternative locates the fish screen facility upstream of the existing Cove Intake in the Cove Forebay. Advantages of this location are that the fish screen can be designed within acceptable approach velocities and that a fish bypass system is not required. However, major disadvantages are that it will require a cofferdam to facilitate its construction, which would increase the cost of this alternative, and an outage of the Cove Powerhouse, which would result in approximately 4 months of lost generation.

3.3.1.2 Design Considerations. Key conceptual design considerations for fish screens located upstream of the Cove Intake would include the following:

- Flows. Hydraulic capacity of the Cove development is 1,227 cfs. Based on the Project's flow duration curve, this flow is exceeded only 15 percent of the time. The hydraulic capacity of the Grace development is 960 cfs, which is exceeded approximately 30 percent of the time. The project's 50 percent flow exceedance is approximately 650 cfs. For study purposes, the Cove development hydraulic capacity of 1,227 cfs was used in sizing the screen area.
- Approach Velocity. An approach velocity of 0.8 fps was used in sizing the screen area for this alternative. If this alternative is considered for implementation, the actual size of fish to be protected from impingement on the screen should be determined or recommended by the ECC to either confirm that the 0.8 fps approach velocity is appropriate or to establish a different value. The size of fish has a relationship to its cruising/sustained swimming speed which could be used to justify the approach velocity criteria. An approach velocity of 0.8 fps to avoid impingement of fingerling trout is accepted by the Idaho Department of Fish and Game (IDFG).
- Type. Fish screens would be stainless steel, wedge-wire bars welded to a structural backing with a 0.25-inch wide opening between bars and a minimum clear opening area through the screen of 40 percent. These screen criteria are accepted by the IDFG for fingerling trout. Because of their proximity in Cove Forebay, the screens would be considered exclusionary (i.e. no fish bypass system required).

- Cleaning. Fish screens would be automatically cleaned with a trashraking machine. The rake head of the machine would be suitable for raking the stainless steel, wedge-wire bars of the fish screen. A conveyor system would also be provided to transport the raked trash to the end of the fish screen facility for disposal. The trashraking machine operation would be local control, timed, or based on differential head across the fish screens. In addition, winter conditions may also result in ice clogging the fish screens. If the automatic cleaning activity cannot mitigate the potential icing situation to maintain flow to the Cove Powerhouse, then removal of the fish screens during these times of the year may be required.

3.3.1.3 Arrangement and Design. The conceptual fish screen arrangement upstream of the Cove Intake is shown on Figures 3-5 and 3-6.

This conceptual fish screen arrangement would require a cofferdam to facilitate its installation and construction. It was assumed that the flashboards at Cove Dam would be removed to lower the Cove Forebay water level to minimize the height of the cofferdam and, therefore, its cost. The cofferdam would be constructed in the wet with clean granular material, and a synthetic liner would be placed on its upstream slope to provide the seepage barrier. The material for the cofferdam would be obtained from offsite sources.

The conceptual fish screen facility would consist of inclined fish screen panels in a straight alignment across the front of the existing intake. This alignment would direct trash and floating debris coming down the Bear River to the dam and accommodate an automatic trashraking machine to clean the fish screens.

A deflector beam would extend upstream of the fish screens to protect them from large trash and floating debris. The deflector beam would be supported by a concrete frame at each pier. A hoist/trolley/monorail system and access platforms would also be provided to facilitate fish screen removal and maintenance.

Other screen arrangements, such as a V-type, could also be considered, which would shorten the length of the facility and possibly reduce its overall cost; however, they would not accommodate an automatic trashraking machine. For these types of arrangements, an air or water back-flushing system could be added to facilitate automatic cleaning of the fish screens

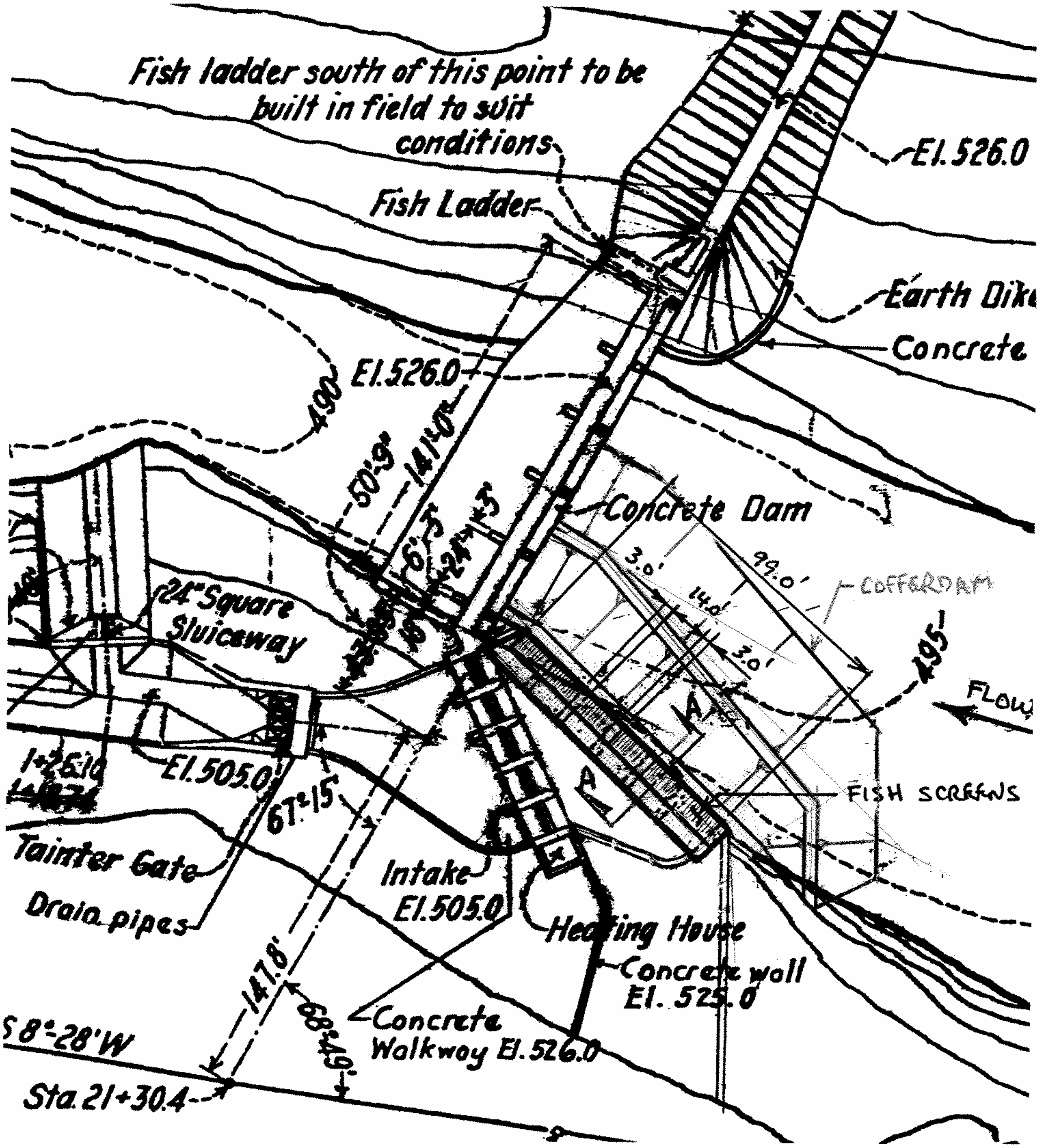


Figure 3-5
Alternative No. 3A – Cove Intake Fish Screen (Upstream of Intake) Plan

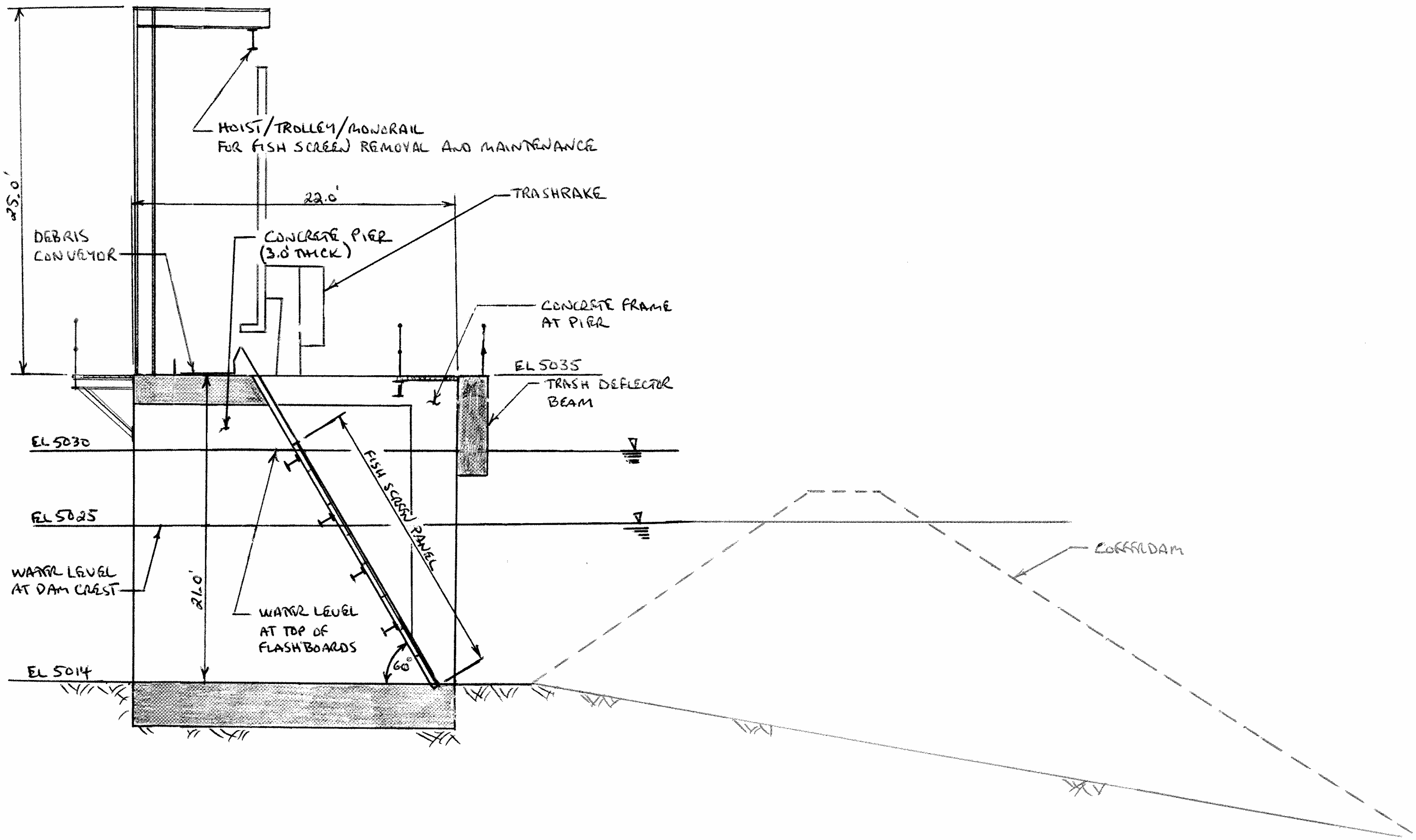


Figure 3-6
Alternative No. 3A – Cove Intake Fish Screen (Upstream of Intake) Section A-A

3.3 Alternative No. 3B - Cove Intake Fish Screens (Downstream of Intake)

3.3.1 Fish Screen Conceptual Design

3.3.1.1 Location. This alternative locates the fish screen facility immediately downstream of the existing Cove Intake and upstream of the existing Cove Flume headgate. Advantages of this location are that the fish screens can be designed within acceptable approach velocities and that a cofferdam is not required because the stoplogs in the Cove Intake can be used to provide the means to dewater the area for its construction. However, major disadvantages are that it will require a fish bypass system to return fish back to the Bear River, because they have entered the Cove development conveyance system, and an outage of the Cove Powerhouse, which would result in approximately three months of lost generation.

The fish screen facility could be located further downstream within the Cove conveyance system; however, this location would not offer any significant technical or economic advantages over the proposed location.

3.3.1.2 Design Considerations. Key conceptual design considerations for fish screens located downstream of the Cove Intake would include the following:

- <u>Flows.</u> Hydraulic flows for this alternative would be the same as those outlined for Alternative No. 3A.
- <u>Approach Velocity.</u> Approach velocities for this alternative would be the same as those outlined for Alternative No. 3A.
- <u>Type.</u> Fish screens would be the same as those described for Alternative 3A. However, because of their proximity in the Afterbay downstream of the Cove Intake, the screen facility would require a fish bypass system to return fish back to the Bear River.
- <u>Cleaning.</u> Screen cleaning requirements would be the same as those outlined for Alternative No. 3A.

3.3.1.3 Arrangement and Design. The conceptual fish screen arrangement downstream of the Cove Intake is shown on Figures 3-7 and 3-8.

This conceptual fish screen facility would be similar to that described for Alternative No. 3A. The Alternative No. 3B arrangement would consist of inclined fish screen panels in a straight alignment across the Afterbay of the Cove Intake. This alignment would accommodate an automatic trashraking machine. Because the existing Cove Intake would lie upstream of the facility, which contains stoplogs and trashracks, a cofferdam and a trash deflector beam would not be required to implement the facility construction in the dry and protect the fish screens from large trash or floating debris.

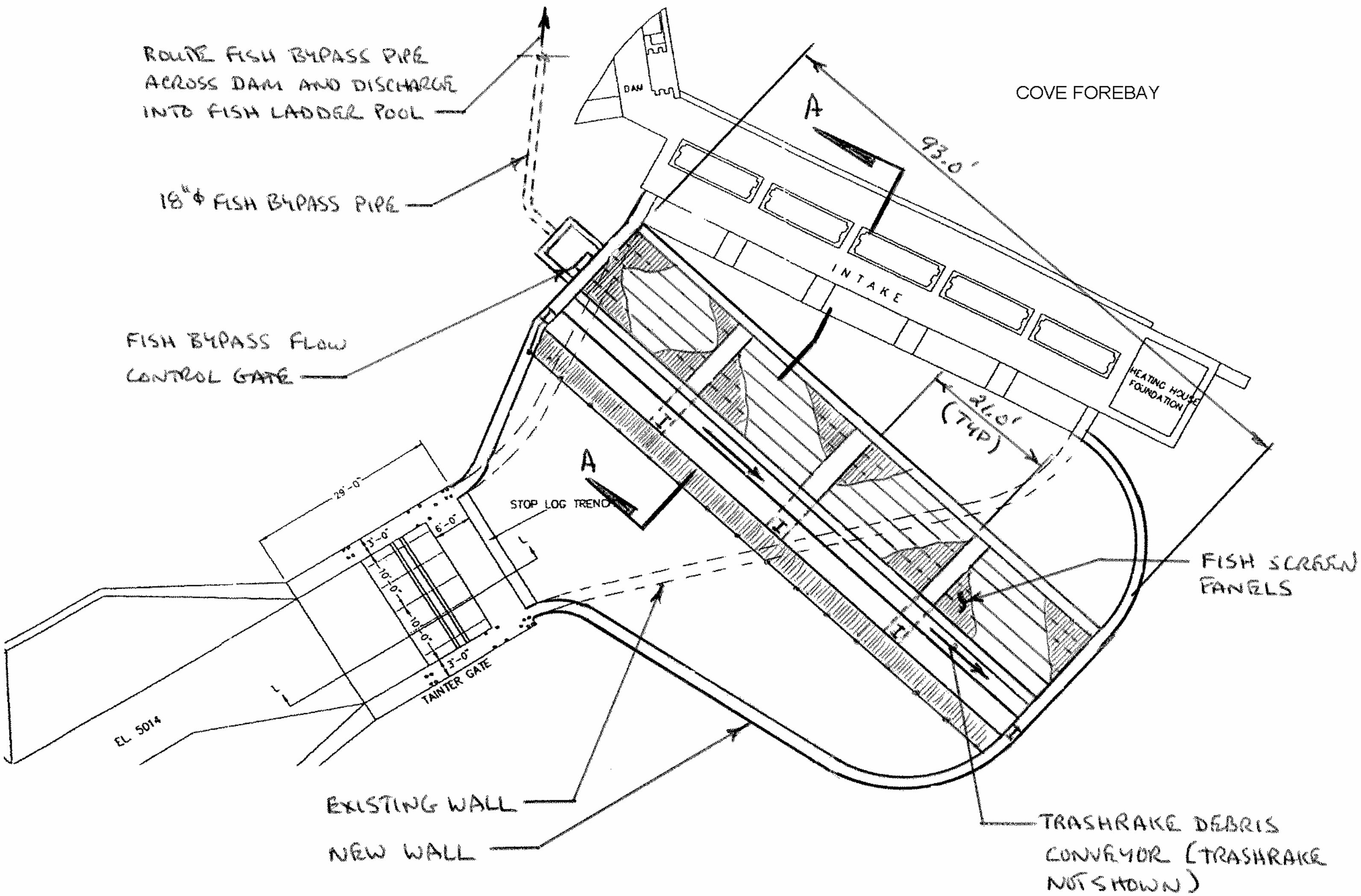


Figure 3-7
Alternative No. 3B – Cove Intake Fish Screen (Downstream of Intake) Plan

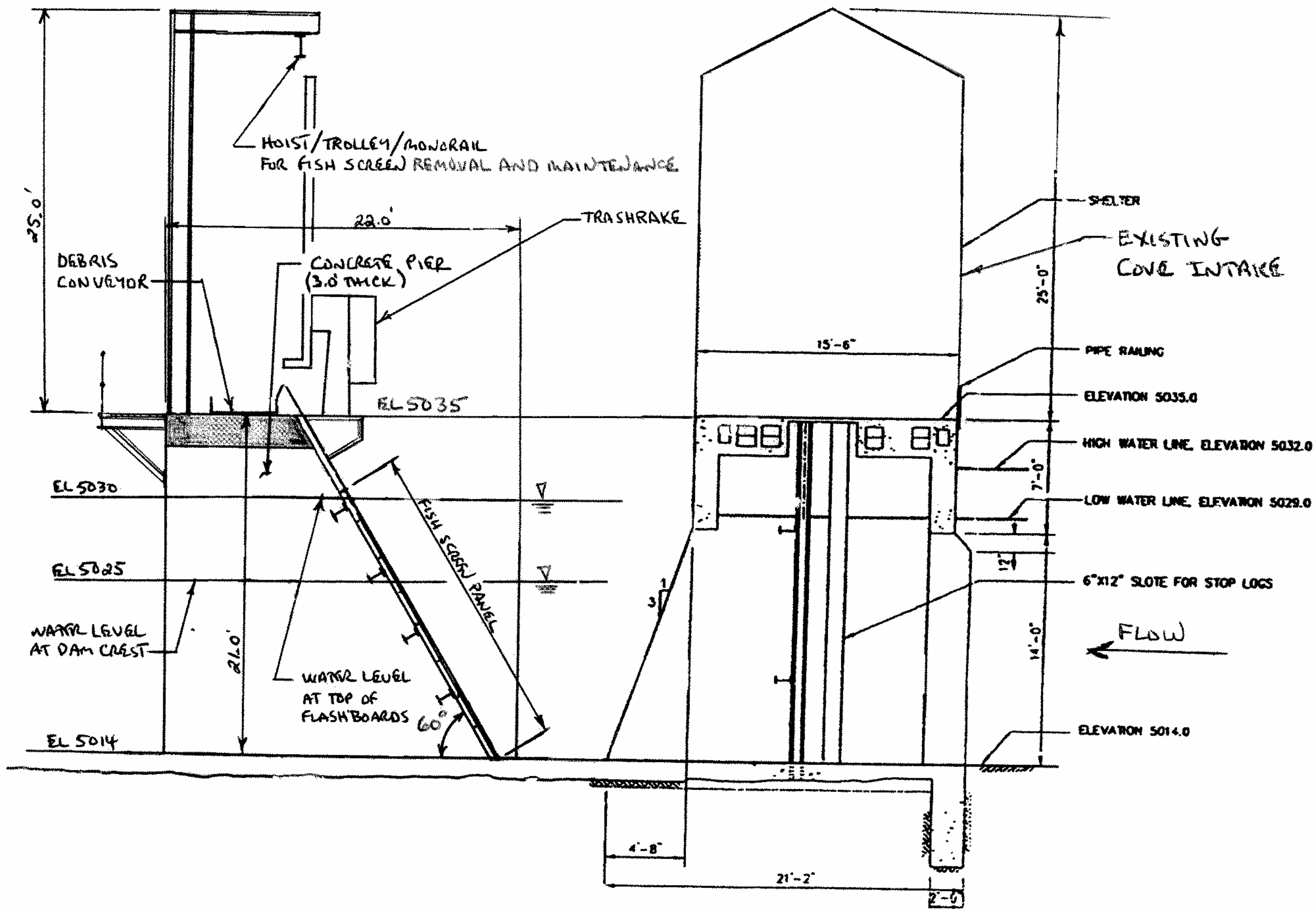


Figure 3-8
Alternative No. 3B – Cove Intake Fish Screen (Downstream of Intake) Section A-A

Other screen arrangements, such as a V-type, could also be considered, which would shorten the length of the facility and possibly reduce its overall cost; however they would not accommodate an automatic trashraking machine. For these types of arrangements, an air or water back-flushing system could be added to facilitate automatic cleaning of the fish screens.

Fish that enter the screen area would be returned to the Bear River through a fish bypass system. The fish bypass system would consist of a flow control gate and a fish bypass pipe. The bypass pipe would be designed for a minimum flow depth of 40 percent of the pipe diameter and velocities between 6 to 12 fps for the entire operational range of the system. In no instance, the pipe velocity will be less than 2 fps. Because of the significant drop from the screen level to the Bear River downstream of Cove Dam, it was assumed that the fish bypass pipe would extend from the fish screen area across the existing dam and discharge into one of the upper pools of the proposed fish ladder located on the right abutment of the dam. Otherwise, the fish bypass pipe would have to travel a significant distance downstream before it could discharge to the river.

3.4 Alternative No. 4 – Grace Tailrace Barrier

3.4.1 General

Exclusion barriers are designed to minimize the attraction and prevent the movement of upstream migrating fish into an area where there is no upstream egress or suitable spawning area, such as powerhouse tailraces, and to guide fish to an area where upstream migration can continue. Primary types of exclusionary barriers are picket barriers, velocity barriers, and vertical drop structures. Other types of barriers, such as electric and acoustic fields, have limited application because of inconsistent results most often attributed to varying water quality. For purposes of this study, picket barriers were assumed for the conceptual design. Velocity barriers and drop structures would require raising the tailwater level, which would reduce the net head on the units for power generation.

3.4.2 Tailrace Barrier Conceptual Design

3.4.2.1 Location. This alternative locates the tailrace barrier at the confluence of the Grace Tailrace with the Bear River/Cove Forebay. This location would stop the migration of fish up the tailrace and would assist in their continued migration upstream.

3.4.2.2 Design Considerations. Key conceptual design considerations for the tailrace barrier would include the following:

- Maximum clear opening between pickets: one inch
- Minimum picket array open area: 40%
- Average design velocity through pickets: less than 1 fps
- Maximum differential head across pickets: 0.3 feet
- Minimum picket extension above water surface: 2 feet
- Cleaning of the pickets will be required to prevent trash accumulation that would violate the above criteria.

3.4.2.3 Arrangement and Design. The conceptual tailrace barrier arrangement at the Grace development is shown on Figures 3-9 and 3-10.

The tailrace barrier would consist of an inclined rack composed of bars spaced with a 1-inch clear opening. The inclined rack would facilitate cleaning of the racks with an automatic trashraking machine from the elevated platform located at EL 5035, approximately 3 feet above the high water level in Cove Forebay and 5 feet above the normal Cove Forebay level with water at the top of the existing flashboards on Cove Dam. The raked debris from the racks would be disposed immediately downstream of the structure. The tailrace barrier structure would be approximately 210 feet long to provide the required picket through velocity at the development's 960 cfs hydraulic capacity and would span across the downstream end of the existing tailrace channel.

An embankment type cofferdam, consisting of clean granular material and a synthetic liner seepage barrier, would also be required to facilitate construction of the tailrace barrier adjacent to the Bear River. Construction of the structure would result in approximately two months of lost generation at the Grace Powerhouse.

Currently, a rockfill berm exists at this location to assure a minimum tailwater level on the Grace turbines. This hydraulic restriction for plant operation would be maintained by the proposed tailrace barrier arrangement. No topographic or bathymetric drawings exist of this area. Therefore, if this alternative is selected for further consideration and optimization, a survey of the area would be required.

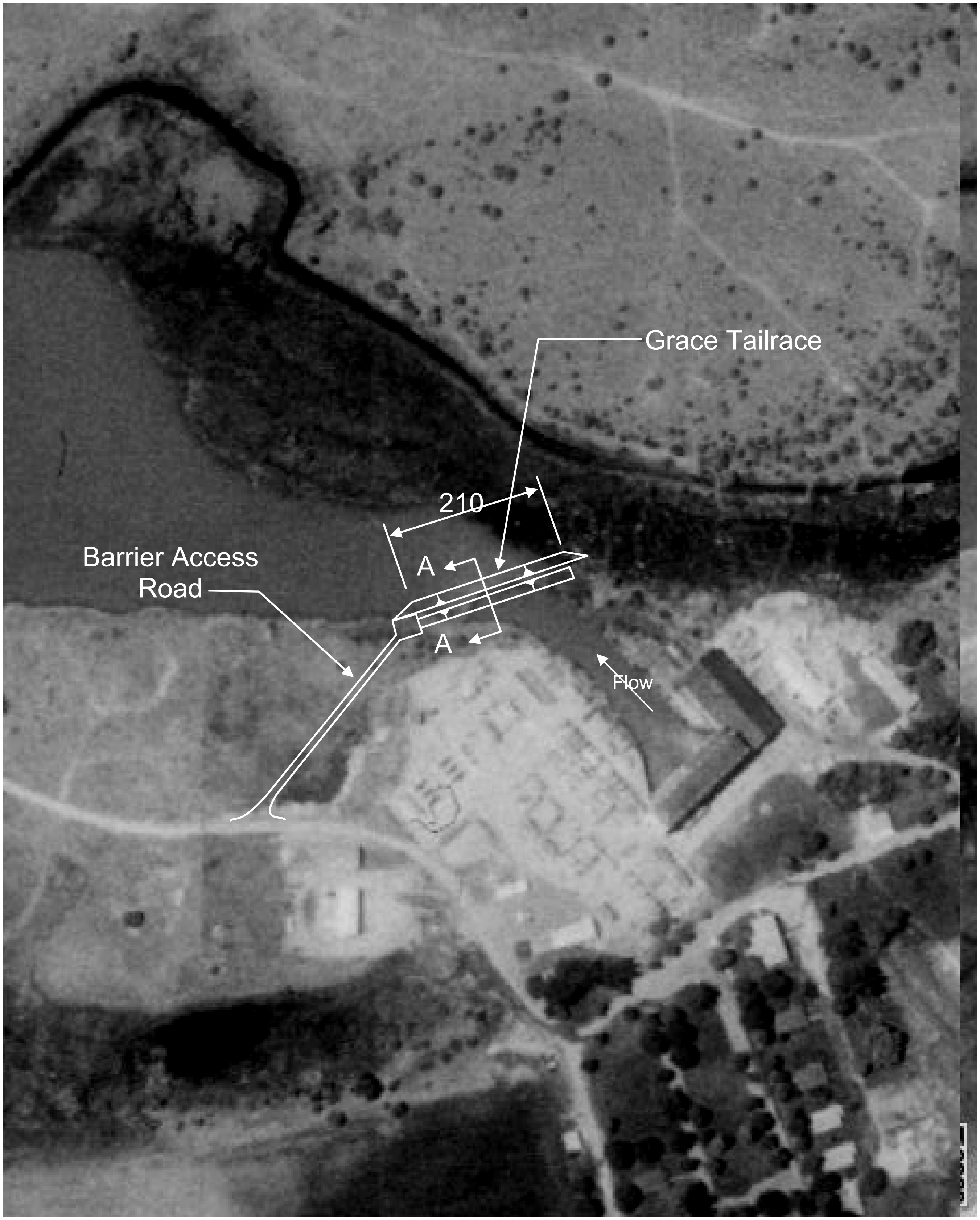


Figure 3-9
Alternative No. 4 – Grace Tailrace Barrier Plan

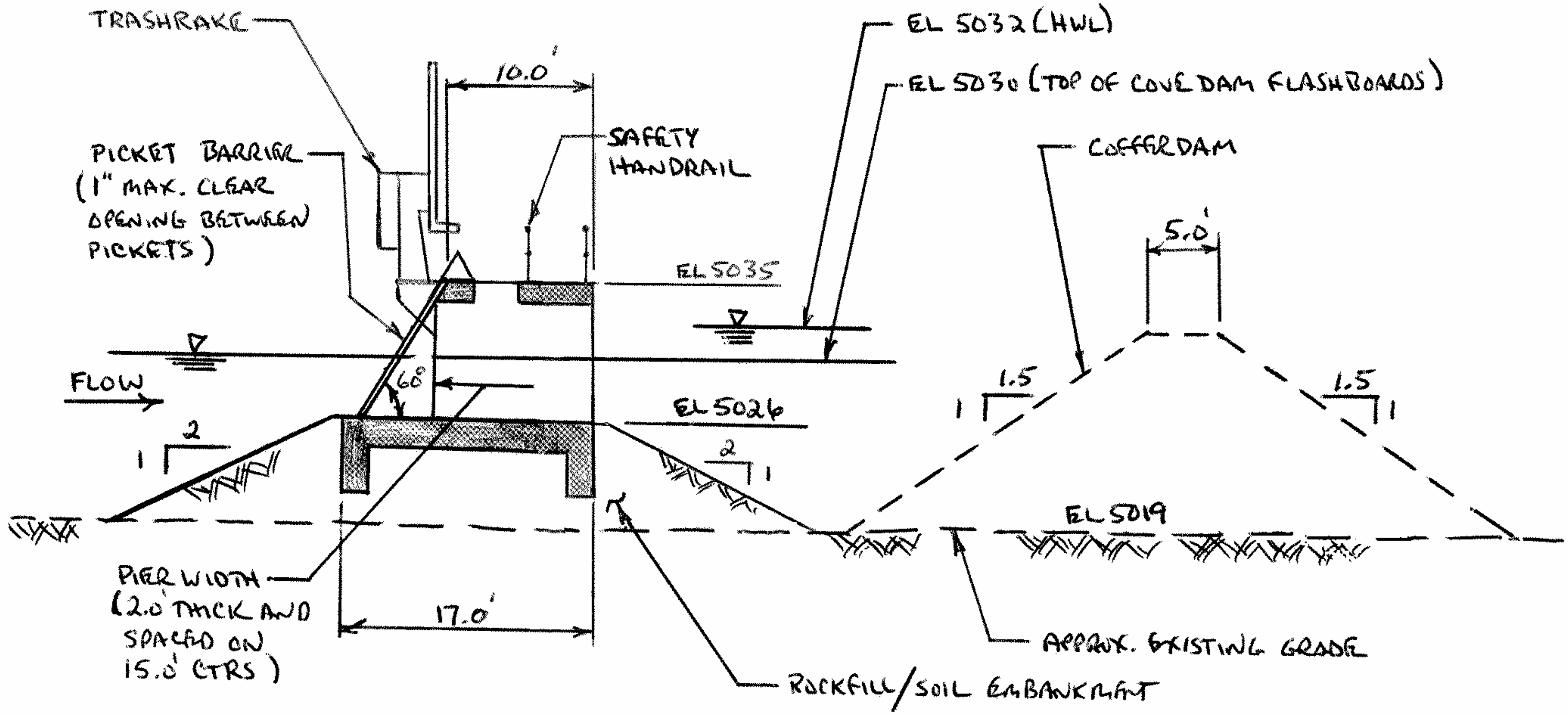


Figure 3-10
Alternative No. 4 – Grace Tailrace Barrier Section A-A

An access road would also be provided to allow operation and maintenance personnel to service the tailrace barrier structure.

3.6 Alternative No. 5 – Cove Tailrace Barrier

3.6.1 Tailrace Barrier Conceptual Design

3.6.1.1 Location. This alternative locates the tailrace barrier at the confluence of the Cove Tailrace with the Bear River. This location would stop the migration of fish up the tailrace and would assist in their continued migration upstream.

3.6.1.2 Design Considerations. Key conceptual design considerations for the tailrace barrier would be the same as those outlined for Alternative No. 4.

3.6.1.3 Arrangement and Design. The conceptual tailrace barrier arrangement at the Cove development is shown on Figures 3-11 and 3-12.

This tailrace barrier would also consist of an inclined rack composed of bars spaced with a 1-inch clear opening. The inclined rack would facilitate cleaning of the racks with an automatic trashraking machine from the elevated platform located approximately 10 feet above the invert of the structure. The raked debris from the racks would be disposed immediately downstream of the structure. Because no topographic or bathymetric drawings of this area exist, it was assumed for study purposes that the water depth at the development's hydraulic capacity of 1,227 cfs was 4 feet. This assumption results in a tailrace barrier structure length of 270 feet. If this alternative is selected for further consideration and optimization, topographic and bathymetric surveys of the area would be required.

As with the Grace Tailrace Barrier, the Cove Tailrace Barrier would also require an earthen-type cofferdam to facilitate its construction adjacent to the Bear River. Construction of the structure would result in approximately two months of lost generation.

An access road would also be provided to allow operation and maintenance personnel to service the tailrace barrier structure.

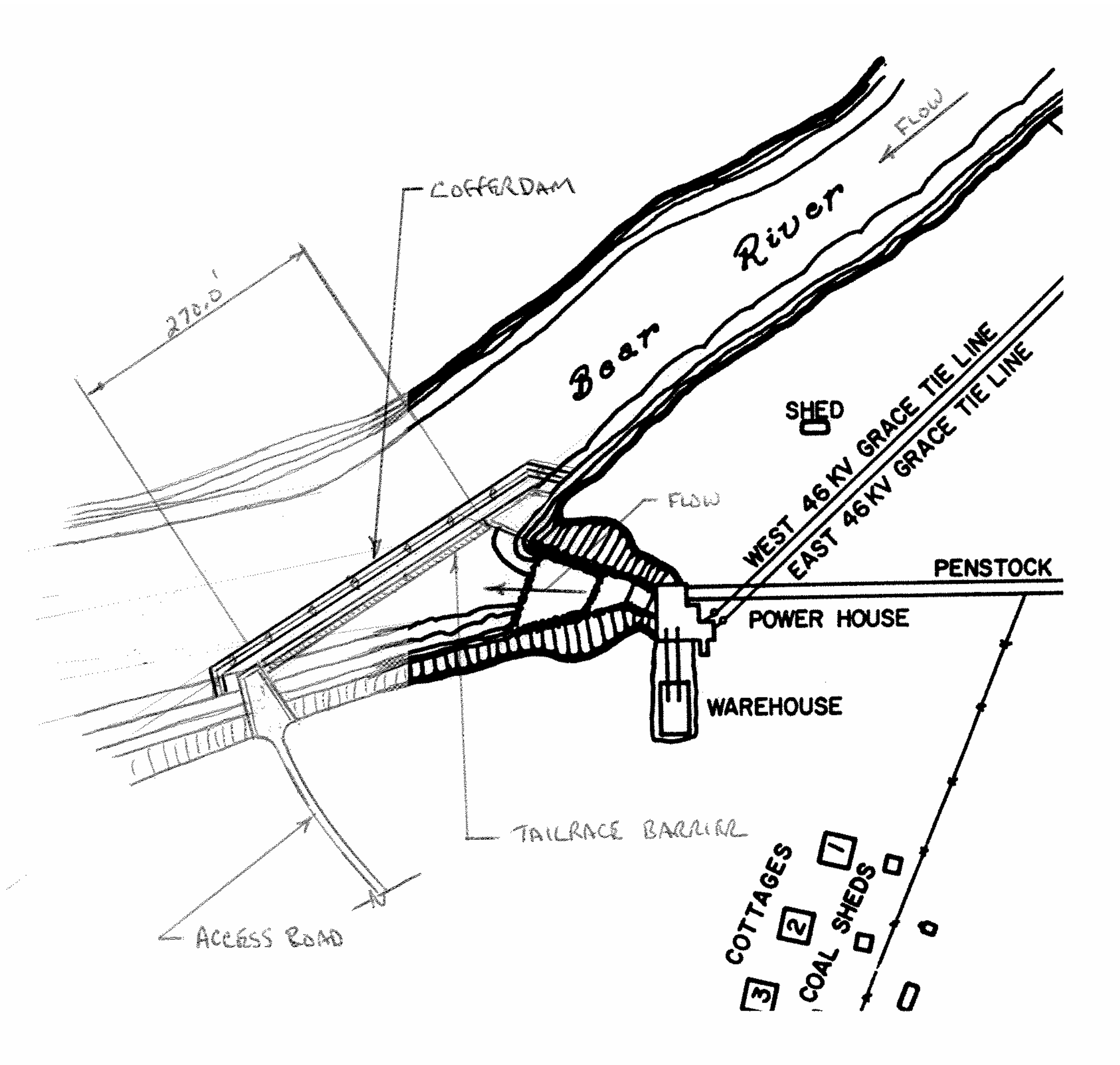


Figure 3-11
Alternative No. 5 – Cove Tailrace Barrier Plan

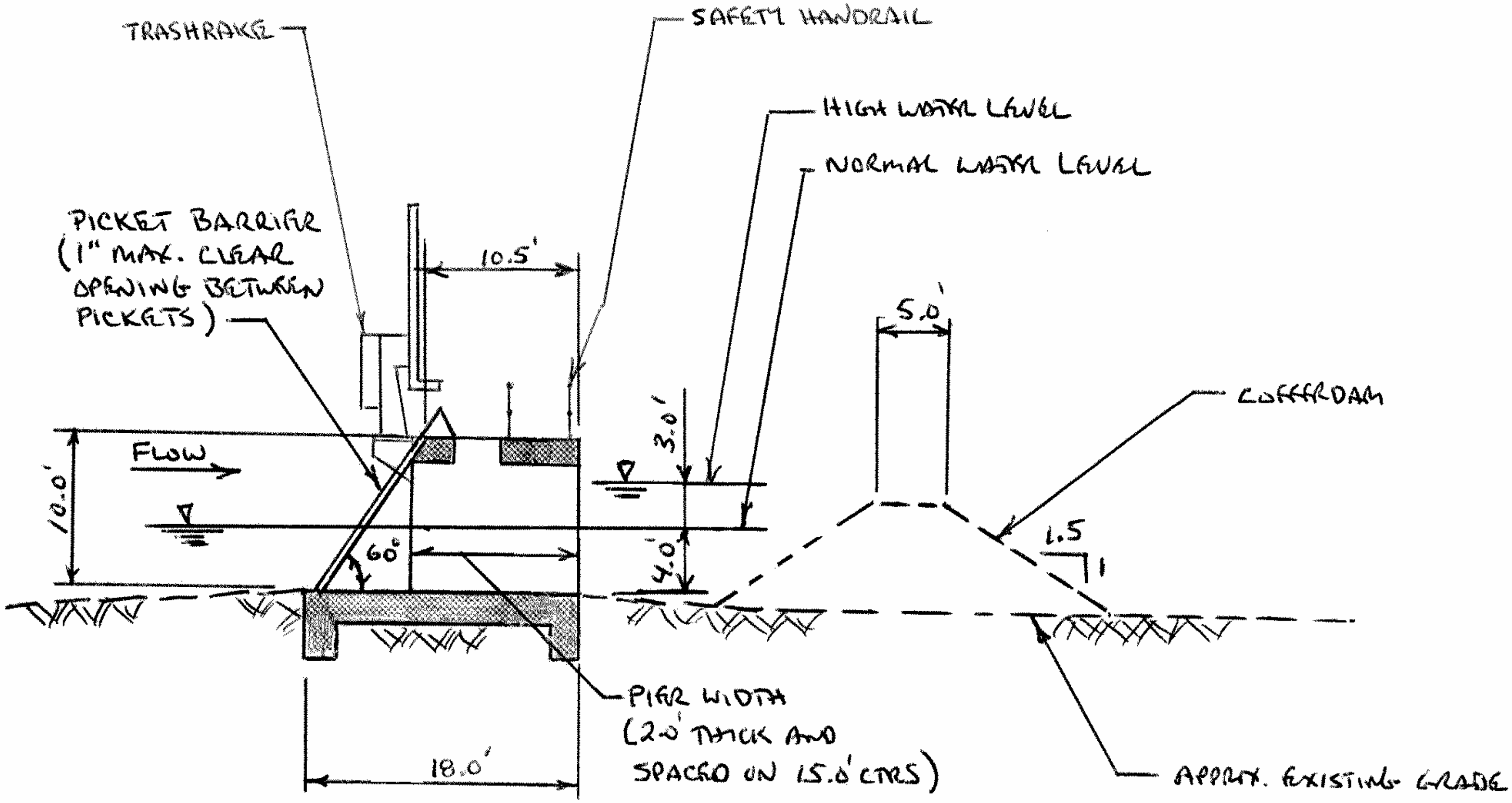


Figure 3-12
Alternative No. 5 – Cove Tailrace Barrier Section A-A

3.7 Alternative No. 6 - Grace/Cove Interconnection Canal

3.7.1 General

An interconnection canal between the Grace Tailrace and the Cove Intake would channel water directly between these two structures, avoiding the Bear River and making the Cove Dam superfluous to the system and allowing its removal. This alternative would eliminate the need for fish screens at the Cove Intake, a barrier at the Grace Tailrace, and a fish ladder at the Cove Dam. The drawback to this alternative is that the flow into the Cove development would be limited by the 960 cfs hydraulic capacity of the Grace Powerhouse. The Cove development can currently operate with a maximum flow of 1,227 cfs, so there would be lost generation potential with this alternative. Based on the Project's flow duration curve, the magnitude of this lost generation would be on the order of 3,400 Mwhr/year. In addition, when the Grace Powerhouse has an outage, there would be no flow to Cove because there is no bypass through the Grace Powerhouse.

To recapture the lost generation potential of the Cove Powerhouse, a small diversion weir would be constructed across the Bear River approximately 200 to 300 feet upstream of the confluence of the Grace Tailrace with the Bear River. This weir would divert up to 267 cfs to the Interconnection Canal for conveyance with the 960 cfs from the Grace Powerhouse to the Cove Powerhouse, which would equal its maximum hydraulic capacity. Therefore, no lost generation would occur at the Cove Powerhouse over the operating life of the project due to this alternative.

This is a fish-friendly option because it eliminates Cove Dam and provides connectivity of the Bear River through the Cove impoundment area.

3.7.2 Interconnection Canal Conceptual Design

3.7.2.1 Location. The interconnection canal would be located along the eastern edge of the current Cove Forebay as shown in Figure 3-13. The location of the diversion weir across the Bear River is also shown on the figure.

3.7.2.2 Design Considerations. Key conceptual design considerations for the interconnection canal include the following:

- Flows. Maximum flow in the canal would be 1,227 cfs, the hydraulic capacity of the Cove Powerhouse.
- Canal Type. The proposed trapezoidal canal cross section would have a 15-foot wide base and 15-foot high sides with 1.5:1 slopes. The canal would be lined with concrete to minimize leakage. Water depth would be about 11 feet at the 1,227 cfs design flow. A

canal of this configuration would have nominal headloss for water conveyance over its approximately 1,600-foot length.

- Diversion Weir Fishway and Intake Fish Screens. The diversion weir across the Bear River would include a fish ladder to allow passage of upstream migrants past the weir and fish screens on the intake structure to avoid impingement of fingerling trout. The design consideration for the ladder and fish screens would be similar to those described for Alternatives 2, 3A, and 3B.
- Constructability. Since the Cove Dam would become obsolete and removed in this alternative, it was assumed that the dam breach would occur before beginning construction of the canal to allow work to be done in the dry with only a small earthen cofferdam required along the canal alignment to prevent normal river flows from entering the canal construction area.

3.7.2.3 Arrangement and Design. The conceptual interconnection canal arrangement is shown on Figure 3-13. A typical canal section is shown on Figure 3-14. The canal invert was assumed to be at EL 5019 to match the invert elevation of the Grace Tailrace. The crest of the berm was set at EL 5034 to match the crest of the Cove Intake walls at the point of connection. Water depth would be about 11 feet at maximum flow, leaving 4 feet of freeboard. The gradient of the canal would be very small.

The canal would be lined with concrete to reduce leakage. Head losses were calculated to be about 3 inches for this configuration and the maximum design flow. Riprap armoring of the lower portion of the outer side of the embankment was added to protect the berm during periods of flooding in the Bear River.

In order to divert water coming out of the Grace Tailrace to the Bear River when the Cove Powerhouse has an outage, a broad-crested weir spillway would be installed along the western side of the canal as shown on Figures 3-13 and 3-15. The conceptual spillway would consist of a 200-foot long concrete weir with a crest at EL 5030, which is the same elevation as the top of the existing flashboards at Cove Dam. Water depth over the weir would be approximately 1.75 feet at the maximum flow of 1,227 cfs. A 20-foot wide by 3-foot deep concrete stilling basin would be included to prevent erosion of the river channel.

A plan of the diversion weir across the Bear River upstream of the Grace Tailrace to recapture up to 267 cfs for power generation at the Cove Powerhouse is shown on Figure 3-16. Sections of the diversion facility are shown on Figures 3-17 and 3-18.

The diversion weir facility would consist of a 4-foot high weir, fish ladder, intake structure, and a flow conveyance channel to the Interconnection Canal. The facility would be designed to allow passage of the respective licensed 10 cfs and 35 cfs instream flows, while diverting the remaining flows above the instream flows to the project for power generation.

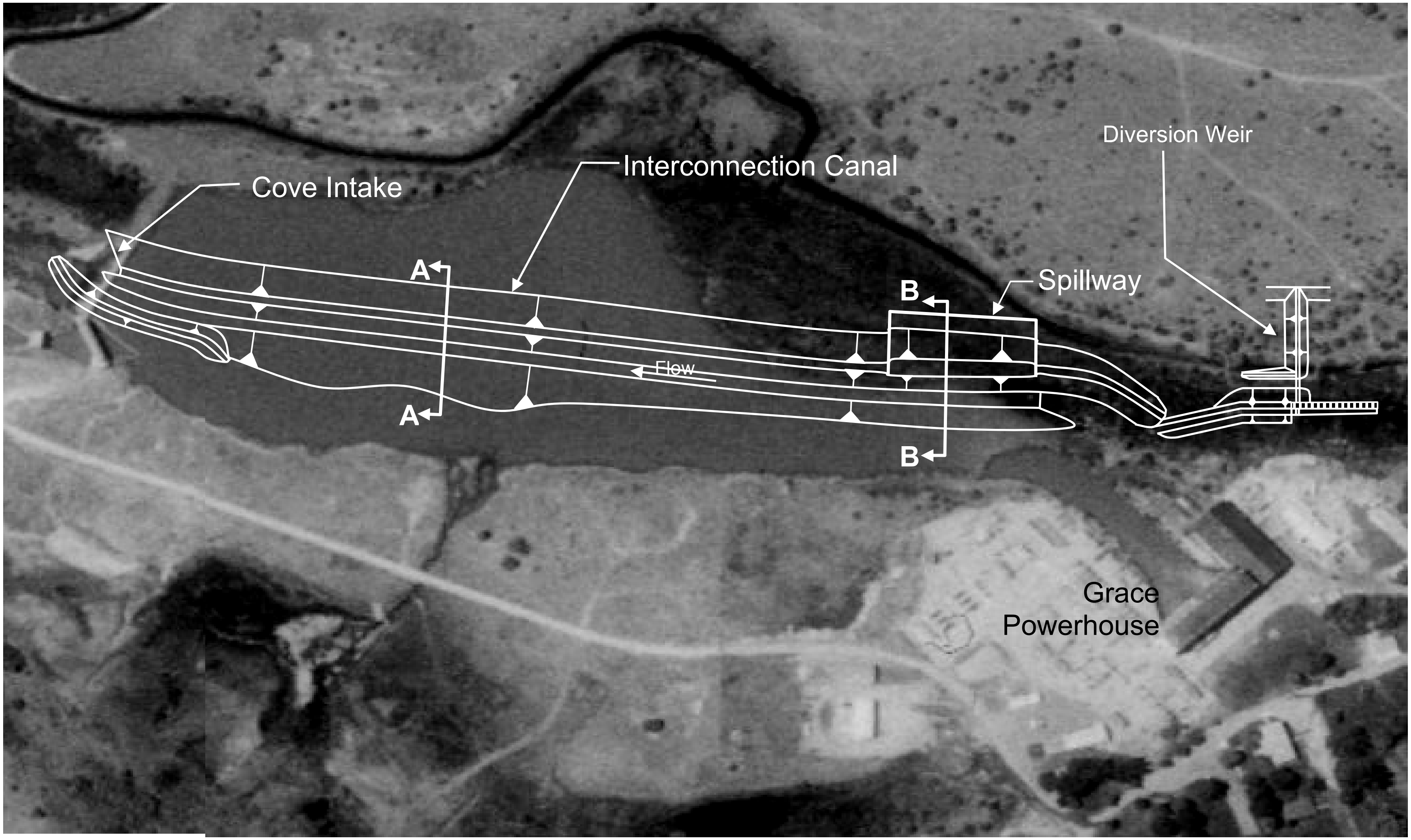


Figure 3-13
Alternative No. 6 – Grace/Cove Interconnection Canal Plan

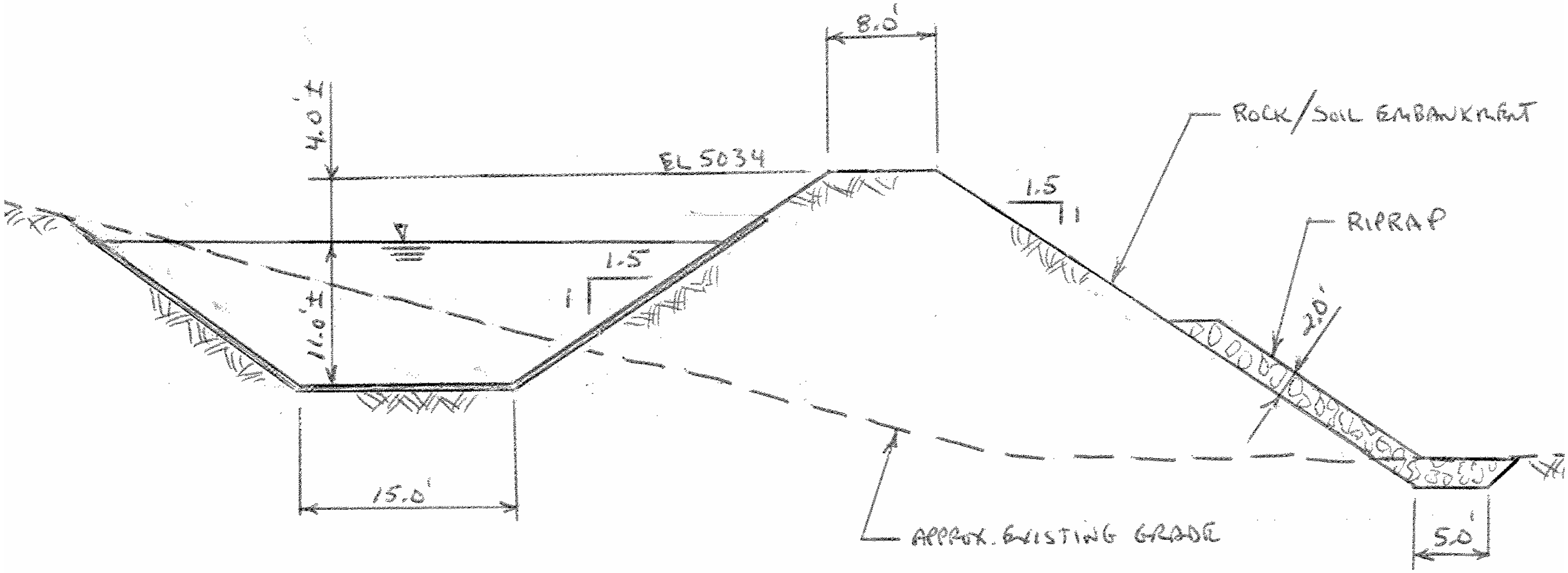


Figure 3-14
Alternative No. 6 – Grace/Cove Interconnection Canal Section

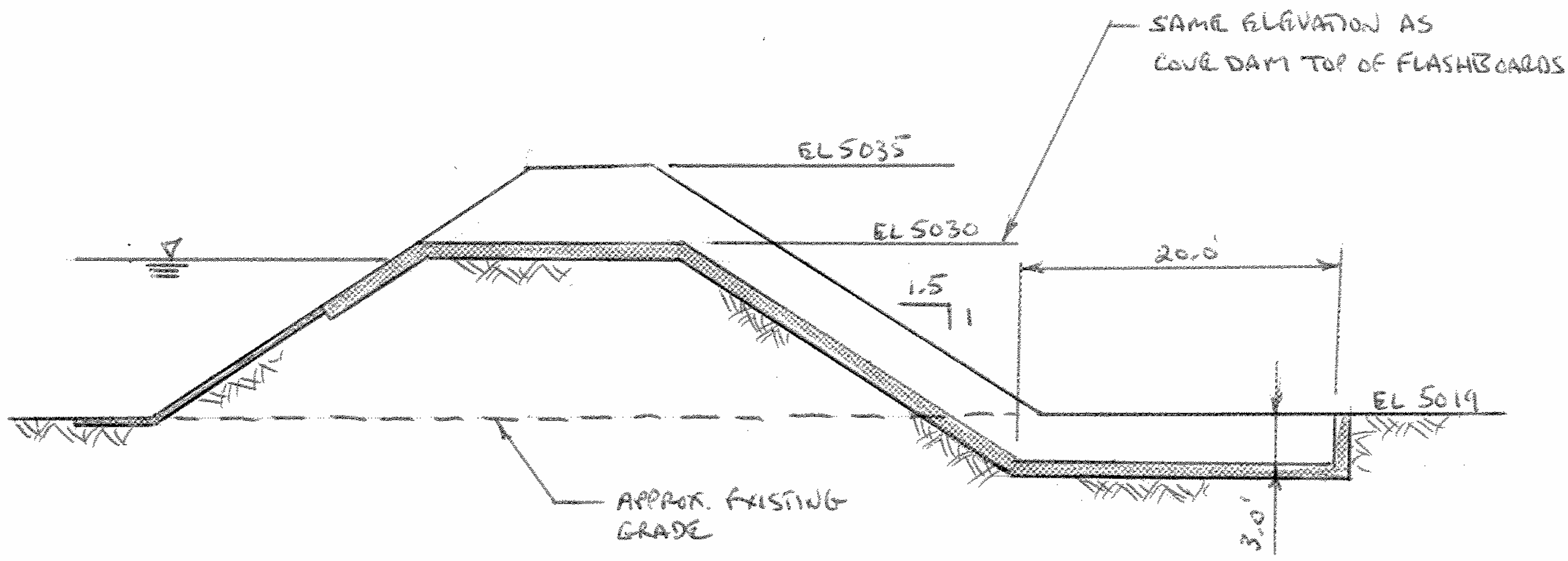


Figure 3-15
Alternative No. 7 – Grace/Cove Interconnection Canal Cross Section

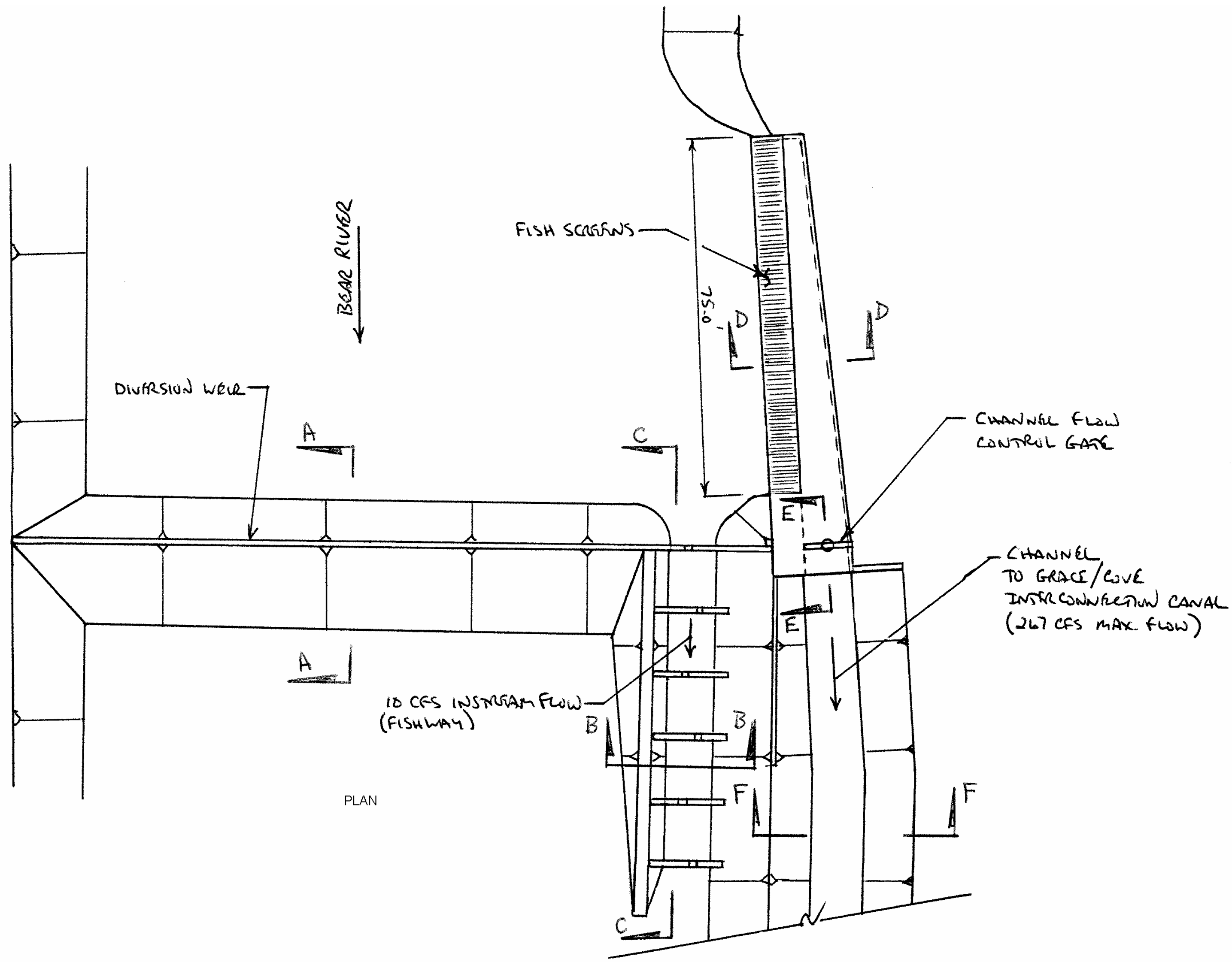


Figure 3-16
Alternative No. 6 – Grace/Cove Interconnection Canal Diversion Weir Plan

