

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:

Professional engineering services for the Water Treatment Plant (WTP) Capacity Evaluation as described in the attached Exhibit A – Scope of Services.

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 WTP Capacity Evaluation shall not exceed \$109,800 per the attached Exhibit B 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 ____, 2018.

CLIENT:

CITY OF AURORA

(Client Name)

(Signature)

(Name and Title)

ENGINEER:

CRAWFORD, MURPHY & TILLY, INC.

Theresa O'Grady, P.E.
(Signature)

Theresa O'Grady, 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

Water Treatment Plant Capacity Evaluation

Exhibit A- Scope of Work

Background

The City of Aurora has provided a good, reliable, and safe drinking water system to its citizens since the late 1840's. The City's first water system consisted of a natural spring connected to a wooden reservoir and wooden watermain. The City drilled its first deep well in 1892 and continued to use deep well water as its source for the next 100 years with a series of deep wells numbering 12 in 1992. With the construction of the lime-softening water treatment plant completed in 1992 to achieve radium removal compliance as well as utilize the Fox River as a source water, the City took significant strides in improving the quality and continuing to provide reliable water with a combination of three water sources: Fox River, deep wells, and shallow wells. Along the way, the City has experienced some difficulties, from drought conditions, algae blooms on the Fox River, record rainfall events to water quality issues. Through it all, the City has maintained focus on optimizing treatment in order to continue to provide a good, reliable, and safe drinking water system.

Crawford, Murphy & Tilly (CMT) has provided water system planning, design, and construction engineering services for the City of Aurora for over 40 years. This includes design of the City's wells, river intake, well collector mains, water treatment plant, transmission mains, pump stations, and storage tanks. In addition, CMT completed the last Water Master Plan Update for the City in 2007 and updated the hydraulic model of the distribution system in 2017.

Until now, the focus has been supplying good, reliable and safe drinking water to the citizens of Aurora. However, there is potentially an opportunity for the City to fully utilize its investments in the water system, and in particular the water treatment plant, to be a regional supplier to neighboring communities. This is possible because of the diversity built into the City's water source (river water, deep well water, and shallow well water), declining deep well aquifer levels that some communities in the area have experienced, and declining water usage per person by the City's water customers has decreased the City's overall water usage. Given all of this, there appears to be a need and it appears as though the City's Water Treatment Plant has excess capacity which can be used to meet that need.

Project Overview

The evaluation will include four components: Source Capacity Analysis, WTP Capacity Analysis, Water Usage Projections and Distribution System Analysis.

Source Capacity Analysis

As noted above, the City utilizes three water sources – Fox River, deep well water and shallow well water. When the WTP was constructed the City decided to maintain source water capacity such that any two of the three water sources could meet Maximum Day Demands in the event that one source became unusable. This was important in 2017 when the water quality on the Fox River was so degraded that the City switched entirely to deep and shallow well water for its water source.

For this evaluation, we will determine the existing firm capacity of each of the three water sources and then determine the existing capacity available taking into account the largest source becoming unusable. Next, the analysis will identify the source water upgrades that would be required to obtain a firm source water capacity of 42 MGD, taking into account the largest source becoming unusable.

WTP Capacity Analysis

The WTP is currently rated at 42 MGD. However, there may be a difference between rated capacity and actual capacity to the level of treatment required to meet changing water quality on the Fox River and Partnership for Safe Water treatment performance goals. The first component of this evaluation will be to determine the sustainable capacity of the water treatment plant under current conditions. Processes that may restrict capacity will be assessed, such as filters, finished water pumping, filter backwash pond capacity, and clearwells. In addition, this analysis would look at the process improvements that would be required to treat 42 MGD and meet the Partnership for Safe Water treatment performance goals. This analysis will also look at the operational impact, such as emergency/drought conditions, staffing levels, impact to chemical feed systems, and electrical costs to run the WTP at a higher sustained flow rate. As part of the emergency/drought conditions evaluation, the potential for interconnects with Lake Michigan Water communities such as the City of Naperville will be assessed in order to strengthen water supply redundancy.

Once the WTP Capacity Analysis is completed, CMT will meet with the City to determine what excess capacity the City is comfortable using to potentially serve other communities.

Water Usage Projections

Given the growth that has occurred since the last Water Master Plan Update in 2007, one would anticipate that water usage would have increased. It didn't. In fact, water usage has decreased. In the past 10 years (2007 to 2017), population has increased from 173,373 to 200,456, and the Average Day demand has decreased from 17.15 MGD to 16.85 MGD and the Maximum Day Demand has decreased from 27.25 MGD to 22.08 MGD. At its highest point in 1994, water usage per capita was 130.34 gallons per person per day. At its lowest point, water usage per capita was 78.44 gallons per person per day in 2015. This represents a decrease in water usage of almost 40%.

For this study, we first need to determine the projected water usage for the City to its buildout population and then look at the projected water usage for neighboring communities to determine which ones could be served by the excess capacity determined in the WTP Capacity Evaluation. Neighboring communities to be included in the study include North Aurora, Sugar Grove, Montgomery, Warrenville, and Batavia.

For the City and neighboring communities, water usage and population projections will be made to 2050 based on Chicago Metropolitan Agency for Planning (CMAP) population projections. CMT will also contact the neighboring communities to determine if they have information on their anticipated buildout population. The water usage projections for the City and neighboring communities will include a range for Average Day Demand and Maximum Day Demand based on a current trends (CT) projection and a less resource intensive (LRI) projection. The CT projection would be realized if water use per person continue at current levels. The LRI projection would be realized if water usage per capita continued to decrease as a result of water conservation, replacement of fixtures with low-flow fixtures, and reduction of water loss.

Once the water usage projections for the City and neighboring communities are compiled, we would meet with the City to determine which neighboring communities will be included in the next step, the Distribution System Analysis.

Distribution System Analysis

Once we have pinpointed which neighboring communities to potentially serve, the intent is to determine the ability of the existing distribution system to supply water to various points in the distribution system for bulk takeoff from neighboring communities. This analysis would be performed using the City's recently updated hydraulic model. Hydraulic modeling would include steady state modeling to determine the impact to pressure and fireflow under Maximum Day demand conditions as well as extended period simulation modeling to determine the impact to water quality and water system operations (in particular filling and draining of existing water storage tanks). If modeling indicated that the existing distribution system could not supply the needed demand for the bulk takeoff points, CMT will utilize the hydraulic model to determine what improvements might be required to meet the needed demand and pressure at those points.

For the improvements identified in the WTP Capacity Analysis and Distribution System Analysis, CMT will prepare a conceptual opinion of probable construction costs (OPCCs) which can then be used as a starting point for discussions with the potential bulk water purchasers. CMT will use the Association for the Advancement of Cost Engineering (AACE) standards for generation of conceptual (Class 5) opinions of probable construction cost.

The deliverable for this evaluation will be a report highlighting the evaluation components and results.

Project Tasks

The following tasks are anticipated for the Water Treatment Plant Capacity Evaluation:

1. Obtain & Review Existing Information – We anticipate that the following information would be provided by the City and CMT would review it prior to the Kick-off Workshop.
 - A. Chemical usage records (to be provided by the City)
 - B. Water Treatment Plant (WTP) monthly operating reports as submitted to the IEPA for 2017 and 2018 noting raw, pre-filtered, finished and distribution water quality data (to be provided by the City)
 - C. Raw and finished water flows and billed water records for 2017 through 2018 (to be provided by the City)
 - D. WTP staffing information
 - E. Latest Water Loss Audit
 - F. Other information as required

Note that CMT will also review data that we previously prepared including WTP construction drawings for the original WTP and WTP Upgrade and past Water Master Plans which looked at the WTP unit processes.

2. Kick-off Workshop - A kick-off workshop will be conducted with CMT and City staff to discuss the existing information, operational constraints, routine operation and maintenance, Partnership for Safe Water constraints, regulatory impacts, study components, etc.
 - A. Preparation for workshop including agenda and gather materials for workshop
 - B. Attend and participate in workshop
 - C. Compile and distribute minutes/notes from workshop

3. Conduct On-Site Investigations - If possible, on-site investigations shall be conducted in conjunction with the Kick-off Workshop. The extent of on-site investigations will be established at the Kick-off Workshop, but could include the following items.
 - A. Inspect the overall physical characteristics of the plant and water treatment equipment (age, general condition, evidence of corrosion, overall estimated remaining service life, etc.).
 - B. Assess filters for maximum loading rate.
 - C. Assess clearwell storage facilities for capacity.

 - D. Assess available finished water pumping capacity.
 - E. Assess capacity of chemical usage and chemical feed systems.
 - F. Discuss operations and maintenance procedures with plant personnel.
 - G. Discuss plant flexibility, redundancy and ability to control/adjust various treatment processes.

4. Source Capacity Analysis -
 - A. Identify existing firm capacities of sources – Fox River Intake Pump Station, deep well pumps and shallow well pumps, taking into consideration specific capacities of deep and shallow wells. Determine firm capacity if any of the sources were to become unusable.
 - B. Identify upgrades required to supply a firm capacity of 42 MGD to the Water Treatment Plant, considering unusable source criteria.

5. WTP Capacity Analysis - After reviewing existing information and conducting the Kick-off Workshop and on-site investigations, use the information compiled from these tasks to assess the existing (and potential) WTP capacity.
 - A. Identify existing firm capacities of equipment and processes.
 - B. Assist WTP staff to simulate 42 MGD operation and observe and evaluate operations.
 - C. Identify equipment, processes requiring replacement, upgrade or modifications to meeting rated capacity of 42 MGD.
 - D. Identify future regulations which may impact WTP capacity.
 - E. Identify operational impact, such as emergency/drought conditions, source water quality, staffing levels, impact to chemical feed systems, and chemical and electrical costs to run the WTP at a higher sustained flow rate.
 - F. Investigate potential Lake Michigan interconnects for emergency/drought conditions.
 - G. Meet with the City to review analysis and decide on WTP excess capacity available.

6. Water Usage Projections - Determine the projected water usage for the City and neighboring communities to their buildout population and identify which ones could be served by the excess capacity determined in the WTP Capacity Evaluation.
 - A. Obtain 2050 population projections from CMAP for the City and neighboring communities to be included in the evaluation.
 - B. Contact neighboring communities to obtain historical population and water usage data including estimated buildout populations.
 - C. Review most recent water loss audit for the City.
 - D. Compile CT (current trends) and LRI (less resource intensive) water usage projections for the City and neighboring communities.
 - E. Meet with the City to identify neighboring communities that could be supplied by the WTP excess capacity.
7. Distribution System Analysis – Determine the ability of the existing distribution system to supply water to various points in the distribution system for bulk takeoff from neighboring communities.
 - A. In conjunction with the meeting with the City noted in 5E, identify probable areas for bulk takeoff points in the distribution system for the communities that could be supplied.
 - B. Run the existing system hydraulic model under existing Maximum Day Demand conditions to establish a baseline of pressure/available fire flow (steady state) and water age/operations (extended period simulations).
 - C. Run the model (similar to B) but with the bulk water flow rates applied to the model at the takeoff points identified.
 - D. Compare pressure/fireflow and water age/operations under the existing and proposed conditions to determine impact to distribution system.
 - E. If distribution system can not provide needed bulk water takeoff flow rates, incorporate distribution improvements into the model to determine extent of improvements required to provide bulk water takeoff flow rates without negatively impacting the distribution system.
8. Prepare Budgetary Cost Estimates - Provide conceptual cost estimates (AACE Class 5) for each of the improvements identified in the WTP Capacity Analysis and the Distribution System Analysis.
9. Prepare Water Treatment Plant Capacity Evaluation Report
 - A. Develop pre-final (75%) report.
 - B. Meet with the City to discuss comments on the pre-final report.
 - C. Develop draft final report.
 - D. Meet with the City to discuss comments on the draft final report.
 - E. Incorporate City comments and submit final report.
10. Project Management
 - A. Correspondence between City staff and CMT.
 - B. Periodic progress updates.
 - C. QA/QC.

CRAWFORD, MURPHY & TILLY, INC.
 CONTRACT ATTACHMENT - EXHIBIT B - 2018 PROFESSIONAL SERVICES COST ESTIMATE

CLIENT City of Aurora
 PROJECT NAME WTP Capacity Evaluation
 CMT JOB NO. -

Prep By TLO
 DATE 11/15/18

Apprvd TLO
 DATE 11/15/18

TASK NO.	TASKS \ CLASSIFICATIONS	MAN HOURS & LABOR SUMMARY												TOTAL	
		PRINCIPAL	SENIOR PROJECT ENGINEER / MANAGER	PROJECT MANAGER	PROJECT ARCHITECT	SENIOR ENGINEER LAND SURVEYOR	SENIOR ARCHITECT	SENIOR ENGINEER MANAGER	GIS SPECIALIST	ENGINEER ARCHITECT	SENIOR TECHNICIAN	TECHNICAL PLANNER	TECHNICIAN MGR		TECHNICIAN II
CITY OF AURORA 2018 HOURLY RATES		\$205.44	\$190.66	\$152.90	\$119.08	\$145.96	\$83.90	\$89.69	\$104.63	\$71.66	\$81.46	\$61.18	\$69.15		
1	Obtain & Review Existing Information		14	12											26
2	Kick-off Workshop		24	8											32
3	Conduct On-Site Investigation		36	20											56
4	Source Capacity Analysis		3	24											27
5	WTP Capacity Analysis		52	58											110
6	Water Usage Projections		12	34				40							86
7	Distribution System Analysis		3	27				102							132
8	Prepare Budgetary Cost Estimates		2	8				24							34
9	Prepare WTP Capacity Evaluation Report			52	28			14	14	28				8	144
10	Project Management, QA/QC	8	48												56
11															0
12															0
13															0
14															0
15															0
TOTAL MAN HOURS		8	246	219	0	0	14	180	28	0	0	0	8	703	
SUBTOTAL - BASE LABOR EFFORT		\$1,644	\$46,902	\$33,485	\$0	\$0	\$1,175	\$16,144	\$2,930	\$0	\$0	\$0	\$553	\$102,833	

