STANDARD AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT made between the City of Aurora, 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 - three sub areas of Area 3 (Zone 3A, 3B and 3E), Area 4 and one subarea of Area 5 (Zone 5A) based on flushing sequences developed previously.

The engineering services for the implementation of watermain flushing operations for Zones 3A, 3B and 3E of Area 3, Area 4 and Zone 5A of Area 5 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.

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 services for the implementation of watermain flushing operations for Zones 3A, 3B & 3E of Area 3, Area 4 and Zone 5A of Area 5 shall not exceed $229,800 per the attached Exhibits D, D-1, and D-2 without further authorization from the CLIENT.

Once the 2019 Watermain Flushing Program has been established and the City staff members are able to work independently, the City has indicated the desire for the City staff members to continue with the flushing program and complete the extents scoped for 2019, without CMT assistance. The City shall communicate their intention of continuing or discontinuing the engineering services provided by CMT at any time during the project, but no earlier than the 3rd week of flushing. The City shall provide at least 30 days' notice if discontinuing the engineering services provided by CMT.

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 _____, 2019.

CLIENT:

CITY OF AURORA
(Client Name)

_____
(Signature)

_____
(Name and Title)

CMT Job No. _____

ENGINEER:

CRAWFORD, MURPHY & TILLY, INC.

Kevin D. Nelson
(Signature)

Kevin Nelson, Vice-President
(Name and Title)

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. Risk Allocation

Inherent to the completion of this project, ENGINEER staff will be required to operate CLIENT owned valves and fire hydrants. ENGINEER staff will be provided training by CLIENT staff at the beginning of the project on the proper operation of valves and fire hydrants. Subject to the condition of the existing valves and fire hydrants, such proper operation of the existing valves and fire hydrants may result in damage and consequential damages for which the ENGINEER cannot be held responsible.

CITY OF AURORA
2019 FLUSHING PROGRAM –
ZONES 3A, 3B & 3E OF AREA 3, AREA 4 AND ZONE 5A OF AREA 5 FLUSHING

EXHIBIT A - SCOPE OF SERVICES
March 4, 2019

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. This year the City will embark on its second round of watermain flushing for the remaining three subareas of Area 3 (namely Zones 3A, 3B and 3E), Area 4 and one subarea of Area 5 (namely Zone 5A).

Project Tasks

Project tasks for the flushing of three subareas of Area 3, (namely 3A, 3B and 3E), Area 4 and one subarea of Area 5 (namely Zone 5A) 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 including a brochure that would be mailed to residents in Zones 3A, 3B & 3E of Area 3; Area 4 and Zone 5A of Area 5 as well as setting up a website. The content for the public notification information will be provided by CMT for publishing and delivery 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 entry level engineer with at least 2 years of flushing experience. The remaining 5 positions would be provided by the City' Water & Sewer maintenance division.

   Based on production rates achieved with unidirectional flushing completed in previous six 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 maintenance worker and two other crews each with only one W&S maintenance worker.

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. *Office Engineering*

   As unidirectional and conventional flushing proceeds in the field, CMT will provide office support (as needed) 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).

5. *Coordination Meetings*

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

6. *Miscellaneous Effort*

   Update Flushing Sequences:

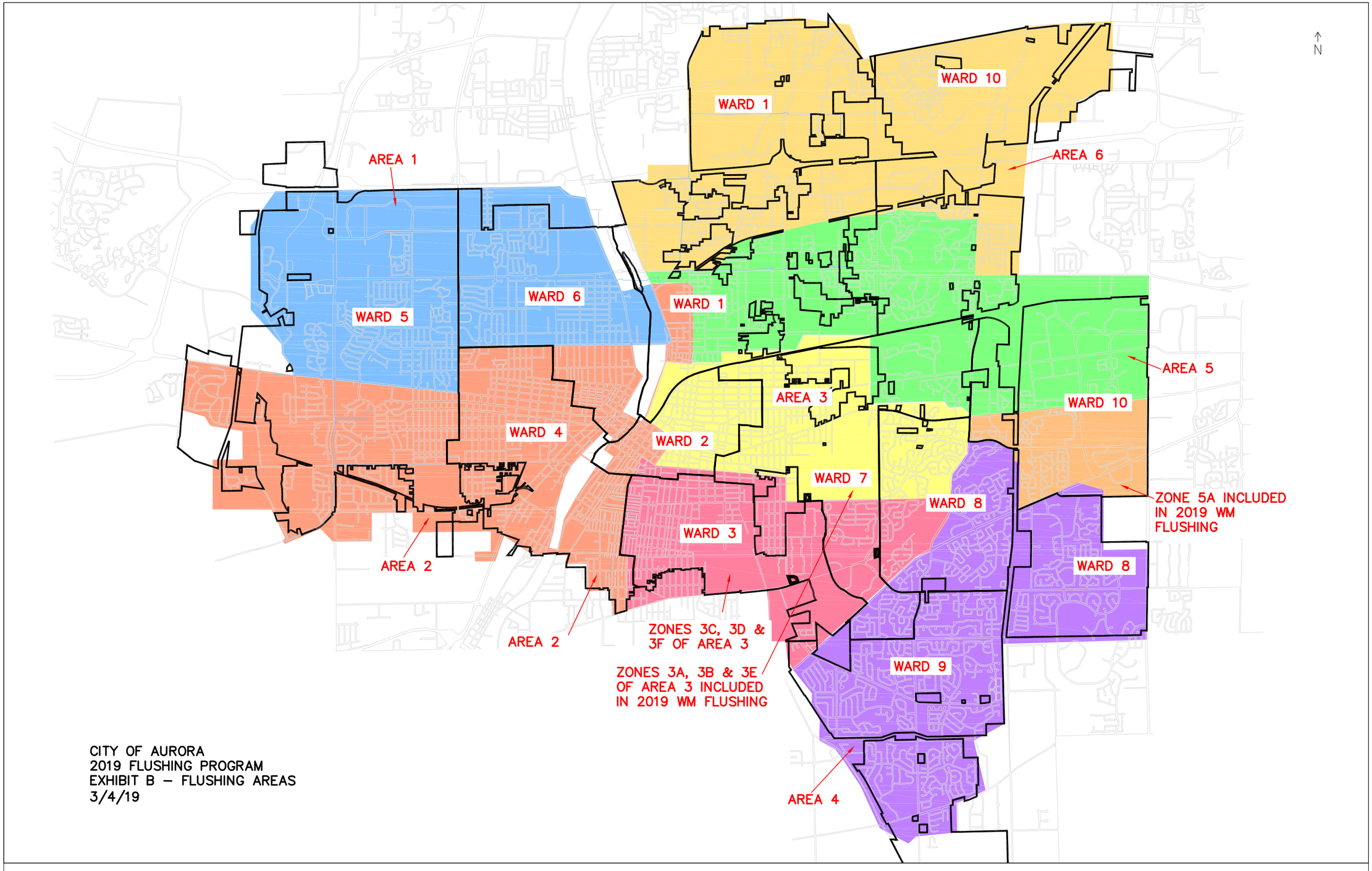
   It is anticipated that the City will provide CMT with the engineering plans for the new water main replacements in Zones 3A, 3B & 3E of Area 3; Area 4 and one subarea of Area 5 namely Zone 5A. CMT will update the Unidirectional flushing and Conventional flushing sequences accordingly and check the design criteria for planned flushing sequences.

   GIS Assistance:

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

Schedule

Flushing is planned to begin the second week in May and will continue through the end of September, resulting in approximately 89 working days taking into account holidays and a couple of rain/heat days.



