

**WORK ORDER 9**

**Water Quality Study and Potable Water Treatment Facility Evaluation**

This Work Order Number 9 is entered into as of this \_\_\_ day of \_\_\_\_\_, 2022, pursuant to that certain Continuing Contract Agreement, dated April 17, 2018, renewed and amended as of May 18, 2021 (collectively referred to as the "Agreement"), by and between INDIAN RIVER COUNTY, a political subdivision of the State of Florida ("COUNTY") and Tetra Tech, Inc. ("Consultant").

The COUNTY has selected the Consultant to perform the professional services set forth on Exhibit A (Scope of Work), attached to this Work Order and made part hereof by this reference. The professional services will be performed by the Consultant for the fee schedule set forth in Exhibit B (Fee Schedule), attached to this Work Order and made a part hereof by this reference. The Consultant will perform the professional services within the timeframe more particularly set forth in Exhibit C (Time Schedule), attached to this Work Order and made a part hereof by this reference all in accordance with the terms and provisions set forth in the Agreement. Pursuant to paragraph 1.4 of the Agreement, nothing contained in any Work Order shall conflict with the terms of the Agreement and the terms of the Agreement shall be deemed to be incorporated in each individual Work Order as if fully set forth herein.

IN WITNESS WHEREOF, the parties hereto have executed this Work Order as of the date first written above.

**CONSULTANT:**

**BOARD OF COUNTY COMMISSIONERS  
OF INDIAN RIVER COUNTY**

**By:** \_\_\_\_\_

**By:** \_\_\_\_\_  
\_\_\_\_\_, Chairman

**Print Name:** Brenda Keenan P.E.

**Title:** Sr. Project Manager

**BCC Approved Date:** \_\_\_\_\_

**Attest: Jeffrey R. Smith, Clerk of Court and Comptroller**

**By:** \_\_\_\_\_  
Deputy Clerk

**Approved:** \_\_\_\_\_  
Jason E. Brown, County Administrator

**Approved as to form and legal sufficiency:** \_\_\_\_\_  
Dylan T. Reingold, County Attorney

## ATTACHMENT A

### INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICE

#### WATER QUALITY STUDY AND POTABLE WATER TREATMENT FACILITY EVALUATION

#### SCOPE OF SERVICES

##### I. BACKGROUND

The County operates two water treatment facilities to provide potable water service to its customers. The two plants have a combined capacity of 25.7 MGD and an average daily flow of approximately 12 MGD. The plants obtain raw water from the upper Floridan aquifer and treat it with nanofiltration. Pretreatment for the membranes includes addition of sulfuric acid and a scale inhibitor. The permeate is blended with raw water and chlorine is added for disinfection, fluoride is added for fluoridation and lime, carbon dioxide and sodium hydroxide are added for remineralization, pH and alkalinity control and calcium carbonate stability.

The proposed study is intended to focus on finished water quality as it leaves the treatment facilities and water quality within the distribution system and how it may affect the metallic components of the customers plumbing systems. The study will also evaluate the operation of the existing treatment facilities in terms of efficiency and operation in accordance with industry standards and applicable regulations. Recommendations for modifications to the operations or water treatment processes to improve their efficiency, finished water quality or reduce corrosivity will be included in the final report.

The professional services described herein will be performed in accordance with the Continuing Contract Agreement for Engineering Services, dated April 17, 2018, Amendment 1 between Indian River County and Tetra Tech, Inc.

##### II. SCOPE OF WORK

###### Task 1 – Preliminary Work Tasks

1. Tetra Tech will arrange for and attend a project kickoff meeting to introduce team members, establish lines of communication, discuss project objectives and expectations and review data availability and collection. Tetra Tech will prepare and distribute minutes to all participants within a week of the meeting.
2. Tetra Tech will develop an initial data request of documents and information required to perform the study and evaluation. The data request will be prepared in preparation for the kickoff meeting so that it can be reviewed at the meeting.
3. Tetra Tech will set up a time and date to tour each of the two treatment facilities to familiarize themselves with the processes and operations of both facilities. It is anticipated that these tours will take place after a substantial portion of the requested data has been received so that questions about the data can be answered during the tour.

4. Tetra Tech will receive, list, and organize all the data received from the County for use in the study and evaluation.

