Rennaker, Joanne (DEQ)

From: Howard Croft <hcroft@cityofflint.com>
Sent: Friday, June 26, 2015 3:41 PM
To: Laura Sullivan
Cc: Brent Wright; Dayne Walling; donna. cole; gdn2@aol.com; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Bincsik; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green; Michael Sargent
Subject: Re: Water Quality Update

As a follow up to this afternoon's email, I am answering several questions that have subsequently been asked.

The vendor is "Calgon Carbon" with headquarters in Pennsylvania. They are both the supplier of the material and the installer as well. After initial designs were approved by the DEQ, various water samples from the Flint River were drawn and sent to Calgon for two weeks of testing under various conditions to try and gauge the effectiveness of the specific carbon filters chosen. Flow rate and temperature tests were performed by our engineering firm LAN at the water plant prior to the design being developed and forwarded to the DEQ. The filter media is Granulated Activated Carbon and the first filters are scheduled for installation to begin following the 4th of July weekend.

Pleas forward me any additional questions that may arise.

Thank you,

On Fri, Jun 26, 2015 at 3:25 PM, Laura Sullivan <dr.laura2@gmail.com> wrote:
Hello Howard,

Could you provide the following information to the team?

You refer to a vendor - is this the supplier of the new filter media? Testing the efficacy of the media should not be conducted by the vendor.

What tests have been conducted and under what circumstances (flow rate, temperature)? From what location was the water used in these tests collected?

What is the identity of the filter media? Is it GAC?

Yours truly,
L Sullivan

On Friday, June 26, 2015, Howard Croft <hcroft@cityofflint.com> wrote:

Technical Team,

I am writing to provide you an update on the City's ongoing plan to improve the water quality in the City of Flint.

This morning, the U of M Flint announced that recent testing showed TTHM levels slightly above the MCL in two of its buildings. The City responded to this recent information of concern with increased flushing in the area where subsequent internal tests have shown the levels to have subsided to under than 80 ppb.

The TTHM level leaving the water plant is currently in the 45 -55 ppb range and in areas with minimal circulation the level can rise by the time it reaches a tap.

The installation of new filter media at the water plant which is designed to greatly reduce the TTHM level in the plant is ahead of schedule and is expected to be installed by mid-July. The DEQ has approved the design and actual testing by the vendor over the past two weeks has verified that the selected media should work. **This is expected to have an immediate impact on TTHM levels**.

In addition to the filter installation, we have engaged in increased valve exercising over the last two months and have checked over half of the 7,000 valves in the system. The valve turning has a tendency to result in temporary water discoloration but increases the overall water circulation and identifies areas where valves are inoperable.

Our annual Consumer Confidence Report will be distributed in early July and will contain significant information about the water system. We will also include the notice of our recent quarterly testing in which all eight sites were verified to be under the MCL but the running average at one site required a notice to be sent.

I will email everyone when we schedule the next TAC team meeting which we have currently targeted for mid-August.

--
Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

--
Laura L. Sullivan, Ph. D.
3101 Hawthorne Drive
Flint, Michigan 48503
dr.laura2@gmail.com

Human(kind). Be both.

--

Howard Croft
Public Works Director
City of Flint
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Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

Rennaker, Joanne (DEQ)

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Sent: Friday, June 26, 2015 2:42 PM
To: Brent Wright; Dayne Walling; donna. cole; gdn2@aol.com; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Bincsik; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green; Michael Sargent
Subject: Water Quality Update

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Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043

hcroft@cityofflint.com

Rennaker, Joanne (DEQ)

From: Brent Wright <bwright@cityofflint.com>
Sent: Friday, June 26, 2015 12:00 PM
To: Rosenthal, Adam (DEQ)
Cc: Mike Glasgow; Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Re: 6/30 & 7/1/15 deadlines

Adam,

1- We have more than 100 sample bottles out but are only seeing a couple returned daily.

2-Mike is working LT2 Source Water Monitoring Plan and should have it to you before the 1st.

3-Both the Lake Huron water source and Flint River water source along with the violation letter CCR's are at the printers, I will send you a copy of each one as soon as they drop the extras off to me. This is usually a day after they mail them out.

Thank you

On Thu, Jun 25, 2015 at 10:47 AM, Rosenthal, Adam (DEQ) <ROSENTHALA@michigan.gov> wrote:

Morning Mike & Brent, just wanted to remind you/confirm that Flint is on track for a few items.

1 – We hope you have 61 more lead/copper samples collected and sent to the lab by 6/30/15, and that they are will be below the AL for lead. As of now with 39 results, Flint's 90th percentile is over the AL for lead.

2 – LT2 source water monitoring plan, reminder that it is due to our office for review by 7/1/15 per Mike's 4/3/15 letter, (attached).

3 – Consumer Confidence Report, (CCR), has not been received yet – due to our office, Gen. Co. LHD & your customers by 7/1/15.

Please provide an update for the above items.

thanks,

Adam Rosenthal, EQA

MDEQ – Office of Drinking Water and Municipal Assistance

Lansing District – Constitution Hall 1SW

PO Box 30242

Lansing, MI 48909

517-284-6644

fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:

DEQ-DWMA-Lansing@michigan.gov

--

Brent Wright
Water Plant Supervisor
City of Flint
4500 N. Dort Hwy.
Flint, MI. 48505
Ph: 810.787.6537 ext. 3510
Fx: 810.787.3710

Rennaker, Joanne (DEQ)

From:	Rosenthal, Adam (DEQ)
Sent:	Thursday, June 25, 2015 10:48 AM
To:	Mike Glasgow; 'bwright@cityofflint.com'
Cc:	Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject:	6/30 & 7/1/15 deadlines
Attachments:	Flint-2015-04-03-LT2ESWTR.pdf

Morning Mike & Brent, just wanted to remind you/confirm that Flint is on track for a few items.

1 – We hope you have 61 more lead/copper samples collected and sent to the lab by 6/30/15, and that they are will be below the AL for lead. As of now with 39 results, Flint's 90th percentile is over the AL for lead.

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Please provide an update for the above items.

thanks,

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For MORs, Lab Results & Reporting Forms:
DEQ-DWMA-Lansing@michigan.gov

2310

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 3, 2015

Mr. Brent Wright
City of Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

Dear: Mr. Wright

SUBJECT: Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule)
2nd Round of Source Water Monitoring Requirements

The LT2 Rule was promulgated by the United States Environmental Protection Agency on January 5, 2006. The Department of Environmental Quality (DEQ) adopted this rule into the Administrative Rules in December, 2009. All public water systems that are supplied by a surface water source, and systems supplied by a ground water source under the direct influence of surface water (GWUDI), are subject to this rule.

According to the LT2 Rule, systems are required to conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. Please keep in mind that grandfathering data will not be accepted for the second round of monitoring. This monitoring includes at least one source water *Cryptosporidium*, *E. coli*, and turbidity sample per month for a period of 24 months for systems serving populations greater than 10,000 people. Systems will be assigned to a "treatment bin" based on the results of source water monitoring. The treatment bin specifies the level of *Cryptosporidium* removal and/or inactivation that the system must achieve.

Our records indicate that your system is required to comply with the source water monitoring requirements on Schedule 2 as stated below in Table 1. Therefore, your system is required to submit to the DEQ, a source water monitoring plan for each plant by July 1, 2015, and start the 2nd round of monitoring in October, 2015.

Table 1 – LT2 Milestone Dates for 2nd Round of Source Water Sampling

System Population	Schedule	Must submit Source Water Sampling Plan by...	Must begin second round of source water monitoring...
At least 100,000	1	January 1, 2015	April 1, 2015
50,000 – 99,999	2	July 1, 2015	October 1, 2015
10,000 – 49,999	3	July 1, 2016	October 1, 2016
<10,000	4	July 1, 2017	October 1, 2017

Enclosed with this letter is a Source Water Sampling Plan template that you can complete and submit to this office to comply with the July 1, 2015, deadline. The template includes instructions and a worksheet that will assist the DEQ in determining if your plan meets the requirements of the LT2 Rule.

If you have any questions about this subject, feel free to contact me at 517-290-8817; prysbym@michigan.gov; or Department of Environmental Quality, Office of Drinking Water and Municipal Assistance, Lansing District Office, 525 West Allegan Street, 1st Floor South, P.O. Box 30242, Lansing, Michigan 48909-7742.

Sincerely,

Michael F. Prysby, P.E.
District Engineer
Field Operations Section
Office of Drinking Water and
Municipal Assistance

Enclosures

cc: Mr. Howard Kroft, City of Flint

Rennaker, Joanne (DEQ)

From: Hansen, Jeff <jrhansen@lan-inc.com>
Sent: Tuesday, June 16, 2015 3:12 PM
To: Prysby, Mike (DEQ)
Subject: RE: Flint GAC 2 of 2

Ok... we'll add it.

Jeffrey R. Hansen
Senior Project Manager

From: Prysby, Mike (DEQ) [mailto:PRYSBYM@michigan.gov]
Sent: Tuesday, June 16, 2015 2:54 PM
To: Hansen, Jeff
Subject: RE: Flint GAC 2 of 2

I agree....except it hasn't met CT yet....which is gained in the 3mgal well...

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Hansen, Jeff [mailto:jrhansen@lan-inc.com]
Sent: Tuesday, June 16, 2015 2:50 PM
To: Prysby, Mike (DEQ)
Subject: RE: Flint GAC 2 of 2

Hi Mike,

I was curious why you require an anti-syphon valve in this case? I can see it at the intermediate point since it is before filtration, but the water in the weir chamber is completely treated and ready to drink. It seems very unlikely that the treated water would backflow into the chlorine pipe, but even if it did why would it matter since it is drinkable?

Jeffrey R. Hansen
Senior Project Manager

From: Prysby, Mike (DEQ) [mailto:PRYSBYM@michigan.gov]
Sent: Tuesday, June 16, 2015 2:24 PM
To: Hansen, Jeff
Cc: Busch, Stephen (DEQ); Cook, Pat (DEQ)
Subject: RE: Flint GAC 2 of 2

Jeff,

I have reviewed the preliminary plans for the GAC addition for the Flint WTP filters. I do not have any major concerns with the preliminary plans. I did note the tap off the existing chlorine solution line immediately west of Filter No. 6 that will convey liquid chlorine to the new feed point within the first bay of the weir chamber. In our review of the intermediate chlorination feedpoint (March 2104), we called for an anti-syphon valve to be installed on the feedline prior to the application point in the trough (just prior to filtration). Since this proposed tap is upstream of the anti-syphon device, an additional anti-syphon device will need to be provided on the proposed chlorine solution line prior to injection within the proposed drop-pipe. If the device is to be located within the first weir chamber, it will need to be above the high water level.

I will be out on extended medical leave beginning tomorrow. I could be back as early as sometime next week or as late as early July. For timely permit issuance, the final submittal should be directed to Steve Busch.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Hansen, Jeff [mailto:jrhansen@lan-inc.com]
Sent: Saturday, June 13, 2015 12:52 PM
To: Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ); Cook, Pat (DEQ); Matta, Samir; Green, Warren; Brent Wright (bwright@cityofflint.com); mglasgow@cityofflint.com
Subject: Flint GAC 2 of 2

Preliminary plans.

Jeffrey R. Hansen
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B • Flint, MI 48532
T 810.820.2682 **C** 810.333.3201
www.lan-inc.com • JRHansen@lan-inc.com

Rennaker, Joanne (DEQ)

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Rennaker, Joanne (DEQ)

From:	Hansen, Jeff <jrhansen@lan-inc.com>
Sent:	Tuesday, June 16, 2015 2:27 PM
To:	Prysby, Mike (DEQ)
Subject:	RE: Flint GAC 2 of 2

Thanks Mike – we'll get it taken care of.

Good luck with the knee surgery and rehab.

Jeffrey R. Hansen
Senior Project Manager

From: Prysby, Mike (DEQ) [mailto:PRYSBYM@michigan.gov]
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Subject: Flint GAC 1 of 2
Attachments: GAC-basis-of-design.pdf

Mike,

Attached is our revised basis of design. I am going to send preliminary drawings in a separate email due to file sizes.

Thanks,

Jeffrey R. Hansen
Senior Project Manager

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BASIS OF DESIGN
FILTER MEDIA REPLACEMENT WITH GRANULAR ACTIVATED CARBON (GAC)
CITY OF FLINT

1. GENERAL DESCRIPTION

As one measure to assist with the reduction of total trihalomethanes (TTHM) in the water system the City of Flint (City) proposes to replace the existing anthracite media with GAC for each of the 12 filters within the water treatment plant (WTP). Two layers of media were installed in the filters in 2005: 12" of sand and 18" of anthracite. Recent investigations have shown that the sand installed does not meet the original design specifications and some intermixing of sand and anthracite has occurred. Consequently, replacement of the sand layer for all 12 filters is also proposed.

It is anticipated that the GAC media will be biologically active and chlorine feed prior to filtration can adversely affect the GAC. Therefore, the intermediate chlorine feed point is proposed to be moved to the weir chamber immediately downstream of the filters. The existing chlorine piping and diffuser upstream of the filters will remain in place for future use either for disinfection of the filters if necessary or for general disinfection if/when the KWA supply is available and GAC media is no longer needed in terms of TTHM control.

Relevant design information is provided in this narrative and detailed calculations follow.

2. DESIGN CRITERIA

The Flint WTP began full time operation using the Flint River on April 25th, 2014. The following information was taken from monthly operating reports (MOR's) for the full year from May 2014 through April 2015:

A. Average daily demand (ADD) = 18.3 MGD
B. Maximum daily demand (MDD) = 25.4 MGD
C. Minimum monthly average chlorine feed at intermediate point = 1.8 mg/l
D. Average monthly chlorine feed at intermediate point = 2.9 mg/l
E. Average plant effluent pH = 7.8
F. Maximum monthly average plant effluent pH = 8.1

Selected WTP design flow = 24 MGD
Maximum WTP flow expected = 30 MGD
Minimum WTP flow expected = 8 MGD

3. MEDIA DESIGN

A. GAC Media

- 18" depth
- GAC media selected is Filtrasorb 400 manufactured by Calgon Carbon Corporation with an effective size of 0.65 mm, uniformity coefficient of 1.90 and specific gravity of 1.40.
- The Filtrasorb 400 characteristics vary slightly from Ten State Standards (TSS) which state an effective size of 0.45-0.55 mm and a maximum uniformity coefficient of 1.65. However, it is somewhat unclear if TSS apply

to GAC as a capping layer. Also, the Filtrasorb 400 does meet the AWWA standard B604-12 for Granular Activated Carbon.

- When the GAC adsorptive capacity is spent, the media will act strictly as a filtering media. The hope is that the KWA supply will be active by the time GAC adsorption is limited. However, Calgon has agreed to test the GAC capacity quarterly after installation for 1 year to evaluate performance and future need to regenerate or replace the GAC.

B. Sand Media

- 12" depth
- Sand media shall have effective size of 0.50 mm, uniformity coefficient of 1.65 or less, and specific gravity of 2.5 or greater.

C. Dual Media Performance

- Sand settling velocity greater than GAC settling velocity
- D90 of GAC / D10 of sand < 4.0 to avoid excessive intermixing
- Adequate expansion of both medias during backwash without media loss
- Combined head loss of proposed medias less than combined head loss of existing sand and anthracite

4. INTERMEDIATE CHLORINE FEED

The new chlorine feed point will be within the first bay of the weir chamber. In order to avoid stripping of chlorine as the water cascades over the weir, a submerged drop pipe will be installed that outlets on the downstream side of the weir wall. Chlorine will be injected into this drop pipe. Contact time will begin in the second bay of the weir chamber.

