

STANDARD AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT made between the City of Aurora, a home rule Illinois municipal corporation, whose address is 44 E. Downer Place, Aurora, Illinois 60507 hereinafter called the **CLIENT** and Crawford, Murphy & Tilly, Inc., Consulting Engineers, 2750 West Washington Street, Springfield, Illinois 62702, hereinafter called the **ENGINEER**.

WITNESSETH, that whereas the **CLIENT** desires the following described professional engineering, land surveying or architectural services:

Continuation of a planned and organized system-wide watermain flushing program through the implementation of watermain flushing operations for a portion of the City of Aurora - four sub areas of Area 6 (Zone 6D, 6E, 6F and 6G), and four sub areas of Area 1 (Zone 1A, 1B, 1C and 1D) based on flushing sequences developed previously.

The engineering services for the implementation of watermain flushing operations for Zones 6D, 6E, 6F and 6G of Area 6, and Zones 1A, 1B, 1C and 1D of Area 1 is described in the attached Exhibit A – Scope of Services. The limits of the above-mentioned flushing areas are shown in the attached Exhibit B. The four sub areas of Area 6 and four sub areas of Area 1 are shown in the attached Exhibit B-1.

NOW THEREFORE, the **ENGINEER** agrees to provide the above described services and the **CLIENT** agrees to compensate the **ENGINEER** for these services in the manner checked below:

On a time and expense basis in accordance with the attached Exhibit C - Schedule of Hourly Charges which is subject to change at the beginning of each calendar year. Reimbursable direct expenses will be invoiced at cost. Professional or Subconsultant services performed by another firm will be invoiced at cost plus ten percent. Note that no Professional or Subconsultant services are anticipated to be furnished to the **ENGINEER** by another firm on this project.

At the lump sum amount of \$ ____.

IT IS MUTUALLY AGREED THAT, payment for services rendered shall be made monthly in accordance with invoices rendered by the **ENGINEER**.

IT IS FURTHER MUTUALLY AGREED:

That the compensation for engineering services for the implementation of watermain flushing operations for Zones 6D, 6E, 6F & 6G of Area 6, and Zones 1A, 1B, 1C & 1D of Area 1 shall not exceed \$131,500, per the attached Exhibit D, D-1, and D-2 without further authorization from the **CLIENT**.

The **CLIENT** and the **ENGINEER** each binds himself, his partners, successors, executors, administrators and assignees to each other party hereto in respect to all the covenants and agreements herein and, except as above, neither the **CLIENT** nor the **ENGINEER** shall assign, sublet or transfer any part of his interest in this **AGREEMENT** without the written consent of the other party hereto. This **AGREEMENT**, and its construction, validity and performance, shall be governed and construed in accordance with the laws of the State of Illinois. This **AGREEMENT** is subject to the General Conditions attached hereto.

IN WITNESS WHEREOF, the parties hereto have affixed their hands and seals this ____ day of ____, 2023.

CLIENT:

CITY OF AURORA

(Client Name)

(Signature)

(Name and Title)

ENGINEER:

CRAWFORD, MURPHY & TILLY, INC.

(Signature)

Chris Dagiantis, Water Resources – Group Manager

(Name and Title)

CMT Job No. _____

STANDARD GENERAL CONDITIONS
Crawford, Murphy & Tilly, Inc.

1. Standard of Care

In performing its professional services hereunder, the **ENGINEER** will use that degree of care and skill ordinarily exercised, under similar circumstances, by members of its profession practicing in the same or similar locality. No other warranty, express or implied, is made or intended by the **ENGINEER'S** undertaking herein or its performance of services hereunder.

2. Reuse of Document

All Reports, Drawings, Specifications, other documents, and electronic media prepared or furnished by **ENGINEER** pursuant to this Agreement are instruments of service in respect to the Project and shall be the property of the **CLIENT**. **ENGINEER** shall retain the right of reuse of said documents and electronic media by and at the discretion of the **ENGINEER** whether or not the Project is completed. Reproducible copies of **ENGINEER'S** documents and electronic media of the Project and **ENGINEER'S** documents shall be delivered to the **CLIENT**; however, Project and **ENGINEER'S** documents and electronic media are not intended or represented to be suitable for reuse by the **CLIENT** or others on additions or extensions of the Project, or on any other project.

3. Termination

This Agreement may be terminated by either party upon seven days prior written notice. In the event of termination, the **ENGINEER** shall be compensated by the client for all services performed up to and including the termination date, including reimbursable expenses.

4. Parties to the Agreement

The services to be performed by the **ENGINEER** under this Agreement are intended solely for the benefit of the **CLIENT**. Nothing contained herein shall confer any rights upon or create any duties on the part of the **ENGINEER** toward any person or persons not a party to this Agreement including, but not limited to any contractor, subcontractor, supplier, or the agents, officers, employees, insurers, or sureties of any of them.

5. Construction and Safety

This project will be completed with **CLIENT** staff working alongside **ENGINEER** staff. The **ENGINEER** shall be responsible for the safety of their own personnel working on the job site. The **CLIENT** shall be responsible for the safety of their own personnel working on the job site.

6. Payment

CLIENT shall be invoiced once each month for work performed during the preceding period. **CLIENT** agrees to approve and pay such invoices in the manner provided by the Local Government Prompt Payment Act, 50 ILCS 505/1 et. seq. **CLIENT** further agrees to pay interest on all amounts approved and not paid at the interest rate permitted under the Local Government Prompt Payment Act.

7. Insurance

ENGINEER shall indemnify and save harmless **CITY**, its officers and employees, from suits, actions or claims of any character brought because of any injuries or damages received or sustained by any person, persons, or property resulting from any negligent act, error or omission on the part of **ENGINEER**.

During the term of this AGREEMENT, **ENGINEER** shall provide the following types of insurance with no less than the following specified amounts.

- a. Comprehensive general liability – combined single limit amount of \$1,000,000 per incident, \$2,000,000 general aggregate limit.
- b. Auto Liability – combined single limit amount of \$1,000,000 per incident on any vehicle driven by an R.I. while engaged in any activity within the scope of this AGREEMENT.
- c. Professional Liability - \$5,000,000;
- d. Worker's Compensation – Statutory Limit; the policy shall include a "Waiver of Subrogation" clause;
- e. "Umbrella Coverage" - \$5,000,000.

ENGINEER shall furnish to **CITY** satisfactory proof of coverage of the above insurance requirements by a reliable company or companies, before commencing any work. Such proof shall consist of a current certificate executed by the insurance company(s) and shall be filed with **CITY**. Said certificate shall name the city of Aurora as additional, non-contributory insured and contain a clause which requires that no change shall be made to the coverage and there shall be no cancellation or lapse of such coverage unless **CITY** receives written notification from the insurance company providing coverage at least thirty (30)-days in advance of said cancellation or change in coverage.

CITY OF AURORA 2023 FLUSHING PROGRAM – ZONES 6D, 6E, 6F & 6G OF AREA 6, AND ZONES 1A, 1B, 1C & 1D OF AREA 1 FLUSHING

EXHIBIT A - SCOPE OF SERVICES

February 23, 2023

Background

In 2012, the city of Aurora embarked upon the development of a planned and organized system-wide multi-year watermain flushing program as part of routine water distribution system maintenance. Flushing distribution system watermains is considered a standard and recommended practice by the American Water Works Association (AWWA).

Watermain flushing can be performed either by means of conventional flushing or unidirectional flushing. In order to effectively flush the watermain, a target velocity of 5 feet per second is desired. Conventional flushing which consists of sequentially opening fire hydrants can sometimes achieve the target velocities. In locations where the target velocity cannot be achieved, unidirectional flushing is required. Unidirectional flushing is a systematic method of closing watermain valves and opening hydrants to direct water one-way at high velocities through targeted segments of pipe. Unidirectional flushing induces high water velocities which effectively removes deposits and cleans the pipe. The benefits of flushing include removal of rust and sediment, improved chlorine residual, and reduction in taste and odor; all of which can help provide high quality water to city of Aurora residents.

The city's water distribution system consists of over 740 miles of pipe. The extents of the flushing areas for the entire water distribution system have been determined as shown in Exhibit B. Flushing areas have been determined based on: dividing the city into 6 areas with similar total lengths of watermain; the location of water transmission main endpoints (locations that potable water from the Water Treatment Plant enters the distribution system) and a summary of water quality issue locations for ten years previous to 2012.

