Project Status Update

Subject: City of Miami Beach Water Quality Evaluation
NW 72nd Street and South Pointe Park
Miami Beach, Florida
E Sciences Proposal Number 7-0210-022

To: ***City of Miami Beach***

From: ***E Sciences, Incorporated***

Date: ***July 20. 2021***

The City of Miami Beach (the City), through the implementation of an ongoing monthly surface water sampling program, identified the potential presence of a fecal bacteria issues near the kayak launch at 72nd Street. The City conducted targeted sampling, including multiple outfalls and other structures associated with the local stormwater system, to attempt to identify the potential sources of the bacteria identified in those locations. Additionally, a video and dye test investigation of the sanitary sewer were conducted and it did not identify pipe failures that would be obviously associated with the fecal bacteria presence in the area. While sewer spills had been documented on land west = of the kayak launch, data collected prior to and following the discharges did not indicate that the bacteria count at the subject location was associated with the documented sewer spill incidents. The City engaged E Sciences to review the existing data and information and assist the City in identifying potential sources of the presence of bacteria in the surface waters near the kayak launch. This memorandum was prepared to document the results of the evaluation conducted to date.

Data Review and City Coordination

E Sciences reviewed analytical data collected by the City at the kayak launch site and other locations across the City between 2016 and 2020. Sampling locations included surface water locations (referred to as ambient locations), outfalls, and stormwater structures. The data set included over 2,500 tests conducted across the City for fecal coliform, enterococci, pH, ammonia, phosphorous and nitrogen. E Sciences' review was focused on the enterococci data to evaluate potential trends based on sampling locations, correlation with other parameters analyzed, rain events and tidal conditions.

The following review was conducted for the data collected across the City and the area focused around the kayak launch site collected since 2019:

- The data was compiled into maps to provide a visual of the relative locations of the sampling points and concentrations. The maps included locations of sanitary sewer and stormwater systems, as well as locations of the reported sewer systems breaks.
    - The data did not suggest a correlation between concentrations recorded at locations nearest to the outfall and those further away from an outfall. For example, enterococci counts at an outfall location could be higher than an ambient sample collected nearby at some locations and lower for other locations. Therefore, the data was inconclusive to determine if the outfall discharge was a contributing source of fecal coliform, specifically enterococci, in the surface water.
    - No correlation was observed between the enterococci data recorded at the kayak launch

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and nearby stormwater structures. However, we note data points were collected at varying times and locations so direct correlations of the data to evaluate trends could not be made.
    - Elevated bacteria counts were detected in other areas of the City beyond the kayak launch site, indicating the potential presence of a background condition.
    - Samples collected from stormwater manholes along 72nd street indicated high levels of enterococci when compared to samples collected from the stormwater system along 73rd street and other streets.
- E Sciences conducted a field reconnaissance to evaluate field conditions and features.
- Data plots were generated including rainfall data and tide elevation data corresponding to the date and time of sample collection.
    - There was no correlation observed between enterococci and rainfall or tide conditions. However, we note that there was not consistent data available to fully evaluate these trends.
- The enterococci data was plotted with corresponding pH, dissolved oxygen, or temperature values to evaluate potential correlations. No obvious correlation was observed.
- The City provided results of fecal coliform analysis conducted for sediment samples collected from several stormwater structures including near the kayak launch.
- The City provided results of gene biomarker analysis (source tracking) conducted for water samples collected from several stormwater structures near the kayak launch site. The test identified the presence of dog fecal biomarker in the samples but no human biomarker was identified above the laboratory detection threshold. This observation would be an indication that the presence of fecal coliform in the stormwater system is not inherently related to a sanitary sewer break or discharge.

Based on the findings of the review of the data available, a sampling plan was developed focusing on the kayak launch area to further evaluate the potential effects of rainfall, tide, and proximity of stormwater and sewer features. The sampling plan included three outfalls in close proximity to the Kayak Launch and multiple upstream structures connected to those outfalls. The sampling schedule was developed to incorporate variable tide conditions (incoming, outgoing and lag tide). The City has also indicated that integrity testing had been conducted for the sewer system and no evidence of breaks or leaks had been reported.

April 2021 Sampling

Sampling was conducted between April 19, 2021 and April 21, 2021. Enterococci data collected from outfall and upstream structures was evaluated to identify potential trends that may warrant additional investigation. The following observations were noted:

- Monday levels are significantly lower than Tuesday and Wednesday for outfall and upstream structures.
- Data collected from the three outfalls show the same concentration trends over the course of the day on April 20, 2021 but the same does not occur on the remaining sampling dates.
- A potential correlation is observed between enterococci levels in the outfalls and tide trends. However, a definite correlation would require additional sampling and evaluation.
- Most upstream structures consistently exhibit elevated levels of enterococci. In some instances levels at the upstream structures were higher than the corresponding outfall sample.
- No correlation with rainfall data was identified.
- No source tracking was conducted as part of this preliminary sampling plan.

Considerations

It is important to note that enterococci are commonly found in the feces of humans and warm-blooded animals but also can grow freely in the environment as acknowledged in FDEP's document titled *2020 Integrated Water Quality Assessment for Florida: Sections 303(d), 305(b), and 314 Report and Listing Update*. The presence of fecal coliform in surface water bodies has been documented across Florida and it is a predominant condition that has been linked to urban runoff as well as sanitary sewer discharges. Potential additional contributing factors associated with the presence of fecal coliform can be associated with plants, sand, soil and sediments that contribute to a certain background level in ambient waters and vary based on local environmental and meteorological conditions.

The data collected across the City and within the kayak launch area indicate that elevated enterococci levels are present within the surface water and stormwater system. The data available was not collected consistently at multiple locations and weather conditions for a long enough period of time to provide conclusive observations as to the potential source of those elevated bacteria levels. We also note that the data is not indicative of an isolated condition at the kayak launch.

Based on the information and data available, additional investigation would be necessary to evaluate the nature of the enterococci bacteria detected. This investigation would entail additional literature review and conducting additional sampling and analysis. Additional sampling would be focused on additional source tracking analysis, analysis of tracer compounds and other known environmental pollutants to identify or eliminate potential sources from consideration.