

PALM BEACH COUNTY  
BOARD OF COUNTY COMMISSIONERS

AGENDA ITEM SUMMARY

Meeting Date: May 1, 2018 Consent [X] Regular [ ]  
Public Hearing [ ]

Department: Water Utilities Department

I. EXECUTIVE BRIEF

**Motion and Title:** Staff recommends motion to approve: Consultant Services Authorization (CSA) No. 5 for the Water Treatment Plant No. 11 (WTP11) Membrane Replacement Pilot Study (Project) with Kimley-Horn and Associates, Inc., in the amount not to exceed \$185,745.

**Summary:** On July 11, 2017, the Board of County Commissioners (BCC) approved the Water Utilities Department (WUD) Contract for Consulting/Professional Services Water Treatment and Water Resources Engineering Services with Kimley-Horn and Associates, Inc., (R2017-0903). CSA No. 5 provides for professional engineering services to support the WTP11 Project. The reverse osmosis (RO) membranes at WTP11 are over ten (10) years old and need replacing. CSA No. 5 will pilot the latest RO membranes and select suitable replacement RO membranes and antiscalant. The Small Business Enterprise (SBE) participation goal established by the SBE Ordinance is 15% overall. The Contract with Kimley-Horn and Associates, Inc., provides for SBE participation of 28% overall and Minority/Women Business Enterprise (M/WBE) participation of 7%. CSA No. 5 includes an overall SBE and M/WBE participation of 0% and 0% respectively. The cumulative SBE and M/WBE participation including CSA No. 5 is 37.98% and 3.68% overall. Kimley-Horn and Associates, Inc., is headquartered in Raleigh, North Carolina but maintains an office in Palm Beach County from which the majority of the work under CSA No. 5 will be undertaken. The Project is in the WUD FY18 Budget. (WUD Project No. 18-025) District 6 (MJ)

**Background and Justification:** WTP11 serves the Cities of Belle Glade, South Bay and Pahokee, in addition to unincorporated Palm Beach County. WTP11 is the sole water treatment facility supplying drinking water to the service area and therefore it is critical that WTP11 can reliably and effectively treat and distribute drinking water to WUD's customers. The RO membranes presently installed at WTP11 are at the end of their serviceable life and are in need of replacement. The wellfield supplying raw water to WTP11 for treatment is showing signs of degrading raw water quality, this coupled with proposed treatment modifications at WTP11 require that replacement RO membranes be trialed and piloted simulating the anticipated real-world conditions. The Project will pilot several RO membranes and antiscalants and select the most suitable replacement membranes and antiscalant.

**Attachments:**

- 1. Four (4) Originals of CSA No. 5
- 2. Location Map
- 3. Proof of Insurance from Insurance Tracking Service (ITS)

Recommended By: Jim Stiles 4-2-18  
Department Director Date

Approved By: [Signature] 4/12/18  
Deputy County Administrator Date

**II. FISCAL IMPACT ANALYSIS**

**A. Five Year Summary of Fiscal Impact:**

Fiscal Years	2018	2019	2020	2021	2022
Capital Expenditures	\$185,745	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Operating Costs	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
External Revenues	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Program Income (County)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
In-Kind Match County	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>NET FISCAL IMPACT</b>	<b><u>\$185,745</u></b>	<b><u>0</u></b>	<b><u>0</u></b>	<b><u>0</u></b>	<b><u>0</u></b>
<b># ADDITIONAL FTE POSITIONS (Cumulative)</b>	<b><u>0</u></b>	<b><u>0</u></b>	<b><u>0</u></b>	<b><u>0</u></b>	<b><u>0</u></b>


**Budget Account No.:** Fund 4001 Dept 720 Unit 2323 Object 3120

Is Item Included in Current Budget? Yes  X  No        
 Does this item include the use of federal funds? Yes       No  X

Reporting Category  N/A

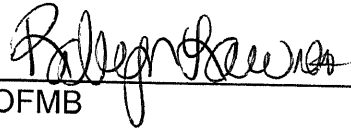
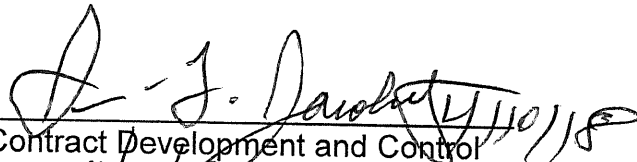
**B. Recommended Sources of Funds/Summary of Fiscal Impact:**

One (1) time expenditure from user fees, connection fees and balance brought forward.


**C. Department Fiscal Review:** \_\_\_\_\_ 

**III. REVIEW COMMENTS**

**A. OFMB Fiscal and/or Contract Development and Control Comments:**

<p>                  OFMB <span style="float: right;">4/6/18 2018/4/6/18</span></p>	<p>                  Contract Development and Control <span style="float: right;">4/10/18</span></p>
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**B. Legal Sufficiency:**

  
 Assistant County Attorney 4/12/18

**C. Other Department Review:**

\_\_\_\_\_  
 Department Director

This summary is not to be used as a basis for payment.

**CONSULTANT SERVICES AUTHORIZATION NO. 5**

**Project Title: Water Treatment Plant No. 11 Membrane Replacement Pilot Study**

**Project No. WUD 18-025**

**Budget Line Item No. 4001-720-2323-3120**

**District No.: 6**

**THIS AUTHORIZATION No. 5** to the Contract for Consulting/Professional Services Water Treatment and Water Resources Engineering dated July 11, 2017 (Resolution R2017-0903) by and between Palm Beach County and the Consultant identified herein, is for the Consultant Services described in Item 3 of this Authorization. The Contract provides for 28% SBE participation and 7% M/WBE participation. This Consultant Services Authorization includes 0% SBE participation and 0% M/WBE participation. The cumulative SBE and M/WBE participation, including this authorization is 37.98% and 3.68% participation, respectively. Additional authorizations will be utilized to meet or exceed the stated overall participation goal.

1. CONSULTANT: Kimley-Horn and Associates, Inc
2. ADDRESS: 1920 Wekiva Way, Suite 200, West Palm Beach, FL 33411
3. Description of Services to be provided by the Consultant:  
Water Treatment Plant No. 11 Membrane Replacement Pilot Study  
  
Water Treatment Plant (WTP) No. 11 has been in operation and producing potable water for the City's of Belle Glade, Pahokee and South Bay since 2007. The original reverse osmosis (RO) membranes remain in service and need replacing. To this end, the Consultant will conduct a membrane pilot study at WTP No. 11 to select suitable replacement RO membranes and antiscalant.  
  
**See ATTACHMENT A Scope of Work** for a detailed description of the services to be provided under CSA 5.
4. Services completed by the Consultant to date (Summary and Status of Authorizations):  
  
**See ATTACHMENT E.**
5. Consultant shall begin work promptly on the requested services upon receipt of the notice to proceed.
6. The compensation to be paid to the Consultant for providing the requested services shall be:
  - A. Computation of time charges plus expenses, not to exceed \$185,745.00
  - B. Fixed price of \$0.00
7. This Authorization may be terminated by the County without cause or prior notice. In the event of termination not the fault of the Consultant, the Consultant shall be compensated for all services performed through the date of termination, together with reimbursable expenses (if applicable) then due.

**Consultant Services Authorization No. 5**

**Project No. WUD 18-025**

**Project Title: Water Treatment Plant No. 11 Membrane Replacement Pilot Study**

- 8. SBE participation is included in Attachment D under this Authorization. The attached Schedule 1 defines the SBE applied to this Authorization and Schedule 2 establishes the SBE contribution from each subconsultant (Letter of Intent to perform as an SBE).
- 9. EXCEPT AS HEREBY AMENDED, CHANGED OR MODIFIED, all other terms, conditions and obligations of the Contract dated 6/4/2014 remain in full force and effect.

IN WITNESS WHEREOF, this Authorization is accepted, subject to the terms, conditions and obligations of the aforementioned Contract.

PALM BEACH COUNTY, A POLITICAL SUBDIVISION OF THE STATE OF FLORIDA

Sharon R. Bock, Clerk & Comptroller,  
Palm Beach County

Palm Beach County,  
Board of County Commissioners

ATTEST:

Signed: \_\_\_\_\_

*C.I.*  
*3/27/18*

Signed: \_\_\_\_\_

Melissa McKinlay, Mayor *JCD*


Typed Name: \_\_\_\_\_  
Deputy Clerk

\_\_\_\_\_  
Date

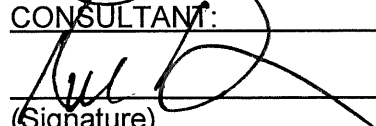
Approved as to Form and Legal  
Sufficiency

Signed: \_\_\_\_\_

Typed Name: \_\_\_\_\_  
County Attorney

ATTEST:  
  
\_\_\_\_\_  
(Witness Signature)

*ADAM KERR, ASSOCIATE*  
\_\_\_\_\_  
(Name and Title)

CONSULTANT:  
  
\_\_\_\_\_  
(Signature)

Russell Barnes, P.E.  
\_\_\_\_\_  
(Name)

Kimley-Horn and Associates, Inc.  
\_\_\_\_\_  
(Title)

*3-23-18*  
\_\_\_\_\_  
(Date)

## LIST OF ATTACHMENTS

**Project No. WUD 18-025**

**Consultant Services Authorization No. 5**

**Project Title: Water Treatment Plant No. 11 Membrane Replacement Pilot Study**

ATTACHMENT - A	Scope of Work
ATTACHMENT - B	Budget Summary
ATTACHMENT - C	Project Schedule
ATTACHMENT - D	SBE Schedule 1, 2, 3a and 4
ATTACHMENT - E	Authorization Status Report - Summary and Status of Authorizations
ATTACHMENT - F	Authorization Status Report – Summary of SBE Tracking
ATTACHMENT - G	Location Map

## ATTACHMENT A

### CONSULTANT SERVICES AUTHORIZATION NO. 5

#### PALM BEACH COUNTY WATER UTILITIES DEPARTMENT ENGINEERING/PROFESSIONAL SERVICES

#### SCOPE OF WORK FOR

#### Water Treatment Plant No. 11 Membrane Replacement Pilot Study

#### INTRODUCTION

Palm Beach County (COUNTY) entered into an agreement entitled Contract for Engineering/ Professional Services - Palm Beach County Utilities Department Project No. WUD 17-007 (CONTRACT) with Kimley-Horn and Associates, Inc. (CONSULTANT) to provide engineering services for various general activities on (Reference Document R2017-0903). This Consultant Service Authorization will be performed under that CONTRACT.

This Consultant Services Authorization No. 5 encompasses providing services related to the membrane replacement pilot study at Water Treatment Plant No. 11 (WTP11).

#### BACKGROUND

This Consultant Services Authorization encompasses providing services related to the Water Treatment Plant No. 11 Membrane Replacement Pilot Study which includes comparison of three different membranes for salt rejection, operating pressure, flux, fouling characteristics, and ability to clean the membrane elements with no raw water acid injection. In addition, this pilot will consider and evaluate RO train arrays, permeate back pressure, second stage boost using turbo-chargers to address the increasing levels of salt in the raw water supply to Water Plant No. 11. The goal is to identify the membrane that exhibits the best performance with respect to operating pressures, water quality and long-term performance, which should be utilized for the future replacement.

The existing reverse osmosis membranes, by DOW FilmTec, are more than 11 years old. These membranes are in need of replacement due to age and are also needed to improve salt rejection. Today's membranes offer the possibility of reduced operating cost by operating at lower pressures and produce better finished water quality.

Palm Beach County Water Utilities Department (PBCWUD) has a membrane pilot unit that was evaluated and is being refurbished under a separate authorization by PBCWUD. The refurbishment is intended to update the pilot unit to accurately reflect the treatment process at WTP No. 11. This pilot unit will be relocated and utilized for this pilot testing.

The Floridan Aquifer wells serving WTP No. 11 are increasing in salt content and this increase is likely to continue in the future. Membrane elements selected to replace the existing membranes must be able to perform at the predicted elevated raw water salt content.

## **SCOPE OF SERVICES**

CONSULTANT shall perform the engineering Scope of Services as described herein and as consists of the following:

### **Task 1 – Pilot Testing Protocol and Membrane Selection Criteria**

The CONSULTANT will prepare the membrane pilot operating protocol used to test the pre-selected membrane elements and anti-scalents (via CSA #1 Membrane and Anti-Scalent Task) summarizing the operating conditions, parameters and configurations for both the membrane selection testing as well as the scale inhibitor testing; data collection plan; fouling determination; and autopsy procedures. The protocol will include a responsibility matrix identifying the party or personnel responsible for the operation, sampling, data collection, data analysis, and review designees. Each person involved in the project will have a defined role and planned effort for the duration of the pilot testing.

The protocol will include preparation of a step by step procedure for the pilot testing process detailing the stages of membrane testing, schedule of each stage, and criteria of concern ranges of operation for the operating staff's reporting. A communication plan will be identified should one of the parameters be out of range to notify PBCWUD Staff and CONSULTANT.

CONSULTANT will identify recent raw water quality projections for future raw water supply at WTP No. 11. The raw water projection will establish the elevated TDS simulation for use during the membrane pilot testing.

CONSULTANT will prepare a draft membrane selection evaluation criteria for review with PBCWUD staff prior to pilot testing initiation. The membrane selection criteria will have a quantifiable selection criteria for identifying the best performing membrane for both the current water quality as well as the simulated higher TDS water quality. Additional weighted components of the criteria include energy consumption, fouling and cleaning frequency, as well as bid pricing for the membrane elements.

CONSULTANT will lead one (1) pilot protocol and membrane selection criteria review meeting to discuss and finalize the selection criteria to be utilized for comparison during the pilot testing results review and the bid evaluation.

CONSULTANT shall procure the selected membrane elements for testing of both phases including three manufacturers' membrane elements for the first phase and three sets of the selected membrane manufacturer's elements for scale inhibitor testing phase.

### **Task 2 - Pilot Unit Membrane Testing**

Replacement of the existing reverse osmosis membranes will affect the operating cost, finished water quality, and the ability to produce drinking quality water at the plant design production capacity at WTP No. 11 for the next decade. Making the proper selection will involve researching available and proven membranes, analyzing the affects each membrane will have on the parameters stated above, then validating the projections through operation of the pilot unit with the recommended membranes and arrays.

The CONSULTANT will procure the previously selected membrane elements for testing. The procurement will include three (3) sets of 21 membranes each from three (3) different manufacturers for membrane selection testing. Following membrane selection testing and a manufacturer is selected for additional scale inhibitor testing, the CONSULTANT will procure two (2) additional sets of 21 membranes from the selected manufacturer for the remaining two

membrane trains, as well as two (2) membrane elements to replace the two elements removed for autopsy.

The CONSULTANT will prepare loading instructions for testing selected membranes in selected vessels for each production train. This Scope of Work includes one (1) pilot study using three (3) separate membranes/membrane configurations with a pilot operation duration of 10 weeks. The first 10 weeks of pilot testing will utilize raw water prior to acid injection to simulate the sulfuric acid elimination intended for this facility. The raw water will be dosed with the existing WTP No. 11 scale inhibitor prior to the pilot unit cartridge filter. This testing will simulate the membrane performance for an equal comparison of each manufacturer (or array). Following the 10-week pilot testing period, the CONSULTANT will provide a recommendation of the membrane elements to be utilized for further scale inhibitor testing.

The second round of testing will include the selected membrane elements loaded into all three membrane trains with three different scale inhibitors being dosed after the raw feed split and prior to the membrane feed pumps. This testing will simulate the membrane performance using different scale inhibitors for an equal comparison of membrane fouling performance with each manufacturer's chemical. To determine fouling potential, this scale inhibitor testing will be 12 weeks in duration.

The CONSULTANT will prepare an electronic spreadsheet format for recording data from the pilot unit. PBCWUD's staff will collect daily routine operating data (pH, conductivities, pressures, flow rates, etc.) from the pilot unit, insert that data in the electronic spreadsheet, and forward the spreadsheet to the CONSULTANT twice per week to be used in conjunction with the automatic data collected through the pilot unit's online instruments. Additional sample collection will include a suite of membrane water quality related samples to be tested by an independent laboratory prior to pilot startup. The CONSULTANT will provide the sample bottles and courier the samples to the independent laboratory. One additional suite of membrane water quality sample sets will be collected during the increased TDS testing of membrane performance.

The CONSULTANT will establish protocol for performing membrane autopsies that will be used to determine fouling/scaling that may be occurring on the membrane that is not indicated in the pilot operating data. Frequently, pilot testing is not able to be operated for the longer periods needed to collect the operating data to indicate there is fouling/scaling occurring. This proposal includes the cost to conduct up to twelve (12) membrane autopsies.

CONSULTANT shall provide monthly test results in graphical format to PBCWUD, the installed membrane manufacturers, and their representatives. This documentation will be presented to PBCWUD during each monthly progress meeting during the pilot testing phase of this scope.

CONSULTANT will provide up to eight (8) process inspection site visits to WTP No. 11 to review the overall pilot unit operation and system condition.

CONSULTANT will prepare a report which presents the findings and recommendations of the pilot testing program described in this Task. CONSULTANT will prepare 4 copies of a pilot testing report and attend one meeting to discuss these findings and draft report. The report will provide recommended modifications to the membrane trains associated with the replacement of membranes. Consultant will prepare an AACE Class 4 opinion of probable costs for proposed modifications.



### **Task 3 - Prepare Report**

CONSULTANT will prepare a pilot testing report summarizing the results of each of these tasks.

CONSULTANT will provide a draft report for review and will update the report incorporating the comments discussed at review meetings and submit copies of the final report.

#### **ITEMS PROVIDED BY OWNER**

CONSULTANT shall be entitled to rely on the completeness and accuracy of all information provided by PBCWUD. PBCWUD shall provide all information and services requested by CONSULTANT during the project including, but not limited to, the following:

1. Membrane normalized data – current water plant operating data
2. Purchase of additional membrane elements for testing not identified above
3. Pilot testing chemicals, cartridge filters, power, water, concentrate disposal, and any other consumables required for the pilot testing
4. Staff efforts to collect pilot system data and forward such data to the CONSULTANT
5. Existing facility design drawings and specifications

#### **DELIVERABLES**

The following deliverables will be provided as a result of the efforts described in the Scope of Services:

1. Four (4) copies of Draft Membrane Replacement Pilot Protocol
2. Four (4) copies of Final Membrane Replacement Pilot Protocol
3. Four (4) copies of the Draft Membrane Bid Documents
4. Four (4) signed and sealed copies of the Final Membrane Bid Documents
5. Four (4) copies of Membrane Replacement Pilot Draft Report
6. Four (4) signed and sealed copies of Final Report with CD

Electronic versions of all deliverables shall be provided in both native (e.g. DOC, XLS, DWG, etc.) and PDF file formats.

#### **ITEMS NOT INCLUDED**

1. FDEP permitting is not anticipated to be required for the membrane replacement.
2. Membrane pilot unit upgrades or installation

#### **COMPENSATION**

The services included in this CSA supplement are based on a cost plus basis of \$185,745.00

## **SBE PARTICIPATION**

### **1. SCHEDULE 3(A) – Professional Services Activity Report**

This form shall be submitted by the prime contractor with each payment application when SBE and/or M/WBE sub-consultants are utilized in the performance of the contract. This form shall contain the names of all SBE and M/WBE sub-consultants, specify the sub-consultants dollar amount for each sub-consultants and show amount drawn and payments to date issued to sub-consultants.

### **2. SCHEDULE 4 – SBE-M/WBE Payment Certification**

A schedule 4 for each SBE and/or M/WBE sub-consultant shall be completed and signed by the proposed SBE and/or M/WBE after receipt of payment from the prime. When applicable, the prime shall submit this form with each application submitted to the county for payment to document payment issued to a sub-consultant in the performance of the contract.

SBE participation is included in the **ATTACHMENT F** under this authorization. The attached Schedule 1 defines the SBE applied to this CSA/Contract and Schedule 2 establishes the SBE contribution from each subcontractor (Letter of Intent to Perform as an SBE).

**ATTACHMENT - B**

BUDGET SUMMARY											
Task	CSA 5 WTP #11 Membrane Replacement Pilot Study	Labor Classification and Hourly Rate									Sub Consultant Services/ Out of Pocket Expenses
		Principal	Pr. Mgr	Professional	Engineer/ Analyst	Designer	Tech Support	Snr Support Staff	Support Staff	Labor Total	
Number	Task Description										
1	<b>Pilot Testing Protocol and Membrane Selection Criteria</b>										
	Prepare Draft Operating Protocol		4	12	30	2		2		\$6,540.00	
	Prepare Final Operating Protocol		2	8	12			2		\$3,246.00	
	Identify Raw Water Quality for Testing		2		4					\$876.00	
	Prepare Draft Membrane Selection Criteria	2	6		12					\$3,132.00	
	Prepare Final Membrane Selection Criteria		2		12					\$1,740.00	
	Document Review Meeting	2	4	8				2		\$2,898.00	
	T&M Administrative Production (8 Months)		32					48		\$12,720.00	
	Membrane Element Procurement Allowance (107 Elements @ \$190 each)									\$0.00	\$ 20,330.00
	<b>Subtotal Task 1</b>	<b>4</b>	<b>52</b>	<b>28</b>	<b>70</b>	<b>2</b>	<b>0</b>	<b>54</b>	<b>0</b>	<b>\$31,152.00</b>	<b>\$ 20,330.00</b>
2	<b>Pilot Unit Membrane Testing</b>										
	Pilot Unit Loading Plan, Loading, and Startup		4	4	16					\$3,252.00	
	Membrane Selection Testing (10 Weeks)	6	16	20	60					\$14,724.00	
	Prepare TM of Findings and Select Membrane for Phase 2		4	12	8				4	\$3,996.00	
	Membrane Selection Review Meeting	2	4	8						\$2,664.00	
	Membrane Loading and Startup		4		10					\$1,968.00	
	Scale Inhibitor Testing Operation (12 Weeks)	6	12	24	72				4	\$16,104.00	
	Weekly Data Analysis and Review		4	12	24				6	\$5,892.00	
	Laboratory Sampling and Analysis Allowance			2	8					\$1,182.00	\$ 2,500.00
	Project Progress Meetings (10 Meetings)	6	36		80					\$18,144.00	
	Process Inspection Site Visits (8 Visits)	2	8		40					\$6,600.00	
	Membrane Autopsy Protocol and Analysis	1	1	4	2					\$1,326.00	
	Membrane Autopsies Allowance (12 elements)									\$0.00	\$ 9,600.00
	<b>Subtotal Task 2</b>	<b>23</b>	<b>93</b>	<b>86</b>	<b>320</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>\$75,852.00</b>	<b>\$ 12,100.00</b>
3	<b>Prepare Membrane Pilot Testing Report</b>										
	Data Analysis	4	20	24	40					\$13,584.00	
	Draft Report	4	18	40	60	9			8	\$19,731.00	
	Pilot Report Review Meeting	2	4	8						\$2,664.00	
	Final Report	4	12	24	12	4			12	\$10,332.00	
	<b>Subtotal Task 3</b>	<b>14</b>	<b>54</b>	<b>96</b>	<b>112</b>	<b>13</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>\$46,311.00</b>	<b>\$ -</b>
	Labor Subtotal Hours	41	199	210	502	15	0	54	34		1,055
	Labor Raw Costs	\$84.00	\$74.00	\$53.00	\$36.00	\$45.00	\$36.00	\$39.00	\$28.00		
	Labor Multiplier	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
	Labor Subtotal	252.00	222.00	159.00	108.00	135.00	108.00	117.00	84.00		
	Labor Total	\$10,332.00	\$44,178.00	\$33,390.00	\$54,216.00	\$2,025.00	\$0.00	\$6,318.00	\$2,856.00	\$153,315.00	
										\$153,315.00	
	Subconsultant Labor Total	\$ -									\$ 12,100.00
	Subconsultant Multiplier										1.0
	Subcontract Total	\$ -									\$12,100.00
	Out of Pocket Expenses (mileage, copies, printing, procurement, etc.)										\$20,330.00
	<b>TOTAL</b>	<b>\$ -</b>									<b>\$185,745.00</b>

# Quotation

**To: Lance Littrell**

**From: Cheddy Tobias/Quote#06080117cmt**

**Company: Kimley-Horn - FL**

**Date: August 1, 2017**

Please find our formal quotation below for our Autopsy service for West Palm Beach.

Services	Quantity	Unit Price	Total Price
Membrane Autopsies <i>WO#TBA</i>	6-12	\$800.00 each	\$4,800.00-\$9,600.00

- All prices are shown in US dollars and are *ex-works origin*.
- Credit terms to be determined.
- Lead time to be advised upon receipt of each membrane.
- Electronic report submitted upon completion.
- Quote valid for 60 Days.
- ***Completion and return of autopsy questionnaire is imperative to assist with evaluation.***

If you have any questions, please don't hesitate to contact me.

Best regards,

Cheddy Tobias  
[ctobias@avistatech.com](mailto:ctobias@avistatech.com)

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140 Bosstick Boulevard  
San Marcos, California 92069, United States

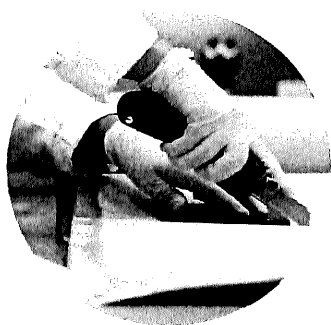
Tel. +1.760.744.0536

[www.avistatech.com](http://www.avistatech.com)



**WHY CONDUCT AN AUTOPSY?**

- Identify scaling or fouling problems.
- Determine the proper cleaning regimen.
- Verify a successful working RO system.
- Improve system performance.

**CORPORATE OFFICES**

**Avista Technologies, Inc.**  
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140 Bosstick Boulevard  
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**TROUBLESHOOTING RO AND MF/UF SYSTEMS**

A membrane autopsy includes a physical dissection of a reverse osmosis (RO) membrane removed for laboratory analysis and can be one of the most definitive methods of troubleshooting an RO system.

**MEMBRANE AUTOPSY PROCESS:****1. Full Element Wet Test**

The full element is tested in a single element vessel. Flow, pressure and salt rejection data is collected and then normalized to the membrane manufacturer's specification. This full element data is then compared to flat sheet samples harvested from that element to identify mechanical leaks and physical damage such as compaction.

**2. External Inspection**

The exterior components such as the brine seal, permeate tube, external casing and anti-telescoping devices are inspected for physical damage.

**3. Internal Visual Exam**

The element is dissected to examine glue lines, membrane folds, and the permeate side of the element. Any foulants or odors are also noted during this inspection.

**4. Foulant Analysis**

Samples collected from the membrane surfaces are analyzed using a series of tests to identify the composition of the foreign material on the membrane surface.

**5. Organic Analysis**

Foulant samples are scraped from the membranes surface, Gram stained and examined under a light microscope. The sample is inspected for biological material including bacteria, yeast, fungi, algae and mold. Loss on ignition (LOI) is performed to determine what percentage of the material is organic.

**6. Identification of Inorganic Foulants**

Energy Dispersive X-ray (EDX) analysis is used to determine the percent of inorganic material in a foulant sample. Scanning Electron Microscope (SEM) produces close and clean images of the foulant layer.

**7. Chromatic Elemental Imaging**

Chromatic Elemental Imaging (CEI) generates vivid, three-dimensional color images that identify specific elemental foulant constituents, concentrations and spatial locations on a membrane's surface.

**8. Laboratory Cleaning Study**

These are performed to determine which of the RoClean or AvistaClean products will restore performance. A membrane sample is placed in a laboratory apparatus and tested for water passage and salt passage before and after cleaning.

**9. Identifying Membrane Damage**

If damage of the active membrane surface is suspected, a dye test is performed to expose and highlight damaged areas. For polyamide membranes, Fujiwara testing is conducted to indicate exposure to a Group 7 Halogen.

**ANALYTICAL REPORT**

All of the test results are summarized in a final report which includes a concise Executive Summary. Results and on-site performance data are used to suggest site-specific methods of improving pretreatment, reducing membrane fouling, and achieving overall success on site cleans.

## Littrell, Lance

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**From:** Littrell, Lance  
**Sent:** Thursday, March 22, 2018 7:34 AM  
**To:** Miller, Mark  
**Cc:** Littrell, Lance  
**Subject:** WTP #11 Membrane Pilot Elements

Mark,

I have spoken to the membrane manufacturers that we intend to utilize for this pilot. All have indicated that they will provide membranes for \$190 per element.

We will be procuring three sets of 21 elements for the first phase of pilot testing, each set will be from a different manufacturer. This will include a total of 63 membrane elements (4-inch diameter).

To facilitate the autopsies of the first phase of pilot testing, we will be pulling up to two elements from each set of membrane elements. A total of 6 membrane elements will be pulled in total from the first phase of testing.

In moving into the second, antiscalent phase of the testing, we will be supplying two new sets of 21 membrane elements to replace the elements in two pilot units. A total of 42 elements will be procured from the selected membrane manufacturer for this phase. In addition, we will need to replace the two membrane elements pulled from the selected membrane elements for autopsy. An additional two elements will be added to the 42 element procurement listed above.

A table of these elements required for each phase and the cost associated with each is shown below:

Phase of Testing	Number of Elements	Unit Cost (\$/element)	Total
Phase 1 – Membrane Selection Testing	63	\$190.00	\$11,970.00
Phase 1 – Membrane Selection Testing	42	\$190.00	\$7,980.00
Phase 2 – Antiscalent Testing Autopsy Replacement	2	\$190.00	\$380.00
Totals	107	\$190.00	\$20,330.00

These costs are included within the CSA #5 for the WTP #11 Membrane Replacement Pilot Testing.

Best regards,

*Lance*

**Lance R. Littrell, P.E.**  
**Kimley-Horn** | 189 South Orange Avenue, Suite 1000, Orlando, FL 32801  
Direct: 407 412 7544 | Mobile: 407 209 9082

[lance.littrell@kimley-horn.com](mailto:lance.littrell@kimley-horn.com)

# ATTACHMENT - C

## PROJECT SCHEDULE

The completion dates for this work will be as follows (starting from CONSULTANT'S receipt of Notice-to-Proceed).

<u>Engineering Services</u>	<u>Completion Date</u>
	<u>From Notice to Proceed</u>
Task 1 – Pilot Testing Protocol and Finished Water Quality Goals	4 weeks
Task 2 – Pilot Unit Membrane Testing	32 weeks
Task 3 – Prepare Membrane Pilot Testing Report	48 weeks

Note:

1. Schedule assumes that PBCWUD's comments will be provided in 2 weeks
2. Schedule assumes 2 weeks for pilot unit installation and startup
3. Schedule accounts for 8 weeks from delivery of Membrane Bid Documents to bid receipt

**SCHEDULE 1  
LIST OF PROPOSED SBE-M/WBE PARTICIPATION**

PROJECT NAME OR BID NAME: Water Treatment Plant No. 11 Membrane Replacement Study PROJECT NO. OR BID NO.: WUD 18-25

NAME OF PRIME BIDDER: Kimley-Horn and Associates, Inc. ADDRESS: 1920 Wekiva Way, Suite 200, West Palm Beach, FL 33411

CONTACT PERSON: Mark Miller, P.E. PHONE NO.: 561-845-0665 FAX NO.: 561-863-6392

BID OPENING DATE: N/A USER DEPARTMENT: Water Utilities Department

**THIS DOCUMENT IS TO BE COMPLETED BY THE PRIME CONTRACTOR AND SUBMITTED WITH BID PACKET. PLEASE LIST THE NAME, CONTACT INFORMATION AND DOLLAR AMOUNT AND/OR PERCENTAGE OF WORK TO BE COMPLETED BY ALL SBE -M/WBE's ON THIS PROJECT. IF THE PRIME IS AN SBE-M/WBE, PLEASE ALSO LIST THE NAME, CONTACT INFORMATION AND DOLLAR AMOUNT AND/OR PERCENTAGE OF WORK TO BE COMPLETED BY THE PRIME ON THIS PROJECT. THE PRIME AFFIRMS THAT IT WILL MONITOR THE SBES LISTED TO ENSURE THE SBES PERFORM THE WORK WITH ITS OWN WORKFORCE.**

Name, Address and Phone Number	(Check one or both Categories)		DOLLAR AMOUNT AND/OR PERCENTAGE OF WORK				
	M/WBE	SBE	Black	Hispanic	Women	Caucasian	Other
	Minority Business	Small Business					(Please Specify)
1.	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____
2.	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____
3.	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____
4.	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____
5.	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____
(Please use additional sheets if necessary)							
Total			_____	_____	_____	_____	_____

Total Bid Price \$ 185,745.00

Total SBE-M/WBE Participation Dollar Amount and/or Percentage of Work 0%

I hereby certify that the above information accurate to the best of my knowledge: Kimley-Horn and Associates, Inc. by T. Rapp Sr. Vice President, Kimley-Horn and Associates, Inc.  
Signature Title

- NOTE:
- The amount listed on this form for a SBE-M/WBE Prime or Subcontractor must be supported by price or percentage listed on the signed Schedule 2 or signed proposal in order to be counted toward goal attainment.
  - Firms may be certified by Palm Beach County as an SBE and/or M/WBE. If firms are certified as both an SBE and M/WBE, please indicate the dollar amount and/or percentage under the appropriate category.
  - M/WBE information is being collected for tracking purposes only.



**OSBA SCHEDULE 2  
LETTER OF INTENT TO PERFORM AS AN SBE-M/WBE**

This document must be completed by ALL SBE-M/WBE's and submitted with this bid packet. Specify in detail, the particular work items to be performed and the dollar amount and/or percentage for each work item. SBE credit will only be given for items which the SBE-M/WBE's is certified to perform. Failure to properly complete Schedule 2 will result in your SBE participation not being counted.

PROJECT NUMBER: WUD18-025 PROJECT NAME: Water Treatment Plant No. 11 Membrane Replacement Pilot Study

TO: Kimley-Horn and Associates, Inc.  
(Name of Prime Bidder)

The undersigned is certified by Palm Beach County as a - (check one or more, as applicable):

Small Business Enterprise \_\_\_\_\_ Minority Business Enterprise \_\_\_\_\_  
Black \_\_\_\_\_ Hispanic \_\_\_\_\_ Women \_\_\_\_\_ Caucasian \_\_\_\_\_ Other (Please Specify) \_\_\_\_\_

Date of Palm Beach County Certification: \_\_\_\_\_

The undersigned is prepared to perform the following described work in connection with the above project. Additional Sheets May Be Used As Necessary

Line Item/ Lot No.	Item Description	Qty/Units	Unit Price	Total Price/ Percentage
	NA	NA	NA	NA
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

at the following price or percentage \_\_\_\_\_  
(SBE Prime or Subcontractor's Quote)

and will enter into a formal agreement for work with you contingent upon your execution of a contract with Palm Beach County.

If undersigned intends to sub-subcontract any portion of this job to a certified SBE-M/WBE or a non-SBE subcontractor, please list the name of that subcontractor and the amount below.

Price or Percentage 0% \_\_\_\_\_  
(Name of Subcontractor)

The Prime affirms that it will monitor the **SBE-M/WBE** listed to ensure the **SBE-M/WBE** perform the work with their own work force. The undersigned **SBE-M/WBE** Prime or **SBE-M/WBE** subcontractor affirms that it has the resources necessary to perform the work listed without subcontracting to a non-certified SBE or any other certified SBE subcontractors except as noted above.

The undersigned subcontractor understands that the provision of this form to Prime Bidder does not prevent Subcontractor from providing quotations to other bidders.

Kimley-Horn and Associates, Inc.  
Print name of  
**SBE-M/WBE** Company

By: *Boyan T. Rapp*  
(Signature)

Boyan T. Rapp SVP  
Print name/title of person executing on behalf  
of **SBE-M/WBE**



# ATTACHMENT - F

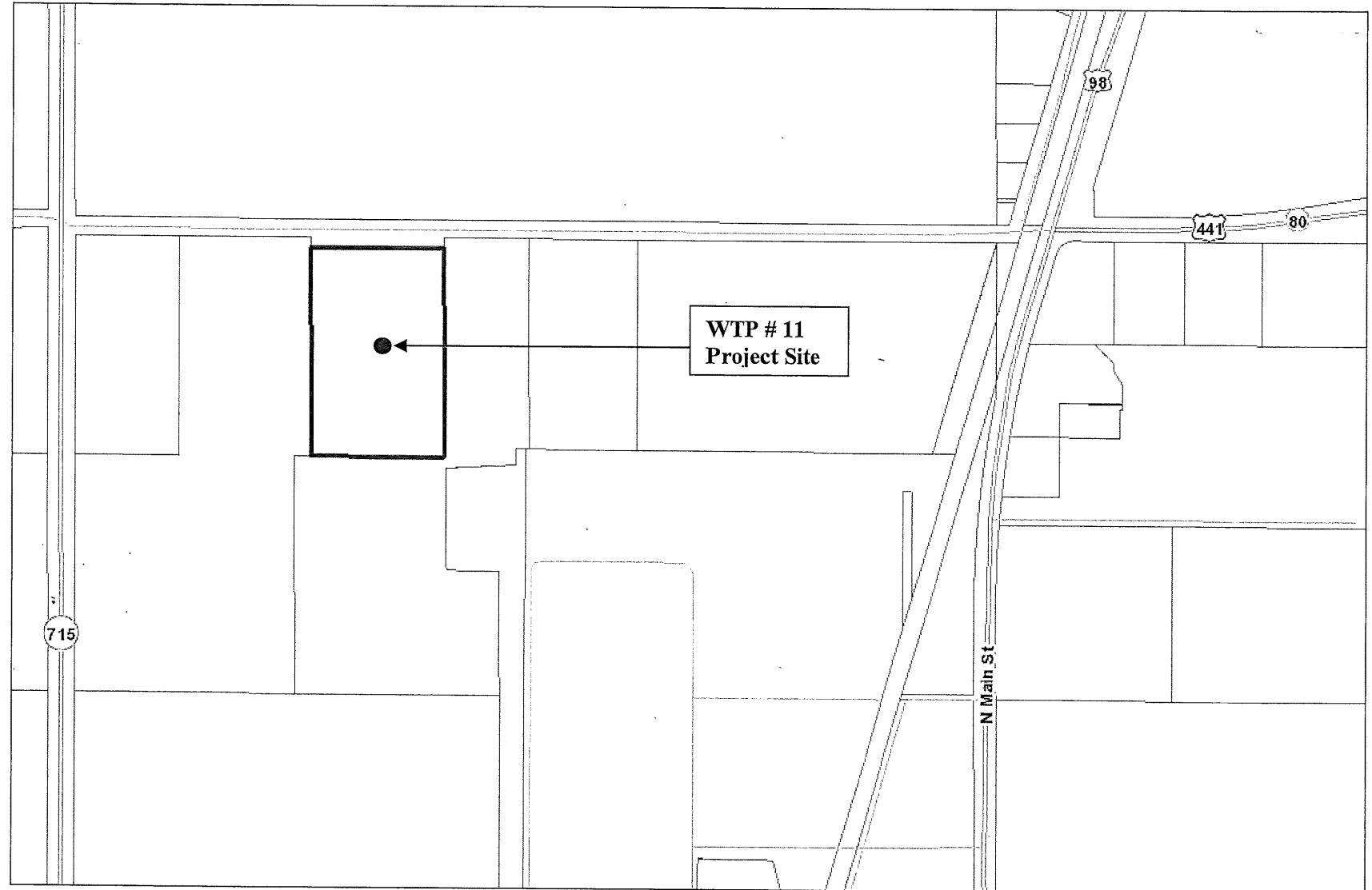
## AUTHORIZATION STATUS REPORT

### SUMMARY OF SBE / MINORITY BUSINESS TRACKING

	Total	SBE	M/WBE
<b>Current Proposal</b>			
Value of Authorization No. 5	\$185,745.00		
Value of SBE - M/WBE Letters of Intent	\$0.00	\$0.00	\$0.00
Actual Percentage	0.00%	0.00%	0.00%
<b>Signed Authorizations</b>			
Total Value of Authorizations	\$417,213.67		
Total Value of SBE - M/WBE Signed Subcontracts	\$229,014.67	\$229,014.67	\$22,203.12
Actual Percentage	54.89%	54.89%	5.32%
<b>Signed Authorizations Plus Current Proposal</b>			
Total Value of Authorizations	\$602,958.67		
Total Value of Subcontracts & Letters of Intent	\$229,014.67	\$229,014.67	\$22,203.12
Actual Percentage	37.98%	37.98%	3.68%
<b>GOAL</b>		<b>28.00%</b>	<b>7.00%</b>