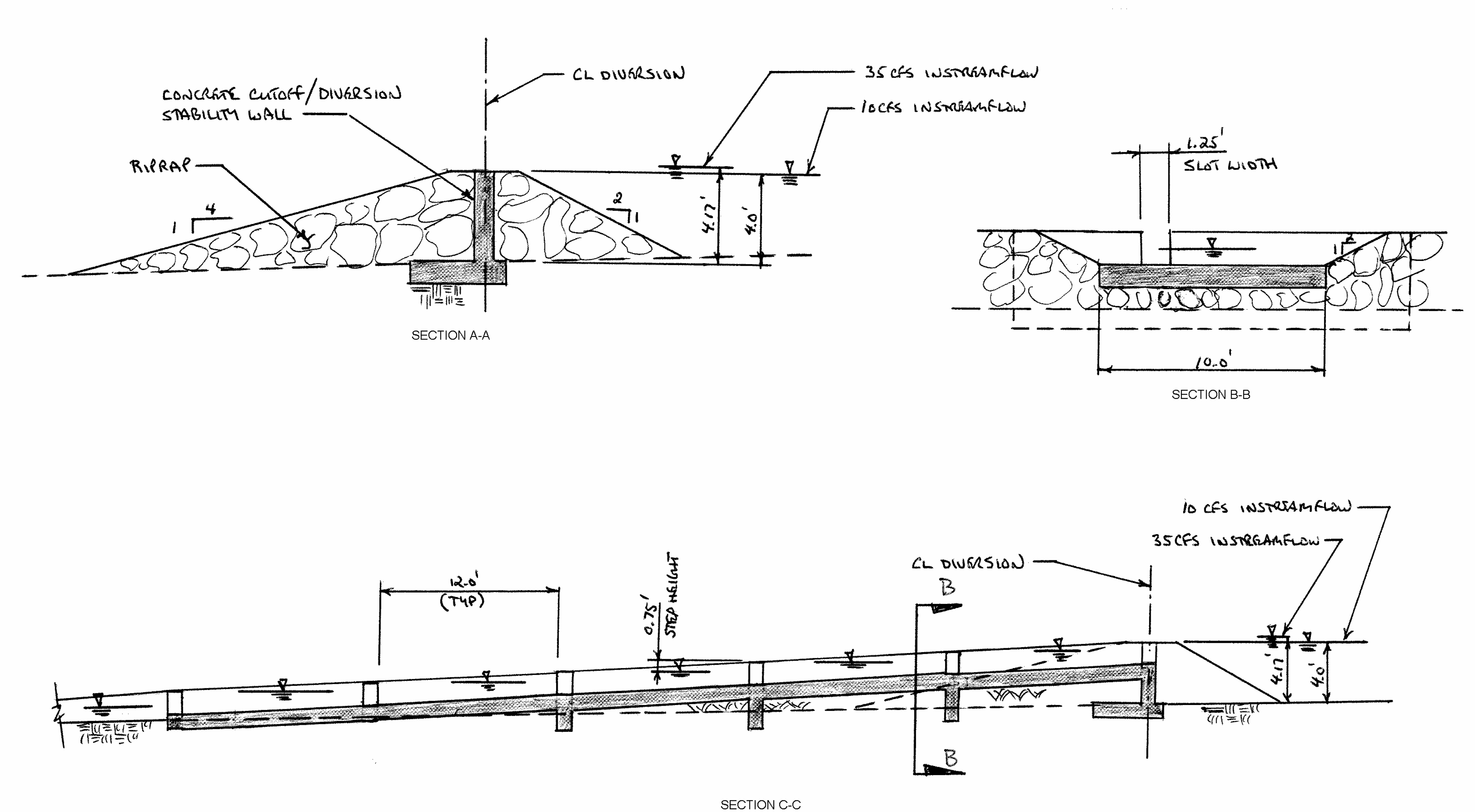


Figure 3-17
Alternative No. 6 – Grace/Cove Interconnection Canal Diversion Weir Sections A-A, B-B, and C-C

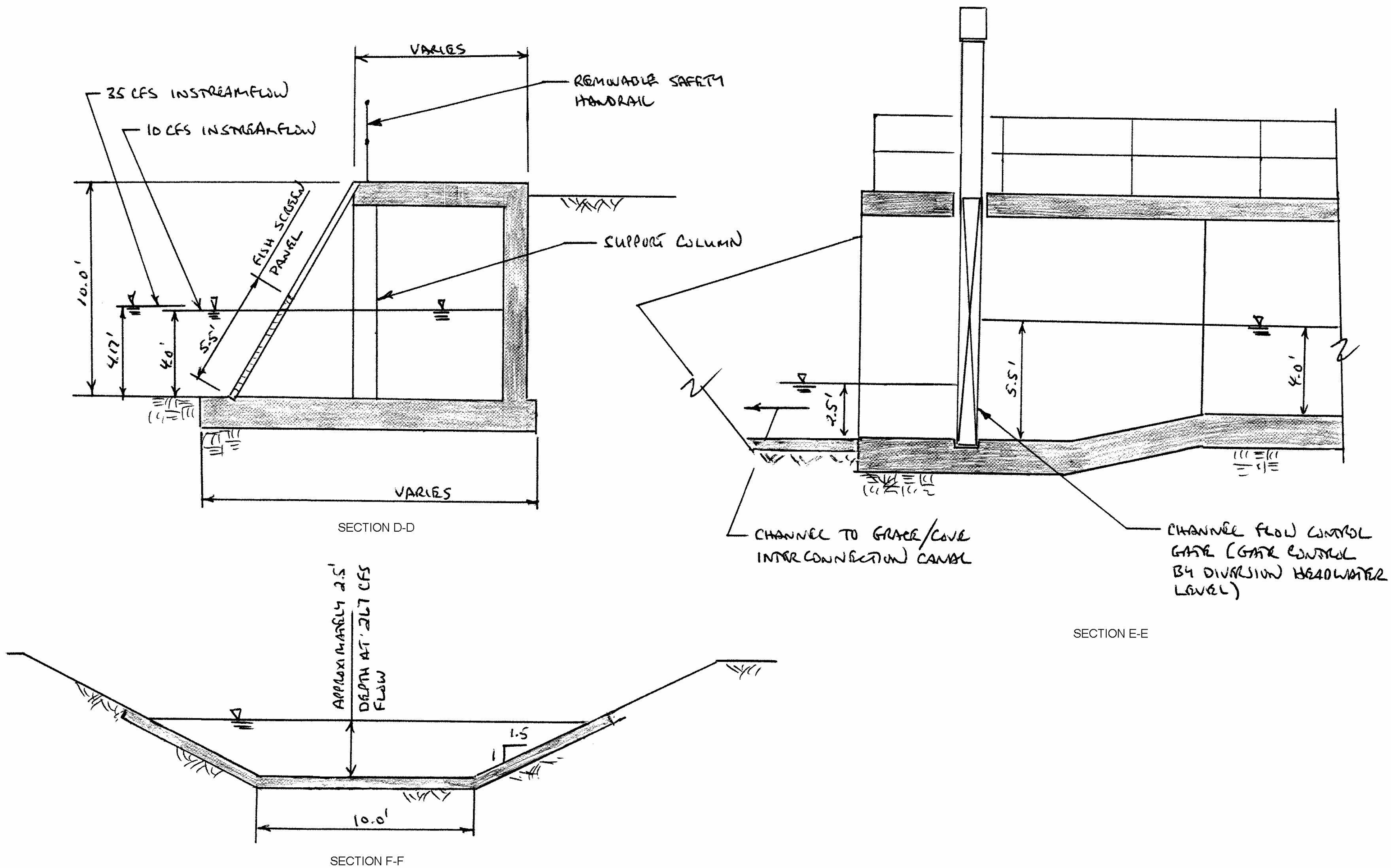


Figure 3-18
Alternative No. 6 – Grace/Cove Interconnection Canal Diversion Weir Sections D-D, E-E, and F-F

The weir would be a 4-foot high, rockfilled, embankment structure, approximately 150 feet in length. The embankment would include a concrete wall to provide a positive cutoff of seepage through the rockfill and to stabilize the rockfill during high river flow events. The small forebay created by the diversion weir would have a water surface level at the weir crest to direct 10 cfs to the adjacent fish ladder for instream flow purposes and the remaining flow to the intake structure for power generation. For the 35 cfs instream flow requirement, the forebay level would be allowed to rise and spill over the weir. Because of the weir length, this rise would be very small (i.e. approximately 2 inches). The forebay level would be automatically controlled by a channel flow control gate located at the downstream end of the intake structure to ensure instream flows are met and available additional river flow is diverted for power generation.

A fish ladder would be provided at the left abutment of the diversion weir. The ladder would consist of a series of small concrete weirs with vertical slots sized to pass 10 cfs. The ladder would have 5 pools with a 0.75-foot step between pools. The pools would be sized to dissipate the energy created by the 10 cfs flow and 0.75-foot hydraulic head.

The diversion weir would divert available additional river flow to an intake structure located along the left bank of the river. Under normal conditions, the water depth entering the intake would be approximately 4 feet. The intake would include inclined fish screens suitable for screening fingerling trout. The fish screens would extend approximately 75 feet upstream of the diversion weir which would provide an 0.8 fps approach velocity to the intake to avoid impingement of fingerling front on the fish screens.

Cleaning of the fish screens would be performed manually. However, the intake would be arranged to accommodate the installation of an automatic trashraking machine in the future, if warranted. Based on the project's flow duration curve, the diversion of available additional river flows would only occur approximately 30 percent of the time. Because of this low diversion occurrence, the use of an automatic trashraking machine would probably not be justified.

The diverted flow would be conveyed from the intake structure to the Interconnection Canal via a channel excavated along the left bank of the river. The channel would be trapezoidal in shape and concrete lined.

This Interconnection Canal alternative would preclude the need for fish screens at the Cove Intake, a barrier at the Grace Tailrace, and a fish ladder at the Cove Dam. The cost estimate for this alternative also includes the work done under Alternative No. 1 – Project Decommision that is associated with the Cove Dam removal and restoration of the Cove Forebay. These tasks would restore the Bear River to a more natural state from the Cove Tailrace up to the Grace Tailrace.

Implementation at this alternative would impact the generation of power at the Grace and Cove Powerhouses during construction. Because the Cove Dam would be demolished as the first major construction activity, an outage of the Cove Powerhouse during the entire construction duration of the alternative would result, which is estimated to be 6 months. Flow through the Grace Powerhouse would be retained during construction, except during the connection of the Interconnection Canal to the Grace Tailrace, which would require a 2 month outage at the Grace Powerhouse to complete its construction.

No topographic or bathymetric information is available for the majority of the canal length. Therefore, if the alternative is selected for further consideration and optimization, additional survey work would be required.

4.0 Alternative Cost Estimates

The construction activities and quantities were determined for each of the conceptual decommission, fish-friendly, and Project interconnection alternatives. The overall estimated project cost for each alternative is summarized in Table 4-1. Cost breakdown sheets for each alternative are provided in Appendix B. The table also includes the estimated lost generation that could be expected at the existing project powerhouses due to outages required for the implementation and construction of the specific alternative.

The construction quantities for each alternative were determined from the sketches included in this report. Material, equipment, and construction unit prices were based on in-house information and cost data from previous projects. A 20 percent contingency was also included to obtain the total estimated construction cost of each alternative.

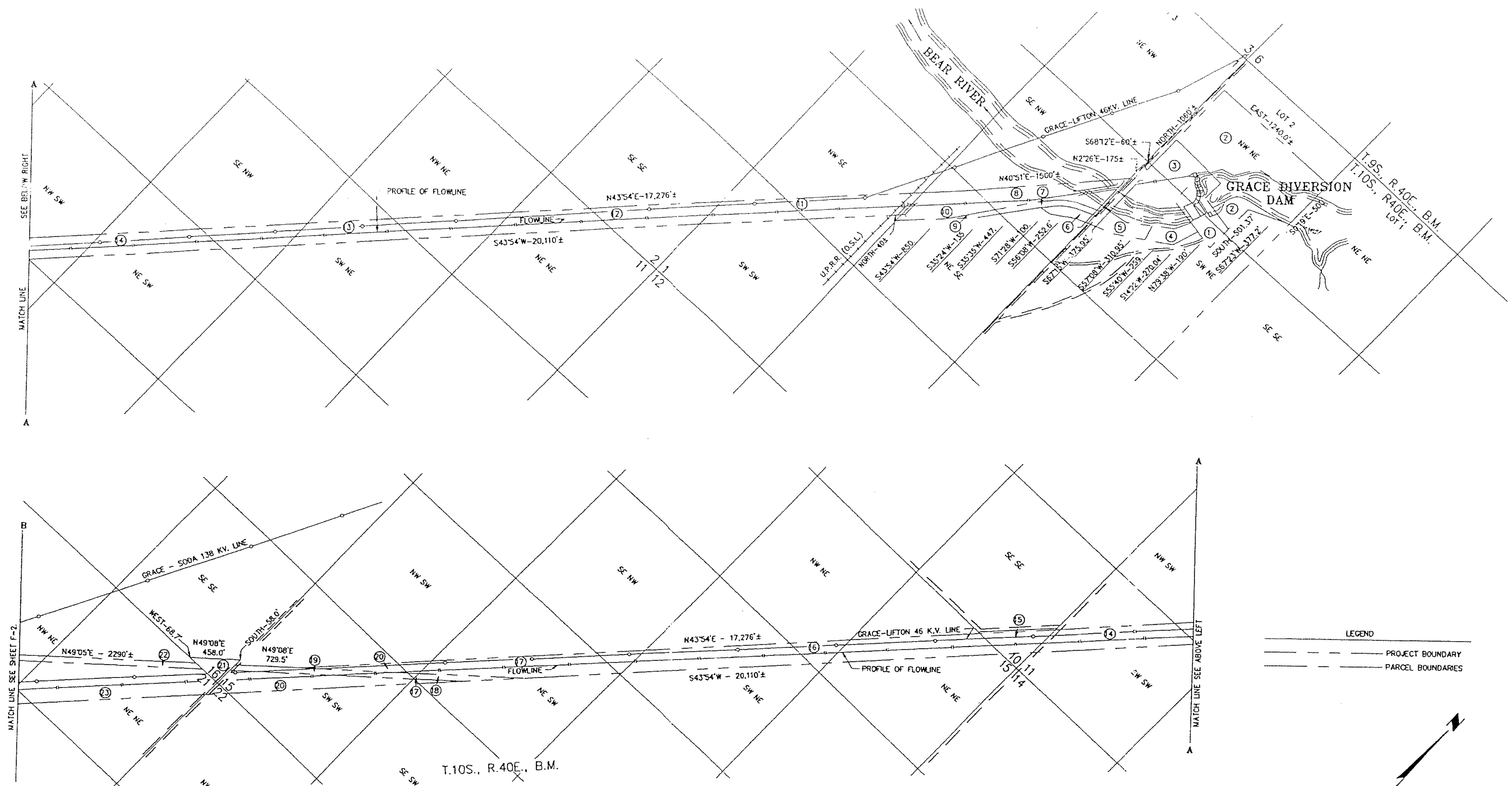
To arrive at the total project cost for each alternative, a 15 percent allowance for PacifiCorp's indirect cost to implement the respective alternative and a lump sum for engineering were added to the total construction cost. For some of the alternatives, the engineering cost includes an estimated allowance for topographic and/or bathymetric surveying and geotechnical investigations as required to support the detailed design of the alternative.

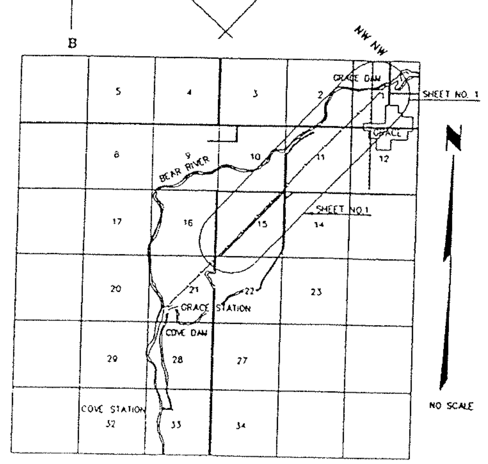
As stated previously in this report, these estimated costs provide order of magnitude level costs associated with the various alternatives studied. As an alternative or combination of alternatives are selected for further consideration, additional studies should be conducted to optimize the specific arrangement and conceptual design, establish design criteria, and refine the estimated project costs.

Table 4-1. Estimated Project Costs					
Alt. No.	Alternative Description	Lost Generation During Construction (Mwhr)	Total Construction Cost ($)	PacifiCorp Indirect Cost and Engineering ($)	Total Project Cost ($)
1	Project Decommission	28,000/yr. (Cove)	2,531,600	635,000	3,166,600
2	Cove Dam Fish Ladder	0	904,300	336,00	1,240,300
3A	Cove Intake Fish Screens (Upstream of Intake)	9,300 (Cove)	1,596,800	565,000	2,161,800
3B	Cove Intake Fish Screens (Downstream of Intake)	7,000 (Cove)	1,427,200	494,000	1,921,200
4	Grace Tailrace Barrier	21,700 (Grace)	1,166,200	375,00	1,541,200
5	Cove Tailrace Barrier	4,700 (Cove)	1,285,900	393,000	1,678,900
6	Interconnection Canal	14,000 (Cove) 21,700 (Grace)	3,151,200	958,000	4,109,200

APPENDIX A

APPLICABLE PROJECT DRAWINGS





VICINITY MAP T.10S., R.40E., B.M.

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PACIFICORP

F-3

PACIFICORP DECEMBER, 1994 PORTLAND, OREGON

APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

GENERAL PLAN OF PROJECT WORKS
EXHIBIT F-3

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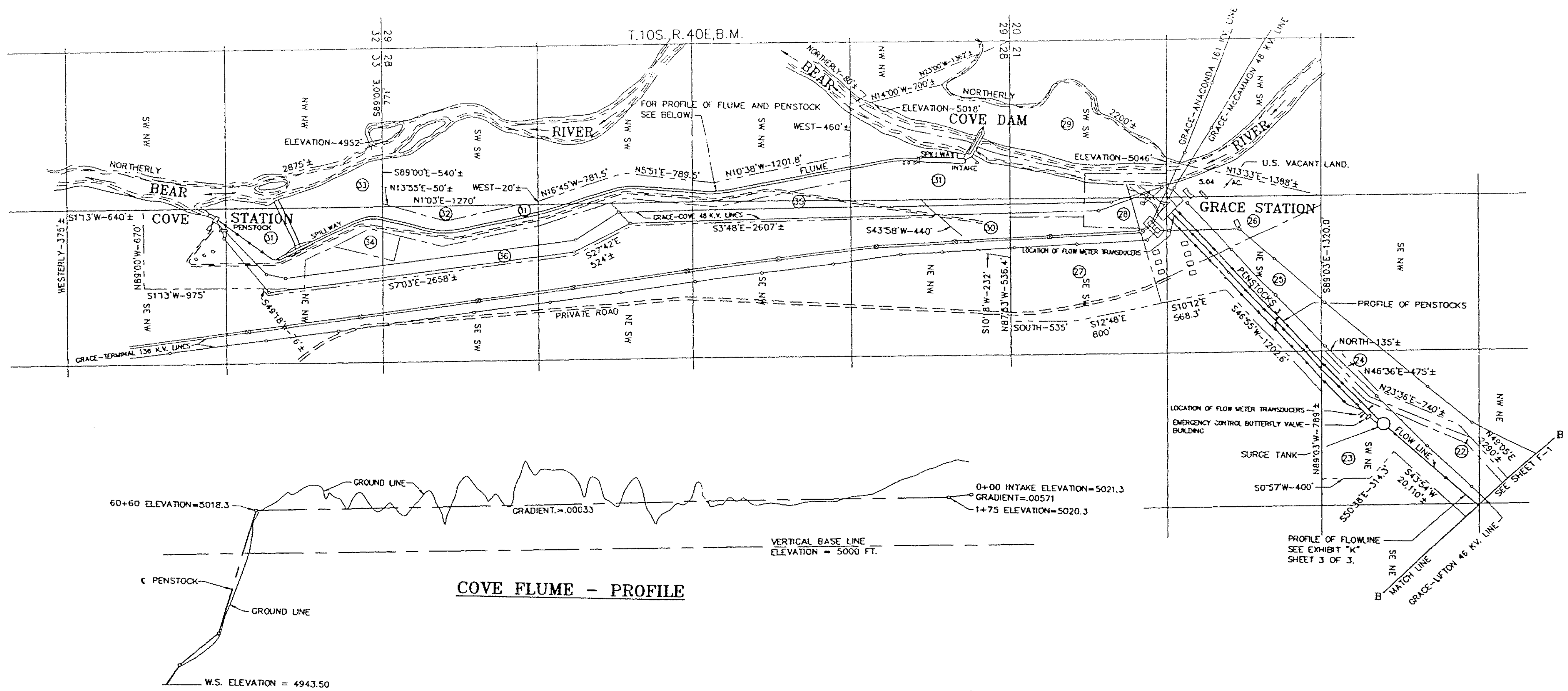
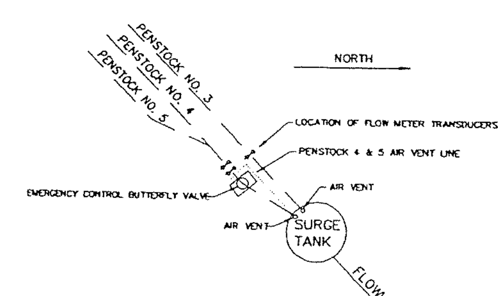
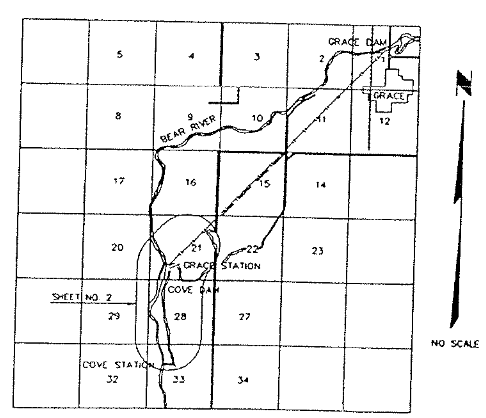


COVE FLUME - PROFILE



DETAIL MAP
SHOWING LOCATION OF UPPER FLOW METER TRANSDUCERS & PENSTOCK NO. 4 AIR VENT LINE
NO SCALE

LEGEND
PROJECT BOUNDARY
PARCEL BOUNDARIES



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F-11

PACIFICORP DECEMBER, 1994 PORTLAND, OREGON
APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

GENERAL PLAN OF PUBLIC WORKS
EXHIBIT F-11

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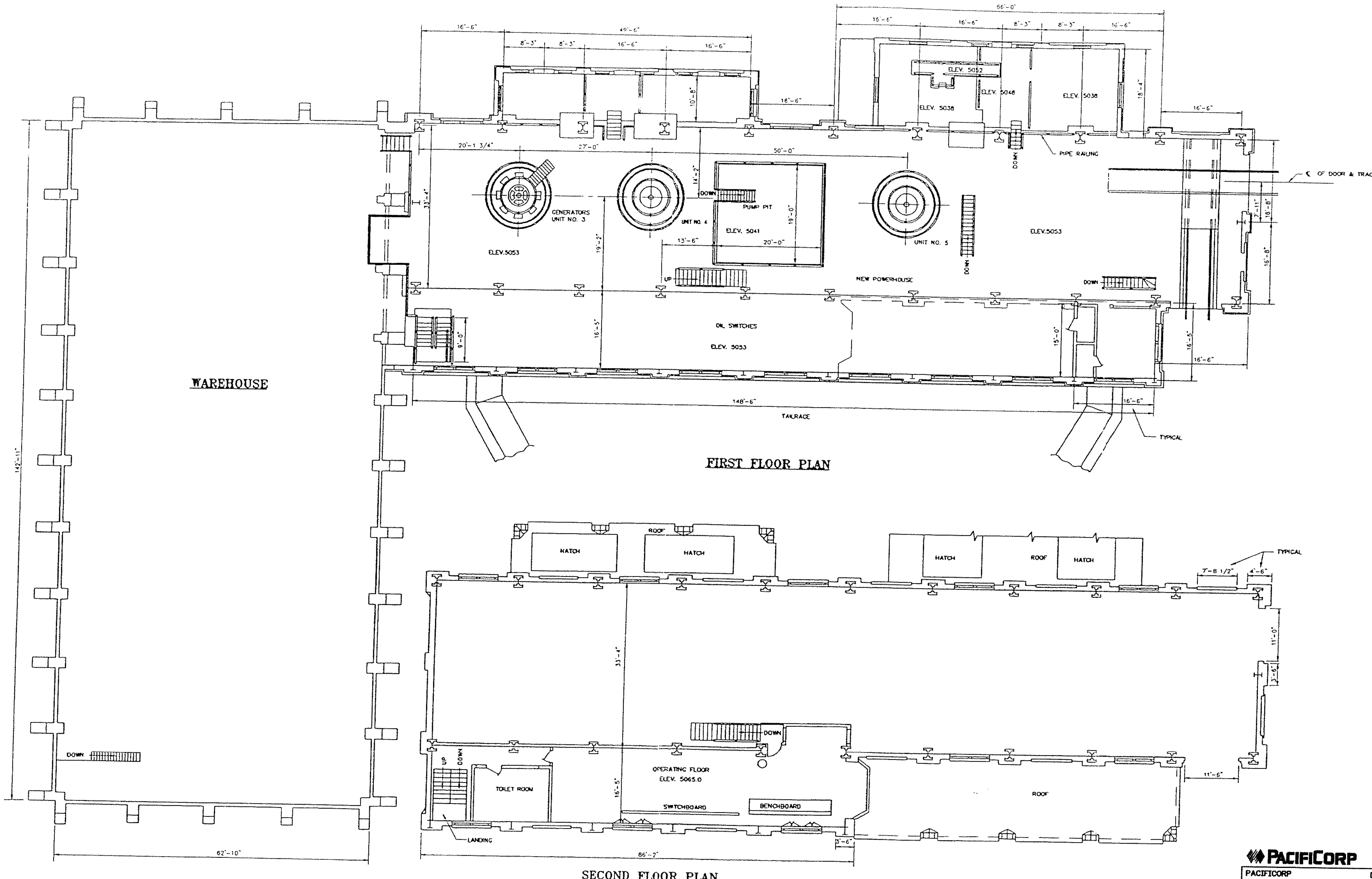

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F-8

PACIFICORP DECEMBER, 1994 PORTLAND, OREGON

APPLICATION FOR GRACE–COVE HYDROELECTRIC PROJECT LICENSE

PROJECT NO. 20

GRACE DEVELOPMENT POWERHOUSE

PLANS

EXHIBIT F–8

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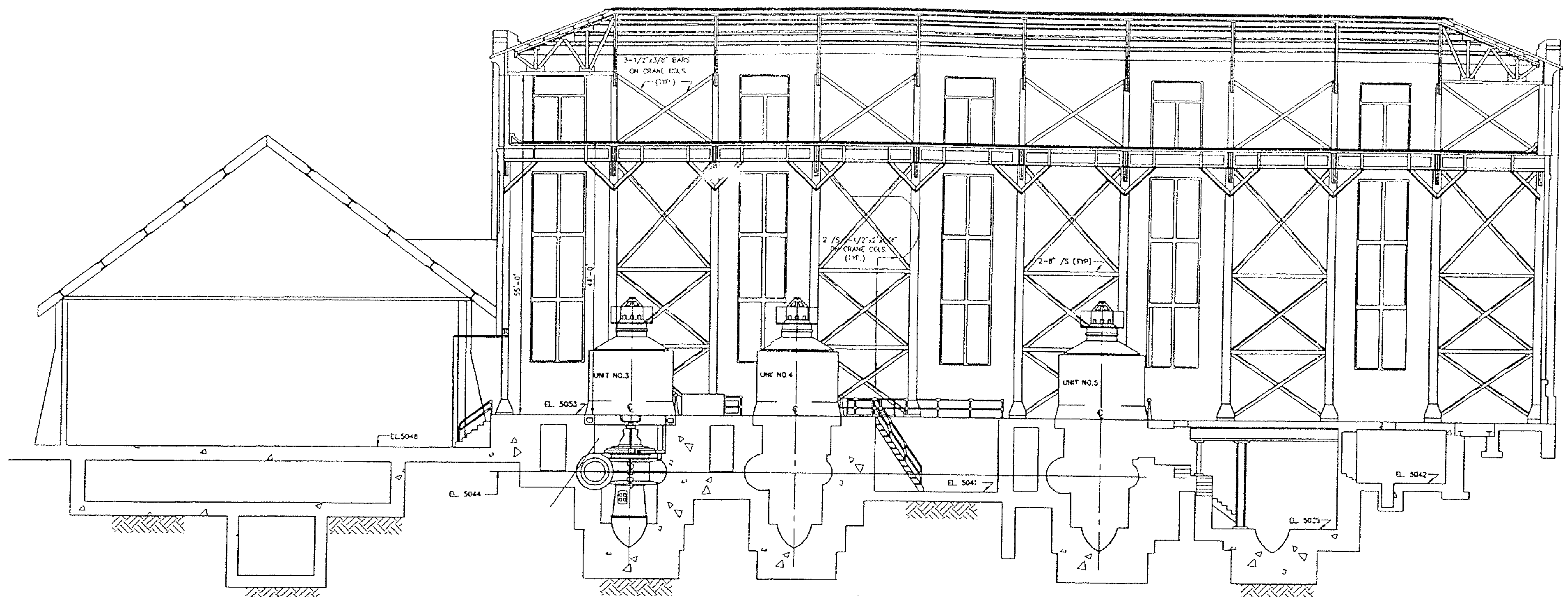
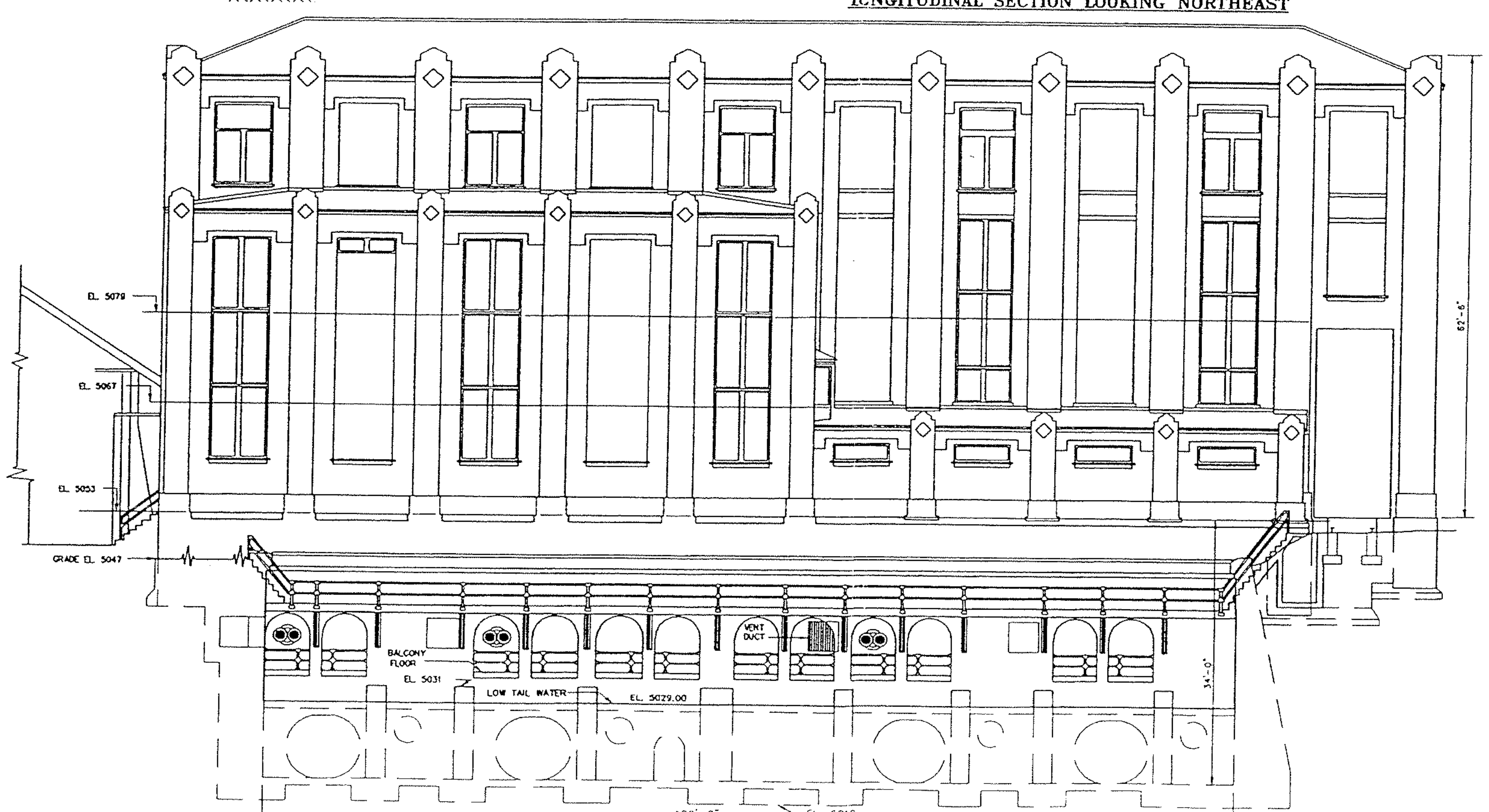


LONGITUDINAL SECTION LOOKING NORTHEAST



SOUTHWEST ELEVATION

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F-9

PACIFICORP DECEMBER, 1994 PORTLAND, OREGON

APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE

PROJECT NO. 20

GRACE DEVELOPMENT POWERHOUSE

PLANS

EXHIBIT F-9

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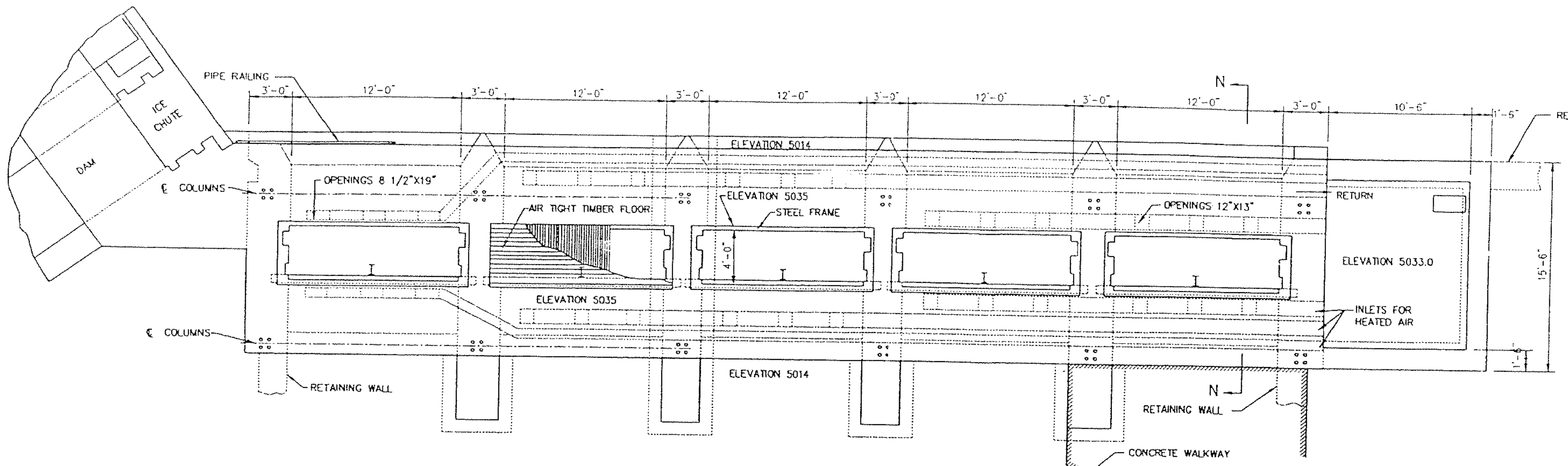
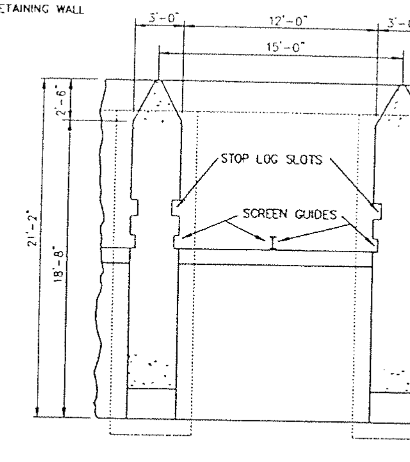


