



## **EXHIBIT #A**

### **PROJECT UNDERSTANDING**

In 2014, Indian River County Utilities (IRCU) authorized Kimley-Horn to perform the first phase of developing a new water distribution system hydraulic model to reflect IRCU's current GIS (Geographical Information System) data and better represent their existing water distribution system configuration. As part of this work, Kimley-Horn developed a representative water distribution model of IRCU's service area based on IRCU's GIS data at that time. The next phase includes calibration and further development of the model for existing conditions. This consists of:

- Collecting field pressure recordings and flow testing data using existing hydrants
- Hydraulic system calibration
- Developing and running extended period simulations with the remote storage tanks, North Beach Repump, and the ground storage tanks at South Oslo
- Better defining existing operation of remote elevated storage tanks and high service pumps (i.e. drain and fill versus keeping full)
- Evaluating the system's ability to achieve the PBS&J recommended ISO fire flow requirements
- Providing recommendations for future storage tank operations and infrastructure improvements.
- Identifying areas of low pressure and/or areas with potentially closed valves
- Defining residence times within the distribution system including at Total Trihalomethanes (TTHMs) and Haloacetic acids five (HAA5) sites
- Identifying critical valves within the system
- Developing limited unidirectional flushing (UDF) maps to address pockets of poor water quality

Consultant will update the model to account for infrastructure and operational changes that have occurred since the model was developed in 2014; this consists of updating the model for recent developments, water demands, infrastructure improvements and water plant operations.

Based on this understanding, the following tasks will be performed by the Consultant.

## **SCOPE OF SERVICES**

### **Task 1 – Update the Water System Hydraulic Model**

- Consultant will collect information provided by IRCU and other departments including, but not limited to IRCU's GIS shape files for existing water meter billing data, existing and future land uses, densities and development information, record drawings for infrastructure improvements constructed since 2014, MOR data, SCADA data, areas with potential water quality concerns, automatic flushing locations, Hydromax information for valves and fire hydrants, and current population data.
- Consultant will attend a kick-off meeting with IRCU staff to discuss and collect information on the existing water system, consisting of current and proposed water system improvements, new developments (pending or approved), areas of known low system pressures, current water plant and pump station operations, new fire flow requirements, and to define the approach to updating the water system model.
- Consultant will update the model to add any improvements that have been added to the system since the last model update in 2014. It is assumed that the County can provide a list of all new projects constructed during that time frame. The model will also be updated using the County's GIS data and available record drawings. The model will only include pipes that are 6-inch in diameter or larger.
- Consultant will update the model to reflect any changes in operating parameters that have been enacted since the 2014 model was developed. The Consultant will also add the locations of automatic flushers in the distribution system.
- The Consultant will review current MOR data and SCADA data to verify peaking factors for peak hour flow and maximum daily flow that were estimated as part of the 2014 model development.
- Using the LoadBuilder feature of WaterGEMS, the Consultant will update the demands in the system with more recent water meter billing data. It is assumed that existing customer meter data can be geocoded by the County for one years' worth of billing data. The system demand will then be scaled to match the existing system demands for maximum daily flow and peak hour flow scenarios to the MOR data. Loadbuilder will also be used to assign a land use to each node in the model based on the GIS land use map. Once both the land use data and billing data are updated in the model, the information will be used to estimate potable water demands for different land uses.

### **Task 2 – Calibrate the Water System Hydraulic Model**

- Consultant will develop a calibration plan to test a portion of the hydraulically significant transmission water mains in the Indian River County water distribution system. Development of the calibration plan will require coordination with and support from IRCU

staff. The intent of the plan will be to calibrate only the significant transmission watermains that can be easily hydraulically isolated and where suitable fire hydrants are available to flow. This will be done by selecting various fire hydrants in the water distribution system to serve as flow hydrants and selecting other fire hydrants to serve as pressure hydrants. Due to the unknown availability of suitable fire hydrants and the looping in the distribution system, it may not be possible to calibrate all of the significant transmission watermains. A second focus of the calibration plan will be to observe how the storage tanks and the North Beach Repump Station react during fire flow events. It is assumed most tests will be performed with these tanks and/or repump station hydraulically isolated, but at least one test will be performed with a portion of these tanks/stations operational and connected.

The calibration plan will consist of a map identifying up to fifteen (15) hydrants selected to be used and a description of which fire hydrants should serve as flow hydrants to stress the distribution system, and which should serve as pressure hydrants for each test, and a description of how the water plants, elevated storage tanks and North Beach Repump Station should be operated during testing. The available data currently being collected by Hydromax as part of their fire flow testing will be reviewed to determine if the number of flow hydrants can be reduced. The consultant will provide an electronic version of the calibration plan prior to the field testing and will prepare hard copies for the IRCU and Kimley-Horn staff involved in the execution of the calibration plan. Development of the calibration plan will also include up to two (2) meetings with IRCU staff and up to one (1) day of field time to evaluate the appropriate fire hydrants to be flowed.

