M E M O R A N D U M

To:	Jim Well Ducks Unlimited	**Date:**	18 August 2013
From:	Yantao Cui, Ph.D., Senior Hydraulic Engineer	**Number of pages:**	1

Subject: Review of Cone Screens Installation at M & T Intake

My comments below are based on the assumption that there is adequate depth and sweep velocity for the cone screen to work under the current river configuration based on early discussions and document reviews.

If the above assumption is true, the key question would be whether the operation condition for the cone screens will improve or deteriorate after their installation. I have reason to believe that future conditions will improve (i.e., both depth and sweep velocity increase at the intended cone screen location) under the condition that we can hold the west bank in place. Once the cone screens are constructed and the intake is switched to the west bank, the gravel bar near the east bank will be allowed to grow, which will push more flow toward the west bank, resulting in increased velocity around the new intake. The increased velocity should provide some additional erosion of the river bed, thus, increase the depth around the intake.

If the above reasoning is accepted, the key question is then whether we can hold the west bank to its current location. I believe this can be done by strengthening the rock toe and make it a permanent structure. How the rock toe should be strengthened is out of the scope of this review, but at a minimum, the height of the rock tow should be increased to prevent the river from a sudden erosion of the sediment on top of the toe and jump to the west of the toe during an extreme event.

With regard to the design of the cone screen, I'd like to know whether the platform that the screens will be sitting on is necessary. I do not believe this platform helps prevent the screen from damages by sediment deposition. As a matter of fact, it may increases the chance for sediment to get into the screen because the shear stress from the platform decreases the flow velocity, making suspended sediment susceptible to deposit ONTO the platform under certain flow conditions, and potentially increases the chance of overall sediment deposition to the intake area. If at all possible, I'd suggest not having a platform, and having the screens sit on top of the conduits directly. If that is not feasible, the platform should be designed as small as possible to reduce its influence to the flow, and detached from the bank.

A related comment I'd like to make here is with regard to the August 16, 2013 e-mail by Les Heringer, who cautioned the feasibility of removing rocks near Golden State Island due to concerns of flood protection agencies and downstream land owners. I have spent some time reviewing the aerial photographs after receiving Les' e-mail message, and my impression is that the rocks near Golden State Island likely have minimal contribution to flood protection because the rocks are located in the middle of the river corridor away from the west bank levee. It'd help me (and perhaps others) to better understand the rocks' value if we are provided with the background information of these rocks (e.g., when was the rock protection constructed and for what reason).