October 1, 2004

Fred Ayer, Executive Director  
Low Impact Hydropower Institute  
34 Providence Street  
Portland, Maine 04103

RE: RAQUETTE RIVER PROJECTS – Erie Boulevard Hydropower, LP
    Carry Falls Project   FERC #2060
    Upper Raquette Project  FERC # 2084
    Middle Raquette Project  FERC #2320
    Lower Raquette Project  FERC # 2330

Dear Fred,

Attached is Land & Water Associates, Inc.’s DRAFT review of Erie Boulevard Hydropower, LP’s application for the four Raquette River Projects, located on the Raquette River in northern New York.

I have determined that the Projects meet the Low Impact Hydropower Institute (LIHI) certification criteria. Consequently, I recommend that the Institute should certify the Raquette Projects as low impact.

I will be happy to answer any questions prior to or during the Board’s upcoming meeting in October.

Sincerely,

David A. Van Wie

David A. Van Wie  
Principal
Low Impact Hydropower Institute
Certification Review

Raquette River Projects
Carry Falls Project FERC #2060
Upper Raquette River Project FERC #2084
Middle Raquette River Project FERC #2320
Lower Raquette River Project FERC #2330

Introduction:

An application for Low Impact Hydro Certification was filed with the Low Impact Hydro Institute (LIHI) in June 2004 by Erie Boulevard Hydropower, LP (Reliant Energy), for four FERC-licensed hydropower projects on the Raquette River in St. Lawrence County in northern New York. The application includes the following projects, which include a total of 14 different developments over the length of the Raquette River.¹

<table>
<thead>
<tr>
<th>Project/Development</th>
<th>River Mile</th>
<th>Generation (MW)</th>
<th>Dam Crest Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry Falls Project</td>
<td>68</td>
<td>0 MW = storage only</td>
<td>1385 ft</td>
</tr>
<tr>
<td>Upper Raquette River Project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stark</td>
<td>66</td>
<td>23,872 kW</td>
<td>1355 ft</td>
</tr>
<tr>
<td>Blake</td>
<td>62</td>
<td>13,913 kW</td>
<td>1250.5 ft</td>
</tr>
<tr>
<td>Rainbow Falls</td>
<td>56</td>
<td>22,828 kW</td>
<td>1181.5 ft</td>
</tr>
<tr>
<td>Five Falls</td>
<td>54</td>
<td>22,828 kW</td>
<td>1077.0 ft</td>
</tr>
<tr>
<td>South Colton</td>
<td>52</td>
<td>18,948 kW</td>
<td>973.5 ft</td>
</tr>
<tr>
<td>Middle Raquette River Project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higley</td>
<td>47</td>
<td>7,300 kW</td>
<td>880.6 ft</td>
</tr>
<tr>
<td>Colton</td>
<td>45</td>
<td>30,101 kW</td>
<td>835.0 ft</td>
</tr>
<tr>
<td>Hannawa</td>
<td>39</td>
<td>7,200 kW</td>
<td>548.5 ft</td>
</tr>
<tr>
<td>Sugar Island</td>
<td>38</td>
<td>4,800 kW</td>
<td>470.0 ft</td>
</tr>
<tr>
<td>Lower Raquette River Project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norwood</td>
<td>28</td>
<td>2,000 kW</td>
<td>326.1 ft</td>
</tr>
<tr>
<td>East Norfolk</td>
<td>23</td>
<td>3,500 kW</td>
<td>287.9 ft</td>
</tr>
<tr>
<td>Norfolk</td>
<td>22</td>
<td>4,500 kW</td>
<td>254.1 ft</td>
</tr>
<tr>
<td>Raymondville</td>
<td>20</td>
<td>2,000 kW</td>
<td>209.6 ft</td>
</tr>
</tbody>
</table>

A copy of the application was posted on the LIHI website July 9, 2004, with a public comment period ending September 9, 2004. No comments were received during that period.

¹ The application does not include the Piercefield Project upstream of Carry Falls, which is also owned by Erie. Several smaller exempt projects on the Raquette are not included in this application (Yaleville, Unionville, Hewwittville, Sissonville). The Potsdam Project (FERC #2869), owned by the Village of Potsdam, is not included.
The applicant’s projects were previously owned by the Niagara Mohawk Power Corporation before later acquisition by Reliant Energy through its Erie Boulevard Hydropower, LP affiliate. In 1992, New York State Department of Environmental Conservation (NYSDEC) had denied without prejudice Niagara Mohawk’s application for a Section 401 Water Quality Certification. Niagara Mohawk then appealed the certification, and settlement negotiations ensued to resolve issues pertaining to issuance of the certification and the new license. The original FERC license expired in 1993 and the project operated under an annual license in the interim period until the settlement negotiations were completed and the new license was issued. FERC issued a draft environmental assessment (EA) in 1996, and following comments by several parties, a final EA was issued on June 30, 2000, noting that the water quality certification appeal was ongoing. The licenses were issued following an Offer of Settlement signed in April 1998 (version dated March 13, 1998) by Niagara Mohawk Power Corporation and sixteen other parties\(^2\). New FERC licenses were issued for the four Raquette Projects on February 13, 2002.

A description of each development and each project is included in Attachment A.

Environmental Context

The Raquette River begins in the Adirondack highlands at Blue Mountain Lake, Raquette Lake and Long Lake, then flows northwest past Potsdam to Massena, NY before emptying into the St. Lawrence River/Seaway at the St. Regis Indian Reservation in Franklin County. The St. Lawrence River flows northeastward into the Gulf of St. Lawrence.

The projects are in a largely rural, forested area that is dependent on forestry, some agriculture (in the lower valley), wood products, and tourism. The Village of Potsdam, midway along the Raquette River, is home of Clarkson University and other colleges.

The current hydropower dams were built in the 1930s. Historically, the river has been developed for water power for sawmills, paper mills, tanneries, and other industry.

The Adirondack Park boundary runs through the Upper Raquette Project. Carry Falls, Stark, Blake, and Rainbow are entirely within the Park boundary, while part of Five Falls is within the Park.

The area experiences cold, snowy winters and short summers. Annual precipitation is about 40 inches. As the river flows down the north face of the Adirondacks, it transitions from coldwater habitat above the applicant projects, to a coolwater aquatic community/fishery as the river

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reaches the lower gradients. Water quality is considered good to excellent, although acid deposition causes pH to be elevated in the Adirondacks where buffering is low. The river ecosystem is generally low in nutrients and fine sediments, so total productivity is relatively low.

**General Description of the Raquette River Project Settlement Agreement and FERC Orders**

Key issues in the Settlement Agreement include

- providing minimum flows in bypass reaches,
- providing a minimum baseflow in the river below Raymondville,
- providing flows for fish spawning and downstream passage, and
- reducing the reservoir drawdowns particularly at Carry Falls and Stark.

The drawdown at Carry Falls was reduced from 53 feet to 30 feet with implementation of a new guide curve, and the drawdown at Stark was reduced from 23 feet to 1 foot or less. The settlement limits drawdowns in other reservoirs of only a half foot to two feet.

Also, the settlement includes requirements for:

- constructing portage facilities and trails at many of the developments,
- maintaining and improving recreation access,
- transferring certain lands for recreational access into the project boundary,
- implementing scheduled whitewater releases for boating primarily in the Colton bypass reach, and also at Hannawa and Sugar Island.
- establishing a Raquette River Advisory Committee (RRAC) to advise and provide comments on the recreation plan for the projects, and to approve expenditure of a $5000 annual fund for mitigation and enhancement projects.

The settlement agreement also requires a streamflow monitoring plan for flow and water level monitoring, including gages visible to the public.

In a settlement provision that remained separate from the FERC licensing and this Low Impact Hydropower application, Niagara Mohawk agreed to convey over 12,000 acres to New York State.

On June 11, 2002, the NYS Department of Environmental Conservation issued Water Quality Certifications for the Lower and Middle Raquette Projects, and also for the Upper Raquette and Carry Falls Projects. The WQCs included by reference the terms of the Settlement Agreement.

On February 13, 2002, FERC issued an order accepting the Settlement Agreement and four orders containing new license provisions for the four subject Projects, with a common expiration date of December 21, 2033.
Issues Resulting from the Certification Review

In interviews conducted by L&WA, the resource agencies and interested parties expressed a consistently positive attitude toward the Settlement Agreement and new FERC License, and satisfaction with Erie’s implementation of the requirements in the Agreement and FERC. With only a few minor delays for reasonable “real life” issues, Erie has reportedly met the timetables established for completing plans, agency coordination, and construction of facility improvements. There appear to be no significant issues that conflict with the Settlement Agreement, the License and the Low Impact Criteria.

Public Comment:

There were no public comments received outside of the interview process by the reviewer.

Conclusion:

Based on our review of project documents filed by the applicant, and available from FERC, and on the interviews conducted with knowledgeable parties, I conclude that this project meets the current criteria for Low Impact Hydropower Certification. I therefore recommend certification.
Low Impact Certification Criteria:

A. Flows [PASS]

1) Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?

YES = Pass, Go to B
N/A = Go to A2
NO = Fail

Yes. PASS

The pertinent resource agency recommendations were provided in the form of the Settlement Agreement and were incorporated into both the state’s 401 Water Quality Certifications (WQC), dated June 11, 1998, and the FERC Orders, dated February 13, 2002. The required flows are being implemented according to the schedule in the WQC and Settlement Agreement. All required plans were filed and approved by FERC after appropriate consultation with resource agencies

Minimum flows requirements are as follows (see FERC Orders for more details):

<table>
<thead>
<tr>
<th>Project/Development</th>
<th>Schedule Date</th>
<th>Required Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry Falls Project</td>
<td>NA</td>
<td>No bypass reach</td>
</tr>
<tr>
<td><strong>Upper Raquette River Project</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stark</td>
<td>2003</td>
<td>45 cfs / 90 cfs</td>
</tr>
<tr>
<td>Blake</td>
<td>2003</td>
<td>55 cfs; 120 cfs for walleye spawning season</td>
</tr>
<tr>
<td>Rainbow Falls</td>
<td>2005</td>
<td>20 cfs</td>
</tr>
<tr>
<td>Five Falls</td>
<td>2004</td>
<td>50 cfs; 145 cfs for walleye spawning season</td>
</tr>
<tr>
<td>South Colton</td>
<td>2004</td>
<td>20 cfs/ 60 cfs</td>
</tr>
<tr>
<td><strong>Middle Raquette River Project</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higley</td>
<td></td>
<td>None required in bypass; 20 cfs fish movement</td>
</tr>
<tr>
<td>Colton</td>
<td>2002</td>
<td>Seasonal schedule: 100/240/200/125/90 cfs</td>
</tr>
<tr>
<td>Hannawa</td>
<td>2002</td>
<td>50/95/65 cfs</td>
</tr>
<tr>
<td>Sugar Island</td>
<td>2002</td>
<td>300/400 cfs</td>
</tr>
</tbody>
</table>
Lower Raquette River Project

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norwood</td>
<td>2002</td>
<td>No bypass flows required; 20 cfs fish movement</td>
</tr>
<tr>
<td>East Norfolk</td>
<td>2002</td>
<td>75 cfs</td>
</tr>
<tr>
<td>Norfolk</td>
<td>2002</td>
<td>55 cfs + 20 cfs</td>
</tr>
<tr>
<td>Raymondville</td>
<td>2002</td>
<td>No bypass flow required; 20 cfs fish movement</td>
</tr>
</tbody>
</table>

Baseflow requirements below Raymondville:  
- 560 cfs in normal or wet years  
- 290 cfs in dry years

The Settlement Agreement and FERC Order also include requirements for filing and implementing a plan for monitoring headwater and tailwater elevations, base flows and minimum flows. These plans were approved by FERC and are being implemented.

A letter dated August 14, 2003 from David Stillwell of US Fish and Wildlife Service to Reliant Energy indicated that inspections of the flow and fish movement measures undertaken to date on the Raquette developments were satisfactory.

2) Not applicable

3) Not applicable

B. Water Quality [PASS]

1) Is the Facility either:

a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? OR

Yes.

L&WA has confirmed, through interviews with NYSDEC, that the Raquette River Project is in compliance with all conditions contained in the Clean Water Act - Section 401 Water Quality Certifications (WQC) issued for the four projects on June 11, 2002. The Section 401 WQC includes and incorporates the terms of the Settlement Agreement. Therefore, compliance with the WQC implies compliance with the entire Settlement Agreement, including the provisions that were specifically excluded from the FERC license. We have found no instances to date where the applicant has failed to meet the terms of the Settlement Agreement.
The WQC contains standard provisions related to erosion and sediment control for project maintenance and construction activities. The NYSDEC has confirmed that Erie has properly consulted with the Department when there has been any construction at the projects that triggers 401 certification conditions. The most prominent occurrence was for redevelopment of the Higley development.

There has been no maintenance dredging, and there is none planned.

b) **In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?**

YES = Go to B2
NO = Fail

N/A

2) **Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?**

YES = Go to B3
NO = Pass

Yes. Carry Falls Reservoir is on the 2002 303(d) list of waterbodies that fail to meet one or more applicable water quality standards.

3) **If the answer to question B.2 is yes, has there been a determination that the Facility is not a cause of that violation?**

YES = Pass
NO = Fail

Yes. PASS

The 2002 NYSDEC 303(d) list indicates that the Carry Falls Reservoir is in non-attainment of water quality standards (categorical: fish consumption) due to mercury contamination from atmospheric deposition. There are no indications that the Raquette Projects contribute to the non-attainment.

C. Fish Passage and Protection [PASS]

1) **Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and downstream passage of anadromous and catadromous fish issued by Resource**
Agencies after December 31, 1986?

YES = Go to C5
N/A = Go to C2
NO = Fail

Yes.

L&WA has confirmed with both the USFWS and the NYSDEC that upstream passage for anadromous or catadromous fish was not a management objective at the time of the Settlement Agreement, and no prescriptions or provisions have been made in the agreement or the FERC licenses. The FERC MPEA states at page 125, “Because there are no anadromous fish species in the reach of the Raquette being considered in this MPEA, anadromous fish passage is not recommended at this time”.

Eels presently get as far upstream as Hannawa Falls without passage structures. There are reports from USFWS and NYSDEC that stray Pacific salmon which were stocked in Lake Ontario are sometimes found below Raymondville. Also, Bill Gordon of NYSDEC mentioned that sturgeon may occur in the lower Raquette River, but that passage is not deemed desirable.

The 2002 Settlement Agreement and the new FERC licenses contain the relevant requirements by Resource Agencies for downstream fish passage in the form of required downstream passage flows, modifications to the structures and streambed in order to make the flows more “fish friendly”, and scheduled installation of 1 inch clear spaced bar trashracks to prevent/reduce entrainment. The 2002 Settlement Agreement supercedes previous prescriptions issues by USDOI in 1999.

Further, the US Departments of Interior and Commerce have also reserved their authority to prescribe fish passage facilities for the Raquette Project, and Article 403 of the FERC license reserves FERC authority to require construction, operation and maintenance of any such prescribed fish passage facilities.

2) Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct)?

YES = Go to C2a
NO = Go to C3

No.
FERC’s Final Multiple Project Environmental Assessment notes that “Up to the turn of the century, … the lower Raquette River shared the fish fauna of the St. Lawrence River (including Atlantic salmon), which were unable to travel upstream past Hannawa Falls.” (pg 104). Our discussions with fisheries biologists at US FWS and NYSDEC indicate that it is not known whether the historic Atlantic salmon populations were sea-run or landlocked. Also, the historic record indicates that Atlantic salmon had disappeared from the Raquette River (in the late 1800s) long before the dams were built (in the 1930s), presumably due to pollution, previous dams (for paper mills, sawmills and other industry), overfishing, and clearcutting in the watershed resulting in higher water temperatures.

a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or part to the Facility?

YES = Go to C2b
N/A = Go to C2b
NO = Fail

N/A. See response to #2 above.

b) If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?

YES = Go to C5
N/A = Go to C3
NO = Fail

N/A.

3) If, since December 31, 1986:

a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a above), and

Yes, they did.

b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,
The agencies included fish passage conditions in the Settlement Agreement.

c) Was a reason for the Resource Agencies’ declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?

NO = Go to C5
N/A = Go to C4
YES = Fail

No.

See response to C2 above. The lack of anadromous fish in the river is not attributed to the presence of the applicant’s facilities.

L&WA has confirmed with both the USFWS and the NYSDEC that upstream passage for anadromous or catadromous fish was not a management objective at the time of the Settlement Agreement, and no prescriptions or provisions have been made in the settlement agreement or the FERC licenses. The FERC MPEA states at page 125 “Because there are no anadromous fish species in the reach of the Raquette being considered in this MPEA, anadromous fish passage is not recommended at this time”.

Nevertheless, in Article 403 of each FERC license, the Department of Interior has reserved its right to issue fish passage prescriptions in the future in the event circumstances change.

4) Skip.

5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?

YES = Go to C6
N/A = Go to C6
NO = Fail

Yes. The Settlement Agreement and FERC license requirements for downstream fish passage at all 14 developments are intended to provide for downstream passage of riverine fish, and American eels in the lower river. There are no mandatory prescriptions for the upstream passage of riverine fish. L&WA has confirmed that Erie is on schedule with implementing the downstream fish passage requirements.
6) **Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?**

**YES = Pass, go to D**
**N/A = Pass, go to D**
**NO = Fail**

*Yes.*

The Settlement Agreement and FERC License require the phased future installation of 1-inch clear spacing physical barrier (bars or overlay) at the location of the existing trash racks at each development, beginning in 2002 to 2007 in the Lower Raquette; 2007 to 2011 in the Middle Raquette, and 2013 to 2019 in the Upper Raquette. The new one inch trashracks are already installed at Higley, several years ahead of schedule, as a result of the redevelopment construction there. Parties to the settlement commented that the fish protection structures were not viewed by the parties as a high priority, and thus were scheduled for future installation to spread the costs out over time.

**D. Watershed Protection [PASS]**

1) **Is the Facility in Compliance with Resource Agency Recommendations, or, if none, with license conditions, regarding protection, mitigation or enhancement of lands inundated by the Facility or otherwise occupied by the Facility, and regarding other watershed protection, mitigation and enhancement activities?**

**YES and N/A= Pass**
**NO = Fail**

*Yes.*

A key issue in the Settlement Agreement was to reduce the pond level fluctuations at Carry Falls, Stark, and other project developments to improve habitat, recreational values, and to protect shoreline. Erie has implemented a new “guide curve” for Carry Falls that sets seasonal pond elevation targets and reduces the drawdown from 55 feet to 30 feet. In addition, the drawdown at the Stark impoundment (which backwaters to Carry Falls) was reduced from as much as 23 feet down to 1 foot or less (due to the reduced drawdown at Carry Falls and the decoupling of the operation of the two reservoirs).

The parties to the settlement negotiation were careful to consider the value of the Carry Falls storage for peaking power and river regulation, and accordingly carefully balanced the multiple resource values of the river in limiting the drawdown to 30 feet. The June 2002 Water Quality Certification provides assurance that the watershed and shoreline resources are protected.
Pond level fluctuations have been reduced at other project impoundments as part of the license terms.

The FERC licenses and WQCs also require erosion and sediment control plans for any new construction, maintenance and management facilities on project lands. According to the FERC licenses, conveyance of land rights for project lands (e.g. utility easements) to other parties also requires standards and protocols for protection, maintenance and enhancement of surrounding lands.

In addition, a provision of the Settlement Agreement provides for adding certain lands associated with recreation access, canoe portages, and recreation trails to be within the project boundary. Further, a provision of the settlement agreement outside of the FERC project boundaries required the previous owner, Niagara Mohawk, to convey 12,000 acres of neighboring lands to the State of New York for permanent protection as part of the Settlement Agreement to mitigate for project impacts.

E. Threatened and Endangered Species Protection [PASS]

1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?

YES = Go to E2
NO = Pass, go to F

Yes.

Bald eagle nest sites, including at least one active site, exist near the Carry Falls impoundment.

The yellow lampmussel exists in the vicinity of the Lower and Middle Raquette Projects, and is considered a species of concern/interest by the FWS and NYS DEC.

The FERC MPEA notes that two state-listed species have been documented in the vicinity of the projects: the common loon (a protected wildlife/special concern species), and the spruce grouse (a threatened species).

2) N/A

3) N/A

4) N/A
5) If E.2. and E.3. are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?

Yes.

The Settlement Agreement, signed by state and federal resource agencies, declares that project facilities and operations consistent with the agreement will have no adverse effect on federal or state listed threatened or endangered species.

Article 407 of the FERC Order Issuing New License for the Carry Falls and Upper Raquette Projects, issued February 13, 2003, required Erie to file a bald eagle protection and management plan that contains measures for implementing any necessary signage to warn users not to disturb nests, and monitoring the results of implemented measures, and reporting to US FWS, NYSDEC and FERC. The required plan was prepared including consultation with NYSDEC and USFWS, and was filed with FERC on April 11, 2003. An Order from FERC dated July 17, 2003 accepted and approved the plan. At this time, the agencies have decided not to mark the nests with warning signs, in order to avoid attracting attention from users which are normally dispersed over a remote area. NYSDEC monitors the nests.

During settlement discussions, US FWS requested that Erie conduct a study of the yellowlampmussel population. In July 2000, Erie conducted surveys following a study plan developed in consultation with US FWS and NYSDEC. The surveys indicated that yellow lampmussel is more abundant in the Raquette River than previously noted, and stable, self-sustaining populations exist where they had not been previously reported. The FERC MPEA concluded that reductions in pond level fluctuations at several project impoundments would improve and increase habitat further for yellow lampmussel, so no further studies or requirements were recommended.