CITY OF FLINT WTP
Filter Media Replacement
Basis of Design

				Notes
Max. Expected Flow Rate =	30.0 mgd =	20,833 gpm =	2,785 cft/min	
Max. Day May 2014 - April 2015 =	25.4 mgd =	17,639 gpm =	2,358 cft/min	
Avg. Day May 2014 - April 2015 =	18.3 mgd =	12,708 gpm =	1,699 cft/min	
Design Flow Rate =	24.0 mgd =	16,667 gpm =	2,228 cft/min	
Min. Expected Flow Rate =	8.0 mgd =	5,556 gpm =	743 cft/min	
Area / Filter =	700 sft			
Number of Filters =	12			

mgd	30.0	24.0	8.0
Loading (gpm/sft) =	2.48	1.98	0.66

				Notes
Top of Underdrain elev =	723.58			
Washwater Trough Weir elev =	730.67			
Operating Water Level =	734.00			
Top of Filter Basin / Floor elev =	736.00			
Filter BW Dimensional D =	7.08			
Existing Sand D =	12.00 inches =	1.00 ft		
Existing Anthracite D =	18.00 inches =	1.50 ft		
Proposed Sand D =	12.00 inches =	1.00 ft		
Proposed GAC D =	18.00 inches =	1.50 ft		See following pages for details
Proposed Water Depth =		7.92 ft		
Max Cold BW Flow rate / filter =	7910 gpm =	11.3 gpm/sft		To match current BW flow rate
Max Warm BW Flow rate / filter =	11900 gpm =	17.0 gpm/sft		Use when water temp > 65 degrees
Max Sand Expanded D =	14.2 inches =	1.18 ft =	18%	Occurs at cold temps
Max GAC Expanded D =	45.10 inches =	3.76 ft =	150%	
Total BW Expanded D =	59.30 inches =	4.94 ft		
Proposed BW Freeboard =		2.14 ft		
Proposed # of Filters to Replace	12			
GAC Volume =	12,600 cft			
GAC apparent density =	33.7 lbs/cft			
GAC Total Weight =	424,620 lbs =	212.3 tons		

mgd	30.0	24.0	8.0
EBCT (min) =	4.5	5.7	17.0

Propose to relocate intermediate chlorine feed to inlet side of weir chamber following filtration
Intermediate CL2 feed point to remain in place as means to disinfect filters in the future, if needed

mgd	30.0	24.0	8.0	Notes
Contact time (min) =	33.0	43.7	131.2	
CT =	59.5	78.7	236.1	Calculations attached separately

Required CT at 1.8 mg/l chlorine, less than 0.5 degrees C, and pH of 8.0 = 56 OK

CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation

Filter Media Analysis 2015 1st Stage

Date: 06/03/15

By: JRH

Data Entry:

WATER INPUT DATA	
Backwash Rate (gpm/sf)	11.3
Water Temperature (F°)	32
Viscosity (centipoise)	1.79355
Dynamic Viscosity (# -sec/sf)	3.746E-05
Water Density (#/cf)	62.42
Mass Density (# -sec/ft^4)	1.940

COMMENTS

SITE LOCATION	10 States		Filtrasorb 400		Filtrasorb 300		300/400 Mix		New sand / 300		New sand / 400	
Media Type	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	New sand	GAC	New sand	GAC
Bed Depth (in)	12	18	12	18	12	18	12	18	12	18	12	18
Uniformity Coefficient	2.30	1.65	2.30	1.90	2.30	2.10	2.30	1.925	1.70	2.10	1.65	1.90
Effective Size (mm)	0.400	0.550	0.40	0.625	0.40	0.800	0.40	0.670	0.65	0.900	0.50	0.650
d60% Size (mm)	0.920	0.908	0.920	1.188	0.920	1.680	0.920	1.290	1.105	1.890	0.825	1.235
d90% Size (mm)	1.607	1.269	1.607	1.826	1.607	2.762	1.607	2.000	1.577	3.107	1.154	1.899
Porosity	0.40	0.50	0.40	0.614	0.40	0.586	0.40	0.55	0.40	0.586	0.40	0.586
Specific Gravity	2.554	1.45	2.554	1.40	2.554	1.40	2.554	1.45	2.500	1.40	2.500	1.40
Media Density (#/cf)	159.4	90.5	159.4	87.4	159.4	87.4	159.4	90.5	156.0	87.4	156.0	87.4
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.12	7.03	5.87	7.03	4.05	9.49	7.27	5.57	3.35
Reynolds Number	2.447	0.734	2.447	1.403	2.447	3.731	2.447	1.978	3.968	5.201	1.741	1.567
Correction Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.12	7.03	5.87	7.03	4.05	9.49	7.27	5.57	3.35
Unhindered Settling Vel. (ft/sec)	20.68	6.20	20.68	11.85	20.68	31.53	20.68	16.71	33.53	43.95	14.71	13.24
Expansion Coefficient (n)	3.287	3.708	3.287	3.475	3.287	3.151	3.287	3.358	3.132	3.048	3.401	3.437
Bed Porosity Coefficient (k)	142.82	27.92	142.82	17.00	142.82	31.61	142.82	30.16	167.27	37.07	125.75	21.03
Porosity (expanded)	0.462	0.784	0.462	0.889	0.462	0.721	0.462	0.747	0.423	0.677	0.492	0.835
Bed Depth Expanded (in)	13.4	41.6	13.4	62.7	13.4	26.8	13.4	32.0	12.5	23.1	14.2	45.1
% Expanded Bed	11.6	131.0	11.6	248.3	11.6	48.6	11.6	77.5	4.0	28.3	18.2	150.3
d90gac/d10s Ratio	3.173		4.564		6.905		5.001		4.780		3.797	
Discussion/Notes									Use 18.2 gpm/sft BW		Use 11.3 gpm/sft BW	

Lockwood, Andrews & Newnam, Inc.

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CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation
Filter Media Analysis 2015 1st Stage

Date: 06/03/15
By: JRH
Data Entry:

WATER INPUT DATA	
Backwash Rate (gpm/sf)	17.0
Water Temperature (F°)	80
Viscosity (centipoise)	0.86134
Dynamic Viscosity (# -sec/sf)	1.799E-05
Water Density (#/cf)	62.22
Mass Density (# -sec/ft^4)	1.927

COMMENTS

SITE LOCATION	10 States		Filtrasorb 400		Filtrasorb 300		300/400 Mix		New sand / 300		New sand / 400	
Media Type	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	New sand	GAC	New sand	GAC
Bed Depth (in)	12	18	12	18	12	18	12	18	12	18	12	18
Uniformity Coefficient	2.30	1.65	2.30	1.90	2.30	2.10	2.30	1.93	1.70	2.10	1.65	1.90
Effective Size (mm)	0.400	0.550	0.400	0.625	0.400	0.800	0.400	0.670	0.650	0.900	0.500	0.650
d60% Size (mm)	0.920	0.908	0.920	1.188	0.920	1.680	0.920	1.290	1.105	1.890	0.825	1.235
d90% Size (mm)	1.607	1.269	1.607	1.826	1.607	2.762	1.607	2.000	1.577	3.107	1.154	1.899
Porosity	0.40	0.50	0.40	0.61	0.40	0.586	0.40	0.550	0.40	0.59	0.40	0.59
Specific Gravity	2.554	1.45	2.554	1.40	2.554	1.40	2.554	1.45	2.500	1.40	2.500	1.40
Media Density (#/cf)	159.4	90.5	159.4	87.4	159.4	87.4	159.4	90.5	156.0	87.4	156.0	87.4
Min. Fluidization Rate (gpm/sf)	13.38	4.09	13.38	5.98	13.38	11.24	13.38	7.75	18.07	13.92	10.62	6.42
Reynolds Number	9.640	2.905	9.640	5.556	9.640	14.781	9.640	7.829	15.633	20.604	6.858	6.206
Correction Factor	1.000	1.000	1.000	1.000	1.000	0.853	1.000	1.000	0.840	0.779	1.000	1.000
Min. Fluidization Rate (gpm/sf)	13.38	4.09	13.38	5.98	13.38	9.59	13.38	7.75	15.18	10.85	10.62	6.42
Unhindered Settling Vel. (ft/sec)	81.46	24.55	81.46	46.95	81.46	124.90	81.46	66.16	132.10	174.11	57.95	52.44
Expansion Coefficient (n)	2.866	3.231	2.866	3.028	2.866	2.746	2.866	2.926	2.731	2.656	2.965	2.995
Bed Porosity Coefficient (k)	184.94	38.40	184.94	26.18	184.94	41.60	184.94	44.59	185.36	44.89	160.68	31.81
Porosity (expanded)	0.435	0.777	0.435	0.867	0.435	0.722	0.435	0.719	0.417	0.694	0.469	0.811
Bed Depth Expanded (in)	12.7	40.4	12.7	52.3	12.7	26.8	12.7	28.9	12.3	24.3	13.6	39.5
% Expanded Bed	6.2	124.3	6.2	190.5	6.2	48.9	6.2	60.3	2.9	35.2	13.0	119.3
d90gac/d10s Ratio	3.173		4.564		6.905		5.001		4.780		3.797	
Discussion/Notes									Use 20 gpm/sft BW		Use 16.5-17 gpm/sft BW	

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CITY OF FLINT WTP

Label	Location	Diameter		L	W	D	Bottom	Vol	Flow Rate		Baffle	Time	Velocity	Flow Rate		Time	Flow Rate		Time
	CT CALCS																		
	TIME FROM FILTERS EFFLUENT TO 1ST TAP																		
		in	ft	ft	ft	ft	elev	cft	mgd	cft/s	Factor	min	fps	mgd	cft/s	min	mgd	cft/s	min
A	Weir chamber, pre-baffle			26.75	13.08	15.5	709.00	5423	30.0	46.4	1.0		#DIV/0!	24.0	37.1	2.43	8.0	12.4	7.30
B	Weir chamber, post-baffle			26.75	8.5	10.0	709.00	2274	30.0	46.4	1.0	0.82	0.55	24.0	37.1	1.02	8.0	12.4	3.06
	Effluent pipe																		
C	wc - bldg face	48	4.00	16.00				201	30.0	46.4	1.0	0.07	3.69	24.0	37.1	0.09	8.0	12.4	0.27
D	bldg face - junct well	48	4.00	401.00				5039	30.0	46.4	1.0	1.81	3.69	24.0	37.1	2.26	8.0	12.4	6.79
	Res. 3																		
E	Junct well			12.00	18.00	15.0	704.00	3240	30.0	46.4	0.50	0.58	0.34	24.0	37.1	0.73	8.0	12.4	2.18
F	Clear well			140.00	177	10.0	709.00	247,800	30.0	46.4	0.30	26.69	0.09	24.0	37.1	33.37	8.0	12.4	100.10
G	Transfer chamber			7.00	55.25	15.0	704.00	5,801	30.0	46.4	0.50	1.04	0.11	24.0	37.1	1.30	8.0	12.4	3.91
H	Suction well			9.00	25.75	15.0	704.00	3,476	30.0	46.4	0.50	0.62	0.24	24.0	37.1	0.78	8.0	12.4	2.34
	Pump																		
I	Suction pipe	36	3.00	12.00				85	30.0	46.4	1.0	0.03	6.57	24.0	37.1	0.04	8.0	12.4	0.11
J	Discharge pipe	30	2.50	20.00				98	30.0	46.4	1.0	0.04	9.46	24.0	37.1	0.04	8.0	12.4	0.13
K	Dis. pipe (to bldg face)	42	3.50	34.00				327	30.0	46.4	1.0	0.12	4.82	24.0	37.1	0.15	8.0	12.4	0.44
	Finish main 1																		
L1	bldg face - 1st tee	42	3.50	208.00				2001	30.0	46.4	1.0	0.72	4.82	24.0	37.1	0.90	8.0	12.4	2.69
M1	tee - WTP tap	42	3.50	223.00				2146	30.0	46.4	1.0	0.77	4.82	24.0	37.1	0.96	8.0	12.4	2.89
N1	WTP tap - bldg face	12	1.00	19.00				15	30.0	46.4	1.0	0.005	59.10	24.0	37.1	0.01	8.0	12.4	0.02
	Subtotal											1.49				1.87			5.60
	Finish main 2																		
L2	bldg face - 1st tee	42	3.50	73.00				702	30.0	46.4	1.0	0.25	4.82	24.0	37.1	0.32	8.0	12.4	0.95
M2	tee - 1st split	42	3.50	277.00				2665	30.0	46.4	1.0	0.96	4.82	24.0	37.1	1.20	8.0	12.4	3.59
	Subtotal											1.21				1.51			4.53
								Total CT time	@ 30 mgd =			33.0		@ 24 mgd =		43.7	@ 12 mgd =		131.2

	2014								2015							
Month	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr		Min	Avg	Max
Cl2	5.0	4.7	3.9	3.3	3.1	2.5	2.0	1.8	1.8	2.1	2.4	2.0		1.8	2.9	5.0
pH	7.37	7.48	7.62	7.78	7.82	7.71	7.87	8.07	7.74	7.84	7.89	7.83		7.4	7.8	8.1

Flow (mgd)	30.0	24.0	8.0
CT =	59.5	78.7	236.1

Table C-1. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 0.5°C or Lower

CHLORINE CONCENTRATION	pH<=6 Log Inactivation						pH=6.5 Log Inactivation					
(mg/L)	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	23	46	69	91	114	137	27	54	82	109	136	163
0.6	24	47	71	94	118	141	28	56	84	112	140	169
0.8	24	48	73	97	121	145	29	57	86	115	143	172
1	25	49	74	99	123	148	29	59	88	117	147	176
1.2	25	51	76	101	127	152	30	60	90	120	150	180
1.4	26	52	78	103	129	155	31	61	92	123	153	184
1.6	26	52	79	105	131	157	32	63	95	126	155	189
1.8	27	54	81	108	135	162	32	64	97	129	161	193
2	28	55	83	110	138	165	33	66	99	131	164	197
2.2	28	56	85	113	141	169	34	67	101	134	169	201
2.4	29	57	86	115	143	172	34	68	103	137	171	205
2.6	29	58	88	117	146	175	35	70	105	139	174	209
2.8	30	59	89	119	148	178	36	71	107	142	178	213
3	30	60	91	121	151	181	36	72	109	145	181	217

CHLORINE CONCENTRATION	pH=7.0 Log Inactivation						pH=7.5 Log Inactivation					
(mg/L)	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	33	65	98	130	163	195	40	79	119	158	198	237
0.6	33	67	100	133	167	200	40	80	120	159	199	239
0.8	34	68	103	137	171	205	41	82	123	164	205	246
1	35	70	105	140	175	210	42	84	127	169	211	253
1.2	36	72	108	143	179	215	43	86	130	173	216	259
1.4	37	74	111	147	184	221	44	89	133	177	222	266
1.6	38	75	113	151	188	226	46	91	137	182	228	273
1.8	39	77	116	154	193	231	47	93	140	186	233	279
2	39	79	118	157	197	236	48	95	143	191	238	286
2.2	40	81	121	161	202	242	50	99	149	198	248	297
2.4	41	82	124	165	206	247	50	99	149	199	248	298
2.6	42	84	126	168	210	252	51	101	152	203	253	304
2.8	43	86	129	171	214	257	52	103	155	207	258	310
3	44	87	131	174	218	261	53	105	158	211	263	316

CHLORINE CONCENTRATION	pH=8.0 Log Inactivation						pH=8.5 Log Inactivation						pH=9.0 Log Inactivation					
(mg/L)	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	46	92	139	185	231	277	55	110	165	219	274	329	65	130	195	260	325	390
0.6	48	95	143	191	238	286	57	114	171	228	285	342	68	136	204	271	339	407
0.8	49	98	148	197	246	295	59	113	177	236	295	354	70	141	211	281	352	422
1	51	101	152	203	253	304	61	122	183	243	304	365	73	146	219	291	364	437
1.2	52	104	157	209	261	313	63	125	188	251	313	376	75	150	226	301	376	451
1.4	54	107	161	214	268	321	65	129	194	258	323	387	77	155	232	309	387	464
1.6	55	110	165	219	274	329	66	132	199	265	331	397	80	159	239	318	398	477
1.8	56	113	169	225	282	338	68	136	204	271	339	407	82	163	245	326	408	489
2	55	115	173	231	288	346	70	139	209	278	348	417	83	167	250	333	417	500
2.2	59	118	177	235	294	353	71	142	213	284	355	426	85	170	256	341	426	511
2.4	60	120	181	241	301	361	73	145	218	290	363	435	87	174	261	348	435	522
2.6	61	123	184	245	307	368	74	148	222	296	370	444	89	178	267	355	444	533
2.8	63	125	188	250	313	375	75	151	226	301	377	452	91	181	272	362	453	543
3	64	127	191	255	318	382	77	153	230	307	383	460	92	184	276	369	460	552

Source: AWWA, 1991.