The watermain flushing program began in 2012 with the design of Area 1 flushing sequences. In 2013, Area 1 was flushed and the design of the flushing sequences for Area 2 was completed. In 2014, Area 2 was flushed and the design of flushing sequences for Areas 3 and 4 were completed. In 2015, remainder of Area 3 and Area 4 were flushed and the design of flushing sequences for Areas 5 and 6 was completed. In 2016, Areas 5 & 6 were flushed. In addition, the hydraulic analysis and design of flushing sequences were updated for Areas 1 through 6 to incorporate field changes, modifications to the flushing program parameters learned through the previous 4 years of field work, and new watermains constructed or replaced since the program began. With the completion of flushing in Areas 5 & 6, flushing of the entire water distribution system was completed.

In the summer of 2017, the City embarked upon its second round of watermain flushing, beginning with Area 1. In the summer of 2018, the City embarked upon the second round of watermain flushing for Area 2 and three subareas of Area 3 namely, Zones 3C, 3D and 3F. In the summer of 2019, the City embarked upon the second round of watermain flushing for Area 3 and three subareas of Area 4 namely, Zones 4A, 4B and 4C. No watermain flushing was performed in 2020. In the summer of 2021, the City embarked upon the second round of watermain flushing for the remaining three subareas of Area 4 (namely Zones 4C, 4D and

4F), and three subareas of Area 5 (namely Zone 5A, 5B and 5C). In the summer of 2022, the City embarked on its second round of flushing for the remaining four subareas of Area 5 (namely Zones 5D, 5E, 5F and 5G) and three subareas of Area 6 (namely Zones 6A, 6B and 6C). This summer, the City will embark on its second round of flushing for the remaining four subareas of Area 6 (namely Zones 6D, 6E, 6F and 6G) and four subareas of Area 1 (namely Zones 1A, 1B, 1C and 1D).

Project Tasks

Project tasks for the flushing of four subareas of Area 6, (namely 6D, 6E, 6F and 6G), and four subareas of Area 1 (namely 1A, 1B, 1C and 1D) will include the following:

1. Project Start-up

At the start of the flushing portion of the project, a kick-off meeting will be held with City staff to coordinate the field effort. The kick-off meeting will be attended by CMT team members so that flushing protocol/procedures can be reviewed by everyone at the same time. Project start-up activities will include update of the hydraulic model and development of flushing sequences for new and/or replaced watermain in the areas proposed to be flushed, the compilation of contact information for critical facilities, development of a flushing schedule, and the generation of checklists for field use.

It is anticipated that the City will provide equipment required for the flushing including diffusers, hydrant wrenches, valve keys, hydrant flow meter, pressure gauges, hoses, signs, lab kits and traffic control. The equipment to be used will be coordinated at the kick-off meeting.

It is anticipated that the City will prepare public notification information through social media and customer service. The content for the public notification information will be provided by CMT for publishing by the City.

Prior to unidirectional flushing in each area, it is anticipated the City will locate each valve to be operated as part of the unidirectional flushing sequence using a GPS locator. The valve locations and numbers will be provided by the City as GIS data for use on CMT's mobile devices.

2. Unidirectional Flushing

Within each subarea, there are sections of watermain noted for conventional flushing and sections noted for unidirectional flushing. The unidirectional flushing will be performed first in each subarea.

The unidirectional flushing will be performed with a crew of 6 people (2 valve operating crews each with 2 people, 1 person on the flushing hydrant, and 1 covering the residual pressure monitoring hydrant). Of the 6 unidirectional flushing crew members, it has been assumed that the flushing operations will be headed by one (1) CMT engineer with at least 2 years of flushing experience and assisted by an entry level engineer for 50% of unidirectional flushing crew hours. The remaining 5 positions, including 1 intern, 2 summer help and 2 full time staff would be provided by the City's Water & Sewer maintenance division.

Based on production rates achieved with unidirectional flushing completed in previous seven years, it has been assumed that 7,500 ft. of watermain can be unidirectionally flushed each day. The production rates for the unidirectional flushing will be evaluated periodically throughout the project.

