

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Continuation Sheet**

Section number _____ Page _____

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 88002741 Date Listed: 12/15/88

<u>Elwha River Hydroelectric Power Plant</u>	<u>Clallam</u>	<u>WA</u>
Property Name	County	State

Hydroelectric Power Plants in Washington State, 1890-1938 MPS
Multiple Name

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

Patrick Andrus
Signature of the Keeper

12/15/88
Date of Action

=====
Amended Items in Nomination:

The contributing resource count included in section 3 of the nomination is correct. However, the list of contributing structures on page 4 of section 7 should read "Penstocks (4)." Also, L. L. Summers and Company should be listed as the builder on the builder/architect line of section 8. These issues were resolved during a telephone conversation with Leonard Garfield of the Washington SHPO office.

DISTRIBUTION:

- National Register property file
- Nominating Authority (without nomination attachment)

2741

RECEIVED

NOV 2 1988

NATIONAL REGISTER

United States Department of the Interior
National Park Service

National Register of Historic Places
Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name Elwha River Hydroelectric Power Plant
other names/site number N/A

2. Location

street & number North End of Lake Aldwell not for publication
city, town Port Angeles vicinity
state Washington code WA county Clallam code 009 zip code 98362

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
<input checked="" type="checkbox"/> private	<input type="checkbox"/> building(s)	Contributing	Noncontributing
<input type="checkbox"/> public-local	<input checked="" type="checkbox"/> district	1	buildings
<input type="checkbox"/> public-State	<input type="checkbox"/> site	6	sites
<input type="checkbox"/> public-Federal	<input type="checkbox"/> structure	7	structures
	<input type="checkbox"/> object		objects
			0 Total

Name of related multiple property listing:
Hydroelectric Power Plants in Washington State

Number of contributing resources previously listed in the National Register 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.
Robert E. Moran Signature of certifying official
Washington State Office of Archaeology & Historic Preservation State or Federal agency and bureau
October 12, 1988 Date

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of commenting or other official

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:
 entered in the National Register.
 See continuation sheet.
 determined eligible for the National Register. See continuation sheet.
 determined not eligible for the National Register.
 removed from the National Register.
 other, (explain:)
Patrick Andrews Signature of the Keeper
12/15/88 Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)

INDUSTRY/energy facility

Current Functions (enter categories from instructions)

INDUSTRY/energy facility

7. Description

Architectural Classification

(enter categories from instructions)

Other/concrete gravity dam

Other/industrial vernacular

Materials (enter categories from instructions)

foundation concrete

walls concrete

roof

other

Describe present and historic physical appearance.

Located in the northern foothills of the Olympic Mountains, the Elwha River Power Plant is sited in a canyon where the Elwha River, flowing from the glaciers of Mount Olympus, provides a 100 foot head for operation of the turbines.

CONSTRUCTION OF DAM: In 1911, the engineering firm, L.L. Summers and Company of Chicago began construction on the dam and powerhouse. The engineers closed the Elwha Canyon with a 450 foot long dam. A 30 degree deflection near the center of the structure divides the dam into two tangent sections. The structure consists of a 120 foot long concrete gravity central section flanked by concrete multiple-buttress spillway and intake sections.¹

Unlike the concrete gravity dam which was derived from the more conventional masonry monolithic structures, the multiple-buttress dam represented an novel form derived from slab construction. It was invented in 1903 by N.F. Ambursen, and was used for structures under a height of 150 feet. In this dam type, the water load is carried by a row of concrete buttresses in the shape of triangular slabs set with their narrow edges facing up and downstream. Concrete slabs, inclined in the direction of the stream flow, are placed between the upstream faces of the buttresses. The row of slabs act as broad beams, which impound the water and transmit the load to the buttresses, primarily as a compressive force.²

The multiple-buttress dam had several design advantages. It is a highly articulated form that requires a minimum of material. Because it is constructed in separate load-bearing units, any structural failure is limited to a single bay. If designed properly, the Ambursen dam cannot overturn because the resultant of the water load and the weight of the dam passes close to the longitudinal center line of the base. The total load is uniformly distributed over the buttresses.

