Nevada Irrigation District

Staff Report

for the Regular Meeting of the Board of Directors, November 13th, 2019

TO: Honorable Board of Directors

FROM: Keane Sommers, P.E., Hydroelectric Manager
Dar Chen, P.E., G.E., Senior Engineer - Dam Safety

DATE: November 6, 2019

SUBJECT: **Combie Dam Upgrades – Alternatives Development**

HYDROELECTRIC

RECOMMENDATION:

Approve a contract in the amount of $367,148 with Gannett-Fleming to perform Alternatives Development for Combie Dam Upgrades and authorize the General Manager to execute the necessary documents.

BACKGROUND:

The Combie Dam Upgrades will cover 1) scouring resistance at the toe areas, 2) stabilization of the unanchored portion of the gravity dam at each abutment, and 3) increasing the outlet flow through the dam for future water demand. These three upgrades are physically correlated and will involve resolutions of sophisticated technical issues. The Hydroelectric Department plans to develop alternatives that will achieve all of the upgrades, then select the most favorable one for approvals by DSOD and FERC, followed by the detailed design.

Combie Dam (or Van Giesen Diversion Dam) is an 85-foot-high and 762-foot-long concrete arch dam on the Bear River. Built in 1928, it supplied water to canals on the north and south sides of the river. In the 1980s, the Combie North and Combie South Powerhouses were built; and, through the Combie North Powerhouse, the water continues to be supplied to District facilities and customers via the Combie Phase 1 canal.

Since its construction in 1920s, Combie Dam has an on-going issue of high flows causing scouring at the toe of the dam. Several repairs and improvements at the

lower portions of the toe areas have been made to resolve the problems. As the design probable maximum flood (PMF) increased from under 30,000 CFS to 73,500 CFS over the past several decades, the flood scouring potential has extended to the entire right and left abutments. Since the 1990s, the California Division of Safety of Dams (DSOD) has expressed concern of the scouring issue at the abutment toe areas. In 2018, the District analyzed the stabilities of Combie Dam and found that the unanchored portions of the gravity sections of the dam at the abutments would be unstable under the PMF loading. In addition, the District wants to consider upgrades to the conveyance portion of the dam to meet the future needs of the downstream demand.

A request for proposal (RFP) was sent to 11 consulting firms specialized in dam engineering and design in the United States. Six well-prepared proposals were received. The proposals were reviewed by a Selection Panel of 4 Professional Engineers from the Hydroelectric and Engineering Departments. The proposal selection is based on the following selection criteria:

- Team experience, project management, and quality control;
- Project approach and insights;
- Experience with DSOD, FERC, and other regulatory agencies;

All of the 6 teams presented good proposals, with some variation in their project approaches and in the total costs, which are summarized in the following table.

Consulting Teams	Total Cost ($)	Notes
AECOM	359,140	
Black & Veatch	589,988	Include extensive field investigations
Gannett-Fleming	**367,148**	
GEI	311,555	
HDR	474,505	
Stantec	150,880	No field investigation

The Selection Panel unanimously rated the Gannett-Fleming proposal with the highest total score. The proposal demonstrated great experience in evaluating and designing similar projects, showed a good project approach, and had reasonable project costs. Therefore, Gannett-Fleming is recommended for Combie Dam Upgrades – Alternatives Development.

Award of this contract supports District Strategic Plan Goals 1 and 2 by replacing critical infrastructure and maintaining compliance with State and Federal regulators.

BUDGETARY IMPACT:

The 2019 Hydroelectric Department Budget includes $450,000 for Dam Safety Related studies.

KSS
MDC

Attachment:

- Presentation Slides for Board Meeting

Board of Directors Meeting

Combie Dam Upgrades – Alternatives Development

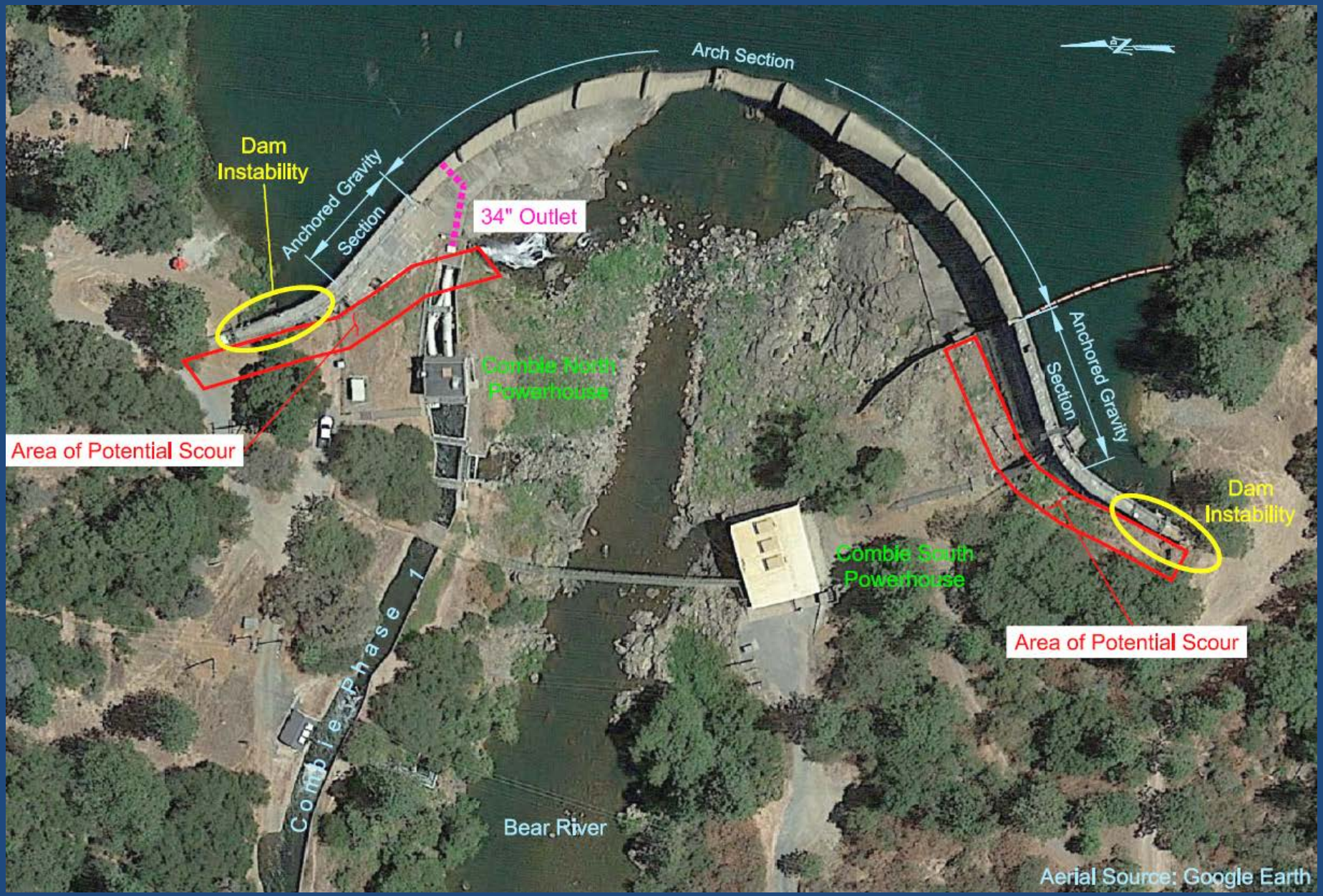
Presented by
Keane Sommers, Hydroelectric Manager
Dar Chen, Dam Safety Engineer