- Consultant will execute the field calibration plan with support of IRCU staff in order to collect pressure and flow data that will be used to calibrate the model. It is assumed that the field calibration will be conducted before the Roseland elevated storage tank is converted to a repump station. During the testing, flows and pressures will be recorded at selected flow and pressure fire hydrants and SCADA information recording the flows, pressures, and water levels from the water treatment plants, ground storage tanks, and North Beach Repump will be documented. It is also understood that several lift stations throughout the distribution system record real time pressure data for the water system. It is assumed that this information can be relied upon as part of the execution of the calibration plan. It is assumed that up to three (3) Kimley-Horn staff members for up to five (5) field days will be required for this task. Effort beyond this amount will be considered additional services and can be performed for an agreed upon fee if needed.
- Consultant will assimilate the data recorded during the field testing and use the Darwin Calibrator feature of WaterGEMS to calibrate the existing pipes in the existing hydraulic model prepared under a previous work order. Multiple scenarios will be created in the model to represent the various tests performed in the field and the effect on the hydraulic model. The friction factors of the tested pipes will be adjusted based on the results of the field testing.

### **Task 3 – Additional Existing System Model Development**

- Consultant will apply the new friction factors developed as part of Task 2 to the modeling scenarios updated as part of Task 1.
- Once the new friction factors are applied to the distribution system, Consultant will adjust operating conditions in the model for the water plant discharge pressures, elevated storage tanks and North Beach Repump in an effort to attempt to match the flows and tank levels observed from the SCADA data. The Consultant will review areas where the model is not representative of the field data and review with the County potential for closed valves in these areas.
- Consultant will update the calibrated model to reflect the proposed improvements for the Roseland elevated storage tank. It is assumed that the new Roseland pump station will not be in service before the field calibration is performed; however, evaluation of the existing system will be performed assuming the Roseland improvements are complete.
- Consultant will review SCADA data to develop a diurnal water demand curve for the system demands.
- The Consultant will collect information on the South County ground storage tanks including the normal operating levels. Consultant will incorporate the South County ground storage tanks and the storage tank interconnect into the hydraulic model.
- Consultant will develop an extended period simulation for maximum daily flow and average daily flow demand scenarios using the diurnal water demand curve. It is assumed that for each demand scenario up to eight extended period sub-scenarios will be developed to look at different operations for the elevated storage tanks, North Beach repump, and existing interconnect to the South County Storage Tank.

### **Task 4 – Model Evaluation/Report Preparation**

- Consultant will use the calibrated model to evaluate the fill time and flows through the interconnect for various water levels in the South County ground storage tanks and make recommendations about operations of the existing interconnect. The intent of the evaluation is not to evaluate the size of the ground storage tanks, but to recommend the capacity and fill times for the interconnect. The Consultant will review the impact the interconnect will have on the South County's contact time (CT) calculations. It is assumed that up to 30 hours of effort is required for this task and significant effort beyond this amount will be considered additional services.
- Consultant will evaluate the ability of the water distribution system's ability to provide the recommended ISO/PBS&J fire flow requirements for the various land use types currently in the hydraulic model. It is expected that it may not be feasible to provide the recommended fire flow for some land use types without extensive improvements. After these areas and land use types are identified, the Consultant will meet with the County

to evaluate the County's goals for providing the recommended ISO fire flow versus performing improvements. Based on the County's goal, the Consultant will adjust fire flow requirements for selected land use types and then recommend improvements required to meet the resulting fire flows. Consultant will attend up to one (1) meeting to discuss the fire flow requirements.

During the skeletonization of the hydraulic model, it was noted that some public fire hydrants may be served by 4-in watermains. The Consultant will develop a list of these fire hydrants that may be currently served by 4-in watermains. The Consultant will review the previous version of the hydraulic model before it was skeletonized and identify these hydrants where possible.

- Consultant will use the calibrated model to identify existing weaknesses and low-pressure areas in system and to make recommendations for infrastructure improvements that could address the areas of known low pressure conditions.
- Consultant will use the calibrated model to simulate average daily and maximum daily flows in order to determine residence times at each node for these conditions. These runs will be used as initial estimates of areas experiencing the longest residence times within the water system and to estimate the service area limits of the two water treatment facilities. Consultant will prepare two (2) exhibits within the WaterGEMS platform to show the results of the residence time analysis for both the average daily flow and maximum daily flow conditions.
- Consultant will use the calibrated model to evaluate the operation of and provide recommendations for elevated storage tank operational changes or elimination, and/or infrastructure improvements. A preliminary evaluation of the ground storage tanks was performed by Kimley-Horn as part of a separate work order. The work included with this task will be finalizing the recommendations using the calibrated model. It is assumed that up to two days of effort is required for this task and significant effort beyond this amount will be considered additional services.
- Consultant will use the calibrated model along with information provided by Hydromax regarding the County's valves and input from the County to identify critical valves in the distribution system. The Consultant will meet with the County to develop the list of potential criteria (amount of flow, valve age/condition, accessibility, proximity to critical customers, etc) that can be used to prioritize the inline valves (6-in and larger) within the distribution system.
- Consultant will prepare a draft report summarizing the combined water system findings including a list of recommendations, and preliminary opinions of probable costs for the recommended improvements. Consultant will attend one (1) meeting to discuss the report findings and revise the draft report up to one (1) time to address reasonable comments. Consultant will furnish up to six (6) copies of the report and all deliverables.

- Consultant will deliver an electronic WaterCAD v10.01.01.04 format compatible with Series 5 for 2019/2020 conditions.

### **Task 5 –Limited Unidirectional Flushing Maps**

- The Consultant can provide up to 200 hours of engineering time for services related to the preparation of unidirectional flushing map(s) for areas of with poor water quality. Effort beyond this amount will be considered additional services and can be performed for an agreed upon fee if needed or as part of separate work orders. The following is a list of services that the Consultant could perform as a part of these hours:
  - Meet with County staff to identify and prioritize areas with dirty/cloudy water and confirm design criteria for hydrant flushing
  - Provide zone flushing map(s) for areas with dirty/cloudy water. These maps typically include flushing location, piping materials available and size, and sequential flushing directions for each identified piping segment in order to open and close the UDF hydrants and valves during flushing activities.

### **ADDITIONAL ITEMS NOT INCLUDED UNDER SCOPE**

- Capacity Analysis Report Update
- Additional field testing with Roseland improvements completed
- Improvements outside the primary service area
- Multiple scenarios beyond those listed
- Updating IRCU's GIS files
- Re-establish Stage 2 Testing locations if necessary
- Development of system scenarios for 5 yr, 10 yr, 20 yr, and build out conditions
- Master Planning for Water Supply, Permitting, Treatment Capacity and Distribution System including reviewing impacts for annexing land from Sebastian
- Meetings beyond those listed herein can be provided as an additional service.
- Unidirectional Flushing Plans beyond what is described in the Scope of Services

### **OWNER FURNISHED ITEMS & SUPPORT**

- Staff for hydrant flushing and pressure recording gages, equipment, etc.
- 2018 and 2019 MOR data
- Record drawings for improvements that have been constructed since January 2014
- Available pressure data throughout the model area
- Identification of areas of known low system pressures or high residence time
- Identification of areas with known water quality issues
- Current water plant and pump station operational data
- Plans for service area expansion and/or significant planned development
- Recent infrastructure improvements
- Available reports for distribution system (i.e. Hydromax valve report)

## **EXHIBIT B - FEE SCHEDULE**

We will provide these services in accordance with our Continuing Consulting Engineering Services Agreement for Professional Services dated April 17<sup>th</sup>, 2018, by and between INDIAN RIVER COUNTY, a political subdivision of the State of Florida (“COUNTY”) and Kimley-Horn and Associates, Inc., (“Consultant”).

The Consultant will provide professional services for Task 1 through Task 5 on a lump sum fee basis as follows:

<b>Task No.</b>	<b>Task</b>	<b>Task Fee</b>
<b>Task 1</b>	Update the Water System Hydraulic Model	<b>\$16,604</b>
<b>Task 2</b>	Calibrate the Water System Hydraulic Model	<b>\$52,500</b>
<b>Task 3</b>	Additional Model Development	<b>\$20,569</b>
<b>Task 4</b>	Model Evaluation/Report Preparation	<b>\$55,261</b>
<b>Task 5</b>	Limited Unidirectional Flushing Maps	<b>\$32,054</b>
	<b>TOTAL</b>	<b>\$176,988</b>



## **EXHIBIT C – TIME SCHEDULE**

In general, the following schedule is anticipated and consultant will work as expeditiously as possible to meet a mutually agreed upon schedule:

Task 1 – Update the Water System Hydraulic Model	12 weeks from NTP
Task 2 – Calibrate the Water System Hydraulic Model	16 weeks from NTP
Task 3 – Additional Existing System Model Development	22 weeks from NTP
Task 4 – Model Evaluation/Report Preparation	32 weeks from NTP
Task 5 – Limited Unidirectional Flushing Maps	32 weeks from NTP