

# HIGHLINE WATER DISTRICT KING COUNTY, WASHINGTON

## RESOLUTION 24-8-7C

### RESOLUTION AUTHORIZING CONSULTANT AGREEMENT #24-60-21 WITH CAROLLO ENGINEERS, INC. FOR PROFESSIONAL ENGINEERING AND MODELING SERVICES RELATING TO THE DISTRICT'S HYDROLIC MODEL UPGRADE

**WHEREAS**, the District's hydraulic modeling software H2O Net has been replaced by Infowater Pro by the software vendor; and,

**WHEREAS**, the hydraulic model is a critical tool in preparation of a Water System plan, and the District is required to complete a Water System plan by 2026 and conversion of the hydraulic model to Infowater Pro requires specialized experience; and,

**WHEREAS**, Carollo Engineers, Inc. completed the previous hydraulic model conversion and calibration and has intimate knowledge of the current District model; and,

**WHEREAS**, the District evaluated Statements of Qualifications of three (3) engineering consultants from the MRSC roster and selected Carollo Engineers in accordance with the District's Procurement Manual; and,

**WHEREAS**, the District's Engineer and General Manager have reviewed the Scope of Services (Exhibit A), and Level of Effort Cost (Exhibit B), submitted by Carollo Engineers, Inc. and recommend approval of this resolution.

### NOW, THEREFORE, BE IT RESOLVED,

1. The General Manager or designee is authorized to enter Consultant Contract #24-60-21 with Carollo Engineers Inc., for a not to exceed amount of \$101,700.00.
2. The General Manager and/or the District's Legal Counsel are authorized to make minor changes to the agreement if required.

**ADOPTED BY THE BOARD OF COMMISSIONERS** of Highline Water District, King County, Washington, at an open public meeting held on the **7th** day of **August 2024**.

### BOARD OF COMMISSIONERS

Signed by:  
  
48FC432C4556410...  
**Kathleen Quong-Vermeire**, President

DocuSigned by:  
  
78D086C0748D4ED...  
**Polly Daigle**, Commissioner

Signed by:  
  
6E7D4CD7088F4C7...  
**Daniel Johnson**, Commissioner

DocuSigned by:  
  
382D4C89A38F421...  
**Vince Koester**, Secretary

Signed by:  
  
87480370F2E446D...  
**Todd Fultz**, Commissioner

**HIGHLINE WATER DISTRICT  
HYDRAULIC MODEL DEVELOPMENT  
SCOPE OF SERVICES**

The following Scope of Services has been developed to assist Highline Water District (District) with the development and calibration of its new hydraulic model. The following tasks under this Scope of Services have been prepared based on Carollo's (Consultant)'s current understanding of the proposed project, and through discussions with District staff.

**TASK 100 – PROJECT MANAGEMENT**

The purpose of this task is to direct activities and maintain the project within the contracted scope, schedule, and budget. This consists of project administration, monthly invoicing, client and team coordination and quality assurance/quality control review necessary to successfully complete this project to the District's expectations. This task consists of the following activities:

TASK 100 ACTIVITIES

**Subtask 101 - Monthly Progress Reports and Invoices.**

This subtask consists of production and implementation of the project plan, schedule, and budget. Assist the project team members in the implementation of the task items, reviewing the work-in-progress reports. Prepare and submit monthly activity reports showing current project status and identifying key issues or elements of the project that will need to be addressed in the proceeding weeks. An electronic version of the monthly progress reports will be sent to the District for review and approval. This task assumes that no hard copy of the monthly progress reports will be distributed.

**Subtask 102 - Meeting No. 1- Kick-off Meeting**

- Facilitate a kick-off meeting to review scope and initial data requests.

**Subtask 103 - Client Coordination.**

- Manage the consultant project team to track time and budget, work elements accomplished, work items planned for the next period, scope changes, time and budget needed to complete the project.
- Create and maintain a working project schedule.
- Review project status, including scope, budget, and schedule during virtual PM meetings, monthly.

Task 100 Assumptions

1. The total length of the project is 6 months.
2. Six monthly status meetings will be held over Microsoft Teams.

Task 100 District Input

1. Team member contact information.
2. Receive, review, and process Consultant invoices in a timely manner.

Task 100 Consultant Deliverables

1. Six monthly progress reports and invoices.

Task 100 Meetings

1. Meeting No. 1 - Kickoff Meeting.

2. PM Virtual Meetings.

### **TASK 200 – GIS UPDATES**

The purpose of this task is to support the District with wrapping-up their GIS database and making it ready for model import. The focus on this task is on a general review of the database/connectivity, and configuration around facilities such as pump stations, reservoirs, etc. The connectivity of the District's GIS will be confirmed in the hydraulic model and updates will be sent to the District.

#### Task 200 Assumptions

1. Assumes 60 hours of support to ready GIS data for model import.

#### Task 200 District Input

1. GIS database of water system

#### Task 200 Consultant Deliverables

1. GIS database of water system updates to be made.

#### Task 200 Meetings

1. None.

### **TASK 300 – HYDRAULIC MODEL BUILD**

The purpose of this task is to support the District in the development of its new InfoWater Pro hydraulic model. This task also includes assisting staff during field testing, collecting the necessary data to calibrate the hydraulic model. This task will be critical to provide training and mentoring so the District can easily take and use the model in-house for analysis after the completion of this Plan. This task consists of the following activities:

#### TASK 300 ACTIVITIES

##### **Subtask 301 - Hydraulic Model Build**

The purpose of this task is to import the District's GIS database and build the new InfoWater Pro hydraulic model. This task will review connectivity and validate the model run.

##### **Subtask 302 -Water Demands Allocation and Diurnal Patterns**

- Review billing data provided by the District for years 2022 and 2023.
- Allocate meters to closest junctions in hydraulic model.
- Apply demand distribution to the model based on meter locations and demand factors for each customer class. Demands for the largest customers will be applied directly to each customer location. The demands will include the current year for model calibration. No future demands will be estimated or allocated.
- Develop custom diurnal patterns by service area utilizing historical representative SCADA data. Both Average Day Demand and Maximum Day Demand patterns will be developed.

#### Task 300 Assumptions

1. District will provide SCADA data to determine water demands and diurnal patterns.

#### Task 300 District Input

1. Updated GIS database of water system.

#### Task 300 Consultant Deliverables

1. None.

Task 300 Meetings

1. None.

**TASK 400 – HYDRAULIC MODEL CALIBRATION**

This task includes assisting staff during field testing, collecting the necessary data to calibrate the hydraulic model, as well as the calibration of the hydraulic model. This task consists of the following activities:

TASK 400 ACTIVITIES

**Subtask 401 – Calibration Plan**

Consultant will develop a calibration plan to summarize both loggers long-term and hydrant tests activities. Consultant will identify hydrants to be tested, as well as location to install pressure loggers.

**Subtask 402 – Perform Hydrant Flow Tests**

Consultant will provide up to 12 pressure loggers to be used for hydrant flow testing at up to 12 locations. Consultant will identify hydrants to be tested and develop a calibration plan to summarize activities. District staff will install pressure loggers at predetermined locations. Consultant will accompany District staff during flow testing and will read and record flow hydrant flows and pressures. All residual hydrant pressure results will be measured by pressure loggers in addition to manual pressure readings by District staff and recorded by Consultant staff. District will provide hydrant pitot tubes and diffusers.

**Subtask 403 – Hydraulic Model Calibration**

- Steady State Calibration: Calibrate the model using hydrant flow test data provided by Consultant. Up to 12 hydrant tests will be used for calibration. Consultant will work with the District to determine the appropriate hydrant sites, it is assumed no more than 12 sites will be considered. Verify appropriate model settings and parameters (such as tank levels, pump curves, etc.) using data provided by District, including SCADA information. Calibrate the hydraulic model according to M32 guidelines.
- Extended Period Simulation (EPS): Calibrate the model for one week in the summer. SCADA data will be provided by the District and will be used for calibration.

**Subtask 404 – Meeting No. 2 – Hydraulic Model Development**

Facilitate a meeting to present the results of the model development and calibration efforts.

**Subtask 405 – Hydraulic Model Development and Calibration TM**

Summarize model development and calibration in a Draft TM for the District's review.

Task 400 Assumptions

1. The District and Consultant will conduct hydrant flow testing to support model calibration.
2. Consultant will provide up to 12 pressure loggers. District will provide the rest of the equipment, including pitot tubes, diffusers for hydrants and any needed equipment to operate hydrants.
3. It is assumed that the hydrant testing can be completed in 3 days in the field.
4. Hydrant flow testing will be performed in the Summer of 2024.
5. District will provide SCADA data for EPS calibration.
6. Meeting will be help virtually.