## **Task 2 – Process and Finished Water Quality Evaluation**

1. Using the water quality and operating data provided by the County, Tetra Tech will perform membrane projection, chemical addition and blending calculations for the existing treatment plants so that changes in operations can be simulated to determine the effect of operational changes. The calculations will be used to understand how key water quality parameters are changed in each step of the process and how changes to the existing operation will change the finished water quality.
2. Values for various corrosion and stability indices will be calculated for the permeate, blended water, finished water and a combination of varying percentages of finished water from each of the two treatment facilities blended to simulate water quality in the distribution system. It is anticipated that the following indices will be calculated:
  - Langelier Index
  - Calcium Carbonate Precipitation Potential
  - Larson Index
  - Chloride to Sulfate Mass Ratio
  - Ryznar Index

The calculations will be performed using custom spreadsheet tools and the AWWA Tetra Tech (RTW) Model for Water Process & Corrosion Chemistry, Version 2.0. The significance of each index as it relates to corrosion of various metals will be discussed and ways to modify the finished water quality to make it less corrosive will also be discussed.

The key water quality parameters and corrosion indices will be summarized in tabular form and graphically as appropriate to compare water quality from the two treatment facilities and how it might change as they are mixed in the distribution system.

3. The water quality will be compared to the recommendations in the USEPA “Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primacy Agencies and Public Water Systems”, March 2016 to determine if the existing water quality is consistent with the recommendations for optimum corrosion control for this system. If the recommendations are not consistent with the current operations, changes to achieve optimum corrosion control will be described. Overall recommendations for adjustments to the operation and finished water quality based upon work performed under this task will be summarized.

### **Task 3 – Distribution System Water Quality**

1. Tetra Tech will obtain and compile water quality information from the distribution system provided by the County. The distribution water quality will be compared to the finished water quality from the two treatment facilities to see if it is consistent with the quality at the point of entry or undergoes changes in the distribution system.
2. Customer comments received by the County and furnished to Tetra Tech will be separated by type, e.g., brown water, chlorine taste, scaling, pinhole leaks, etc. The customer comments by type will be graphed versus time to determine if there is any seasonal pattern or if an increase in customer comments occurs at a particular point in time that can be correlated to a specific event such as a main break or change in plant operation.
3. Customer comments, lead and copper sampling results and other distribution water quality sampling results will be entered into GIS. Maps will be created from the information input to identify areas with increase customer comments, higher lead or copper concentrations and/or with varying water quality.
4. Tetra Tech will review recent published distribution water quality and corrosion control information and studies for similar water quality and impact upon premise plumbing systems and summarize the findings and recommendations of those studies as they relate to the County's system.
5. Tetra Tech will summarize findings and conclusions based upon the review of the distribution water quality evaluation conducted under this task. Recommendations will be provided for modifications to the treatment process, finished water quality or operations, as appropriate, to improve water quality within the distribution system and minimize the impact upon premise plumbing systems

### **Task 4 – Project Updates**

1. Tetra Tech will schedule and conduct a monthly meeting with the County staff to discuss issues related to the study, make the County aware of any issues that require attention on an expedited basis and discuss the progress of the work. Tetra Tech will prepare and provide to all participants minutes of the meetings including any significant items discussed, decisions made, direction given, items agreed upon and action items.

### **Task 5 – Summary Report**

1. The work performed under the proceeding tasks will be summarized in a draft report and provided to the County for review and comment. Tetra Tech will meet with the County to discuss the report and receive any comments or questions about the analysis and recommendations. A final report will be prepared and furnished to the County to respond to any comments or questions raised on the draft report.

### III. PROVIDED BY COUNTY

Information including, but not limited to the following, to be provided by the County to facilitate performing the scope of services:

- Monthly operating reports
- Finished water quality goals
- Chemical usage and dosages
- Historical raw, permeate, blended and finished water quality
- Membrane skid array, number of vessels, membranes per vessel, membrane manufacturer and type, design flux, age, and first stage permeate backpressure or energy recovery device information, if applicable
- Detailed process schematic for each of the water treatment plants
- Distribution water quality sampling data
- Lead and copper sampling data
- Historical customers comments received


### IV. COMPENSATION SUMMARY

Attachment B presents a more detailed breakdown of the estimated compensation defined in the Scope of Services. The total lump sum compensation for this proposal is **\$84,003**. The County will be invoiced monthly for charges incurred during the previous month and submit the invoice to the Water Wastewater Operations Manager by the 15<sup>th</sup> of the following month.