TASKS (CONTINUED)	TOTAL LABOR EFFORT	DIRECT EXPENSE & REIMBURSABLES											TOTAL EXPENSE	TOTAL FEE
		TRAVEL MILEAGE	MEALS & LODGING	PRINTING	EQUIP-MENT	MISC	SURVEY MTL	SUBS	SUBS ADMIN	OTHER EXP	OTHER EXP			
1 Obtain & Review Existing Information	\$4,504												\$0	\$4,504
2 Kick-off Workshop	\$5,799	\$200											\$200	\$5,999
3 Conduct On-Site Investigation	\$9,922	\$200											\$200	\$10,122
4 Source Capacity Analysis	\$4,242												\$0	\$4,242
5 WTP Capacity Analysis	\$18,783												\$0	\$18,783
6 Water Usage Projections	\$11,074												\$0	\$11,074
7 Distribution System Analysis	\$13,849												\$0	\$13,849
8 Prepare Budgetary Cost Estimates	\$3,757												\$0	\$3,757
9 Prepare WTP Capacity Evaluation Report	\$20,109			\$250									\$250	\$20,359
10 Project Management, QA/QC	\$10,795												\$0	\$10,795
11	\$0												\$0	\$0
12	\$0												\$0	\$0
13	\$0												\$0	\$0
14	\$0												\$0	\$0
15	\$0												\$0	\$0
TOTALS	\$102,834	\$400	\$0	\$250	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$650	\$103,484
TIME PERIOD OF PROJECT	2018	2019	2020	2021	TOTAL	EST % OF OT HRS INCLUDED ABOVE AVERAGE OVERTIME RATE PREMIUM						0%	MULTI-YEAR + OT MLTPLR & AMT	
PERCENTAGE OF WORK TO BE PERFORMED BY YEAR	0%	100%	0%	0%	100%	OT ADJUSTMENT FACTOR						15%		
WEIGHTING FACTOR FOR 3% ANNUAL ADJUSTMENT	0.0000	1.0300	0.0000	0.0000	1.0300							0.0000	1.0300	\$3,105
ESTIMATED CONTINGENCY													3%	\$3,200
ROUNDING														\$11
TOTAL FEE	MATH CROSS CHECK IS OK													\$109,800

**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 *
10	Principal (IDOT cap at \$70)	\$70.00	\$203.00	\$205.44
20	Senior Project Engineer/Manager (CMT management engineer)	\$64.96	\$188.40	\$190.66
30	Project Engineer/Manager (sr. level PE or special discipline struct. or elect.)	\$52.10	\$151.09	\$152.90
40	Senior Engineer (licensed professional engineer)	\$40.58	\$117.67	\$119.08
41	Senior Architect	\$38.59	\$111.93	\$113.27
42	Senior Technical Manager	\$49.74	\$144.23	\$145.96
43	Senior Planner (aviation planning, environ. assessments, etc.)	\$36.22	\$105.04	\$106.30
44	GIS Specialist	\$28.59	\$82.91	\$83.90
50	Engineer (graduate engineer)	\$30.56	\$88.63	\$89.69
51	Architect	\$31.39	\$91.03	\$92.12
60	Planner (aviation planning, environ. assessments, etc.)	\$24.31	\$70.48	\$71.33
65	Technical Manager	\$24.42	\$70.81	\$71.66
70	Registered Land Surveyor (PLS for plats, easements, etc.)	\$44.08	\$127.82	\$129.35
80	Senior Technician (exp survey tech, CAD tech, resident inspector)	\$35.65	\$103.39	\$104.63
90	Technician II (survey instrument man, CAD operator, inspector)	\$27.75	\$80.49	\$81.46
100	Technical I (junior-level rodman, inspector, CAD operator)	\$20.85	\$60.45	\$61.18
110	Clerical/Word Processor	\$23.56	\$68.33	\$69.15

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

Computation of billing rate multiplier:

Direct labor factor	1.0000
Audited overhead rate	1.641
Subtotal	<u>2.6409</u>
Profit factor	1.10
Total	<u><u>2.90</u></u>

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