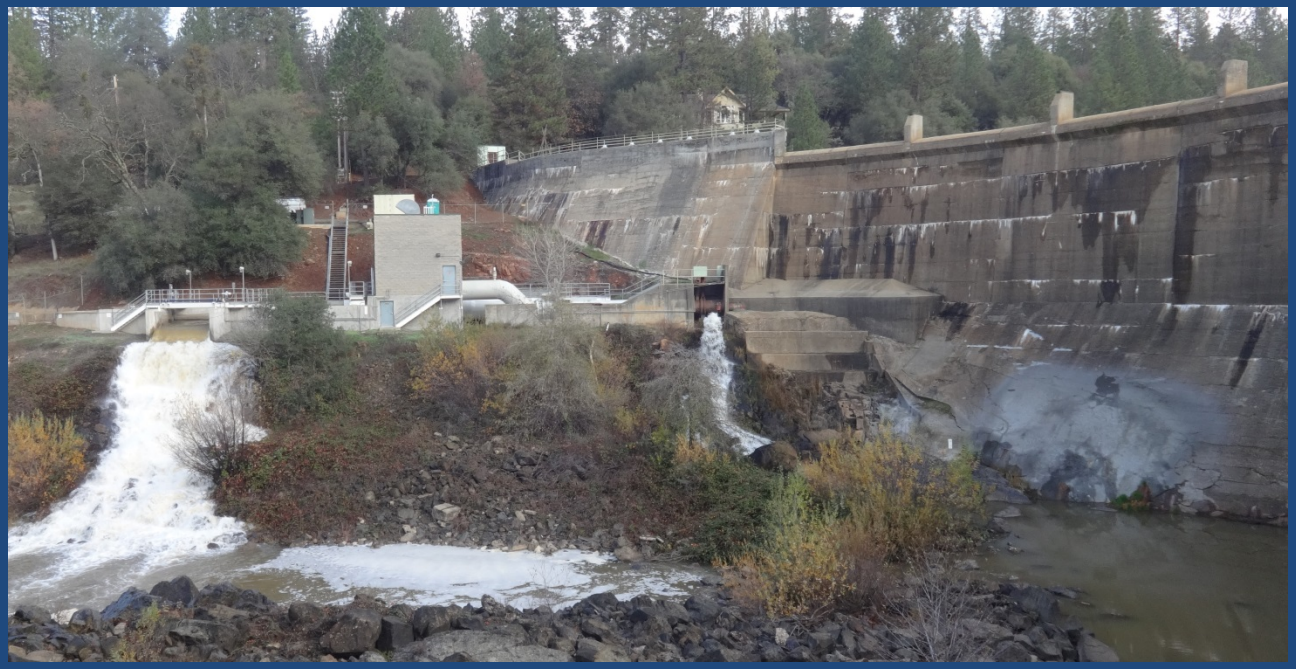
November 13, 2019

Combie Dam Upgrades

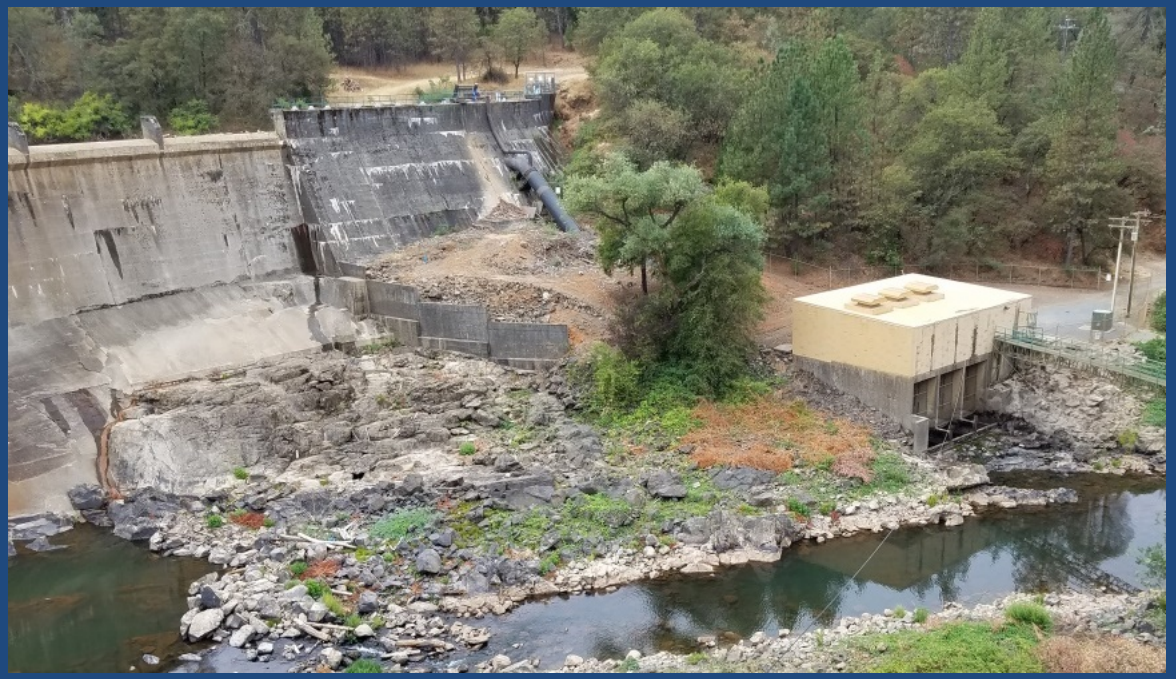
1. Scour Resistance in the abutment toe areas to prevent failure of dam under probable maximum flood (PMF) overflow of 4 to 14 feet.
2. Dam Stabilization at unanchored portions of the gravity sections of the dam in the abutments under PMF.
3. Flow Increase for water supply through dam to meet future water demand.