The Settlement Agreement, WQC and FERC licenses require reductions in the pond level fluctuations (including seasonal limits) to enhance fish and wildlife habitat, including habitat for nesting waterfowl. These provisions will benefit the common loon. The spruce grouse is an upland species that is unlikely to be impacted by project operations. The Resource agencies had the opportunity, but did not include specific provisions in the Settlement Agreement regarding loons, or spruce grouse.

F. Cultural Resource Protection [PASS]

1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?

YES = Pass, go to G
N/A = Go to F2
NO = Fail
Yes.

On February 6, 2002, Erie signed a fully revised “Programmatic Agreement” with FERC, the Advisory Council on Historic Preservation, and the New York State Historic Preservation Officer (SHPO) for the four Raquette River projects, with the St. Regis Tribe and the US Department of Interior as concurring parties. By letter dated February 11, 2002, the Advisory Council on Historic Preservation filed with FERC the executed agreement that amended the previous 1996 Programmatic Agreement. On April 14, 2003, Erie submitted its required Historic Property Management Plan to FERC, and has yet to receive a response. Erie reports that it has consulted as necessary with the State Historic Preservation Officer and the St. Regis Mohawk Tribe on ground disturbing activities.

2) Skip.

G. Recreation [PASS]

1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?

YES = Go to G3
N/A = Go to G2
NO = Fail

Yes.

Erie filed a recreation plan in accordance with the License orders and settlement agreement. A Raquette River Advisory Council (RRAC) has convened and has established its bylaws, and will advise the Project owner on issues related to recreation, and other resource enhancements.

Land & Water Associates has confirmed that the recreation facility improvements required in the FERC license are being completed according to schedule in a timely manner, in consultation with parties to the settlement agreement, including the Adirondack Mountain Club. The parties we contacted expressed satisfaction with Erie’s efforts and progress, and expressed no problems with compliance with the License or Settlement recreation requirements.

The previous project owner, Niagara Mohawk, conducted extensive studies in the pre-application and settlement processes determine the most highly valued whitewater releases. The settlement agreement calls for annual releases, according to an annual whitewater budget, at Colton (the most highly values bypass reach), Sugar Island and/or Hannawa. Releases have been well received by the whitewater boaters.
H. Facilities Recommended for Removal [PASS]

1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?

NO = Pass  
YES = Fail

No.

The Settlement Agreement does not include any condition relating to dam removal of the subject project in whole or part. The Settlement Agreement states that “no signator to this Settlement has, or is, advocating decommissioning of any development of the Raquette River Projects or any of the project facilities during the term of the new licenses for the Raquette River Projects.”
Reports of Contacts

Mark Woythal
NYSDEC (Albany Office)

Bruce Carpenter
NY Rivers United

Betty Lou Bailey
Adirondack Mountain Club

Steve Patch, Project Biologist
US Fish and Wildlife Service

Andrew Fahlund
American Rivers

Alice Richardson
NYSDEC

Bill Gordon
NYSDEC

John Omohundro
Adirondack Mountain Club

Peter Skinner
American Whitewater

Sheree Bonaparte
St. Regis Mohawk Tribe

John Montan
St. Lawrence County Planning Commission

Tom Skutnick, Project Manager
Erie Boulevard Hydropower, LLC

Joe Kuta
NYSDEC, Division of Water

George Outcalt
Adirondack Park Agency
RAQUETTE RIVER PROJECTS
Report of Contact

Date of Conversation:    July 29, 2004
Person Contacted:        Mark Woythal
Affiliation:             NYSDEC
Telephone Number:        518-402-8847
Reviewer:               David Van Wie

Summary of Discussion:

Mark said to contact Alice Richardson, who is more familiar with the final negotiations and implementation.

Mark said he is comfortable with the established base flows: this will have a major impact on the entire river system. Better base flows in the lower river may attract other species from the river system, including salmonids. He says there are salmonids (Pacific salmon from Lake Ontario) at the lower project, Raymondville, and there is a poaching problem there.

Mark said there was no real advocacy for dam removal or other more wholesale restoration of the ecosystem, which has changed into a warmwater/cool water habitat. The river is lacking in "bed load" or fine substrates which would be necessary for significant salmonid habitat. They have found a few trout in some tributaries, but establishing larger populations is questionable.

Eels get past 8 dams. The agreements predated some of the latest concern about eels. There are no prescriptions for moving these fish and there is a lot of habitat, so this may be an issue in the future depending on further monitoring of eels in the region. USFWS has reserved authority for prescriptions, so the issue can be revisited in the future.
Report of Contact

Date of Conversation:    July 29, 2004
Person Contacted:        Andrew Fahlund
Affiliation:             American Rivers
Telephone Number:        202-347-9230 ext 3022
Reviewer:               David Van Wie

Summary of Discussion:

Andrew noted right away that he is on the Board of the Low Impact Hydropower Institute, so he
did not want to create any appearance of conflict in his roles. He said Bruce Carpenter did most
of the negotiating on the Hoosic and Raquette projects, and is familiar with the issues on those
rivers.

I asked if he could identify any general issues regarding the Raquette River, without specific
comment or opinion of his own, which I should delve into, simply as a matter of priority or
interest. He said the Settlement is acceptable and a better outcome than might have occurred in
a contested decision. The process was cheaper, and there were significant environmental gains
in the entire river system, which are consistent with the criteria.

He commented on how challenging it can be to apply the Low Impact criteria to a large project
like the Raquette which has had such cumulative impacts from flow, fish passage and water
quality, in a way that has changed the entire river ecosystem over many years, in conjunction
with other watershed issues. The ecosystem will make great gains as it responds to the new
flows and facilities. The parties accepted the settlement as an acceptable way to maintain the
hydropower values and address the environmental issues.
Report of Contact

Date of Conversation:    July 30, 2004

Person Contacted:        Bruce Carpenter

Affiliation:             New York Rivers United

Telephone Number:        315-339-2097

Reviewer:               David Van Wie

Summary of Discussion:

Bruce has no concerns with the status of project, or the settlement agreement. He said that Erie has been very cooperative, and timely in completing obligations. Bruce has some wariness about the implications of so many transfers of the licenses, that as people less familiar with the settlement process are involved, there is more uncertainty. But he said the local operators are very knowledgeable and helpful.

He said the settlement went through at a critical time in moving to deregulation, and there were some land transfer issues that are not part of the relicensing process. He said the Raquette has been “one of our best successes” as a major river agreement, including projects with high value for peaking power using innovative compromises to maintain peaking power values while also addressing environmental issues. The agreement included projects that were not yet up for relicensing so they were able to achieve benefits sooner than otherwise might have.

The baseflow below the Raymondville project will provide great benefits to the ecosystem. I asked about how the river, in transition, is expected to improve, and how will they know if it is improving enough. Bruce said that they did a lot of Delphi flow studies and were able to compare flows and resulting habitat in certain reaches across rivers. He said the conclusion is that the flows are as good as they can get it while still operating the hydropower projects for renewable energy.

Bruce believes the license implementation is pretty much on schedule. The whitewater people are very enthused about the opportunities, and how Erie is scheduling releases to allow sort of a whitewater tour at different locations.

In the bypass reaches, the habitat is already showing signs of supporting a high valued fishery.