Lockwood, Andrews & Newnam, Inc.
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DESIGN NOTES AND COMPUTATIONS

SUBJECT: FLINT WTP - GAC SHEET NO. OF

HEAD LOSS THROUGH MEDIA

$$h_L = \frac{1.067\, V^2\, D}{\phi\, g\, \epsilon^4} \frac{C_D f}{d}$$ ROSE EQUATION

V = flow velocity (fps)
D = media depth (ft)
d = particle dia. (ft)
C_D = drag coefficient $= \frac{24}{R} + \frac{3}{\sqrt{R}} + 0.34$

$$R = \frac{\phi d V}{\mu \text{ (Kinematic)}}$$

ϕ = shape factor
(0.82 - sand)
(0.80 - GAC)
(0.73 - crushed, angular sand)

V_{max} @ 3 gpm/sft

ϵ = porosity

$$\frac{3 \text{ gal}}{\text{min, sft}} \left| \frac{\text{cft}}{7.48052 \text{ gal}} \right| \frac{1 \text{ min}}{60 \text{ sec}} = 0.006684 \text{ fps}$$

f = mass fraction of sand particles @ dia. (d)

SEE SPREADSHEET CALCS FOR EACH MEDIA

PREPARED BY VRH DATE 5/29/15 CHECKED BY DATE PROJECT NUMBER D-005

CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation
Filter Media Analysis 2015 1st Stage

WATER INPUT DATA	
Flow Rate (gpm/sf)	3.00
Velocity (fps)	0.006684
Water Temperature (F°)	32
Kinematic Viscosity (ft^2/s)	1.931E-05
Dynamic Viscosity (# -sec/sf)	3.746E-05
Water Density (#/cf)	62.42
Mass Density (# -sec/ft^4)	1.940
g (ft/sec^2) =	32.2

32	5/27/2015 field measurements		
40	time:	2:30	
50	Filter #7		
60	water depth in service	98 inches =	8.17 ft
70	Flow as per panel	1160 gpm	
80	8 filters in service		
90	MOR plant flow		

Existing Sand

Shape factor 0.82
Porosity = 0.4
Depth = 12 in = 1.0 ft

Mesh	d			f			R	Cd	(Cd)(f)/d	
#	mm	in	ft	% passing	% retained	Cumulative				
8	2	0.07874	0.00656	1	0	0	1.862	15.4	0.0	
16	1.18	0.04646	0.00387	0.9925	0.0075	0.0075	1.099	25.0	48.5	
30	0.6	0.02362	0.00197	0.3076	0.6849	0.6924	0.559	47.3	16,460	
50	0.3	0.01181	0.00098	0.0256	0.282	0.9744	0.279	91.9	26,337	
100	0.15	0.00591	0.00049	0.0087	0.0169	0.9913	0.140	180.2	6,188	
200	0.075	0.00295	0.00025	0.005	0.0037	0.995	0.070	355.3	5,343	
	0.0312	0.00123	0.00010	0	0.005	1	0.029	844.0		lost by wash
									54,376	

Head loss = 3.83 ft

Proposed Sand w/ 400

Shape factor 0.82
Porosity = 0.4
Depth = 12 in = 1.0 ft

Mesh	d			f			R	Cd	(Cd)(f)/d	
#	mm	in	ft	% passing	% retained	Cumulative				
-16	1.154	0.0454	0.00379	0.9	0.1	0.1	1.075	25.6	675	
-20	.0.825	0.0325	0.00271	0.6	0.4	0.5	0.768	35.0	5,173	
35	0.5	0.0197	0.00164	0.1	0.4	0.9	0.466	56.3	13,724	
50	0.3	0.0118	0.00098	0.05	0.05	0.95	0.279	91.9	4,670	
100	0.15	0.0059	0.00049	0.005	0.045	0.995	0.140	180.2	16,476	
200	0.075	0.0030	0.00025	0.005	0	0.995	0.070	355.3	0	
	0.0312	0.0012	0.00010	0	0.005	1	0.029	844.0		lost by wash
									40,718	

Head loss = 2.87 ft

Anthracite

Shape factor 0.7
Porosity = 0.45
Depth = 18 in = 1.5 ft

Mesh	d			f			R	Cd	(Cd)(f)/d
#	mm	in	ft	% passing	% retained	Cumulative			
8	2.38	0.09370	0.00781	0.95	0.05	0.05	2.162	13.5	86.3
18	1	0.03937	0.00328	0.1	0.9	0.950	0.909	29.9	8,203
30	0.6	0.02362	0.00197	0.04	0.01	0.960	0.545	48.4	246
40	0.4	0.01575	0.00131	0.01	0.03	0.990	0.363	71.4	1,631
100	0.15	0.00591	0.00049	0.0075	0.0025	0.993	0.136	184.6	938
200	0.075	0.00295	0.00025	0.005	0.0025	0.995	0.068	364.1	3,699
	0.0312	0.00123	0.00010	0	0.005	1	0.028	864.9	
									14,803

Head loss = 1.15 ft = 13.7 in

Ex. mixed media HL = 4.98 ft

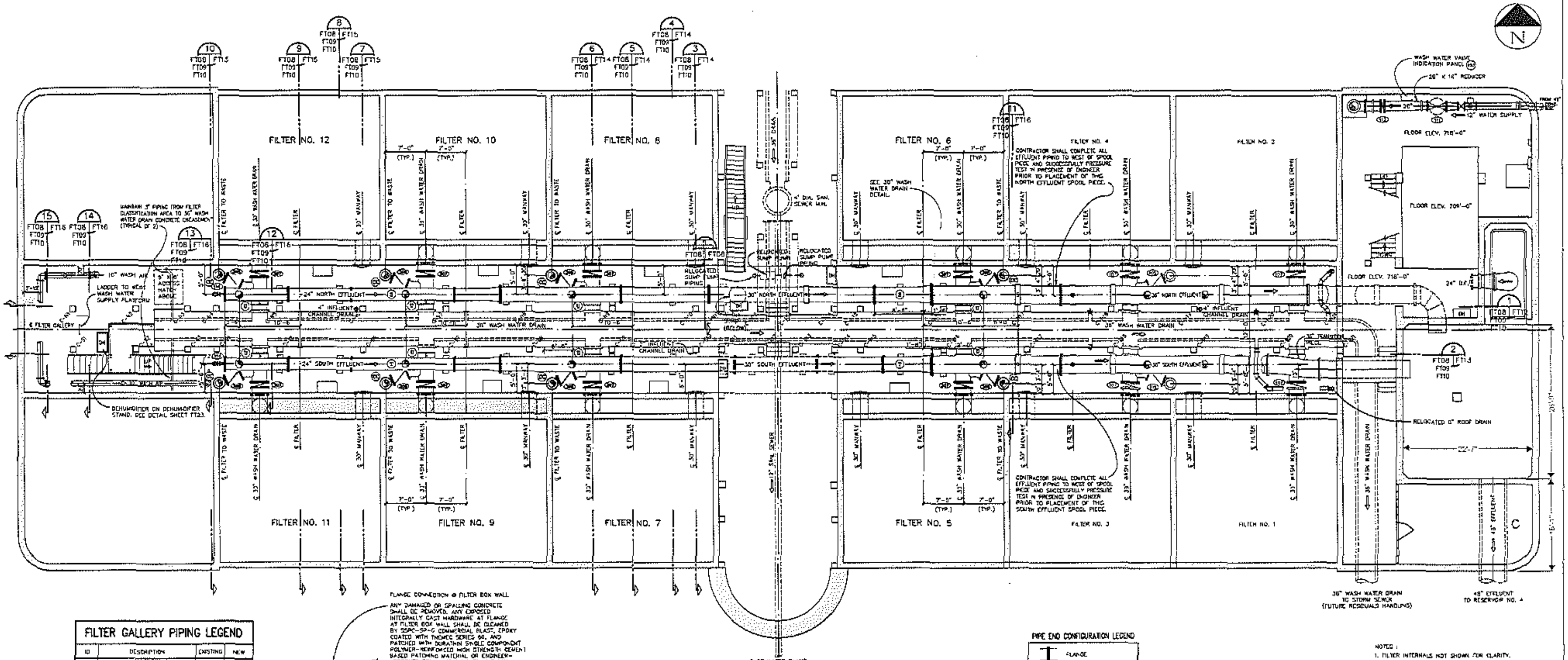
GAC - Filtrsorb 400

Shape factor 0.8
Porosity = 0.614
Depth = 18 in = 1.5 ft

Mesh	d			f			R	Cd	(Cd)(f)/d
#	mm	in	ft	% passing	% retained	Cumulative			
8	2.38	0.0937	0.00781	0.99	0.01	0.01	2.162	13.5	17.3
12	1.68	0.0661	0.00551	0.95	0.04	0.05	1.526	18.5	134.2
30	0.6	0.0236	0.00197	0.1	0.85	0.9	0.545	48.4	20,913
40	0.4	0.0157	0.00131	0.04	0.06	0.96	0.363	71.4	3,263
100	0.15	0.0059	0.00049	0.01	0.03	0.99	0.136	184.6	11,252
200	0.075	0.0030	0.00025	0.005	0.005	0.995	0.068	364.1	7,398
	0.0312	0.0012	0.00010	0	0.005	1	0.028	864.9	
									42,976

Head loss = 0.84 ft = 10.1 in

Pr. mixed media HL = 3.71 ft



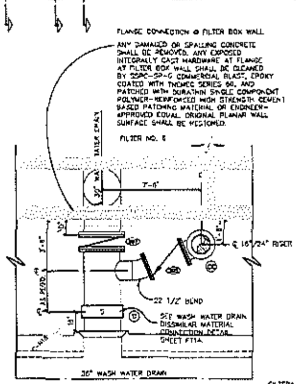
FILTER PLAN – EL. 720'-0"

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

NOTES :

1. FILTER INTERNALS NOT SHOWN FOR CLARITY.
2. SUPPORT MECHANISMS FOR VALVES, ACTUATORS, & PIPING NOT SHOWN FOR CLARITY. REFER TO 1/4 SCALE SECTIONS FOR SUPPORT LOCATIONS.
3. HANDRAIL NOT SHOWN FOR CLARITY. SEE NEW FILTER GALLERY SECTION FOR NEW HANDRAIL AT FLOOR ELEV. 718'± AT TOP OF 36" WASH WATER DRAIN CONCRETE ENCASEMENT.

FILTER GALLERY PIPING LEGEND			
ID	DESCRIPTION	EXISTING	NEW
P	WASH WATER SUPPLY – GALLERY SERVING FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
Q	REWASH FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	NO
R	EFFLUENT FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
S	NORTH EFFLUENT	YES	YES
T	SOUTH EFFLUENT	YES	YES
U	WASH WATER DRAIN FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
V	INFLUENT FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
W	SURFACE WASH FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	NO
X	PLANT WATER AND SURFACE WASH	YES	NO
AA	WASH AIR SUPPLY – GALLERY	YES	NO
BB	WASH AIR SUPPLY FILTERS NO. 5 – NO. 12, INCLUSIVE	NO	YES
CC	FILTER TO WASTE SERVING FILTERS NO. 5 – NO. 12, INCLUSIVE	NO	YES
DD	PROCESS WATER	NO	YES
EE	WASH WATER SUPPLY – WEST	NO	YES



EXISTING CAST IRON WASH WATER DRAIN DISTANCE FROM FILTER BOX WALL TO FLANGE/FLANGE FACE	
FILTER NO.	DISTANCE "D"
5	8.5"±
6	10"±
7	8.5"±
8	8.5"±
9	9.5"±
10	8"±
11	9.75"±
12	9.5"±

FILTERS NO. 7, 9, & 11 SIMILAR.
FILTERS NO. 5, 8, 10, & 12 OPPOSITE HAND.

30" WASH WATER DRAIN DETAIL

SCALE : 1/4" = 1'-0"

GENERAL NOTE

ALL DRAWINGS ARE A REPRESENTATION OF ACTUAL CONDITIONS BASED ON 1952 CONSTRUCTION PLAN DRAWINGS. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, SIZES, AND LOCATIONS OF ALL RELEVANT ITEMS.

GENERAL NOTE NO. 1 ⚠

THIS NOTE APPLIES TO DRAWINGS FT01 THROUGH FT28

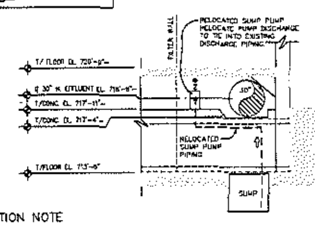
THE WORK ARE FOR ALL CONCRETE SURFACES THAT ARE REPAIRED, INFILLED OR PATCHED SHALL BE SMOOTH AND FLUSH WITH SURROUNDING CONCRETE SURFACES. IF NECESSARY THE CONTRACTOR SHALL GRIND THE NEW SURFACES TO BE FLUSH WITH THE ADJOINING SURFACES.

PIPE END CONFIGURATION LEGEND

- FLANGE
- GROOVED END COUPLING
- SLEEVE TYPE COUPLING

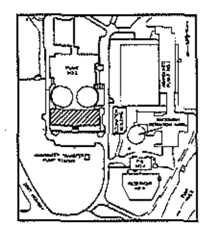
GENERAL CONSTRUCTION NOTE

NO MOUNTING OR FASTENING OF ANY TEMPORARY OR PERMANENT EQUIPMENT, SUPPORTS, OR DEVICES TO THE CONCRETE OF THE FILTER BOXES OR INFLUENT CHANNEL IS PERMITTED.