PLAN OF INTAKE



SECTION O-O
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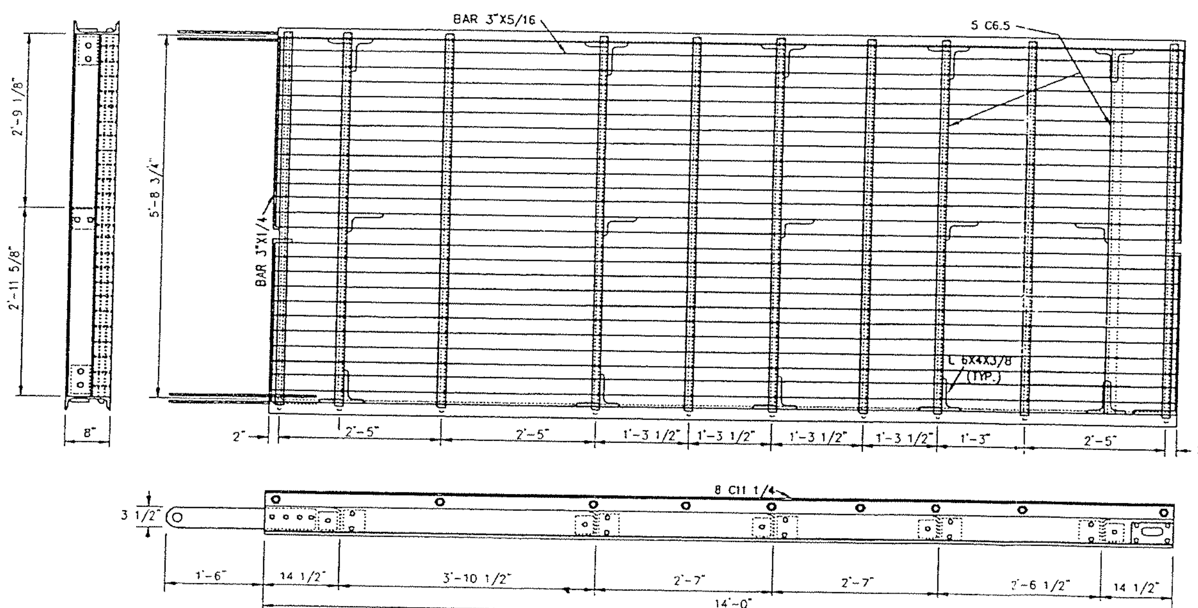

FRONT, END, & BOTTOM VIEW OF SCREENS
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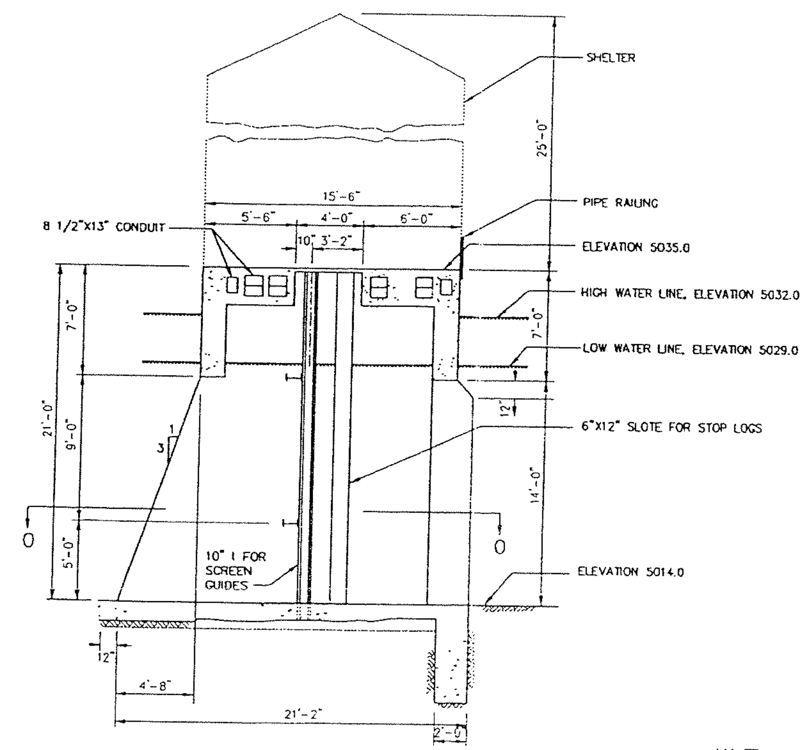
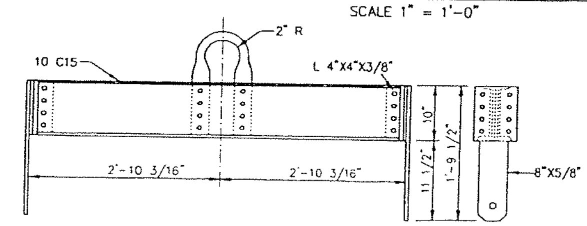
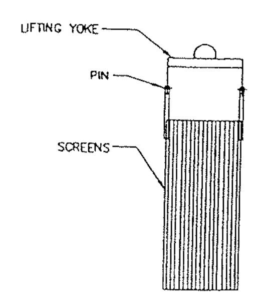


SECTION N-N



LIFTING YOKE



ASSEMBLY OF SCREENS

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PACIFICORP F-12

PACIFICORP DECEMBER, 1994 PORTLAND, OREGON
APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

COVE DEVELOPMENT
INTAKE PLAN, SECTIONS & DETAILS
EXHIBIT F-12
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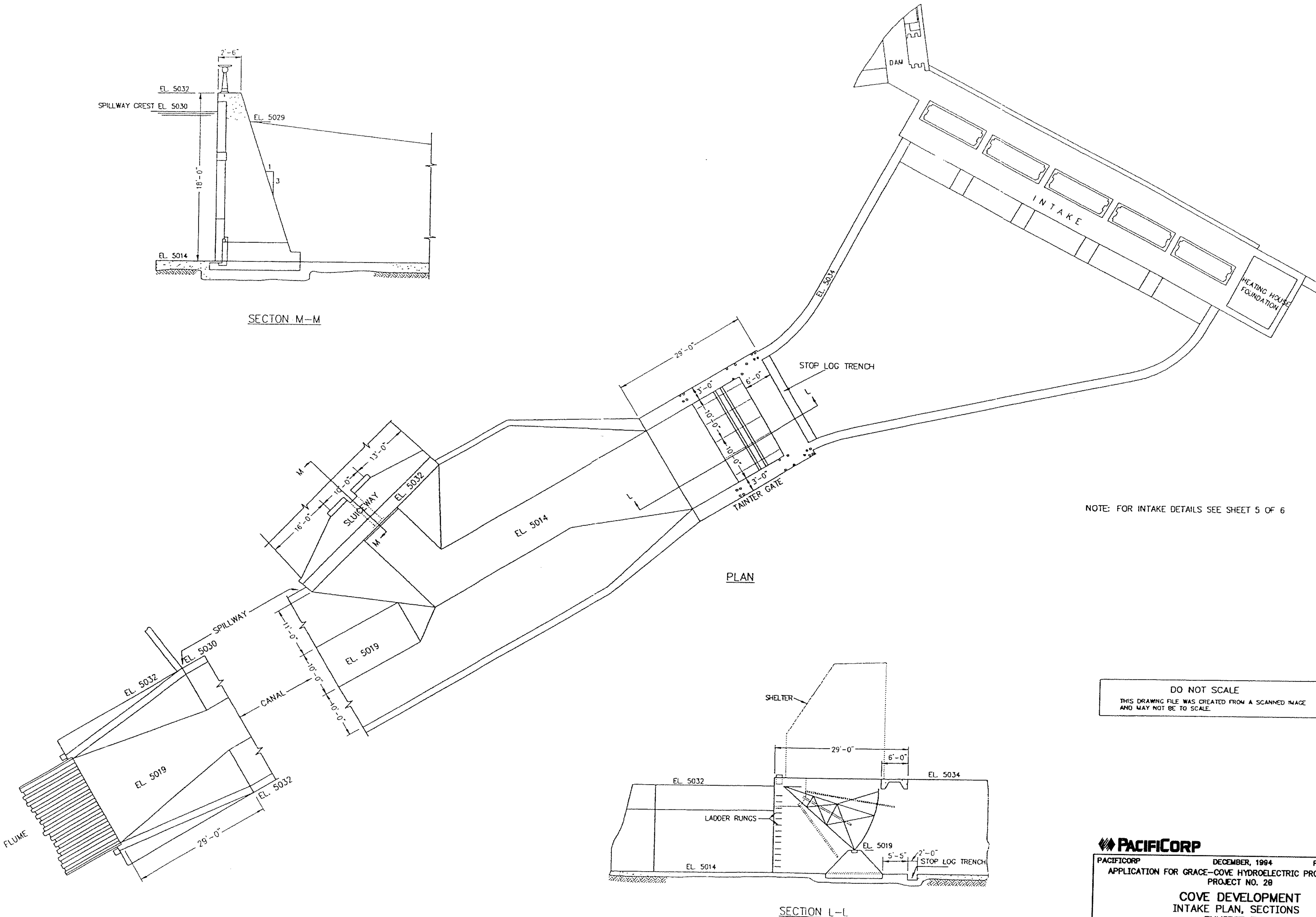

NOTE: FOR INTAKE DETAILS SEE SHEET 5 OF 6

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PACIFICORP F-13

PACIFICORP DECEMBER, 1994 PORTLAND, OREGON

APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

COVE DEVELOPMENT
INTAKE PLAN, SECTIONS
EXHIBIT F-13

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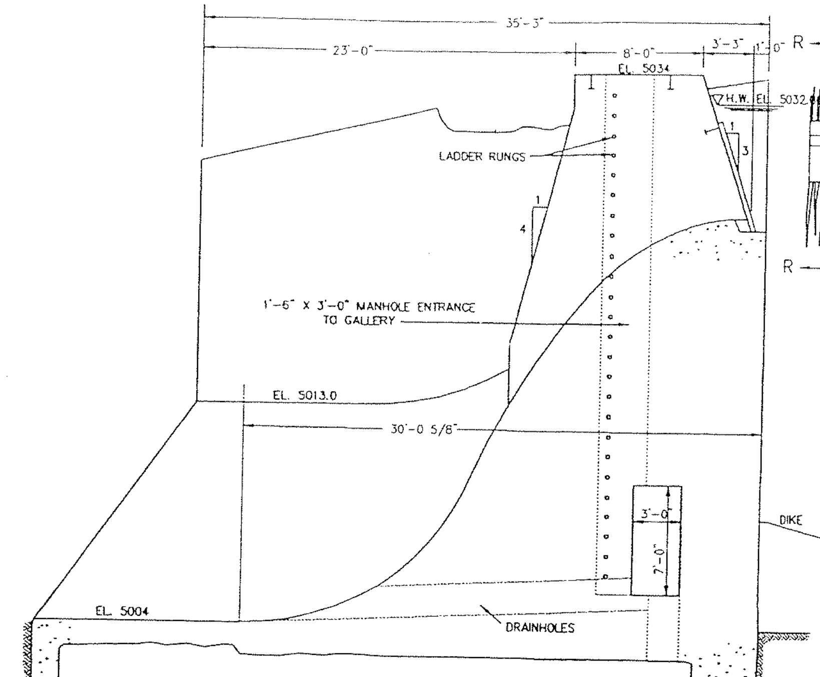
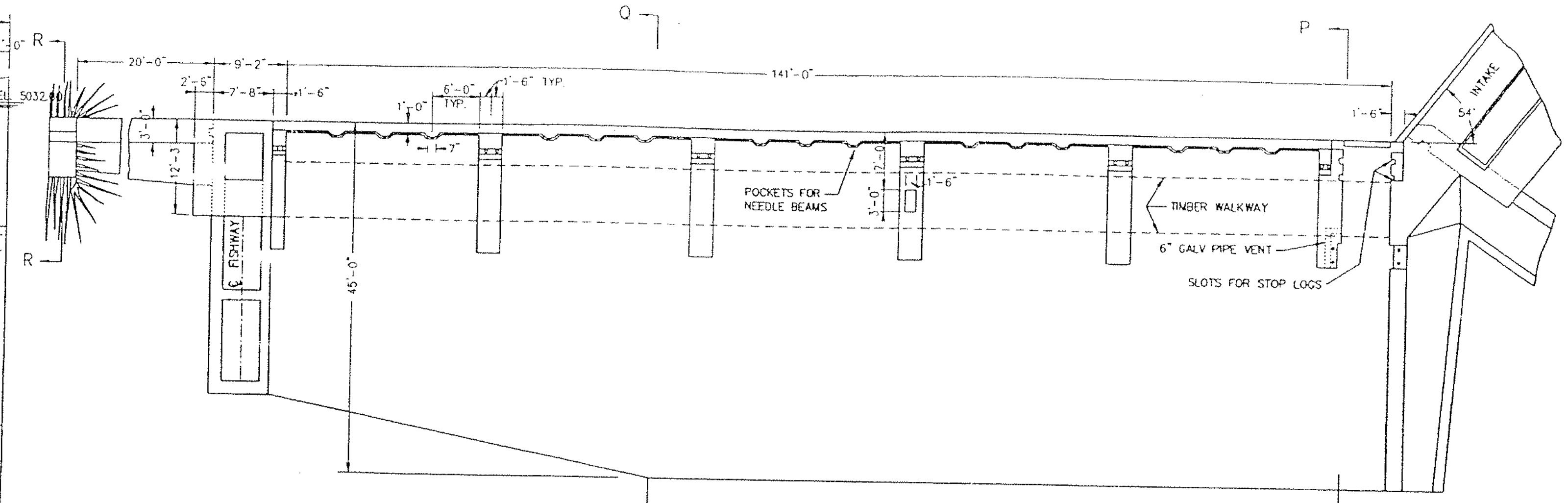
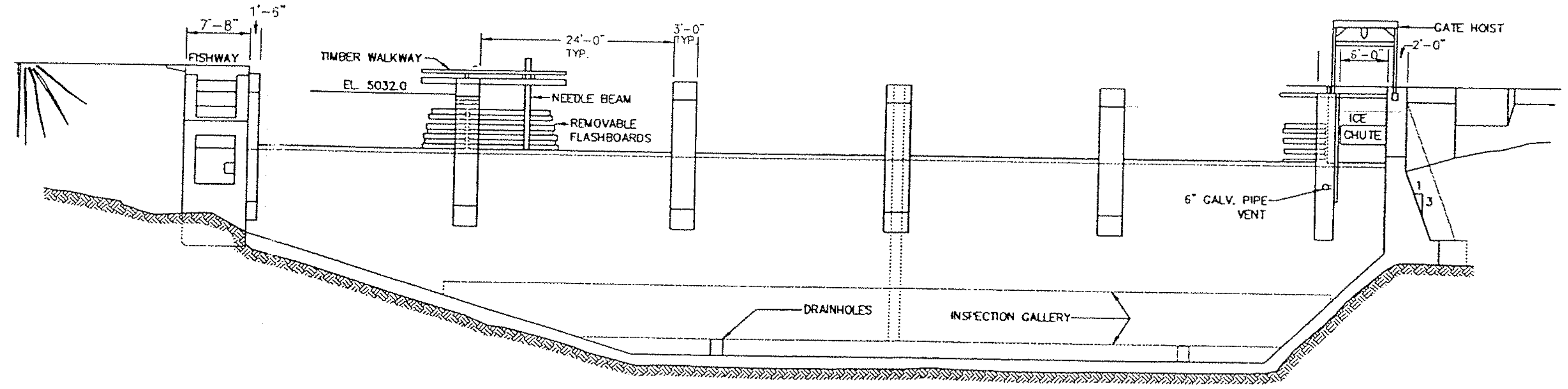


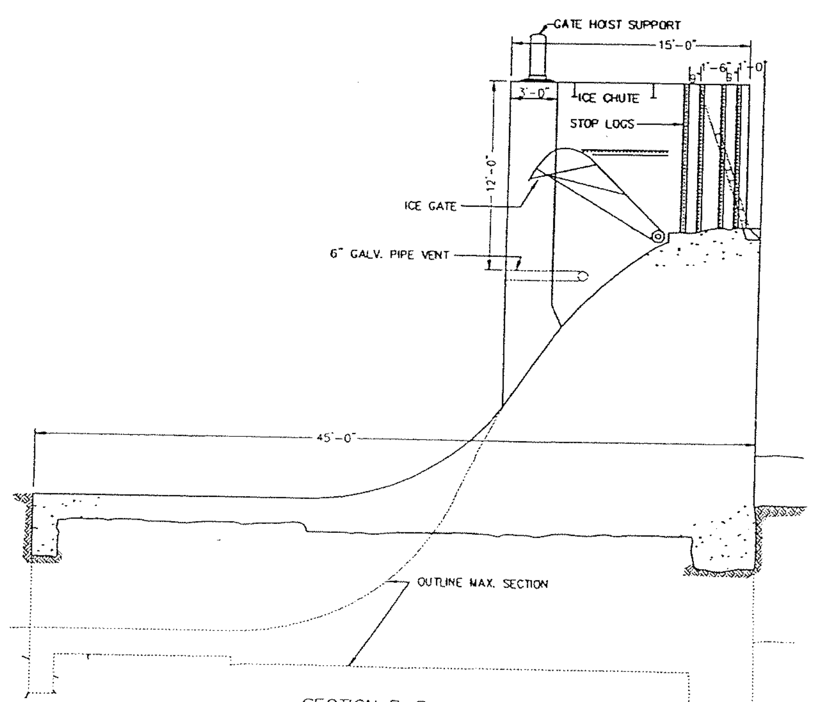
SECTION Q–Q



PLAN



ELEVATION



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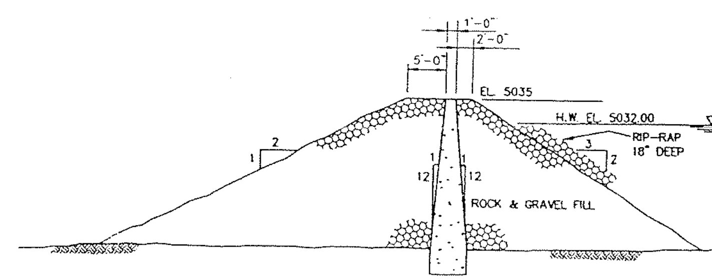


SECTION R–R

DO NOT SCALE

THIS DRAWING FILE WAS CREATED FROM A SCANNED IMAGE AND MAY NOT BE TO SCALE.