They tried to get the Piercefield project included in the settlement but could not. They had to work through some wetlands issues with the Adirondack Park folks. Now the Piercefield is done, and he wonders if that project should be included in the Low Impact certificate.
Report of Contact

Date of Conversation: July 30, 2004 and August 4, 2004

Person Contacted: Steve Patch

Affiliation: US Fish & Wildlife Service, Cortland, NY

Telephone Number: 607-753-9334

Reviewer: David Van Wie

Summary of Discussion:

Steve has no concerns about the implementation of the FERC license and settlement agreement at the Raquette either. Erie is doing things pretty well on time, and very much consistent with agreements.

The most significant issues were getting flows into the bypass reaches, and finding how to set the gates to get flows that are fish friendly. He believes the river will respond to the new flows, particularly below Raymondville. Colton and Sugar Island look good, but they haven’t done eco-sampling yet. Stark and Blake have new flows.

Steve said there were no proposals for dam removal. The river would not afford opportunities to restore significant cold water habitat. Historically, there were trout in the river many years ago, but changes in land use and temperature affected the habitat. Trout are still found in few places and tributaries.

The trails and portages are still being completed, and should provide good access to the entire river.

In the second call, I mentioned that the FERC EA said that St.Lawrence River species, including Atlantic Salmon, had once occurred as far upstream as Hannawa Falls. I asked Steve about the historical existence of anadromous fish in the Raquette. He said there has been no real resolution as to whether historical populations of Atlantic salmon were sea-run or landlocked. He said there was some pool and riffle habitat, but they are not sure what kind of population the river could have supported. The salmon may have been long gone before the dams were built… they disappeared in the late 1800s, and the dams were built in the 1930s. Other factors leading to loss of salmonid populations were clearcutting in the watershed causing higher water temperatures. Also there were many old mills, earlier dams, and pollution in the river from towns and industry.

He said the eel issue has become more high profile in recent years. Eels get upstream in small numbers, but it is not clear what population could be maintained in the river.
Report of Contact

Date of Conversation: August 4, 2004
Person Contacted: Alice Richardson
Affiliation: NYSDEC
Telephone Number: 315-785-2267
Reviewer: David Van Wie

Summary of Discussion:

I asked Alice about the salmonids in the St. Lawrence ecosystem and the Raquette. She confirmed that the salmonids in the Raquette are stray Pacific salmon that were stocked in Lake Ontario. She said that Atlantic salmon are failing all over the place in the St. Lawrence region. Some landlocked salmon are stocked in the Salmon River, with some reproduction happening, but not a sustaining population.

On the Raquette River, the objective was only for downstream passage, not for upstream. Upstream is not an objective of NYSDEC. Alice said that eel still get to Sugar Island and may get to Hannawa without additional upstream fish passage. Anadromous fish are not a management objective for the Raquette, and catadromous fish were not an objective for this river at the time of relicensing.

Alice said that there have been no issues with implementation as far as she is concerned. Erie has been timely, cooperative, and notify agencies of problems or issues. They are adhering to the Settlement Agreement.

I asked Alice about bald eagle issues. She said that there was a report to FERC that there are eagles nests in the area of the upper dams. Erie has coordinated with the agencies and they have agreed so far to not post warnings that would make the areas more conspicuous. Bill Gordon and Blanch Towne are the contact persons for ESA issues.

Alice said there are no issues with water quality. At Five Falls, Erie had to move some rocks in the bypass reach, and they did a good job avoiding disturbance of sediments. Work was coordinated with NYSDEC. At the redevelopment at Higley, the contractors did a good job. Areas were well maintained, no instances of concern.

Alice confirmed that the Carry Falls Reservoir is on the 303d list due to mercury and other waters in the watershed are on the list due to acid rain, not due to project facilities. Ann Rice at the Division of Water can provide more information.
I asked about the extended schedule for installing trash racks. Alice said that this was not a major issue for this project, and that they wanted to be consistent with other projects statewide, while allowing Erie to spread the costs out for work that was not viewed as critical to be done right away.
Report of Contact

Date of Conversation:    August 5, 2004

Person Contacted:    John Montan

Affiliation:    St. Lawrence County Planning Office

Telephone Number:  315-379-2292

Reviewer:   David Van Wie

Summary of Discussion:

While Erie received the licenses fairly recently and the operating history under the licenses is not long, John was not aware of any deficiencies, unresolved issues or failure to perform on license conditions. There has been good participation by Erie and all parties.

An issue he believes needs to be monitored is the ability to accurately measure flows. He said that some of the measures to “throttle” the water are pretty primitive, and need to be checked, although he had no reason to believe there are any deficiencies.

John said that he understands that the transfer of lands to NYSDEC has been completed, including surveying and mapping.

John mentioned that the Raquette River research fund ($5000/year to go to projects not required in license or for compliance) is moving forward. They are discussing building an ADA platform at the non-Erie Potsdam project in town.

As Erie is purchased by Brascan, he wonders how the follow through with the Settlement Agreement will change, although he noted that the staff remain the same despite the change in ownership.

John also noted that the St. Regis tribe was a late arrival to the process (not involved in original settlement discussions), but that their concerns appear to have been met in the License and cultural resources plan. He said he would email me a name of a contact at the tribe.
Report of Contact

Date of Conversation: August 9, 2004

Person Contacted: John Omohundro

Affiliation: Adirondack Mountain Club

Telephone Number: 315-265-8365

Reviewer: David Van Wie

Summary of Discussion:

John said that his impression is that Erie has provided just about everything that the Club and recreation interests have asked for. Erie’s engineers are working on the designs, and everything seems according to plan. The Raquette River Advisory Committee is meeting later this week, its first meeting since establishing the bylaws, and they will review progress to date, and determine how to spend some available funds.

John said that Niagara Mohawk had historically owned land which were kept undeveloped and provided habitat. The project owners have been praised as good land stewards. They did the right thing and conveyed most of these land to the state in fee or through conservation easements.

The only black mark on the issue is that certain lands around Carry Falls outside of the FERC projects were kept by a subsidiary of Niagara Mohawk for development into a “New Hollywood” community. It is going through the Adirondack Park Authority process, and appears to be designed to be low impact (cluster of cottages). The club wishes that this didn’t happen but it is outside of the hydro realm, and they didn’t have enough leverage.

John said that the recreation developments within the Settlement Agreement were not considered to have any impact on the bald eagle. The strategy so far has been to be low key in the eagle protection plan.

A third area of concern for John is the cultural/historical issues. He had to push to include the Colton Tannery and the Hannawa red sandstone powerhouse in the license documents. He is not sure what the status of the cultural management plan, but he wants to be sure that they are protected.

All in all, John said the Club is happy with how the Raquette projects were relicensed and are being managed.
Report of Contact

Date of Conversation:    August 9, 2004
Person Contacted:    Tom Skutnik, Project Manager – Raquette Project
Affiliation:    Erie Boulevard Hydropower, LLC
Telephone Number:  315-413-2789
Reviewer:   David Van Wie

Summary of Discussion:

**Water level monitoring plan** – Tom gave me an update on the modifications needed for each development to provide required flows in a way that is conducive to fish movement (concentrating flows, directing flows as needed, plunge pools), including construction of new gates in stop log structures. Consultation with agencies is occurring, and progress is satisfactory. Some measures are ahead of schedule, such as trashracks at Higley.

