

**Minutes Of
Engineering And Maintenance Committee Meeting
Of The Water Works Board
Of The City Of Birmingham
November 26, 2018**

An Engineering and Maintenance Committee Meeting of The Water Works Board of the City of Birmingham was held Monday, November 26, 2018, at 11:30 a.m., at the Cahaba Pump Station Museum, 4012 Sicard Hollow Road, Birmingham, Alabama, 35243, to discuss engineering and maintenance issues.

The following Committee members were present: Brett A. King, Brenda J. Dickerson, Sherry W. Lewis and Ronald A. Mims. Other Board Members present who do not serve on the Committee were: Tommy Joe Alexander, William “Butch” Burbage, Jr. and Deborah Clark.

The meeting was also attended by: Mac Underwood, General Manager; T. M. “Sonny” Jones, Assistant General Manager of Engineering and Maintenance; Darryl R. Jones, Assistant General Manager of Operations and Technical Services; Grace Amison, Executive Assistant to the Board of Directors; Tammy Wilson, Executive Assistant to T. M. “Sonny” Jones and Darryl R. Jones; Rick Jackson, Public Relations Specialist; Scott Starkey, Security Manager; Cynthia Williams, Security Coordinator; Terrell Jones, Security Manager; Ben Sorrell, Chief Engineer; Jeremy Millwood, Technical Support Analyst I; Stephen Franks, Principal Engineer; Mark Parnell, Parnell Thompson, LLC; Kelvin Howard, Kelvin Howard, LLC; Brian Ruggs and Patrick Flannelly, ARCADIS; Tommy Palladino, and Martha Bozeman, Agency 54; Chandra Abesingha, CE Associates; Theo Johnson, Volkert, Inc.; Dana Nail, Attorney General Office; Michael Canino and Jeremy Young, Schnabel Engineering.

Chair of the Committee, Director Brett King called the meeting to order at 11:32 a.m., declaring there was a quorum and opening the meeting with prayer.

Following, meeting minutes from June 19, July 24 and August 21, 2018 were approved by the Committee.

Next, was a request for the Committee to hear a presentation on Lake Purdy Dam Improvements Technical Alternative Evaluation and recommendation from ARCADIS. Brian Ruggs delivered a talk and presentation. Mr. Ruggs introduced dam safety experts from Schnabel Engineering, Mike Canino and Jeremy Young. Director Lewis arrived at the meeting at 11:41 a.m. We are looking at foundation seepage, dam overtopping/scour and dam stability, according to Mr. Ruggs. Rainfall is a key component of our design. The design standard we are designing for is the Probable Maximum Flood (PMF). The PMF for Birmingham is about 42” in a 24-hour period. Previous rain events in Birmingham were discussed, with 6” in a 24-hour period in 2015 mentioned. Birmingham has never seen a 16” rainfall, but we are designing for a PMF event an event, Brian Ruggs stated. Mr. Canino discussed the technical aspects. The dam was

built from 1906 – 1910 and in 1916 there were some seepage issues which were addressed. The dam was raised 20 feet in 1927. From 1979 to 1980 there was a grouting program implemented to address some seepage. There are limitations with grouting such as unknown void locations, clay resisting grout filling, anchoring/grouting operations could represent risk, there is no guarantee that a seepage barrier can be established, technique is difficult to price/scope and the United States Army Corps of Engineers (USACE) is moving away from grout. The recommended concept is a positive cutoff wall. The objectives are to control seepage, improve safety and reduce uplift beneath the dam. The wall is constructed as a continuous barrier from abutment to abutment. Comparing construction costs of grouting versus a secant pile wall show that the estimated costs are \$18M for the secant pile wall compared to \$10M - \$20M for grouting. Under construction risks, the cost is low for the secant pile wall compared to moderate for grouting. The outcome uncertainty for the secant pile wall is low compared to a high outcome uncertainty for grouting. The solution life of the secant pile wall is high compared to an unknown solution life for grouting. Director Burbage asked what the wall is made of. Mr. Canino responded, it is made of concrete. Regarding dam overtopping; the dam can safely pass 40% PMF or 16-inches without overtopping sections and instream scouring which is at the toe of the dam. Overtopping diagram protection options were looked at. In terms of stability; options were discussed for an overflow section which are anchoring, downstream buttressing or a combination of the two. Construction risk considerations were discussed in that there are degrees of uncertainties. The estimated construction cost for anchoring is \$28.4M for 100% of the PMF, downstream buttress is \$30.4M for 100% of the PMF, upstream buttress with dowels is \$32.9M for 100% of the PMF and upstream buttress without dowels is \$34.9M for 100% of the PMF. In summary, Brian Ruggs stated the seepage mitigation recommendation is a positive cutoff wall, the dam overtopping protection for walls and scour is a protection apron at the toe and for stability improvements the recommendation is a concrete mass buttress. Mr. Ruggs stated their goal was to get the Birmingham Water Works (BWVB) back to normal as quickly as possible and this is the approach they recommend. Patrick Flannelly responded to questions Board Members have raised in the past such as, why can't we just grout the dam and worry about the stability later and if we are just trying to fix seepage, what would it cost? Mr. Flannelly stated this dam must be renewed. Dam safety standards say the PMF is 42". Our recommendation is that the dam needs to be able to handle larger rainfalls. Director Clark asked if there have been complications with positive cut-off walls anywhere else. Mr. Canino stated the deeper water could create a concern, however for the depths of this project it should not be a problem. Director Lewis asked if there was a risk for the Board. Mr. Canino responded problems can be addressed along the way, but there should not be any risk. Some discussion occurred regarding the seepage over time and how it is being plotted. Mr. Ruggs stated data is obtained during dryer times and we are coming up on a time to collect that data again possibly. In 2015 was the last time data was collected. An indication that seepage had increased was the remediation work where erosion had started to occur at the beginning of the year. There is still seepage, but the erosion is under control. Assistant General Manager Darryl Jones stated daily flows are taken and it is possible to collect some data. Recent aerial drone footage video collected of areas under concern at the dam was shown to the Committee. Discussion occurred regarding the

extent of the erosion, which is indicative of the entire foundation according to Mr. Canino. Risks were discussed relating to the Board not taking any action. Mr. Canino pointed out that the left side erosion is more prominent. Patrick Flannelly responded if the Board gives approval, it will be a three-year construction project. AGM Darryl Jones pointed out on the drone video that 22 Solar Bees were purchased between 2009 and 2011 to improve the water quality at Lake Purdy.

Following, was a request for the Committee to recommend to the full Board to take bids to clean, repair and upgrade man-way access and paint the Sipsey Raw Water Tank Sites 1, 4, & 5 dual 500,000-gallon tanks at an estimated cost of \$2,000,000.00, as part of the BWWB Tank Maintenance Program and requirement of Alabama Department of Environmental Management (ADEM). AGM Sonny Jones stated Staff wants to get back to the tank maintenance program. The Committee agreed to move the item to the full Board.

Next, was a request for the Committee to recommend to the full Board to take bids to clean the Mulberry Site 4 Raw Water Tanks at an estimated cost of \$600,000.00, as part of the BWWB Tank Maintenance Program and requirement of ADEM. AGM Sonny Jones provided a handout (a copy of which is on file with the Committee meeting book) of bid documents and photographs of the deterioration of the raw water tanks. Director Mims asked how often this is done. AGM Darryl Jones stated it had been about 20 years when we cleaned them in 2014; however, it needed to be done before that. Also, two tanks were cleaned at a time, according to AGM Darryl Jones. Some discussion occurred regarding the cost of this proposed cleaning compared to the cost of the cleaning in 2014. AGM Darryl Jones recommended cleaning the raw water tanks every two years because it improves the water quality going into the Western Filter Plant. Director Clark asked if this would decrease the amount of chemicals needed at the plant. AGM Darryl Jones responded yes. Director Lewis questioned the frequency. AGM Darryl Jones stated this cycle will help in determining the frequency needed in the future. This proposal is for all four Mulberry tanks. Director Dickerson asked if tanks A and B only could be cleaned. AGM Darryl Jones responded yes. The Committee agreed to take bids to clean tanks A and B and move the item to the full Board.

Following, Director King stated he hoped to determine if the Committee wants to authorize ARCADIS to move forward on their proposal and see some seepage data from the dam at the next Committee meeting.

As there was no further business to be brought before the Committee, the meeting was adjourned at 12:57 p.m.

/s/

Michael Johnson
Interim General Manager

/s/

Brett A. King, Esq.
Director

/s/

Sherry W. Lewis
Director

/s/

Ronald A. Mims
Director

/s/

Brenda J. Dickerson, Ph.D.
Second-Vice Chairwoman/Second Vice President