3. *Conventional Flushing*

After the unidirectional flushing is completed in each subarea, conventional flushing will be performed with a reduced crew size of 4 members. Conventional flushing will be performed with crew members from the unidirectional flushing crew broken down into three crews – one with 1 CMT entry level engineer and one W&S intern and two other crews each with 1 W&S summer help.

It is anticipated that the two 1-person crews will be flushing in a separate area from the 2-person crew (1 CMT + 1 City member), so all three crews can be operating hydrants without adversely impacting the system.

It has been assumed that a 2-person crew will be able to conventionally flush 21 hydrants per day and a 1-person crew will be able to conventionally flush 15 hydrants per day resulting in 30 hydrants per day for the two 1-person crews. The production rates for the conventional flushing will be evaluated periodically throughout the project.

4. *Engineering Support*

As unidirectional and conventional flushing proceeds in the field, CMT will provide support as needed in the field to address field issues including closed valves, drainage problems, low pressure or inadequate flow. In addition, CMT will provide daily updates to the city for updating the flushing hotline. CMT will also provide updates to the City on a timely basis for updating the flushing schedule on the website. CMT will plan operations 1 - 3 days in advance to allow for time to contact critical facilities and to move signs for each zone (or subarea) and plan personnel/equipment for traffic control.

5. *ISO Fire Flow Testing*

As flushing proceeds in the field, CMT will provide support as needed in the field to perform flow testing as part of the ISO requirements. CMT will plan on performing 1-2 flow tests in each sub area identified to be flushed this summer.

6. *Coordination Meetings*

It has been assumed that coordination meetings (no more than once per month) will be required throughout the project.

7. *Miscellaneous Effort*

Update Flushing Sequences:

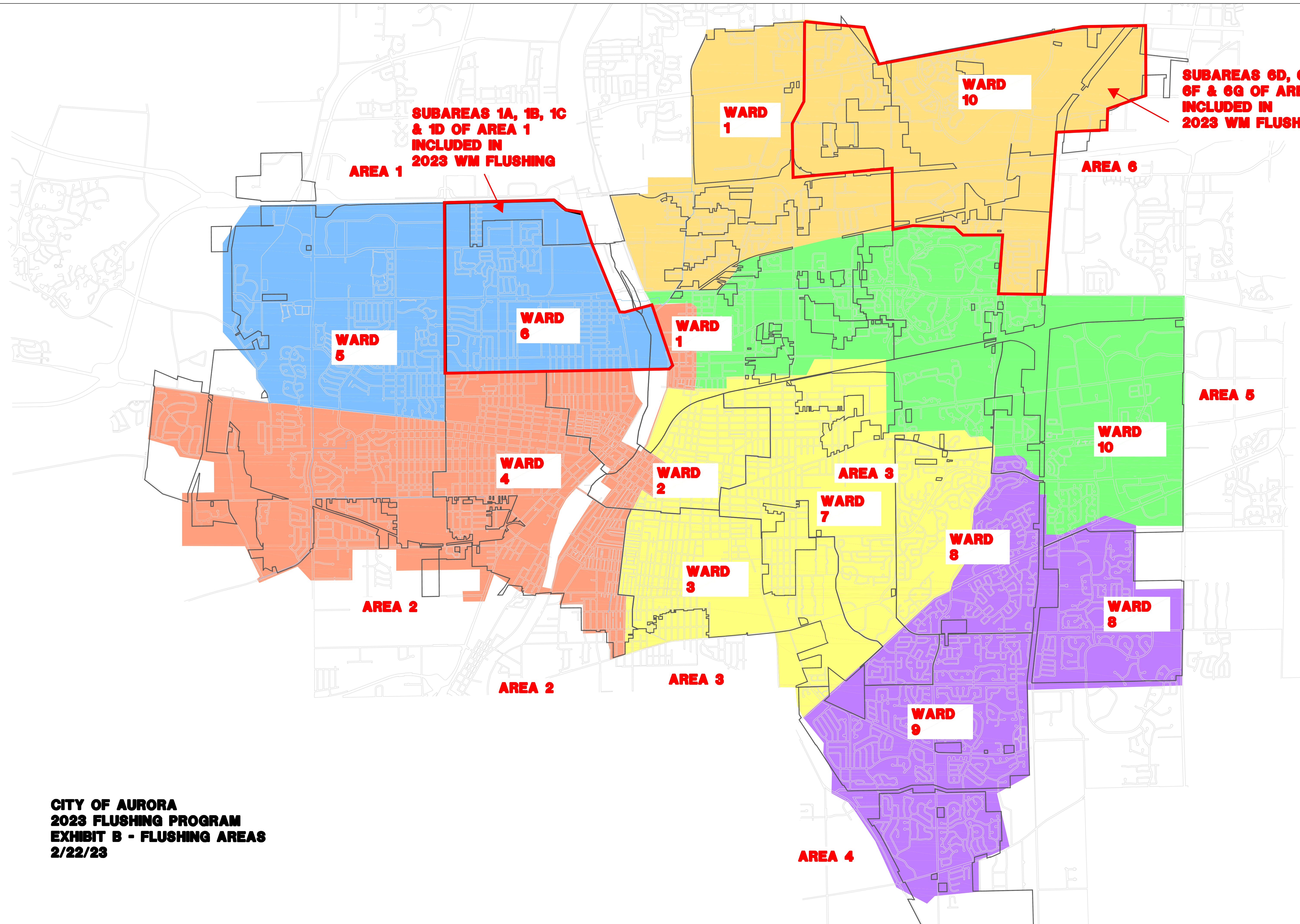
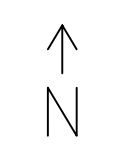
The City shall provide CMT with the engineering plans for the new water main replacements in Zones 6D, 6E, 6F & 6G of Area 6; and Zones 1A, 1B, 1C, 1D of Area 1. CMT will update the Unidirectional flushing and Conventional flushing sequences accordingly and check the design criteria for planned flushing sequences.