**Recreational enhancements** – Progress is satisfactory for 2004 projects at Colton, Hannawa and Sugar Island, expect to go out to bid soon. He has coordinated with John Omohundro to determine specific needs. Contractor installed a canoe put in at Higley a couple years ahead of schedule. Other projects are on schedule.

**Whitewater studies and releases** – Releases were provided at Colton, and got good reviews. There doesn’t seem to be any interest for releases at Hannawa or Sugar Island. Chris Koll is trying to schedule releases to coordinate with other rivers.

**Cultural Resources** - Plan filed in February 2002 was submitted to Commission in April 03. Erie will be filing annual reports, and conducting investigations for any major ground disturbance activities.

**ESA Plan** – bald eagle plan – has been accepted by FERC. Strategy is to keep things at a low profile.

**Dredging/WQ** - aside from work at Higley, there are no significant projects planned.

**Land transfer to NY State** - The transfer of 12,000 acres of conservation easements to the state was a Niagara Mohawk responsibility as part of the Settlement Agreement. This is outside the project boundary and not part of Erie’s requirements in the settlement.

**Property easements, conveyances** – There are not major issues under this Article. Erie files a conveyance report.
Piercefield project – was not included in the Settlement Agreement because of pond fluctuations and wetland issues and concerns by the Adirondack Park agency. The issues have been addressed and a new license application was filed last November. No action yet on the license. When a new license is issued, they may want to include this in the Low Impact certification as well.
Report of Contact

Date of Conversation: August 9, 2004

Person Contacted: Bill Gordon

Affiliation: NYSDEC

Telephone Number: 518-785-2254

Reviewer: David Van Wie

Summary of Discussion:

Bill has moved from Fisheries over to Wildlife, and is not directly involved in the Raquette at present. He was involved in the Settlement negotiations.

As far as he understands, the settlement terms are ahead of schedule, but he hasn’t been to the Projects to verify this. Also, all seems to be going well with the bald eagle monitoring, but that is managed by Blanche Town (315-639-6122).

Regarding historical populations of salmonids, it was presumed early in the settlement discussions that salmon could make it up into the Raquette, but with other issues in the St. Lawrence affecting salmon, it appears to be a remote possibility that they could really be reestablished there. They didn’t want to require major investments in advance of any real need. A FERC license reopener for fish passage prescriptions could be used in the future.

Eels are also in jeopardy in the St. Lawrence, but they were not a management objective for the Raquette at the time. Sturgeon can go up to Raymondville, but there was no push to establish passage.

Bill feels it would be nice if there was more free-flowing river habitat in the Raquette, but if you are going to keep the hydropower you should manage the fisheries as impoundments. His biggest issue was fertility of the aquatic ecosystem, with high flushing rates. Not much could be done to enhance fertility.

At Carry Falls, there is a mercury problem that is atmospheric in nature, probably aggravated by acid rain. There was no debate or concern that the reservoir fluctuations were a major contributing factor to the mercury problem.
Report of Contact

Date of Conversation: August 9, 2004
Person Contacted: Sheree Bonaparte
Affiliation: St. Regis Tribe, Historic Preservation Officer
Telephone Number: 518-358-2272
Reviewer: David Van Wie

Summary of Discussion:

Sheree has been in this position since September, so was not involved in the 2002 revisions to the Cultural Resource Programmatic Agreement. Since September, she has involved in Piercefield Project, where the Tribe did not sign the agreement.

She said her concern is that the cultural resources issues are viewed by the licensee and FERC as discrete locations for archaeology or even anthropology, whereas the tribes view cultural and historic resources as being the entire region that were used by ancestors, and which have been modified by the commercial projects. The tribe’s cultural lifestyle had changed over this time.

She said that the tribe’s environmental officer, Ken Jock (508-358-5937), has had past concerns regarding the low flows in the lower river. She will be meeting with him this week and can discuss the issues, and get back to me or provide comments through the LIHI website. I emailed her the web site information and my contact information.
Report of Contact

Date of Conversation: August 9, 2004

Person Contacted: Peter Skinner

Affiliation: American Whitewater

Telephone Number: 518-674-5519

Reviewer: David Van Wie

Summary of Discussion:

Peter was involved in the settlement negotiations. He said that the whitewater people have been quite happy with the releases, and with the cooperation received from Erie/Reliant in scheduling releases. He said the Chris Koll sits down each year with Erie/Reliant to schedule releases in a manner that coordinates with releases from other nearby rivers, so boaters can move from one river to another on consecutive days.

The only complaint they have is that Erie has not provided them with information or a “one way” data link to AWA’s website on information relating to dispatched releases. Erie has been great with planned, scheduled whitewater releases, but sometimes the dispatcher must pass higher flows or spill water in certain reaches because of turbine maintenance or other short term generation reasons. AWA would like to be able to post this information real-time, or even with short notice so that boaters can know if a river is/will be boatable due to unusual or unplanned, but dispatched releases. The dispatchers have said they can provide information as desired, but have not been instructed to do so. Peter heard that there was some concern voiced about competitive issues in spot market generation, but he said that other project owners have been cooperative with the existing Web-based boating information. AWA would like to see if they can resolve this issue, which they understood to be part of the Settlement but it was not spelled out specifically in the agreement.
Report of Contact

Date of Conversation: September 7, 2004

Person Contacted: George “Skip” Outcalt

Affiliation: Adirondack Park Agency

Telephone Number: 518-891-4050

Reviewer: David Van Wie

Summary of Discussion:

Mr. Outcalt noted that only the Carry Falls and part of the Upper Raquette Projects are inside the Adirondack Park boundary. He said he is not aware of any issues of compliance, or concerns about the Settlement or implementation of the FERC license and permits. Issues he highlighted as important to review included installation of the new trashracks (fish entrainment), funding the River Fund, and implementing/monitoring flows and water levels of the impoundments. He said that the Niagara Mohawk land transfers have been carried out.

He suggested I talk with Steve Patch at USFWS, and possibly contact the Jordan Club, a large landowners on Carry Falls reservoir.
Report of Contact

Date of Conversation: September 9, 2004

Person Contacted: Joe Kuta

Affiliation: NYSDEC, Division of Water

Telephone Number: 315-785-2513

Reviewer: David Van Wie

Summary of Discussion:

Joe checked the 303d list, and the state’s PWL (Priority Waterbody List) to determine any non-attainment or WQ issues in the Raquette River mainstem. He said the only listing is Carry Falls, which is listed for fish consumption/mercury due to atmospheric deposition. He found nothing about listings for acid rain or other issues related to the dams. He said acidity is a problem in many waterbodies in the region, but apparently the cause of listing in the Raquette River.
The Raquette River, with a drainage basin of 1,269 square miles, originates in the Adirondack Mountains, flows generally north-northwest for more than 120 miles, and empties into the St. Lawrence River near Massena, New York. Most of the basin is sparsely populated, with much of the land forested and brushland. The region’s economy depends primarily on recreational tourism and timber-based industries.

The Lower, Middle, and Upper Raquette River Projects have a combined installed capacity of 161.462 megawatts (MW), and are operated to provide peak energy and capacity to the regional grid. The projects generate annually an average of 831 gigawatt-hours (Gwh) of power. Carry Falls functions as a seasonal storage reservoir.