Scope Item	Compensation
Task 1 – Preliminary Work Tasks	\$8,561
Task 2 – Process and Finished Water Quality Evaluation	12,981
Task 3 – Distribution System Water Quality	32,056
Task 4—Project Updates	7,089
Task 5 – Summary Report	23,316
<b>Total</b>	<b>\$84,003</b>

## V. SCHEDULE

Task	Days
Task 1 – Preliminary Work Tasks	40
Task 2 – Process and Finished Water Quality Evaluation	30
Task 3 – Distribution System Water Quality	45
Task 4—Project Updates	Ongoing
Task 5– Summary Report	25
<b>Total</b>	<b>140</b>

 <b>Price Proposal</b>		<b>Labor Plan</b> 7 Resource							<b>ATTACHMENT B</b>				
<b>Water Quality and Treatment Eval</b> <i>Perform study and evaluation of water treatment facilities and potable water quality.</i>													
Submitted to: Indian River County Dept. of Utility Ser Contract Type: Lump Sum		Rate-->	223.56	295.68	152.88	112.5	126.93	82.5	115.38	<b>Pricing by Resource</b>			
<b>Project Phases / Tasks</b>	<b>Total Labor Hrs</b>	Sr Project Manager (Keenan)	Principal Engineer (Christopher)	Project Engineer 2 (Ribotti)	Engineer 3 (Arenas)	Sr GIS Analyst (Morris)	Project Administrator (Lawrence)	Sr CAD Designer 1 (Matthews)	Labor	Travel	ODCs	<b>Task Pricing Totals</b>	
	<b>565</b>	51	55	146	207	38	44	24	83,255	473	275	<b>84,003</b>	
<b>1. Preliminary Work Tasks</b>		<b>59</b>	<b>8</b>	<b>3</b>	<b>22</b>	<b>23</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>8,308</b>	<b>253</b>	<b>-</b>	<b>8,561</b>
Attend Kickoff Mtg. and Prepare Minutes		18	5	2	5	5		1		2,971			2,971
Prepare Data Request		6	1	1	3			1		683			683
Tour Water Treatment Facilities		22			10	12				2,879	253		3,132
Collect and Organize Data		13	2		4	6		1		1,775			1,775
<b>2. Process and Finished WQ Evaluation</b>		<b>95</b>	<b>3</b>	<b>8</b>	<b>20</b>	<b>56</b>	<b>-</b>	<b>-</b>	<b>8</b>	<b>12,981</b>	<b>-</b>	<b>-</b>	<b>12,981</b>
Perform process calculations		57	1	4	12	40				7,629			7,629
Calculate corrosion indices		21	1	2	6	12				2,970			2,970
Compare WQ to Optimum Corrosion Cont		17	1	2	2	4		8		2,382			2,382
<b>3. Distribution System Water Quality</b>		<b>218</b>	<b>12</b>	<b>24</b>	<b>50</b>	<b>84</b>	<b>28</b>	<b>20</b>	<b>-</b>	<b>31,781</b>	<b>-</b>	<b>275</b>	<b>32,056</b>
Compile and Compare WQ Data		33	1	2	6	20		4		4,312			4,312
Compile and Graph Customer Comments		32	3	3	6	16		4		4,457			4,457
Map Water Quality Information		44	3	3	6	4	28			6,331			6,331
Review Corrosion Control Literature		73	3	8	16	40		6		10,477	275		10,752
Summarize Findings and Conclusions		36	2	8	16	4		6		6,204			6,204
<b>4. Project Updates</b>		<b>35</b>	<b>12</b>	<b>8</b>	<b>12</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>7,089</b>	<b>-</b>	<b>-</b>	<b>7,089</b>
Arrange for and Attend Progress Mtgs.		27	10	8	8			1		5,865			5,865
Prepare Meeting Minutes		8	2		4			2		1,224			1,224
<b>5. Summary Report</b>		<b>158</b>	<b>16</b>	<b>12</b>	<b>42</b>	<b>44</b>	<b>10</b>	<b>18</b>	<b>16</b>	<b>23,096</b>	<b>220</b>	<b>-</b>	<b>23,316</b>
Prepare Draft Report		120	8	8	34	32	10	12	16	17,057			17,057
Attend Review Meeting		18	4	2	4	6		2		2,937	220		3,157
Prepare Final Report		20	4	2	4	6		4		3,102			3,102
<b>Totals</b>		<b>565</b>	<b>51</b>	<b>55</b>	<b>146</b>	<b>207</b>	<b>38</b>	<b>44</b>	<b>24</b>	<b>83,255</b>	<b>473</b>	<b>275</b>	<b>84,003</b>