NATIVE VILLAGE OF EKLUTNA

Proposed Eklutna Final Fish & Wildlife Program

April 9, 2024

Our principles

- We seek a fair balance of renewable energy production, drinking water protection, river conservation, public recreation, and cultural restoration.
- The Eklutna River must flow with adequate water for abundant salmon habitat, continuously and without interruption from its source to the sea.
- Fish must be able to freely swim the entire length of the Eklutna River, upstream to the lake and its headwater tributaries, and back downstream.
- Restoration of the Eklutna River and its fisheries will address 100 years of cultural harms to the Eklutna Dena'ina and enhance Southcentral Alaska.

Proposed Eklutna Final Fish & Wildlife Program - Core Components

1. **Alternate "Eklutna River Release Facility"**
    - Construct a pump station that takes water directly from the bottom of Eklutna Lake and discharges it at the glacial moraine area upstream of the dam. The water would be released downstream through the existing dam outlet gate instead of the AWWU portal valve facility.
    - This alternate system would provide continuous instream flow to all 12 miles of the Eklutna River below the dam; operate completely independent from any existing AWWU or hydropower infrastructure; support future dam removal by ensuring that AWWU can maintain its full withdrawals; and, if necessary, keep the river watered during dry winter months once the Eklutna Lake Dam is removed.

2. **Existing Outlet Gate & Other Infrastructure Improvements**
    - Automate the existing outlet gate as proposed.
    - Construct new AWWU bridges to have hydraulic capacity for a free-flowing river.

3. **Reopener for Dam Removal Once 40 MW of Replacement Renewable Energy Is Secured or other acceptable alternatives.**
    - The Project Owners must secure 40 MW of replacement renewable energy no later than 2034 and following the process called for in Sections 2 through 6, remove the Eklutna Lake Dam unless other solutions are found that meet the resource goals described in "Our Principles." While other solutions that meet the resource goals

described in "Our Principles" may also be considered in the reopener, our preferred solution is the removal of the Eklutna Lake Dam.

4. **Water Flows, Water Budget, & Monitoring and Adaptive Management Plan**
    - We do not believe the flow regime in the Proposed Final is adequate to attract or support fish or restore natural river processes. However, if the utilities agree to the core components outlined above in our proposal, we are willing to accept the proposed year-round instream flow regime, as well as the channel maintenance flow regime, the annual water budget, and the monitoring and adaptive management plan as proposed in the Proposed Final Fish and Program of 3/19/2024 until the dam can be removed or other acceptable alternatives implemented. The alternative Eklutna River Release Facility and the automated existing outlet gate must deliver this flow regime.

5. **Establish Fund Reserve**
    - All earnings from the Eklutna Hydro Lake Dam over and above the cost to operate it, would be placed into an interest-bearing reserve account to be used to pay for the alternatives to meet the fish and wildlife resource goals as stated above by 2034.
6. **Seek Federal Funding**
    - The Native Village of Eklutna will assist in seeking federal fund support through either grants or a direct appropriation from the federal government in partnership with the Project Owners.

7. **Committee Membership**
    - NVE shall be a permanent member of the Eklutna River Committee

Our Rationale

The Eklutna River, our river, has been degraded for 95 years. We will wait a bit longer to see the full restoration of the Eklutna River until sufficient new "firm" renewable energy is installed to displace Eklutna hydropower. Industry experts predict that sufficient new firm renewable energy will be installed by 2034 to displace Eklutna hydropower, and we are ready and willing to help develop these new renewable energy sources. When sufficient new firm renewables are installed, the Eklutna Lake Dam must be removed, or other acceptable alternatives implemented. Our partners have committed to the full cost of removing the Eklutna Lake Dam.

Until the Eklutna Lake Dam is removed, the Eklutna River must flow its entire length below the dam. By drawing water from the bottom of Eklutna Lake and discharging it at the glacial moraine area upstream of the dam to be released downstream through the existing dam outlet gate, the alternative "Eklutna River Release Facility" proposed above will allow the Eklutna River to flow its entire length.

The Eklutna River Release Facility will do everything the AWWU Portal does, including more. It will provide year-round continuous flow to the entire river without leaving a one-mile gap of a dry river. It will avoid impacting AWWU facilities, operations, or water withdrawals, allow

AWWU to draw its full water entitlement even after dam removal, and ensure the river will never go dry.

