Request for Proposal

For

Professional Qualifications

For

DESIGN SERVICES FOR IMPROVEMENTS AT THE WATER TREATMENT PLANT

As described herein

Statement of Qualifications

Accepted until September 7, 2022

Office of the Service Director

2310 Second Street

Cuyahoga Falls, Ohio 44221

REQUEST FOR PROPOSAL

For

PROFESSIONAL QUALIFICATIONS

DESIGN SERVICES FOR IMPROVEMENTS AT THE WATER TREATMENT PLANT

I. INTRODUCTION

The City of Cuyahoga Falls, Ohio ("Owner") is seeking qualifications statements in accordance with Ohio Revised Code Sections 153.65 through 153.73 from design professional firms to provide professional engineering services for improvements at the City's Water Treatment Plant located in Cuyahoga Falls, Ohio.

Cuyahoga Falls requests proposals to prepare preliminary and final design construction documents and all document preparation associated therewith, including application for the plan approval from the Ohio Environmental Protection Agency.

II. BASIC SCOPE OF SERVICES

The City owns and operates a municipal Water Treatment Plant (WTP) rated for a peak design flow of approximately 9 million gallons per day (mgd), a current average daily production of approximately 4.9 mgd and a current peak daily production of approximately 7.1 MGD. The WTP serves approximately 19,000 customers in the City of Cuyahoga Falls while providing bulk water sales to the neighboring communities of Munroe Falls and the Silver Lake.

An ion exchange (IX) softening process is used at the WTP that softens water from eighteen (18) supply wells located in Waterworks Park adjacent to the Cuyahoga River. The plant uses pre-chlorination and sand filtration to oxidize and remove iron and manganese to below their secondary maximum contaminant levels (MCLs) prior to ion exchange (IX) softening to reduce hardness to desired levels. Water discharges from the IX process to a 2.2 MG capacity clearwell followed by high service pumping.

The project includes the following improvements at the WTP:

- Demolition of the existing softening building and replacement with a new building and IX softening system.
- Replacement of the existing brine treatment (iron removal) system and additional brine storage.
- Upgrades and replacement of high service pumps and controls.
- Other related plant process pumping and piping improvements.

Services required include: Preparation of a General Plan and Preliminary Engineering Report for submittal to Ohio EPA; surveying; geotechnical engineering; water treatment hydraulic and process design; architecture; structural engineering; mechanical, electrical & plumbing (MEP) design; contract document preparation; funding assistance; bidding services; and construction management and RPR services. These improvements will be in accordance with recommendations presented in the attached Preliminary Engineering Report

III. OBJECTIVE

The Project is to construct improvements to the Water Treatment Plant located at 2054 Munroe Falls Boulevard, Cuyahoga Falls, Ohio 44221. The ion exchange (IX) process building and process infrastructure have exceeded their useful life and the City desires to replace them with a new softening building and IX process. The high service pumping system is also in need of repair and rehabilitation. The City has identified improvements to the WTP to upgrade the facilities.

IV. EVALUATION CRITERIA

Each firm responding to this RFQ will be evaluated and selected based on its qualifications and the qualifications and experience of the particular individuals identified as the firm's proposed team for the Project. Owner will consider the firm's competence to perform the required professional design services as indicated by the technical training, education and experience of the firm's personnel who would be assigned to perform the services and of the firm's current staff; availability of staff; relevant past work and performance of the firm's prospective consultants and the firm's previous experience when working with its proposed consultants; the firm's experience in performing engineering studies and construction administration; the firm's equipment and facilities; the location, availability and accessibility of facilities and equipment to support staff activities on the

Project; experience in new construction and renovation; experience and capabilities of creating or reviewing Critical Path Method (CPM) schedules as a project management resource; specification writing credentials and experience; experience with working within the construction management at risk delivery methods; any previous work performed in connection with Owner or any other political subdivisions; and other similar information.

- Responsibility and stability – such considerations as length of time firm has been in business, length of time principals have been with firm, financial responsibility, professional liability coverage, etc.
- Experience – such considerations as other similar projects completed by the firm, similar design projects completed by key personnel of the firm, support staff abilities, range of in-house capabilities, etc.
- Location – Such consideration as location of firm's office that will be responsible for project coordination, previous work in the general geographic area, key project personnel office location, etc. Lower project costs should result if limited travel expenses are required and better communication can be maintained which should result in a higher quality project.
- Quality of work – Such considerations as adequateness of material supplied to permit evaluation, evaluation, quality of presentation, cooperation, concern, etc.
- Time schedule and anticipated man-hours to complete the project.

The City will accept SOQ's until 5:00 pm, Wednesday, September 7, 2022 at the Office of the City Service Director, 2310 Second Street, Cuyahoga Falls, Ohio 44221. Please contact the Service Director at 330-971-8240 with any questions.

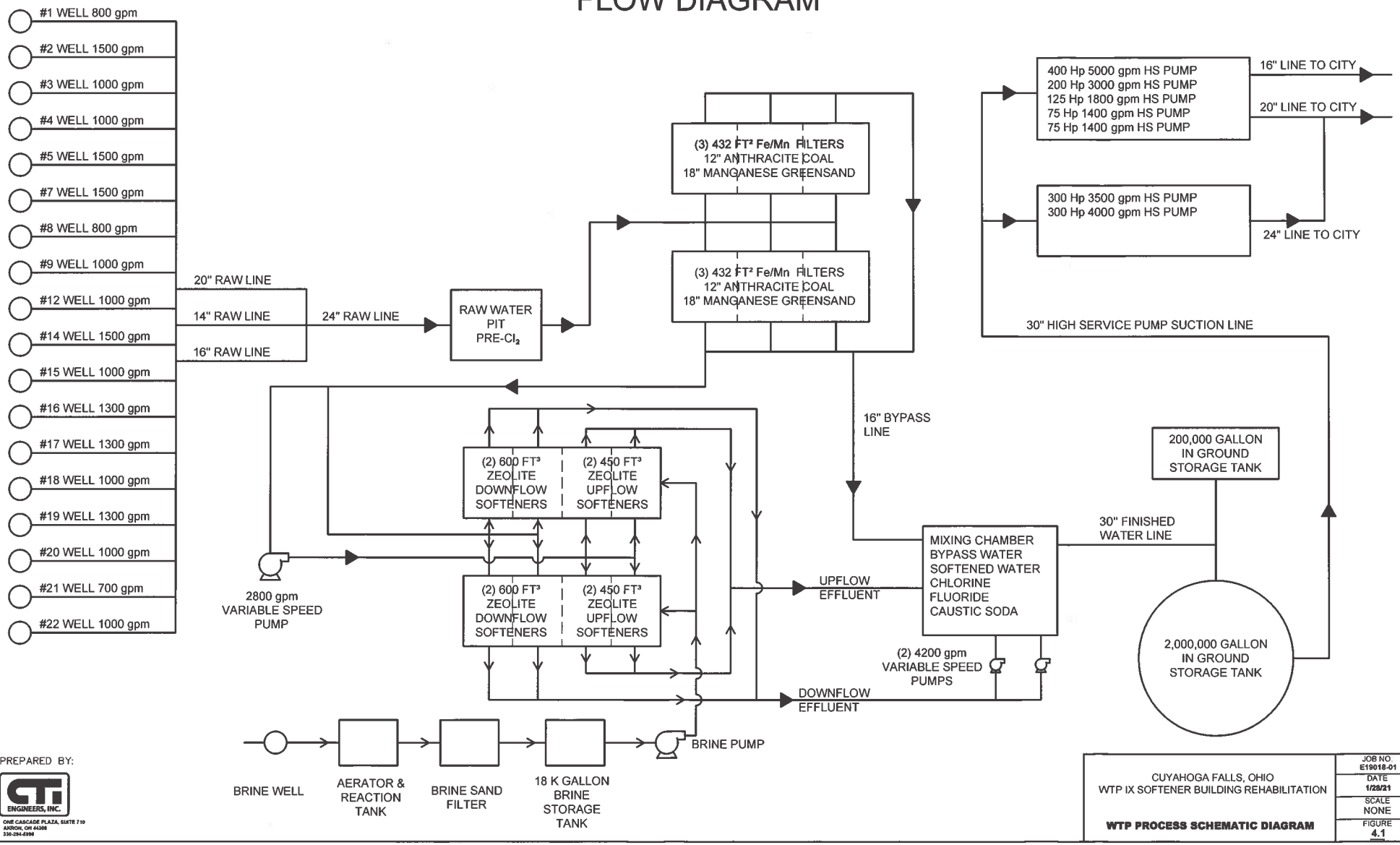
Each firm shall submit a total of five (5) copies of the SOQ's in a sealed envelope clearly marked on the outside "DESIGN SERVICES FOR IMPROVEMENTS AT THE WATER TREATMENT PLANT."

The City retains the option of rejecting or accepting any Statement of Qualifications. Should a firm be selected and the City cannot negotiate a contract with the selected firm ranked best qualified, the City shall inform the firm in writing of the termination of negotiations and enter into negotiations with the firm ranked next best qualified. If negotiations again fail, the same procedure shall be followed with

each next best-qualified firm selected until a contract is negotiated. However, the City retains the right to reject all SOQ's and initiate the process of obtaining SOQ's from qualified engineering firms at a later date.

Exhibit A
Preliminary Engineering
Report

CITY OF CUYAHOGA FALLS WATER TREATMANT PLANT
FLOW DIAGRAM



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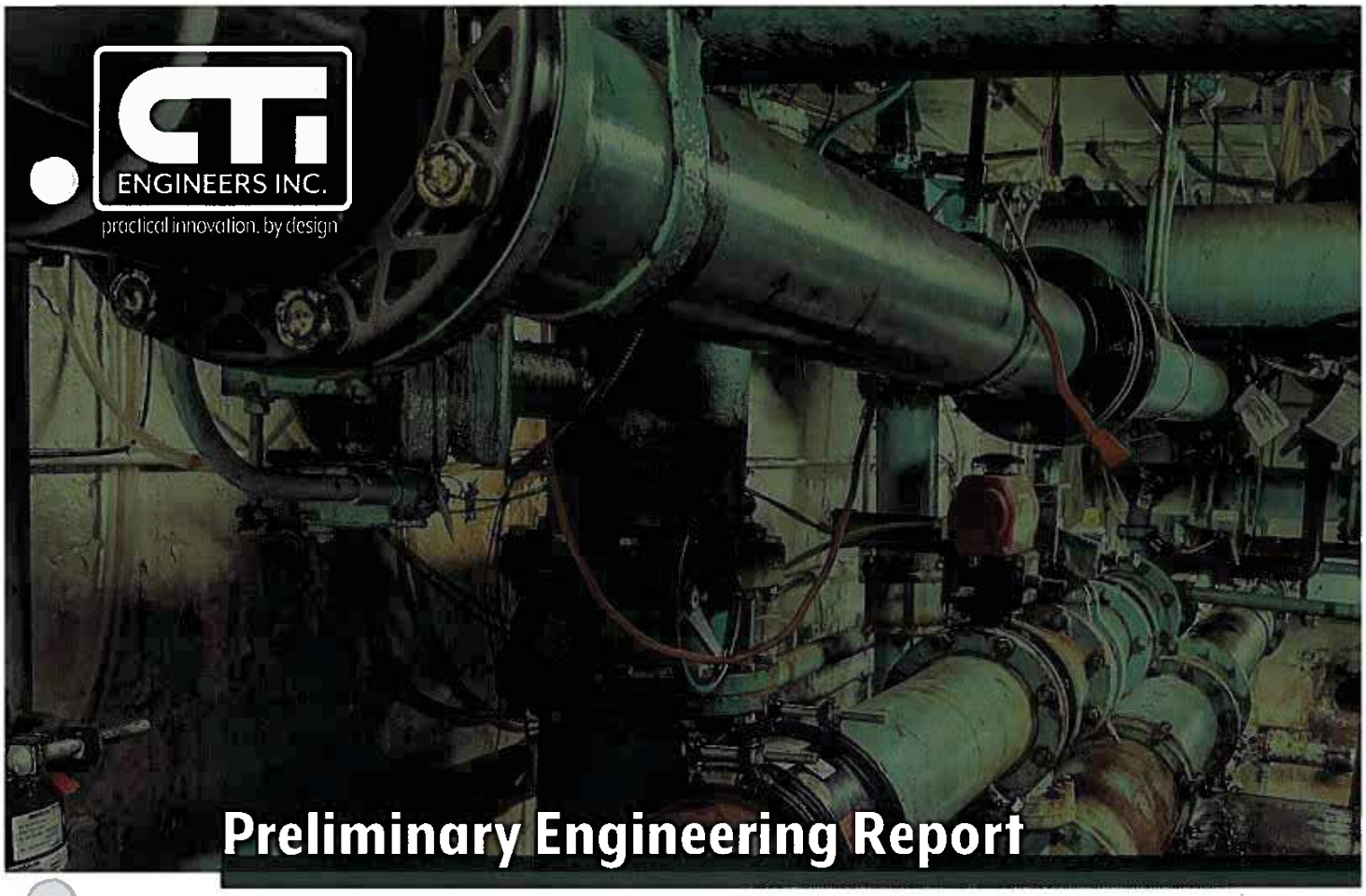
CUYAHOGA FALLS, OHIO
WTP IX SOFTENER BUILDING REHABILITATION

WTP PROCESS SCHEMATIC DIAGRAM

JOB NO.	E19018-01
DATE	1/28/21
SCALE	NONE
FIGURE	4.1



ENGINEERS INC.

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Preliminary Engineering Report

January 2021

City of Cuyahoga Falls, Ohio

WATER TREATMENT PLANT ION EXCHANGE REHABILITATION STUDY

ENGINEERS INC.

ctiengr.com

WATER TREATMENT PLANT ION EXCHANGE REHABILITATION STUDY

City of Cuyahoga Falls, Ohio

Prepared by:

CTI ENGINEERS, INC.
Akron, Ohio
CTI Project No. E19018-01

January 2021

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CTI ENGINEERS INC.

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List of Abbreviations

1.	AL	Action Level
2.	EPA	Environmental Protection Agency
3.	ft^2	square feet
4.	ft^3	cubic feet
5.	ft^3/day	cubic feet per day
6.	fps	feet per second
7.	gpm	gallons per minute
8.	gpd	gallons per day
9.	HP	horsepower
10.	HS	high service
11.	IX	ion exchange
12.	Kg/day	kilograms per day
13.	L.F.	linear feet
14.	L.S.	lump sum
15.	MG	million gallons
16.	MGD	million gallons per day
17.	mg/l	milligrams per liter
18.	ug/l	micrograms per liter
19.	No.	number
20.	Ph	phase
21.	rpm	revolutions per minute
22.	SCADA	supervisory control and data acquisition
23.	s.u.	standard units
24.	S.Y.	square yards
25.	TDH	total dynamic head
26.	V	volts
27.	WTP	water treatment plant
28.	MRDL	maximum residual disinfectant level
29.	NPDES	National Pollution Discharge Elimination System

1.0 | Introduction

The City of Cuyahoga Falls owns and operates a water treatment plant (WTP) which has a peak design capacity of 9 million gallons per day (MGD). The plant currently provides an average daily flow of approximately 4.9 MGD, and a peak daily flow of approximately 7.1 MGD. Potable water is provided to the City (approximately 19,000 customers) while also providing bulk water to the neighboring communities of Munroe Falls and Silver Lake. An aerial map showing the location of the WTP is shown in **Figure 1.1**.

The City's population (per the 2010 census) is 49,652 residents. The City of Monroe Falls has 5,012 residents while the Village of Silver Lake has 2,519 residents.

An ion exchange (IX) softening process is used at the WTP that softens water from eighteen (18) supply wells located in Waterworks Park adjacent to the Cuyahoga River. A site Plan of the existing plant is presented in **Figure 1.2**. The plant uses pre-chlorination and anthracite and greensand filtration to oxidize and remove iron and manganese to below their secondary maximum contaminant levels (MCLs) prior to IX softening to reduce calcium and magnesium (hardness) to desired levels. The IX softening process reduces the raw water hardness from an average of 300 mg/l to approximately 180 mg/L.

The IX softening system consists of four (4) down-flow and four (4) up-flow concrete resin beds, and process piping that are housed in an existing Softener Building. This building was constructed circa 1937 and is experiencing severe structural damage within the roof framing as well as deterioration to concrete structural elements and piping due to the building's age and corrosion.

The City retained CTI Engineers, Inc. (CTI) to conduct a preliminary study to investigate alternatives for improving or replacing the existing IX softening process and building. Budgetary capital construction cost opinions were developed for each alternative.

A residual byproduct of the IX softening process is the production of a waste stream that has a high chloride concentration. This waste stream has been permitted to be discharged to the Cuyahoga River by the Ohio Environmental Protection Agency (EPA) with discharge limitations stated within the City's National Pollutant Discharge Elimination System (NPDES) permit. The permit limits the chloride discharge to 3,701 Kg/day. The chloride discharge limits the City's softening capacity and therefor methods of reducing and optimizing brine use were evaluated as part of this study. A copy of the City's NPDES Permit has been included in **Appendix A**.

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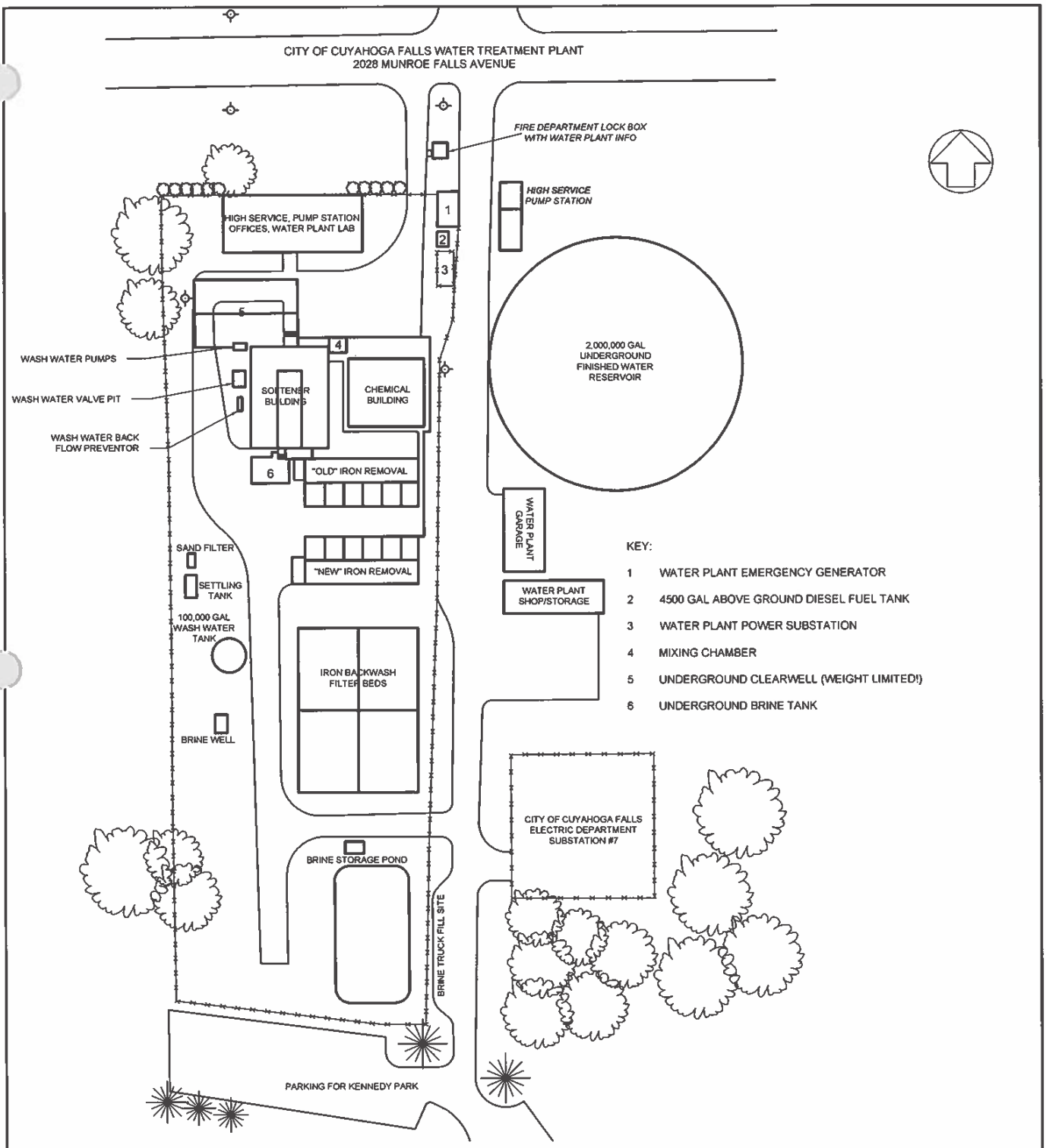
CUYAHOGA FALLS, OHIO
WTP IX SOFTENER BUILDING REHABILITATION

AERIAL VICINITY MAP

JOB NO.	E19018-01
DATE	1/28/21
SCALE	NONE
FIGURE	1.1



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CUYAHOGA FALLS, OHIO
WTP IX SOFTENER BUILDING REHABILITATION

EXISTING SITE PLAN

JOB NO.	E19018-01
DATE	1/28/21
SCALE	NONE
FIGURE	1.2

2.0 | Objective

The objective of this Feasibility Study was to determine a cost-effective method (based on capital costs) to rehabilitate or replace the existing IX softening process and building. The building and equipment are in poor condition and have exceeded their useful life. Methods of reducing and optimizing the discharge of the brine backwash to the Cuyahoga River are also presented as well as proposing exploration methods for identifying an alternate or backup brine source for the City.

