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**Subject:** RE: Eklutna Initial Information Package - DRAFT for Review  
**Date:** Friday, April 24, 2020 12:41:36 PM

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Ms. Owen,

Thank you for the opportunity to review of the Draft Initial Information Package Report (IIP) prepared by McMillen Jacobs Associates on behalf of the Municipality of Anchorage dba Municipal Power and Light (MLP), Chugach Electric association, Inc. (Chugach), and the Matanuska Electric Association, Inc. (MEA). The IIP report was prepared in accordance with a 1991 Fish & Wildlife Agreement tied to the Owner's Eklutna Hydroelectric Project. My comments below are on behalf of a public interest for flood safety and for the protection of infrastructure at the Glenn Highway bridges.

The proposed introduction of intentional flow releases into the Eklutna River from the Upper Dam could present risks to downstream public interests. While not highlighted or underscored, these risks are acknowledged and identified in the IIP. Under Section 6.3 Information Needs, the impacts to downstream infrastructure is listed first, along with dam safety, flood protection, and liability for sediment further in the list. It is encouraging to see that new studies are underway to evaluate geomorphic changes in the basin. A sediment transport study was conducted for the lower dam removal project. In email sent from Melanie Arnolds, DOT&PF Central Region Utilities Engineer, on July 16, 2019, you received my comments on that report including excerpts from that study that illustrate the data gaps and assumptions made at that time.

Select excerpts from this IIP report along with my comments are provided below.

- *“The contractor was required to remove metal and other debris from the canyon bottom and regrade the remaining sediment into a stable condition...The owners’ team conducted a site reconnaissance of the Eklutna River in 2019...At that time there appeared to still be some construction debris on top of and embedded within the sediment...” (p. 49)*

DOT&PF: The metal and other debris observed by the Upper Dam owners are likely remnants of construction equipment and materials that were buried during a dangerous slope failure that occurred during the Lower Dam removal project. This slope failure incident is not mentioned in the IIP report, yet it would seem a relevant topic from a habitat perspective given that additional construction-related debris could be unearthed over time by stream flows.

- *“4.2.5 Emergency Action Plan. The ADNR certificate of approval requires the project owners to maintain an Emergency Action Plan (EAP) for the Eklutna dam. The*

*EAP outlines notification and response procedures for project personnel and public safety agencies to follow in the unlikely event of a failure or potential failure of the dam. The ADNR certificate of approval also requires the project owners to review and update the plan annually and periodically conduct various training and drill exercises (Chugach, 2016a).” (Pg. 64)*

DOT&PF: DOT&PF requests a copy of this Emergency Action Plan (EAP) for review. If the Owners proceed with intentional flow releases into the river from the Upper Dam, their future EAP updates should address sediment management in the vicinity of the Glenn Highway bridges and who would be responsible for that work.

- *“In 2016 HDR determined that the accumulated sediment (sediment plug) extended approximately 0.6 miles upstream [of the Lower Dam] and that the approximate volume of the sediment plug was 230,000 cubic yards (HDR, 2016b). In 2011 the USACE stated that removing the lower dam and **releasing this accumulated sediment into the river without adequate flushing flows could do more physical and biological harm than good** by degrading the existing fish habitat downstream even further (USACE, 2011).” (Pg. 68, emphasis added)*

DOT&PF: The USACE concern about potential physical and biological harm is not well explained. How does the USACE define “adequate” when it comes to flushing flows, and what does it view to be the objective of flushing flows? (100% removal of accumulated sediments from the Eklutna River system to the Knik River?)

- *“As part of the alternatives analysis for the lower dam removal project, Eklutna, Inc. considered several options for removing the accumulated sediment from the canyon. Ultimately, Eklutna, Inc. determined that none of these options were practical and feasible due to excessive cost, challenging logistics, and additional impacts to the Eklutna River. Instead, **Eklutna, Inc. proposed to leave a majority of the accumulated sediment in place** and redistribute the sediment excavated to allow demolition of the dam downstream (HDR, 2016a). During the planning phase of the lower dam removal project, **both the Alaska Railroad and the Alaska Department of Transportation and Public Facilities (ADOT&PF) expressed concern about potential impacts to the downstream bridges from the large amount of accumulated sediment that would be flushed downstream and potentially accumulate at the bridges**, and requested that the accumulated sediment be removed from the canyon as part of the project (MJA, 2020). **A sediment transport model was developed by HDR in 2016. The model concluded that generally all sediment gradations, other than the coarsest armor layer, would be transported out of the sediment plug within approximately one to two years under the current flow regime** with the finer sediments generally conveyed through the Eklutna River reach and into the Knik Arm. However, limited historical data was available for the Eklutna River at the time of the study. Therefore, hydrologic, geotechnical, and physical assumptions were made for sediment modeling, and calibration of the model was not possible (HDR, 2016b).” (Pg. 69, emphasis added)*

DOT&PF: My recollection is that The Conservation Fund was either unwilling to fund or lacked the funds to remove accumulated sediments from the canyon. Given that most of the material from behind the dam is embanked along the side of the channel,

the HDR prediction highlighted above clearly did not come to pass.

