TAYLOR ENGINEERING, INC.

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SFWMD C-8 AND C-9 WATERSHEDS FLOOD PROTECTION LEVEL OF SERVICE ADAPTATION PLANNING AND MITIGATION PROJECTS STUDY

Date: May 2, 2022

Time: 2:30 PM – 3:30 PM

Subject: Bi-Weekly Meeting #24

Attendees Highlighted:

- Hongying Zhao, **SFWMD**
- Ana Carolina Maran, **SFWMD**
- Nicole Cortez, **SFWMD**
- Akin Owosina, **SFWMD**
- Ann Springston, **SFWMD**
- Lichun Zhang, **SFWMD**
- Matahel Ansar, **SFWMD**
- Larry Brion, **SFWMD**
- Carol Ballard, **SFWMD**
- Ruben Arteaga, **SFWMD**
- Sashi Nair, **SFWMD**
- Francisco Pena Guerra, **SFWMD**
- Shahana Mona, **SFWMD**
- Vijay Mishra, **SFWMD**
- Irela Bague, **Miami Dade**
- Marina Blanco-Pape, **Miami Dade**
- Alberto Pisani, **Miami Dade**
- Gregory Mount, **Broward**
- Kevin Hart, **SBDD**
- Susan Bodmann, **Broward**
- Jennifer Jurado, **Broward**
- Rajendra Sishodia, **Broward**
- Virginia Walsh, **WASD**
- Omar Abdelrahman, **RER**
- Pamala Sweeney, **RER**
- Katherine Hageman, **RER**
- Valentina Caccia, **RER**
- Michael Zygnerski, **Broward Co**
- Karina Cordero, **RER**
- Michael DelCharco, **Taylor Engineering**
- Angela Schedel, **Taylor Engineering**
- Pat Lawson, **Taylor Engineering**
- Joseph Wilder, **Taylor Engineering**
- Stephanie Massey, **Taylor Engineering**
- Lynette Cardoch, **Moffatt & Nichol**
- Peter Sahwell, **Nova Consulting**
- John Loper, **Anclote Consulting**
- David Key, **ESP – Florida**
- Nathan Slaughter, **ESP – Florida**
- Sarah Hamm, Moffatt & Nichol
- Elton Smith, Taylor Engineering

Notes:

1. **Meeting Kickoff**
   - Roll Call
2. **Task 2 – Modeling:**
   - Scenario M2B Discussion
     i. Update on modeling. The pump was upsized after a couple iterations – both pumps at 2,550 cfs. Trying to get it back below current conditions. Elevated canals and have flow through the berm back into the canal.
     ii. Last meeting we saw connection with the C7 system. There are 4 connections between the basins. We will assume the connections are closed.
     iii. Counterintuitively it raised elevations in the C8 canal. That is because water moving into the C8 was generally near the peak. But, blocking the C7 flow kept flow from escaping the C8 at other times and then actually caused a net increase in stage.

iv. So, instead of just blocking the flow, Joe modeled one-way gates. Had to do multiple iterations of gates to get the size right. So, this is a part of the mitigation project in M2B.

v. Katherine Hagemann asked if these connections were by design? Do they have a positive benefit in terms of flood risk?

- We assume so. Some have been historically closed. Some are wide open gravity systems.
- They would appear to have a benefit now, but may have some unintended consequences.

vi. Joe presented depth of flooding differences between SLR 2 and SLR2 with mitigation M2B. South Broward has lots of pumps. Those pumps are creating some flooding in the basin. That has nothing to do with the canal flooding, it is really a function of groundwater. Most of the direct connections are draining okay. The areas that are contained and controlled by pumps shows.

vii. Joe presented where GW elevations are higher than the median topography. Topo minus GW. So, we are seeing the ground water surface above land surface.

- Sashi – so, the impoundments have water surfaces higher? Joe – yes the impoundment was set at 4 ft. So, the GW is getting higher.

viii. Comparing maximum overland flood depth with groundwater conditions. He showed where the head difference is higher – i.e. showing flooding.

ix. The tidal area has a 1 ft or 0 ft elevation (near sea level) and the water is much higher due to storm surge. So, we are seeing the surge elevation.

x. Hongying asked to see with and without mitigation. Joe presented the difference between M2A and M2B. We looked at the results and they look reasonable. There are some residual mapping data that shows elevated data – but they are not "real." We need to examine these a little more to understand why the are showing.

- To recap – the goals for each mitigation scenario: M2A – 25 year SLR 1; M2B 25 yr SLR2
- Scenario M2C Discussion

i. We discussed goals for M2C – it is going to mitigate the 25-yr SLR3 scenario. There are two concerns:

- Are there are limits on mitigation projects? We should discuss that. Anything off the table? Because if we could model canal widening, we could look at 100-yr
- For M2C – we could probably get 25-yr down to current conditions for SLR3. But we could never get 5- or 10-yr to work for SLR3. That is because of antecedent conditions. If 5-yr peaks at 4 ft, when you have SLR3 the avg tide is 4 ft plus – you cannot lower the canal stage. The SLR tailwater just does not allow the smaller storm to pump out.

ii. Is canal widening possible? Well, segments of C9 have a large right of way. It is likely already part of the flow path. So, yes, we could increase conveyance in C9. C8, on the other hand, would be much more difficult. The C8 is basically at capacity for the pumps. Going any large will probably not result in any changes.

- Katherine Hagemann – in the modeling stage, it would be helpful to look at widening the canal, especially for the C9. For the C8 – the density of development would certainly make it difficult to widen the canal. Any thing else we could do? Any large storage basins we could do?

a. Joe – we've looked at as much potential storage that we could. We tried storage in the mine-pits. We tried Lake Ojus. We have the idea that we could do some deep well injection for 500-acre-ft areas.
b. Hongying – we really hoped the mine-pits would work. But, they are too permeable. We just don't have the large areas we need to build a storage basin.
c. The mine pits we have are so permeable they just leak. No way to line the bottom or edges that worked.

iii. For C8 – it will really be increase pump sizes and widen the canal.
iv. We talked about 5-yr event modeling. The problem is if you have to keep a head on the canal to keep sea level from intruding. It is a problem with the initial condition.
v. Katherine – could you share a shape file of the 10-yr storm with future SLR conditions? Because some are on septic, they have flood already, and it would be great to be able to see them. They might be able to work with USACE about funding some large projects. Will that be available?
    - The District has already posted those rasters – Hongying will provide that link.
vi. Hongying – Perhaps we should shoot towards 100-yr SLR3? Joe, the problem is what the mitigation activities would be? Can we widen the canal?
    - Does the team have any thoughts?
    - Vijay thinks that widening the C8 would be very tricky. Realistically, not sure it would happen. It would really be something the county would have to drive. Katherine – yes, it would be very challenging.
    - Susan – Is not the alternative to lose those homes to flood?

3. **Task 3 – Flood Damage Assessment**
    - Team is working on planning level expected annual damages (EADs) – looking at raising homes and road by 1 ft, 2 ft, and 3 ft. Just as policy level analysis.
4. **Additional action Items from Previous Meeting**
    - District will provide link to existing FPLOS results
    - District will discuss M2C goals – is it 25-yr SLR3 or 100-yr SLR3?
    - Angela will take notes and attendance next week