The Eklutna River Release Facility will be more affordable than the AWWU Portal. A similar system (the Siphon Bypass Pipeline) was projected to cost as little as $8.4 million.

While we believe that this siphon pump option provides the best compromise by protecting Anchorage's water supply and taking a staged approach to full fish passage, the Native Village of Eklutna continues to recognize and support our other resource-oriented partners at USFWS, NOAA, and ADF&G in accomplishing our shared resource goals of full fish passage.

Removal of the Eklutna Lake Dam, in combination with the Eklutna River Release Facility, could continue to allow the production of some hydropower from the Eklutna Hydroelectric Project.

While we do not believe the flow regime proposed in the Draft Final is adequate to attract or support fish or restore natural river processes, we are willing to compromise and accept the proposed flow regimes should the utilities agree to our proposals. We are also willing to delay fish passage into Eklutna Lake until the Eklutna Lake Dam is fully removed or other alternatives are implemented to achieve our resource goals, which converge with the 1991 Agreement signatory resources agencies.

Eklutna River Restoration Project

Pump Station Alternative – Project Description

(April 4, 2024 by Don Spiegel, GV Jones & Associates)

Pump Station Alternative – there may be a need for an alternative, or an adder, to the Recommended AWWU Portal Project for various reasons as follows:

- The recommended Portal Release Alternative is a "single straw" into Eklutna Lake. The operation and thus success of the alternative relies on 35-year old infrastructure to be 100% available. The suggested mitigation for the "single straw" option is use of an existing gated opening at the base of the Eklutna Dam spillway structure that would allow Eklutna Lake water (or some ponded water when the Lake level is below the gated opening) to flow into the Eklutna River. Project documentation has stated that the pond may be capable of supplying up to 12 hours of water. The gate will be controlled to open when the Eklutna Water Project infrastructure is unavailable. This is a questionable concept because the bottom elevation of the opening is Elevation 852. Eklutna lake is below Elevation 852 six months out of the year and thus the gate cannot provide reliable water during that period.
- The last mile of the Eklutna River between the downstream bottom of Eklutna Dam and the AWWU Portal facility is not part of the restoration zone.
- The AWWU Portal release may impact the ability of AWWU to operate at the original design capacity of the Eklutna Water Project.

This Pump Station Alternative is intended to work independent of, or in tandem with, the Portal Release Alternative. The Pump Station Alternative consists of construction of one reinforced concrete cylinder pump station adjacent to Eklutna Lake near the Eklutna Dam and with a discharge to the pond and stream that routes water to the gate at the base of the spillway structure.

Facilities that comprise the Pump Station Alternative are as described below and as are shown on the attached figures. For an overall view of the proposed Pump Station Alternative, see Figure 1.

<u>1. Intake Crib</u>

- Type of Structure. The structure should consist of a screening arrangement anchored to a precast concrete base. The precast concrete base can be set on the Lake bottom via barge and the screen can be anchored to the precast concrete base by divers. The screen itself should be a framed Type 316 stainless steel fabrication with 1.5 inch spacing,

horizontal and vertical, between slats. Type 316 stainless steel chain link fencing material anchored to the Type 316 stainless steel frame can be used for this function.

- Structure Size. The Type 316 stainless steel screen crib should measure 8 feet long by 6 feet wide by 6 feet high. The open area for water would include the front face of the crib (nominally 6' x 6' = 36 sf) plus the two sides (nominally 2 x 8' x 6' = 96 sf). At a 40 cfs flow rate, the nominal approach velocity to the crib would be 40 / 36 + 96 = 0.30 feet per second which is an acceptable velocity in terms of fish exclusion. The crib top may want to be plated so that debris cannot easily enter the crib from the top.
- Connection To Suction Pipe. The 36" diameter suction pipe could be flanged and gasketed to the back side of the screen crib making it water tight and structurally sound. Special detailing of this connection will be required.