SECTION 1 FT08 FT08

SCALE : 1/4" = 1'-0"

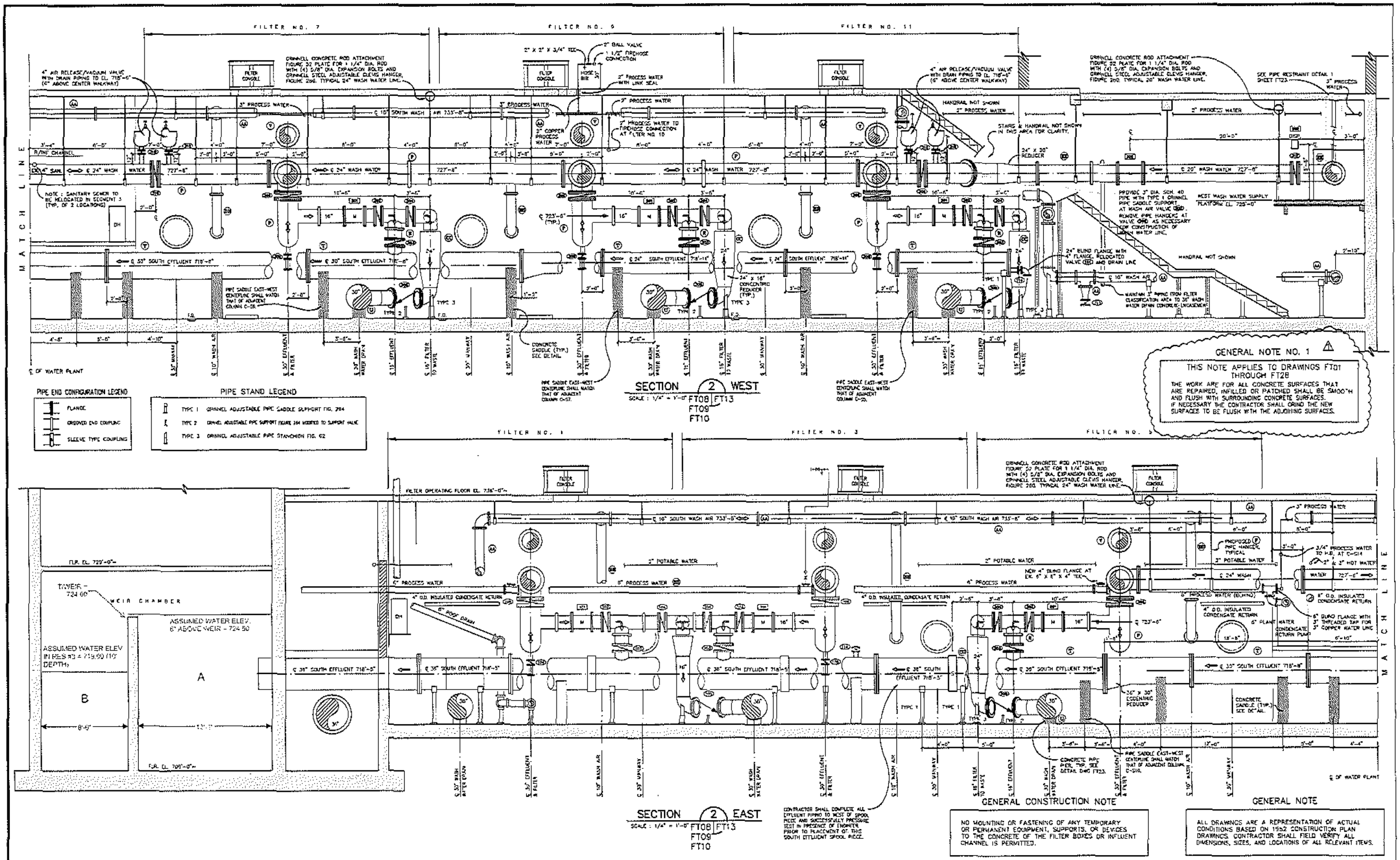


KEY PLAN

THE DLZ TEAM	FLINT — MICHIGAN CITY OF FLINT DEPARTMENT OF PUBLIC WORKS & UTILITIES	WATER TREATMENT PLANT REHABILITATION PHASE I, SEGMENT 4 FILTER REHABILITATION NEW FILTER PLAN – EL. 720'-0"	DRAWN J.B.P. CHK'D. C.A.F. APPR'D. C.A.F. DATE JUNE 2002 PROJECT NUMBER 7019-04	SHEET OF DRAWING NUMBER FT08

NO.	REVISION	BY	DATE
1	ADDENDUM NO. 1 REVISION	JO	10/03
2	AS-BUILT	DJW	8/05

001361



THE DLZ TEAM

FLINT MICHIGAN

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS & UTILITIES

WATER TREATMENT PLANT REHABILITATION
PHASE I, SEGMENT 4

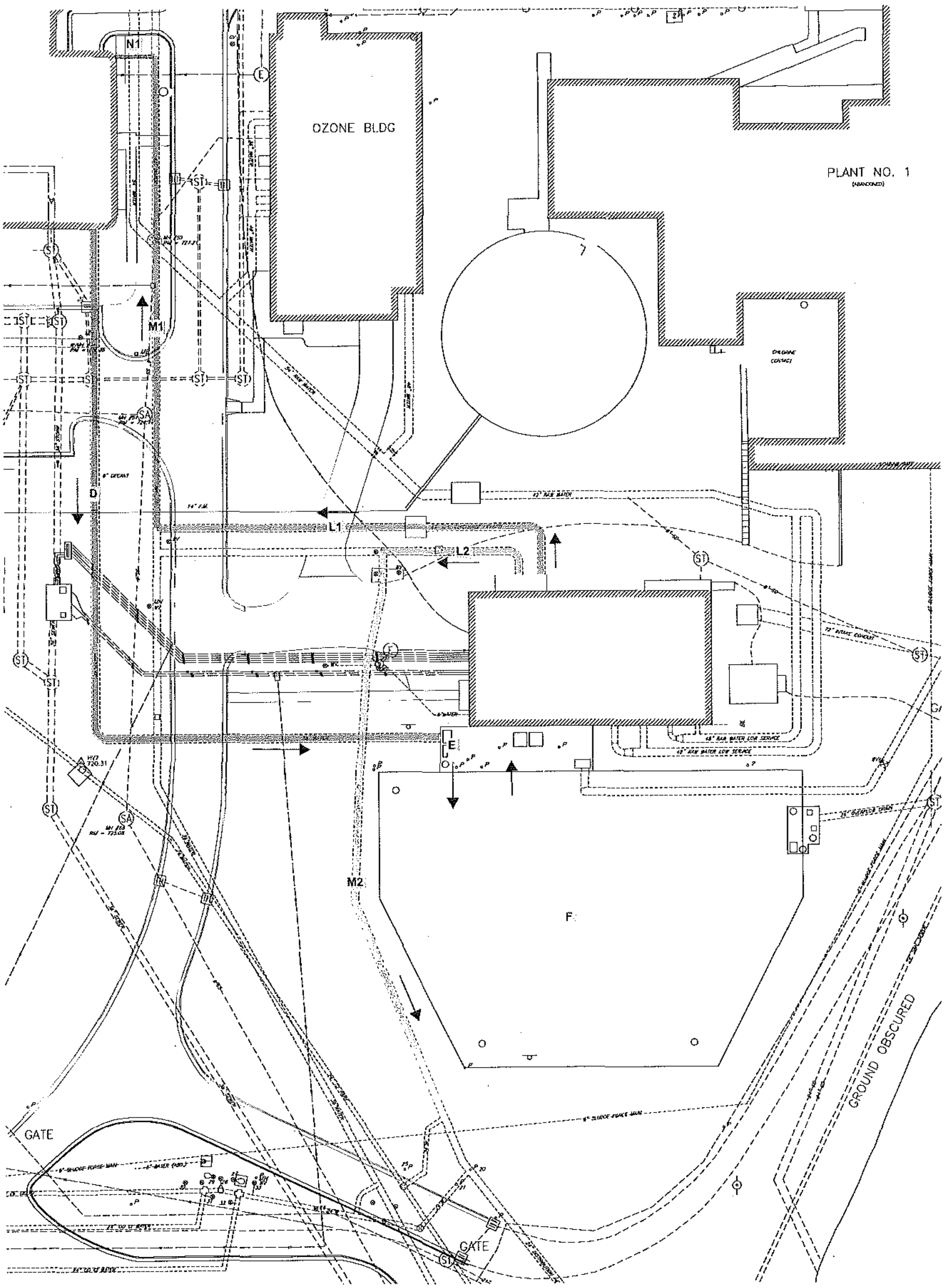
FILTER REHABILITATION
NEW FILTER GALLERY SECTIONS

DRAWN	J.B.P.	
CHK'D.	C.A.P.	
APPR'D	C.A.P.	
DATE	JUNE 2002	
PROJECT NUMBER	7019-04	

NO.	REVISION	BY	DATE
1	ADDENDUM NO. 1 REVISION	JO	10/03
2	AS-BUILT	DJV	8/05

SHEET
OF
DRAWING NUMBER
FT13

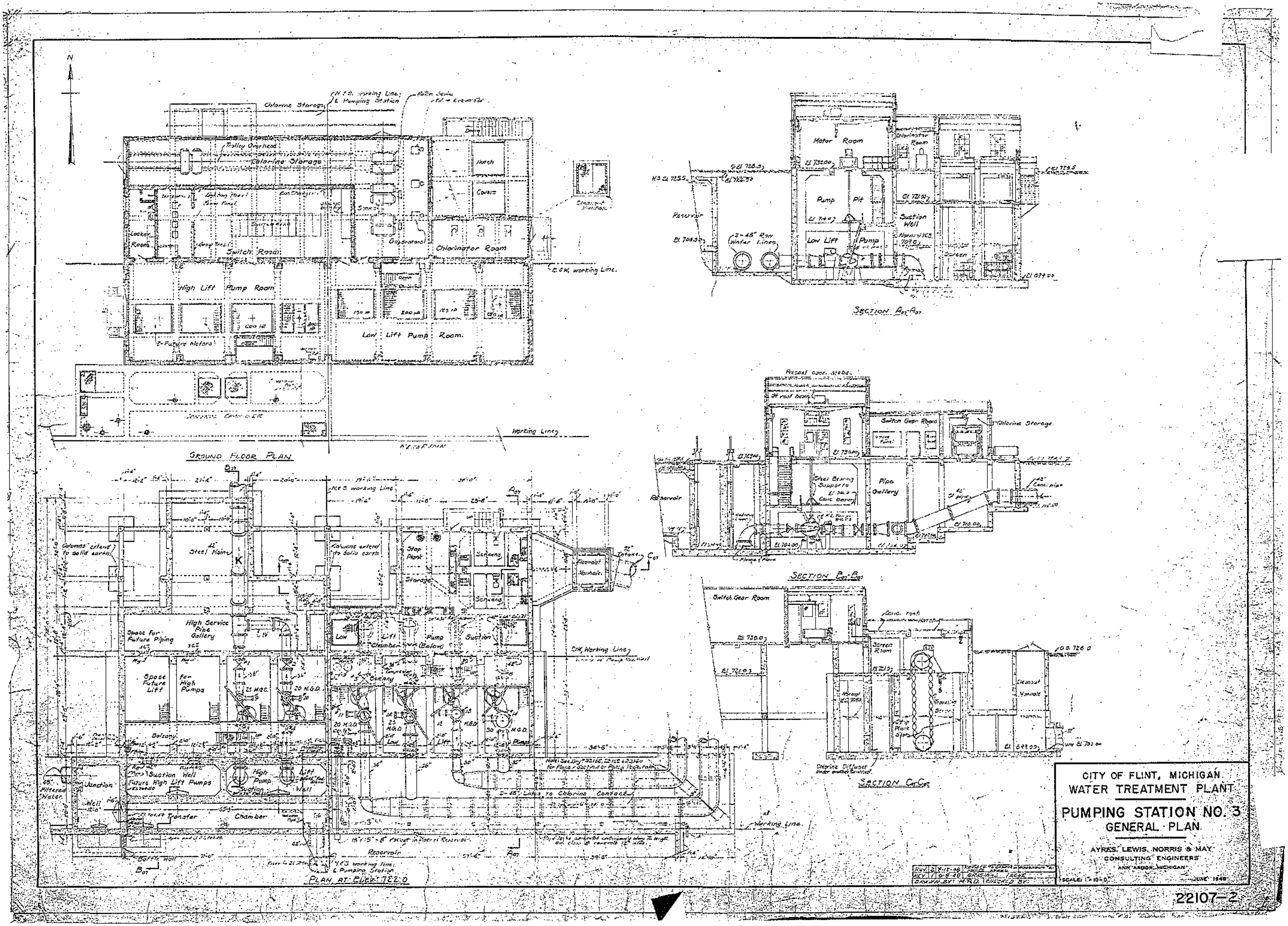
001362


OZONE BLDG
PLANT NO. 1
(ABANDONED)
N1
M1
D
L1
L2
E
M2
F
GATE
GATE
GROUND OBSCURED

001363

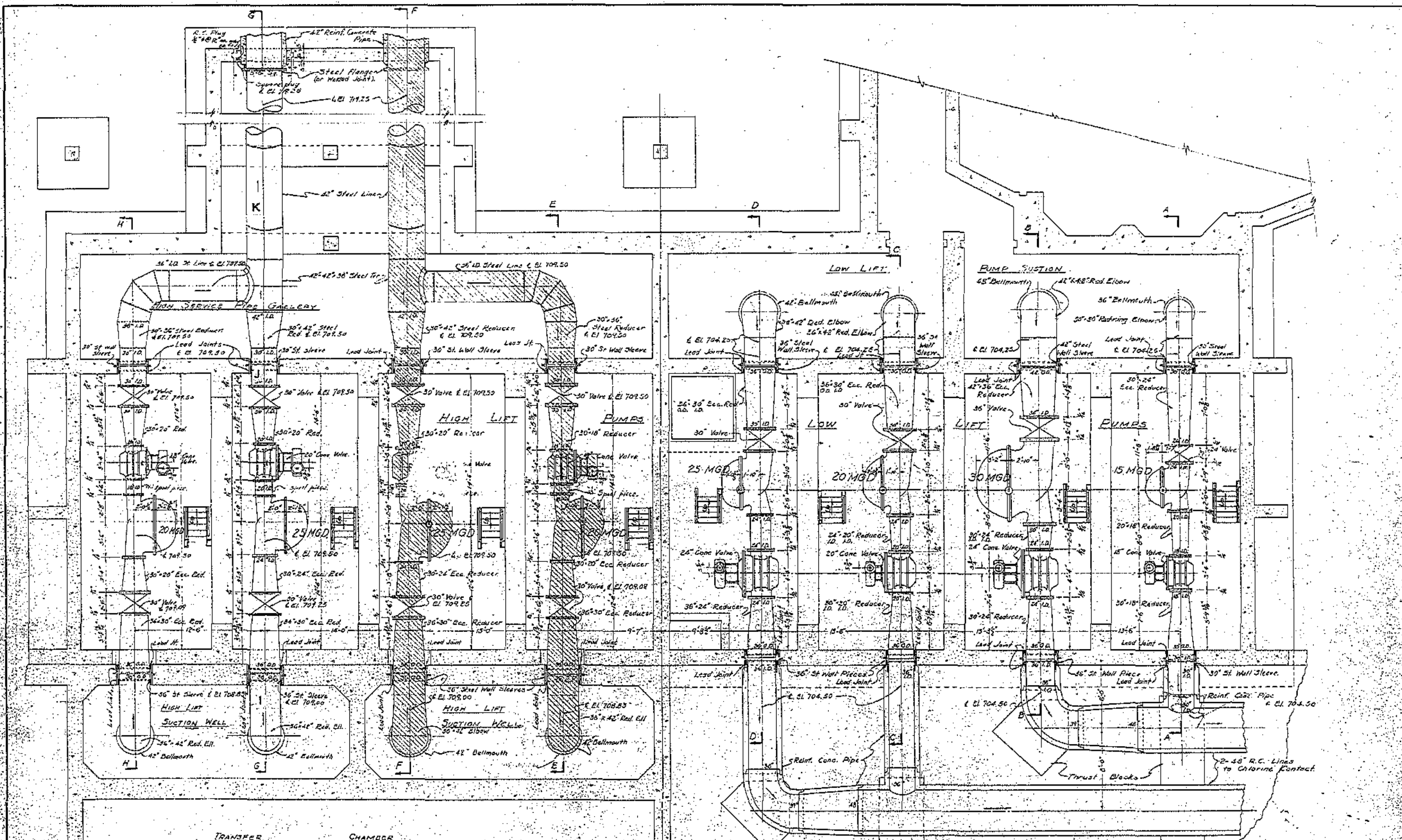
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
GENERAL PLAN
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
JUNE 1948
22101-2
Note
Existing Structures are dotted
Structures under this Contract are shaded.
FLINT RIVER
INTAKE
PUMPING STATION No. 3
UNDERGROUND RESERVOIR No. 3
EXISTING CLARIFIER
EXISTING SOFTENING PLANT
CHLORINE CONTACT
CONNECTION TO OLD CHLORINE CONTACT
INLET CHAMBER OLD RESERVOIR
Lift Station
New or Here
Existing Fence
Construction Baseline A
Relocated gate
650± of new and relocated fence