GIS Assistance:

CMT will provide training and assistance as and when needed for the collection of field data.

8. *Schedule*

Flushing is planned to begin on May 22, 2023 and will continue through mid-August, resulting in approximately 55 working days taking into account holidays and a couple of rain/heat days.

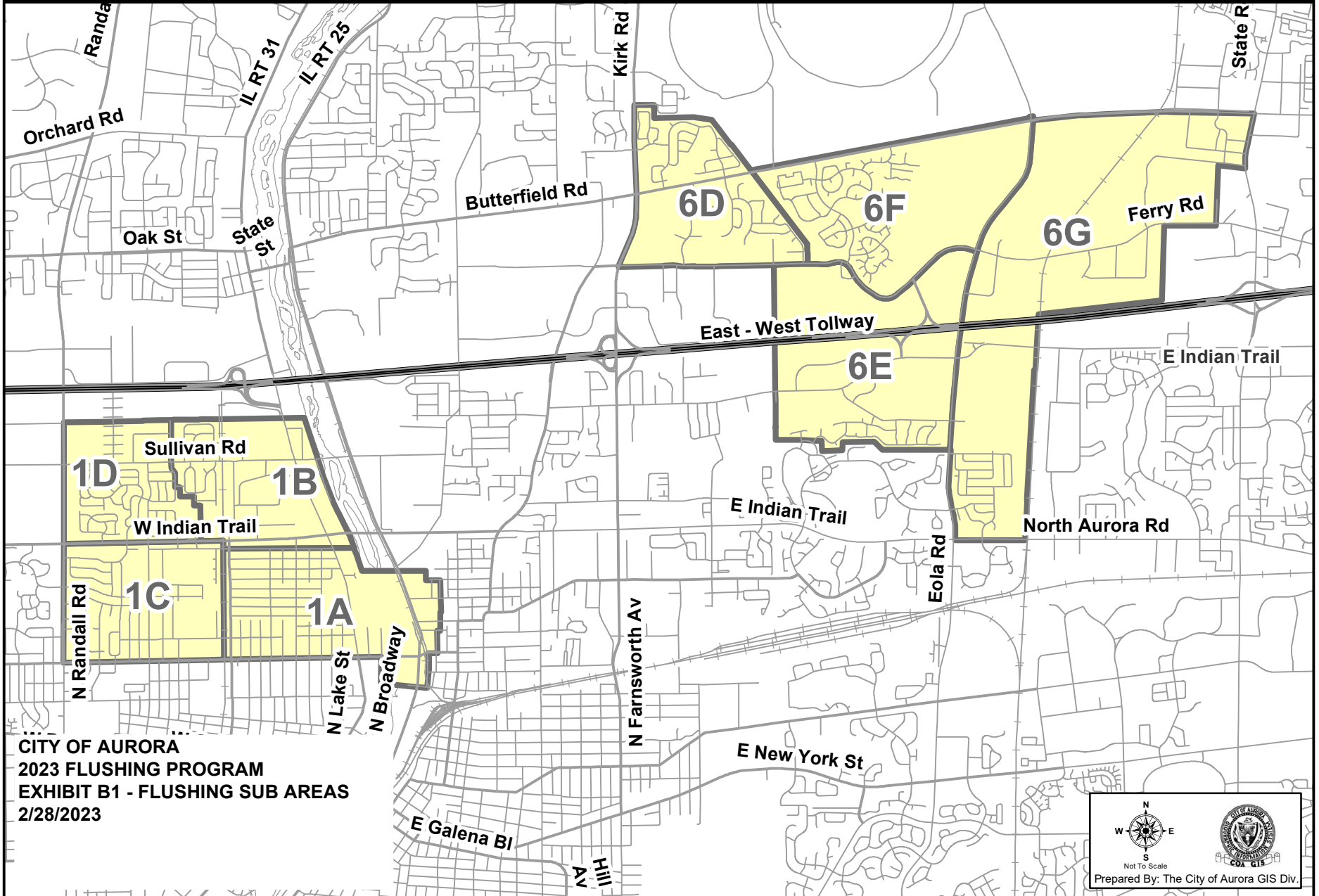


**SUBAREAS 1A, 1B, 1C
& 1D OF AREA 1
INCLUDED IN
2023 WM FLUSHING**

**SUBAREAS 6D, 6E,
6F & 6G OF AREA 6
INCLUDED IN
2023 WM FLUSHING**

**CITY OF AURORA
2023 FLUSHING PROGRAM
EXHIBIT B - FLUSHING AREAS
2/22/23**

2023 WATERMAIN FLUSHING PROGRAM SUB AREA



CITY OF AURORA
2023 FLUSHING PROGRAM
EXHIBIT B1 - FLUSHING SUB AREAS
2/28/2023

Not To Scale
Prepared By: The City of Aurora GIS Div.

**EXHIBIT C
CITY OF AURORA
RESIDENT INSPECTION AND ENGINEERING SERVICES**

CLASS NO.	CLASSIFICATION	2022 AVG DIRECT LABOR RATE	ESTIMATE 2023 AVG DIRECT LABOR RATE (2022 Rate x 7.0%)	BILLING RATE Dir Labor x 2.99 Multiplier)
10	Principal (IDOT Cap is \$78)	78.00	78.00	233.22
20	Project Engineer II	72.91	78.01	233.26
30	Project Engineer I (Traffic Engineer)	64.41	68.92	206.07
36	Project Structural Engineer I	58.44	62.53	186.97
40	Sr. Engineer I	43.10	46.12	137.89
42	Technical Manager II	62.31	66.67	199.35
44	GIS Specialist	38.31	40.99	122.57
47	Sr. Structural Engineer I	46.85	50.13	149.89
50	Engineer I	33.64	35.99	107.62
56	Structural Engineer I	34.79	37.23	111.30
60	Planner I	33.92	36.29	108.52
65	Technical Manager I	31.33	33.52	100.23
70	Land Surveyor	41.86	44.79	133.92
80	Sr. Technician I	42.60	45.58	136.29
81	Sr. Technician II	52.04	55.68	166.49
90	Technician II	39.90	42.69	127.65
100	Technician I	27.69	29.63	88.59
110	Administrative/Accounting Assistant	26.25	28.09	83.98

Computation of Billing Rate Multiplier:

Direct labor factor	1.0000
Audited overhead rate	1.7226
Subtotal	2.7226
Profit factor	1.10
Total	2.99

Overhead and rate calculation is based on AASHTO guidelines for all US DOT's nationwide.

