

**CITY OF HALLANDALE BEACH
2009 AGREEMENT**

**HAZEN AND SAWYER, PC
WORK AUTHORIZATION No. 39**

2013 UPDATES TO WATER AND WASTEWATER MODELS

*In accordance with Article 12 of the AGREEMENT between City of Hallandale Beach, Florida (**CITY**) and Hazen and Sawyer, P.C. (**CONSULTANT**) for TRANSPORTATION PLANNING AND ENGINEERING, TRAFFIC STUDIES, UTILITIES, ROADWAYS, GEOTECHNICAL CONSULTING AND TESTING SERVICES, the following scope of services is provided as requested by the **CITY**. Compensation shall be on a maximum amount not-to-exceed basis for salary costs and reimbursables as set forth in the original agreement.*

BACKGROUND

The **CITY** desires to update the existing water and wastewater hydraulic models with the current consumption and future water demands and wastewater forecasts, as well as recently constructed improvements (lift station additions, force main additions, elevated tank removal, etc.). The updated models will then be used for analyzing the system capacities and developing potential system improvements to correct present and future system deficiencies.

This scope of services details the tasks necessary to update the water transmission and distribution system model and the wastewater collection and transmission system model, to verify the models and to develop system improvements required to meet projected water consumptions and wastewater flow projections. The service also includes the task of developing a list of system improvements and the cost estimation of the potential improvements.

SCOPE OF SERVICES

CONSULTANT shall provide professional engineering services to the **CITY** for the services described in the sections that follow.

Task 1 – Kickoff Meetings

- **CONSULTANT** shall attend a project kickoff meeting with the Public Works/Utilities/Engineering Department to obtain data gathered by **CITY** and discuss project scope.
- **CONSULTANT** shall attend a project kickoff meeting with the Planning and Zoning Department to obtain population projecting data and other miscellaneous information.

Task 2 – Water Use and Wastewater Flowrate Estimation

CONSULTANT shall determine, given the available information, the existing distribution of water use and wastewater generation throughout the **CITY**'s water and wastewater service area.

CONSULTANT will forecast these distributions, given the available information, for the years 2015, 2020, 2025 and 2030.

- **CONSULTANT** shall obtain from the **CITY** all water and wastewater customer account information. The account information includes customer account number; parcel identification number; service address; service information (service type, meter size and account type); account status; water consumption and date of meter reading for at least the past 12 months and up to the past two years. The customer account information will be reviewed to identify single-family and multifamily water and wastewater customer accounts.
- **CONSULTANT** shall estimate the water uses and wastewater generation based on a standard percent increase as estimated by the city-wide population increase.
- For the years 2015, 2020, 2025 and 2030, **CONSULTANT** shall estimate the water use for each TAZ using the 2010 water use in the TAZ by customer account type and the percentage changes in the TAZ's population. **CONSULTANT** shall similarly project wastewater generation by TAZ.
- **CONSULTANT** shall distribute the 2015, 2020, 2025 and 2030 water uses and wastewater generation to the water distribution and wastewater collection system nodes using the available information.

Task 3 – Water Model Updates

Task 3.1 – Water Model Update – Baseline/Calibration

- **CONSULTANT** shall develop and update the water model scenario with the current water demands, as provided by **CITY**.
- **CONSULTANT** shall develop and update the infrastructure of the water model scenario with the latest improvements within the last five years – baseline development – as provided by the **CITY**.
- **CONSULTANT** shall calibrate the baseline model by collecting field data including operating flowrates, pressures and related data. **CONSULTANT** shall update the model scenario with the current operation conditions.

Task 3.2 – Water Model Updates

- **CONSULTANT** shall update the water model with the projected water demands.
- **CONSULTANT** shall, using the updated water model, analyze the existing water transmission and distribution system for the proposed demand projections for the year 2015, 2020, 2025, 2030, and 2035. The model runs will be included in the maximum daily flow, peak hour flow, three fire flows for both existing and future water demand conditions. **CONSULTANT** shall define specific capacity limitations (high service pumps, pipelines) in the system that might result from future demand increments. **CONSULTANT** shall develop up to two alternative

improvement model scenarios for correcting system deficiencies. **CONSULTANT** shall finalize these model scenarios to correct deficiencies.

Task 3.3 – Water Model Summary Technical Memorandum

- **CONSULTANT** shall review the proposed model projections and develop a summary of the low pressure locations and recommended improvements, if any. **CONSULTANT** shall prepare a summary technical memorandum that provides the model results for the five year incremental planning period.
- **CONSULTANT** shall prepare a budgetary cost estimate for the recommended water infrastructure improvements, delineated by model run scenario.