Farthest upstream is the Carry Falls Project No. 2060, located between river mile (RM) 68 and 75. The project includes an 826-foot-long dam that varies in height from 63 to 76 feet, and a 7-mile-long reservoir with a 3,000-acre surface area. It has no generating facilities, providing instead seasonal and daily flow regulation to facilitate the peaking and load-following operation of the Upper Raquette River Project and optimize downstream power generation.

Immediately downstream, from RM 52 to 68, is the 102.389-MW Upper Raquette River Project No. 2084. The project consists of five developments: Stark Falls, Blake Falls, Rainbow Falls, Five Falls, and South Colton. Each development has a dam, reservoir, and powerhouse. The project typically operates in either a peaking or load-following mode, using releases from its and the Carry Falls reservoirs.

About five miles below the Upper Raquette River Project, from RM 38 to 47, is the 47.073-MW Middle Raquette River Project No. 2320. This project consists of four developments, each with a dam, reservoir, and powerhouse: Higley, Colton, Hannawa, and Sugar Island. Higley operates as a re-regulating development to provide steadier flows for the downstream hydroelectric facilities. The other three developments operate run of river with a pondage mode. Erie has increased the installed capacity of the Higley development by 2.33 MW, from the existing 4.97 to 7.3 MW.
Twenty miles downstream and just above the mouth of the river, from RM 19 to 27, is the 12.0-MW Lower Raquette River Project No. 2330. The project consists of four developments, each with a dam, reservoir, and powerhouse: Norwood, East Norfolk, Norfolk, and Raymondville. The project typically operates in a store-and-release pulsing or peaking mode, using releases from the upstream projects. During periods of high flows, the project may operate run of river.

The Carry Falls Project works consist of:

(a) a 826-foot-long dam; (b) a 568-foot-long by 76-foot-high concrete gravity spillway with a crest elevation of 1,386 feet mean sea level (msl); (c) a 258-foot-long by 63-foot-high concrete gated non-overflow spillway with two 14.5 foot by 27-foot tainter regulating gates, two 10-foot-square low-level sluice gates, and an intake structure with two 15-foot-square openings for future power installation; (d) five earth dikes totaling approximately 2,500 feet in length, with lengths varying from 320 feet to 1,015 feet, maximum heights varying from 12 feet to 31 feet, and each with a crest width of 12 feet at elevation 1,392 feet msl with upstream and downstream slopes of 3:1 and 2.5:1 respectively; and (e) a 7-mile-long reservoir with a surface area of 3,000 acres and a usable storage capacity of 104,463 acre-feet at a normal pool elevation 1,385 msl.

The Upper Raquette Project works consist of five developments:

The Stark development comprising: (a) a 35-foot-high concrete gravity dam with a 294-foot-long by 35-foot high concrete overflow section with a crest elevation of 1,355.0 feet above mean sea level (msl) and a 94-foot-long control gate section consisting of two 27-foot-long by 15-foot-high radial tainter gates with a crest elevation of 1,340.8 feet msl, a low-level sluice gate section consisting of one motor controlled 12-foot square slide gate, and a 6-foot-wide stoplog section; (b) seven earthen saddle dikes with a crest elevation of 1,362.0 feet, totaling approximately 3,700 feet in length, each 16 feet wide with upstream and downstream slopes of 3:1 and 2.5:1, respectively; (c) a 1.5-mile-long reservoir at normal pool elevation 1,355.0 feet; (d) a concrete intake structure housing the trashracks and trashrack raking structure, and a 18.33-foot-high by 18.66-foot-wide motor-driven slide gate; (e) a 651-foot-long, 18-foot-diameter welded steel pipeline; (f) a 75-foot-long by 73-foot-wide concrete powerhouse containing a 23,872 kilowatt (kW) generating unit; and (g) appurtenant facilities.

The Blake development comprising: (a) a 75-foot-high concrete gravity dam with a 592-foot-long by 80-foot-high concrete overflow section with a crest elevation of 1,250.5 feet msl and a 140-foot-long non-overflow section with a crest elevation of 1,266.0 feet; (b) three earthen dikes with a crest elevation of 1,259.5 feet, totaling approximately 1,840 feet in length, each 16 feet wide with upstream and downstream slopes of 3:1 and 2.5:1, respectively; (c) a 5.5-mile-long reservoir at normal pool elevation 1,250.5 feet; (d) a concrete intake structure housing the trashracks and trashrack
raking structure, and a 18.33-foot-high by 18.66-foot-wide motor-driven slide gate; (e) a 731-foot-long, 18-foot-diameter welded steel pipeline; (f) a 75-foot-long by 73-foot-wide concrete powerhouse containing a 13,913 kW generating unit; and (g) appurtenant facilities.

The **Rainbow** development comprising: (a) a 2,677-foot-long by 75-foot-high concrete gravity-type dam with a 751-foot-long by 81.5-foot-high concrete overflow section with a crest elevation of 1,181.5 feet msl and two non-overflow sections totaling 120 feet and 176 feet in length, respectively; (b) two earthen saddle dikes with a crest elevation of 1,190.0 feet, totaling approximately 2,570 feet in length, each 16 feet wide with upstream and downstream slopes of 3:1 and 2.5:1, respectively; (c) a 3.5-mile-long reservoir at normal pool elevation 1,181.5 feet; (d) a concrete intake structure housing the trashracks and trashrack raking structure, and a 18.33-foot-high by 18.66-foot-wide motor-driven slide gate; (e) a 645-foot-long, 18-foot-diameter welded steel pipeline; (f) a 75-foot-long by 73-foot-wide concrete powerhouse containing a 22,828 kW generating unit; and (g) appurtenant facilities.

The **Five Falls** development comprising: (a) a 1,750-foot-long by 50-foot-high concrete gravity dam flanked at each end by earthen dikes totaling approximately 1,190 feet in length, each 16 feet wide with upstream and downstream slopes of 3:1 and 2.5:1, respectively; (b) a 500-foot-long concrete gravity ogee overflow spillway with a crest elevation of 1,077.0 feet; (c) a 6-foot-wide stoplog section with a sill elevation of 1,072.0 feet; (d) a 1.0-mile-long reservoir at normal pool elevation 1,077.0 feet; (e) a 60-foot-long gated concrete intake structure housing the trashracks and trashrack raking structure, and a 18.33-foot-high by 18.66-foot-wide motor-driven slide gate; (f) a 1,399-foot-long, 18-foot-diameter welded steel pipeline; (g) a 75-foot-long by 73-foot-wide concrete powerhouse containing a 22,828 kW generating unit; and (h) appurtenant facilities.

The **South Colton** development comprising: (a) a 970-foot-long, 45-foot-high concrete gravity-type dam and earthen abutments; (b) a 592-foot-long, 42-foot-high concrete gravity ogee spillway with a crest elevation of 973.5 feet msl; (c) a 6-foot-wide stoplog section with a sill elevation of 968.0 feet; (d) a 1.5-mile-long reservoir at normal pool elevation 973.5 feet; (e) a 60-foot-long gated concrete intake structure housing the trashracks and trashrack raking structure, and a 18.33-foot-high by 18.66-foot-wide motor-driven slide gate; (f) a 1,300-foot-long, 18-foot-diameter pipeline; (g) a 75-foot-long by 73-foot-wide concrete powerhouse containing a 18,948 kW generating unit; and (h) appurtenant facilities.