2. Suction Pipe

- Type and Size of Pipe. The suction pipe should be bell and spigot reinforced concrete drainage pipe, ASTM C 76 or equal. The pipe should be 36 inches in diameter and the pipe should be installed in the Lake via barge at the low water level time of year (May and June). It also should be installed at an approximate 0.1 to 0.125 percent slope with the downward slope going back to the Cylinder Pump Station. This will help route and control water as the pipe continues on land when it leaves the Lake portion of the run.
- Length of Pipe. It is expected that the pipe length will be about 2,500 feet in length but this needs confirmation with bathymetry data for the Lake bottom.
- Buoyancy Concerns. The pipe should be filled with water as it is placed so that no buoyancy issues are created. The weight of the concrete pipe itself may be enough to eliminate buoyancy concerns but this needs to be thought about and sequenced properly.

3. Cylinder Pump Station

- Depth of Pump Station. The cylinder pump station must be low enough to allow gravity supply with Lake water at low lake level yet high enough to allow personnel and equipment access into the cylinder from the grade above (see Figure 2 for an enlarged view). The pump station bottom Elevation 800 is set based on a 0.1 to 0.125 slope of the raw water pipe from the Intake Crib. The pump station top Elevation 880 is set based on the existing grade near the pump station location. The bottom portion of the pump station cylinder should be constructed during the low water level time of year (May and June) up to perhaps Elevation 840 to 850. The top portion of the cylinder pump station can be constructed later in the summer but should be constructed such that Lake water does not overtop the top of wall at any time. The pump station should be a reinforced concrete cylindrical structure. See Figures 3 and 4 for details of the Cylinder Pump Station.
- Type/Size of Pumps. Three wet pit submersible pumps should be used as shown on Figure 3. Each pump should be rated 6,000 gallons per minute at a discharge head of approximately 45 feet (from low water surface elevation of 820 to the discharge elevation

of approximately 860; plus some dynamic losses). The resulting motor for this condition is approximately 100 horsepower in size. No on-line spare pump is required for outage periods although having a shelf spare pump stored on the site might be a wise investment.

- Pump Discharge Piping. Each pump should have its own individual discharge pipe, 18-inches in diameter. The piping should be ductile iron pipe for strength and longevity.
- Removal of Pumps. A removable cover should be provided over each pump that would help facilitate removal of the pump via a crane for maintenance.

4. Pump Station Discharge Routing

The three discharge pipes should exit the pump station cylinder and discharge flow onto a reinforced shotcrete pad that then routes the water into an existing pond. This pond is adjacent to the location of the Cylinder Pump Station and typically has some water in it even during low lake level periods. A ground survey of the pond and the ground that separates the pond from the stream that runs to the upstream face of the Eklutna Dam is needed so that effective routing of the pump station discharge can occur. It is thought that there is a slight downward slope in the stream from the pond to the dam face which has a gated exit through the dam at an invert elevation of 852. If the slope is not consistently downward, or if the slope is not well formed in the stream, improvements to the stream slope and side berms should be implemented

5. Access Road to Cylinder Pump Station

A 20-foot wide, gravel or asphalt, access road should be constructed for construction needs as well as later operations and maintenance needs. The road will be at approximate elevation 880. The routing should match the alignment of existing trails so as to disturb as few trees as necessary. A preliminary routing of the road is shown on Figures 1 and 2. This routing overlaps existing trails as much as possible

6. Electrical Supply

A new three phase power supply will be required to power the Cylinder Pump Station. Three phase power, at 13.47 KV, is available along Eklutna Lake Road at the Eklutna Water Treatment Facility approximately six miles away. Single phase power is available from the Eklutna Water Treatment Facility to Eklutna Lake. This single phase power supply is mounted on wooden poles along Eklutna Lake Road. It is possible that the extension of three phase power to the Cylinder Pump Station could also be mounted on these wooden poles.

It is suggested that an Electrical Building be constructed adjacent to the Cylinder Pump Station to house all electrical and instrumentation equipment. Housing the electrical equipment inside the Pump Station Building increases maintenance and operations issues with the equipment, so a separate building is suggested. For reliability and redundancy reasons, it is suggested that two transformers, 13.47 KV primary to 480 volt secondary be provided and arranged in a Main-Tie-Main arrangement. Normal operation would be for one transformer to feed two 100 horsepower pumps with the other transformer feeding the third 100 horsepower pump and miscellaneous

single phase station and grounds needs. Each pump should be powered with 480 volt Variable Frequency Drives or, at a minimum, with solid state soft starters to limit starting current in-rush. In addition, a manual transfer switch to connect a portable generator to the station should be provided in case of long-term power outages. It is anticipated that the Electrical Building would measure approximately 16 feet by 20 feet and that the building would be of CMU construction with a steel joist and metal deck roof. A preliminary electrical single line diagram is presented as Figure 5.

The emergency generator could be portable or could be permanent and is expected to be about 300 KW in size. The engine would be a diesel engine and thus would require some on-site storage of diesel if permanent placement is selected.

7. Gate System Improvements

At the Eklutna Dam outlet structure, a manual drainage gate allows release of water from the base of the dam. The invert elevation of the is gate is El. 852. It is important to motorize this gate in order to add some flexibility in operation for water to reach the Lower Eklutna River. Also, it is possible that construction of a weir structure upstream of the gate, with a second operable gate, could provide some storage of water coming from the Cylinder Pump Station. This storage of water could then be used to provide continuous water downstream of the dam should the pump station be out of service for short periods of time (say for a few hours).

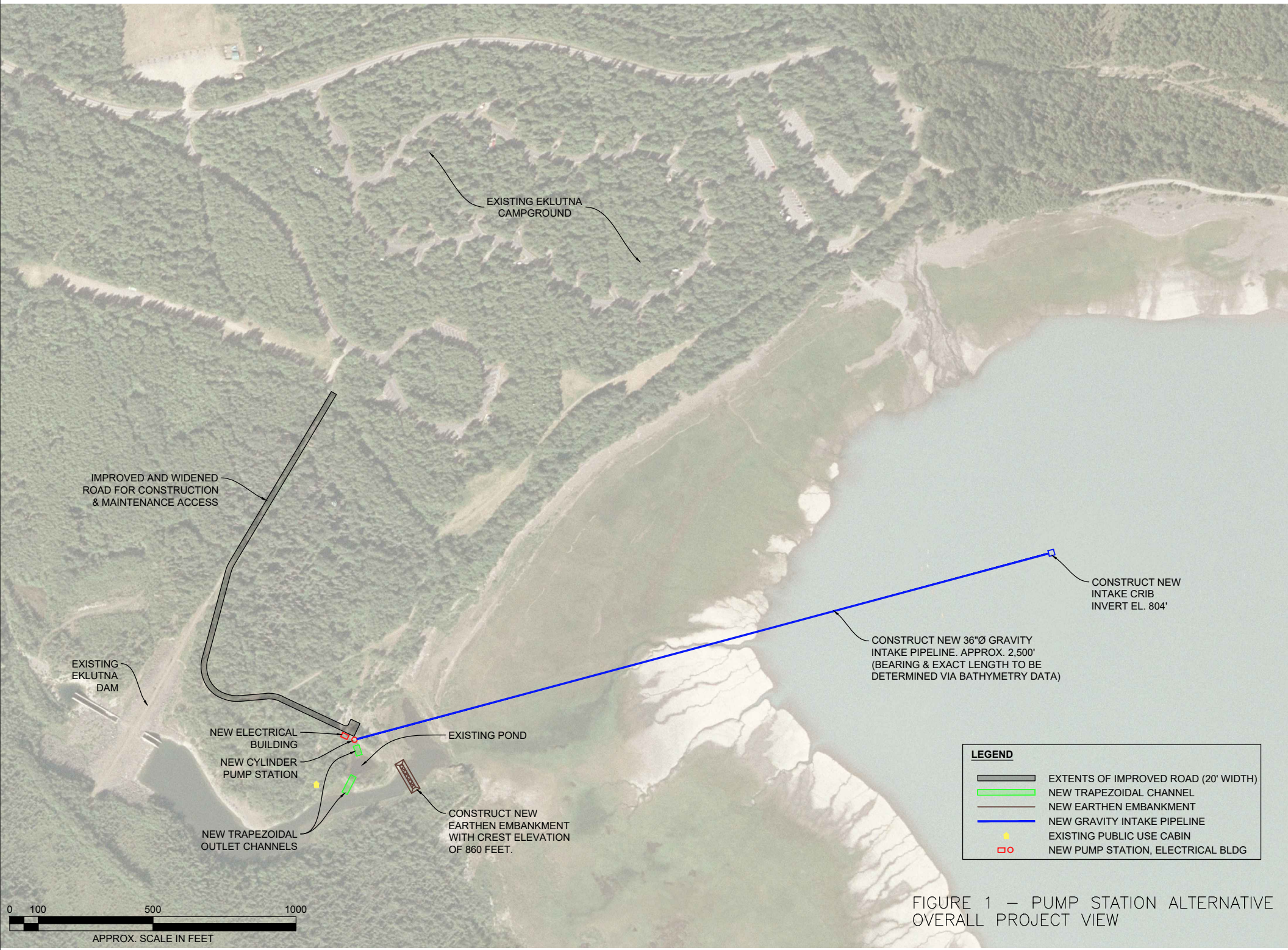

FIGURE 1 – PUMP STATION ALTERNATIVE OVERALL PROJECT VIEW

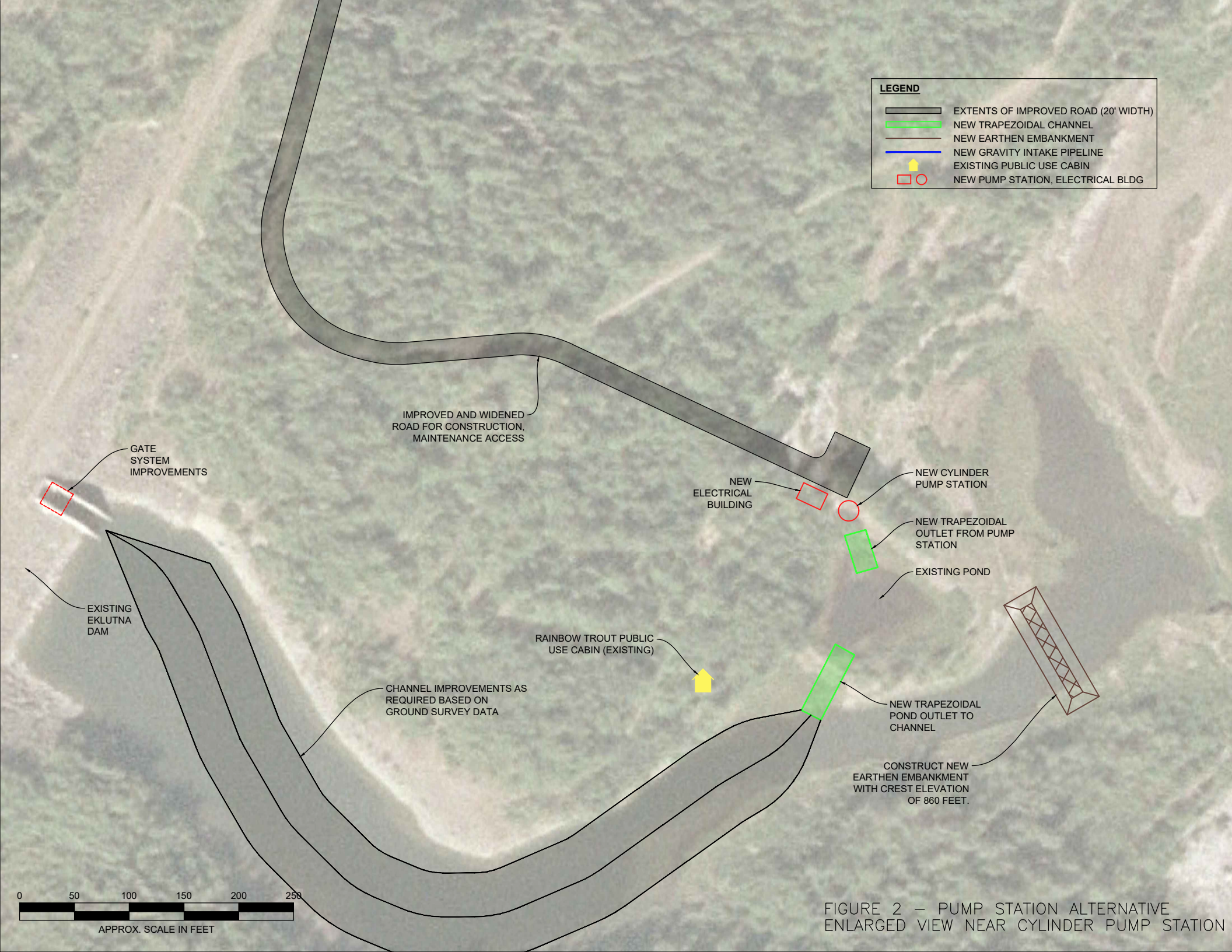

FIGURE 2 – PUMP STATION ALTERNATIVE
ENLARGED VIEW NEAR CYLINDER PUMP STATION