Task 400 District Input

1. Requested data.
2. Comments on Hydraulic Model Development and Calibration TM.

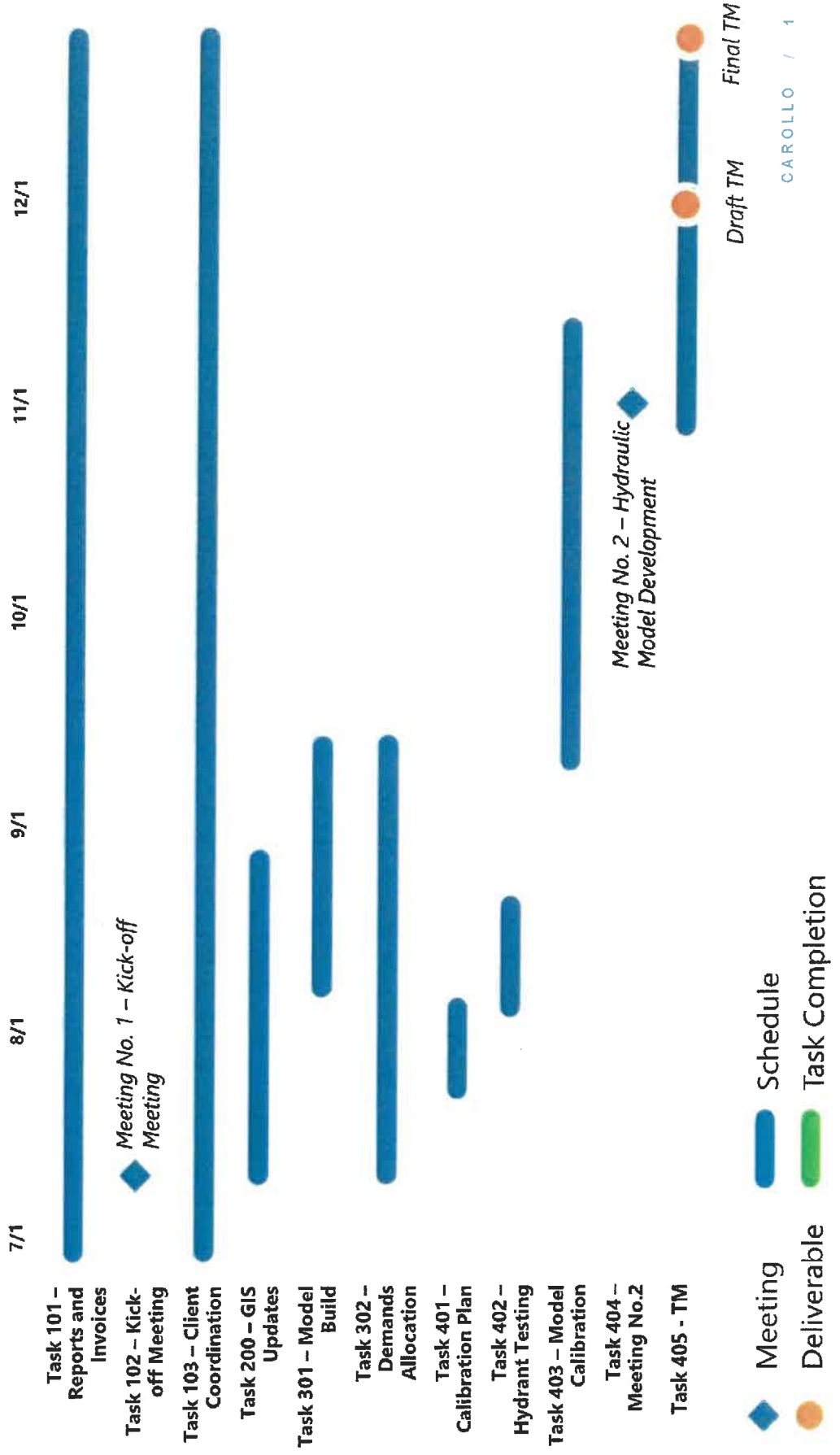
Task 400 Consultant Deliverables

1. Draft Hydraulic Model Development and Calibration TM.
2. Final Hydraulic Model Development and Calibration TM.

Task 400 Meetings


1. Meeting No. 2 – Hydraulic Model Development.

# Highline Water District Modeling Schedule



**HIGHLINE WATER DISTRICT  
HYDRAULIC MODEL DEVELOPMENT  
EXHIBIT B  
LEVEL OF EFFORT**

TASK / DESCRIPTION	PM		QM		Modeling		GIS		DP		Total Hours	Carollo Labor Cost	OTHER DIRECT COSTS		TOTAL COST
	Nabonnand	Wicklein	Meozer	Christensen	Varies	Travel, Shipping and Printing	PECE	Total ODC							
Total Labor Rate	\$225.00	\$305.00	\$195.00	\$130.00	\$120.00										
<b>Task 100 - Project Management</b>	24	2	8	2	8						44	\$ 8,790	\$ -	\$ 660	\$ 9,450
101 Monthly Progress Reports and Invoices	8	0	0	0	6						12	\$ 2,070		\$ 180	\$ 2,250
102 Meeting No.1 - Kick-off Meeting	2	2	8	2	2						16	\$ 3,120		\$ 240	\$ 3,360
103 Client Coordination	16	0	0	0	0						16	\$ 3,600		\$ 240	\$ 3,840
<b>Task 200 - GIS Updates</b>	2	2	16	40	0						60	\$ 9,380	\$ -	\$ 900	\$ 10,280
200 GIS Updates	2	2	16	40	0						60	\$ 9,380	\$ 900	\$ 900	\$ 10,280
<b>Task 300 - Hydraulic Model Build</b>	5	10	72	20	0						107	\$ 20,815	\$ -	\$ 1,605	\$ 22,420
301 Hydraulic Model Build	1	6	40	8	0						55	\$ 10,895		\$ 825	\$ 11,720
302 Water Demands Allocation and Diurnal Patterns	4	4	32	12	0						52	\$ 9,920		\$ 780	\$ 10,700
<b>Task 400 - Hydraulic Model Calibration</b>	38	20	182	22	12						274	\$ 54,440	\$ 1,000	\$ 4,110	\$ 59,550
401 Calibration Plan	0	2	10	8	4						24	\$ 4,080		\$ 360	\$ 4,440
402 Perform Hydrant Flow Tests	30	0	44	0	0						74	\$ 15,330	\$ 1,000	\$ 1,110	\$ 17,440
403 Hydraulic Model Calibration	2	12	104	6	0						124	\$ 25,170		\$ 1,860	\$ 27,030