PACIFICORP

F-14

PACIFICORP — DECEMBER, 1994 — PORTLAND, OREGON

APPLICATION FOR GRACE–COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

COVE DEVELOPMENT
DIVERSION DAM PLAN ELEVATIONS AND SECTIONS
EXHIBIT F–14

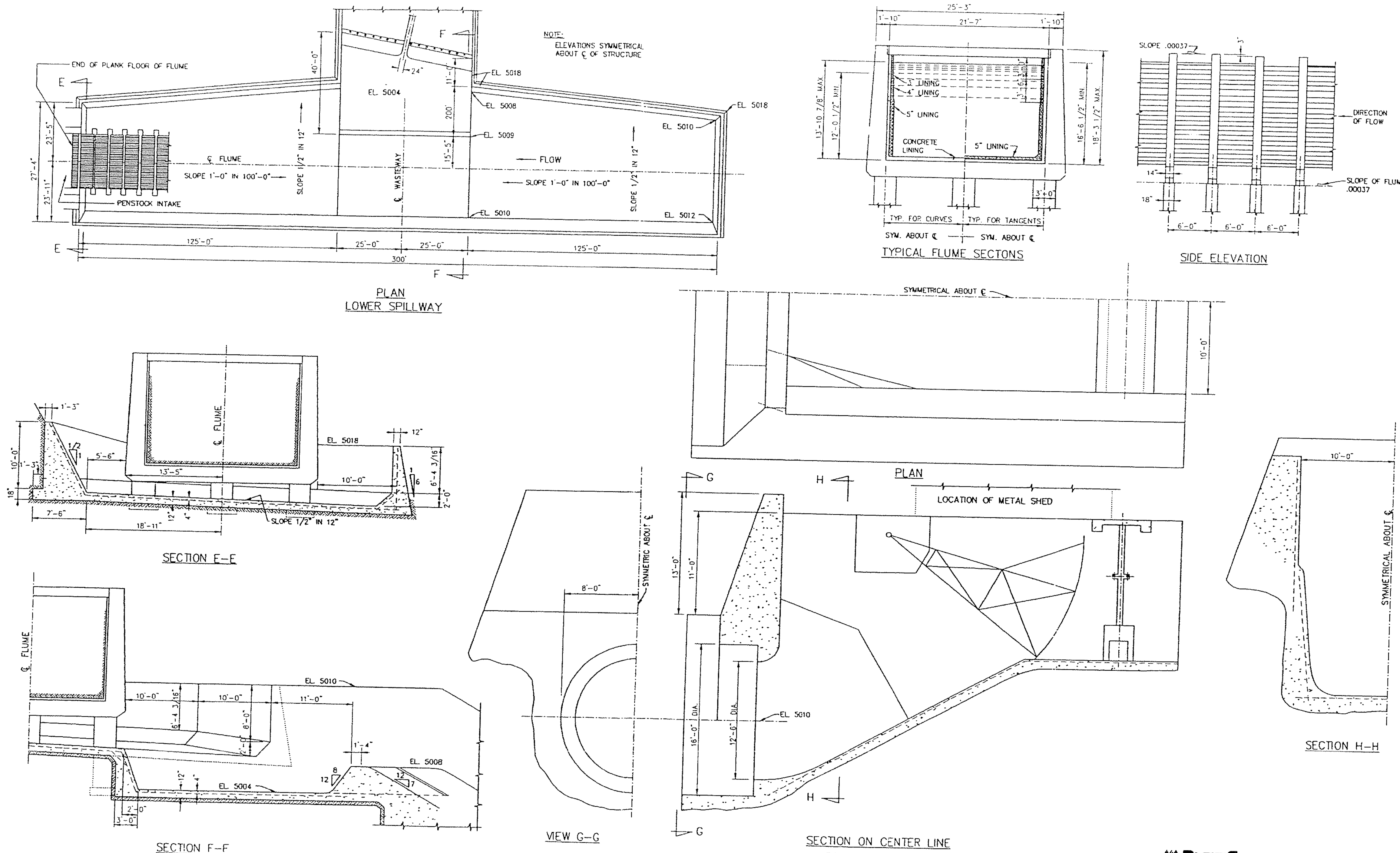
SCALE AS SHOWN

SCALE: INCHES

REVISION:
1 REVISE EXHIBIT LABEL AND ADDED FERC DRAWING NUMBER AND REVISE PROJECT NUMBER.

PLOT SCALE: 1 = — SCALE: NONE — CAD No. 20-1017

PROJ# — SHEET F-14 — 20-1017 — REV 1



DO NOT SCALE

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PACIFICORP F-15

PACIFICORP DECEMBER, 1994 PORTLAND, OREGON

APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

COVE DEVELOPMENT
FLOWLINE PLANS, SECTIONS & DETAILS
EXHIBIT F-15

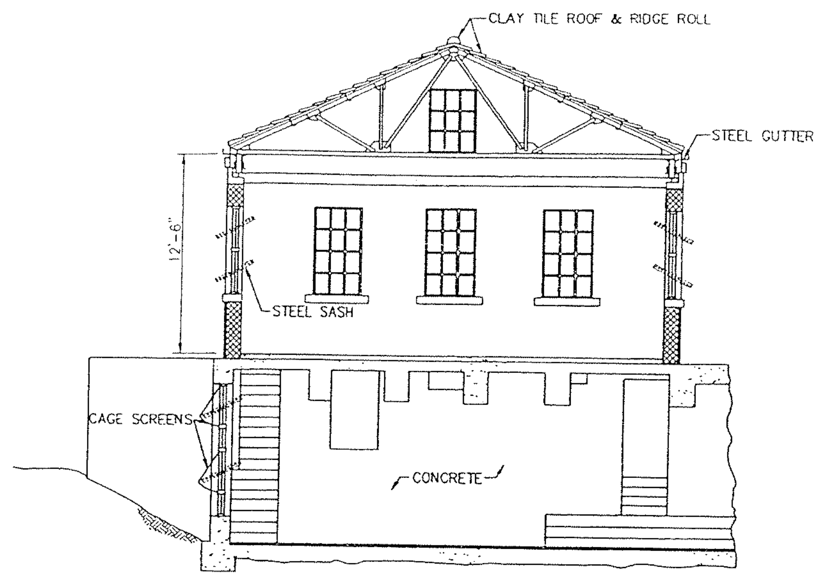
SCALE AS SHOWN

SCALE: INCHES

REVISION:
1 REVISE EXHIBIT LABEL AND ADDED FERC DRAWING NUMBER AND REVISE PROJECT NUMBER.

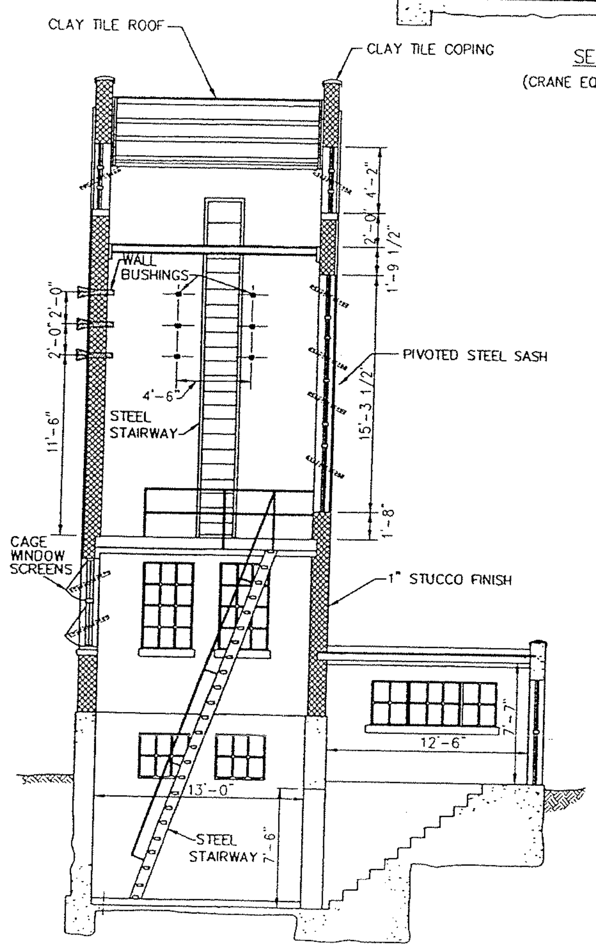
PLOT SCALE: 1 = | SCALE: NONE | CAD No: 20-1018

PROJ# SHEET F-15 20-1018 REV. 1



SECTON B-B
(CRANE EQUIPMENT NOT SHOWN)

NORTH ELEVATION
(CRANE EQUIPMENT NOT SHOWN)



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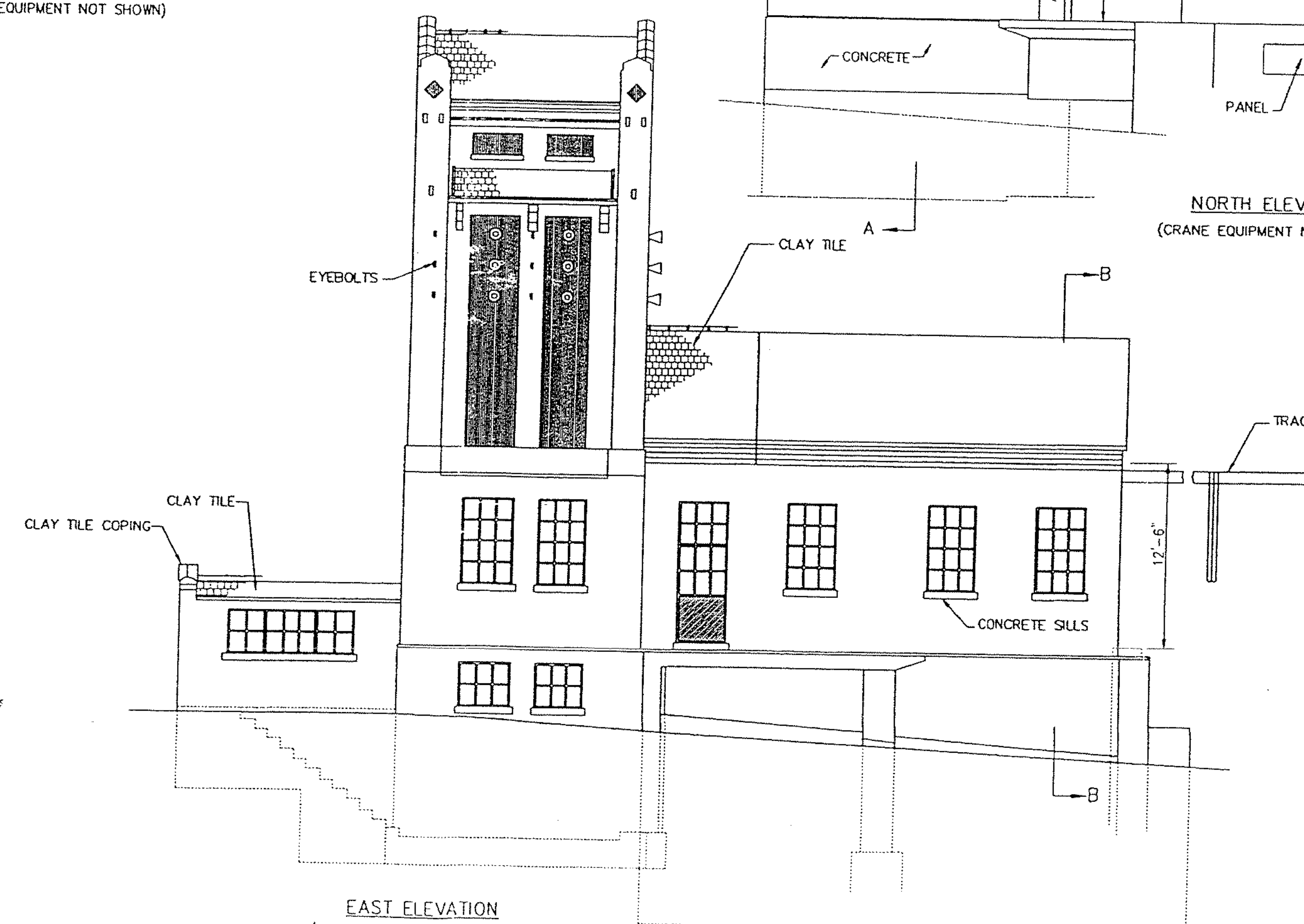

EAST ELEVATION
(CRANE EQUIPMENT NOT SHOWN)

DO NOT SCALE
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PACIFICORP

F-16

PACIFICORP — DECEMBER, 1994 — PORTLAND, OREGON

APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

COVE DEVELOPMENT
POWERHOUSE SECTIONS & ELEVATIONS
EXHIBIT F-16

SCALE AS SHOWN

0 1 2 3 4 5 6

SCALE: INCHES

REVISION:
1 REVISE EXHIBIT LABEL AND ADDED FERC DRAWING NUMBER AND REVISE PROJECT NUMBER.

PLOT SCALE: 1 =

SCALE: NONE

CAD No: 20-1019

PROJ# — SHEET F-16 — 20-1019 — REV. 1

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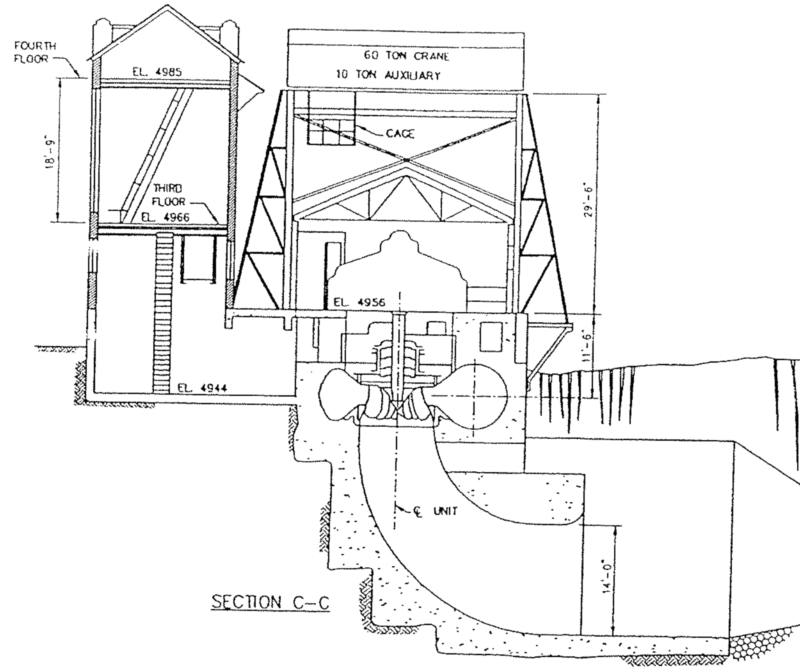

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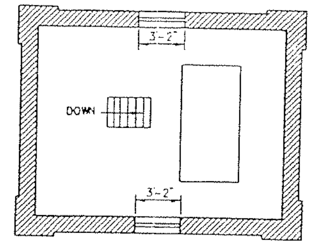
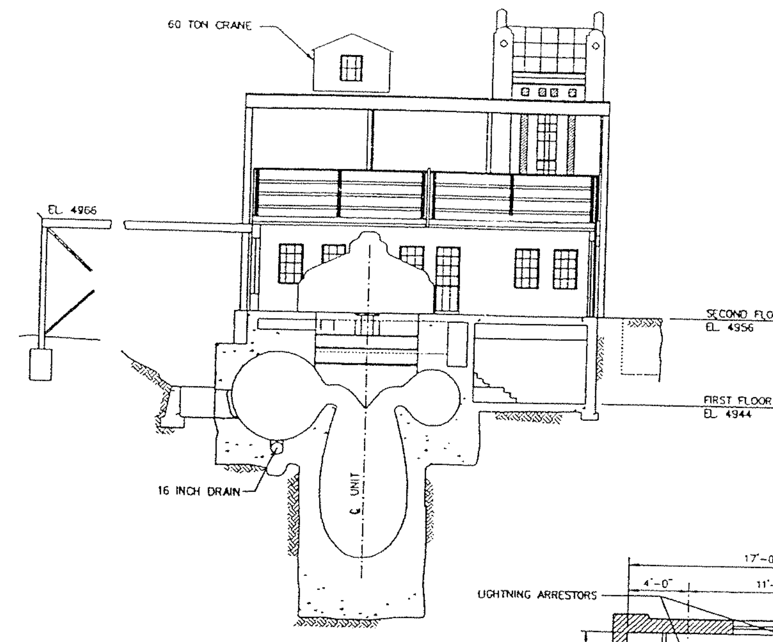


FOURTH FLOOR PLAN



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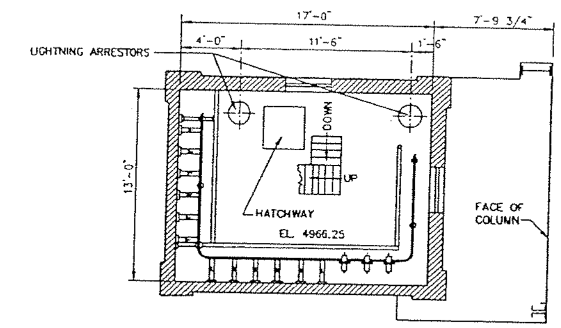
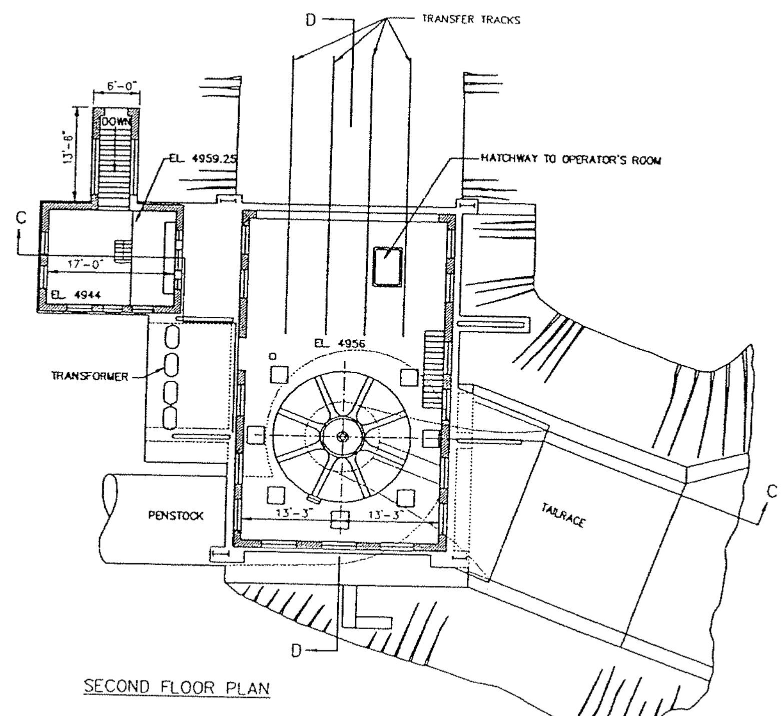
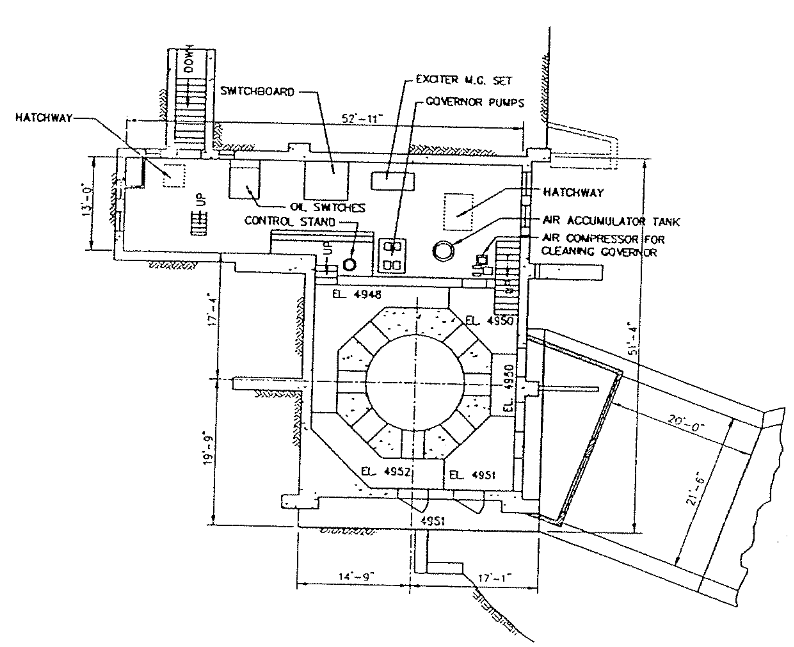


THIRD FLOOR PLAN



SECOND FLOOR PLAN



FIRST FLOOR PLAN

DO NOT SCALE

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PACIFICORP

F-17

PACIFICORP — DECEMBER, 1994 — PORTLAND, OREGON

APPLICATION FOR GRACE-COVE HYDROELECTRIC PROJECT LICENSE
PROJECT NO. 20

COVE DEVELOPMENT
POWERHOUSE PLANS & SECTIONS
EXHIBIT F-17

SCALE AS SHOWN

SCALE: INCHES

REVISION:
1. REVISE EXHIBIT LABEL AND ADDED FERC DRAWING NUMBER AND REVISE PROJECT NUMBER.