CITY OF AURORA

2023 WATERMAIN FLUSHING PROGRAM - Subareas 6D, 6E, 6F & 6G of Area 6, and Subareas 1A, 1B, 1C & 1D of Area 1 Flushing

Exhibit D - Professional Services Cost Estimate Summary

20-Mar-23

Exhibit	Description	Manhours	Amount
D-1	Zone 6D + Zone6E + Zone 6F + Zone 6G + Zone 1A + Zone 1B + Zone 1C + Zone 1D - Flushing Costs	913	\$131,500

CITY OF AURORA

2023 Watermain Flushing Program - Subareas 6D, 6E, 6F, 6G of Area 6 and Subareas 1A, 1B, 1C, 1D of Area 1 Flushing

Exhibit D-1 - Professional Services Cost Estimate
20-Mar-23

Assumptions:

Unidirectional Flushing - Assume 6 total with 1 CMT crew leader and 5 City crew members
Conventional Flushing - Assume reduced crew with 1 CMT crew leader and 3 City crew members
Technical Assistance - Assume CMT to provide daily office technical assistance

Conventional Flushing Crew:

-->assume reduced crew, one 2-person crew (1 CMT leader and 1 City member) and two 1-person crew, for conventional flushing

Crew Size (1 CMT + 1 City)	1	
Engineer (\$/hr.)	\$137.89	
2023 Crew Cost (\$/hour)	\$137.89	
Number of Hydrants per day	21	Based on a 2 person crew flushing between 20 - 25 hydrants per day in 2015 Watermain Flushing Program
City Crew Size (2 City crews with 1 person each)	2	
Number of Hydrants per day	30	Based on a 1 person crew flushing 15 hydrants per day

Unidirectional Flushing:

CMT Crew Size	1	
Engineer (\$/hr.)	\$137.89	
2023 Crew Cost (\$/hour)	\$137.89	
Approximate feet per day	7,500	Based on average of 7,500 feet/day of UDF Flushing with a 6 member crew.
Assume operating a maximum of 30 valves per day (add crew days as necessary above footage calculation)		

Flushing Technical Assistance

2023 Senior Engineer (\$/hour)	\$137.89
2023 GIS Specialist (\$/hour)	\$122.57
2023 Engineer	\$107.62

Technical Assistance - assume 1 hours per day
Field Paperwork - assume 5 hours per week
Coordination Meetings - assume 2.5 hours per week
Project Management Time - 1.5 hours per week (2023 Hourly Rate = \$233.26/hr)

	6D	6E	6F	6G	1A	1B	1C	1D	TOTAL
Conventional Flushing									
Length of watermain (feet)	34,605	29,473	43,426	43,669	74,535	12,842	55,713	26,600	320,863
Length of watermain (miles)	6.55	5.58	8.22	8.27	14.12	2.43	10.55	5.04	61

--> Conventional Flushing (2 person crew with 1 CMT Engineer and 1 City crew member)

# of Hydrants	41	59	55	26	40	10	75	40	306
Estimated flushing time (crew hours)	16	23	21	10	16	4	29	16	119
Estimated flushing time (crew days)*	2.5	3.5	3.0	2.0	2.5	1.0	4.0	2.5	21.0
Estimated CMT Crew Labor Cost	\$2,757.80	\$3,860.92	\$3,309.36	\$2,206.24	\$2,757.80	\$1,103.12	\$4,412.48	\$2,757.80	\$23,165.52

-->Conventional Flushing (2 person City crew)

# of Hydrants	60	84	80	41	57	15	106	60	443
Estimated flushing time (crew hours)	16	23	22	11	16	4	29	16	121
Estimated flushing time (crew days)*	2.5	3.5	3.0	2.0	2.5	1.0	4.0	2.5	21.0
Estimated CMT Crew Labor Cost	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Unidirectional Flushing (1 CMT person crew)

Length of watermain (feet)	30,568	19,779	19,407	36,959	30,656	27,046	12,587	15,643	192,645
Length of watermain (miles)	5.79	3.75	3.68	7.00	5.81	5.12	2.38	2.96	36
Number of Sequences	13	8	7	15	21	23	6	10	103
Number of Valves to Operate	55	31	40	49	131	58	59	32	455
Average Length of Watermain per Sequence (feet)	2,351	2,472	2,772	2,464	1,460	1,176	2,098	1,564	1,870
Average # of Valves per Sequence	4	4	6	3	6	3	10	3	39
# of valves per mile of watermain	10	8	11	7	23	11	25	11	105
Estimated flushing time (crew hours)	33	22	21	40	33	29	14	17	209
Estimated flushing time (crew days)*	4.5	4.0	3.0	5.5	4.5	4.0	2.0	2.5	30.0
Estimated CMT Crew Labor Cost (Senior Engineer)	\$4,964.04	\$4,412.48	\$3,309.36	\$6,067.16	\$4,964.04	\$4,412.48	\$2,206.24	\$2,757.80	\$33,093.60

