

## **CITY OF HALLANDALE BEACH**

**November 21, 2013**

### **SCOPE OF WORK FOR**

#### **HYDROSTATIC SALINITY BARRIER FOR WELLFIELD PROTECTION**

##### **Phase II - BACKGROUND WATER QUALITY, HYDROLOGIC DATA ANALYSIS AND BENCH SCALE EFFLUNET TREATMENT**

##### **INTRODUCTION**

The City of Hallandale Beach (CITY) owns and operates a water treatment facility that relies on the Biscayne aquifer as its water supply source. The CITY's water supply wells are located in relatively close proximity to the coast. Over the years, the quality of the groundwater in the vicinity of these wells has been compromised as a result of saltwater intrusion. This condition has led to the abandonment of some of the CITY's water supply wells, and in some cases regulatory limitations have been imposed governing the operation of certain wells. While the CITY has been working in the development of alternatives to address this issue, it is worthwhile to evaluate available options to preserve the CITY's current water supplies and infrastructure investments by evaluating saltwater intrusion control methods.

The CITY is interested in conducting further evaluations to determine the feasibility of preserving or restoring the CITY's wellfield through the creation of a hydrostatic salinity barrier using available reclaimed water from the City of Hollywood. It is reasonable to assume that the seawater will continue to intrude inland further than it currently has unless some action is taken such as a salinity barrier to reestablish the freshwater/saltwater equilibrium further seaward.

The CITY is currently installing a new stormwater system along NE 14<sup>th</sup> Avenue with pipelines, 2 pumping stations, and up to 16 drainage wells which parallel the coastline. The project is being partially funded by the Federal Emergency Management Agency (FEMA) to assist with flooding concerns. In addition to the flood control benefit, these drainage wells may be capable of providing an additional benefit as a salinity barrier to the CITY by using available reclaimed water from the City of Hollywood during dry periods when no stormwater is entering the drainage wells.

MWH (CONSULTANT) worked with the CITY to develop a preliminary assessment of using reclaimed water during periods of no precipitation in the drainage wells for use as a salinity barrier. Meetings were held with the Florida Department of Environmental Protection-Underground Injection Control (FDEP-UIC) Division, Broward County, and the South Florida Water Management District to

##### **PROJECT DESCRIPTION**

The purpose of this study is to determine background water quality of the existing environment including groundwater within the drainage wells, surface water from area

impoundments and canals as well as stormwater discharged to the drainage system. Meet with Broward County stakeholders to achieve consensus on nutrient reductions given background conditions. Based on the stakeholder input, collect and analyze background data and perform bench scale testing of Hollywood WWTP effluent using tailored biocatalyst in an effort to determine the efficacy of the technology to achieve goals.

## **SCOPE OF SERVICES**

CONSULTANT shall perform professional services as described in the following tasks:

### **TASK 1 – Project Management and QA/QC**

This task will consist of communications with the CITY Project Manager, managing the budget and schedule of the project, managing the staffing, review of subconsultant invoices, project coordination, document control, and quality management.

- Conduct a kick-off meeting
- Provide management and coordination of activities
- Develop and update project schedule
- Prepare invoices and progress reports
- Provide overall quality assurance and quality control (QA/QC) of deliverables

### **TASK 2 – Review Background Water Quality Data, Coordinate with Stakeholders and Establish Treatment Goals**

- Develop a list of applicable discharge standards
- Meet with Broward County to determine any new water quality standards under consideration/development for ground water, estuarine systems and inter coastal waters.
- Identify potential sampling sites for gathering background water quality.
- Coordinate sampling locations and contaminants with CITY's field staff or laboratory personnel for sample collection and testing by the City's contract lab.
- Obtain with City's assistance, a secondary effluent sample from the Hollywood Wastewater Treatment Plant for bench scale testing
- Analyze water quality as collected and tested by the CITY from:
  - Hollywood Secondary Effluent (Pre-Chlorination)
  - Hallandale Drainage Wells
  - Hallandale Production Wells
  - Surface Water (as agreed upon with Broward County)
- Meet with the CITY and recommend treatment goals for the bench scale testing.

### **TASK 3 – Bench Scale Testing**

- Conduct bench-scale, proof of concept experimental study using tailored biocatalysts for the reduction of nutrient contaminants specifically targeting nitrogen, and phosphate. The proof of concept study will be conducted through Johns Hopkins University at the Bloomberg School of Public Health in partnership with MWH.
- Wastewater samples will be shipped, Baltimore, MD. Where specially-designed reactors, will test the efficacy of nitrification, de-nitrification and phosphate reduction. Once the reactors are stabilized, specifically designed biocatalysts will be added to the reactors at appropriate doses to achieve nutrient reduction. This proof of concept study will focus primarily upon the reduction of nitrogen species in the wastewater, particularly ammonia, nitrite, nitrate and TKN as well as phosphate.
- At the conclusion of the study, a draft Technical Memorandum (TM) describing the experimental protocol employed, the results of the experimentation, the conclusions in terms of the efficacy of the biocatalysts for nitrogen species and phosphate removal, and recommendations for next steps will be provided. Following receipt of comments from the CITY, the CONSULTANT shall finalize the TM.
- Follow-up meetings will be held with the County to review the results of testing.

### **TASK 4 – Hydrologic Data Analysis**

- A review of current hydrologic data collected from the newly constructed drainage and monitoring wells
- A review of the current USGS monitoring wells
- A review of the current City monitoring and production well data
- Analyze data, and prepare a Technical Memorandum recommending any additional data or testing needs required to construct the fate and transport model needed to evaluate potential movement in the saltwater interface over time.

### **ASSUMPTIONS**

1. The CITY will contract directly for laboratory sampling and analytical services to characterize background environmental conditions.
2. The City will provide all data from the drainage well project and that CONSULTANT can reasonably rely on such data in its analysis.
3. In the performance of these services, CONSULTANT may use personnel and resources from CONSULTANT's affiliated companies.
4. Meetings with others than the CITY, Broward County EPD, and the City of Hollywood, are excluded unless added by amendment.
5. CITY will provide comments on draft TM in 10 calendar days.

6. Three (3) hard copies and one electronic file for each deliverable will be submitted to the CITY.

## **EXCLUSIONS**

The CONSULTANT shall not perform any groundwater or surface water modeling simulations during this preliminary assessment. The CONSULTANT shall not develop any cost estimate in this phase of the project. Bench scale testing is limited at the proof of concept level.

## **SCHEDULE**

The project schedule is included in **Attachment A**.

## **COMPENSATION**

CONSULTANT shall provide the services listed herein for the lump sum fee of \$159,976. The breakdown of the fee is included in **Attachment B**. The CITY will be invoiced monthly on the basis of the percent complete of each task deliverable.

# ATTACHMENT - A

## PROJECT SCHEDULE

	<b>FROM NTP</b>
TASK 1	N/A
TASK 2	6 weeks
TASK 3	16 Weeks
TASK 4	8 Weeks

## ATTACHMENT - B

### PAYMENT

	<b>Deliverable</b>	<b>Fee</b>
TASK 2	Project Setup, Standards list development and Stakeholder Meeting No. 1	\$17,000
TASK 2	Location ID, Qualitative Analysis and Stakeholder Meeting No. 2	\$25,432
TASK 3	Bench Testing and Draft Report	\$65,524
TASK 3	Bench Testing Final Report	\$15,006
TASK 4	Hydrologic TM	\$37,014
	<b>Total</b>	<b>\$159,976</b>