

VILLAGE OF WELLINGTON
UTILITY ENGINEERING SERVICES WORK AUTHORIZATION
Chemical Feed System Rehabilitation and Improvements

This Work Authorization authorizes Kimley-Horn and Associates, Inc. to perform services set forth herein and is issued pursuant to the Agreement for Consulting Services, between Wellington (“Client” or “Village”) and Kimley-Horn and Associates, Inc. (“Kimley-Horn” or “Consultant”), dated February 9, 2016 (“Agreement”). All terms and conditions of said Agreement are hereby incorporated and made part of this Work Authorization.

BACKGROUND

The current treatment processes utilized at the Village of Wellington’s Water Treatment Plant (WTP) include lime softening and conventional filtration as well as RO membrane treatment. Chlorine in the form of sodium hypochlorite is injected upstream of the filters and in the softeners to achieve a free chlorine residual within the filters. Filtered water flows via gravity to Clearwell No. 3 where the water is stabilized to reduce the potential formation of disinfection byproducts (DBP) by forming chloramines through the introduction of anhydrous ammonia. The lime softened and filtered water is then pumped either to the Finished Water Storage Tank No. 3 or Clearwell No. 4 (and subsequently Finished Water Storage Tank No. 4) to be blended with reverse osmosis permeate from the RO process trains. The concentration of DBP, total chlorine, and free ammonia produced by the water treatment systems and placed into the distribution system piping have a significant effect on the formation of DBPs, decay in the chlorine residual concentration, and growth of nitrifying bacteria in the distribution system.

Under separate contract, Kimley-Horn prepared a WTP Chlorine and Disinfection By-Product Analysis Technical Memorandum that included a detailed analysis of the formation of DBPs, chlorine feed system, and ammonia feed system. The Technical Memorandum (TM) made recommendations for water quality improvements related to reducing the formation of disinfection by-products and increasing the effectiveness and efficiency of the overall disinfection process related to 4-log removal at the Village of Wellington’s (Village) Water Treatment Plant (WTP).

Additionally, the original design for the 2017 WTP Renewal and Replacement (R&R) Project included chemical feed system improvements and rehabilitation consisting of replacement, in-kind, of concrete chemical trench systems, minimal (flow based) automated chemical feed systems, and additional chemical feed points through the WTP. However, WTP Chlorine and Disinfection By-Product Analysis Technical Memorandum determined that modifications to the original design including an updated chemical feed trench system, fully automated (compound loop control) chemical feed systems, and additional chemical feed points for 4-log removal would increase the effectiveness and efficiency of the overall chemical feed systems. For example, constructing additional sodium hypochlorite and anhydrous ammonia chemical feed points will allow free chlorine contact time (additional 2-log removal) and then chloramine formation in Clearwell No. 4.

The authorization will cover the associated design, permitting, and bidding services to implement the recommended alternatives and complete rehabilitation of the WTP chemical feed systems including sodium hypochlorite, anhydrous ammonia, fluoride, polymer, lime, polyphosphate, carbon dioxide, and caustic. The design and permitting will include and incorporate the chemical

feed system components associated with the original 2017 WTP Renewal and Replacement (R&R) Project. Construction stage services are not included as part of this scope of work.

The following is a list of the tasks that will be performed and a description of the scope of work involved for each task.

SCOPE

Task 1 – Preliminary Engineering and Technical Design Memorandum

- A. Kimley-Horn will conduct a series of site visits at the WTP to gather data, perform a preliminary assessment, and to meet with Village staff to discuss WTP chemical feed system operational methodology and preferences including proposed modifications and/or expansions.
- B. Kimley-Horn will evaluate the existing chemical feed systems including all installed or uninstalled existing chemical feed system equipment. The following existing processes, equipment, and components will be included in the evaluation:
 - Existing bulk sodium hypochlorite solution dilution system from 12.5% (trade) solution
 - Automated sodium hypochlorite feed systems for flow-based and compound loop (residual trim) systems
 - Automated sodium hypochlorite feed systems with or without softened water to drive an educator for the feed solution
 - Incorporating the existing W&T LVN-2000s, Magnatex sodium hypochlorite feed pumps, and PLC-5 Control Panels
 - Automated anhydrous ammonia feed systems (mass flow meters) for flow-based and compound loop (residual trim) systems
 - The other chemical feed systems including fluoride, polymer, lime, polyphosphate, carbon dioxide, and caustic will only be evaluated for piping configurations, chemical trench configurations, injection points, and injection methodology.
- C. Kimley-Horn will evaluate multiple proposed chemical trench and chemical feed system technologies including chemical dosing pumps, pre-cast concrete chemical trench systems, pressurized 'looped' chemical feed systems, and automated chemical feed systems while considering, but not limited to, the following: operational flexibility, optimization of chemical usage, potential impacts to existing systems, future expansion impacts, turn-down, and the ability to meet regulatory and goal DBP requirements.
- D. Kimley-Horn will prepare and issue a Technical Design Memorandum that presents the findings and recommendations for the existing and proposed chemical trench and feed system improvements or rehabilitation. The Technical Design Memorandum will include recommendations for the existing chemical feed system components including associated electrical control panels and automated feed system components. The Technical Design Memorandum will to serve as the Basis of Design for Task 2.
- E. Kimley-Horn will present the findings at a review meeting with Village staff to discuss the findings and receive comments from the Village for incorporation in the final Technical

Design Memorandum. The Village's comments will be incorporated into the final Memorandum.

Task 2 – Chemical Trench and Chemical Feed System Improvements Design, Permitting, and Bidding

- A. Kimley-Horn will prepare Construction Plans and Specifications for the Chemical Trench and Chemical Feed System Improvements in accordance with the Basis of Design established under Task 1. The following Construction Plan Sheets are anticipated:

Cover Sheet, Construction Details, General Notes	6 plan sheets
Chemical Feed System and Trench Improvements	18 plan sheets
Sodium Hypochlorite Feed System Improvements	9 plan sheets
Ammonia Feed System Improvements	5 plan sheets
Electrical Improvements	8 plan sheets
Instrumentation and Control	6 plan sheets

52 plan sheets estimated

- B. Kimley-Horn will prepare an Opinion of Probable Construction Cost for the Project when the Construction Documents are at 60%, 90% and 100% complete.
- C. Kimley-Horn will engage and coordinate with an electrical engineering subconsultant to provide design and permitting for the Chemical Trench and Chemical Feed System electrical and I&C improvements.
- D. Kimley-Horn will provide updated chemical feed system control narratives for the proposed Sodium Hypochlorite and Anhydrous Ammonia feed systems to generally include written control descriptions, control logic, alarms, setpoints, and alarm actions.
- Draft Control Narrative - The draft control narrative will be submitted to the Village in electronic format (Microsoft Word) for review and comment. Kimley-Horn will update the draft control narrative to (final draft).
 - Final Control Narrative - The final control narrative will be submitted to the Village in electronic format (Microsoft Word).
- E. Kimley-Horn will present the plans, specifications, and construction cost opinion to the Village for review at 60% and 90% completion.
- F. Kimley-Horn will prepare and submit the applicable Palm Beach County Health Department permit application for the project and will assist the Village in responding to Requests for Additional Information through the permitting process.
- G. Kimley-Horn will assist the Village with the contractor procurement process including attendance at the pre-bid meeting, assistance with response to bidder RFIs, addenda preparation assistance, review of the apparent low bidder's proposal, and preparation of a written summary review of the bids.

- H. Kimley-Horn will assist the Village and Contractor with the Building Permit application and Building Department Requests for Additional Information associated with the Chemical Trench and Chemical Feed System Improvements.