Subtotal Estimated flushing time (crew days)*	7.0	7.5	6.0	7.5	7.0	5.0	6.0	5.0	51.0
Subtotal Estimated flushing time (crew hours)	56	60	48	60	56	40	48	40	408

ISO/Fire Flow Testing

Estimated flow testing time (crew days)*	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.0
Estimated CMT Crew Labor Cost	\$551.56	\$551.56	\$551.56	\$551.56	\$551.56	\$551.56	\$551.56	\$551.56	\$4,412.48
Total Estimated flushing and flow testing time (crew days)*	7.5	8.0	6.5	8.0	7.5	5.5	6.5	5.5	55.0

Office/Engineering Support

Technical Assistance time (hours)	7	8	6	8	7	5	6	5	51
Estimated Labor Cost	\$965.23	\$1,034.18	\$827.34	\$1,034.18	\$965.23	\$689.45	\$827.34	\$689.45	\$7,032.39
Engineer (50% of CMT crew hours for UDF)	18	16	12	22	18	16	8	10	120
Estimated CMT Crew Labor Cost (50% of CMT crew hours for UDF)	\$1,937.16	\$1,721.92	\$1,291.44	\$2,367.64	\$1,937.16	\$1,721.92	\$860.96	\$1,076.20	\$12,914.40

Total

Length of watermain (feet)									513,508
Length of watermain (miles)									97

Miscellaneous Effort

Update flushing maps (hours)									40
Update flushing maps (cost)									\$5,515.60
Facility Contact List (hours)									32
Facility Contact List (cost)									\$4,412.48
Project Start-up/Close-Out (hours)									100
Project Start-up/Close-Out Costs									\$18,557.50
GIS Assistance (hours)									20
GIS Assistance Costs									\$2,451.40
Field Paperwork (hours)									60.0
Field Paperwork Cost									\$8,273.40
Coordination Meetings (hours)									30.0
Coordination Meetings Cost									\$6,997.80
Project Management (hours)									20.0
Project Management Cost									\$4,665.20

Total Labor Hours for CMT	85	88	70	94	85	65	66	59	913
Total Cost	\$11,175.79	\$11,581.06	\$9,289.06	\$12,226.78	\$11,175.79	\$8,478.53	\$8,858.58	\$7,832.81	\$131,491.77

*rounded up to \$131,500

*Rounded up to nearest half day (this accounts for time to move signs).

CITY OF AURORA

2023 Watermain Flushing Program - Zones 6D, 6E, 6F & 6G of Area 6, and Zones 1A, 1B, 1C & 1D of Area 1

Exhibit D-2 - Summary of Unidirectional and Conventional Flushing Statistics

22-Feb-23

	6D	6E	6F	6G	1A	1B	1C	1D	TOTAL
Conventional Flushing									
# of Hydrants	101	143	135	67	97	25	181	100	849
Length of watermain (feet)	34,605	29,473	43,426	43,669	74,535	12,842	55,713	26,600	320,863
Length of watermain (miles)	6.55	5.58	8.22	8.27	14.12	2.43	10.55	5.04	61
Unidirectional Flushing									
Length of watermain (feet)	30,568	19,779	19,407	36,959	30,656	27,046	12,587	15,643	192,645
Length of watermain (miles)	5.79	3.75	3.68	7.00	5.81	5.12	2.38	2.96	36
Number of Sequences	13	8	7	15	21	23	6	10	103
Number of Valves to Operate	55	31	40	49	131	58	59	32	455
TOTAL									
Length of watermain (feet)	65,173	49,252	62,833	80,628	105,191	39,888	68,300	42,243	513,508
Length of watermain (miles)	12.34	9.33	11.90	15.27	19.92	7.55	12.94	8.00	97