CITY OF AURORA
2019 FLUSHING PROGRAM
EXHIBIT B – FLUSHING AREAS
3/4/19

EXHIBIT C
CITY OF AURORA
RESIDENT INSPECTION AND ENGINEERING SERVICES

CLASS NO.	CLASSIFICATION	2017 AVG DIRECT LABOR RATE	BILLING RATE MULTIPLIER @ 2.90	2018 BILLING RATE *	2019 BILLING RATE **
10	**Principal** (IDOT cap at $70)	$70.00	$203.00	$205.44	$211.39
20	**Senior Project Engineer/Manager**	$64.96	$188.40	$190.66	$196.19
30	**Project Engineer/Manager**	$52.10	$151.09	$152.90	$157.34
40	**Senior Engineer** (licensed professional engineer)	$40.58	$117.67	$119.08	$122.54
41	**Senior Architect**	$38.59	$111.93	$113.27	$116.56
42	**Senior Technical Manager**	$49.74	$144.23	$145.96	$150.19
43	**Senior Planner** (aviation planning, environ.	$36.22	$105.04	$106.30	$109.38
44	**GIS Specialist**	$28.59	$82.91	$83.90	$86.34
50	**Engineer** (graduate engineer)	$30.56	$88.63	$89.69	$92.29
51	**Architect**	$31.39	$91.03	$92.12	$94.79
60	**Planner** (aviation planning, environ.	$24.31	$70.48	$71.33	$73.39
65	**Technical Manager**	$24.42	$70.81	$71.66	$73.74
70	**Registered Land Surveyor**	$44.08	$127.82	$129.35	$133.11
80	**Senior Technician** (exp survey tech, CAD tech,	$35.65	$103.39	$104.63	$107.66
90	**Technician II** (survey instrument man, CAD	$27.75	$80.49	$81.46	$83.82
100	**Technical I** (junior-level rodman, inspector,	$20.85	$60.45	$61.18	$62.95
110	**Clerical/Word Processor**	$23.56	$68.33	$69.15	$71.16

*Using an escalation rate of 1.2% based on the CCI increase from November 2016 to November 2017.

**Using an escalation rate of 2.9% based on the CCI increase from November 2017 to November 2018.

Computation of billing rate multiplier:

Direct labor factor	1.0000
Audited overhead rate	1.641
Subtotal	2.6409
Profit factor	1.10
Total	2.90

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

CITY OF AURORA
2019 WATERMAIN FLUSHING PROGRAM - Zones 3A, 3B & 3E of Area 3, Area 4 and Zone 5A of Area 5 Flushing

Exhibit D - Professional Services Cost Estimate Summary
4-Mar-19

Exhibit	Description	Manhours	Amount
D-1	Zone 3A + Zone 3B + Zone 3E + Area 4 + Zone 5A - Flushing Costs	1,976	$229,800

CITY OF AURORA

2019 Watermain Flushing Program - Area 3A, 3B, 3E , Area 4 and Area 5A Flushing

Exhibit D-1 - Professional Services Cost Estimate

4-Mar-19

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 Assitance - Assume CMT to provide daily office technical asstance

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.)	$92.29	
2019 Crew Cost ($/hour)	$92.29	
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.)	$92.29	
2019 Crew Cost ($/hour)	$92.29	
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

2019 Senior Engineer ($/hour)	$122.54
2019 GIS Specialist ($/hour)	$86.34

Technical Assistance - assume 8 hours per day
Field Paperwork - assume 5 hours per week
Coordination Meetings - assume 4 hours per week
Project Management Time - 5 hours per week (2019 Hourly Rate = $196.19/hour)