ADDITIONAL SERVICES

Any services not specifically provided for in the above scope, as well as any changes in the scope requested by the Village, will be considered additional services to this Work Authorization and will be performed based on subsequent Work Authorizations approved prior to performance of the additional services. The evaluation and design of automated chemical feed systems only include the sodium hypochlorite and anhydrous ammonia chemical feed systems. The other chemical feed systems including fluoride, polymer, lime, polyphosphate, carbon dioxide, and caustic will only be evaluated for piping configurations, chemical trench configurations, injection points, and injection methodology. Control narratives for only the proposed Sodium Hypochlorite and Anhydrous Ammonia feed systems are included.

INFORMATION AND SERVICES PROVIDED BY THE VILLAGE

Kimley-Horn assumes that the completeness and accuracy of all information provided by the Village, including plans and specifications prepared by others, can be relied upon in the performance of professional services.

ASSUMPTIONS AND INFORMATION / SERVICES PROVIDED BY THE VILLAGE

Kimley-Horn assumes that all information provided by the Village can be relied upon in the performance of professional services.

SCHEDULE

Services provided under this agreement will begin within 7 days of receipt of a signed agreement. Kimley-Horn will perform these services according to the schedule below:

- Draft Technical Design Memorandum delivered for Village review within 5 weeks from receipt of information from the Village as described under Task 1.
- Final Technical Design Memorandum submitted to the Village within 2 weeks of receipt of the Village's review comments.
- 60% Draft Plans, Specifications, and Cost Opinion submitted to the Village 4 weeks after submitting the Final Technical Design Memorandum
- 90% Draft Plans, Specifications, and Cost Opinion submitted to the Village within 2 weeks of receipt of the Village's review comments.
- 100% (Final) Construction Plans, Specifications, and Cost Opinion submitted to the Village within 2 weeks of receipt of the Village's review comments.

COMPENSATION

Kimley-Horn will perform the services described in the Scope of Services on a lump sum basis for \$99,630.

ESTIMATE FOR ENGINEERING SERVICES

PROJECT:	Village of Wellington Chemical Feed System Improvements				SHEET 1 of 1		
CLIENT:	Wellington				FILE NO.		
ESTIMATOR:	Matt Tebow/John Potts				DATE:	12/02/20	
DESCRIPTION: See Scope of Services	DIRECT LABOR (MAN-HOURS)						
	Principal	Engineer (PE)	Engineer (EI)	Admin		SUB	EXP
							LINE
	JP/MM	MT	AG/DC	TC			TOTAL
Task 1 - Preliminary Engineering and Technical Design Memorandum							
Review Operating Conditions and Performance	2.0	4.0	6.0				\$1,790
Preliminary Engineering and Evaluation	4.0	12.0	6.0				\$3,580
Preliminary Electrical/I&C Engineering and Evaluation	2.0	4.0				\$4,750	\$5,880
Prepare Draft Technical Design Memorandum	2.0	12.0	8.0	2.0			\$3,490
Review Meeting	2.0	4.0	6.0	1.0			\$1,870
Prepare Final Technical Design Memorandum	1.0	8.0	4.0	1.0			\$2,075
Task 2 - Design, Permitting , Bidding							
Prepare 60% Plans (52 sheets), Specifications, and OPC	4.0	30.0	140.0	10.0			\$22,090
Review 60% with VOW		4.0	6.0	1.0			\$1,400
Prepare 90% Elec/Inst drawings and specifications	3.0	14.0	8.0	6.0		\$27,500	\$31,875
Prepare 90% Plans (52 sheets), Specifications, and OPC	3.0	22.0	60.0	6.0			\$11,415
Review 90% documents with VOW	2.0	6.0	15.0	10.0			\$3,910
Prepare 100% Construction Documents		4.0	6.0	1.0			\$1,400
Bid Phase Services	3.0	18.0	20.0	6.0		\$2,500	\$8,855
	28	142	285	44			
	\$235	\$165	\$110	\$80		1.00	
	\$6,580	\$23,430	\$31,350	\$3,520		\$34,750	\$99,630