001364



Ground Floor Plan
Chlorine Storage
Switch Room
Chlorinator Room
High Lift Pump Room
Low Lift Pump Room
Locker Room
Working Line
Plan at Elev. 722.0
Steel Main
High Service Pipe Gallery
Space for Future Piping
Suction Well
Transfer
Chamber
Reservoir
Working Line
Section A07-A07
Motor Room
Pump Pit
Low Lift Pump
Suction Well
Reservoir
Section B07-B07
Switch Gear Room
Chlorine Storage
Pipe Gallery
Reservoir
Section C07-C07
Switch Gear Room
Screen Room
Traveling Screen
Chlorine Diffuser
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
PUMPING STATION NO. 3
GENERAL PLAN
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22107-2

001365



Note:
Layout of pipe in Pump Station is for Steel pipe.
Denotes Future High Lift Pumps & Pipes

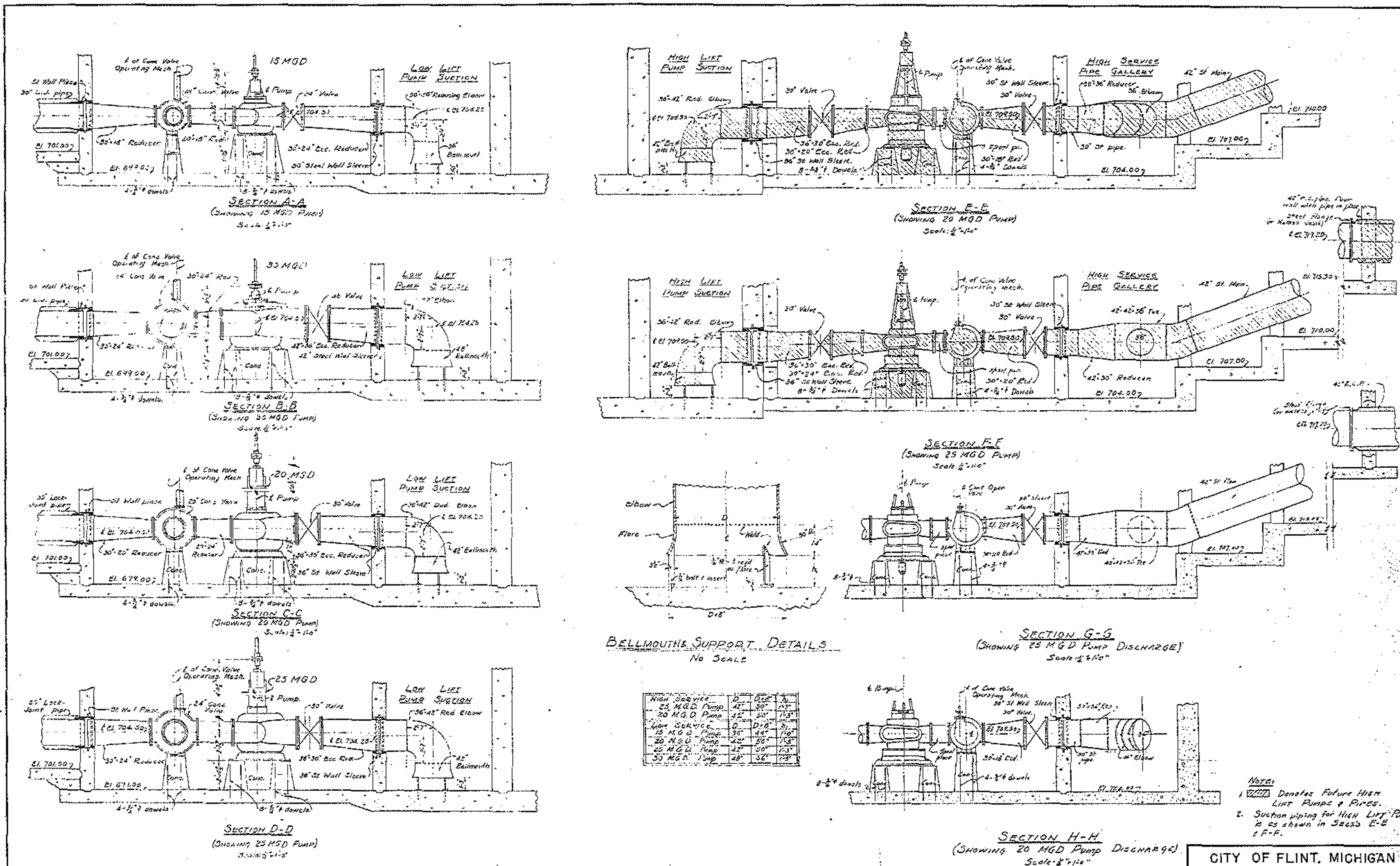
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
PUMPING STATION NO.3
PLAN OF PUMP PIPING

AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN

SCALE: AS SHOWN
NOV. 1948

S 22107-A4

001366



Bellmouth & Support Details
No Scale

High Service	D	D+8"	h
25 M.G.D. Pump	42"	50"	1'-3"
20 M.G.D. Pump	42"	50"	1'-3"
Low Service	D	D+8"	h
15 M.G.D. Pump	36"	44"	1'-0"
20 M.G.D. Pump	42"	50"	1'-3"
25 M.G.D. Pump	42"	50"	1'-3"
30 M.G.D. Pump	48"	56"	1'-9"

Note:
1. Denotes Future High Lift Pumps & Pipes.
2. Suction piping for High Lift Pumps is as shown in Sects E-E & F-F.

REV	5	Mar.'49	Spool Piece Notation & S.E.M.
REV	4	Feb.'49	Relocate H Lift Pumps
REV	3	Jan.'49	Relocate L Lift Valves
REV	2	Dec.'48	Complete Details
REV	1	Oct.'48	Original Issue
DRAWN BY			CHECKED BY

CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT

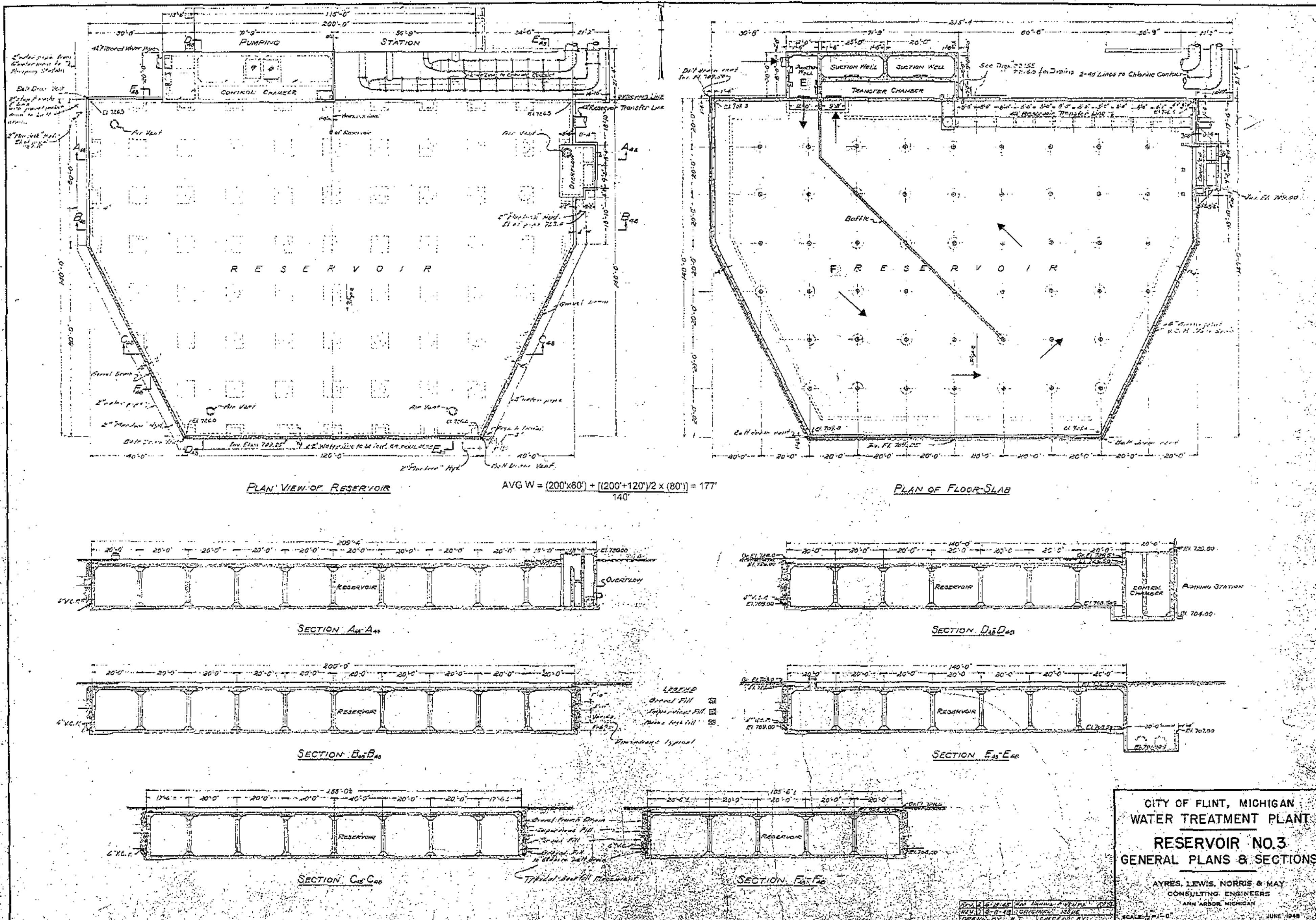
PUMPING STATION NO.3
SECTIONS OF PUMP PIPING

AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN

SCALE: AS SHOWN NOV. 1948

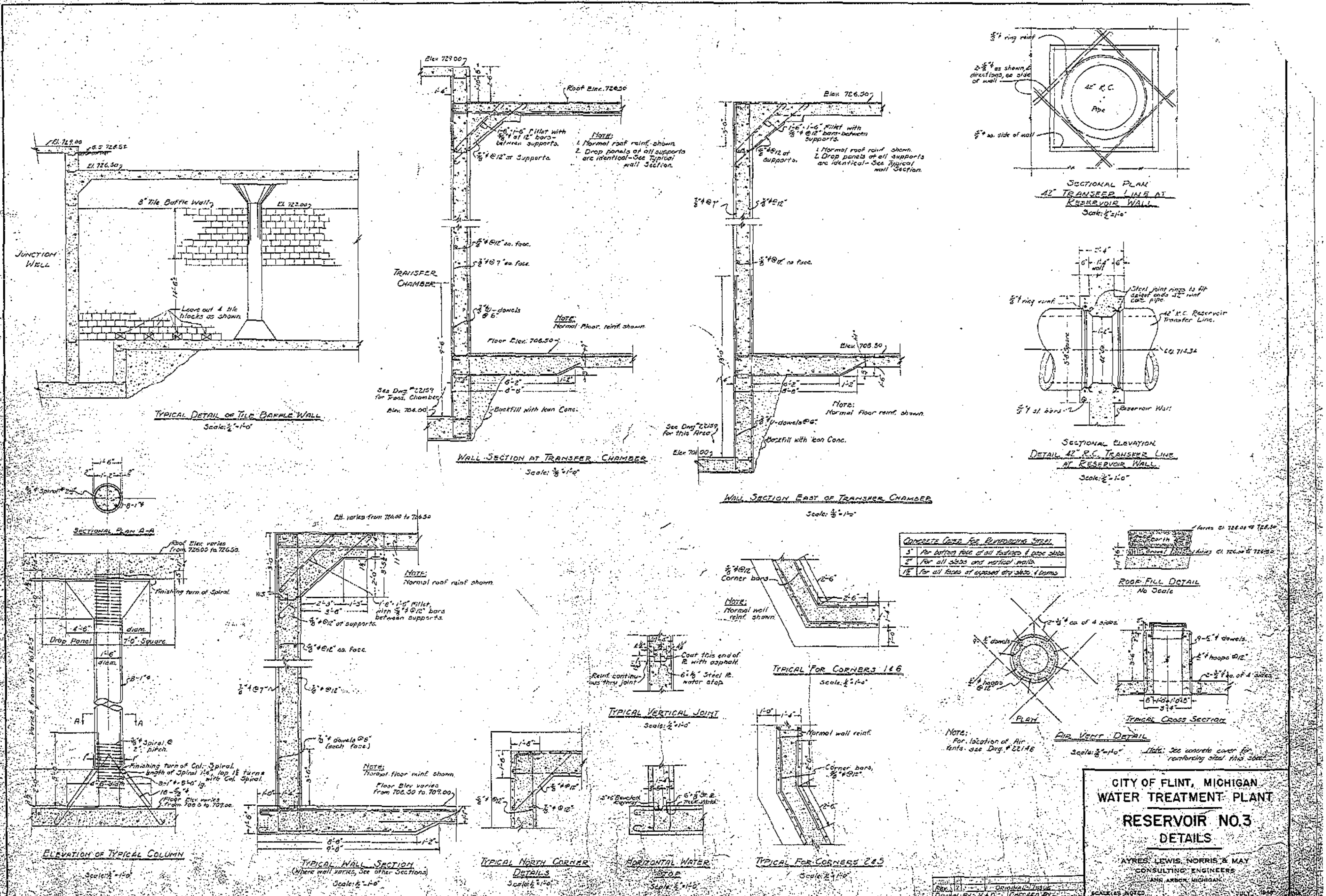
S 22107-B4

001367

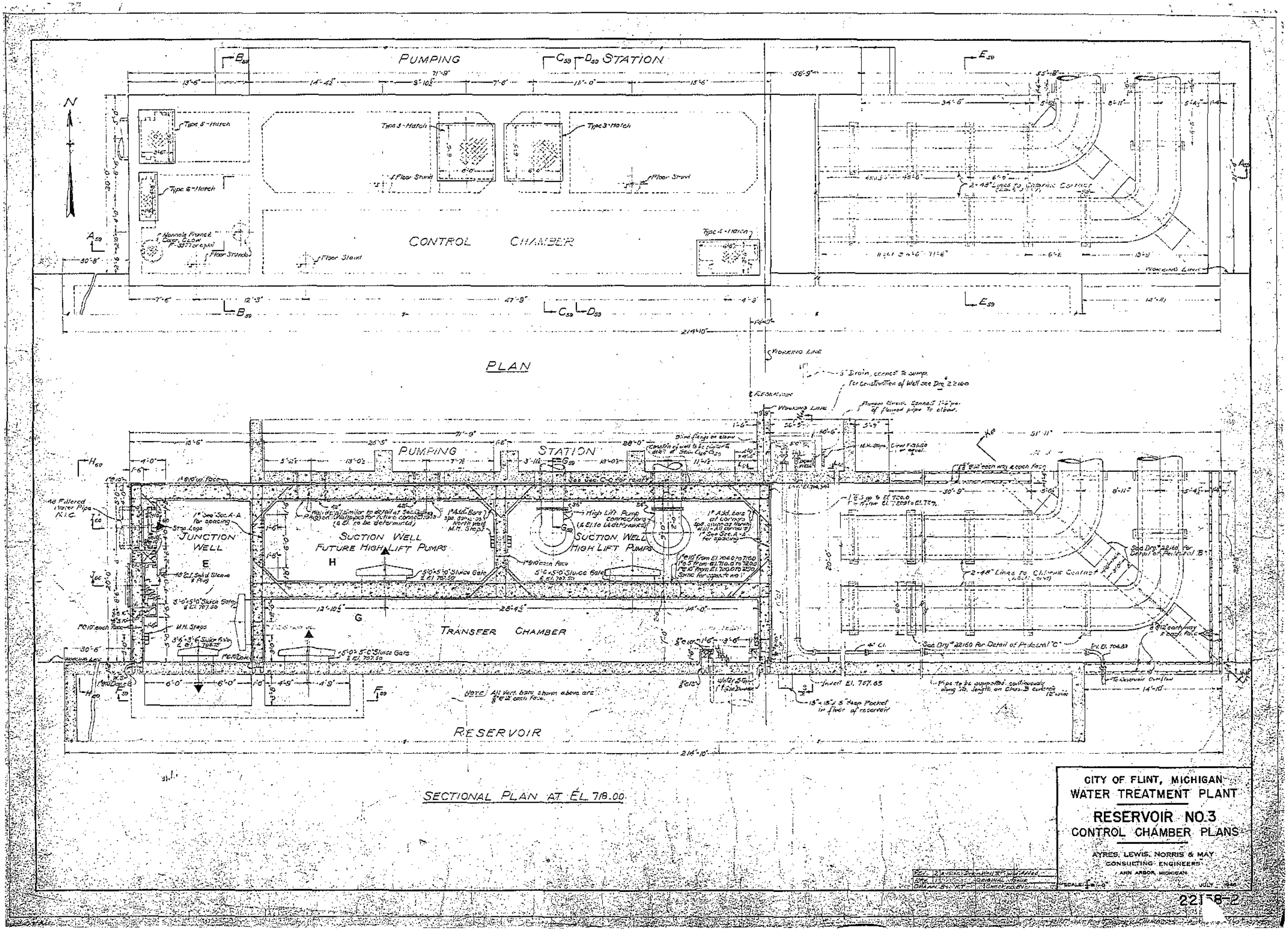


PUMPING
STATION
CONTROL CHAMBER
RESERVOIR
PLAN VIEW OF RESERVOIR
AVG W = (200'x60') + [(200'+120')/2 x (80')] = 177'
140'
SUCTION WELL
SUCTION WELL
TRANSFER CHAMBER
Baffle
RESERVOIR
PLAN OF FLOOR-SLAB
SECTION A48-A48
SECTION D48-D48
SECTION B48-B48
SECTION E48-E48
SECTION C48-C48
SECTION F48-F48
Legend
Overflow
Pumping Station
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
GENERAL PLANS & SECTIONS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
JUNE 1948
22148-2

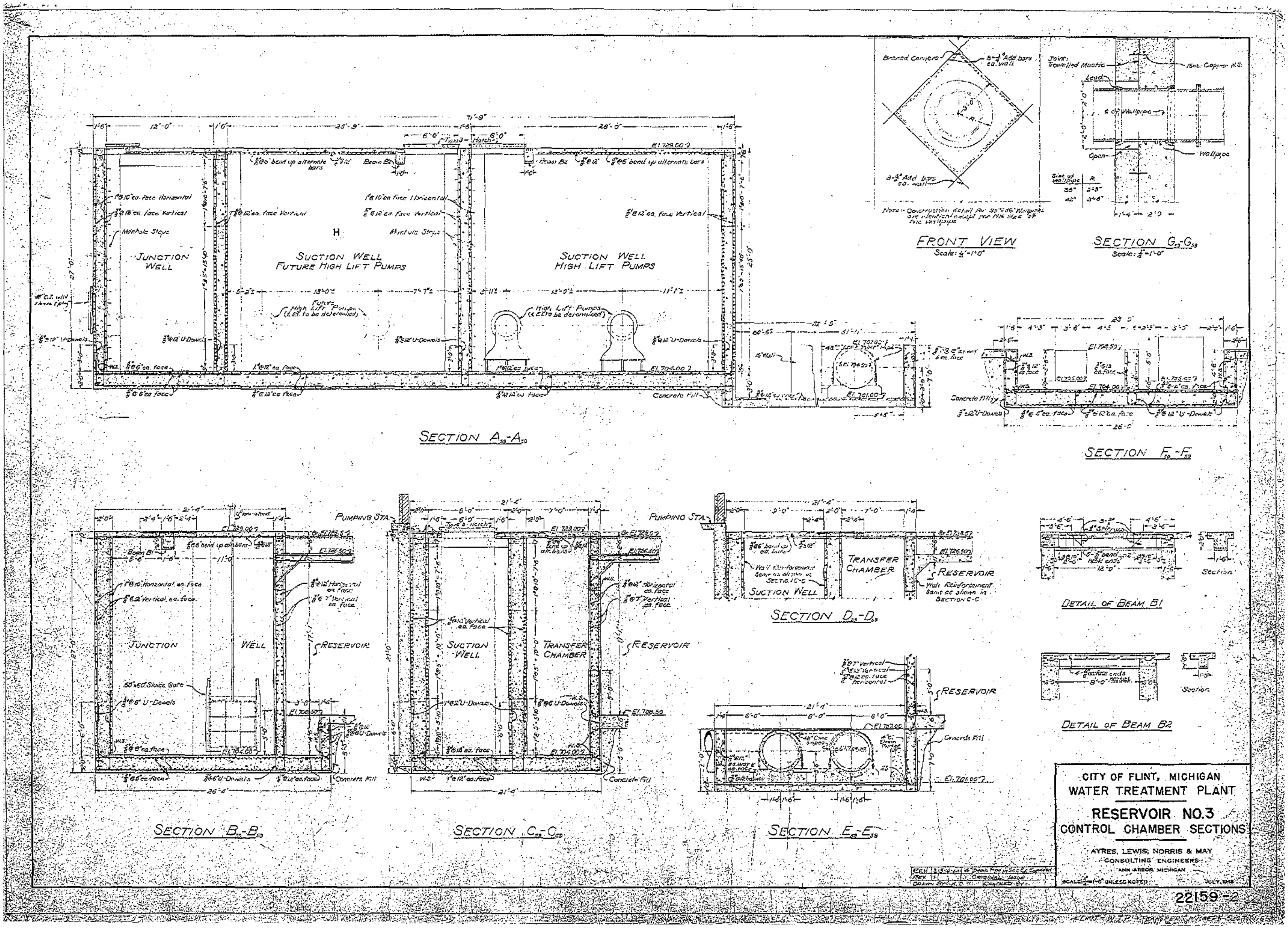
001368



Junction Wall
8" Tile Baffle Wall
Typical Detail of Tile Baffle Wall
Scale: 1/2"=1'-0"
Transfer Chamber
Wall Section at Transfer Chamber
Scale: 3/8"=1'-0"
Wall Section East of Transfer Chamber
Scale: 3/8"=1'-0"
Sectional Plan 42" Transfer Line at Reservoir Wall
Sectional Elevation Detail 42" R.C. Transfer Line at Reservoir Wall
Sectional Plan A-A
Elevation of Typical Column
Typical Wall Section
(Where wall varies, see other Sections)
Typical North Corner Details
Horizontal Water Stop
Typical Vertical Joint
Typical for Corners 1 & 6
Typical for Corners 2 & 5
Concrete Cover for Reinforcing Steel
3" For bottom face of all footings & base slabs
2" For all slabs and vertical walls
1 1/2" For all faces of exposed dry slabs & beams
Roof Fill Detail
No Scale
Plan
Typical Cross Section
Air Vent Detail
Note: For location of Air Vents see Dwg. # 22146
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
DETAILS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
Scale as noted
22157

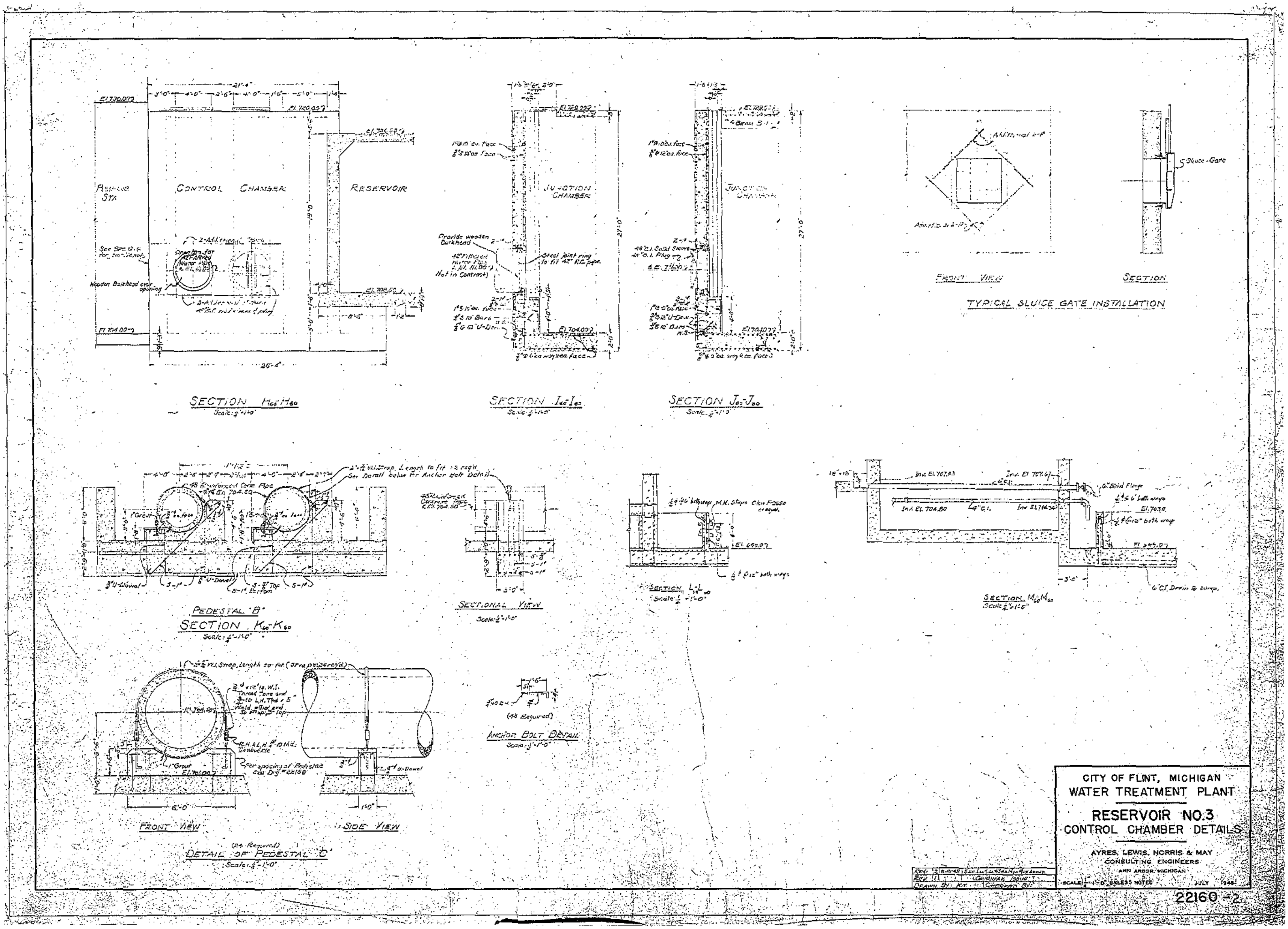

PUMPING STATION
CONTROL CHAMBER
Type 5-Hatch
Type 6-Hatch
Type 3-Hatch
Type 4-Hatch
Floor Stand
WORKING LINE
214'-10"
PLAN
PUMPING STATION
JUNCTION WELL
E
SUCTION WELL
FUTURE HIGH LIFT PUMPS
H
SUCTION WELL
HIGH LIFT PUMPS
G
TRANSFER CHAMBER
2-48" Lines to Chlorine Contact
NOTE: All Vert. bars shown above are $\frac{3}{4}$" ⌀ 12" each face.
RESERVOIR
214'-10"
SECTIONAL PLAN AT EL. 718.00
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
CONTROL CHAMBER PLANS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22188-2

001370



JUNCTION WELL
SUCTION WELL FUTURE HIGH LIFT PUMPS
SUCTION WELL HIGH LIFT PUMPS
SECTION A-A
FRONT VIEW
Scale: 1/4"=1'-0"
SECTION G-G
SECTION F-F
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
DETAIL OF BEAM B1
DETAIL OF BEAM B2
RESERVOIR
TRANSFER CHAMBER
PUMPING STA.
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
CONTROL CHAMBER SECTIONS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22159-2

001371



CONTROL CHAMBER
RESERVOIR
JUNCTION CHAMBER
SECTION H60-H60
SECTION I60-I60
SECTION J60-J60
FRONT VIEW
SECTION
TYPICAL SLUICE GATE INSTALLATION
Sluice-Gate
PEDESTAL "B"
SECTION K60-K60
SECTIONAL VIEW
SECTION L-L
SECTION M60-M60
ANCHOR BOLT DETAIL
(48 Required)
FRONT VIEW
SIDE VIEW
(24 Required)
DETAIL OF PEDESTAL "C"
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
CONTROL CHAMBER DETAILS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22160-2

Rennaker, Joanne (DEQ)

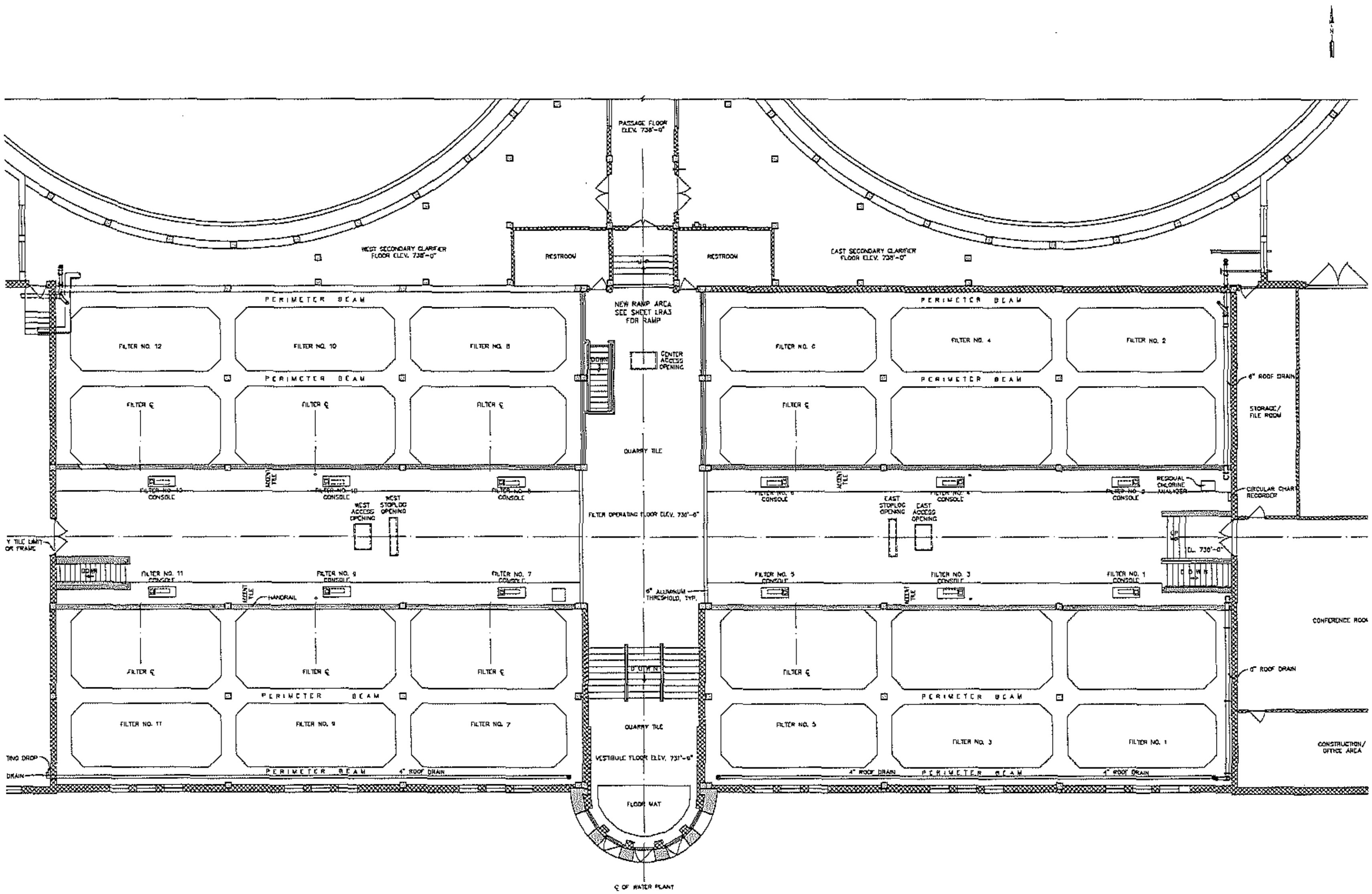
From:	Hansen, Jeff <jrhansen@lan-inc.com>
Sent:	Saturday, June 13, 2015 12:52 PM
To:	Prysby, Mike (DEQ)
Cc:	Busch, Stephen (DEQ); Cook, Pat (DEQ); Matta, Samir; Green, Warren; Brent Wright (bwright@cityofflint.com); mglasgow@cityofflint.com
Subject:	Flint GAC 2 of 2
Attachments:	Flint-PRELIM-Drawings.pdf

Preliminary plans.

Jeffrey R. Hansen
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B • Flint, MI 48532
T 810.820.2682 **C** 810.333.3201
www.lan-inc.com • JRHansen@lan-inc.com

001373



1 **FILTER GALLERY**
SCALE: 1/8" = 1'-0"

Flint WTP
Phase II, Segment III - Electrical Improvements
Flint MI, 48505

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B
Flint, MI 48532
Tel 810-820-2682 Fax 810-820-2703

KEY PLAN

REVISIONS

NO.	DESCRIPTION	DATE

FILE LOG

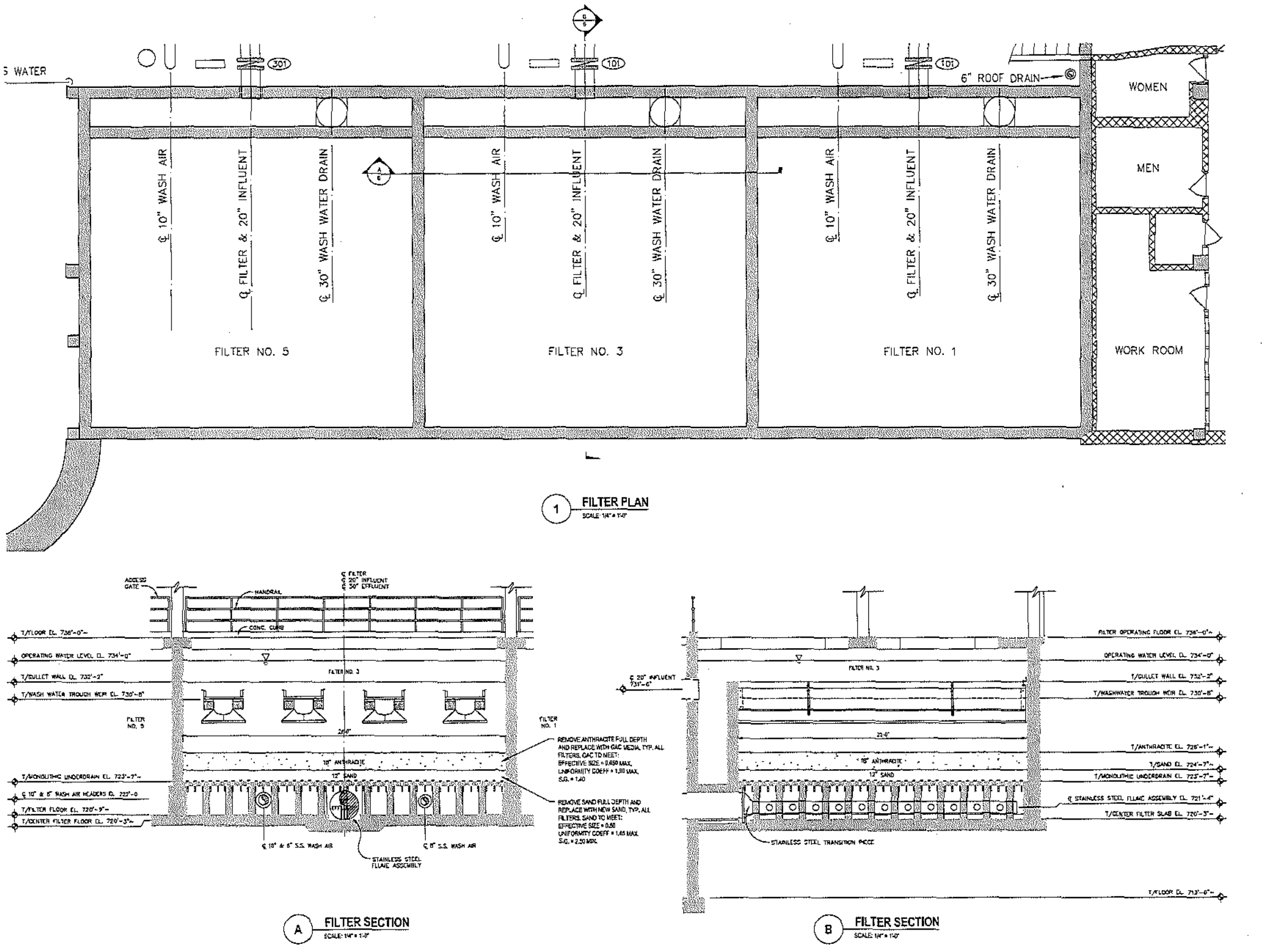
Project No. 130-10701-001
Date: January 17, 2014

FILTER GALLERY PLAN

C4-101
5 of XX

ProjectWise: Pw:\\LADPWLADCONT:PROJECTWISE\DOCUMENTS\PROJECTS\130-10701-001\4-0-PRODUCTION\4-01-DRAWINGS\...
File: C:\projectwise\jhansen\d0296414\C4-101.dwg Plotted: 6/13/2015 12:41 PM By: Hansen, Jeff

001374



Flint WTP
Phase II, Segment III - Electrical Improvements
Flint MI, 48505

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B
Flint, MI 48532
Tel 810-820-2682 Fax 810-820-2713

KEY PLAN

REVISIONS

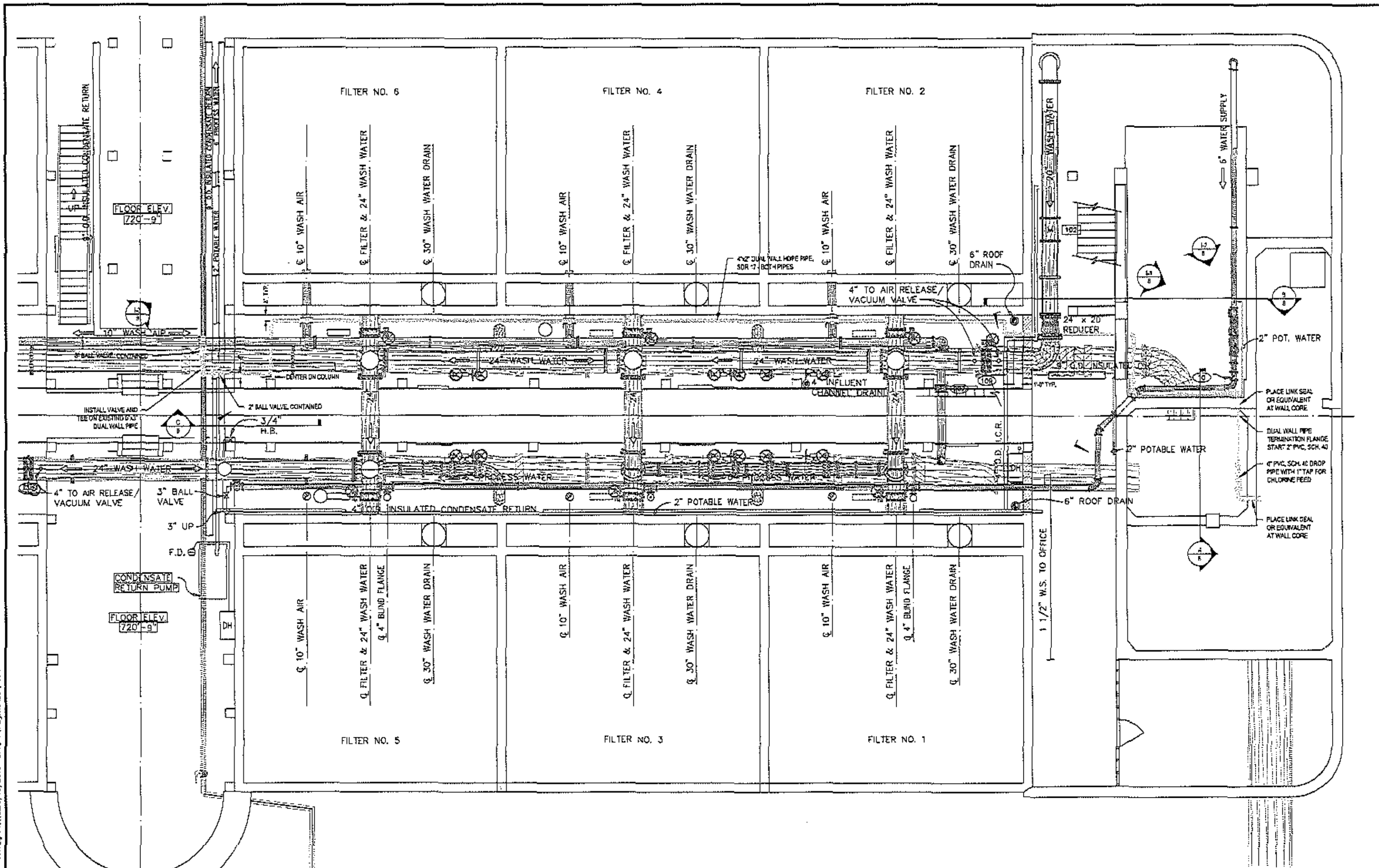
FILE LOG

Project No. 130-10701-001
Date: January 17, 2014

FILTER PLAN & SECTIONS
TYPICAL OF TWELVE

C4-102

6 of XX



NOTES

1. PIPE SUPPORTS TO BE PLACED AS PER PIPE AND SUPPORT MANUFACTURER'S RECOMMENDATIONS. SUPPORTS TO BE COOPER B3098 "O" BRACKET OR EQUAL.

Flint WTP
Phase II, Segment III - Electrical Improvements
Flint MI, 48505

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
PLANNING ENGINEERING PROGRAM MANAGEMENT
1311 South Linden Road, Suite B
Flint, MI 48532
Tel 810-820-2682 Fax 810-820-2703

KEY PLAN

REVISIONS

FILE LOG

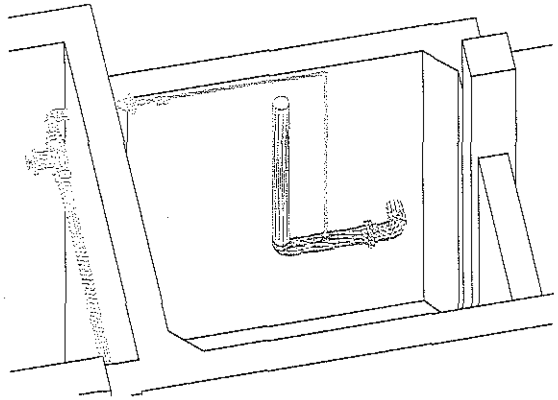
Project No. 130-10701-001
Date: January 17, 2014

CHLORINE PIPING PLAN

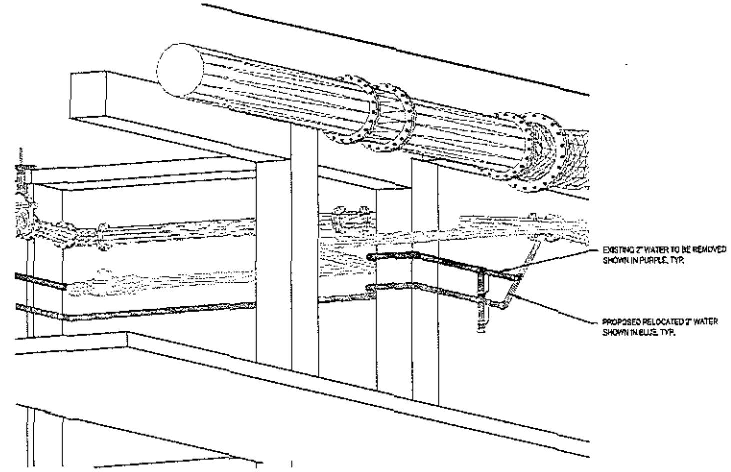
C4-103

7 OF XX

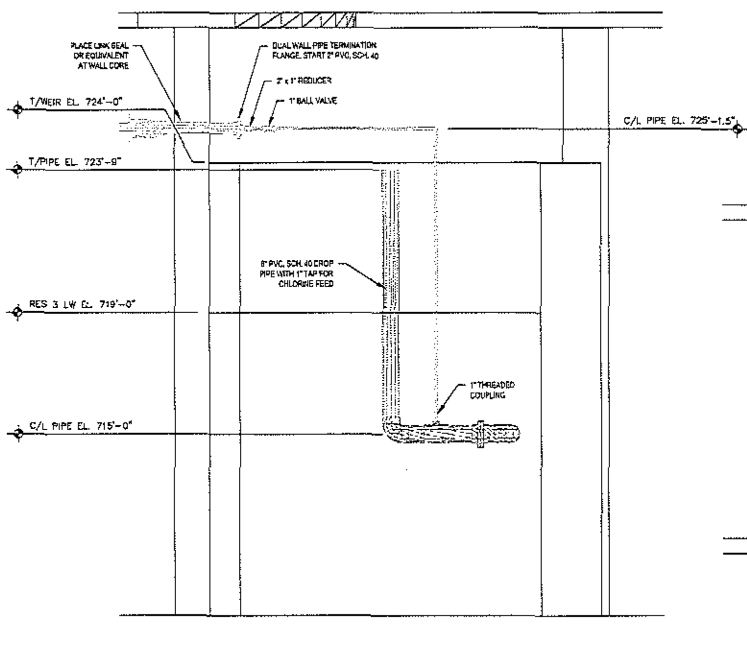
001376



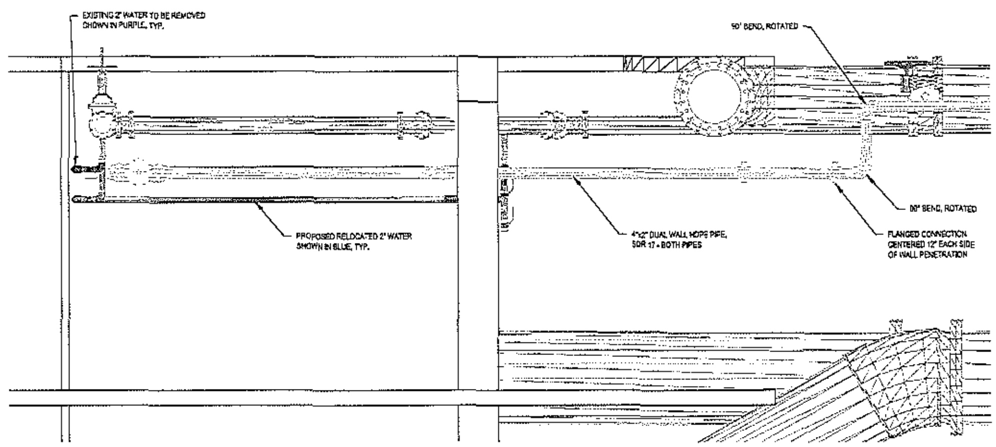
1-1 CHLORINE PIPING ISOMETRIC
SCALE: 1/2" = 1'-0"