Task 4 – Wastewater Model Updates

Task 4.1 – Wastewater Model Update – Baseline/Calibration

- **CONSULTANT** shall develop and update the water model scenario with the current water demands, as provided by **CITY**.
- **CONSULTANT** shall develop and update the infrastructure of the water model scenario with the latest improvements within the last five years – baseline development – as provided by the **CITY**.
- **CONSULTANT** shall collect field data including operating flowrates and pressures and related data. **CONSULTANT** shall update the model scenarios with the current operation conditions.

Task 4.2 – Wastewater Model Updates

- **CONSULTANT** shall update the wastewater model with the additional wastewater flowrates for the proposed population projections.
- **CONSULTANT** shall analyze the existing wastewater collection and transmission system for the proposed demand projections for the year 2015, 2020, 2025, 2030, and 2035. The model runs to be included are average daily and maximum daily flow with extended period simulation (EPS). **CONSULTANT** shall define specific capacity limitations (lift stations, pipe replacements) in the system that might result from future flow increments. **CONSULTANT** shall develop up to two alternative improvement model scenarios for correcting system deficiencies. **CONSULTANT** shall finalize these model scenarios to correct deficiencies.
- **CONSULTANT** shall utilize preliminary sizing for lift station nos. 4, 12, and 13. **CONSULTANT** shall determine if selected sizing is adequate or if revisions to hydraulic capacity and or total dynamic head of lift station pumps should be revised, based on model results.

Task 4.3 – Wastewater Model Summary Technical Memorandum

- **CONSULTANT** shall summarize results of this evaluation in a memorandum.

- **CONSULTANT** shall prepare a budgetary cost estimate for the recommended wastewater infrastructure improvements, delineated by near-term proposed development, future identified development, and buildout condition.

Task 5 – Meetings and Training/Model Assistance

- **CONSULTANT** shall meet with **CITY** staff at the end of the project to discuss the final technical memorandums.
- **CONSULTANT** shall provide assistance to **CITY** on an as-requested basis up to the limits of this Task.

ASSUMPTIONS:

Services Performed by CITY Staff

The following assistance is required from the **CITY** prior to project initiation for completion of this project:

- Provide lists of the number of residential units, the number of commercial square footage and the acreage of all new residential and commercial developments that have been approved by the **CITY** or are being built in the **CITY**.
- Provide all available information regarding potential additional residential and commercial developments expected through year 2020.
- Provide all monthly water consumption data for at least the past 12 months and up to the past two years and customer account data.
- Provide copies of all agreements with neighboring cities and other utilities regarding water and wastewater services.
- Collect and summarize water and wastewater systems improvements physical data. Provide updated base map depicting infrastructure improvements completed in the last three years, and those improvements currently planned and under construction.
- Collect and summarize design and operations data for the high service pumps serving the water system.
- Collect and summarize design and operations data for the lift stations serving the wastewater system.
- Operations assistance to accommodate collection of field data at storage tanks including flowrate and pressure/elevation data. The **CITY** will provide and install pressure measuring and flow devices as needed.
- Wastewater peaking factors based on **CITY**'s anticipated redevelopment, including seasonal and diurnal variations.

- Provide WaterCAD and SewerCAD as revised by City

Other Key Assumptions

The following is the basis of the modeling to be performed:

- WaterCAD software will be utilized as the base for the water model
- SewerCAD software will be utilized as the base of the wastewater model.
- Both of the completed model packages will be turned over to **CITY** staff at the completion.
- The water model will include pipes 6 inches or above in diameter and those that form critical loops in the system.
- The wastewater model will include gravity pipes 12 inches or above in diameter and force mains.
- No hours for legal assistance are included in this scope of work.
- Lift station nos. 4, 12, and 13 are presently being upgraded. **CITY** will provide initial hydraulic assumptions for these lift stations.
- Lift station no. 8 is scheduled for upgrade. **CITY** will provide initial hydraulic assumptions for this lift station.

COMPENSATION

Compensation will be as follows:

<u>Description</u>	<u>Cost</u>
LABOR – Lump Sum (Tasks 1-4)	
Task 1 – Kickoff Meetings/Initiation	\$5,601
Task 2 – Flow Distribution to Nodes	\$19,940
Task 3 – Water Model Updates	\$61,156
Task 4 – Wastewater Model Updates	\$61,156
LABOR – Not To Exceed (Task 5)	
Task 5 – Meetings/Training – <i>NOT TO EXCEED</i>	\$20,332

CONSULTANT proposes to perform the above services for the lump sum fee of \$147,853. Additional training and meetings will be billed as incurred for a not to exceed up to a limit of \$20,332, for a total contract value of \$169,185.

SCHEDULE

We are prepared to proceed with these services immediately. The services are anticipated to be completed within four months of receipt of background information from City as listed in assumptions. Services related to trainings will continue for assistance on an as-needed basis for one year.

AUTHORIZATION - HAZEN AND SAWYER, P.C.

Accepted: Patrick A. Davis, P.E.
Vice President

Date: