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 (Area 1) based on flushing sequences developed previously.

The engineering services for the implementation of watermain flushing operations for Area 1 is described in the attached Exhibit A – Scope of Services. The limits of Areas 1 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 Area 1 shall not exceed $253,200 per the attached Exhibits 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 _____, 2017.

CLIENT:

CITY OF AURORA
(Client Name)

_____
(Signature)

_____
(Name and Title)

CMT Job No. _____

ENGINEER:

CRAWFORD, MURPHY & TILLY, INC.


(Signature)

Bernard D. Held, Senior 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

Payment for services rendered shall be made monthly in accordance with invoices rendered by the **ENGINEER**. If payment is to be on a lump sum basis, monthly payments will be based on the portion of total services completed during the month. Invoices, or any part thereof, which are not paid within 45 days after the date of issue shall bear interest at the rate of 1% for each month or fraction thereof from the date 45 days after issue to time of payment.

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
2017 FLUSHING PROGRAM – AREA 1 FLUSHING

EXHIBIT A - SCOPE OF SERVICES
January 4, 2017

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. With this project, the City will embark on its second round of watermain flushing, beginning with Area 1.

Project Tasks

Project tasks for the flushing of Area 1 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 the proposed flushing crew so that flushing protocol/procedures can be reviewed by everyone at the same time. Project start-up activities will also include the 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, 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 Area 1 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.

2. *Locating and Marking Valves*

   Prior to unidirectional flushing in each area, CMT will find and mark (with painted valve numbers) each valve to be operated as part of the unidirectional flushing sequences.

3. *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 supervisor with 1 of the valve operators also covering the residual pressure monitoring hydrant). Of the 6 unidirectional flushing crew members, it has been assumed that all 6 will be CMT staff members. It has been assumed that 2 of the 6 crew members provided by CMT will be entry level engineers, one with at least 2 years of flushing experience. The remaining 4 positions would be either technical assistants or summer intern positions.

   Based on production rates achieved with unidirectional flushing completed in previous four 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.

4. *Conventional Flushing*

   After the unidirectional flushing is completed in each subarea, conventional flushing will be performed. Conventional flushing will be performed with crew members from the unidirectional flushing crew broken down into two crews – one with 2 CMT crew members and one with 4 CMT crew members.

It is anticipated that the 2 person crew will be flushing in a separate area from the 4 person crew, so both 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 4 person crew will be able to conventionally flush 42 hydrants per day. The production rates for the conventional flushing will be evaluated periodically throughout the project.

5. *Office Engineering*

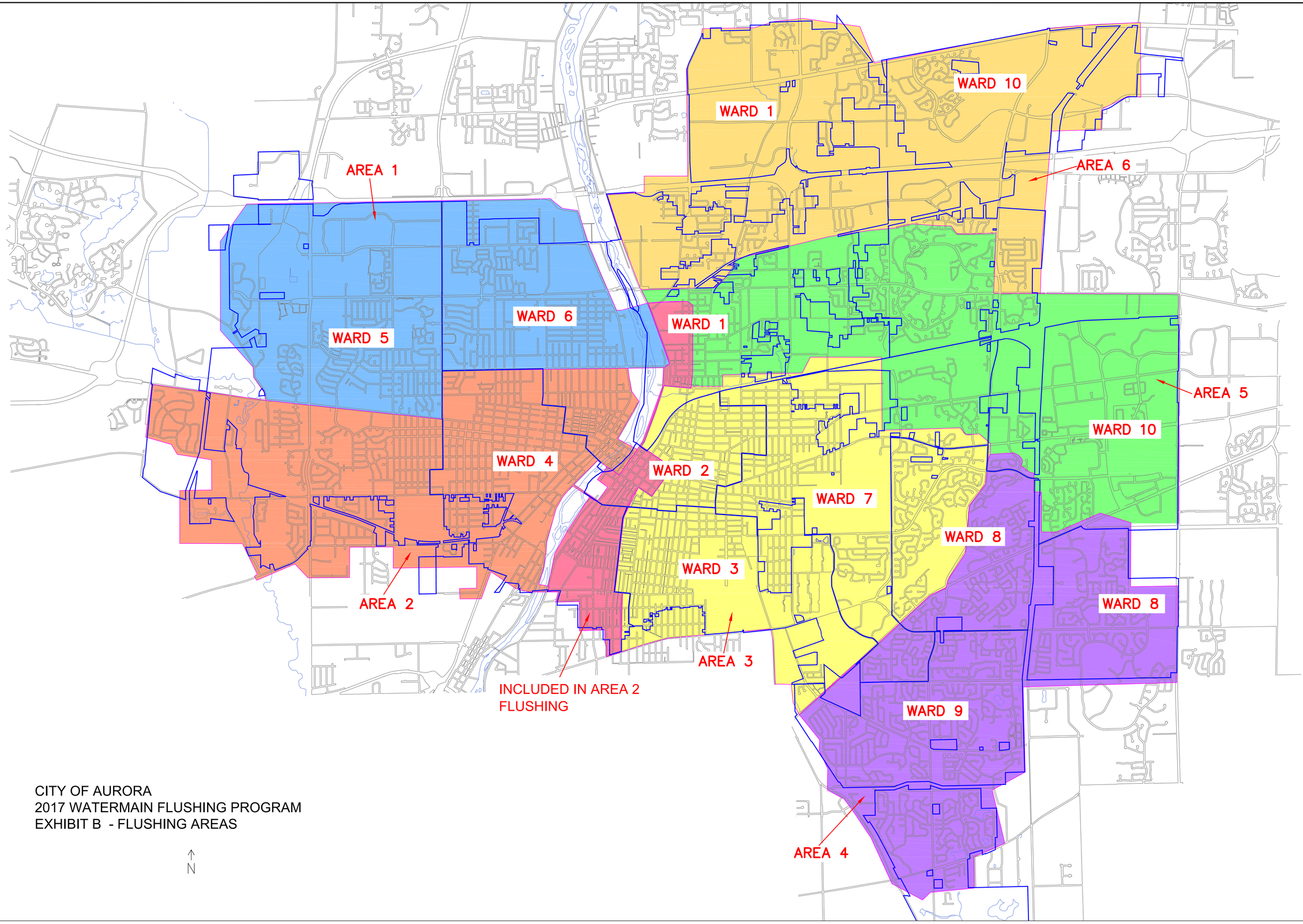
   As unidirectional and conventional flushing proceeds in the field, CMT will provide office support (as needed) to address field issues including closed valves, drainage problems, low pressure or inadequate flow. In addition, CMT will record daily updates to the city flushing hotline.

6. *Coordination Meetings*

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

Schedule

Flushing is planned to begin the third week in May and will continue through July, resulting in approximately 46 working days taking into account holidays and a couple of rain days.



CITY OF AURORA
2017 WATERMAIN FLUSHING PROGRAM
EXHIBIT B - FLUSHING AREAS

EXHIBIT C– SCHEDULE OF HOURLY CHARGES
CITY OF AURORA
RESIDENT INSPECTION AND ENGINEERING SERVICES

CLASS NO.	CLASSIFICATION	2016 AVG DIRECT LABOR RATE	2017 AVG DIRECT LABOR RATE 2016 + 3.25%	BILLING RATE MULTIPLIER @ 2.90
10	**Principal** (IDOT cap at $70)	70.00	$70.00	$203.00
20	**Senior Project Engineer/Manager** (CMT management engineer)	62.92	$64.96	$188.40
30	**Project Engineer/Manager** (sr. level PE or special discipline struct. or elect.)	50.46	$52.10	$151.09
40	**Senior Engineer** (licensed professional engineer)	39.30	$40.58	$117.67
41	**Senior Architect**	37.38	$38.59	$111.93
42	**Senior Technical Manager**	48.17	$49.74	$144.23
43	**Senior Planner** (aviation planning, environ. assessments, etc.)	35.08	$36.22	$105.04
44	**GIS Specialist**	27.69	$28.59	$82.91
50	**Engineer** (graduate engineer)	29.60	$30.56	$88.63
51	**Architect**	30.40	$31.39	$91.03
60	**Planner** (aviation planning, environ. assessments, etc.)	23.54	$24.31	$70.48
65	**Technical Manager**	23.65	$24.42	$70.81
70	**Registered Land Surveyor** (PLS for plats, easements, etc.)	42.69	$44.08	$127.82
80	**Senior Technician** (exp survey tech, CAD tech, resident inspector)	34.53	$35.65	$103.39
90	**Technician II** (survey instrument man, CAD operator, inspector)	26.88	$27.75	$80.49
100	**Technical I** (junior-level rodman, inspector, CAD operator)	20.19	$20.85	$60.45
110	**Clerical/Word Processor**	22.82	$23.56	$68.33

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
2017 WATERMAIN FLUSHING PROGRAM - Area 1 Flushing

Exhibit D - Professional Services Cost Estimate Summary
4-Jan-17

Exhibit	Description	Manhours	Amount
D-1	Area 1 - Flushing Costs	2,955	$253,200

CITY OF AURORA
2017 Watermain Flushing Program - Area 1 Flushing
Exhibit D-1 - Professional Services Cost Estimate
4-Jan-17

Assumptions:

Unidirectional Flushing - Assume 6 CMT crew members with 2 Engineers and 4 Interns
Conventional Flushing - Assume 6 CMT crew members working on conventional flushing with 2 crews.
Technical Assitance - Assume CMT to provide daily office technical asstance (previously provided by WTP Staff)
CMT Staff (1 Engineer) finding and checking valves prior to flushing

Conventional Flushing Crew:
-->assume unidirectional crew spilts into two crews, a 2-person crew and a 4-person crew, for conventional flushing

Crew Size	2	
Technical Assistant ($/hr.)	$60.45	
Engineer ($/hr.)	$88.63	
2017 Crew Cost ($/hour)	$149.08	
Number of Hydrants per day	21	Based on a 4 person crew flushing between 40 - 50 hydrants per day in 2015 Watermain Flushing Program

Crew Size	4	
Technical Assistant ($/hr)	$60.45	
Technical Assistant ($/hr)	$60.45	
Technical Assistant ($/hr.)	$60.45	
Engineer ($/hr.)	$101.60	
2017 Crew Cost ($/hour)	$282.95	
Number of Hydrants per day	42	Based on a 4 person crew flushing between 40 - 50 hydrants per day in 2015 Watermain Flushing Program

Unidirectional Flushing:

Crew Size	6	
Technical Assistant ($/hr)	$60.45	
Technical Assistant ($/hr)	$60.45	
Technical Assistant ($/hr.)	$60.45	
Technical Assistant ($/hr.)	$60.45	
Engineer ($/hr.)	$88.63	
Engineer ($/hr.)	$88.63	
2017 Crew Cost ($/hour)	$419.06	
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

2017 Senior Engineer ($/hour)	$117.67

Finding/Checking Valves - assume locating and marking 15-20 valves per day
Technical Assistance - assume 6 hours per day
Field Paperwork - assume 5 hours per week
Coordination Meetings - assume 4 hours per week
Project Management Time - 5 hours per week (2017 Hourly Rate = $188.40/hour)

	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	TOTAL
Conventional Flushing											
Length of watermain (feet)	74,535	12,842	55,713	26,600	19,510	44,782	26,862	74,724	14,299	25,113	374,980
Length of watermain (miles)	14.12	2.43	10.55	5.04	3.70	8.48	5.09	14.15	2.71	4.76	71
--> Conventional Flushing (2 CMT person crew)											
# of Hydrants	27	10	61	34	21	36	23	73	20	23	328
Estimated flushing time (crew hours)	11	4	24	13	8	14	9	28	8	9	128
Estimated flushing time (crew days)*	**2.0**	**0.5**	**3.0**	**2.0**	**1.0**	**2.0**	**1.5**	**3.5**	**1.0**	**1.5**	**18**
Estimated Crew Labor Cost	$2,385.28	$596.32	$3,577.92	$2,385.28	$1,192.64	$2,385.28	$1,788.96	$4,174.24	$1,192.64	$1,788.96	$21,467.52
-->Conventional Flushing (4 CMT person crew)											
# of Hydrants	70	15	120	66	30	80	45	125	20	45	616
Estimated flushing time (crew hours)	14	3	23	13	6	16	9	24	4	9	121
Estimated flushing time (crew days)*	**2.0**	**0.5**	**3.0**	**2.0**	**1.0**	**2.0**	**1.5**	**3.5**	**1.0**	**1.5**	**18**
Estimated Crew Labor Cost	$4,527.20	$1,131.80	$6,790.80	$4,527.20	$2,263.60	$4,527.20	$3,395.40	$7,922.60	$2,263.60	$3,395.40	$40,744.80
Unidirectional Flushing (6 CMT person crew)											
Length of watermain (feet)	30,656	27,046	12,587	15,643	11,732	18,580	20,999	18,332	14,057	10,229	179,861
Length of watermain (miles)	5.81	5.12	2.38	2.96	2.22	3.52	3.98	3.47	2.66	1.94	34.06
Number of Sequences	21	23	6	10	5	13	11	13	5	5	112
Number of Valves to Operate	131	58	59	32	25	83	47	44	19	19	517
Average Length of Watermain per Sequence (feet)	1,460	1,176	2,098	1,564	2,346	1,429	1,909	1,410	2,811	2,046	1,606
Average # of Valves per Sequence	6	3	10	3	5	6	4	3	4	4	5
# of valves per mile of watermain	23	11	25	11	11	24	12	13	7	10	15
Estimated flushing time (crew hours)	33	29	14	17	13	20	23	20	15	11	195
Estimated flushing time (crew days)*	**4.5**	**4.0**	**2.0**	**2.5**	**2.0**	**3.0**	**3.5**	**3.0**	**2.0**	**1.6**	**28.1**
Estimated Crew Labor Cost	$15,086.16	$13,409.92	$6,704.96	$8,381.20	$6,704.96	$10,057.44	$11,733.68	$10,057.44	$6,704.96	$5,363.97	$94,204.69
Locating and Marking Valves:											
Number of Valves to Find/Check	131	58	59	32	25	83	47	44	19	19	517
Technical Assistance time (hours)	60	27	27	15	11	38	21	20	9	9	236
Estimated Labor Cost	$7,046.75	$3,119.94	$3,173.73	$1,721.34	$1,344.80	$4,464.74	$2,528.22	$2,366.85	$1,022.05	$1,022.05	$27,810.46
Office Engineering											
Technical Assistance time (hours)	39	27	30	27	18	30	30	39	18	19	277
Estimated Labor Cost	$4,589.13	$3,177.09	$3,530.10	$3,177.09	$2,118.06	$3,530.10	$3,530.10	$4,589.13	$2,118.06	$2,188.66	$32,547.52
Total											
Length of watermain (feet)											554,841
Length of watermain (miles)											105
Miscellaneous Effort											
Project Start-up/Close-Out (hours)											100
Project Start-up/Close-Out Costs											$15,303.50
Field Paperwork (hours)											46.1
Field Paperwork Cost											$5,424.59
Coordination Meetings (hours)											36.9
Coordination Meetings Cost											$6,948.19
Project Management (hours)											46.1
Project Management Cost											$8,685.24
Total Labor Hours	411	270	297	258	173	308	291	371	171	176	2955
Total Cost	$33,634.52	$21,435.07	$23,777.51	$20,192.11	$13,624.06	$24,964.76	$22,976.36	$29,110.26	$13,301.31	$13,759.04	$253,136.51
											*rounded up to
											$253,200

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

CITY OF AURORA

2017 Watermain Flushing Program - Area 1 Flushing

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

4-Jan-17

	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	**TOTAL**
Conventional Flushing											
# of Hydrants	97	25	181	100	51	116	68	198	40	68	**944**
Length of watermain (feet)	74,535	12,842	55,713	26,600	19,510	44,782	26,862	74,724	14,299	25,113	**374,980**
Length of watermain (miles)	14.12	2.43	10.55	5.04	3.70	8.48	5.09	14.15	2.71	4.76	**71.02**
Unidirectional Flushing											
Length of watermain (feet)	30,656	27,046	12,587	15,643	11,732	18,580	20,999	18,332	14,057	10,229	**179,861**
Length of watermain (miles)	5.81	5.12	2.38	2.96	2.22	3.52	3.98	3.47	2.66	1.94	**34.06**
Number of Sequences	21	23	6	10	5	13	11	13	5	5	**112**
Number of Valves to Operate	131	58	59	32	25	83	47	44	19	19	**517**
TOTAL											
Length of watermain (feet)	105,191	39,888	68,300	42,243	31,242	63,362	47,861	93,056	28,356	35,342	**554,841**
Length of watermain (miles)	19.92	7.55	12.94	8.00	5.92	12.00	9.06	17.62	5.37	6.69	**105.08**