

TASK ORDER No. 2

**CONTINUING PROFESSIONAL SERVICES
(Civil Engineering – Water)
FOR**

Hydraulic Modeling for Nitrification Action Plan (Phase 2)

THIS TASK ORDER FOR CONTINUING PROFESSIONAL SERVICES (“Task Order”) is made on the day of _____, between the **City of Lake Worth Beach**, a Florida municipal corporation (“City”) and **Kimley-Horn and Associates, Inc.**, a North Carolina CORPORATION (“CONSULTANT”).

1.0 Project Description:

The City desires the CONSULTANT to provide those services as identified herein for the Project. The Project is described in the CONSULTANT’s Proposal, dated **August 14, 2023**, and services are generally described as: **Develop a system-wide flushing plan and perform hydraulic modeling utilizing the City’s existing WaterCAD water distribution system hydraulic model to identify the water age in the City’s distribution system.** (the “Project”).

2.0 Scope

Under this Task Order, the CONSULTANT will provide the City of Lake Worth Beach with civil engineering related to water consulting services for the Project as specified in the **CONSULTANT’s proposal attached hereto and incorporated herein as Exhibit “1”**.

3.0 Schedule

The services to be provided under this Task Order shall be completed within **184-274** calendar days from the City’s approval of this Task Order or the issuance of a Notice to Proceed.

4.0 Compensation

This Task Order is issued for a not to exceed amount of **\$94,381.32**. The attached proposal identifies all costs and expenses included in the not to exceed amount. Invoices will be itemized by the hours per person for the total work completed for each month.

5.0 Project Manager

The Project Manager for the CONSULTANT is **Fannie Howard**, phone: **(561) 840-0246**; email: **fannie.howard@kimley-horn.com**; and, the Project Manager for the City is Garry Baker, phone: 561-586-1713; email: gabaker@lakeworthbeachfl.gov

6.0 Progress Meetings

The CONSULTANT shall schedule periodic progress review meetings with the City Project Manager as necessary but every 30 days as a minimum.

7.0 Authorization

This Task Order is issued pursuant to the Continuing Professional Services Agreement (Civil Engineering – Water) based on RFQ#23-300 between the City of Lake Worth Beach and the CONSULTANT, dated March 21, 2023 (“Agreement” hereafter). If there are any conflicts between the terms and conditions of this Task Order and the Agreement, the terms and conditions of the Agreement shall prevail.

IN WITNESS WHEREOF, the parties hereto have made and executed this Task Order No. 2 as of the day and year set forth above.

CITY OF LAKE WORTH BEACH, FLORIDA

By: _____
Carmen Y. Davis, City Manager

ATTEST:

By: _____
Melissa Ann Coyne, City Clerk

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

APPROVED FOR FINANCIAL
SUFFICIENCY

By: _____
Glen J. Torcivia, City Attorney

By: _____
Yannick Ngendahayo, Financial Services Director

CONSULTANT: KIMLEY-HORN AND ASSOCIATES, INC.

By: _____
[Signature]

[Corporate Seal]

STATE OF Florida)
COUNTY OF Palm Beach)

THE FOREGOING instrument was acknowledged before me by means of physical presence or online notarization on this 14th day of August, 2023, by Kimley-Horn and Associates, Inc. a North Carolina Corporation, who is personally known to me or who has produced _____ as identification, and who did take an oath that he or she is duly authorized to execute the foregoing instrument and bind the CONSULTANT to the same.

[Signature]

Notary Public Signature

Notary Seal:

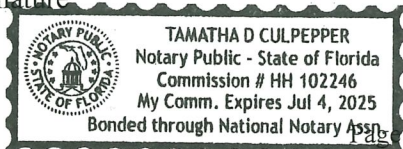


EXHIBIT 1

FOR

Hydraulic Modeling for Nitrification Action Plan (Phase 2)

1.0 Project Description

The City of Lake Worth Beach Water Treatment Plant (WTP) is comprised of a Lime Softening Water Plant and a Reverse Osmosis (RO) Water Plant. Water is blended from the two facilities to produce potable water for the City. The City's water system also includes a North Booster Station and South Booster Station which both have onsite chlorine injection facilities.

Until recently, the City's water distribution system has required bi-annual free chlorine maintenance operations to restore chlorine residuals in the water to acceptable levels. The City had been observing a gradual decrease in chlorine levels between free chlorine maintenance operations which may be symptomatic of organic growth in the distribution system. This condition is known as nitrification, and it can be accelerated in areas within the distribution system that have very low water flow rates leading to stagnant water.

To address this issue, the City previously retained Kimley-Horn to develop a Nitrification Action Plan (NAP) to proactively seek a solution to the decreasing chlorine levels within their distribution system. The NAP was completed in November 2022 and it identified a phased list of improvements that could be implemented to address the decreasing chlorine levels. Two of the recommendations included in the NAP were to develop a system-wide flushing plan and to perform hydraulic modeling to identify the water age within the City's distribution system.

The City has requested that Kimley-Horn assist with these two recommendations using the City's existing WaterCAD water distribution system hydraulic model. As part of this work, the City has also requested that Kimley-Horn use the hydraulic model to help locate a valve that could be potentially closed in the northern distribution system.

The following is understood about the City's existing WaterCAD water distribution system hydraulic model:

- The model has been recently updated by another consultant and can be relied upon to perform the hydraulic modeling for this scope of services.
- Only steady state demand scenarios have been developed in the model; additional work will be required to develop extended period demand scenarios in the model.
- No work will be required to update the piping/valve/fire hydrant infrastructure or steady state demand scenarios in the model. Information related to the operation of storage facilities and pumping operations will need to be added to the model to develop extended period demand scenarios.
- The model will not need to be calibrated to perform the hydraulic modeling for this scope of services.
- The model includes the existing system valves.

With this understanding, Kimley-Horn will perform the following scope of services for Phase 2 of the Nitrification Action Plan development.

2.0 Scope of Services

Task 1 – Limited Hydraulic Model Development and Analysis

- Attend a kickoff meeting with City staff.
- Collect information on the existing water system including pump curves, operation descriptions of distribution system remote storage tank and pump operations, record drawing for the storage tanks and pumping facilities and location and estimated flow rates for automatic flushers in the distribution system. The following information shall also be provided to Kimley-Horn by the City:
 - Existing WaterCAD hydraulic water distribution model
 - Existing water system GIS data (shapefile or Geodatabase) which includes the water distribution system valve locations
 - Flow data from the *City of Lake Worth Beach 2022 Water Distribution system Modeling Update (January 2023)* in its raw format that can be manipulated as needed to add to the existing WaterCAD model.
- Incorporate the specific physical hydraulic features into the model limited to what is needed to develop an extended period simulations. Examples of these features include tank sizes, control valve settings, pump curves, automatic flushers and several node elevations such as high service pumps.
- Review the diurnal water demand curve for the system demands that was prepared as part of the *City of Lake Worth Beach 2022 Water Distribution system Modeling Update (January 2023)* and update as need to incorporate into the existing WaterCAD model.
- Develop an extended period simulation for the average daily flow demand scenarios using the diurnal water demand curve. It is assumed that up to three (3) extended period sub-scenarios will be developed to look at different operations for the storage tanks and pumping stations in the distribution system.
- Run up to three (3) extended period simulations to identify the water age throughout the distribution system and to generate recommendations for distribution system operations in order to keep the water age below the acceptable levels per industry standards.
- Use the model to help identify the location of a valve that the City believes to be closed in the northern distribution system. Up to 40 hours of engineering time has been budgeted for this task.

Task 2 – Conventional Flushing Plan

Kimley-Horn will utilize the hydraulic model to develop a conventional flushing plan which can be used by operations staff to conduct hydrant flushing operations. The flushing plan will be developed with the goal of improving the hydrant flushing sequencing, reducing the water residence times, reducing stagnant areas and improving water system quality and disinfectant residuals. The conventional flushing plan design will consist of “zones” and sequencing of the “zones” with the goal of moving clean water out from the WTP into the flushed zones. Zone sizes

will be based on what City crews are typically able to flush in a day. Additional sequencing within a zone may be recommended in order to facilitate clean water moving into a given zone early in the day (ie, by flushing hydrants on larger pipes within a zone).

The hydraulic model will also be used to identify pipes where minimum scouring velocities of 3 feet per second (fps) cannot be achieved while flowing the 2.5-in nozzle or the 4.0-in nozzle. These areas will be noted and may be candidates in the future for limited unidirectional flushing if they are thought to be contributing to water quality issues.