Combie Dam


Arch Section
Dam Instability
Anchored Gravity Section
34" Outlet
Combie North Powerhouse
Area of Potential Scour
Anchored Gravity Section
Dam Instability
Combie South Powerhouse
Area of Potential Scour
Combie Phase 1
Bear River
Aerial Source: Google Earth



Combie
Right
Abutment



Combie
Left
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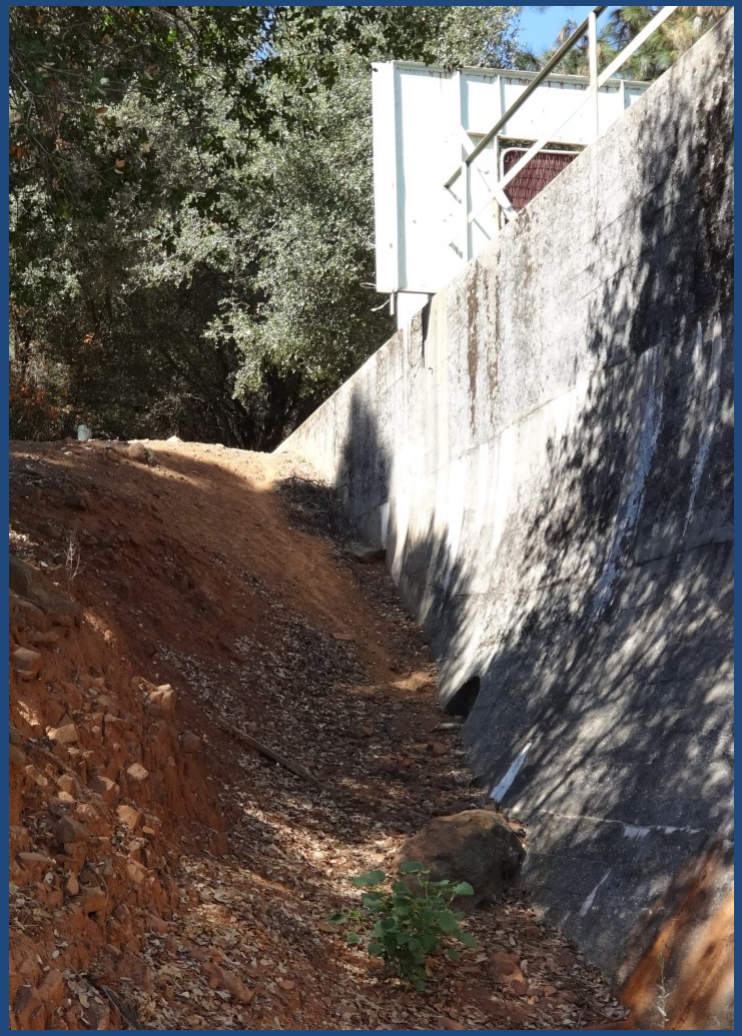
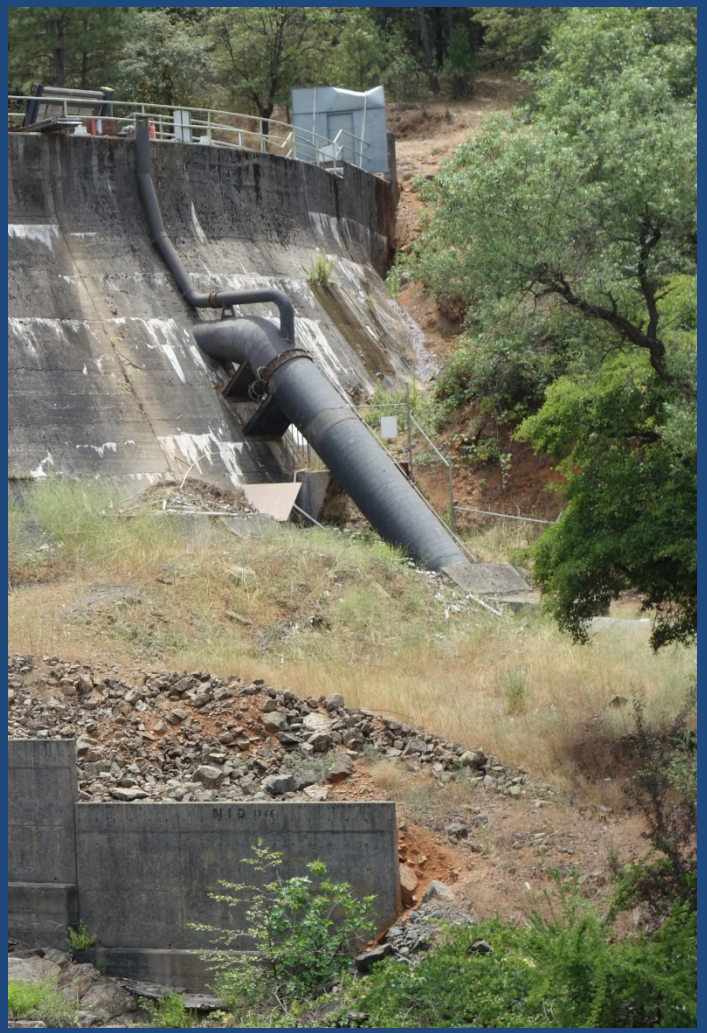
Combie Dam - Potential Scour Areas under Probable Maximum Flood (PMF)