	3A	3B	3E	4A	4B	4C	4D	4E	4F	5A	TOTAL
Conventional Flushing											
Length of watermain (feet)	76,134	83,898	62,546	128,320	108,982	67,550	90,021	86,646	54,866	93,869	852,832
Length of watermain (miles)	14.42	15.89	11.85	24.30	20.64	12.79	17.05	16.41	10.39	17.78	162
--> Conventional Flushing (2 person crew with 1 CMT Engineer and 1 City crew member)											
# of Hydrants	40	85	72	145	120	70	94	101	62	115	904
Estimated flushing time (crew hours)	16	33	28	56	46	27	36	39	24	44	349
Estimated flushing time (crew days)*	**2.5**	**4.5**	**3.5**	**7.0**	**6.0**	**3.5**	**5.0**	**5.5**	**3.5**	**6.0**	**47.0**
Estimated Crew Labor Cost	$1,845.80	$3,322.44	$2,584.12	$5,168.24	$4,429.92	$2,584.12	$3,691.60	$4,060.76	$2,584.12	$4,429.92	$34,701.04
-->Conventional Flushing (2 person City crew)											
# of Hydrants	60	127	97	196	176	105	137	147	89	167	1301
Estimated flushing time (crew hours)	16	34	26	53	47	28	37	40	24	45	350
Estimated flushing time (crew days)*	**2.5**	**4.5**	**3.5**	**7.0**	**6.0**	**3.5**	**5.0**	**5.5**	**3.5**	**6.0**	**47.0**
Estimated Crew Labor Cost	$0.00	$0.00	$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)	27,399	25,593	24,151	27,331	38,528	20,367	25,773	23,792	17,100	45,133	275,167
Length of watermain (miles)	5.19	4.85	4.57	5.18	7.30	3.86	4.88	4.51	3.24	8.55	52
Number of Sequences	11	10	6	13	18	7	9	9	9	21	113
Number of Valves to Operate	50	51	55	103	86	50	77	49	41	122	684
Average Length of Watermain per Sequence (feet)	2,491	2,559	4,025	2,102	2,140	2,910	2,864	2,644	1,900	2,149	2,435
Average # of Valves per Sequence	5	5	9	8	5	7	9	5	5	6	63
# of valves per mile of watermain	10	11	12	20	12	13	16	11	13	14	130
Estimated flushing time (crew hours)	30	28	26	30	42	22	28	26	19	49	300
Estimated flushing time (crew days)*	**4.5**	**4.0**	**3.5**	**4.0**	**5.5**	**3.0**	**4.0**	**3.5**	**3.0**	**6.5**	**41.5**
Estimated Crew Labor Cost	$3,322.44	$2,953.28	$2,584.12	$2,953.28	$4,060.76	$2,214.96	$2,953.28	$2,584.12	$2,214.96	$4,799.08	$30,640.28
Office Engineering											
Technical Assistance time (hours)	56	68	56	88	92	52	72	72	52	100	708
Estimated Labor Cost	$6,862.24	$8,332.72	$6,862.24	$10,783.52	$11,273.68	$6,372.08	$8,822.88	$8,822.88	$6,372.08	$12,254.00	$86,758.32
Total											
Length of watermain (feet)											1,127,999
Length of watermain (miles)											214
Miscellaneous Effort											
Update flushing maps (hours)											100
Update flushing maps (cost)											$12,254.00
Facility Contact List (hours)											60
Facility Contact List (cost)											$5,537.40
Project Start-up/Close-Out (hours)											100
Project Start-up/Close-Out Costs											$15,660.00
GIS Assistance (hours)											40
GIS Assistance Costs											$3,453.60
Field Paperwork (hours)											90.0
Field Paperwork Cost											$8,306.10
Coordination Meetings (hours)											80.0
Coordination Meetings Cost											$15,252.80
Project Management (hours)											90.0
Project Management Cost											$17,159.40
Total Labor Hours for CMT	112	136	112	176	184	104	144	144	104	200	1,976
Total Cost	$12,030.48	$14,608.44	$12,030.48	$18,905.04	$19,764.36	$11,171.16	$15,467.76	$15,467.76	$11,171.16	$21,483.00	$229,722.94
											*rounded up to
											$229,800

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

CITY OF AURORA

2019 Watermain Flushing Program - Zones 3A, 3B, & 3E of Area 3, Area 4 and Zone 5A of Area 5

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

4-Mar-19

	3A	3B	3E	4A	4B	4C	4D	4E	4F	5A	TOTAL
Conventional Flushing											
# of Hydrants	100	212	169	341	296	175	231	248	151	282	2,205
Length of watermain (feet)	76,134	83,898	62,546	128,320	108,982	67,550	90,021	86,646	54,866	93,869	852,832
Length of watermain (miles)	14.42	15.89	11.85	24.30	20.64	12.79	17.05	16.41	10.39	17.78	162
Unidirectional Flushing											
Length of watermain (feet)	27,399	25,593	24,151	27,331	38,528	20,367	25,773	23,792	17,100	45,133	275,167
Length of watermain (miles)	5.19	4.85	4.57	5.18	7.30	3.86	4.88	4.51	3.24	8.55	52
Number of Sequences	11	10	6	13	18	7	9	9	9	21	113
Number of Valves to Operate	50	51	55	103	86	50	77	49	41	122	684
TOTAL											
Length of watermain (feet)	103,533	109,491	86,697	155,651	147,510	87,917	115,794	110,438	71,966	139,002	1,127,999
Length of watermain (miles)	19.61	20.74	16.42	29.48	27.94	16.65	21.93	20.92	13.63	26.33	214