The contractors proposed to hang the Elwha dam between the rock walls of the canyon, and to support the structure by building a deep cut-off wall at the base of the gorge. However, they confronted many problems in their attempt to place the concrete between an upstream and downstream cofferdam. The rapid, turbulent flow of water through the gorge caused severe leakage underneath the cofferdams; it became apparent that it would not be possible to build the foundation in a watertight enclosure, and the concrete could not be laid under optimum, dry conditions. As a result most of the "bottom course" was "deposited in the wet" by lowering batches of concrete into the water in buckets. The foundation was built to water level by this primitive method.

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetSection number 7 Page 2

In order to prevent seepage underneath the dam, a caisson or rectangular opening, 26 1/2 by 9 1/2 feet, was built in the center of the structure. Ten foot thick curtain walls braced with heavy reinforced concrete beams, were inserted into the caisson. The original design specified that these cutoff walls would be extended to impervious material, and would be firmly anchored to the main structure and to the adjacent canyon walls by steel rods.³

DAM FAILURE: Despite the design intentions in the spring of 1912 leakage occurred at the downstream toe of the dam. The contractor agreed to open up the caisson to observe the extent of seepage. The excavation also revealed the character of the masonry at the base of the dam. It was possible to scoop out the original concrete material by hand; the cement had been completely washed from the aggregate, and the dam was not resting on bedrock. In an attempt to sink the caisson further and replace the soft concrete, the gates were closed and the water in the reservoir behind the dam rose. Pressure in the caisson below the dam led to the failure and on the evening of October 30, 1912, the bottom of the dam gave way. In the torrent of the draining reservoir, the dam was severely damaged.

Substantial damage was also done to the generating equipment, the switchboard, and the curtain wall at the south end of the powerhouse. Subsequent investigations revealed that the force of the water swept away critical structural components; the caisson curtain walls and the steel cut-off wall at the toe of the dam became part of the debris that flooded downstream. Strangely enough the upper portion of the dam remained intact: a bridge of concrete, 100 feet deep, remained wedged between the canyon walls.⁴

In reconstructing the dam, a plan was adopted to excavate materials from the walls of the canyon and to place this heavy rock fill above, below, and beneath the dam. In addition, it was necessary to construct a toe of sufficient weight and stability to carry the enormous quantity of fill and to resist the tendency to scour.

The toe consists of a massive 3000 ton steel crib filled with concrete, and placed 25 feet downstream from the toe of the original structure. The concrete toe was reinforced by rows of interlocking steel pilings driven 50 feet into the river bed at various intervals. The rows of steel pilings were driven across the entire width of the river at point 15, 35, and 85 feet from the toe of the original structure.

Rock from the sides of the canyon was dynamited into the river to provide a heavy rock fill over the river bed and protect the foundation from inevitable scouring. One of the critical requisites for the successful completion of the work was to insure a minimum of space or voids between the rocks. This was accomplished by depositing the fill quickly. In order to attain an adequate and proportionate mixture, large quantities of earth were placed on the exposed rock of the perpendicular canyon walls before they were dynamited into the river. The dam was cushioned from the blasts by the construction of tunnels adjacent to the dam.

The successful repair of the dam was contingent upon making the upstream face of the structure impervious to seepage. Timber mattresses were placed on top of the rock fill across the entire upstream are extending 150 feet west of the dam face. The timber was covered by additional fill of loose rock and earth material transported to the site in dump cars from the adjoining hills.

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetSection number 7 Page 3

Despite this large quantity of fill, there continued to be seepage through the foundation at a rate of 300 second feet. Consequently, the engineers proposed to continue placing earth fill on top of the timber mats. During the summer of 1914, hydraulic pumps were used to wash earth and gravel from the south slope above the dam onto the timber mats. By December, 1914, the seepage had been halted. After four long years, the Elwha River dam was completed.⁵

Headgates and Spillway: During the repair of the foundation, the north spillway was enlarged which increased its overflow capacity to 50,000 cubic feet. In addition, modern steel tainter gates, 13 3/4 by 23 feet, were installed in both spillways to replace the primitive stop logs that were originally employed. The gate was the most recent "tainter" patent of its day, a gate commonly used in early 20th century American power plant installations. In cross-section, the gate is a circular steel arc and is riveted to a steel framework of channels and angles that rotate about an axis near the downstream edge of the buttresses. Originally, the gates could be raised both manually and from a switchboard by means of cables connected to motor operated hoists.

The headgates occupy 50 feet of the buttressed dam section, adjacent to the north spillway. There are two 12 by 15 foot gates and one 5 by 8 foot gate which regulate the flow of water into three penstocks. The headgates are able to discharge a maximum capacity of 1750 c.f.s. of water to operate the generating units. Trash racks were installed in front of the gates to prevent debris from entering the turbine casings.⁶

Penstocks and Generating Units: Two nine foot six inch diameter steel penstocks and one three foot diameter penstock are connected to the head gates. The large penstocks supply water under a 100 foot head to operate two 4,800 hp Wellman Seaver Morgan Francis type, double runner turbines, direct connected to 3,000 KV Westinghouse alternators of the revolving field type which generate three-phase current at 6,600 volts when operating at 360 r.p.m. The units are regulated by Woodward governors of the oil pressure type. Oil is supplied to each governor by a triplex oil pump operated from the generator shaft by belting.

The smallest penstock supplies water to power a turbine that is direct connected to a direct current 200 KW exciter unit. This unit not only provides excitation for the generator field, it also supplies current to light the station, and to operate the 30 ton capacity crane. All of this equipment was part of the original installation; with cleaning and minor rebuilding, the equipment survived the dam failure.

Generators #3 and #4 were added in 1921 and 1922 to provide the additional power needed to operate the Washington Pulp and Paper Mill in Port Angeles which began production in 1921. One enormous penstock, whose pressure is regulated by a large standpipe, was also added in 1921; it carries water from the headgate to two 5,000 hp S. Morgan Smith and Company turbines which are direct connected to two 3,330 KVA Westinghouse alternating current generators (6600 volt, 60 cycle, 3 phase, 300 rpm., last patent date August 29, 1916). The units are regulated by a Woodward Governor.⁷

Powerhouse: The equipment is housed in a simple, straightforward concrete structure. The original two story building is 60 feet high and 90 by 70 feet in plan. The building rests

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Continuation Sheet**

Section number 7 Page 4

on bedrock and is structurally supported by reinforced concrete columns that are faced with curtain walls. The lower floor contains the generating units, while the transformers and high tension switching apparatus occupies the upper story.

The original power plant was expanded in 1921 when generator #3 and #4 were added to the complex.⁸ The one story addition abuts the south wall of the original structure. The original building is a solid, rectangular concrete form punctuated by a succession of windows; the concrete in the addition, on the other hand, has been reduced to slender horizontal beams and vertical columns which rhythmically frame the walls of windows.

Switchboard: The controls for the station and for the outgoing transmission lines are located in the switching gallery which occupies 600 square feet in the southeast corner of the generating room. The original circular bench switchboard remains intact and is still being used. The instruments are mounted on panels of oiled black slate which are supported on a structural steel frame. A curvilinear row of steel Doric columns which supports the switchboard is an example of the marvelous detailing that survives intact.

Transformers: Like many of the early hydroelectric installations, the Elwha River Power Plant housed the transformers. As the technology developed, "open air" substations were built in which the equipment was left uncovered adjacent to the plants. Originally the Elwha Plant housed two banks of Westinghouse transformers. There were seven 1,000 KVA oil-insulated, water-cooled units which transformed 6,600 volts to the line voltage of 66,000 volts. The current passed through Kelman oil switch circuit breakers; it was then led directly through insulating roof bushings to external transmission lines.