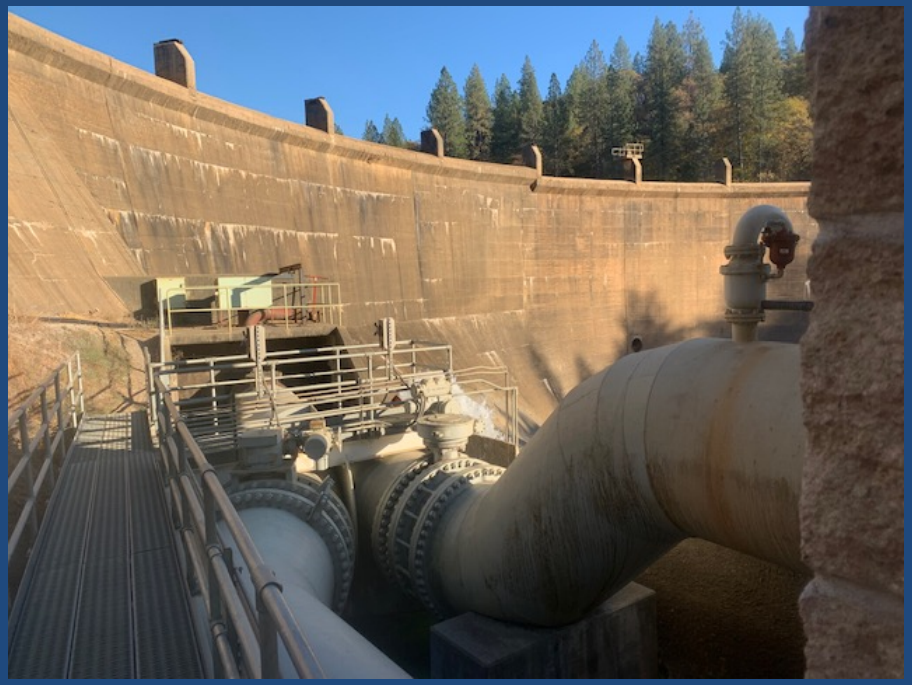


Dam Stabilization

Anchors (1991) on Gravity Section of Dam

Flow Increase

Combie 34” Outlet through Dam for Water Supply



Combie Dam Upgrades - Plan

Current Project

- Evaluate various possible methods for scour protection, dam stabilization, and outlet flow increase.
- Develop alternatives for solution to the 3 integrated upgrades.
- Present the preferred alternative to DSOD and FERC for their approvals (2020 – 2021).

Following Projects

- Design the Upgrades for approvals by DSOD and FERC (2021 – 2022).
- Construction

Consultants Selection

- Request for Proposal was sent to 11 firms specializing in concrete dam engineering and design.
- Received 6 proposals.
- Selection Panel unanimously rated Gannett-Fleming proposal with the highest score.

Recommendations

Approve a contract in the amount of $367,148 with Gannett-Fleming to perform Combie Dam Upgrades - Alternatives Development, and authorize the General Manager to execute the necessary documents.