Richard Bailey, Ph.D.

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November 9, 2021

Daniel Woldesenbet, Ph.D., P.E.  
General Manager, Director

Alameda County Water Flood Control & Water Conservation District

399 Elmhurst Street  
Hayward, CA 94544-1395

RE: Comments on the draft “Tide Gate Operations Memorandum for the 7th St. Flood Control Station at Lake Merritt”

Dear Dr. Woldesenbet:

As a professional aquatic biologist, and having occupied an office on the shores of Lake Merritt for more than 25 years as the former Executive Director of the Lake Merritt Institute, I offer the following comments on the proposed dry weather tide gate operations manual at the 7th Street Flood Control Station, as proposed in the November 4, 2020 draft report to the City of Oakland by Wood Rogers, Inc.

1. 303(d) Listing: In a critical oversight, the report fails to mention that Lake Merritt is listed as an impaired body of water due to organic enrichment / low oxygen conditions by the US Environmental Protection Agency under Section 303(d) of the Clean Water Act, and by the California State Water Resources Control Board. (i) Because tide gate operations can impact flushing, organic enrichment, and oxygen levels, recommendations in the report must take this listing into account. To do otherwise invites regulatory scrutiny.

Although natural estuaries experience low oxygen conditions, Lake Merritt’s highly urbanized watershed render it very unnatural. To quote Dr. Alex Horne (professor emeritus of Environmental Engineering at UC Berkeley), “Although I have made the argument that a bit of anoxia in estuaries is often natural, it is also true that plenty of oxygen makes everything more able to resist other environmental “insults” such pollution from PAHs (automobile crankcase oil drips), copper & Zinc (car brakes & copper plated roofs and gutters), or ammonia  - all from street runoff since their mode of toxic action is often via the gills or skin of aquatic organisms which thus are better off with more oxygen than even natural conditions might sometimes bring.”

1. Wet Weather / Dry Weather: The report considers only dry weather conditions, but it is during periods of wet weather runoff that flooding is most likely; the oxygen problem (due to salinity stratification) occurs; and when wetlands are most likely to die from water elevations that are too high, or too low.
2. Measure DD Intent: Several million dollars of Measure DD bond money to improve Lake Merritt was spent on removing channel bottlenecks in order to increase tidal circulation.  Yet this report proposes to limit circulation during daylight hours. This violates the intention of Measure DD.
3. Different Day/ Night tide levels: Separate tidal levels for day and night operations would disrupt natural tidal cycles, likely prevent establishment of healthy wetlands, and not be conducive to optimal circulation and water quality objectives.
4. Mud Flats: Recommended water levels appear to be designed to avoid the sight of mud flats during the day.  This value judgement should be publicly vetted prior to becoming policy. To quote Dr. Alex Horne “A big advantage of tidal flats exposed at low tide is that oxygen in the air can get at the mud and stop anoxia (& hydrogen sulfide bad eggs smell) building up.  Air is 21% by volume of O2 but water at the same temperature is only 0.5% by volume so air has 40 times better a chance to keep the mud clean.”
5. Wildlife and Estuary Health: To quote Dr. Horne again: “Restoration to more natural hydraulic conditions favors the true estuarine species (which have natural resistance to these changes) over both true marine and true freshwater species so should be encouraged.” Imposing unnatural tidal conditions on the nascent wetland restoration efforts is likely to cause them to fail.
6. County Operation Costs: It is obvious that recommendations have been tilted toward reducing operation of the pump station “by approximately half” in order to reduce costs to the county.  For LM, a far better solution is to install remote control of the facility from the County central office, which would save them even more money, and provide better control. Perhaps the upcoming federal infrastructure funding can be applied.
7. Water Depth: Unless someone launches a boat with a deep keel, sailboats rented at the lake do not need 5 ft. of depth.  Staying 50 ft. from the shoreline is required by the Boating Center, and is ample to avoid bottoming out during normal tidal fluctuations.

Keeping daytime water depth low during the daytime but allowing it to be higher at night is incongruous. Can people not drown at night? The threat of drowning is exceedingly low given the shallow shoreline, which is never deeper than 3-4 ft. except in front of creek outfalls.  If someone falls in, they have only to reach for the bulkhead wall to climb out.  The only thing unable to do that was a police horse, which had to be taken to the Bandstand Beach to get out. Past drowning victims have been either suicidal or under the influence of drugs.

There are no “pockets of dead pools” in LM, which is basically flat with only about a 1 ft. difference in bottom elevation away from the shore.  The exception is a ridge about 1ft high across the Glen Echo arm which could not be dredged due to being a harder substrate.  The deepest part of the Lake was named “Bailey’s Deep” in my honor, but it is not a deep pocket. Under contract with the City, I did a depth study for the Lake several years ago. The report should still be in the Lake Merritt Institute office.

RECOMMENDATIONS:

1. Wet Weather: The report should be re-written to include wet weather operations so that the City of Oakland can evaluate flood control in relation to regulatory issues regarding oxygen levels, wetland establishment, and the overall health of wildlife at Lake Merritt.
2. 303(d) Listing: The report should recognize the 303(d) listing, and current status of the City’s efforts to address low oxygen levels due to the highly urbanized watershed.
3. Tide gates: Tide gates should be operated to achieve as natural a tidal cycle as possible while maintaining flood control. There should be no difference between day and night tide gate operations.
4. Remote Control: Rather than adopt a single operation mode, Alameda County should install remote control over the modes, so they can nimbly and efficiently change them in response to changing conditions.  No single mode serves all needs. What is needed is a dynamic equilibrium state – periodic shifting among all the modes to allow each objective to be served as needed.
5. Bubbler Aeration: The report acknowledges the relationship between oxygen levels and water circulation on page 30-5.2: “Flow exchange between the lake and the estuary is one of the most effective ways to improve DO levels.” Yet the limited day limited / night natural differential in tide gate operations compromises flow exchange. The report suggests dredging as an alternative. Rather than dredging, a better solution to low oxygen during stratification is an aeration bubbler system as proposed and tested for the city by Dr. Alex Horne several years ago.  This would be much cheaper, more effective, and more easily approved by regulatory agencies than dredging.
6. In accordance with the recommendation on page 30, “The recommendation requires environmental specialist input prior to implementation”  Dr. Alex J. Horne ([anywaters@comcast.net](mailto:anywaters@comcast.net)) should be consulted regarding the impact of tide gate operations on establishing successful wetlands, oxygen conditions and water quality.

Please take the foregoing comments into consideration before you take action as the Director of the ACFCWCD to implement any recommendation of the Wood Rogers Tide Gate Operation Manual.

Sincerely,

Richard Bailey, Ph.D.

Founder, the Lake Merritt Institute

REFERENCES:

1. <https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2018_integrated_report.html>

cc: Mike Perlmutter, Watershed Program Specialist

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