3.0 | Scope of Work

CTI's services for this Feasibility Study included the following:

1. CTI process, structural, mechanical and electrical engineers reviewed existing plans, reports and data provided by the CLIENT to become more familiar with the details of the existing plant facilities and issues that may affect the proposed facilities and construction.

2. CTI process, structural, mechanical and electrical engineers conducted a site visit to the WTP to review the condition of the existing softening building; existing site and plant equipment; and potential building locations. Engineers discussed operational needs and potential construction related issues with plant personnel.

3. Upon completion of the study, CTI helped coordinate a meeting between the Ohio EPA Division of Drinking and Groundwater and City personnel to discuss EPA requirements, finished water quality goals, and concerns regarding the project. Ohio EPA Division of Surface Water will also be consulted regarding the existing NPDES permit for IX regeneration discharge and the Ohio EPAs' expectation for future limits or potential additional requirements.

4. CTI's process engineers determined the capacity and size of the proposed IX softening system including the resin volume required based on the water quality goals, the expected bypass percentage and empty bed contact time (EBCT) needed to achieve those softening goals.

5. Rough layouts were prepared for both open bed and pressure vessel configurations and preliminary building footprints were determined for each alternative.

6. A preliminary evaluation of the existing softening building was performed to determine the extent of deterioration to the building structure, process piping and equipment, mechanical, HVAC, plumbing, and electrical systems. The evaluation will be based on a visual assessment of the condition of the various facilities and determine the cost of rehabilitation or replacement based on that visual assessment and any existing plans or other information provided by the City. No physical testing of the structural or other elements was proposed and the evaluation was based on the visual assessment and available documentation provided by the City only.

7. A preliminary evaluation was performed of the existing salt brine well treatment and storage system and the requirements for a replacement system. This evaluation was based on a visual assessment and review of available documentation only and no physical testing was conducted.

8. CTI contacted equipment manufacturers and evaluated options and preliminary costs for resin and equipment for both open bed softeners and pressure vessel softeners.

9. CTI's Mech/Elec engineers evaluated the electrical and mechanical facilities and needs for both configurations and develop preliminary costs for each alternative. Preliminary engineering and evaluations were performed on the HVAC, plumbing and electrical related to the new IX softener building replacement.

10. WTP personnel stated that the levels of Chloride discharged from the ion exchange process to the river are approaching the limits allowed under the NPDES permit. The new softening system will need to optimize the regeneration process and minimize salt brine discharge to the river. An assessment of the existing salt brine use was made along with recommendations for optimizing the process and minimizing the related chloride discharge were evaluated.

11. The initial feasibility assessment culminated in a Feasibility Study Report that included a description of the evaluations performed and the results and recommendations for improvements. The report includes a preliminary engineering opinion of probable construction cost for the recommended improvements. The report also included recommendations for further areas of study and provide information on improvements that are to be further evaluated and detailed in the Preliminary Design Report and Final Design.

4.0 | Existing Facilities

CTI personnel reviewed existing plans, reports, and data provided by the City to become more familiar with the details of the existing plant facilities and issues that may affect the proposed facilities and construction. On Wednesday, November 6, 2019, CTI personnel along with employees of PTA Engineering conducted a site visit to the WTP to review the condition of the existing softening building; existing site and plant equipment; and potential building locations. A discussion of operational needs and potential construction related issues was also conducted with City WTP personnel.

Existing Water Treatment Process

The WTP consists of an IX softening process in which water is softened from eighteen (18) supply wells located in Waterworks Park adjacent to the Cuyahoga River. Pre-chlorination and sand filtration processes are used to oxidize and remove iron (Fe) and manganese (Mn) concentrations to below their Maximum Contaminant Levels (MCLs) prior to IX softening. The sand filtration process is the limiting factor in determining the capacity of the WTP. The IX softening process is used to reduce calcium (Ca) and magnesium (Mg) hardness concentrations to desired levels. The IX system consists of four (4) down-flow and four (4) up-flow concrete resin beds, IX pumps and process piping that are housed in an existing Softener Building. This system currently utilizes about 4,500 cubic feet of zeolite resin to soften a design flow of 4.5 MGD, which is half of the plant design capacity. The other 4.5 MGD flow is bypassed and blended with the softened water in a downstream mixing chamber to produce the desired water softness of approximately 180 milligrams per liter (mg/L). A process schematic of the existing WTP is presented in **Figure 4.1**. Salient features of the existing WTP are shown in **Table 4.1**.

Table 4.1: Existing WTP Salient Features

Plant Design Flow	
Design Capacity (Limited by Filters @ 2.25 gpm/SF)	8.03 MGD
Existing Average Daily Flow	4.9 MGD
Existing Peak Daily Flow	7.1 MGD
Supply Wells	
Number of Wells	18
Well Pumping Capacity (w/ largest well out of service)	26.93 (20.88*) MGD
Well No. 1 Capacity	1.15 (0.97*) MGD
Well No. 2 Capacity	2.16 (2.20*) MGD
Well No. 3 Capacity	1.44 (0.65*) MGD
Well No. 4 Capacity	1.44 (0.65*) MGD
Well No. 5 Capacity	2.16 (1.58*) MGD
Well No. 8 Capacity	2.16 (1.51*) MGD
Well No. 9 Capacity	1.15 (1.37*) MGD

Well No. 11 Capacity	1.44 (0.79*) MGD
Well No. 12 Capacity	1.44 (0.79*) MGD
Well No. 14 Capacity	2.16 (1.66*) MGD
Well No. 15 Capacity	1.44 (0.54*) MGD
Well No. 16 Capacity	1.87 (2.30*) MGD
Well No. 17 Capacity	1.87 (1.15*) MGD
Well No. 18 Capacity	1.44 (1.19*) MGD
Well No. 19 Capacity	1.87 (1.66*) MGD
Well No. 20 Capacity	1.44 (0.79*) MGD
Well No. 21 Capacity	1.01 (0.36*) MGD
Well No. 22 Capacity	1.44 (0.72*) MGD
** Approximate measured flow rate. Identified on 8/21/2020*	

IX Process	
Down-flow concrete IX resin beds	
Number of Beds	4
Total Resin Volume	2,697ft³
Up-flow concrete IX resin beds	
Number of Beds	4
Total Resin Volume	1,804ft³
Avg. Bypass Rate (bypass rate depends on hardness)	56%
Iron and manganese sand filters (Greensand Anthracite)	
Number of units	6
Dimensions	18ft x 23ft
Component Capacity	11.2 MGD
Allowable flow rate	3 gpm/sf
Total filter area (all 6 filters)	2,284ft²
High service pumps	
Number of pumps	7
Total Capacity w/ largest pump out of service	21.74 MGD
Pump No. 1 Motor Size	75 HP
Pump No. 1 Capacity	2.02 MGD
Pump No. 2 Motor Size	75 HP
Pump No. 2 Capacity	2.02 MGD
Pump No. 3 Motor Size	125 HP
Pump No. 3 Capacity	2.59 MGD
Pump No. 4 Motor Size	200 HP

Pump No. 4 Capacity	4.32 MGD
Pump No. 5 Motor Size	400 HP
Pump No. 5 Capacity	7.20 MGD
Pump No. 6 Motor Size	300 HP
Pump No. 6 Capacity	5.04 MGD
Pump No. 7 Motor Size	300 HP
Pump No. 7 Capacity	5.76 MGD
Storage	
Total Storage Capacity	9.6 MG
WTP Underground Clearwell – Volume	0.2 MG
WTP Underground Clearwell – Volume	2.0 MG
WTP Wash Water Standpipe – Volume	0.10 MG

Ohio EPA Requirements

Ohio EPA maximum contaminant limits (MCLs) for finished water are shown below in **Table 4.2.**

Table 4.2: Water Quality Goals

Parameter	MCL
Lead (ug/l)	AL=15
Copper (mg/l)	AL=1.3
Barium (mg/l)	2
Fluoride (mg/l)	4.0 4.0
TTHM (ug/l)	80
HAA5 (ug/l)	60
Chlorine (mg/l)	MRDL=4
Iron (mg/l)*	0.3
Manganese (mg/l)*	0.05

** Secondary MCL*

In addition to the water quality goals for finished water, the City also has a permit to discharge brine wastewater to the Cuyahoga River through a NPDES permit. A copy of the NPDES Permit is included in **Appendix A**. The current NPDES permit number is 3IZ00010*GD, has an effective date of May 1, 2018, and an expiration date of April 30, 2023. Effluent loadings to the river have been based on an average design flow of 0.115 MGD. **Table 4.3** shown below presents the final effluent discharge limitations within this permit.

Table 4.3: NPDES Permit Discharge Limits

Parameter	Discharge Limits				
	Maximum	Minimum	Monthly Conc.	Daily Loading (kg/day)	Monthly Loading (kg/day)
pH	9.0 S.U.	6.5 S.U.			
Total Suspended Solids			30 mg/L		13.1
Chloride	8,500 mg/L			3,701	
Iron, Suspended	2,000 ug/L		1,000 ug/L	0.87	0.44
Manganese, Suspended	2,000 ug/L		1,000 ug/L	0.87	0.44
Chlorine, Total Residual	0.038 mg/L				

Upon City approval of this Feasibility Study representatives of CTI will coordinate a meeting between Ohio EPA Division of Drinking and Groundwater, Ohio EPA Division of Surface water, and City personnel to ensure understanding of current requirements and determine future requirements related to the improvements.

Existing IX Softening Process

The existing Softening Building was constructed circa 1937 and was originally designed to house four (4) sand filters (to remove iron and manganese) and four (4) IX softener resin beds to remove calcium and magnesium hardness. After a pretreatment step to oxidize the iron and manganese, the water flowed down through these four (4) sand filters into a filter clearwell below. Approximately half of the filtered water was then pumped up through the four (4) resin beds in an up-flow configuration to remove all of the hardness, while the other half of the process water bypassed the softening step. Both the softened and bypass streams were blended downstream in a blending chamber where final chlorine and other chemicals were added prior to entering the clearwell and being pumped to the distribution system.

A 1959 plant expansion included the construction of three (3) new larger sand filters in a different building ("old filter building") and the existing sand filters were emptied of their sand, filled with IX resin and thereby converted into new softener beds. These filter beds are not ideal for IX softening due to their shallow depth. In order to match the flow configuration of the original plant, these converted sand filters maintained their downward flow direction and became what are referred to as the "Downflow Softeners". They operate in parallel with the original "Upflow Softeners" which are smaller in resin volume and contain approximately 25% less resin volume than the Downflow Softeners. The softening process is complicated by having these four (4) Downflow Softeners (converted filters) operating in parallel with the original Upflow Softeners that have different volumes, shapes, operational and regeneration efficiencies and run times between regenerations. Any improvements to the plant should correct this deficiency by including multiple IX softeners of identical size operating in the same configuration and direction hydraulically.

Existing Softening Building

A preliminary evaluation of the existing softening building was performed by CTI's Structural Engineer, CTI's Water Process Engineer along with Mechanical and Electrical Engineers from PTA Engineering to determine the extent of deterioration to the building structure, process piping and equipment, mechanical, HVAC and plumbing equipment, and electrical facilities. The evaluation was based on a visual assessment of the condition of the various facilities. No physical testing of the structural or other elements were conducted.

The consensus of the group was that rehabilitation of the existing building would not be desirable or cost effective due to:

- The age and condition of the structure and equipment in the building.
- Difficulties in maintaining plant operations and treatment during a rehabilitation project.
- Costs and unknowns within the existing aged structure would make a rehabilitation project likely to encounter unknown issues and problems during construction increasing the likelihood of cost over-runs and change orders.
- Additional costs associated with the removal of asbestos insulation and lead paint while maintaining plant operations.
- Inefficient configuration of the existing resin beds. The downflow resin beds are converted sand filters that are not well suited and do not meet normal design criteria for the IX units.
- The following three issues could not be addressed in a rehabilitation of the existing resin beds:

    1. The upflow and downflow configuration is less efficient and requires more pumps than an IX system with individual resin beds all flowing in the same direction.
    2. The different resin volumes of the existing resin beds makes the determination of regeneration and run times complicated and difficult to operate efficiently. It is difficult to predict when an individual resin bed capacity is spent and scheduling of regenerations is more sporadic and cannot be done on a routine repeatable schedule.
    3. Square or rectangular resin beds tend to be less efficient and have more hydraulic dead zones than circular resin beds which are optimal for treatment and regeneration cycles to minimize brine usage and optimize resin usage.

For these and other reasons the group thought that a new softening system in a new building would be more cost effective and feasible than attempting to rehabilitate and replace the old structural elements, equipment, filter controls, electrical, HVAC, process piping and pumps, while meeting current building code and EPA requirements. The existing building does not meet current building code and

ADA requirements and therefor rehabilitating the building as is, would not meet several modern code requirements although some of these may possibly be "grandfathered" in by the Building Department and allowed as part of a rehabilitation of an existing structure. It would take a high level of effort and major structural modifications, additional rooms, and access improvements, to update the building to meet the current building code.

A lead abatement contractor (JF Construction and Environmental) was consulted onsite and a budgetary cost estimate was prepared for the lead abatement and asbestos removal within the existing building facilities. The lead painted pipe and asbestos roofing will need to be addressed before new process piping and roofing can be installed in its place for any building rehabilitation.

Electrical Improvements

The electrical equipment that is currently in the existing Softener Building consists of the electrical distribution, MCC, lighting, receptacles, controls wiring, HVAC wiring, and process equipment wiring. Due to the condition of most of the existing equipment a complete replacement of all electrical equipment would be necessary in the event of a rehabilitation of the existing Softener Building. The existing MCC appears to be in adequate condition, however the amount of available space for the new equipment will likely not be adequate and need replaced. Most other equipment is corroded and outdated that dictate the necessity of replacement.

The electrical equipment that would be installed in the rehabilitated Softener Building or new building would include electrical distribution equipment, MCC, LED interior and exterior lighting, convenience receptacles, HVAC equipment wiring, process equipment wiring, and controls wiring. The electrical distribution will be routed to the existing outdoor substation similar to the existing feed to the Softener Building. A new MCC and necessary 120V distribution will be installed as required. LED lighting and associated controls will be installed to meet the current energy codes and provide adequate lighting based on the use of each space. Convenience receptacles will be placed throughout the building as necessary for housekeeping purposes and to serve equipment, as necessary. Wiring will be provided to support the HVAC and process equipment, as necessary. The controls wiring will interconnect the softener components and control panel furnished by the equipment vendor. Wiring will be routed from the control panel to the existing SCADA system for monitoring and control purposes as required.

Mechanical Improvements

The existing softener building is conditioned by a space mounted dehumidifier, gas-fired unit heaters, and sidewall propeller fans. The open-air tanks are served by the sidewall exhaust fans and sidewall louvers for air circulation. These fans and louvers are corroded and deteriorating due to constant humid operating conditions and the interaction with the chlorine and softening chemicals (salt). The existing dehumidifier and unit heaters serving the main space are outdated and spare parts are no longer available, and we recommend replacing since we are renovating the space. The lower pipe gallery level has a propeller fan installed in the floor grate that we would recommend removing and replacing with a properly ducted exhaust fan to serve the lower level.

The rehabilitation option will require the replacement of most of the existing equipment. The existing building will require new exhaust fans and heating and dehumidification equipment. The only

recommended additions would be the installation of a ducted exhaust fan for the basement pipe area and associated louver to keep the main space at a neutral pressure.

The two new building options will have similar mechanical and plumbing needs under the proposed configurations. A rooftop unit (RTU) or dehumidification unit will be provided to condition the occupied space. Under the open basin option exhaust fans with louvers would provide a similar air circulation setup to the existing building. More care would need to be provided when selecting the RTU under the open tank option as the open tanks will increase the humidity and the exposure to the softening chemicals in the main area and the RTU. With the closed softening tanks high humidity and chemical corrosion should not be as large of an issue inside the building. The closed tanks will also remove the need of the exhaust fans and louvers that would serve the open tanks. Under these two options a new lab and/or restroom would be provided that would require sanitary and domestic water along with plumbing fixtures. A water heater would be provided along with new plumbing fixtures as required for the lab and restrooms.

Existing Salt Brine Treatment & Storage System

The IX softening process uses a salt brine (NaCl) solution to regenerate the IX resin with sodium (Na) ions. The resin softens the water by exchanging Na ions for calcium (Ca) and magnesium (Mg) hardness ions in the water. The original softening plant used bulk salt deliveries to the plant to produce the salt brine needed to regenerate the zeolite resin.

In 1967 the City drilled a 2,950 foot deep brine well at the plant that produces the brine needed for resin regeneration at a flow rate of approximately 35 gpm. The brine from this brine well is high in iron (Fe) concentration and therefore the brine is treated with a simple oxidation/filtration system. The brine is pumped to a cascading tray aerator to oxidize the various forms of soluble Fe into an insoluble iron oxide precipitate followed by a sand filter to remove the precipitate from the brine stream.

The City also uses the brine from the brine well for deicing the streets during winter months. To maintain their road deicing operation, the plant has one above-ground open lined storage pond where street brine-spraying trucks can load up with untreated brine.

A preliminary assessment of the existing salt brine treatment and storage system was performed to determine the requirements for a replacement system. This evaluation was based on a visual assessment and review of available documentation only and no physical testing was included.

The existing cascade aerator is made of wood that is deteriorating. The existing concrete brine Fe filter tankage is deteriorating and spalling and cracking of the concrete wall was observed. Due to the poor condition of this aging system, a new stainless steel, Fe removal brine treatment system with aeration is recommended as part of this study.

The existing treated brine storage for water softening includes one underground 18,000 gallon concrete storage tank located to the south of the existing IX Softener Building. This below grade brine storage tank condition is unknown and polyethylene-or epoxy lining of the inner walls of the tank is recommended to rehabilitate and protect the tank from corrosion.

Investigation of an alternate brine source is recommended as the current brine well is the sole source of brine for the City. During the design, we could implement exploration techniques to identify alternate nearby brine sources and establish a plan for acquiring this alternate source. Having a redundant brine source will improve treatment reliability open up opportunities for brine uses such as sodium hypochlorite generation which would eliminate the need for chlorine gas and safety gas scrubber system.

One alternate brine source currently being considered is an existing gas well located on City property, adjacent to the water treatment plant, and located to the southwest of the existing brine well. Water Plant Management has discussed repurposing this well with a local well driller who suggested that it is possible to repurpose this nearby gas well into a brine well. This new well could contribute to the existing brine production. This alternate source will be investigated further by Water Plant Management.

Salt Brine Optimization

The IX softening process produces a brine waste stream that is currently discharged to a tributary stream to the Cuyahoga River. The City has an NPDES permit from the Ohio EPA for this discharge. The permit limits the Total Chloride loading to the river to 3,701 Kg/day (**See Table 4.1**). During high water production periods the IX resin is regenerated more frequently and the waste discharged from the process comes close to this maximum daily chloride limit. At times this chloride discharge limit can limit the plant's ability to soften the water to desired levels. Therefore, it is an important goal of this IX rehabilitation project to optimize the IX softening process and minimize the amount of brine (chloride) discharged to the river. This is also good for the environment.

Recommendations for optimizing the process and minimizing the related chloride discharge include the following:

- Purolite is a zeolite resin manufacturer that has developed a proprietary resin known as Shallow Shell Technology "SST" zeolite resin that has been demonstrated to reduce the chlorides produced from the resin regeneration cycles by 20% to 30%.

- Hydraulically optimize the regeneration process by reducing the volume of brine needed to achieve softening by optimizing the bed configuration. Circular steel pressure vessels will reduce the volume of brine needed for softening the same volume of hard water. This is due to the "dead zones" that exist in square or rectangular shaped beds that contain resin that is not reached adequately by a concentrated brine volume that is sufficient for full regeneration of the resin beads. The salt brine does not reach certain dead zones (typically corners) within the rectangular resin bed.

- Improve the monitoring of the regeneration process so that operators can detect the precise moment when the regeneration process is complete, so that "over-brining" of a softener does not occur during the regeneration process. The brine volume fed to an individual softener is normally performed based on time. Operators normally estimate (from experience and taking grab samples off the bottom of a softener during regeneration and measuring the salinity) how long to feed the brine to a particular softener so that it is fully regenerated

and Na breakthrough occurs at the bottom of the softener. This Na breakthrough can vary, however, depending on various factors including the degree to which an individual softener is "spent" of its exchanging capacity when the regeneration begins. The precise moment of Na breakthrough could be detected by improving the monitoring capability at the plant by installing a Coriolis meter on the discharge of each vessel. The Coriolis meter can sample and measure the salinity (density) of the waste brine during regeneration. This would enable the operator to monitor the density spikes in brine, indicating complete regeneration of the resin. Once the resin regeneration is complete, the operator can shut off the brine stream to minimize the volume of brine use. Monitoring the brine concentration discharged from a softener during regeneration is known as an "Elution Study" and offers several benefits in addition to optimizing the brine use. This study or test can serve as an early warning system for the condition of the resin or can detect and troubleshoot other problems in the IX process by measuring and trending salinity versus time (via SCADA). A softener elution study is included in **Appendix B**.

5.0 | Alternatives & Costs

The following section discusses the proposed alternatives for rehabilitating or replacing the existing IX process. Three (3) alternatives were proposed to be evaluated as part of this study:

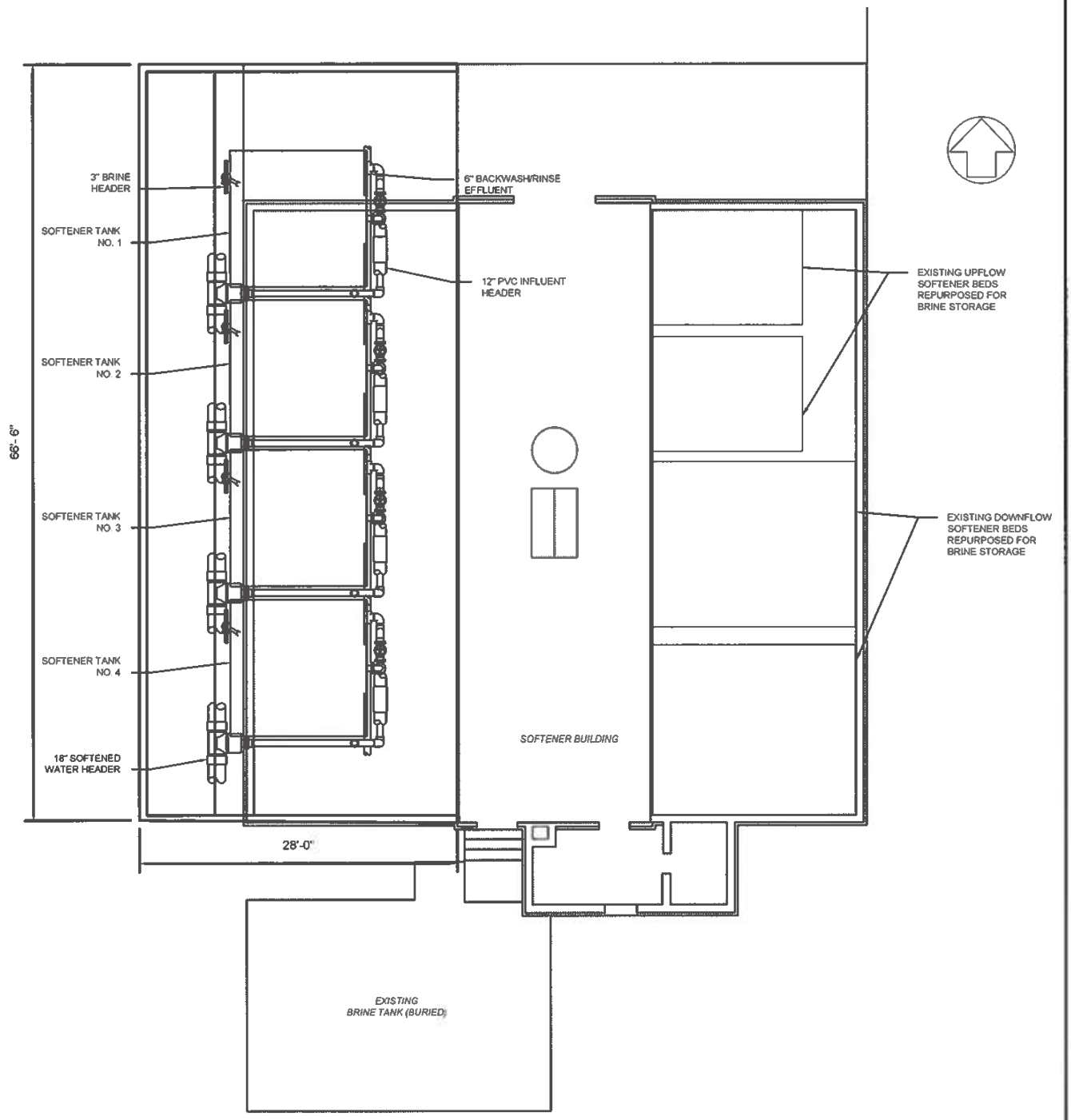
Alternative No. 1 – New Open Bed IX Configuration.
Alternative No. 2 – New Pressure Vessel IX Configuration
Alternative No. 3 – Rehabilitation of the Existing Building and IX System

These three (3) alternatives are described and presented in the following sections along with their respective Preliminary Opinions of Probable Construction Costs. These preliminary cost opinions were put together to give comparative capital costs for the purpose of evaluating the alternatives. Once an alternative is selected, a more detailed cost opinion will be prepared and presented in the Preliminary Engineering Report which will be more detailed, and based on the City's desired Alternative and other items to be included in the design.

Initial discussions on replacing the softening system at the WTP focused on a new building that would be located south of the existing building in the area currently occupied by the abandoned red water filters and adjacent to the red water holding tank. The building was to be relocated in order to keep the existing IX system operational while the new building was being built. Early discussions with plant operators revealed that a new Softener Building could be constructed in the same location as the existing Softener Building if the construction were performed in two phases. The plant can be operated temporarily (for up to nine months) with half of the resin beds offline. During the first phase of construction, one side of the IX process (east side or west side) could be taken offline and demolished while a new replacement IX system is constructed and brought online in the same location. Then in the second phase, all of the process water would be treated by the newly installed system, while the remainder of the old plant was demolished and replaced as needed. This phased approach was preferred operationally rather than relocating the building since the existing softening site is conveniently located near the other process areas of the plant. Constructing in the same location would also be less costly as additional process and chemical piping, wiring, etc, would be required to relocate the building approximately 200 feet south of its existing location. Therefore, all three alternatives include a new or rehabilitated softening building at the same approximate location as the existing building.

Alternative No. 1 - Proposed Open-Bed Configuration

New open-top rectangular IX resin beds could be constructed to replace the existing resin beds as presented in **Figure 5.1**. In discussions with resin manufacturer, they recommended we include a 25% increase in resin volume for the open bed, rectangular vessel configuration, over circular vessels due to efficiency loss and dead zones at the corners of the beds. The larger resin volume accounts for the lower ability of the rectangular vessels to distribute process water and regenerant brine to the resin versus the cylindrically shaped vessels. Therefore, a larger bed size and resin volume was included for this alternative compared to Alternative 2 which includes cylindrical steel vessels.



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CUYAHOGA FALLS, OHIO
WTP IX SOFTENER BUILDING REHABILITATION

ALTERNATIVE 1
PROPOSED OPEN BED TYPE IX SOFTENING CONFIGURATION

JOB NO.	E19018-01
DATE	1/28/21
SCALE	NONE
FIGURE	5.1

The following assumptions were incorporated into this alternative:

- It includes the installation of four (4) square or rectangular resin beds with a surface area of approximately 144 square feet each and a bed depth of six (6) feet. This would contain a total resin volume of 3,456 cubic feet of resin.
- Asbestos removal and some lead abatement will likely be a necessary part of the existing building demolition although the existing pipe gallery may be able to be filled in and abandoned in place eliminating the necessity for removal of the lead paint clad piping.
- A new softener building will be constructed in two phases in approximately the same footprint as the existing Softening building. The new building will be constructed of similar materials to match the existing plant and will house the open cast-in-place concrete resin beds, new operator station, pumps, controls and portions of the brine treatment system.
- Process piping and control valves will be constructed in a new below grade pipe gallery. The wash tank pumps located outside will be relocated to have better access for maintenance and stored inside the new building.
- A new brine iron removal treatment system including mechanical aeration to oxidize the iron in the brine stream and a sand filtration system to remove the iron precipitate. This 35 gpm package treatment system will be constructed of stainless steel or other corrosion resistant materials to prohibit brine corrosion.
- The new open IX resin beds will be constructed in the West wing of the building. The existing east wing resin beds will be lined and converted to additional covered below ground brine storage.

A Preliminary Opinion of Project Cost for Alternative 1 is presented in **Table 5.1**.

Table 5.1: Alternative No.1 Cost Opinion

Description	Total Price
Demolition, incl. Lead Abatement	$462,000
IX Softener Building	$678,000
Electrical/Mechanical	$78,000
Open Concrete Resin Beds	$426,000
Controls/SCADA	$250,000
Process Piping	$606,000
Brine, Iron Removal Treatment	$549,000
East Resin Bed Lining/ Brine Storage	$166,000
Subtotal	**$3,215,000**
General Conditions (6%)	$193,000
Engineering & Legal Services (16%)	$514,000
Contingency (30%)	$964,500
Total	**$4,886,500**

Alternative No. 2- Steel Pressure Vessel Configuration

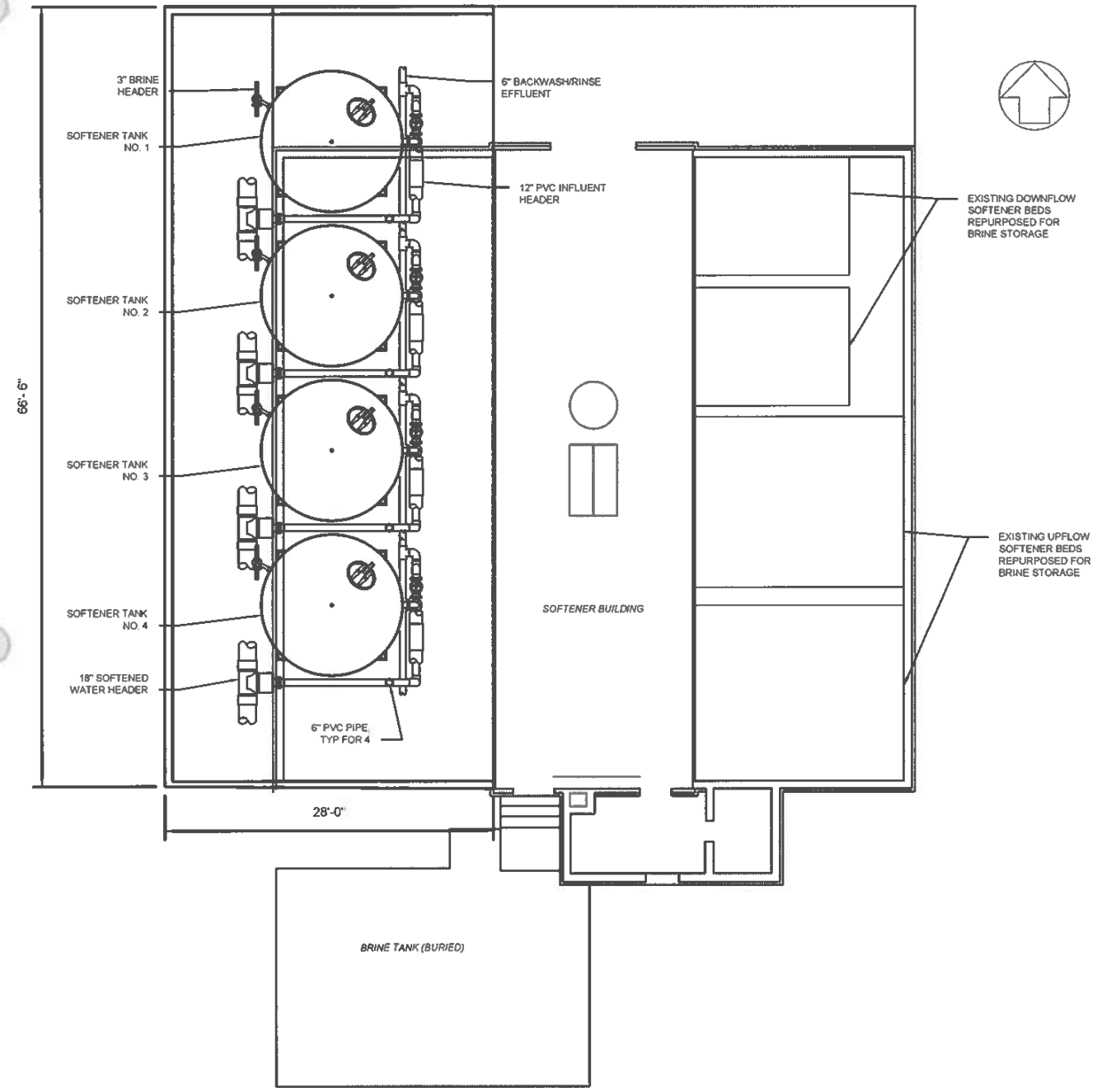
Based on the 9 MGD design flow for the plant (4.5 MGD design flow for the IX process with 50% bypass) and water quality goals stated above, the required resin volume using four 12-foot diameter cylindrical pressure vessels, is 2,715 cubic feet. The amount of hardwater to bypass and re-blend with the softened water is 50 percent. The proposed layout for the pressure vessel configuration is shown in **Figure 5.2**.

An advantage of this steel pressure vessels is the simplicity of construction and ease of maintenance. The factory assembled pressure vessels and control piping are installed entirely above grade on a concrete floor slab. This eliminates the need for a below grade pipe gallery and improves accessibility of the control valves and piping for maintenance. Similarly, the bypass line will be rerouted above grade to provide better access to the motor actuated throttling valve. Since all the process water, brine, and chlorine remain enclosed in the vessels and piping, the corrosion issues of the building roof, doors, windows, electrical, HVAC, pumps, and process equipment are eliminated. Computer and SCADA equipment last longer and perform better in this cleaner, dryer, climate-controlled environment.

The following assumptions were incorporated into this alternative:

- It includes the installation of four (4) 12-foot diameter lined steel pressure vessel resin beds with a surface area of approximately 113 square feet each and a bed depth of six feet. This would contain a total resin volume of 2,715 cubic feet of resin.
- Asbestos removal will likely be a necessary part of the existing building demolition but the lead paint abatement can be avoided by abandoning and encapsulating the pipe gallery in place and avoiding the lead paint on the old piping.
- A new softener building will be constructed in two phases in approximately the same footprint as the existing Softening Building. The new building will be constructed of similar materials to match the existing plant and will house the Steel pressure vessel resin beds, new operators station, pumps, controls including relocating the wash tank pumps, and portions of the brine treatment system inside.
- Process piping and control valves will be constructed above grade and assembled in easily accessible form in front of the steel pressure vessels.
- A new brine iron removal treatment system including mechanical aeration to oxidize the iron in the brine stream and a sand filtration system to remove the iron precipitate. This 35 gpm package treatment system will be constructed of stainless steel or other corrosion resistant materials to prohibit brine corrosion.
- The new pressure vessel IX resin beds will be constructed above grade on a concrete slab in the west wing of the building.
- The existing east wing resin beds will be lined and converted to additional covered, underground brine storage.

A Preliminary Opinion of Project Cost for Alternative 2 is presented in **Table 5.2**.



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CUYAHOGA FALLS, OHIO
WTP IX SOFTENER BUILDING REHABILITATION

ALTERNATIVE NO. □

PRESSURE VESSEL TYPE IX SOFTENING CONFIGURATION

JOB NO.	E19018-01
DATE	8/27/20
SCALE	NONE
FIGURE	5.2

Table 5.2: Alternative No. 2 Cost Opinion

Description	Total Price
Demolition, incl. Lead Abatement	$157,000
IX Softener Building, Complete	$604,000
East Resin Bed Lining/ Brine Storage	$67,000
Process Piping*	$40,000
Electrical/Mechanical	$53,000
IX Softening Pressure Vessels	$1,851,000
Brine, Iron Removal WTP	$589,000
Subtotal	**$3,361,000**
General Conditions (6%)	$202,000
Engineering & Legal Services (16%)	$568,000
Contingency (30%)	$1,008,000
Total	**$5,139,000**

** Additional process piping pricing is included in the IX Softening Pressure Vessels pricing*

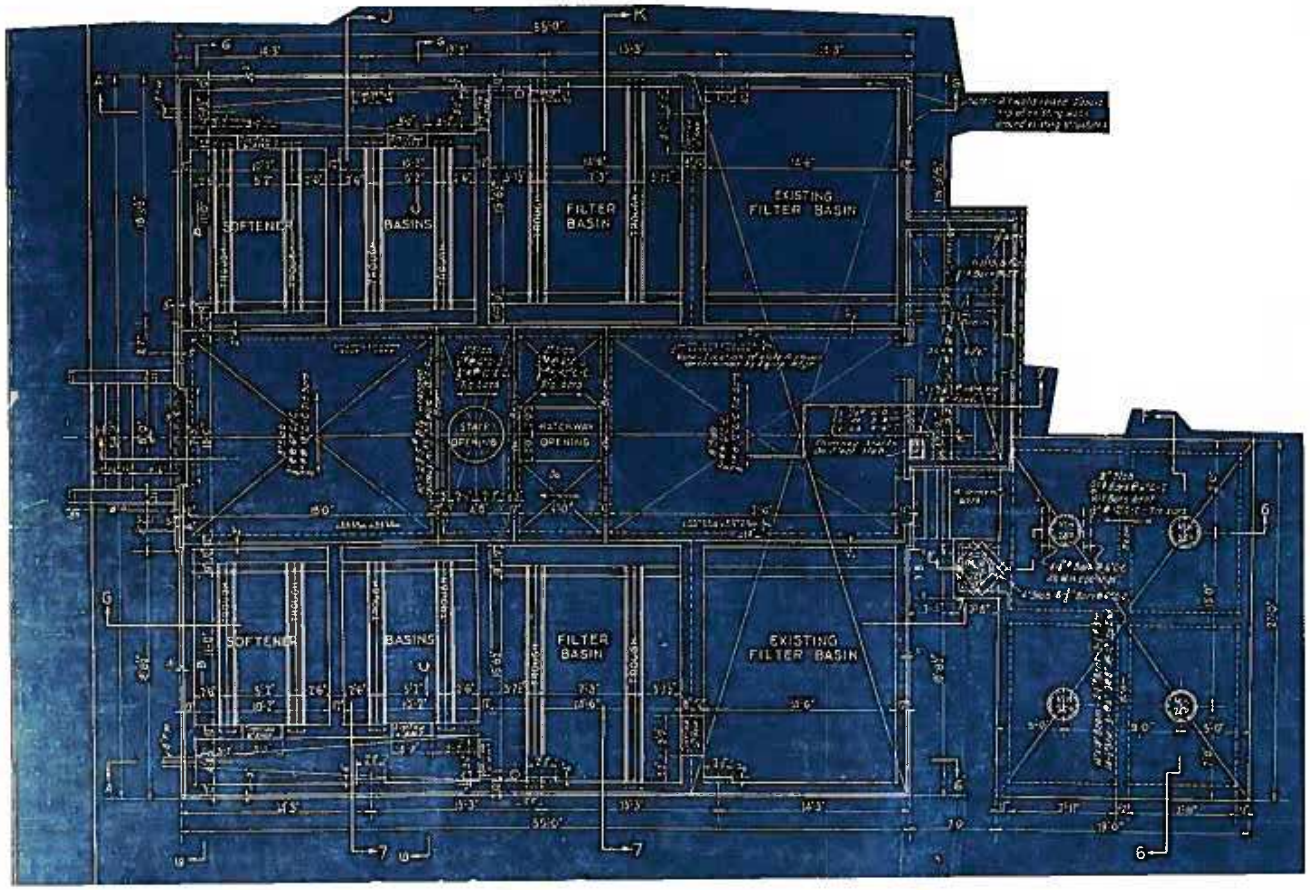
Alternative No. 3 - Rehabilitiation of Existing Building & IX System

As previously discussed, the current IX softening system consists of four (4) down-flow and four (4) up-flow concrete resin beds, and IX pumps and process piping that are housed in an existing Softener Building. The concrete resin beds are open top rectangular basins. Salient features of the existing process were previously shown in **Table 4.1**. As shown, the size of the up-flow versus down-flow resin beds differ which makes flow distribution between the resin beds difficult. In addition, the efficiencies of the beds is reduced due to their shallow depth and rectangular configuration.

In order to re-use and rehabilitate the existing process configuration, the capacity and size of the rehabilitated IX softening system will be based on replacement of the existing resin, underdrain system, launders, all piping and valves. **Figure 5.3** shows a plan view from the original 1937 blueprints of the existing open top rectangular basin configuration.

The following assumptions were incorporated into this alternative:

- It includes the rehabilitation of four (4) downflow resin beds (formerly sand filters) with a planar surface area of approximately 225 square feet each and a resin bed depth of 3 feet. This would contain a total volume of 2,700 cubic feet of resin.
- Similarly, the four (4) upflow resin beds with a planar surface area of approximately 111 square feet each and a bed depth of 4 feet. This would contain a total resin volume of 1,776 cubic feet of resin.
- All of the interior underdrains, support media, piping, launders, wiers and other equipment will be removed and replaced. PVC piping will be used where feasible.
- Asbestos removal will be a necessary part of the existing building rehabilitation which will include a complete tear-off of the existing roof including the structural framing.



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WTP IX SOFTENER BUILDING REHABILITATION

ALTERNATE NO. □

EXISTING OPEN TYPE IX SOFTENING CONFIGURATION

JOB NO.	E19018-01
DATE	8/27/20
SCALE	NONE
FIGURE	5.3

- All of the windows and doors will be replaced and all floor tiling and walls will be prepped and coated or otherwise resurfaced.
- Abatement of the lead paint on the old piping in the pipe gallery will be required for the removal and replacement of all the piping and valves with new equivalent piping and valves.
- All of the concrete tanks and surfaces will undergo appropriate surface preparation and be coated or lined with NSF approved coatings where in contact with drinking water. The downflow clearwell will be cleaned out repaired and coated. The filter gallery concrete walls and floor will be prepped and coated.
- All of the existing controls and SCADA equipment and wiring will be replaced with new including level sensors, flow meters, monitors, PLCs and CPUs.
- A new brine iron removal treatment system including mechanical aeration to oxidize the iron in the brine stream and a sand filtration system to remove the iron precipitate. This 35 gpm package treatment system will be constructed of stainless steel or other corrosion resistant materials to prohibit brine corrosion.
- All electrical wiring and lighting within the building will be replaced. All HVAC ducts, fans, dehumidifiers, heaters and other equipment will be replaced.
- Additional 25,000 gallons brine storage tanks are included to make the alternatives more comparable.
- Another consideration is if there needs to be ADA access to all portions of this building. It will be up to the Building Department's discretion to determine what level of effort will be needed to provide access to the various areas of the building.

A Preliminary Opinion of Project Cost for Alternative 3 is presented in Table 5.3.

Table 5.3: Alternative No. 3 Cost Opinion

Description	Total Price
Demolition, incl. Lead Abatement and Rehabilitation of IX Bldg.	$1,730,000
New Brine Storage	$147,000
Process Piping	$723,000
Electrical/Mechanical	$123,000
Controls/SCADA	$250,000
Rehabilitate Existing Resin Beds	$291,000
Brine, Iron Removal WTP	$549,000
Subtotal	**$3,813,000**
General Conditions (6%)	$229,000
Engineering & Legal Services (16%)	$610,000
Contingency (30%)	$1,144,000
Total	**$5,796,000**

6.0 | Evaluation of Alternatives

There are several issues that need to be considered in evaluating the conditions at the Water Plant and the necessary improvements. These are discussed in this section.

IX Resin Options

IX equipment and zeolite resin manufacturers were contacted by CTI to discuss the proposed IX softening process and the "open bed" and "pressure vessel" configurations being considered. For the zeolite resin material, which would be used in any of the three alternatives, Purolite was contacted. They currently are the sole manufacturer of a relatively new proprietary zeolite resin technology. Artesian of Pioneer (AOP) was also contacted as a manufacturer of pressure vessels, and other treatment plant equipment.

For the open top rectangular configuration, Purolite expressed concern with using rectangular or square open beds as they thought there would be dead zones in the corners of the resin beds which will not get good distribution or contact with the hard water and less efficient regeneration performance. The existing open top system currently utilizes rectangular open-beds for softening and contains approximately 6,600 cubic feet of resin. If these open beds are replaced as outlined in Alternative 1, these open beds would be redesigned to be in a downflow configuration to reduce the need for additional pumping. The proposed open bed configuration would consist of four (4) open bed concrete tanks similar in size to the existing tankage. Due to rectangular configuration, and based on recommendations of the resin manufacturer, a 25% safety factor for addition resin volume was applied for this configuration.

The quality of the resin provided by the manufacturer affects finished water quality and treatment efficiency. Purolite currently has two viable products for this application. Type C100E resin is their standard softening resin product. This is a strong acid cation resin and NSF-61 approved with an entirely gelatin composition.

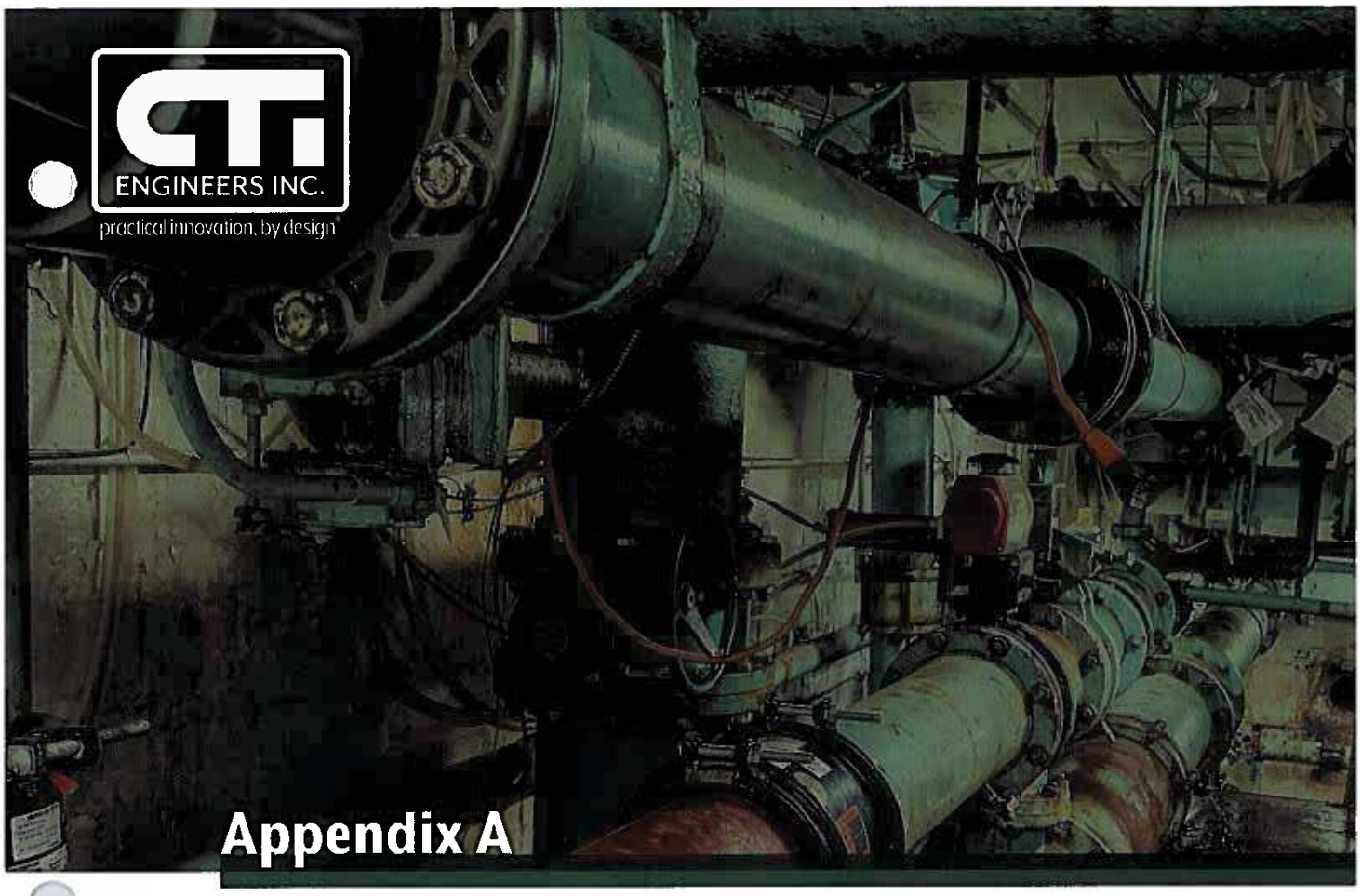
Type SSTC6000E "Shallow Shell" technology or SST resin is Purolite's trademarked product which is also NSF-61 approved and is also a strong acid cation however this product requires less brine to regenerate as the center of the resin beads are solid. During regeneration cycles the SST resin needs to only be regenerated near the surface of the bead, and not all the way through the core like their standard Type C100E resin. This difference in the two products results in a 20% to 30% operational cost savings which also reduces the chloride discharge to the Cuyahoga River. Based on this information, the SST type resin was used in all three of the alternatives for this Study. Product Data Sheets for both products are included in **Appendix D**.

For the pressure vessel configuration four (4) new IX softening steel pressure vessels were recommended. Each vessel has a diameter of 12-feet, with a height of 14'-3". A 6-foot deep resin bed was selected to be used in each of the pressure vessels.

7.0 | Conclusions & Recommendations

The recommended alternative is to replace the existing IX Softener building, using the steel pressure vessels outlined in Alternative 2, and replacing the iron removal brine treatment system. This alternative will result in reduced chlorides discharged to the Cuyahoga River, capital savings costs due to optimized resin configuration and reducing the amount of resin and brine needed to achieve the desired water quality.

Many assumptions were made for the rehabilitation Alternative 3. The condition of the building and the structural integrity is unknown. While the roof is proposed to be replaced and the CMU walls to be patched there is no way of knowing what condition the reinforcement is in or the condition of the openings. Disregarding the building condition, this alternative is not recommended as the existing resin beds were not designed for efficiency but were instead retrofitted to repurpose the existing tankage. Rebuilding the resin beds as outlined in Alternative 3 and in this same configuration as the existing beds, is not an efficient method for resin softening.



NPDES PERMIT

Application No. OH0001091

Issue Date: April 12, 2018

Effective Date: May 1, 2018

Expiration Date: April 30, 2023

Ohio Environmental Protection Agency
Authorization to Discharge Under the
National Pollutant Discharge Elimination System

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et. seq., hereinafter referred to as the "Act"), and the Ohio Water Pollution Control Act (Ohio Revised Code Section 6111),

Cuyahoga Falls Water Treatment Plant

is authorized by the Ohio Environmental Protection Agency, hereinafter referred to as "Ohio EPA," to discharge from the City of Cuyahoga Falls Water Plant wastewater treatment works located at 2028 Monroe Falls Avenue, Cuyahoga Falls, Ohio, Summit County and discharging to Cuyahoga River in accordance with the conditions specified in Parts I, II, and III of this permit.

This permit is conditioned upon payment of applicable fees as required by Section 3745.11 of the Ohio Revised Code.

This permit and the authorization to discharge shall expire at midnight on the expiration date shown above. In order to receive authorization to discharge beyond the above date of expiration, the permittee shall submit such information and forms as are required by the Ohio EPA no later than 180 days prior to the above date of expiration.

Craig W. Butler
Director

Total Pages: 17

Part I, A. - FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of the permit and lasting until the expiration date, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from outfall 3IZ00010601. See Part II, OTHER REQUIREMENTS, for locations of effluent sampling.

Table - Internal Monitoring Station - 601 - Final

Effluent Characteristic	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading* kg/day					
Parameter	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly	Measuring Frequency	Sampling Type	Monitoring Months
00400 - pH - S.U.	9.0	6.5	-	-	-	-	-	3/Week	Grab	All
00530 - Total Suspended Solids - mg/l	-	-	-	30	-	-	13.1	1/Month	24hr Composite	All
00940 - Chloride, Total - mg/l	8500	-	-	-	3701	-	-	3/Week	24hr Composite	All
01044 - Iron, Suspended (Fe) - ug/l	2000	-	-	1000	0.87	-	0.44	1/Month	24hr Composite	All
01054 - Manganese, Suspended (Mn) - ug/l	2000	-	-	1000	0.87	-	0.44	1/Month	24hr Composite	All
50050 - Flow Rate - MGD	-	-	-	-	-	-	-	1/Day	24hr Total	All
50060 - Chlorine, Total Residual - mg/l	0.038	-	-	-	-	-	-	3/Week	24hr Composite	All
70300 - Residue, Total Filterable - mg/l	-	-	-	-	-	-	-	3/Week	24hr Composite	All

Notes for station 3IZ00010601:
a. Effluent loadings based on average design flow of 0.115 MGD.
b. Station 3IZ00010601 combines with storm water and discharges at Station 3IZ00010001. There are no monitoring requirements for Outfall 001.

Part II, OTHER REQUIREMENTS

A. Description of the location of the required sampling stations are as follows:

Sampling Station	Description of Location
3IZ00010001	Outlet 18" discharge pipe to the Cuyahoga River located 1800 feet north of the facility (Lat: 41N 08 ' 42 "; Long: 81 W 27 ' 25 ")
3IZ00010601	Representative sampling point of the discharge of Zeolite regeneration water, at the storm sewer leading to outfall 3IZ00010001. (Lat: 41N 08 ' 23 "; Long: 81 W 27 ' 18 ")

B. This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved.

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

C. All parameters, except flow, need not be monitored on days when the plant is not normally staffed (Saturdays, Sundays, and Holidays). On those days, report "AN" on the monthly report form.

D. Composite samples shall be comprised of at least three grab samples proportionate in volume to the sewage flow rate at the time of sampling and collected at intervals of at least 30 minutes, but not more than 2 hours, during the period that the plant is staffed on each day for sampling. Such samples shall be collected at such times and locations, and in such fashion, as to be representative of the facility's overall performance.

E. Grab samples shall be collected at such times and locations, and in such fashion, as to be representative of the facility's performance.

F. Water quality based permit limitations in this permit may be revised based on updated wasteload allocations or use designation rules. This permit may be modified, or revoked and reissued, to include new water quality based effluent limits or other conditions that are necessary to comply with a revised wasteload allocation, or an approved total maximum daily loads (TMDL) report as required under Section 303 (d) of the Clean Water Act.

G. Not later than 4 months from the effective date of this permit, the permittee shall post a permanent marker on the stream bank at each outfall that is regulated under this NPDES permit and discharges to the Cuyahoga River. This includes final outfalls, bypasses, and combined sewer overflows. The marker shall consist at a minimum of the name of the establishment to which the permit was issued, the Ohio EPA permit number, and the outfall number and a contact telephone number. The information shall be printed in letters not less than two inches in height. The marker shall be a minimum of 2 feet by 2 feet and shall be a minimum of 3 feet above ground level. The sign shall be not be obstructed such that persons in boats or persons swimming on the river or someone fishing or walking along the shore cannot read the sign. Vegetation shall be periodically removed to keep the sign visible. If the outfall is normally submerged the sign shall indicate that. If the outfall is a combined sewer outfall, the sign shall indicate that untreated human sewage may be discharged from the outfall during wet weather and that harmful bacteria may be present in the water.

PART III - GENERAL CONDITIONS

1. DEFINITIONS

"Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

"Average weekly" discharge limitation means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. Each of the following 7-day periods is defined as a calendar week: Week 1 is Days 1 - 7 of the month; Week 2 is Days 8 - 14; Week 3 is Days 15 - 21; and Week 4 is Days 22 - 28. If the "daily discharge" on days 29, 30 or 31 exceeds the "average weekly" discharge limitation, Ohio EPA may elect to evaluate the last 7 days of the month as Week 4 instead of Days 22 - 28. Compliance with fecal coliform bacteria or E coli bacteria limitations shall be determined using the geometric mean.

"Average monthly" discharge limitation means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month. Compliance with fecal coliform bacteria or E coli bacteria limitations shall be determined using the geometric mean.

"85 percent removal" means the arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.

"Absolute Limitations" Compliance with limitations having descriptions of "shall not be less than," "nor greater than," "shall not exceed," "minimum," or "maximum" shall be determined from any single value for effluent samples and/or measurements collected.

"Net concentration" shall mean the difference between the concentration of a given substance in a sample taken of the discharge and the concentration of the same substances in a sample taken at the intake which supplies water to the given process. For the purpose of this definition, samples that are taken to determine the net concentration shall always be 24-hour composite samples made up of at least six increments taken at regular intervals throughout the plant day.

"Net Load" shall mean the difference between the load of a given substance as calculated from a sample taken of the discharge and the load of the same substance in a sample taken at the intake which supplies water to given process. For purposes of this definition, samples that are taken to determine the net loading shall always be 24-hour composite samples made up of at least six increments taken at regular intervals throughout the plant day.

"MGD" means million gallons per day.

"mg/l" means milligrams per liter.

"ug/l" means micrograms per liter.

"ng/l" means nanograms per liter.

"S.U." means standard pH unit.

"kg/day" means kilograms per day.

"Reporting Code" is a five digit number used by the Ohio EPA in processing reported data. The reporting code does not imply the type of analysis used nor the sampling techniques employed.

"Quarterly (1/Quarter) sampling frequency" means the sampling shall be done in the months of March, June, August, and December, unless specifically identified otherwise in the Effluent Limitations and Monitoring Requirements table.

"Yearly (1/Year) sampling frequency" means the sampling shall be done in the month of September, unless specifically identified otherwise in the effluent limitations and monitoring requirements table.

"Semi-annual (2/Year) sampling frequency" means the sampling shall be done during the months of June and December, unless specifically identified otherwise.

"Winter" shall be considered to be the period from November 1 through April 30.

"Bypass" means the intentional diversion of waste streams from any portion of the treatment facility.

"Summer" shall be considered to be the period from May 1 through October 31.

"Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

"Sewage sludge" means a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works as defined in section 6111.01 of the Revised Code. "Sewage sludge" includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes. "Sewage sludge" does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator, grit and screenings generated during preliminary treatment of domestic sewage in a treatment works, animal manure, residue generated during treatment of animal manure, or domestic septage.

"Sewage sludge weight" means the weight of sewage sludge, in dry U.S. tons, including admixtures such as liming materials or bulking agents. Monitoring frequencies for sewage sludge parameters are based on the reported sludge weight generated in a calendar year (use the most recent calendar year data when the NPDES permit is up for renewal).

"Sewage sludge fee weight" means the weight of sewage sludge, in dry U.S. tons, excluding admixtures such as liming materials or bulking agents. Annual sewage sludge fees, as per section 3745.11(Y) of the Ohio Revised Code, are based on the reported sludge fee weight for the most recent calendar year.

2. GENERAL EFFLUENT LIMITATIONS

The effluent shall, at all times, be free of substances:

A. In amounts that will settle to form putrescent, or otherwise objectionable, sludge deposits; or that will adversely affect aquatic life or water fowl;

B. Of an oily, greasy, or surface-active nature, and of other floating debris, in amounts that will form noticeable accumulations of scum, foam or sheen;

C. In amounts that will alter the natural color or odor of the receiving water to such degree as to create a nuisance;

D. In amounts that either singly or in combination with other substances are toxic to human, animal, or aquatic life;

E. In amounts that are conducive to the growth of aquatic weeds or algae to the extent that such growths become inimical to more desirable forms of aquatic life, or create conditions that are unsightly, or constitute a nuisance in any other fashion;

F. In amounts that will impair designated instream or downstream water uses.

3. FACILITY OPERATION AND QUALITY CONTROL

All wastewater treatment works shall be operated in a manner consistent with the following:

A. At all times, the permittee shall maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee necessary to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with conditions of the permit.

B. The permittee shall effectively monitor the operation and efficiency of treatment and control facilities and the quantity and quality of the treated discharge.

C. Maintenance of wastewater treatment works that results in degradation of effluent quality shall be scheduled during non-critical water quality periods and shall be carried out in a manner approved by Ohio EPA as specified in the Paragraph in the PART III entitled, "UNAUTHORIZED DISCHARGES".

4. REPORTING

A. Monitoring data required by this permit shall be submitted monthly on Ohio EPA 4500 Discharge Monitoring Report (DMR) forms using the electronic DMR (e-DMR) internet application. e-DMR allows permitted facilities to enter, sign, and submit DMRs on the internet. e-DMR information is found on the following web page:

http://www.epa.ohio.gov/dsw/edmr/eDMR.aspx

Alternatively, if you are unable to use e-DMR due to a demonstrated hardship, monitoring data may be submitted on paper DMR forms provided by Ohio EPA. Monitoring data shall be typed on the forms. Please contact Ohio EPA, Division of Surface Water at (614) 644-2050 if you wish to receive paper DMR forms.

B. DMRs shall be signed by a facility's Responsible Official or a Delegated Responsible Official (i.e. a person delegated by the Responsible Official). The Responsible Official of a facility is defined as:

1. For corporations - a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

2. For partnerships - a general partner;

3. For a sole proprietorship - the proprietor; or,

4. For a municipality, state or other public facility - a principal executive officer, a ranking elected official or other duly authorized employee.

For e-DMR, the person signing and submitting the DMR will need to obtain an eBusiness Center account and Personal Identification Number (PIN). Additionally, Delegated Responsible Officials must be delegated by the Responsible Official, either on-line using the eBusiness Center's delegation function, or on a paper delegation form provided by Ohio EPA. For more information on the PIN and delegation processes, please view the following web page:

http://epa.ohio.gov/dsw/edmr/eDMR.aspx

C. DMRs submitted using e-DMR shall be submitted to Ohio EPA by the 20th day of the month following the month-of-interest. DMRs submitted on paper must include the original signed DMR form and shall be mailed to Ohio EPA at the following address so that they are received no later than the 15th day of the month following the month-of-interest:

Ohio Environmental Protection Agency
Lazarus Government Center
Division of Surface Water - PCU
P.O. Box 1049
Columbus, Ohio 43216-1049

D. If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in Section 5. SAMPLING AND ANALYTICAL METHODS, the results of such monitoring shall be included in the calculation and reporting of the values required in the reports specified above.

E. Analyses of pollutants not required by this permit, except as noted in the preceding paragraph, shall not be reported to the Ohio EPA, but records shall be retained as specified in Section 7. RECORDS RETENTION.

5. SAMPLING AND ANALYTICAL METHOD

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored flow. Test procedures for the analysis of pollutants shall conform to regulation 40 CFR 136, "Test Procedures For The Analysis of Pollutants" unless other test procedures have been specified in this permit. The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to insure accuracy of measurements.

6. RECORDING OF RESULTS

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

A. The exact place and date of sampling; (time of sampling not required on EPA 4500)

B. The person(s) who performed the sampling or measurements;

C. The date the analyses were performed on those samples;

D. The person(s) who performed the analyses;

E. The analytical techniques or methods used; and

F. The results of all analyses and measurements.

7. RECORDS RETENTION

The permittee shall retain all of the following records for the wastewater treatment works for a minimum of three years except those records that pertain to sewage sludge disposal, use, storage, or treatment, which shall be kept for a minimum of five years, including:

A. All sampling and analytical records (including internal sampling data not reported);

B. All original recordings for any continuous monitoring instrumentation;

C. All instrumentation, calibration and maintenance records;

D. All plant operation and maintenance records;

E. All reports required by this permit; and

F. Records of all data used to complete the application for this permit for a period of at least three years, or five years for sewage sludge, from the date of the sample, measurement, report, or application.

These periods will be extended during the course of any unresolved litigation, or when requested by the Regional Administrator or the Ohio EPA. The three year period, or five year period for sewage sludge, for retention of records shall start from the date of sample, measurement, report, or application.

8. AVAILABILITY OF REPORTS

Except for data determined by the Ohio EPA to be entitled to confidential status, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the appropriate district offices of the Ohio EPA. Both the Clean Water Act and Section 6111.05 Ohio Revised Code state that effluent data and receiving water quality data shall not be considered confidential.

9. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking, and reissuing, or terminating the permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

10. RIGHT OF ENTRY

The permittee shall allow the Director or an authorized representative upon presentation of credentials and other documents as may be required by law to:

A. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.

B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit.

C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.

D. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

11. UNAUTHORIZED DISCHARGES

A. Bypass Not Exceeding Limitations - The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 11.B and 11.C.

B. Notice

1. Anticipated Bypass - If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

2. Unanticipated Bypass - The permittee shall submit notice of an unanticipated bypass as required in paragraph 12.B (24 hour notice).

C. Prohibition of Bypass

1. Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

c. The permittee submitted notices as required under paragraph 11.B.

2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 11.C.1.

12. NONCOMPLIANCE NOTIFICATION

A. Exceedance of a Daily Maximum Discharge Limit

1. The permittee shall report noncompliance that is the result of any violation of a daily maximum discharge limit for any of the pollutants listed by the Director in the permit by e-mail or telephone within twenty-four (24) hours of discovery.

The permittee may report to the appropriate Ohio EPA district office e-mail account as follows (this method is preferred):

Southeast District Office: sedo24hournpdes@epa.state.oh.us
Southwest District Office: swdo24hournpdes@epa.state.oh.us
Northwest District Office: nwdo24hournpdes@epa.state.oh.us
Northeast District Office: nedo24hournpdes@epa.state.oh.us
Central District Office: cdo24hournpdes@epa.state.oh.us
Central Office: co24hournpdes@epa.state.oh.us

The permittee shall attach a noncompliance report to the e-mail. A noncompliance report form is available on the following web site under the Monitoring and Reporting - Non-Compliance Notification section:

http://epa.ohio.gov/dsw/permits/individuals.aspx

Or, the permittee may report to the appropriate Ohio EPA district office by telephone toll-free between 8:00 AM and 5:00 PM as follows:

Southeast District Office: (800) 686-7330
Southwest District Office: (800) 686-8930
Northwest District Office: (800) 686-6930
Northeast District Office: (800) 686-6330
Central District Office: (800) 686-2330
Central Office: (614) 644-2001

The permittee shall include the following information in the telephone noncompliance report:

a. The name of the permittee, and a contact name and telephone number;

b. The limit(s) that has been exceeded;

c. The extent of the exceedance(s);

d. The cause of the exceedance(s);

e. The period of the exceedance(s) including exact dates and times;

f. If uncorrected, the anticipated time the exceedance(s) is expected to continue; and,

g. Steps taken to reduce, eliminate or prevent occurrence of the exceedance(s).

B. Other Permit Violations

1. The permittee shall report noncompliance that is the result of any unanticipated bypass resulting in an exceedance of any effluent limit in the permit or any upset resulting in an exceedance of any effluent limit in the permit by e-mail or telephone within twenty-four (24) hours of discovery.

The permittee may report to the appropriate Ohio EPA district office e-mail account as follows (this method is preferred):

Southeast District Office: sedo24hournpdes@epa.state.oh.us
Southwest District Office: swdo24hournpdes@epa.state.oh.us
Northwest District Office: nwdo24hournpdes@epa.state.oh.us
Northeast District Office: nedo24hournpdes@epa.state.oh.us
Central District Office: cdo24hournpdes@epa.state.oh.us
Central Office: co24hournpdes@epa.state.oh.us

The permittee shall attach a noncompliance report to the e-mail. A noncompliance report form is available on the following web site:

http://www.epa.ohio.gov/dsw/permits/permits.aspx

Or, the permittee may report to the appropriate Ohio EPA district office by telephone toll-free between 8:00 AM and 5:00 PM as follows:

Southeast District Office: (800) 686-7330
Southwest District Office: (800) 686-8930
Northwest District Office: (800) 686-6930
Northeast District Office: (800) 686-6330
Central District Office: (800) 686-2330
Central Office: (614) 644-2001

The permittee shall include the following information in the telephone noncompliance report:

a. The name of the permittee, and a contact name and telephone number;

b. The time(s) at which the discharge occurred, and was discovered;

c. The approximate amount and the characteristics of the discharge;

d. The stream(s) affected by the discharge;

e. The circumstances which created the discharge;

f. The name and telephone number of the person(s) who have knowledge of these circumstances;

g. What remedial steps are being taken; and,

h. The name and telephone number of the person(s) responsible for such remedial steps.

2. The permittee shall report noncompliance that is the result of any spill or discharge which may endanger human health or the environment within thirty (30) minutes of discovery by calling the 24-Hour Emergency Hotline toll-free at (800) 282-9378. The permittee shall also report the spill or discharge by e-mail or telephone within twenty-four (24) hours of discovery in accordance with B.1 above.

C. When the telephone option is used for the noncompliance reports required by A and B, the permittee shall submit to the appropriate Ohio EPA district office a confirmation letter and a completed noncompliance report within five (5) days of the discovery of the noncompliance. This follow up report is not necessary for the e-mail option which already includes a completed noncompliance report.

D. If the permittee is unable to meet any date for achieving an event, as specified in a schedule of compliance in their permit, the permittee shall submit a written report to the appropriate Ohio EPA district office within fourteen (14) days of becoming aware of such a situation. The report shall include the following:

1. The compliance event which has been or will be violated;

2. The cause of the violation;

3. The remedial action being taken;

4. The probable date by which compliance will occur; and,

5. The probability of complying with subsequent and final events as scheduled.

E. The permittee shall report all other instances of permit noncompliance not reported under paragraphs A or B of this section on their monthly DMR submission. The DMR shall contain comments that include the information listed in paragraphs A or B as appropriate.

F. If the permittee becomes aware that it failed to submit an application, or submitted incorrect information in an application or in any report to the director, it shall promptly submit such facts or information.

13. RESERVED

14. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

15. AUTHORIZED DISCHARGES

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than, or at a level in excess of, that authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such violations may result in the imposition of civil and/or criminal penalties as provided for in Section 309 of the Act and Ohio Revised Code Sections 6111.09 and 6111.99.

16. DISCHARGE CHANGES

The following changes must be reported to the appropriate Ohio EPA district office as soon as practicable:

A. For all treatment works, any significant change in character of the discharge which the permittee knows or has reason to believe has occurred or will occur which would constitute cause for modification or revocation and reissuance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. Notification of permit changes or anticipated noncompliance does not stay any permit condition.

B. For publicly owned treatment works:

1. Any proposed plant modification, addition, and/or expansion that will change the capacity or efficiency of the plant;

2. The addition of any new significant industrial discharge; and

3. Changes in the quantity or quality of the wastes from existing tributary industrial discharges which will result in significant new or increased discharges of pollutants.

C. For non-publicly owned treatment works, any proposed facility expansions, production increases, or process modifications, which will result in new, different, or increased discharges of pollutants.

Following this notice, modifications to the permit may be made to reflect any necessary changes in permit conditions, including any necessary effluent limitations for any pollutants not identified and limited herein. A determination will also be made as to whether a National Environmental Policy Act (NEPA) review will be required. Sections 6111.44 and 6111.45, Ohio Revised Code, require that plans for treatment works or improvements to such works be approved by the Director of the Ohio EPA prior to initiation of construction.

D. In addition to the reporting requirements under 40 CFR 122.41(l) and per 40 CFR 122.42(a), all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis of any toxic pollutant which is not limited in the permit. If that discharge will exceed the highest of the "notification levels" specified in 40 CFR Sections 122.42(a)(1)(i) through 122.42(a)(1)(iv).

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the "notification levels" specified in 122.42(a)(2)(i) through 122.42(a)(2)(iv).

17. TOXIC POLLUTANTS

The permittee shall comply with effluent standards or prohibitions established under Section 307 (a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement. Following establishment of such standards or prohibitions, the Director shall modify this permit and so notify the permittee.

18. PERMIT MODIFICATION OR REVOCATION

A. After notice and opportunity for a hearing, this permit may be modified or revoked, by the Ohio EPA, in whole or in part during its term for cause including, but not limited to, the following:

1. Violation of any terms or conditions of this permit;

2. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

3. Change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

B. Pursuant to rule 3745-33-04, Ohio Administrative Code, the permittee may at any time apply to the Ohio EPA for modification of any part of this permit. The filing of a request by the permittee for a permit modification or revocation does not stay any permit condition. The application for modification should be received by the appropriate Ohio EPA district office at least ninety days before the date on which it is desired that the modification become effective. The application shall be made only on forms approved by the Ohio EPA.

19. TRANSFER OF OWNERSHIP OR CONTROL

This permit may be transferred or assigned and a new owner or successor can be authorized to discharge from this facility, provided the following requirements are met:

A. The permittee shall notify the succeeding owner or successor of the existence of this permit by a letter, a copy of which shall be forwarded to the appropriate Ohio EPA district office. The copy of that letter will serve as the permittee's notice to the Director of the proposed transfer. The copy of that letter shall be received by the appropriate Ohio EPA district office sixty (60) days prior to the proposed date of transfer;

B. A written agreement containing a specific date for transfer of permit responsibility and coverage between the current and new permittee (including acknowledgement that the existing permittee is liable for violations up to that date, and that the new permittee is liable for violations from that date on) shall be submitted to the appropriate Ohio EPA district office within sixty days after receipt by the district office of the copy of the letter from the permittee to the succeeding owner;

At anytime during the sixty (60) day period between notification of the proposed transfer and the effective date of the transfer, the Director may prevent the transfer if he concludes that such transfer will jeopardize compliance with the terms and conditions of the permit. If the Director does not prevent transfer, he will modify the permit to reflect the new owner.

20. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

21. SOLIDS DISPOSAL

Collected grit and screenings, and other solids other than sewage sludge, shall be disposed of in such a manner as to prevent entry of those wastes into waters of the state, and in accordance with all applicable laws and rules.

22. CONSTRUCTION AFFECTING NAVIGABLE WATERS

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

23. CIVIL AND CRIMINAL LIABILITY

Except as exempted in the permit conditions on UNAUTHORIZED DISCHARGES or UPSETS, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

24. STATE LAWS AND REGULATIONS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

25. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

26. UPSET

The provisions of 40 CFR Section 122.41(n), relating to "Upset," are specifically incorporated herein by reference in their entirety. For definition of "upset," see Part III, Paragraph 1, DEFINITIONS.

27. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

28. SIGNATORY REQUIREMENTS

All applications submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR 122.22.

All reports submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR Section 122.22.

29. OTHER INFORMATION

A. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

B. ORC 6111.99 provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $25,000 per violation.

C. ORC 6111.99 states that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $25,000 per violation.

D. ORC 6111.99 provides that any person who violates Sections 6111.04, 6111.042, 6111.05, or division (A) of Section 6111.07 of the Revised Code shall be fined not more than $25,000 or imprisoned not more than one year, or both.

30. NEED TO HALT OR REDUCE ACTIVITY

40 CFR 122.41(c) states that it shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with conditions of this permit.

31. APPLICABLE FEDERAL RULES

All references to 40 CFR in this permit mean the version of 40 CFR which is effective as of the effective date of this permit.

32. AVAILABILITY OF PUBLIC SEWERS

Not withstanding the issuance or non-issuance of an NPDES permit to a semi-public disposal system, whenever the sewage system of a publicly owned treatment works becomes available and accessible, the permittee operating any semi-public disposal system shall abandon the semi-public disposal system and connect it into the publicly owned treatment works.

SOFTENER ELUTION STUDY

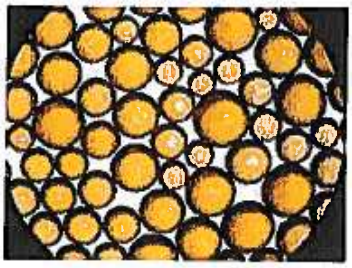
ENGINEERS INC.
ctiengr.com

Softener Elution Study

By James McDonald, PE, CWT
Originally Published: CSCN – July 2006

Ion exchange is a physical process involving velocity, concentration, and time. Regeneration is a combination of the same three ingredients, and if one or two of the variables are askew, proper regeneration will not occur. Then each subsequent regeneration will result in steadily reduced throughput.

During softener regeneration, calcium and magnesium ions are "eluted" from the resin beads with a highly concentrated salt (NaCl) solution. This is one of the most critical steps in the entire ion exchange process and one of the first places for problems to pop up. Monitoring the parameters surrounding this "elution" step, or performing an "elution study," is a very effective and easy investigative tool for the water treatment engineer.



Tools

Tools required to perform an elution study include:

- Salometer: A specialized hydrometer that measures the percent saturation of a brine solution (0-100%).
- 250-mL Graduated Cylinder: This is used as a hydrometer jar for taking the Salometer readings.
- Timer: Stopwatch, wristwatch, etc.
- Graph Paper: To record Salometer readings versus time.

Sampling Points

There are two sampling points for an elution study:

- Brine tank
- Regenerant drain line going to the sewer.

Procedure

1. Measure the concentration of the brine in the brine tank using the salometer. The brine tank should be 90% to 100% saturated (90 to 100 Salometer degrees) at room temperature.

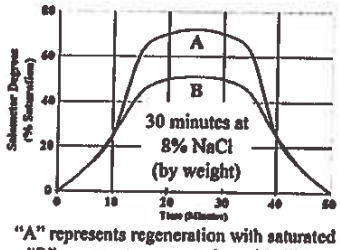
2. Measure the depth of the brine in the brine tank. Also measure the diameter of the brine tank.
3. When the softener is ready for a regeneration and has completed its backwash in the normal manner, make note of the time the brine cycle started.
4. Take a sample from the drain line as soon as the softener switches to the brine cycle. (Be sure the sample is taken at a point before water from a given softener unit has mixed with any other water source.)
5. Transfer the sample to the 250-mL graduated cylinder, insert the Salometer, and take a reading.
6. Take samples every 2 to 3 minutes until the Salometer reading has dropped below 5 Salometer degrees.
7. Make note of the time the brine cycle was complete and measure the final brine depth in the brine tank.
8. Make note of the time when the softener switches from slow rinse to fast rinse.
9. Plot the Salometer readings on graph paper with time (minutes) on the X horizontal axis and Salometer readings on the Y vertical axis.
10. Connect the data points to make a curve.
11. Draw a horizontal line at 30 Salometer degrees.

Interpreting the Results

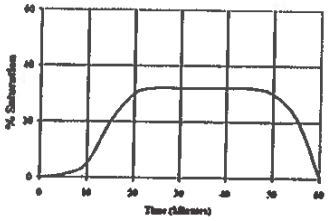
Ideally, there should be 25-30 minutes where the curve is above the 30 Salometer degree reading. This is known as the "30-30 Rule" where a solution of 30 Salometer degrees is in contact with the resin for 30 minutes.

There are a number of operational factors that may affect the appearance of the elution curve. Figure 1 illustrates various possibilities and states possible causes for the shape of each curve. Factors that can adversely affect the elution curve include:

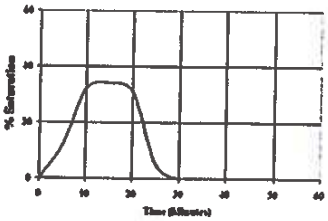
- Not enough brine drawdown.
- Channeling of the resin bed.
- Restricted brine line or eductor resulting in a slow brine draw.
- Restricted distribution system.
- Improper adjustment of brine rinse flowrate.
- Unsaturated brine in brine tank.
- Iron and/or dirt fouling of the zeolite bed.
- Insufficient zeolite bed depth (less than 24 inches, indicating loss of resin).



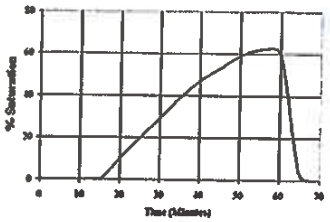
"A" represents regeneration with saturated brine.
"B" represents regeneration with dilute brine.



A good regeneration that uses a minimum of salt.

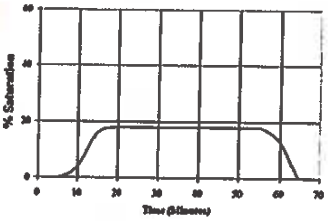


Insufficient brine.
Increase the brine draw time

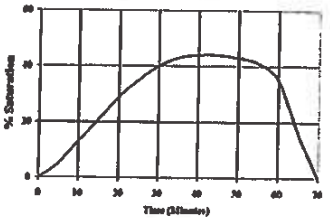


Using more salt than necessary.

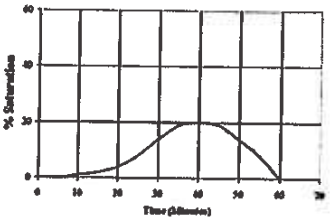
Reduce the brine draw and perhaps decrease slow rinse time.



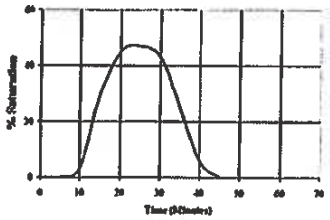
Brine eductor draws too slowly. It should be adjusted to draw brine faster.



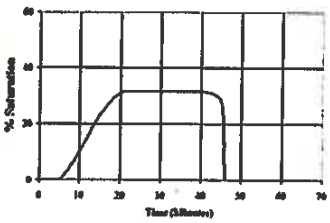
Using more salt than necessary. Reduce brine draw to save salt.



Insufficient brine strength and contact time. Possible remedies are to increase brine draw time, decrease dilution water, and decrease slow rinse rate.



Brine eductor draws too quickly. It should be adjusted to draw brine more slowly.



Brining cycle interrupted by a premature rinse cycle.

Brine Usage

Using the measurements taken on the brine tank (diameter, depth of brine before and after brine draw), the amount of salt used can be calculated. You will need the following information:

- Volume = $\pi r^2 h$
  where $\pi = 3.14$, r = radius, & h = height of brine.
- Assume a void space of 40% between the solid salt pellets.
- At 100% saturation, 1 gallon of brine contains 2.647 pounds of salt.

Conclusions

An unconventional elution curve may not be able to pinpoint the cause of a problem, but it can confirm that a problem exists. After a review of the operating procedure and perhaps an evaluation of a sample of resin has been completed, corrective action can be taken, and a second elution study can confirm that the efficiency of operation has been improved.

References:

- *How to Survey a Sodium Zeolite Water Softener*, Allan Basset, *Analyst*, Winter 2001.
- *Procedures of Industrial Water Treatment*, J. N. Tanis, Ltan, Inc., 1987.
- *Ion Exchange Manual*, Crown Solutions, 1997.

DETAILED COST BREAKDOWNS

CTI PROJECT NUMBER E19018

OHIO DEPARTMENT OF NATURAL RESOURCES
CITY OF CUYAHOGA FALLS
STUDY
MASTER OPINION OF PROBABLE COST OF CONSTRUCTION
August 4, 2020

WATER TREATMENT PLANT REHABILITATION

Alternative 1 is to build a new IX building and softener system using in ground, cast in place concrete tanks similar to the existing IX units. All new.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
1	**DIVISION 1: GENERAL CONDITIONS**									
	Temporary Construction Facilities									
	includes - Job Trailer				12	MONTH		$1,000	$1,000	$12,000
	includes - Port-o-Johns				12	MONTH		$300	$300	$3,600
	includes - Dumpster				6	MONTH		$500	$500	$3,000
	includes - Dewatering				1	LS		$100,000	$100,000	$100,000
	includes - Laydown Yard				1	LS		$1,500	$1,500	$1,500
	includes - Bypass Pumping				1	LS		$15,000	$15,000	$15,000
	SUBTOTAL									**$135,100**
2	**DIVISION 2: EXISTING CONDITIONS**									
	02 41 16.17 - Building Demolition Footings and Foundations									
	Exterior Walls Removed (Brick)				6060	SF			$3.97	$24,058
	Glazed Tile Interior Walls Removed				2800	SF			$1.24	$3,472
	Glazed Tile + Brick Exterior Walls Removed				960	SF			$5.21	$5,002
	Roof Joists Removed - 4x12				2100	LF			$5.50	$11,550
	Wood Deck removed				3850	SF			$0.45	$1,733
	Wood Trusses removed				10	Ea.			$58.00	$580
	Steel Rafters				20	Ea.			$60.00	$1,200
	West Wing Concrete Tanks Abandoned, Hardware Removed, emptied				4	EA		$1,000	$1,000	$4,000
	West Wing Concrete Tanks Removed				176	CY			$350	$61,704

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REV 1

ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
	LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
East Wing Concrete Tanks Abandoned				4	EA		$1,000	$1,000	$4,000
East Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	15.00	18.00	8.00	0	CY	$60		$60	$0
East Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	10.00	11.00	8.00	0	CY	$60		$60	$0
East Wing Slab Removed, 6-inch, reinforced	4.00	25.00		0	SF		$22	$22	$0
Engineered Fill, as needed	20.00	20.00	5.00	0	CY	$75		$75	$0
West Wing Concrete Tanks Removed				4	EA		$4,000	$4,000	$16,000
West Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	15.00	18.00	8.00	0	CY	$60		$60	$0
West Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	10.00	11.00	8.00	0	CY	$60		$60	$0
West Wing Slab Removed, 6-inch, reinforced	4.00	25.00		100	SF		$22	$22	$2,226
Engineered Fill, as needed	20.00	20.00	5.00	74	CY	$75		$75	$5,556
removed	15.00	18.00	2.00	540	SF		$1	$1	$648
Main Hall Intereior Wall Removed (CMU)	50.00	15.00		750	SF		$1	$1	$825
Main Hall Slab Removed, 6-inch, reinforced	55.00	18.00		990	SF		$22	$22	$22,037
Main Hall Roof Removed	55.00	20.00		1100	SF		$75	$75	$82,500
Main Hall Roof Gutter, Trim, and MISC.	200.00			200	LF		$10	$10	$2,000
Basement Exterior Walls Removed (CMU)	55.00	8.00		1320	SF		$1	$1	$1,584
Basement Footings Removed (CIP Concrete-Rebar)	30.00	55.00		170	LF		$17	$17	$2,831
Basement Spiral Staircase Removed				1	EA		$500	$500	$500
Basement Slab Abandoned in place, 6-inch, reinforced	4.00	25.00		100	SF		$20	$20	$2,000
Basement Process Piping, Removed in Place, 12" & under				600	LF		$20	$20	$12,000
Basement Process Piping, Removed in Place, 14" and up				300	LF		$30	$30	$9,000
Basement Process Brine Pumps Removed				2	EA		$250	$250	$500
02 82 00 - Asbestos Abatement									
JF Construction Quote, Asbestos Abatement				1	LS		$52,690	$52,690	$52,690
02 83 00 - Lead Abatement									
JF Construction Quote, Lead Abatement				1	LS		$131,478	$131,478	$131,478
SUBTOTAL									**$461,672**

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WATER TREATMENT PLANT REHABILITATION

Alternative 1 is to build a new IX building and softener system using in ground, cast in place concrete tanks simlar to the existing IX units. All new.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
3	**DIVISION 3: CONCRETE**									
	Footings and Walls									
	Footing for West Wing	70.00	4.00	1.50	16	CY			$400	$6,222
	Walls for West Wing	302.00	1.00	14.00	157	CY			$400	$62,637
	Slabs									
	12" Slab in East wing	70.00	20.00	1.00	52	CY			$765	$39,667
	West New Tanks	70.00	27.00	1.50	105	CY			$470	$49,350
	Sidewalk & Stairs									
	ADA Ramp, 6' wide	20.00	6.00	1.00	4	CY	$80	$20	$100	$444
	Concrete Steps, Front and Back, 10' wide	12.00	10.00	3.00	13	CY	$80	$15	$95	$1,267
	Concrete Sidewalk, full wrap, 5' wide, reinforced	210.00	5.00	0.33	13	CY	$80	$10	$90	$1,166
	Concrete IX Softening Beds - Rectangular									
	West Wing Tanks, Cast in place, reinforced	12.00	12.00	15.00	4	EA	$50,000		$50,000	$200,000
	West wing Tanks, grout, inflated for hardware				4	EA	$15,000		$15,000	$60,000
	Repurpose East Wing Tanks, Brine storage, Liner, Tnemec Quote, 4 ea	12.00	12.00	10.00	2496	CY	$15	$10	$25	$124,800
	Line Existing Brine Storage, Tnemec Quote	19.00	27.00	7.00	779	SF	$10	$5	$15	$23,370
	Line Existing Treated Water Clearwell, Tnemec Quote	22.00	15.00	6.00	594	SF	$10	$5	$15	$17,820
	SUBTOTAL									**$586,743**
4	**DIVISION 4: MASONRY**									
	Exterior Walls									
	CMU, 12-inch, Reinforced	264.00		14.00	3696	SF			$16	$59,506
	Brick Face, 4" x 16", Weep Holes, Incl Soldier Rows				3696	SF	$20		$20	$73,920
	Interior Walls									
	CMU, 8-inch, Reinforced	140.00		20.00	2800	SF	$18		$10	$29,260
	SUBTOTAL									**$162,686**

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REV 1

	ITEMS		DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
			LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
5	**DIVISION 7: THERMAL & MOISTURE PROTECTION**										
	Roofing										
	Assume Truss roof system										
	Wood Trusses		70.00	62.00		4340	SF			$3	$13,367
	Roof Sheathing					5425	SF			$2	$11,121
	Ceiling Sheathing					4340	SF			$2	$7,725
	FRP Panel					4340	SF			$3	$13,758
	Roof Insulation					4340	SF			$2	$8,854
	Roof Panels					5425	SF			$9	$48,554
		SUBTOTAL									**$103,379**
6	**DIVISION 8: DOORS & WINDOWS**										
	Doors & Windows										
	Exterior Doors					2	EA	$3,000	$700	$3,700	$7,400
	Interior Doors					6	EA	$2,000	$500	$2,500	$15,000
	Exterior Windows					10	EA	$2,400	$1,000	$3,400	$34,000
	Openings MISC					1	EA	$500	$500	$1,000	$1,000
		SUBTOTAL									**$57,400**
7	**DIVISION 26: ELECTRICAL**										
	Electrical Improvements										
	Controls & SCADA					1	LS		$78,000	$78,000	$78,000
						1	LS		$250,000	$250,000	$250,000
		SUBTOTAL									**$328,000**
8	**DIVISION 31: EARTHWORK**										
	Seed/Mulch		500.00	25.00		1389	SY		$2.50	$3	$3,472
	Excavation/Backfill/Subgrade Compaction, IX Bldg		100.00	100.00	5.00	1852	CY		$15.00	$15	$27,778
	Excavation/Backfill/Subgrade Compaction, Brine WWTP		60.00	60.00	5.00	667	CY		$15.00	$15	$10,000
		SUBTOTAL									**$41,250**

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REV 1

	ITEMS	DIMENSIONS LENGTH	WIDTH	DEPTH	QUANTITIES		UNIT PRICE MATERIAL	LABOR	SUBTOTAL	ITEM TOTAL
10	**DIVISION 33: UTILITIES**									
	Building Mains & Service									
	Waterline, 3/4" Water Service				200	LF	$15	$16	$31	$6,158
	Core and Boot exist. Manhole				1	EA			$500	$500
	Sanitary Sewer, 6" PVC, SDR-26				100	LF	$38	$26	$64	$6,448
	Sanitary Sewer Lateral, 4" PVC SDR-26				200	LF	$28	$26	$55	$10,908
	Sanitary Connection, P-Trap Assembly & Riser (Lab & Restroom)				2	EA			$800	$1,600
	Sanitary Cleanout				2	EA	$362	$312	$674	$1,347
	IX Softener Process Piping									
	24" Tank Drain, PVC				300	LF	$75	$35	$110	$33,000
	12" Hard Water Influent, PVC				100	LF	$50	$30	$80	$8,000
	12" Soft Water Effluent, PVC				200	LF	$50	$30	$80	$16,000
	8" Hard Water Blend, PVC				200	LF	$40	$25	$65	$13,000
	6" Brine Backwash-Regeneration Line, PVC				100	EA	$35	$20	$55	$5,500
	6" Brine Effluent, PVC				100	EA	$35	$20	$55	$5,500
	Tank Underdrain				1	LS	$159,500	$150,000	$309,500	$309,500
	Resin Regen Brine Pumps, 3 HP, VFD				2	EA	$30,000	$10,000	$40,000	$80,000
	Downflow Lift Pumps, 30HP, VFD				2	EA	$37,950	$10,000	$47,950	$95,900
	Brine Well System Process Piping									
	4" Brine Influent, PVC				100	LF	$50	$35	$85	$8,500
	6" Brine Effluent, PVC				300	LF	$60	$30	$90	$27,000
	4" Bypass, PVC				50	LF	$50	$30	$80	$4,000
	SUBTOTAL									**$632,861**
11	**DIVISION 40: PROCESS INTEGRATION**									
	40 23 13- Brine Well Iron Removal System									
	AOP Quote, Brine Well Iron Removal, 4each, 12' X 12' Filter Cells				1	LS	$539,000		$539,000	$539,000
	SUBTOTAL									**$539,000**
12	**DIVISION 43: LIQUID HANDLING AND STORAGE EQUIPMENT**									
	43 32 53 - Package Bed Ion Exchange, Concrete Tanks									
	AOP Quote, Steel Pressure Vessels, 3,165gpm, w masonry block bldg				0	LS	$2,471,700		$2,471,700	$0
	SUBTOTAL									**$0**
	COMBINED SUBTOTAL									**$3,048,090**

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REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
13	**Overhead & Administrative**									
	Mobilization/Demobilization				1	LS				$15,000
	General Conditions				1	LS				$182,885
	Bonding				1	LS				$30,481
	Contingency				1	LS				$914,427
								TOTAL		$4,268,883
									PROJECT TOTAL	**$4,268,883**

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WATER TREATMENT PLANT REHABILITATION

Alternative 2 is to build a new IX building and softener system using steel pressure vessels as the IX units. All new.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
1	**DIVISION 1: GENERAL CONDITIONS**									
	Temporary Construction Facilities									
	Includes - Job Trailer				12	MONTH		$1,000	$1,000	$12,000
	Includes - Port-o-Johns				12	MONTH		$300	$300	$3,600
	Includes - Dumpster				6	MONTH		$500	$500	$3,000
	Includes - Dewatering				1	LS		$25,000	$25,000	$25,000
	Includes - Laydown Yard				1	LS		$1,500	$1,500	$1,500
	Includes - Bypass Pumping				1	LS		$15,000	$15,000	$15,000
	SUBTOTAL									**$60,100**
2	**DIVISION 2: EXISTING CONDITIONS**									
	02 41 16.17 - Building Demolition									
	Exterior Walls Removed (Brick)				6060	SF			$3.97	$24,058
	Glazed Tile Interior Walls Removed				2800	SF			$1.24	$3,472
	Glazed Tile + Brick Exterior Walls Removed				960	SF			$5.21	$5,002
	Roof Joists Removed - 4x12				2100	LF			$5.50	$11,550
	Wood Deck removed				3850	SF			$0.45	$1,733
	Wood Trusses removed				10	Ea.			$58.00	$580
	Steel Rafters				20	Ea.			$60.00	$1,200

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REV 1

ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
	LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
West Wing Concrete Tanks Abandoned, Hardware Removed, emptied				4	EA		$1,000	$1,000	$4,000
West Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	15.00	18.00	8.00	160	CY	$60		$60	$9,600
West Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	10.00	11.00	8.00	65	CY	$60		$60	$3,911
Engineered Fill, as needed	20.00	20.00	5.00	74	CY	$75		$75	$5,556
East Wing Concrete Tanks Abandoned				4	EA		$1,000	$1,000	$4,000
East Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	15.00	18.00	8.00	160	CY	$60		$60	$9,600
East Wing Concrete Tanks Fill, Aggregate Fill, No 57 Stone, 2 ea tanks	10.00	11.00	8.00	65	CY	$60		$60	$3,911
Engineered Fill, as needed	20.00	20.00	5.00	74	CY	$75		$75	$5,556
Main Hall Roof Gutter, Trim, and MISC.	200.00			200	LF		$10	$10	$2,000
Basement Spiral Staircase Removed				1	EA		$500	$500	$500
Basement Slab Abandoned in place, 6-inch, reinforced	4.00	25.00		100	SF		$20	$20	$2,000
Basement Process Piping, Abandon in Place, 12" & under				400	LF		$8	$8	$3,200
Basement Process Piping, Abandon in Place, 14" and up				100	LF		$18	$18	$1,800
Basement Process Brine Pumps Removed				2	EA		$250	$250	$500
02 82 00 - Asbestos Abatement									
JF Construction Quote, Asbestos Abatement				1	LS		$52,690	$52,690	$52,690
02 83 00 - Lead Abatement									
JF Construction Quote, Lead Abatement				0	LS		$131,478	$131,478	$0
SUBTOTAL									**$156,418**

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REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
3	**DIVISION 3: CONCRETE**									
	Footings and Walls									
	Footing for West Wing	70.00	4.00	1.50	16	CY			$400	$6,222
	Wall for West Wing	84.00	1.50	10.00	47	CY			$400	$18,667
	Slabs									
	12" Slab in W wing	70.00	25.00	1.00	65	CY			$765	$49,583
	Sidewalk & Stairs									
	ADA Ramp, 6' wide	20.00	6.00	1.00	4	CY	$80	$20	$100	$444
	Concrete Steps, Front and Back, 10' wide	12.00	10.00	3.00	13	CY	$80	$15	$95	$1,267
	Concrete Sidewalk, full wrap, 5' wide, reinforced	210.00	5.00	0.33	13	CY	$80	$10	$90	$1,166
	Line Existing Brine Storage Tank, Tnemec Quote	19.00	27.00	7.00	779	SF	$10	$5	$15	$11,685
	Line Existing Treated Water Clearwell, Tnemec Quote	22.00	15.00	6.00	594	SF	$10	$5	$15	$8,910
	Line Existing Concrete Brine Tanks, Repurposed, Tnemec	12.00	12.00	10.00	1536	SF	$10	$5	$15	$46,080
	SUBTOTAL									**$144,024**
4	**DIVISION 4: MASONRY**									
	Exterior Walls									
	CMU, 12-Inch, Reinforced	264.00		20.00	5280	SF			$16	$85,008
	Brick Face, 4" x 16", Weep Holes, incl Soldier Rows				5280	SF	$20		$20	$105,600
	Interior Walls									
	CMU, 8-Inch, Reinforced	140.00		20.00	2800	SF			$10	$29,260
	SUBTOTAL									**$219,868**
5	**DIVISION 7: THERMAL & MOISTURE PROTECTION**									
	Roofing									
	Assume Truss roof system									
	Wood Trusses	70.00	62.00		4340	SF			$3	$13,367
	Roof Sheathing				5425	SF			$2	$11,121
	Ceiling Sheathing				4340	SF			$2	$7,725
	FRP Panel				4340	SF			$3	$13,758
	Roof Insulation				4340	SF			$2	$8,854
	Roof Panels				5425	SF			$9	$48,554
	SUBTOTAL									**$103,379**

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CITY OF CUYAHOGA FALLS
STUDY
MASTER OPINION OF PROBABLE COST OF CONSTRUCTION
August 4, 2020

WATER TREATMENT PLANT REHABILITATION

Alternative 2 is to build a new IX building and softener system using steel pressure vessels as the IX units. All new.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
6	**DIVISION 8: DOORS & WINDOWS**									
	Doors & Windows									
	Exterior Doors				2	EA	$3,000	$700	$3,700	$7,400
	Interior Doors				6	EA	$2,000	$500	$2,500	$15,000
	Exterior Windows				10	EA	$2,400	$1,000	$3,400	$34,000
	Openings MISC				1	EA	$500	$500	$1,000	$1,000
	SUBTOTAL									**$57,400**
7	**DIVISION 26: ELECTRICAL**									
	Electrical Improvements				1	LS		$53,000	$53,000	$53,000
	SUBTOTAL									**$53,000**
8	**DIVISION 31: EARTHWORK**									
	Seed/Mulch	500.00	25.00		1389	SY		$2.50	$3	$3,472
	Excavation/Backfill/Subgrade Compaction, IX Bldg	100.00	100.00	10.00	3704	CY		$15.00	$15	$55,556
	Excavation/Backfill/Subgrade Compaction, Brine WWTP	60.00	60.00	5.00	667	CY		$15.00	$15	$10,000
	SUBTOTAL									**$69,028**
10	**DIVISION 33: UTILITIES**									
	Building Mains & Service									
	Waterline, 3/4" Water Service				200	LF	$15	$16	$31	$6,158
	Core and Boot exist. Manhole				1	EA			$500	$500
	Sanitary Sewer, 6" PVC, SDR-26				100	LF	$38	$26	$64	$6,448
	Sanitary Sewer Lateral, 4" PVC SDR-26				200	LF	$28	$26	$55	$10,908
	Sanitary Connection, P-Trap Assembly & Riser (Lab & Restroom)				2	EA			$800	$1,600
	Sanitary Cleanout				2	EA	$362	$312	$674	$1,347
	IX Softener Process Piping									
	8" Tank Drain, PVC				0	LF	$60	$35	$95	$0
	12" Hard Water Influent, PVC				0	LF	$50	$30	$80	$0
	12" Soft Water Effluent, PVC				0	LF	$50	$30	$80	$0
	8" Hard Water Blend, PVC				0		$40	$25	$65	$0
	6" Brine Backwash-Regeneration Line, PVC				0	EA	$35	$20	$55	$0
	6" Brine Effluent, PVC				0	EA	$35	$20	$55	$0
	Resin Regen Brine Pumps, 3 HP, VFD				0	EA	$30,000	$10,000	$40,000	$0
	Downflow Lift Pumps, 30HP, VFD				0	EA	$37,950	$10,000	$47,950	$0
	Brine Well System Process Piping									
	4" Brine Influent, PVC				100	LF	$50	$35	$85	$8,500
	6" Brine Effluent, PVC				300	LF	$60	$30	$90	$27,000
	4" Bypass, PVC				50	LF	$50	$30	$80	$4,000
	SUBTOTAL									**$66,461**

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WATER TREATMENT PLANT REHABILITATION

Alternative 2 is to build a new IX building and softener system using steel pressure vessels as the IX units. All new.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
11	**DIVISION 40: PROCESS INTEGRATION**									
	40 23 13- Brine Well Iron Removal System									
	AOP Quote, Brine Well Iron Removal, 4each, 12' X 12' Filter Cells				1	LS	$539,000		$539,000	$539,000
	SUBTOTAL									$539,000
12	**DIVISION 43: LIQUID HANDLING AND STORAGE EQUIPMENT**									
	43 32 53 - Package Bed Ion Exchange Vessels									
	AOP Quote, Steel Pressure Vessels, 3,165gpm, w masonry block bldg				1	LS	$1,851,000		$1,851,000	$1,851,000
	SUBTOTAL									$1,851,000
	COMBINED SUBTOTAL									$3,319,677
13	**Overhead & Administrative**									
	Mobilization/Demobilization				1	LS				$15,000
	General Conditions				1	LS				$199,181
	Bonding				1	LS				$33,197
	Contingency				1	LS				$995,903
								TOTAL		$4,615,958
								PROJECT TOTAL		**$4,615,958**

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WATER TREATMENT PLANT REHABILITATION

Alternative 3 is to rehabilitate the existing building and equipment.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
1	**DIVISION 1: GENERAL CONDITIONS**									
	Temporary Construction Facilities									
	Includes - Job Trailer				12	MONTH		$1,000	$1,000	$12,000
	Includes - Port-o-Johns				12	MONTH		$300	$300	$3,600
	Includes - Dumpster				6	MONTH		$500	$500	$3,000
	Includes - Dewatering				1	LS		$25,000	$25,000	$25,000
	Includes - Laydown Yard				1	LS		$1,500	$1,500	$1,500
	Includes - Bypass Pumping				1	LS		$40,000	$40,000	$40,000
	SUBTOTAL									**$85,100**
2	**DIVISION 2: EXISTING CONDITIONS**									
	02 41 16.17 - Building Demolition Footings and Foundations									
	West Wing of Bldg									
	Interior Walls Patched	60.00	15.00		3600	SF		$5	$5	$18,000
	Exterior Walls Patched	60.00	12.00		2880	SF		$5	$5	$14,400
	Roof Removed	60.00	30.00		2700	SF		$50	$50	$135,000
	Roof Gutter, Trim, and MISC. Removed & Replaced	100.00			100	LF		$30	$30	$3,000

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Alternative 3 is to rehabilitate the existing building and equipment.

REV 1

ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
	LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
East Wing of Bldg									
Interior Walls Patched	60.00	15.00		3600	SF		$5	$5	$18,000
Exterior Walls Patched	60.00	12.00		2880	SF		$5	$5	$14,400
Roof Removed	60.00	30.00		1800	SF		$50	$50	$90,000
Roof Gutter, Trim, and MISC. Removed & Replaced	100.00			100	LF		$30	$30	$3,000
Main Hall of Bldg									
Interior Walls Patched	60.00	30.00		3600	SF		$5	$5	$18,000
Exterior Walls Patched	60.00	30.00		7200	SF		$5	$5	$36,000
Main Hall Roof Removed	60.00	40.00		2400	SF		$50	$50	$120,000
Main Hall Roof Gutter, Trim, and MISC. Removed & Replaced	200.00			200	LF		$30	$30	$6,000
Basement									
Basement Exterior Walls Patched	60.00	30.00		7200	SF		$1	$1	$8,640
Basement Process Brine Pumps Removed & Replaced				2	EA	$25,000	$10,000	$35,000	$70,000
IX Concrete Tanks									
Remove & Replace hardware with SS Hardware				1	LS		$250,000	$250,000	$250,000
02 82 00 - Asbestos Abatement									
JF Construction Quote, Asbestos Abatement				1	LS		$52,690	$52,690	$52,690
02 83 00 - Lead Abatement									
JF Construction Quote, Lead Abatement				1	LS		$131,478	$131,478	$131,478
Misc Demolition Allowance, Repairs deterioration				1	LS		$500,000	$500,000	$500,000
SUBTOTAL									**$1,488,608**

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WATER TREATMENT PLANT REHABILITATION

Alternative 3 is to rehabilitate the existing building and equipment.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
3	**DIVISION 3: CONCRETE**									
	Footings									
	Assume good condition									
	Slabs									
	Assume good condition									
	Sidewalk & Stairs									
	Assume good condition									
	Resin Tanks									
	3-part Polymer Lining	11.00	11.00	10.00	2728	SF	$10	$5	$15	$40,920
	Clearwells									
	New in ground 25000 gal brine storage	20.00	20.00	12.00	50	CF	$500	$100	$600	$30,222
	Line Existing Brine Storage Tank, Tnemec Quote	19.00	27.00	7.00	779	SF	$10	$5	$15	$23,370
	Line Existing Treated Water Clearwell, Tnemec Quote	22.00	15.00	6.00	594	SF	$10	$5	$15	$17,820
	New Brine Storage, 22X22X10 Concrete	22.00	22.00	10.00	179	CF	$250		$250	$89,630
	SUBTOTAL									
4	**DIVISION 4: MASONRY**									**$201,962**
	Exterior Walls									
	CMU, 8-inch, Reinforced	60.00	80.00	20.00	0	SF	$25		$25	$0
	Brick Face, 4" x 16", Weep Holes, incl Soldier Rows	60.00	60.00	20.00	0	SF	$20		$20	$0
	Interior Walls									
	CMU, 8-inch, Reinforced	100.00	100.00	20.00	0	SF	$18		$18	$0
	SUBTOTAL									
5	**DIVISION 7: THERMAL & MOISTURE PROTECTION**									**$0**
	Roofing									
	Main Hall Roof, TRUSSES OR FLAT?	70.00	80.00	20.00	5600	SF	$25		$25	$140,000
	East Wing Roof, TRUSSES OR FLAT?	80.00	30.00	20.00	2400	SF	$20		$20	$48,000
	West Wing Roof, TRUSSES OR FLAT?	80.00	30.00	20.00	2400	SF	$20		$20	$48,000
	SUBTOTAL									
6	**DIVISION 8: DOORS & WINDOWS**									**$236,000**
	Doors & Windows									
	Exterior Doors, Remove & Replace				2	EA	$3,000	$2,000	$5,000	$10,000
	Interior Doors, Remove & Replace				6	EA	$2,000	$1,500	$3,500	$21,000
	Exterior Windows, Remove & Replace				10	EA	$2,400	$3,000	$5,400	$54,000
	Openings MISC				1	EA	$20,000	$10,000	$30,000	$30,000
	SUBTOTAL									**$115,000**

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WATER TREATMENT PLANT REHABILITATION

Alternative 3 is to rehabilitate the existing building and equipment.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
7	**DIVISION 26: ELECTRICAL**									
	Electrical Improvements				1	LS		$123,000	$123,000	$123,000
	Controls / SCADA				1	LS		$250,000	$250,000	$250,000
	SUBTOTAL									**$373,000**
8	**DIVISION 31: EARTHWORK**									
	Seed/Mulch	500.00	25.00		1389	SY		$2.50	$3	$3,472
	Excavation/Backfill/Subgrade Compaction, Brine WWTP	60.00	60.00	5.00	667	CY		$15.00	$15	$10,000
	Excavation/Backfill/Subgrade Compaction, Brine Storage	25.00	25.00	11.00	255	CY		$15.00	$15	$3,819
	SUBTOTAL									**$17,292**
10	**DIVISION 33: UTILITIES**									
	Building Mains & Service									
	Waterline, 3/4" Water Service				500	LF	$15	$16	$31	$15,395
	Sanitary Sewer, 6" PVC, SDR-26				100	LF	$38	$26	$64	$6,448
	Sanitary Sewer Lateral, 4" PVC SDR-26				200	LF	$28	$26	$55	$10,908
	Sanitary Cleanout				2	EA	$362	$312	$674	$1,347
	IX Softener Process Piping									
	24" Tank Drain, PVC				300	LF	$75	$35	$110	$33,000
	12" Hard Water Influent, PVC				100	LF	$60	$30	$90	$9,000
	12" Soft Water Effluent, PVC				200	LF	$60	$30	$90	$18,000
	8" Hard Water Blend, PVC				200		$50	$30	$80	$16,000
	3" Brine Backwash-Regeneration Line, PVC				100	EA	$30	$20	$50	$5,000
	3" Brine Effluent, PVC				100	EA	$30	$20	$50	$5,000
	Tank Underdrain				1	LS	$227,700	$150,000	$377,700	$377,700
	Resin Regen Brine Pumps, rebuild, w VFD				2	EA	$20,000	$10,000	$30,000	$60,000
	Downflow Lift Pumps, 3 HP, rebuild				2	EA	$20,000	$10,000	$30,000	$60,000
	Upflow Lift Pumps, 3 HP, rebuild				1	EA	$20,000	$10,000	$30,000	$30,000
	Upflow Lift Pumps, 3 HP, new redundant, split case				1	EA	$37,950	$10,000	$47,950	$47,950
	Brine Well System Process Piping									
	4" Brine Influent, PVC				100	LF	$50	$35	$85	$8,500
	6" Brine Effluent, PVC				300	LF	$50	$30	$80	$24,000
	4" Bypass, PVC				50	LF	$50	$30	$80	$4,000
	3" Brine Storage Line, PVC				500	LF	$30	$20	$50	$25,000
	SUBTOTAL									**$757,248**

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Alternative 3 is to rehabilitate the existing building and equipment.

REV 1

	ITEMS	DIMENSIONS			QUANTITIES		UNIT PRICE			ITEM TOTAL
		LENGTH	WIDTH	DEPTH			MATERIAL	LABOR	SUBTOTAL	
11	**DIVISION 40: PROCESS INTEGRATION**									
	40 23 13- Brine Well Iron Removal System									
	AOP Quote, Brine Well Iron Removal, 4each, 12' X 12' Filter Cells				1	LS	$539,000		$539,000	$539,000
	SUBTOTAL									**$539,000**
12	**DIVISION 43: LIQUID HANDLING AND STORAGE EQUIPMENT**									
	43 32 53 - Package Bed Ion Exchange Vessels									
	AOP Quote, Steel Pressure Vessels, 3,165gpm, w masonry block bldg				0	LS	$2,471,700		$2,471,700	$0
	SUBTOTAL									**$0**
	COMBINED SUBTOTAL									**$3,813,209**
13	**Overhead & Administrative**									
	Mobilization/Demobilization				1	LS				$20,000
	General Conditions				1	LS				$228,793
	Bonding				1	LS				$38,132
	Contingency				1	LS				$1,143,963
								TOTAL		$5,367,097
									PROJECT TOTAL	**$5,367,097**

PRODUCT DATA SHEETS

CTI ENGINEERS INC.

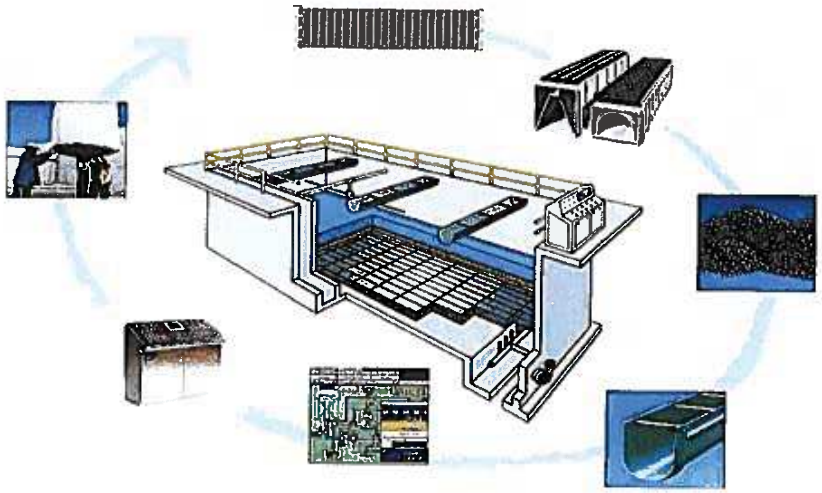
ctiengr.com

LEOPOLD
a xylem brand

Budget Proposal

Cuyahoga Falls WTP

Cuyahoga Falls, OH.



7/2/2020

Xylem Water Solutions USA, Inc.
227 S. Division St.
Zelienople, PA 16063
Mr. Chris Ball
Direct: 724-453-2109
Mobile: 724-713-7145
Email: chris.ball@xyleminc.com

7/2/2020

Project name : Cuyahoga Falls, OH.
Project number : I20279

To Whom It May Concern:

Based on your inquiry, we are pleased to forward the following proposal to your attention. Thank you for the opportunity to offer our equipment and services for the Cuyahoga Falls, OH, WTP project.

We hope that our proposal meets your expectation. If you have any questions, please do not hesitate to contact me or our local representative.

Respectfully,

Chris Ball
Senior Sales Engineer

LEOPOLD
a xylem brand

Table of Contents

1 Technical Description

1.1 SCOPE OF SUPPLY

We are pleased to offer the following materials and services by Xylem Water Solutions USA, Inc. This quotation has been prepared using Leopold specifications.

OPTION 1:

FILTER UNDERDRAIN SYSTEM (UPFLOW FILTERS and DOWN FLOW FILTERS):

LEOPOLD UNIVERSAL® TYPE XA® UNDERDRAIN:

Under this section, we propose to furnish Leopold Universal® Type XA® Underdrain of the Dual/Parallel Lateral type, manufactured from corrosion resistant, high density polyethylene for installation in eight (8) filter cells. Each filter cell measures 11'-0" lateral run x 11'-0". The total filter area is 968 square feet.

The blocks shall be arranged end-to-end and mechanically joined with an O-ring to form continuous underdrain laterals approximately equivalent to the length of the filter cell. The joints shall be gasketed, bell and spigot type with internal alignment tabs for proper alignment, and be air and water tight. Joints shall be snap-lock type so that the blocks are joined with integral interlocking snap lugs and lug receptors for ease of assembly and installation of the laterals, and supplied with carbon steel "L" anchor rods. Epoxy, sealant, bonding agents, or other similar materials used during installation are not included and to be provided by others.

FILTER MEDIA:

Eight (8) filter cells, 121 square feet each
TOTAL FILTER AREA: 968 square feet

997 cubic feet	GRAVEL –12" Depth plus 3% extra	
	1/8" X No.12 -	3 inches (top layer)
	1/4" X 1/8" -	3 inches
	1/2" X 1/4" -	3 inches
	3/4" X 1/2" -	3 inches (bottom layer)
	50 Tons	

OPTION 2:

FILTER UNDERDRAIN SYSTEM (UPFLOW FILTERS and DOWN FLOW FILTERS):

LEOPOLD UNIVERSAL® TYPE XA® UNDERDRAIN:

Under this section, we propose to furnish Leopold Universal® Type XA® Underdrain of the Dual/Parallel Lateral type, manufactured from corrosion resistant, high density polyethylene for installation in eight (8) filter cells. Each filter cell measures 12'-0" lateral run x 12'-0". The total filter area is 1152 square feet.

The blocks shall be arranged end-to-end and mechanically joined with an O-ring to form continuous underdrain laterals approximately equivalent to the length of the filter cell. The joints shall be gasketed, bell and spigot type with internal alignment tabs for proper alignment, and be air and water tight. Joints shall be snap-lock type so that the blocks are joined with integral interlocking snap lugs and lug receptors for ease of assembly and installation of the laterals, and supplied with carbon steel "L" anchor rods. Epoxy, sealant, bonding agents, or other similar materials used during installation are not included and to be provided by others.

WASH TROUGHS:

Under this section, we propose to furnish sixteen (16) Leopold Reinforced Fiberglass Troughs, Leo-Lite No. 87, measuring 12" wide x 14" deep x 12'-0" long, round bottom construction.

Also included is the standard end hanger assembly fabricated from type 316 stainless steel and type 18-8 stainless steel hardware.

Also included shall be type 316 stainless steel stabilizers for stabilization of wash water troughs.

Wash troughs shall have one closed end and one open discharge end with waterstop.

FILTER MEDIA:

Eight (8) filter cells, 144 square feet each
TOTAL FILTER AREA: 1152 square feet

1187 cubic feet — GRAVEL –12" Depth plus 3% extra

1/8" X No.12 -	3 inches (top layer)
1/4" X 1/8" -	3 inches
1/2" X 1/4" -	3 inches
3/4" X 1/2" -	3 inches (bottom layer)

59 Tons

Submittals:

Materials meet and/or exceed American Water Works Association Standard B100 (latest revision) for Filtering Material. Typical samples and/or test reports

detailing the physical and chemical characteristics of the filtering material will be provided for review and approval as required by the specification. If independent testing is required per specification, test reports of the actual material produced will be submitted for approval prior to release for shipment.

Packaging and Placement of Materials:

Material will be packaged in semi-bulk containers, "Super Bags," with lifting sleeves and bottom discharge spout, containing approximately 2,000 to 4,000 pounds per sack. **Pallets are not included in this proposal and can be provided for an additional charge.**

Quantities:

Quantities indicated above are Xylem Water Solutions USA, Inc best calculations of the quantity requirements. Three percent (3%) extra gravel is included to cover incidental damage or loss. Any additional loss of material due to storage or handling is not covered by this proposal.

1.2 SERVICES

MANUFACTURER'S SERVICES (FILTER EQUIPMENT) OPTION 1 and OPTION 2:

The services of a qualified Leopold technical representative to instruct the Contractor's personnel about the proper installation technique of the **filter equipment** will be provided for a period of twelve (12) days (8 hr/day) on site plus four (4) days travel time to and from the job-site in four (4) trips. Additional services may be obtained at the current prevailing rate plus living and travel expenses.

2 Technical Clarification & Deviations

1. Not Used

3 Price & Scope of Supply

3.1 MAIN SCOPE

BASIS of PRICING:

Any items and/or accessories not specifically called out in this quotation must be construed as being furnished by others.

This quotation is considered firm for 90 days. Orders received more than 90 days after the date of this quotation are reviewed by Xylem Water Solutions USA, Inc before acceptance and are subject to changes in prices or delivery depending on conditions existing at the time of entry. Quoted prices are firm for delivery within 12 months from the delivery date stipulated in the plans & specifications or mutually agreed upon by Xylem Water Solutions USA, Inc. and Purchase Order issuer at time of order placement.

We do not include any applicable taxes.

Orders resulting from this quotation should be addressed to Xylem Water Solutions USA, Inc. 227 S. Division St., Zelienople, PA, 16063, USA.

We propose to furnish the material described in this document for **a total budget selling price of**
OPTION 1: $_____.
OPTION 2: $_____.
All prices are DAP Job Site.

For further information pertaining to the equipment contained in this proposal, please contact our area representative, who is:

Harry L. Baker & Associates
1280 SOM Center Rd #215
Cleveland, OH 44124
Phone: 440-461-4577
Fax: 440-461-0429

Attention: Tony Lococo

Pricing is based on the following payment terms (net 30 days):
10% following initial submittal for approval
80% following the date of the respective shipments of the product
5% following installation, not to exceed 150 days after shipment of the product *(whichever comes first)*
5% following start-up, not to exceed 180 days after shipment of the product *(whichever comes first)*

4 Commercial Terms & Conditions

4.1 DELIVERY SCHEDULE

4.1.1 Production schedule

Submittal of mechanical drawings for approval 4 to 6 weeks after order acceptance.

4.1.2 Delivery time

Delivery of fabricated items and filter media 8 to 10 weeks after drawing approval.

FILTER MEDIA WARRANTY (if applicable): SELLER warrants that its filter media products will meet the standards established by the latest edition of AWWA (American Water Works Association) B100. SELLER shall be responsible for verifying that the filter media meets or exceeds the AWWA B100 Standard at the point of sale. Testing shall be by an independent laboratory, which regularly performs testing of filter media. BUYER shall notify Xylem Water Solutions USA, Inc. immediately upon discovery of any defective product. The SELLER shall have the right to inspect said product and BUYER shall, if requested, return the defective product to the SELLER with transportation prepaid. NO LIABILITY IS ASSUMED BY THE SELLER UNDER ANY CIRCUMSTANCES FOR LABOR, MATERIAL OR OTHER COSTS ASSOCIATED WITH THE REMOVAL OR REPLACEMENT OF MEDIA UNLESS PREVIOUSLY APPROVED IN WRITING BY AN AUTHORIZED EMPLOYEE OF THE SELLER.

4.2 TERMS AND CONDITIONS OF SALE – NORTH AMERICA

This order is subject to the Standard Terms and Conditions of Sale – Xylem Americas effective on the date the order is accepted. Terms are available at http://www.xyleminc.com/en-us/Pages/terms-conditions-of-sale.aspx and incorporated herein by reference and made a part of the agreement between parties.
Different terms are hereby rejected unless expressly assented to in writing.

AGREEMENT TO PURCHASE: BUYER agrees to purchase the equipment and services herein in accordance with the terms and conditions set forth above.

_____
(BUYER)

BY:_____

_____

_____

_____, 20 _____

ACCEPTANCE: SELLER hereby accepts BUYER'S offer to purchase.

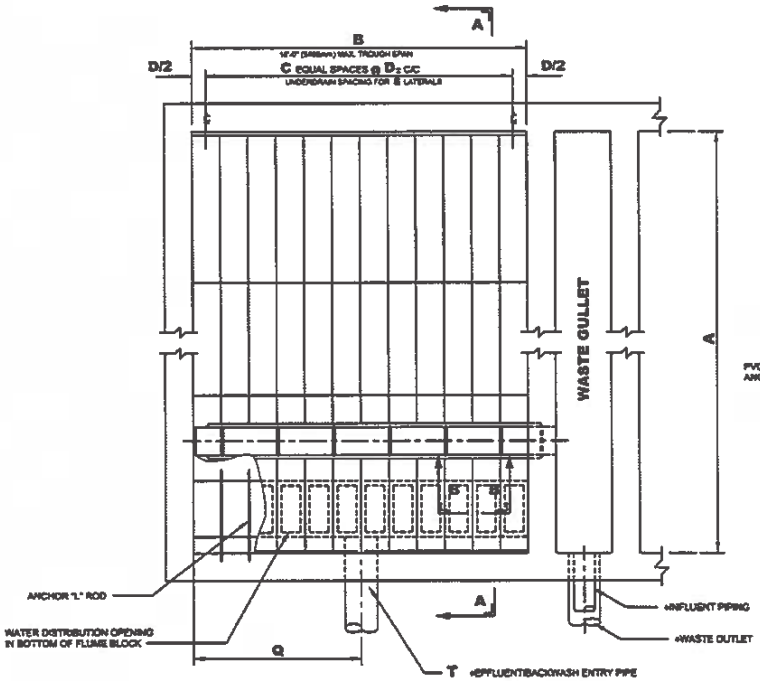
Xylem Water Solutions USA, Inc.

BY:_____

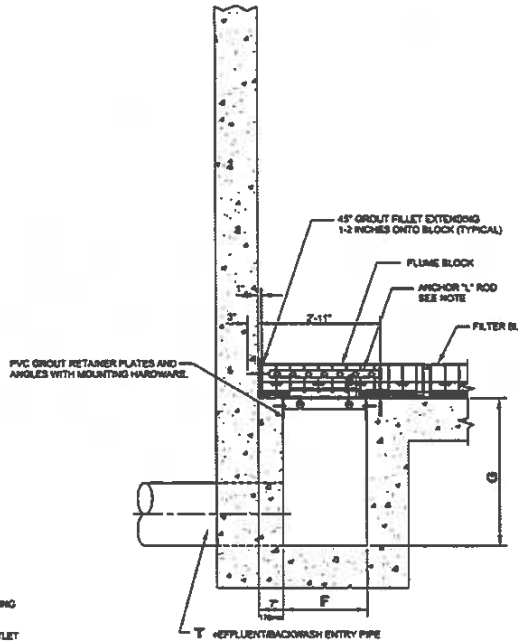
_____

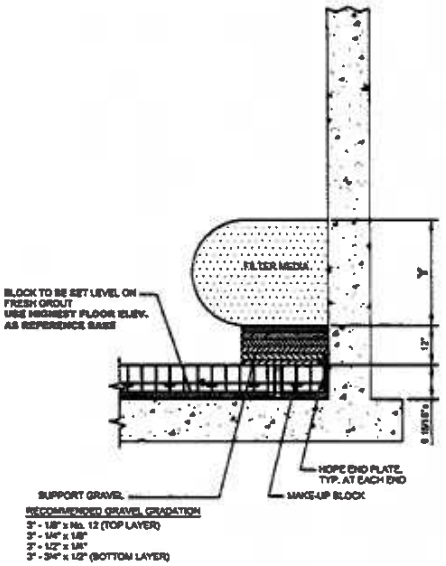
_____

_____, 20 _____



PLAN VIEW

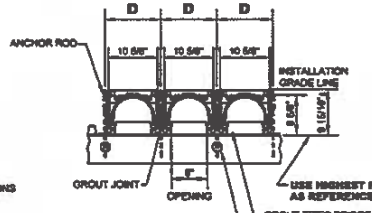




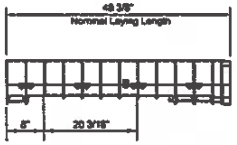
SECTION A-A

NOTES

1. FILTER BLOCK TO BE STRUCTURAL HDPE
2. BRIDGING TO BE INSTALLED BETWEEN FLUME BLOCK TO RETAIN GROUT OVER FLUME
3. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS AND TOLERANCES SHOWN ON THE DRAWINGS AND O&M MANUAL. READ ALL INSTRUCTIONS PRIOR TO RECEIVING, STORING, INSTALLING AND OPERATING FILTER EQUIPMENT.
4. ALL FILTER FLOORS, NEW OR EXISTING, MUST HAVE A ROUGH SURFACE EQUIVALENT TO A MINIMUM 1/8 INCH GROOVE BROOM FINISH PRIOR TO PLACING THE BASE GROUT.
5. BLOWER SYSTEMS WITH PD TYPE BLOWERS MUST INCLUDE AN AUTOMATIC VENT TO ATMOSPHERE VALVE TO CONTROL AIR INTRODUCTION INTO THE FILTER.
6. THE FILTER MUST NOT INCLUDE EXPANSION JOINTS WITHIN THE FILTER BOX.
7. THERE MUST BE A HIGH LOOP IN THE PIPING BETWEEN THE FILTER AND BLOWER LOCATION. THE LOOP SHOULD BE A MINIMUM OF 7 FEET ABOVE THE FILTER OVERFLOW ELEVATION.
8. DIMENSIONS AND OTHER INFORMATION PRESENTED ON THE LEOPOLD PROJECT DRAWINGS REPRESENT LEOPOLD'S BEST INTERPRETATION OF THE PROJECT PLANS AND SPECIFICATIONS AS PREPARED BY OTHERS. AS SUCH, DURING THE APPROVAL PROCESS, THE PURCHASER SHALL THOROUGHLY REVIEW AND VERIFY ALL DIMENSIONS WITH RESPECT TO ACTUAL FIELD CONDITIONS.
9. ANCHOR RODS AND ANCHOR ROD EPOXY MUST BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS AND TOLERANCES SHOWN ON ALL DRAWINGS, THE O&M MANUAL, AND THE EPOXY MANUFACTURER'S INSTRUCTIONS. ENSURE PROPER ANCHOR ROD LOCATION, HOLE SIZES, HEIGHTS, EMBEDMENT DEPTHS, AND EPOXY PENETRATION.



SECTION B-B
SCALE: 1 1/2" = 1'-0"



FRONT FLUME BLOCK

THIS DRAWING IS FOR REFERENCE ONLY
NOT FOR CONSTRUCTION

APPLICATION DATA

PLANT LOCATION:	Cuyahoga Falls, OH (OPTION 1)		
No. OF FILTERS:	8	CELLS PER FILTER:	1
AREA PER FILTER:	121 Sq.Ft.		
FILTER FLOW:	4 GPM / Sq.Ft.		
BACKWASH FLOW:	10 GPM / Sq.Ft.		

DIMENSIONS & DATA

FILTER BASIN								TROUGHS						PIPING								MEDIA
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y
11'-0"	11'-0"	10	12"	11	24"	24"								5'-6"			TBD					72"
				QTY.													MIN.					TOTAL

REVISION			
1			
2			
3			
4			
5			

UNIVERSAL® TYPE XA™ UNDERDRAIN
FRONT FLUME
FILTER ARRANGEMENT
Cuyahoga Falls, OH — 120279

LEOPOLD a xylem brand

Drawn BY	CHECKED BY	DATE	SCALE	DRAWING NUMBER
RS		7-3-20	NONE	E20279.90.02

PRODUCT DATA SHEET

Purolite®
C100E

Polystyrenic Gel, Strong Acid Cation Resin, Sodium form, Potable Water Grade

PRINCIPAL APPLICATIONS

- Softening - Potable Water
- Food and beverage processing
- Softening - Industrial

ADVANTAGES

- Efficient regeneration
- Good kinetic performance
- Low extractables

REGULATORY APPROVALS

- Compliant with FDA Regulation 21 CFR 173.25 for Food Treatment, Ion Exchangers
- Kosher Certified
- Certified by the WQA to NSF/ANSI-61 Standard

TYPICAL PACKAGING

- 1 ft³ Sack
- 25 L Sack
- 5 ft³ Drum (Fiber)
- 1 m³ Supersack
- 42 ft³ Supersack

TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS:

Polymer Structure	Gel polystyrene crosslinked with divinylbenzene
Appearance	Spherical Beads
Functional Group	Sulfonic Acid
Ionic Form	Na^+ form
Total Capacity	1.9 eq/L (41.5 Kgr/ft³) (Na^+ form)
Moisture Retention	46 - 50 % (Na^+ form)
Particle Size Range	300 - 1200 µm
< 300 µm (max.)	1 %
Uniformity Coefficient (max.)	1.7
Reversible Swelling, $Na^+ \rightarrow H^+$ (max.)	10 %
Reversible Swelling, $Ca^{2+} \rightarrow Na^+$ (max.)	8 %
Specific Gravity	1.27
Shipping Weight (approx.)	800 - 840 g/L (50.0 - 52.5 lb/ft³)
Temperature Limit	120 °C (248.0 °F)

Purolite

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purolite.com

Hydraulic Characteristics

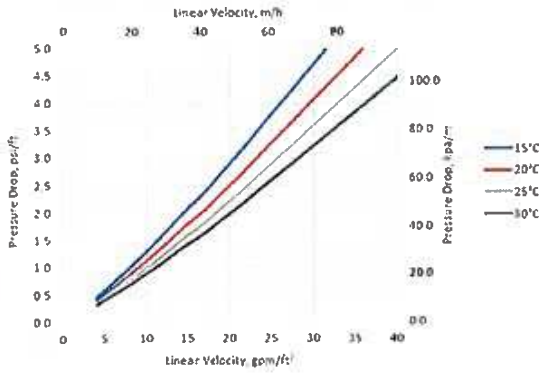
PRESSURE DROP

The pressure drop across a bed of ion exchange resin depends on the particle size distribution, bed depth, and voids volume of the exchange material, as well as on the flow rate and viscosity of the influent solution. Factors affecting any of these parameters—such as the presence of particulate matter filtered out by the bed, abnormal compressibility of the resin, or the incomplete classification of the bed—will have an adverse effect, and result in an increased head loss. Depending on the quality of the influent water, the application and the design of the plant, service flow rates may vary from 10 to 40 BV/h.

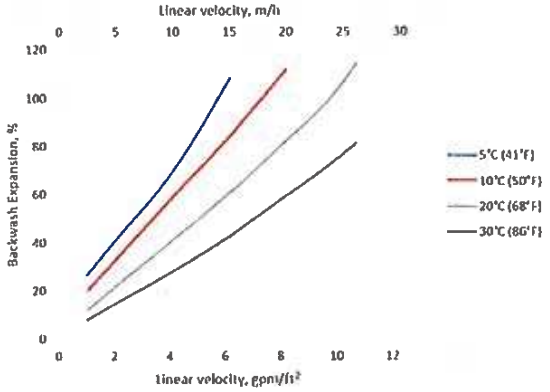
BACKWASH

During up-flow backwash, the resin bed should be expanded in volume between 50 and 70% for at least 10 to 15 minutes. This operation will free particulate matter, clear the bed of bubbles and voids, and reclassify the resin particles ensuring minimum resistance to flow. When first putting into service, approximately 30 minutes of expansion is usually sufficient to properly classify the bed. It is important to note that bed expansion increases with flow rate and decreases with influent fluid temperature. Caution must be taken to avoid loss of resin through the top of the vessel by over expansion of the bed.

PRESSURE DROP ACROSS RESIN BED



BACKWASH EXPANSION OF RESIN BED



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PRODUCT DATA SHEET

Shallow Shell™ SSTC6000E

Polystyrenic Gel, Strong Acid Cation Resin, Sodium form, Shallow Shell™ Technology*

PRINCIPAL APPLICATIONS

- Softening - Industrial
- Softening - Potable Water
- Food and beverage processing
- Demineralization when regenerated with acids

ADVANTAGES

- Highest regeneration efficiency
- Highly effective iron removal
- Highest salt efficiency
- Lower rinse volumes
- Excellent physical and chemical stability

SYSTEMS

- Coflow regenerated systems
- Potable water treatment

REGULATORY APPROVALS

- Certified by the WQA to NSF/ANSI-61 Standard

TYPICAL PACKAGING

- 1 ft³ Sack
- 25 L Sack
- 5 ft³ Drum (Fiber)
- 1 m³ Supersack
- 42 ft³ Supersack

** SST® is a registered trademark of Purolite Corporation.*

TYPICAL PHYSICAL & CHEMICAL CHARACTERISTICS:

Polymer Structure	Gel polystyrene crosslinked with divinylbenzene
Appearance	Spherical Beads
Functional Group	Sulfonic Acid
Ionic Form	Na^+
Dry Weight Capacity (min.)	3.8 eq/kg (Na^+ form)
Moisture Retention	36 - 46 % (Na^+ form)
Particle Size Range	300 - 1200 µm
< 300 µm (max.)	1 %
Uniformity Coefficient (max.)	1.7
Reversible Swelling, $Na^+ \rightarrow H^+$ (max.)	6 %
Shipping Weight (approx.)	775 - 825 g/L (48.4 - 51.6 lb/ft³)
Temperature Limit	60 °C (140.0 °F)

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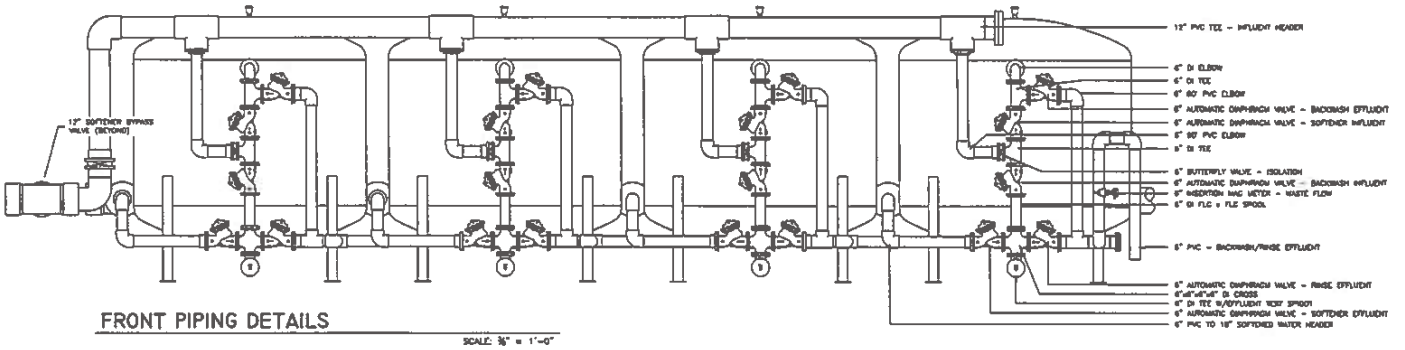
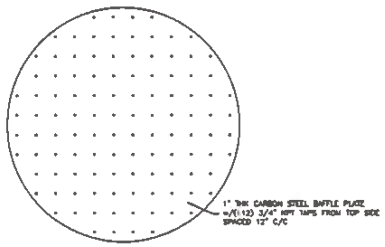


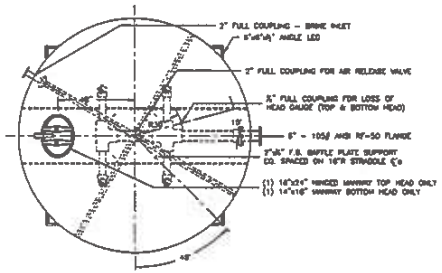
FRONT PIPING DETAILS

SCALE: 3/8" = 1'-0"



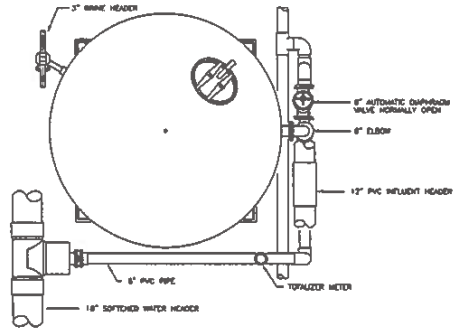
BAFFLE PLATE LAYOUT

SCALE: 3/8" = 1'-0"



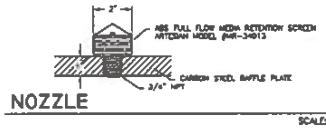
PLAN VIEW (NO PIPING)

SCALE: 3/8" = 1'-0"



PIPING PLAN

SCALE: 3/8" = 1'-0"



NOZZLE

SCALE: NONE

PAINT SCHEDULE

INTERIOR: BLAST TO NEAR WHITE PER SSPC-SP10

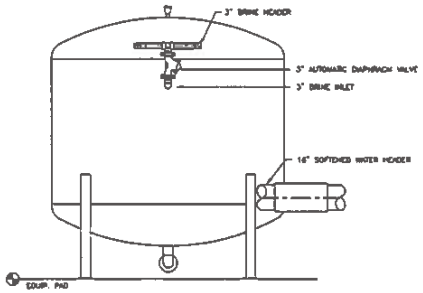
1st COAT	3-5 MILS DFT	THERMEC SERIES 1 ZINNTHANE	
2nd COAT	4-8 MILS DFT	THERMEC SERIES N140 POTA POX PLUS	
3rd COAT	4-8 MILS DFT	THERMEC SERIES N140 POTA POX PLUS	

EXTERIOR: COMMERCIAL BLAST CLEANING PER SSPC-SP6

1st COAT	3-5 MILS DFT	THERMEC SERIES 1 ZINNTHANE	
2nd COAT	4-6 MILS DFT	THERMEC SERIES M69 HI-BUILD EPOXOLINE II	
3rd COAT	4-6 MILS DFT	THERMEC SERIES M69 HI-BUILD EPOXOLINE II	

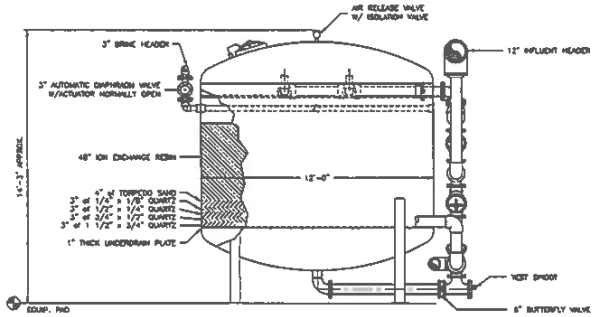
TANK SPECIFICATIONS

DESIGN TEMPERATURE = 20°F / 200°F
DESIGN PRESSURE = 100psi
TEST PRESSURE = 130psi
ASME INSPECTED and STAMPED PER CODE VIII
MATERIAL - SHELL: SA-516-70
HEAD: SA-516-70



REAR PIPING ELEVATION

SCALE: 3/8" = 1'-0"



SIDE PIPING ELEVATION

SCALE: 3/8" = 1'-0"

Revisions

Date	Description

60 Industrial Drive, P.O. Box 847
Pioneer, Ohio 43554
(419) 737-2363 FAX: (419) 737-2364

Date: 6/7/2018 Scale: SHOWN Job No:

Designed By: D. BERTKE

Drawn By: D. BERTKE

AOP ARTESIAN OF PIONEER
Water Treatment Systems

Project/Client: PROPOSED WATER TREATMENT FACILITY
CITY OF CUYAHOGA FALLS, OHIO

Sheet Description: HORIZONTAL FILTER DETAILS

WT3.2