**The Middle Raquette Project works consist of four developments:**

The **Higley** development (in 2002 prior to redevelopment of powerhouse and penstock) comprising: (a) a 34-foot-high concrete gravity dam with 3-foot-high wooden
flashboards, a 209-foot-long concrete gravity ogee-crested spillway, two flood gates, eight steel forebay gates each measuring 12 feet high by 5 feet, 9 inches wide, a trashrack, and two 10-foot-high by 8-foot-wide waste gates; (b) a 742-acre reservoir at normal pool elevation 883.6 feet above mean sea level (msl); (c) a 160-foot-long by 50-foot-wide flume formed by concrete retaining walls on each side; (d) a powerhouse measuring 64 feet to a side by 38 feet high containing three generating units with a total capacity of 4,972 kilowatts (kW). In its recent redevelopment, Erie has increased the installed capacity of the Higley development by 2.33 MW, from the existing 4.97 to 7.3 MW; (e) an intake structure with a 14 x 14 foot headgate, a 13-foot-diameter, 225-foot-long steel pipeline, and a powerhouse measuring 90 feet long and 53 feet wide containing a 7,300 kW generating unit; and (f) appurtenant electrical and mechanical facilities.

The Colton development comprising: (a) a 27-foot-high concrete gravity dam with 2-foot-high flashboards, an 8-foot-wide log flume, a trash gate, and a 204.67-foot-long ogee-crested spillway equipped with a single taintor gate measuring 10 feet high and 25 feet wide; (b) a 195-acre reservoir at normal pool elevation 837.0 feet msl; (c) a concrete intake structure with a brick superstructure, which measures 50 feet wide by 30 feet long by 12 feet high overall, equipped with a motor driven, 16-foot-high by 25.5-foot-wide, taintor gate; (d) a steel pipeline, 11,090 feet long with a diameter of 13.5 feet and 2,100 feet long with a diameter of 12 feet; (e) a 80-foot-high Johnson differential surge tank; (f) three penstocks of lengths 160 feet, 140 feet, and 125 feet, and diameters of 7.5 feet, 7.5 feet, and 9 feet respectively; (g) a brick and structural steel powerhouse measuring 165 feet long and 46 feet wide containing three generating units with a total capacity of 30,101-kW; and (h) appurtenant electrical and mechanical facilities.

The Hannawa development comprising: (a) a 38-foot-high stone and concrete dam with 3.5-foot-high wooden flashboards, a log chute, a motor operated taintor gate measuring 14 feet high by 28 feet wide, an ogee-crested spillway, and a sluice gate; (b) a 204-acre reservoir at normal pool elevation 552.0 feet msl; (c) a headworks structure with five sliding timber gates, all of which are 18 feet high, three are 9.7 feet wide, one is 9 feet wide, and one is 8.8 feet wide; (d) a 2,700-foot-long canal measuring 30 feet wide at the bottom, 120 feet wide at the top, and an average of 22 feet deep, equipped with trashracks that completely cover the canal entrance; (e) two 10-foot-diameter penstocks of 190 feet in length; (f) a sandstone and structural steel powerhouse measuring 66 feet wide by 248 feet long by 40 feet high containing two generating units with a total capacity of 7,200-kW; and (g) appurtenant electrical and mechanical facilities.

The Sugar Island development comprising: (a) a 37-foot-high concrete gravity dam with two tainter gates and a 192-foot-long spillway; (b) a 29-acre reservoir at normal pool elevation 470.0 feet msl; (c) a concrete and brick intake structure with trashracks and a steel headgate measuring 14 feet wide by 16 feet high; (d) a 4,700-foot-long steel pipeline; (e) a 71-foot-high surge tank; (f) two 8-foot-diameter penstocks; (g) a brick and structural steel powerhouse measuring 35 feet wide by 67 feet long by 30 feet high.
containing two generating units with a total capacity of 4,800-kW; and (f) appurtenant electrical and mechanical facilities.

The Lower Raquette Project works consist of four developments:

The Norwood development comprising: (a) a 188-foot-long by 23-foot-high concrete gravity dam with 1-foot-high wooden flashboards; (b) a 350-acre reservoir at normal pool elevation 327.1 feet above mean sea level (msl); (c) a concrete intake structure with steel trashracks oriented 90 degrees to the direction of flow, a skimmer section, and three motor-operated steel sliding gates; (d) two timber flood gates, one 9 feet, 9 inches wide by 12 feet high, and the other 12 feet high by 12 feet wide; (e) a concrete log chute with stoplog opening 11 feet, 2 inches wide by 4 feet, 6 inches high; (f) a concrete and brick powerhouse 59 feet, 9 inches long by 43 feet wide by 34 feet high containing a 2,000-kW generating unit; (g) a 3-mile-long, 23 kilovolt (kV) transmission line connecting the Norwood and Norfolk developments; and (h) appurtenant facilities;

The East Norfolk development comprising: (a) a concrete gravity dam with seven hand-operated sluice gates measuring 8 feet wide by 9 feet high protected by steel trashracks oriented 24 degrees to the direction of flow; (b) a 4-foot by 4-foot pond drain; (c) a 135-acre reservoir at normal pool elevation 287.9 feet msl; (d) a concrete intake structure equipped with steel trashracks oriented 90 degrees to the direction of flow, a skimmer section, and an ice chute with a steel sliding gate; (e) a 32-foot-wide by 1,408-foot-long oval steel flume; (f) a powerhouse containing a 3,500 kW generating unit; (g) a 0.86-mile-long, 23 kV transmission line connecting the East Norfolk and Norfolk developments; and (h) appurtenant facilities;

The Norfolk development comprising: (a) a 20-foot-high concrete dam with 10-inch-high flashboards, three 12-foot-wide by 10-foot-high steel headworks gates, and two 9-foot-wide by 9-foot-high sluice gates; (b) a 10-acre reservoir at normal pool elevation 254.9 feet msl; (c) a 1,275-foot-long power canal; (d) a 700-foot-long, 14-foot-diameter wood stave pipeline protected by two steel trashracks oriented 90 degrees to the direction of flow, a skimmer section, and a 6-foot-wide by 6-foot-high ice sluice gate used for flushing ice and debris downstream; (e) a 14-foot-diameter, 103-foot-long steel penstock fitted with a motor-operated 14-foot-diameter butterfly valve; (f) a concrete and brick powerhouse measuring 52 feet, 6 inches wide by 50 feet, 7 inches long by 35 feet high containing a 4,500 kW generating unit; (g) a short 2.4 kV underground transmission line and a 2.32-mile-long, 115 kV transmission line connecting the Norfolk and Raymondville developments; and (h) appurtenant facilities; and

The Raymondville development comprising: (a) a 292-foot, 6-inch-long by 17-foot-high concrete gravity dam having two-foot-high rubber and steel flashboards; (b) two 4-foot by 4-foot pond drains; (c) a 50-acre reservoir at normal pool elevation 211.6 feet msl; (d) a 48-foot-wide by 447-foot-long concrete power flume having trashracks
oriented 90 degrees to the direction of flow, an ice chute, and three steel flume intake gates, each 12 feet wide by 10 feet high; (e) a concrete, brick, and steel powerhouse measuring 59 feet, 9 inches wide by 42 feet long by 34 feet high containing a 2,000 kW generating unit; and (f) appurtenant facilities.