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Franklin County Water District
P.O. Box 559
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Attention: Board of Directors

Subject: Preliminary Engineering Report Recommendation

Board of Directors,

On December 27, 2015, the Lake Cypress Springs (LCS) watershed experienced a historic flooding event that caused lake waters to rise to record levels. The Water Surface Elevation (WSE) rose to a maximum of 383.92 feet above mean sea level (msl) or 5.92 feet above the conservation pool of the reservoir, set constant at 378.00 msl. Boats, houses, and boathouses experienced significant damage from the event costing many property owners, including the district, thousands of dollars in damages.

This flooding event, classified as a 350-year storm, resulted in the District's being concerned that the existing emergency spillway might not be located at the correct elevation. Although the emergency spillway (385.00 feet msl) was not engaged during the flooding event, anecdotal evidence suggested that it could be located higher in elevation than the original design specifies. As a result, the Franklin County Water District (FCWD), which owns and operates LCS, tasked Carollo Engineers, Inc. (Carollo) with investigating, analyzing, and submitting a Preliminary Engineering Report (PER) to determine if the current spillway elevation is located at the correct elevation, and if not, recommend alternatives to remedy the issue as necessary.

The authorization to prepare the second report was executed in January 2018 and billed on a time and materials basis not to exceed \$72,900.

The report was completed and delivered to the board on February 2, 2018. The purpose of the PER was to understand the hydraulic impact of the do-nothing option, as well as three other alternatives (Alternative 2, 3A, and 3B).

As the report presents, the most significant and broad means to compare each Alternative is the Benefits to Cost Ratio (BC-Ratio). This ratio, as outlined in the report, takes into account the cost associated to complete the renovations, as well as the peak damage difference between each option. The BC-Ratio is widely used in understanding the most cost beneficial route to take in restoration projects. The table below shows each modeled alternative's BC-Ratio.

BOARD OF DIRECTORS:

Gary Cunningham, President – Billy M. Jordan, Vice-President – Rodney Newsom, Secretary – Jenny Dennis, Director – Carmen Sparks, Director

Alternative	OPCC Cost	Damage Difference at Peak Discharge <i>Timestep = 10.77 hr.</i>	BC-Ratio
Alternative 1 (Existing)	\$0	\$0	0.00
Alternative 2 (Design)	\$1,566,000	\$1,104,445	0.71
Alternative 3A (Renovated)	\$1,056,000	\$741,397	0.70
Alternative 3B (Renovated)	\$813,000	\$1,203,963	1.48

This application of the BC-Ratio is where common misconceptions arise. This data is based solely on the cost of renovation and the damage that is accrued throughout the modeling and takes no consideration of the **probability** of the storm event. The option with the highest BC-ratio, Alternative 3B (Renovated), is only effective in saving money if the storm in fact happens. With that being said, the ratio is only applicable in this study when looking at both the ratio and the chances of the peak damage occurring. Only then can an accurate estimation of the actual benefits of each Alternative be made.

Within the report, Carollo stated that “although the level of uncertainty is high, the trendline predictions showcase that the likelihood of LCS reaching 393' msl is somewhere between a 22,000-year and a 101,000-year storm event.” This reiterates that the data highlights the probability of a peak storm event as being very unlikely, making a strong case for no action from the district.

Carollo goes on to further advise that if restoration is to be implemented, than “FCWD should consult with an environmental consultant prior to a design phase to understand the implications of restoration of the emergency spillway”. This would be an additional uncalculated district expense towards restoring the emergency spillway.

In my opinion, the low calculated annual percent chance probability (.001% - .0045%), coupled with the low BC-Ratio, has led me to the conclusion that there is no warranted action from the district.

One additional recommendation made by Carollo, independent of the restoration decision, was that “the use of the Emergency Spillway for agricultural practices (primarily the growing of hay) should be discontinued.” This is explained in the PER as being a result of studying the Operations Maintenance Manual for the LCS Dam. In Carollo’s research, they found that the ideal surface for the spillway is occasionally mowed grass which helps to combat erosion and harborage of burrowing animals. Carollo also found through their hydraulic modeling that mowing can have an effect on the conveyance of the spillway.

With that being said, it is my opinion that the District should discontinue the agricultural practices on the emergency spillway.

Regards,

David I. Weidman