Contributing Structures:

Dam (inc. North and South Spillway)
Penstocks (5)
Surge Tank

Contributing Buildings:

Powerhouse

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

nationally statewide locally

Applicable National Register Criteria A B C D

Criteria Considerations (Exceptions) A B C D E F G

Areas of Significance (enter categories from instructions)

Engineering
Industry

Period of Significance

1910-1937

Significant Dates

1912, 1914

Cultural Affiliation

N/A

Significant Person

N/A

Architect/Builder

Not Known

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

The Elwha River Hydroelectric Power Plant is a historically significant example of a low head hydroelectric system in Washington State from the early 20th century. In addition, the dam is a rare, early example of the multiple-buttress type. Finally, the "blowout", and reconstruction, of the original dam foundation is noteworthy because it represents a failure of early engineering and a successful response to that failure. Although some changes have been made to the system over the years, no one element has been so altered that the continuity of the system is compromised. The Elwha River system meets the registration requirements established in the Hydroelectric Power Plant multiple property documentation form.

Historical Background: Early hydroelectric power development on the Olympic Peninsula was spearheaded by a single individual, Thomas T. Aldwell. The power project was financed by large Eastern interest but it was the vision, tenacity and relentless spirit of Aldwell that pushed forward the construction of a sound installation in the face of countless odds. Soon after Aldwell settled in Port Angeles, it became evident that development of the peninsula was inextricably linked to the growth of industry within the region. And in order to convince companies to invest capital in the area, it would be necessary to assure them that there was an abundant and reliable source of electrical power.

Aldwell's dream of transforming Port Angeles through the development of hydroelectric power began in 1890 when he homesteaded the site on which the existing Elwha River Plant is situated. Over the course of 12 years he quietly purchased the adjacent lands, acre by acre, foot by foot. By 1908 he had acquired all of the land that would be flooded as a result of the development of the site. Meanwhile, his original partners sold out to George A. Glines, a wealthy real estate operator from Winnipeg, who had purchased large tracts of property in Port Angeles, a place he called "an outpost of civilization" with enormous possibilities.⁹

The first concrete step towards the realization of Aldwell's dream was the formation of Olympic Power and Development Company in 1910. Glines was made president and Aldwell became vice-president and general manager of the company. Before money could be secured for construction of a dam, it was necessary to obtain franchises and contracts to convince the financiers that the potential income and market for electrical power would justify their investments. The Olympic Power and Development Company obtained the contract to sell

See continuation sheet

9. Major Bibliographical References

Crown Zellerbach Corporation. More Power to You: 1890-1940. Port Angeles: 1940.
"Glines Canyon Plant Under Supervisory Control," Electrical West, Volume 60, Number 4,
April 1, 1928.

Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey # _____
- recorded by Historic American Engineering Record # _____

See continuation sheet

Primary location of additional data:

- State historic preservation office
- Other State agency
- Federal agency
- Local government
- University
- Other

Specify repository: _____

10. Geographical Data

Acreage of property 3.5

Quadrangle Name: Elwha Scale: 1:24000

UTM References

A	<u>1</u> <u>0</u>	<u>4</u> <u>5</u> <u>8</u> <u>6</u> <u>9</u> <u>0</u>	<u>5</u> <u>3</u> <u>2</u> <u>6</u> <u>8</u> <u>8</u> <u>0</u>
	Zone	Easting	Northing
C	<u>1</u> <u>0</u>	<u>4</u> <u>5</u> <u>8</u> <u>6</u> <u>4</u> <u>0</u>	<u>5</u> <u>3</u> <u>2</u> <u>6</u> <u>7</u> <u>4</u> <u>0</u>

B	<u>1</u> <u>0</u>	<u>4</u> <u>5</u> <u>8</u> <u>7</u> <u>2</u> <u>0</u>	<u>5</u> <u>3</u> <u>2</u> <u>6</u> <u>7</u> <u>6</u> <u>0</u>
	Zone	Easting	Northing
D	<u>1</u> <u>0</u>	<u>4</u> <u>5</u> <u>8</u> <u>6</u> <u>1</u> <u>0</u>	<u>5</u> <u>3</u> <u>2</u> <u>6</u> <u>8</u> <u>1</u> <u>0</u>

See continuation sheet

Verbal Boundary Description

The nominated property is a rectangular parcel located at the confluence of Lake Mills and the Elwha River with boundaries indicated on the attached sketch map (Scale: 1" = 60').