404 Meeting No.2 - Hydraulic Model Development	4	2	8	4	0						18	\$ 3,590		\$ 270	\$ 3,860
405 Hydraulic Model Development and Calibration TM	2	4	16	4	8						34	\$ 6,270		\$ 510	\$ 6,780
<b>Total</b>	<b>69</b>	<b>34</b>	<b>278</b>	<b>84</b>	<b>20</b>						<b>485</b>	<b>\$ 93,425</b>	<b>\$ 1,000</b>	<b>\$ 7,275</b>	<b>\$ 101,700</b>

Agenda Item No.: 5.3  
 Agenda Date: 08/07/24  
 Reviewed By: 

**Subject:** Authorize Consultant Agreement #24-60-21 with Carollo Engineers Inc., for professional surveying and engineering services relating the District’s Hydraulic Model Upgrade

CATEGORY	
<i>Executive</i>	<input type="checkbox"/>
<i>Administrative</i>	<input type="checkbox"/>
<i>Engineering/Operations</i>	<input checked="" type="checkbox"/>

FINANCIAL						
<i>Expenditures?</i>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Budgeted?</i>	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Amount:</i>						\$ <u>101,700.00</u>

**ATTACHMENTS:**

1. Resolution 24-8-7C

**COMMENTS:**

The District’s hydraulic modeling software H2O Net has been replaced by Infowater Pro by the software vendor. The hydraulic model is a critical tool in preparation of a Water System plan, and the District is required to complete a Water System plan by 2026 and conversion of the hydraulic model to Infowater Pro requires specialized experience.

Carollo Engineers, Inc. completed the previous hydraulic model conversion and calibration and has intimate knowledge of the current District model. The District evaluated Statements of Qualifications of three (3) engineering consultants from the MRSC roster and selected Carollo Engineers in accordance with the District’s Procurement Manual.

The District’s Engineering & Operations Manager and General Manager have reviewed the scope of work and budget submitted by Carollo Engineers, Inc. and recommend approval of this resolution.