# ATTACHMENT - G

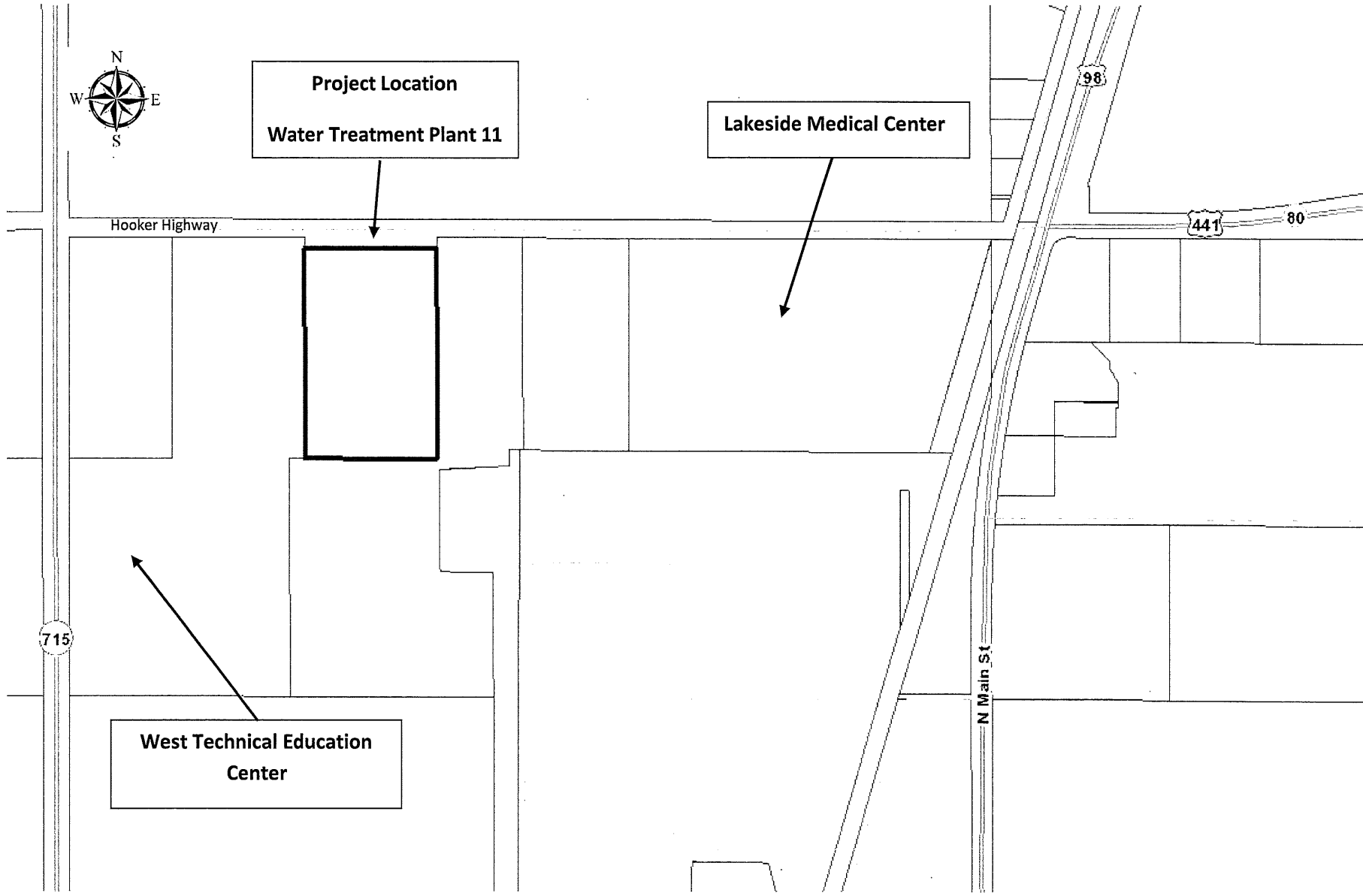
## LOCATION MAP



WUD 18-025 WATER TREATMENT PLANT No. 11 MEMBRANE REPLACEMENT PILOT STUDY

Rev. 11-27-17

ATTACHMENT 2  
Location Map



ATTACHMENT 3

**Summary of Certificates**

**This report displays detailed Certificate of Insurance information for a selected Insured. Any items shown in red are deficient.**

Tuesday, April 03, 2018

- Simple View
- Certificate Images
- Documents

Insured: Kimley-Horn and Associates, Inc. Insured ID: 17-007-PBC

Status: Compliant

ITS Account Number: PLC2681

Project(s): Palm Beach County - Water Utilities

Insurance Policy	Required	Provided	Override
<u>General Liability</u>			
Expiration: 4/1/2019			
General Aggregate:	\$500,000	\$2,000,000	
Products - Completed Operations Aggregate:	\$0	\$0	
Personal And Advertising Injury:	\$0	\$0	
Each Occurrence:	\$500,000	\$1,000,000	
Fire Damage:	\$0	\$0	
Medical Expense:	\$0	\$0	
<u>Automobile Liability</u>			
Expiration: 4/1/2019			
	All Owned Autos	Any Auto not provided	X
	Hired Autos	not provided	X
	Non-Owned Autos	not provided	X
Combined Single Limit:	\$500,000	\$1,000,000	
<u>Excess/Umbrella Liability</u>			
Expiration: 4/1/2019			
Each Occurrence:	\$0	\$5,000,000	
Aggregate Limit:	\$0	\$5,000,000	
<u>Workers Compensation/Employers Liability</u>			
Expiration: 4/1/2019			
<u>Professional Liability</u>			
Expiration: 4/1/2019			
Each Occurrence:	\$3,000,000	\$3,000,000	
Aggregate Limit:	\$3,000,000	\$3,000,000	

Notifications (Show All)

The following letters were issued:

Mar 06 2018 - Renewal Letter