PLOT SCALE: 1 = 1

SCALE: NONE

CAD No. 20-1020

PROJ# — SHEET F-17 — 20-1020 — REV. 1

Sun Spirit J:\Hydro\Work In Progress\Hydro East\Exhibit F\20-1020.dwg P04129 DATE: JAN 27, 2004 TIME: 9:18 AM

APPENDIX B

COST BREAKDOWN SHEETS

Black & Veatch
Corporation

Client: PacifiCorp
Project: Cove Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Opinion of Probable Project Cost
11-Jun-04

SUMMARY

ITEM/DESCRIPTION	TOTAL COST
Alternative No. 1 - Project Decommission	$3,166,600
Alternative No. 2 - Cove Dam Fish Ladder	$1,240,300
Alternative No. 3A - Cove Intake Fish Screens (Upstream of Intake)	$2,161,800
Alternative No. 3B - Cove Intake Fish Screens (Downstream of Intake)	$1,921,200
Alternative No. 4 - Grace Tailrace Barrier	$1,541,200
Alternative No. 5 - Cove Tailrace Barrier	$1,678,900
Alternative No. 6 - Grace/Cove Interconnection Canal	$4,109,200

Black & Veatch

Client: PacifiCorp **11-Jun-04**
Project: Bear River Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Title: Alternative No. 1 - Project Decommission

Description		Quantity	Unit	Unit Cost	Total Cost
1.0 Demolition					
1.1 Dam - Nonreinforced Concrete		1,800	CY	$110.00	$198,000
1.2 Dam Reinforced Concrete		350	CY	$145.00	$50,800
1.3 Embankment Portion of Dam - right abutmment		3500	CY	$26.00	$91,000
1.4 Install Reinforced Concrete Walls in Intake Slots		85	CY	$870.00	$74,000
1.5 Intake & Tainter Gate Bldg		1,700	SF	$15.00	$25,500
1.6 Intake Screens, Stoplogs & Tainter Gate		1	LS	$15,200.00	$15,200
1.7 Intake Warming Shack		225	SF	$8.00	$1,800
1.8 Concrete Flume and Saddles		6,100	CY	$145.00	$884,500
1.9 Flume Timbers		273,600	SF	$1.25	$342,000
1.10 Pressure Box Bldg		780	SF	$15.00	$11,700
1.11 Pressure Box Tainter Gate		1	LS	$2,850.00	$2,900
1.12 Pressure Box Bar Screens		1	LS	$3,050.00	$3,100
1.13 Pressure Box Reinforced Concrete		360	CY	$145.00	$52,200
1.14 Plug Penstock Inlet		30	CY	$290.00	$8,700
1.15 New Powerhouse Door & Cover Windows		1	LS	$13,300.00	$13,300
1.16 Plug Penstock & Draft Tube		110	CY	$290.00	$31,900
2.0 Grace Tailrace Berm Stabilization					
2.1 Rip Rap		200	CY	$50.00	$10,000
3.0 Restoration					
3.1 Grade Silt in Reservoir		50,000	CY	$5.00	$250,000
3.2 Seed Reservoir Area		10.5	AC	$3,000.00	$31,500
3.3 Right Embankment Fine Grade		2,420	SY	$1.00	$2,400
3.4 Grade Over Pressure Box		1	LS	$8,500.00	$8,500
3.5 Grade Over Exposed Penstock		300	CY	$2.00	$600
Subtotal					$2,109,600
Contingency	20%				$422,000
Subtotal Construction Cost					$2,531,600
PacifiCorp Indirect Cost	15%				$380,000
Engineering					$255,000
Total Engineering and Construction Cost					$ 3,166,600

Black & Veatch

Client: PacifiCorp **11-Jun-04**
Project: Cove Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Title: Alternative No. 2 - Cove Dam Fish Ladder

Description		Quantity	Unit	Unit Cost	Total Cost
1.0 Fish Ladder Facility					
1.1 Excavation		2,200	CY	$8.00	$17,600
1.2 Backfill		610	CY	$4.00	$2,400
1.3 Spoil		1,590	CY	$11.00	$17,500
1.4 Concrete:					
Slab on Grade		130	CY	$350.00	$45,500
Formed Walls		350	CY	$870.00	$304,500
Fish Pool Slot Walls		35	CY	$700.00	$24,500
Rehab Existing Spillway Deflector Wall		55	CY	$700.00	$38,500
1.5 Walkway/Platform					
Grating		200	SF	$25.00	$5,000
Handrailing		200	LF	$60.00	$12,000
Ladders		2	EA	$1,000.00	$2,000
1.6 Trashrack (including 1/2" spacing at AWS inlet)		13,500	LB	$1.85	$25,000
1.7 Auxiliary Water Supply System					
Pipe Excavation		60	CY	$8.00	$500
Pipe Backfill		55	CY	$4.00	$200
Pipe (24" Dia.)		40	LF	$110.00	$4,400
1.8 Gates					
1.5'w x 2.0'h		3	EA	$3,000.00	$9,000
2.0'w x 2.0'h		1	EA	$3,500.00	$3,500
1.9 Trashrake (Furnish and Install)		1	LS	$97,000.00	$97,000
1.10 Electrical Power Supply and Controls		1	LS	$75,000.00	$75,000
1.11 Divers		1	LS	$15,000.00	$15,000
1.12 Dewatering					
Dewatering Box		18,500	LB	$1.85	$34,200
Dewatering System		1	LS	$10,000.00	$10,000
1.13 Site Finishing		1	LS	$10,000.00	$10,000
Subtotal					$753,300
Contingency	20.0%				$151,000
Subtotal Construction Cost					$904,300
PacifiCorp Indirect Cost	15.0%				$136,000
Engineering					$200,000
Total Engineering and Construction Cost					$1,240,300

Black & Veatch

Client: PacifiCorp **11-Jun-04**
Project: Cove Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Title: Alternative No. 3A - Cove Intake Fish Screens (Upstream of Intake)

Description		Quantity	Unit	Unit Cost	Total Cost
1.0 Cofferdam					
1.1 Fill Material		3,800	CY	$20.00	$76,000
1.2 Liner Material		8,000	SF	$1.25	$10,000
1.3 Dewatering		1	LS	$40,000.00	$40,000
2.0 Fish Screen Facility					
2.1 Site Work					
Excavation (Rock)		1,570	CY	$20.00	$31,400
Backfill		770	CY	$4.00	$3,100
Spoil		800	CY	$11.00	$8,800
Site Finishing		1	LS	$10,000.00	$10,000
2.2 Concrete					
Slab on Grade		270	CY	$350.00	$94,500
Formed Walls		400	CY	$700.00	$280,000
Elevated Slab		120	CY	$550.00	$66,000
2.3 Fish Screens					
Panels (Furnish and Install)		1,775	SF	$90.00	$159,800
Panel Frames		18,300	LB	$3.70	$67,700
Guides and Supports		34,000	LB	$1.85	$62,900
Screen Removal Structure					
Structural Steel		22,000	LB	$1.85	$40,700
Hoist and Trolley (2 ton)		1	EA	$10,000.00	$10,000
2.4 Trashrake (Furnish and Install)		1	LS	$243,500.00	$243,500
2.5 Handrailing		410	LF	$60.00	$24,600
2.6 Grating		740	SF	$25.00	$18,500
2.7 Miscellaneous Steel		4,500	LB	$1.85	$8,300
2.8 Electrical Power Supply and Controls		1	LS	$75,000.00	$75,000
Subtotal					$1,330,800
Contingency	20.0%				$266,000
Subtotal Construction Cost					$1,596,800
PacifiCorp Indirect Cost	15.0%				$240,000
Engineering					$325,000
Total Engineering and Construction Cost					$2,161,800

Black & Veatch

Client: PacifiCorp **11-Jun-04**
Project: Cove Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Title: Alternative No. 3B - Cove Intake Fish Screens (Downstream of Intake)

Description	Quantity	Unit	Unit Cost	Total Cost
1.0 Cofferdam	(Not Required - See Note 1 Below.)			$0
2.0 Fish Screen Facility				
2.1 Site Work				
Excavation (Common)	4,400	CY	$8.00	$35,200
Backfill	1,700	CY	$4.00	$6,800
Spoil	2,700	CY	$11.00	$29,700
Site Finishing	1	LS	$10,000.00	$10,000
2.2 Concrete				
Slab on Grade	160	CY	$350.00	$56,000
Formed Walls	360	CY	$700.00	$252,000
Elevated Slab	115	CY	$550.00	$63,300
2.3 Fish Screens				
Panels (Furnish and Install)	1,775	SF	$90.00	$159,800
Panel Frames	18,300	LB	$3.70	$67,700
Guides and Supports	34,000	LB	$1.85	$62,900
Screen Removal Structure				
Structural Steel	18,000	LB	$1.85	$33,300
Hoist and Trolley (2 ton)	1	EA	$10,000.00	$10,000
2.4 Trashrake (Furnish and Install)	1	LS	$243,500.00	$243,500
2.5 Handrailing	100	LF	$60.00	$6,000
2.6 Grating	380	SF	$25.00	$9,500
2.7 Miscellaneous Steel	2,150	LB	$1.85	$4,000
2.8 Fish Bypass				
Concrete Manhole	8	CY	$700.00	$5,600
Pipe (18" Dia.)	220	LF	$80.00	$17,600
Pipe Supports	22	EA	$1,000.00	$22,000
Miscellaneous Steel	6,600	LB	$1.85	$12,200
Control Gate (2.0' w x 4.0' h)	1	EA	$5,000.00	$5,000
Excavation (Rock)	60	CY	$20.00	$1,200
Backfill	60	CY	$4.00	$200
Spoil	60	CY	$11.00	$700
2.9 Electrical Power Supply and Controls	1	LS	$75,000.00	$75,000
Subtotal				$1,189,200
Contingency	20.0%			$238,000
Subtotal Construction Cost				$1,427,200
PacifiCorp Indirect Cost	15.0%			$214,000
Engineering				$280,000
Total Engineering and Construction Cost				$1,921,200

Note 1: It is assumed that the existing stoplogs in the existing Cove Intake can be used to dewater the fish screen area for construction purposes.

Black & Veatch

Client: PacifiCorp **11-Jun-04**
Project: Cove Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Title: Alternative No. 4 - Grace Tailrace Barrier

Description		Quantity	Unit	Unit Cost	Total Cost
1.0 Cofferdam					
1.1 Fill Material		5,200	CY	$20.00	$104,000
1.2 Liner Material		14,700	SF	$1.25	$18,400
1.3 Dewatering		1	LS	$20,000.00	$20,000
2.0 Tailrace Barrier Facility					
2.1 Site Work					
Structure Fill Material		1,800	CY	$20.00	$36,000
Abutment Fill Material		470	CY	$20.00	$9,400
Access Road					
Fine Grade		5,250	SF	$3.00	$15,800
Rock Surfacing		65	CY	$36.00	$2,300
Site Finishing		1	LS	$10,000.00	$10,000
2.2 Concrete					
Slab on Grade		360	CY	$350.00	$126,000
Formed Walls		160	CY	$700.00	$112,000
Elevated Slab		125	CY	$550.00	$68,800
2.3 Pickets		58,000	LB	$1.85	$107,300
2.4 Handrailing		570	LF	$60.00	$34,200
2.5 Trashrake (Furnish and Install)		1	LS	$233,000.00	$233,000
2.6 Electrical Power Supply and Controls		1	LS	$75,000.00	$75,000
Subtotal					$972,200
Contingency	20.0%				$194,000
Subtotal Construction Cost					$1,166,200
PacifiCorp Indirect Cost	15.0%				$175,000
Engineering					$200,000
Total Engineering and Construction Cost					$1,541,200

Black & Veatch

Client: PacifiCorp **11-Jun-04**
Project: Cove Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Title: Alternative No. 5 - Cove Tailrace Barrier

Description		Quantity	Unit	Unit Cost	Total Cost
1.0 Cofferdam					
1.1 Fill Material		2,000	CY	$20.00	$40,000
1.2 Liner Material		6,300	SF	$1.25	$7,900
1.3 Dewatering		1	LS	$20,000.00	$20,000
2.0 Tailrace Barrier Facility					
2.1 Site Work					
Structure Excavation (Rock)		440	CY	$20.00	$8,800
Abutment Fill Material		470	CY	$20.00	$9,400
Spoil		440	CY	$11.00	$4,800
Access Road					
Fine Grade		7,500	SF	$3.00	$22,500
Rock Surfacing		100	CY	$36.00	$3,600
Site Finishing		1	LS	$10,000.00	$10,000
2.2 Concrete					
Slab on Grade		440	CY	$350.00	$154,000
Formed Walls		210	CY	$700.00	$147,000
Elevated Slab		165	CY	$550.00	$90,800
2.3 Pickets		82,000	LB	$1.85	$151,700
2.4 Handrailing		690	LF	$60.00	$41,400
2.5 Trashrake (Furnish and Install)		1	LS	$285,000.00	$285,000
2.6 Electrical Power Supply and Control		1	LS	$75,000.00	$75,000
Subtotal					$1,071,900
Contingency	20.0%				$214,000
Subtotal Construction Cost					$1,285,900
PacifiCorp Indirect Cost	15.0%				$193,000
Engineering					$200,000
Total Engineering and Construction Cost					$1,678,900

Black & Veatch

Client: PacifiCorp 11-Jun-04
Project: Bear River Hydroelectric Project
Work: Feasibility Study - Fish Friendly Alternatives
Title: Alternative No. 6 - Grace/Cove Interconnection Canal

Description	Quantity	Unit	Unit Cost	Total Cost
1.0 Demolition				
1.1 Dam - Non-reinforced Concrete	1,809	CY	$100.00	$180,900
1.2 Dam Reinforced Concrete	247	CY	$140.00	$34,600
1.3 Intake Screens	5	EA	$850.00	$4,300
1.4 Haul - 5 mile	2,056	CY	$11.00	$22,600
2.0 Restoration				
2.1 Grade silt in reservoir	50,000	CY	$5.00	$250,000
2.2 Seed reservoir area	6	AC	$3,000.00	$18,000
3.0 Cofferdam				
3.1 Fill Material	1,250	CY	$20.00	$25,000
3.2 Liner	8,250	SF	$1.25	$10,300
3.3 Dewatering	1	LS	$35,000.00	$35,000
4.0 Canal				
4.1 Rock Excavation for Canal	12,000	CY	$20.00	$240,000
4.2 Canal Embankment	26,500	CY	$20.00	$530,000
4.3 Concrete Lining - Slope	1,650	LF	$110.00	$181,500
4.4 Concrete Lining - Slab	1,650	LF	$40.00	$66,000
4.5 Spillway				
Slab on Grade	450	CY	$350.00	$157,500
Formed Walls	360	CY	$700.00	$252,000
4.6 Riprap	3,000	CY	$50.00	$150,000
5.0 Bear River Diversion				
5.1 Diversion Weir				
Excavation (Rock)	160	CY	$20.00	$3,200
Spoil	160	CY	$11.00	$1,800
Rockfill	520	CY	$40.00	$20,800
Concrete				$0
Slab on Grade	30	CY	$350.00	$10,500
Formed Walls	30	CY	$700.00	$21,000
5.2 Fishway				$0
Rockfill	40	CY	$40.00	$1,600
Concrete				$0
Slab on Grade	30	CY	$350.00	$10,500

Formed Walls (Weirs)	20	CY	$700.00	$14,000
5.3 Intake				$0
Excavation (Common)	600	CY	$8.00	$4,800
Backfill	140	CY	$4.00	$600
Spoil	460	CY	$11.00	$5,100
Fish Screens				$0
Panels (Furnish and Install)	415	SF	$90.00	$37,400
Panel Frames	8,800	LB	$3.70	$32,600
Guides and Supports	8,200	LB	$1.85	$15,200
Concrete				$0
Slab on Grade	90	CY	$350.00	$31,500
Formed Walls	80	CY	$700.00	$56,000
Elevated Slab	45	CY	$550.00	$24,800
Handrail	90	LF	$60.00	$5,400
Flow Control Gate (10'w x 10'h)	1	EA	$62,500.00	$62,500
5.4 Channel to Interconnection Canal				$0
Excavation (Common)	2,800	CY	$8.00	$22,400
Spoil	2,800	CY	$11.00	$30,800
Concrete Lining	160	CY	$350.00	$56,000

Subtotal		$2,626,200
Contingency	20%	$525,000
Subtotal Construction Cost		$3,151,200
PacifiCorp Indirect Cost	15%	$473,000
Engineering		$485,000
Total Engineering and Construction Cost		$4,109,200

bc (via e-mail with attachments): Garrett, Holt – Grace, Johnson/FERCEASE – 330 NTO, Kolkman – 330 NTO, Pratt – 330 NTO, Davies – 330 NTO, O'Connor, Snyder, Sturtevant, Zerba, Atwood, Kirschenman, Meyer

Meyer, Carole

From: efiling@ferc.gov
Sent: Wednesday, September 01, 2004 1:17 PM
To: Meyer, Carole
Cc: efiling@ferc.gov
Subject: FERC Acceptance in P-20-000, P-20-027

Notice of Acceptance

This is in reference to:

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