- *“Eklutna, Inc. was required to entirely remove all temporary fill following completion of construction activities and to conduct three years of sediment transport monitoring at the downstream bridges (ADEC, 2017; USACE, 2017). Eklutna, Inc. has committed to providing the results when available.”* (Pg. 69)

*The Section 404 Permit issued by USACE requires Eklutna, Inc. to monitor the physical changes to channel geometry, substrate composition, water temperature and turbidity at three downstream transects (USACE, 2017).”* (Pg. 93)

DOT&PF: Without any flows of significance since the lower dam was removed, one should not expect to find significant geomorphic change or aggradation occurring near the bridges in these monitoring reports. Sediment transport rates will increase with flow increases.

- *“5.4.2 Habitat Degradation. Development within the Eklutna River watershed, including hydropower development, **construction of the railroad and highway bridges**, and aggregate mining, **has degraded channel morphology and salmonid habitat functionality.**”* (Pg. 90, emphasis added)

*“While these [alluvial fan] areas provide quality rearing habitat when wetted, some of these channels de-water as they flow downstream. Conversely, when viewed from the downstream end of the reach, **some of the channels braid into small and often impassable branches moving upstream. These small, shallow braided channels shown in Figure 5-14 often run through heavily wooded areas that can dewater, strand fish, and make passage for salmon difficult or impossible.**”* (Pg. 91, emphasis added)

DOT&PF: The IIP report identifies the highway bridges as having degraded channel morphology and salmon habitat functionality. This is a dishonest appraisal of impact. The channel morphology of alluvial fans is often contrary to and unsupportive of salmon habitat functionality, as noted in the second excerpt shown above from the IIP. In this particular alluvial system, the DOT&PF highway bridges are helping to concentrate flows into a single channel and, arguably, are helping to improve fish passage potential. In Section 6.2.2, USACE-recommended non-flow alternatives for improving fish habitat include provisions that would “...allow for deeper average water depths and provide a single channel for flows...” not unlike the DOT&PF bridges. (See pages 135-137)

- *“The relatively narrow railroad bridge and elevated railbed cause natural bedload to accumulate between the railroad and New Glenn Highway bridges. Much of the bedload deposited between the bridges appears to have been caused by a 100-year flood event on October 12, 1986. **This event flooded the ecosystem behind the elevated railbed and caused a massive volume of bedload being carried down from the canyon to drop out** and superimpose a fresh alluvial deposit on the existing deposits. **This deposit and additional bedload transported in subsequent but smaller events has elevated the riverbed between the bridges to a point where it has become highly braided and subject to frequent channel changes.**”* (Pg. 91, emphasis added)

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DOT&PF: Thank you for highlighting the 1986 flood event in the IIP report, along with the resultant bedload deposition in the vicinity of the Glenn Highway. This is precisely the kind of event that has DOT&PF concerned about safety and potential damage to infrastructure. As a result of the lower dam removal project, there is now roughly 230,000 cubic yards of sediment available for transport to the lower reaches of the river.

*“6.1 Project Effects. 6.2.1 Flow Related. ...In 2018, Trout Unlimited (TU) and NVE hosted a workshop to develop a vision for salmon recovery in the Eklutna River and to identify next steps to improve conditions for salmon in the near-term...the workshop’s recommendations related to streamflow included the following: ...**Future seasonal streamflow should be patterned after a natural hydrograph...**” (Pg. 134, emphasis added)*

DOT&PF: I recommend that the Owners evaluate the natural hydrograph streamflow plan in terms of potential downstream impacts, as noted in the IIP. What would be the highest allowable peak discharge envisioned for this “natural hydrograph” scenario?

- *“Currently, the only way to intentionally release flows through the spillway would be to curtail generating power and let the reservoir fill up until the lake level exceeds the spillway crest. Because of the way the reservoir is operated, this method is not a viable alternative for providing instream flows year-round since it would effectively eliminate the storage capacity for the hydropower project....In addition, **this method would have the inherent safety risk of an unforeseen storm occurring while the reservoir level is high and the freeboard is reduced. This means that there would be a risk of higher flows being released than intended which could pose a significant safety hazard to downstream areas.**” (Pg. 135, emphasis added)*

DOT&PF: Agreed. DOT&PF concurs that an intentional reduction of reservoir storage capacity could introduce flood risks and potentially impact downstream public interests.

- *“For regulated flow release at the dam, **there is a 30-inch by 30-inch drainage outlet at the base of the spillway rated to release 191 cfs when the reservoir is at the spillway crest.** However, this drainage gate is not a typical reservoir outlet intended for continuous use and was supplied only for drainage purposes. An engineering analysis would need to be conducted to verify that the outlet could be used in this way, and if it could, flows would be still be limited by the hydraulic capacity of the gate. **Use of the drainage outlet would also have the same operational constraints regarding year-round instream flows and the same inherent safety risks as use of the spillway regarding some kind of flushing flow, although the safety risk might not be as great.**” (Pgs. 135 & 136)*

DOT&PF: DOT&PF recommends more discussion about the “inherent safety risks” associated with “flushing flows” over the spillway and/or the drainage outlet. Are there any structural or instability concerns? Please clarify what these safety risks are.

Again, thank you for the opportunity to review and provide comment.