See continuation sheet

Boundary Justification

The nominated property includes the dam, water conveyance system and powerhouse historically associated with the Glines Canyon project.

See continuation sheet

11. Form Prepared By

name/title	<u>Lisa Soderberg</u>	date	<u>October 23, 1986</u>
organization	<u>Office of Arch'y & Historic Preservation</u>	telephone	<u>(206) 753-4011</u>
street & number	<u>111 West 21st Avenue, KL-11</u>	state	<u>Washington</u>
city or town	<u>Olympia</u>	zip code	<u>98504</u>

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 2

power to the Citizen's Electric Company of Port Townsend and to the Western Steel Corporation at Irondale. They also received tentative agreements to provide power to the Bremerton Navy Yard, Fort Worden, and Fort Flagler. Ironically, they encountered their most difficult battle in an effort to secure a franchise from the City Council of Port Angeles. Despite Mayor Lewis' attempts to thwart their efforts by means of counter proposal backed by Seattle investors to develop power on the Little River, Glines and Aldwell eventually won the confidence of the council and the franchise to supply power to Port Angeles.¹⁰

As was true of most other hydroelectric developments in the West, Glines and Aldwell sought investors in the East to finance their power project through the floating of bond issues. Eventually, they persuaded Peabody, Houghteling, and Company of Chicago to provide the primary capital for the construction of a dam and power plant on the Elwha River.

In spite of its remote location, the investors were encouraged by many of the natural features of the canyon site and the Elwha River watershed. At this location, the Elwha River provided a 100 foot head for the operation of the turbines. The river rises in the glaciers flanking Mount Olympus and discharges into the straits of Juan de Fuca, at a rate ranging from a minimum of 10,000 cubic feet per second in the summer to a maximum flood flow of 28,000 cubic feet per second during the winter. The 305 square mile Elwha watershed has a mean annual rainfall of 70 inches. Combined with the melting snows of the glaciers, this enormous quantity of rain ensures a reliable supply of water for power development throughout the entire year. Snow and ice deposits at high elevations form natural reservoirs which prevent the shortages that often occur at power installations during the summer months.¹¹

Construction of the project was plagued by difficulties, culminating in the failure of the dam in 1912. A careful investigation was undertaken to assess the cause of the disaster. It was clear that the primary reason for the failure was due to the fact that the dam was supported on porous foundations of sand and gravel. Subsequent borings indicated the bedrock was 70 to 116 feet below the bottom of the dam.

A contemporary engineering journal complained that the Elwha River catastrophe was yet another example of the American engineer's "gross neglect of dam foundations", and his repeated "failure to take adequate precautions against undermining." The journal emphasized that the failure lay in American dam construction practice, because the engineer's European counterpart did not have the same notorious record.

The journal asserted that the immediate cause of the Elwha River dam failure could be attributed to two factors: 1) the premature raising of the head before the cut-off wall had been driven to the proper depth; and 2) the improper placement of the steel sheet piling below the toe of the dam. The location of the steel sheet piling was too close to the tow, and it caused a considerable increase in the upward pressure acting on the base. It also reduced the discharge area beneath the dam. As a result the velocity of the water between the sheet piling and the toe of the dam was greatly accelerated which severely undermined the foundation. The flow of water through the sluice gates during construction eroded the river bed adjacent to the toe. This action may have undermined the lateral support of the dam, and contributed to its failure.¹²