- Kimley-Horn will complete up to one (1) site visit to coordinate hydrant and valve locations with operators to develop the flushing program.
- After the flushing program is designed using the hydraulic model, Kimley-Horn will provide City staff with a map indicating the zones, hydrants and sequencing for the flushing program field implementation. It is assumed that the City will verify the hydrant locations. After the City exercises the assets in the field to determine if the equipment is in working order, Kimley-Horn will revise the flushing plan as needed to avoid use of inoperable assets, if required.
- The Flushing Plan will consist of the following recommendations:
 - Identification of hydrant flushing zones in the distribution system
 - Sequence of system wide and system zone hydrant flushing
 - Duration and frequency of flushing
 - Sampling procedures and water quality to be collected during flushing (as required)

Task 3 – Technical Memorandum

- Prepare a draft technical memorandum to summarize the results of the water age analysis and flushing plan. The memorandum will include map figures indicating the sequencing of the zones and hydrants for the conventional flushing plan.
- Attend a review meeting with City staff to discuss comments on the draft technical memorandum.
- Prepare final technical memorandum which incorporates comments from City staff.

3.0 Schedule (6-9 months)

Task 1 – 1-2 months after receipt of requested information

Task 2 – 3-4 months after Task 1 is complete

Task 3 – 1-2 months for draft after Task 2 is complete; final technical memorandum to be submitted 1 month from receipt of draft review comments by City staff

4.0 Compensation

Kimley-Horn will perform the Services for the total lump sum fee below. Fees will be invoiced monthly based on the actual amount of services performed and expenses incurred. Individual task amounts are informational only.

Additional Services which may be identified as needed at a later time will be negotiated at that time.

Task 1 - Limited Hydraulic Model Development and Analysis	\$28,288.08
Task 2 - Conventional Flushing Plan	\$46,283.66
Task 3 - Technical Memorandum	\$ 19,709.58
Expenses	\$100.00
Total	\$94,381.32

5.0 Progress Meetings

The Consultant shall schedule a kickoff meeting and a draft review meeting as described in the Scope of Work.

6.0 Additional Services

Consultant is available to provide additional services as requested by the City based on a negotiated fee for each task or utilizing hourly rates established by this contract. All additional work shall be negotiated with and authorized by the City in writing prior to initiation by the Consultant. These services could include:

- Engineering time to help locate closed valve(s) beyond 40 hours provided in scope of services
- Calibrating the existing hydraulic model
- Developing a unidirectional flushing plan for all or a portion of the City's distribution system
- Field visits to accompany City staff as they perform system flushing

ESTIMATE FOR ENGINEERING SERVICES

PROJECT: LWB Nitrification Action Plan - Phase 2

Date

Aug-23

CLIENT: City of Lake Worth Beach

ESTIMATOR: FHH

DESCRIPTION:

DIRECT LABOR (MAN-HOURS)

NO.	TASK	SEN PROF II	SEN PROF I	PROF II	PROF I	ANALYST II	ANALYST I	SR TECH SUPP	SUPP STAFF	EXP SUB	Dir Exp	LINE TOTAL
1	Water Age Analysis											
	Kick-off Meeting		2		3		6		1			\$1,779.80
	Data Collection		2		12		12		1			\$3,995.30
	Review Diurnal Curve prepared by others		2		2		6					\$1,512.26
	Develop Extended Period Simulations for up to 3 scenarios to identify water age		6		21		18					\$7,185.78
	Run Water Age Analysis for up to 3 scenarios		6		15		24					\$6,752.28
	Valve Discovery (Model and Field Work)		6		24		10		2			\$7,062.66
												\$0.00
2	Flushing Plan											
	Site Visit (1)		2		6		6		1			\$2,309.60
	Develop Conventional Flushing Plan/Exhibits		30	30	60		120					\$38,120.70
	Identify Pipes with flushing velocities under 3 ft/s		4	4	10		20					\$5,853.36
3	Technical Memorandum											
	Draft technical memorandum		9	6	24		24		1			\$10,633.72
	Draft review meeting		2		2		4					\$1,303.56
	Final technical memorandum		6	4	18		18		2			\$7,772.30
												\$0.00
	<i>Expenses</i>										100.0	\$100.00
												\$0.00
	TOTAL HOURS	0.0	77.0	44.0	197.0	0.0	268.0	0.0	8.0	0.0	100	\$ 94,381.32
	LABOR (\$/HOUR)	297.79	266.48	233.61	176.60	152.37	104.35	194.22	90.94	1.00	1.00	0
	\$/RATE	\$ -	\$ 20,518.96	\$10,278.84	\$ 34,790.20	\$ -	\$ 27,965.80	\$ -	\$ 727.52	\$ -	\$ 100.00	\$ 94,381.32