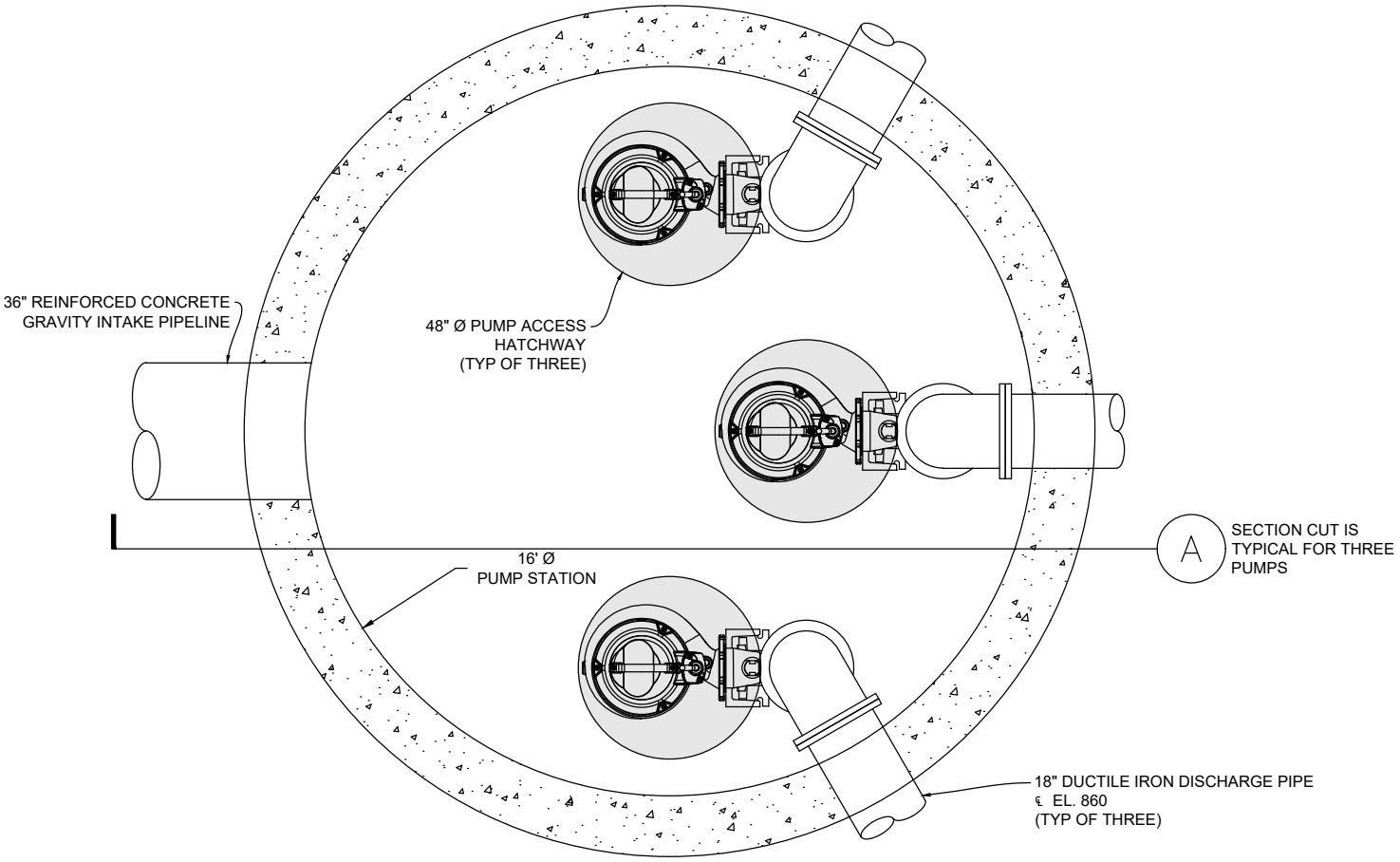

FIGURE 3 – PLAN VIEW OF CYLINDER PUMP STATION

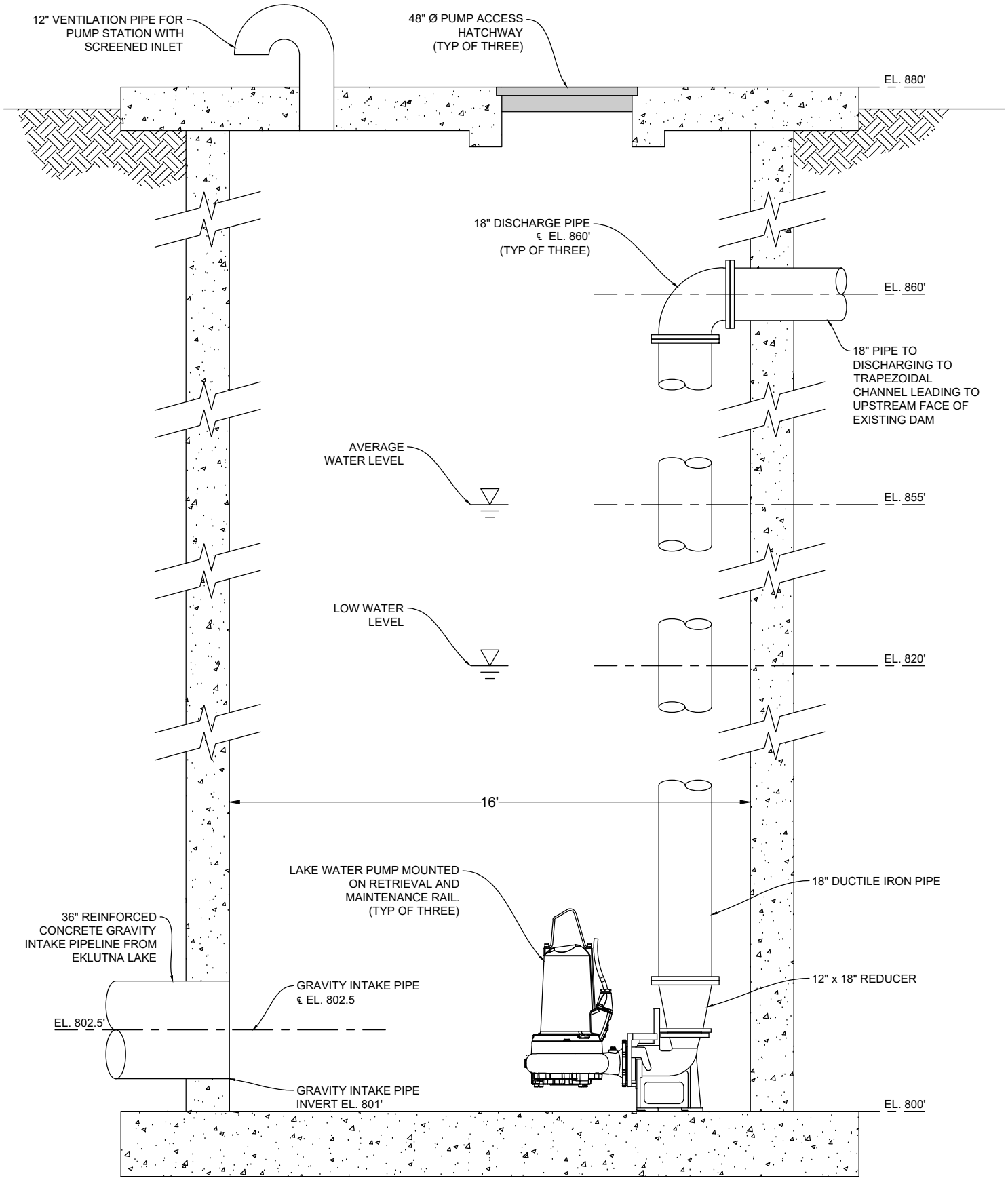

FIGURE 4 – SECTION VIEW OF CYLINDER PUMP STATION

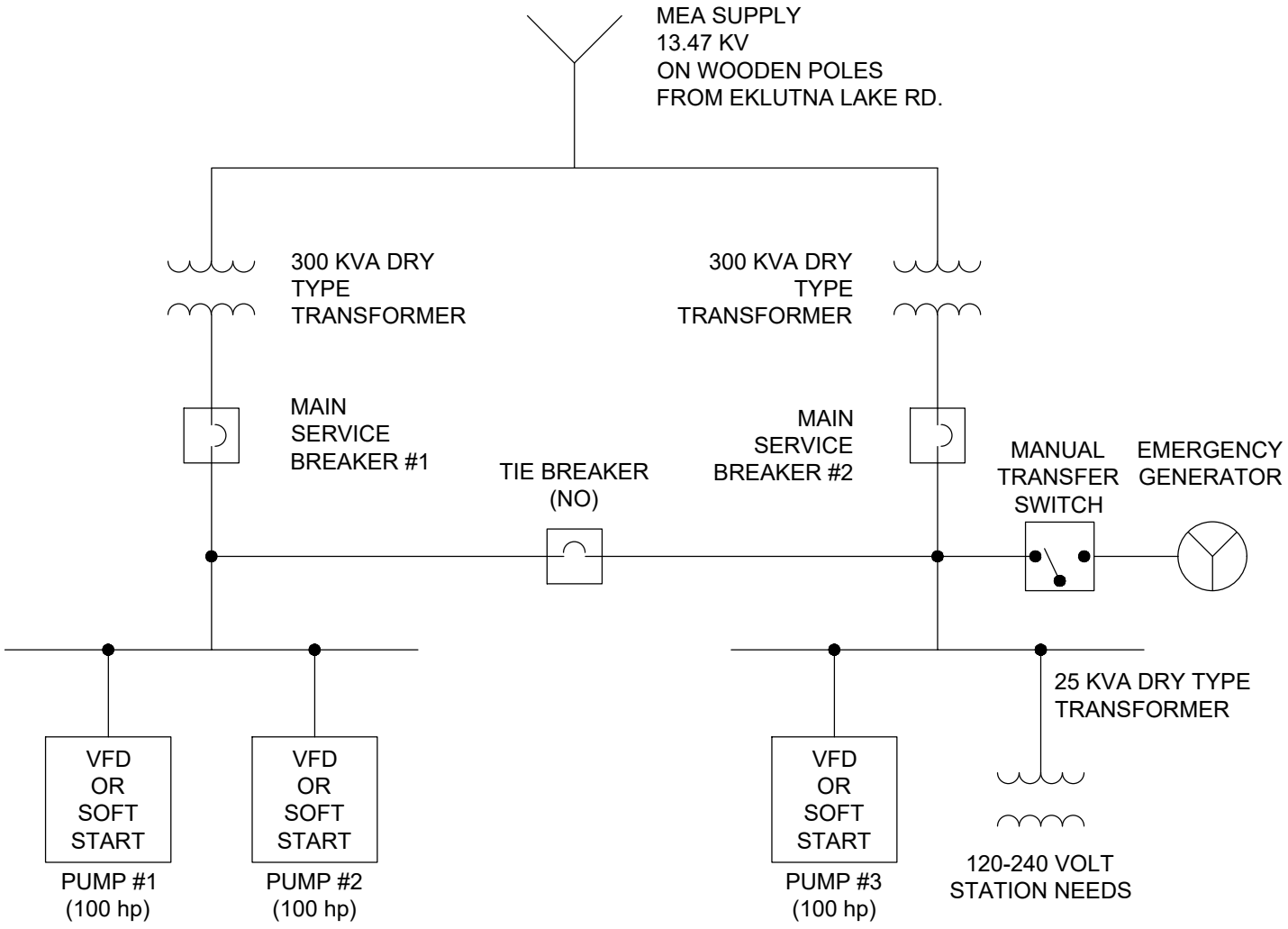

FIGURE 5 – PRELIMINARY ELECTRICAL SINGLE LINE DIAGRAM