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Section number 8 Page 3

The owners immediately set out to rebuild and repair the damage. In the hope that they could reduce costs, they investigated the possibility of building a new dam. However, they did not obtain satisfactory results from borings of the underlying strata taken upstream and downstream from the original structure. Committed to rebuilding, they sought the advice of several specialists who proposed various methods of closing and sealing the opening under the dam. Because over a million dollars had already been invested in the project, there was a strong desire to keep costs as low as possible. It was estimated that it would cost approximately \$600,000 to carry the dam down to bedrock by means of pneumatic caissons. The company's consulting engineers, D.W. Meade and C.V. Seastone of Madison, Wisconsin proposed an original and entirely feasible plan that would cost an estimated \$150,000. This plan involved placing a heavy rock fill above, below, and beneath the dam. The design challenge lay in constructing a toe of sufficient weight and stability to carry the enormous quantity of fill and to resist the tendency to scour. The contractor, J.O. Heyworth and Company of Chicago, executed this economical solution.

The massive toe was a 3000 ton steel crib filled with concrete and reinforced with steel pilings. Rock from the canyon walls served as a fill over the river bed to protect the foundation, and the upstream face of the structure was made impervious to seepage by the placement of timber mattresses on top of the rock fill, with earth fill on top of that. When completed in 1914, the Elwha Plan provided most of the electrical power for the peninsula, including the Bremerton Navy Yard and Forts Flagler, and Worden. Although regional systems of that size were not unusual in Washington, no other system was spearheaded by a single individual.

In time, the Olympic Power Company, which later became the Northwest Power and Light Company, could not meet the load demands of the peninsula's inhabitants and industries. The construction of an additional 15 MW powerplant did not suffice for long. Finally in 1926, almost 20 years after the phenomenon occurred in other parts of the state, a large power company bought up and consolidated the small local entities on the peninsula. In 1937, the Elwha River Plant was purchased by the Crown Zellerbach Corporation to supply power to the pulp and paper mill in Port Angeles.

Although construction of the facility represented a significant achievement for the utility, the project provided no mitigation for the serious loss of fish runs, the inundation of wildlife habitat, or the disruption to the tradition cultural and subsistence economy of the Lower Elwha and Jamestown tribes. Any assessment of the historical impact of this plant must recognize the damage inflicted on both the native inhabitants and the natural environment.

¹Oran D. Jones, "The Olympic Power Company's System," Journal of Electricity, Power and Gas, Volume 35, Number 15, October 9, 1915, p. 280.

²Carl Condit. American Building Art, The Twentieth Century, New York, Oxford University Press, 1961, pp. 226-227.

³Jones, op.cit., p. 280.

⁴Jones, op.cit., p. 298.

⁵Ibid., pp. 298-301.; "Reconstructing the Foundation of the Elwha River Dam," Engineering News, Volume 70, Number 25, pp. 1258-1259.

⁶Jones, op.cit., pp. 280-281.

⁷Ibid., pp. 280-281.

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Continuation Sheet**

Section number 8 Page 4

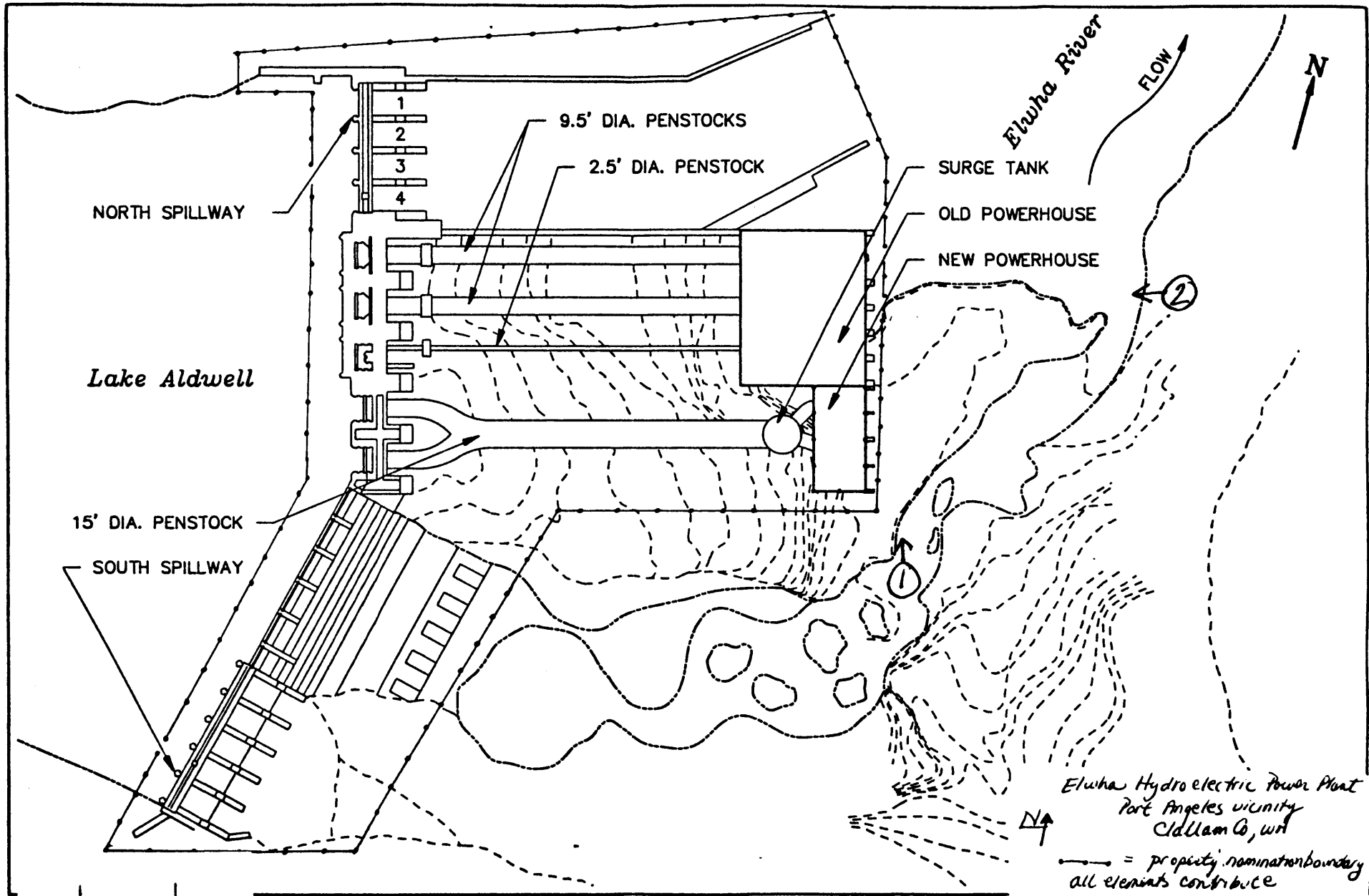
⁸Ibid., p. 281.

⁹Thomas T. Aldwell. Conquering the Last Frontier. Seattle; Superior Publishing Co., 19 ,
pp. 80-84.

¹⁰Ibid., pp. 84-85.

¹¹Jones, op.cit., p. 298.

¹²Ibid., p. 301.



NORTH SPILLWAY

Lake Aldwell

15' DIA. PENSTOCK

SOUTH SPILLWAY

1
2
3
4

9.5' DIA. PENSTOCKS

2.5' DIA. PENSTOCK

SURGE TANK

OLD POWERHOUSE

NEW POWERHOUSE

Elwha River

FLOW

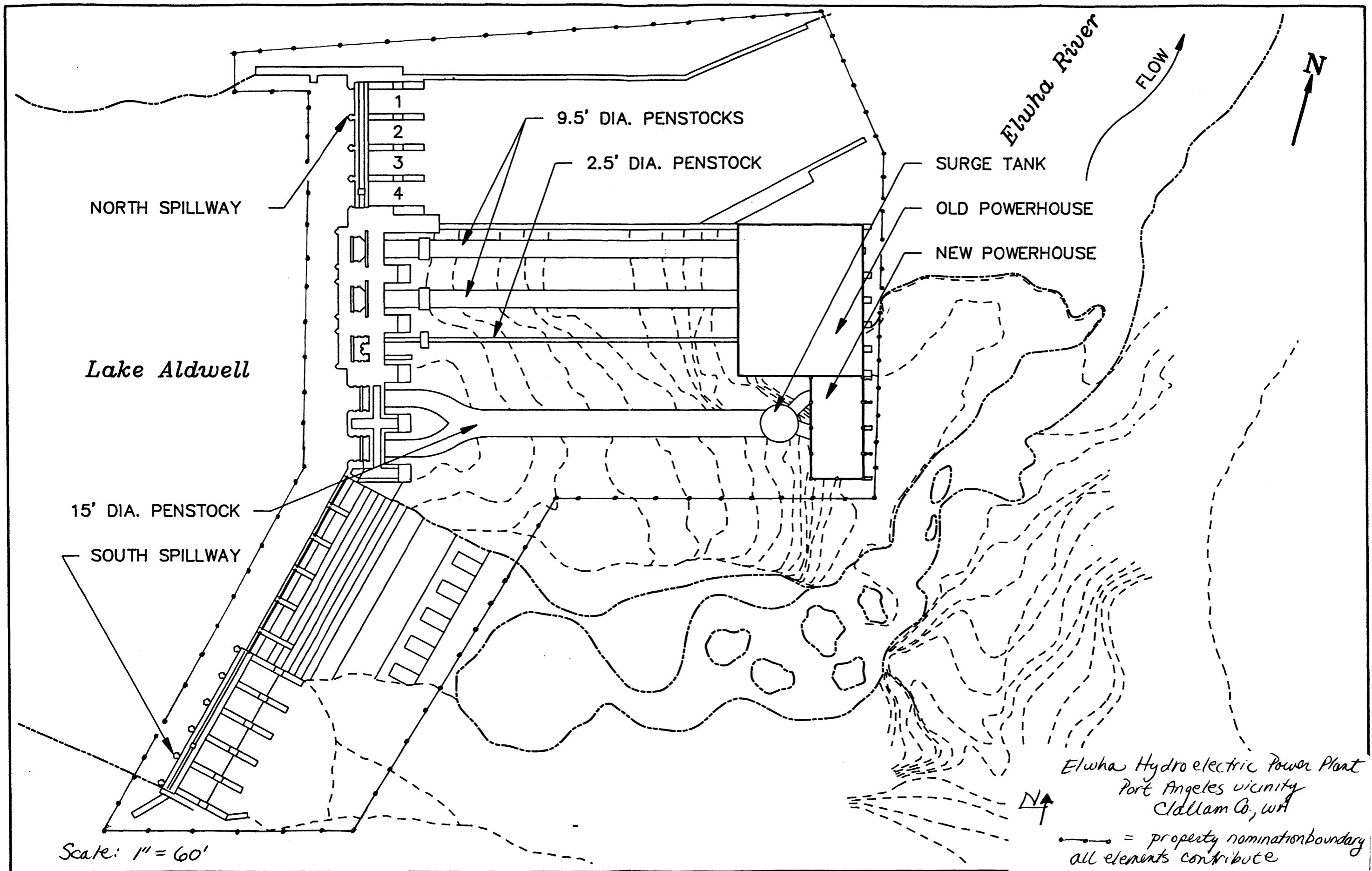
N

0' 60'

Elwha Hydro electric Power Plant
Port Angeles vicinity
Clallam Co, Wn

— = property nomination boundary
all elements contribute

⊙ = photo key



Scale: 1" = 60'

Elwha Hydroelectric Power Plant
 Port Angeles vicinity
 Clallam Co., WA

—●— = property nomination boundary
 all elements contribute