1-2 CHLORINE PIPING ISOMETRIC
SCALE: 1/2" = 1'-0"



A CHLORINE PIPING SECTION
SCALE: 1/2" = 1'-0"



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

Flint WTP
Phase II, Segment III - Electrical Improvements
Flint MI, 48505

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
PLANNING
ENGINEERING
PROGRAM MANAGEMENT
1311 South Linden Road, Suite B
Flint, MI 48532
Tel 810-820-2682 Fax 810-820-2703

KEY PLAN

REVISIONS

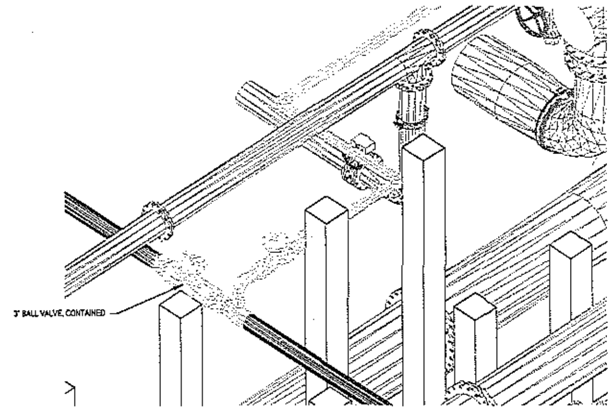
FILE LOG

Project No. 130-10701-001
Date: January 17, 2014

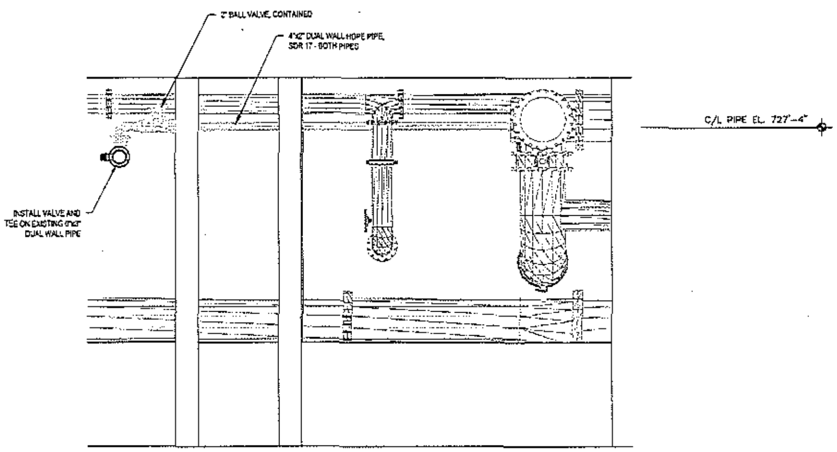
CHLORINE SECTIONS & DETAILS

C4-501
8 OF XX

ProjectWise: PW:\\LADPWLADCONT:PROJECTWISE\DOCUMENTS\PROJECTS\130-10701-001\4-0-PRODUCTION\4-01-DRAWINGS\-
File: C:\projectwise\jhansen\d0296414\C4-501.dwg Plotted: 5/13/2015 12:07 PM By: Hansen, Jeff



I-3 **CHLORINE PIPING ISOMETRIC**
SCALE: 1/2" = 1'-0"



C **CHLORINE PIPING SECTION**
SCALE: 1/2" = 1'-0"

Flint WTP
Phase II, Segment III - Electrical Improvements
Flint MI, 48505

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
PLANNING
ENGINEERING
PROGRAM MANAGEMENT
1311 South Linden Road, Suite B
Flint, MI 48532
Tel 810-820-2682 Fax 810-820-2703

KEY PLAN

REVISIONS

FILE LOG

Project No. 130-10701-001
Date: January 17, 2014

CHLORINE SECTIONS & DETAILS

C4-502
9 OF XX

ProjectWise: PW:\\LADPW.LADCONT:PROJECTWISE\DOCUMENTS\PROJECTS\130-10701-001\4-0-PRODUCTION\4-01-DRAWINGS\
File: C:\projectwise\jhansen\d0296414\C4-502.dwg Plotted: 8/13/2015 12:24 PM By:Hansen, Jeff

Rennaker, Joanne (DEQ)

From: Rosenthal, Adam (DEQ)
Sent: Thursday, June 11, 2015 11:31 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject: FW: Monthly Bromate Results
Attachments: May 2015 Bromate.pdf

fyi, ND

Adam

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Thursday, June 11, 2015 11:29 AM
To: Rosenthal, Adam (DEQ)
Subject: Monthly Bromate Results

Adam,

Here is a copy of the bromate test results from the month of May.

--
Mike Glasgow
Utilities Administrator
City of Flint

NSF International
789 N. Dixboro Rd. Ann Arbor, MI 48105, USA
1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org
Live Safer™

TEST REPORT

Send To: C0211289
Mr. Michael Glasgow
City of Flint, Municipality
1101 South Saginaw Street
Flint, MI 48502

Facility: C0211290
City of Flint Water Plant
4500 North Dort Highway
Flint MI 48505
United States

Result	**COMPLETE**	Report Date	08-JUN-2015
Customer Name	City of Flint, Municipality		
Tested To	USFDA CFR Title 21 Part 165.110		
Description	Municipal Water		
Test Type	Test Only		
Job Number	J-00176235		
Project Number	10005233 (CL17)		
Project Manager	Anna Ciechanowski		

Thank you for having your product tested by NSF International.

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

Report Authorization Kerri L. Le Vanseler **Date** 08-JUN-2015

Kerri Levanseler - Director, Chemistry Laboratory

General Information

Standard: USFDA CFR Title 21 Part 165.110
Date and Time Sampled: 05/26/2015 07:45 EDT
Product Description: Municipal Water
Test Description: Bromate - May 2015 - Additional

Sample Id: **S-0001160148**
Description: Municipal Water - 05/26/2015 07:45 EDT
Sampled Date: 05/26/2015
Received Date: 05/29/2015

Testing Parameter	Reporting Limit	Result	FDA SOQ	Units	P / F
Disinfection Residuals/Disinfection By-Products					
Bromate	5	ND	10	ug/L	Pass

<<Additional Information>>

Sample Id: S-0001160148

Test Parameter	Date Analyzed	Time Analyzed	Date Prepared/ Processed
Disinfection Residuals/Disinfection By-Products			
Bromate (Ref: EPA 300.1)	3-JUN-2015		

Testing Laboratories:

	Flag	Id	Address
All work performed at: (Unless otherwise specified)	→	NSF_AA	NSF International 789 N. Dixboro Road Ann Arbor MI 48105

References to Testing Procedures:

NSF Reference	Parameter / Test Description
C3015	Bromate (Ref: EPA 300.1)

Certifications:

Arizona (# AZ0655)	California (# 03214 CA)	Connecticut (# PH-0625)
Florida (# E-87752 FL)	Hawaii	Indiana
Maryland (# 201)	Michigan (# 0048)	North Carolina (# 26701)
New Jersey (# MI770)	Nevada (# MI000302010A)	New York (# 11206)
Pennslyvania (# 68-00312)	South Carolina (# 81005)	Virginia (# 00045)
Vermont (# VT 11206)		

Test descriptions preceded by an asterisk "*" indicate that testing has been performed per NSF International requirements but is not within its scope of accreditation.

The reported result for Odor, Phenolics, Potassium, Specific Conductance and Total Residual Chlorine cannot be used for compliance purposes within the State of Arizona.

Notes:

1) Bottled water sold in the United States shall not contain Fluoride in excess of the levels published by the USFDA in 21 CFR Part 165.110. These levels are based on the annual average of maximum daily air temperatures at the location where the bottled water is sold at retail. Please refer to the most current edition of the regulation to determine the Fluoride maximum level that pertains to your product.
2) A blank on the FDA SOQ column indicates that no maximum level has been established by the FDA for that contaminant.
3) An ND result means that the contaminant was not detected at or above the reporting limit.

For a list of NSF International Method Detection Limits refer to
http://www.nsf.org/media/enews/documents/minimum_detection_level_spreadsheet.pdf.

Rennaker, Joanne (DEQ)

From: Michael Glasgow <mglasgow@cityofflint.com>
Sent: Wednesday, June 10, 2015 4:20 PM
To: Prysby, Mike (DEQ)
Cc: Brent Wright; Howard Croft
Subject: May 2015 MOR
Attachments: May 2015 MOR.pdf

Mike,

Here is a copy of the May MOR. A hard copy will go out in the mail today, but I like to get you a copy as soon as it is complete. I am still compiling the pool of samples for lead & copper monitoring. I had spoke with Adam a month or so ago about this same topic. I was planning on using the addresses where bottles were sent in the first round (2014). The hundred for which we have results is easy, it is the others that never returned the samples that is taking some time.

FYI - The CCR for Detroit water is complete and headed to the printer this week. Still developing the one for Flint water, but we will be using the same company and since the mailing list is the same, we could still make the July 1st deadline.

--
Mike Glasgow
Utilities Administrator
City of Flint

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	May 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
	Genesee
Signature of Operator-in-Charge	County

Treatment Rate and Filter Data

Maximum Treatment Rate:	20.3	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	69	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	3.1	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	3.5%	Percent of Treated Water

Chemical Data

Chlorine on hand:	24,000	lb.	Est. supply:	33	days
Primary Coagulant (Ferric Chloride) on hand:	126,000	lb.	Est. supply:	7	days
Lime (CaO) on hand:	289	tons	Est. supply:	24	days
Fluoride on Hand:	15,000	lb.	Est. supply:	40	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	229	229
Percent of filter confluence samples > 0.3 NTU:	0.0%	0.0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **NO**
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **NO**
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? **YES**
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? **NO**
If yes, indicate date(s) and duration on a separate sheet.

Coagulation Parameters & Softening Chemical Application | City of Flint Water Treatment Plant | May 2015 | Page 2

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Catloinc Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units: Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	16.6	2.1	18.7	162.7	4.9	0.73	8	3.8	8.2	1.31	1.72
2	16.6	2.0	17.8	162.2	4.8	0.80	8	3.3	8.6	1.26	1.80
3	16.6	2.2	17.6	156.1	4.9	0.80	7	4.4	12.4	1.07	1.59
4	16.6	2.1	17.6	170.2	4.5	0.80	8	3.7	8.6	1.40	1.43
5	17.0	2.0	17.7	163.9	4.4	0.83	7	2.6	4.4	1.41	1.54
6	17.1	2.2	17.6	144.2	4.3	0.72	7	3.8	10.5	1.38	1.59
7	17.3	2.2	19.6	148.4	4.3	0.64	7	3.4	11.4	1.65	1.14
8	17.6	2.2	17.8	186.8	4.5	0.79	7	2.7	3.6	1.33	1.75
9	16.9	1.8	19.9	200.9	5.2	0.88	8	3.4	8.3	1.46	3.25
10	16.3	2.5	20.8	183.8	6.0	0.94	7	6.3	16.8	1.23	1.88
11	16.4	2.8	20.8	183.5	6.3	0.91	7	8.9	23.5	1.04	2.50
12	16.6	2.7	20.6	175.0	6.4	0.97	7	4.0	5.6	0.93	3.31
13	16.6	2.8	20.4	166.0	5.4	0.87	7	3.7	6.4	1.00	1.83
14	16.8	2.6	20.5	166.8	5.4	0.88	7	3.6	6.9	1.17	2.55
15	17.3	2.2	19.8	176.0	5.4	0.82	7	3.3	7.8	1.45	2.32
16	16.9	2.4	20.2	173.9	5.5	0.95	7	3.5	8.7	1.44	1.35
17	16.7	2.5	20.5	175.4	5.7	0.94	7	3.0	6.4	1.33	1.45
18	16.7	2.3	20.5	188.7	5.8	0.94	7	4.8	19.6	1.17	2.10
19	16.8	2.4	20.3	179.2	5.8	0.91	8	6.4	16.3	1.08	2.3
20	16.5	2.2	21.1	152.5	5.3	0.88	7	3.7	13.4	0.91	4.18
21	16.5	2.2	20.9	168.6	4.7	0.78	8	3.0	10.6	0.76	2.84
22	16.7	1.9	20.6	169.4	4.7	0.71	7	2.1	3.5	0.74	2.40
23	16.7	2.5	20.8	175.2	4.7	0.80	8	4.1	14.4	1.00	2.00
24	16.6	2.4	20.9	173.5	4.8	0.78	7	3.2	6.7	1.06	2.46
25	16.7	2.3	19.2	170.3	4.7	0.76	8	3.0	7.6	1.11	2.72
26	16.7	2.5	20.5	177.9	4.3	0.74	7	2.0	4.7	1.12	1.54
27	18.3	2.3	18.9	167.8	4.0	0.68	7	2.6	4.8	1.00	2.94
28	20.0	2.2	17.1	152.9	3.6	0.59	8	9.4	28.1	1.23	3.62
29	19.7	2.3	17.4	154.6	3.6	0.64	7	3.2	6.4	1.06	2.92
30	17.3	2.1	19.9	181.4	4.1	0.73	8	13.3	39.0	1.06	1.64
31	17.3	2.3	19.7	148.8	4.3	0.71	8	8.7	31.9	0.99	1.55
Avg.	17.0	2.3	19.5	169.6	4.9	0.80	7	4.4			2.20
Max.	20.0	2.8	21.1	200.9	6.4	0.97	8	13.3	39	1.65	4.18
Min.	16.3	1.8	17.1	144.2	3.6	0.59	7	2.0			1.14
Total	528.4										

Filter turbiditiy | City of Flint Water Treatment Plant | May 2015 |

WSSN: 2310

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.07	0.09	6	0	0	8	0.07	0.08	6	0	0	0.07
2	8	0.06	0.09	6	0	0	8	0.06	0.08	6	0	0	0.06
3	8	0.07	0.11	6	0	0	8	0.07	0.08	6	0	0	0.07
4	8	0.08	0.09	6	0	0	8	0.07	0.09	6	0	0	0.07
5	7	0.08	0.09	6	0	0	7	0.07	0.08	6	0	0	0.07
6	7	0.08	0.11	6	0	0	7	0.08	0.12	6	0	0	0.08
7	6	0.08	0.11	6	0	0	6	0.07	0.09	6	0	0	0.07
8	7	0.07	0.08	6	0	0	7	0.08	0.09	6	0	0	0.07
9	8	0.08	0.09	6	0	0	8	0.07	0.08	6	0	0	0.07
10	8	0.06	0.08	6	0	0	8	0.06	0.07	6	0	0	0.06
11	7	0.06	0.06	6	0	0	7	0.06	0.09	6	0	0	0.06
12	7	0.08	0.12	6	0	0	7	0.07	0.09	6	0	0	0.08
13	7	0.07	0.09	6	0	0	7	0.07	0.09	6	0	0	0.06
14	7	0.06	0.08	6	0	0	7	0.07	0.12	6	0	0	0.06
15	6	0.06	0.07	6	0	0	6	0.06	0.11	6	0	0	0.07
16	7	0.07	0.09	6	0	0	7	0.07	0.08	6	0	0	0.07
17	7	0.07	0.09	6	0	0	7	0.06	0.07	6	0	0	0.07
18	4	0.07	0.09	5	0	0	4	0.06	0.07	5	0	0	0.07
19	8	0.07	0.09	5	0	0	8	0.07	0.09	5	0	0	0.08
20	8	0.07	0.08	4	0	0	8	0.07	0.08	4	0	0	0.08
21	7	0.06	0.07	6	0	0	7	0.06	0.07	6	0	0	0.08
22	7	0.07	0.12	6	0	0	7	0.07	0.08	6	0	0	0.07
23	8	0.08	0.18	6	0	0	8	0.07	0.08	6	0	0	0.08
24	8	0.08	0.10	6	0	0	8	0.08	0.11	6	0	0	0.08
25	8	0.07	0.09	6	0	0	8	0.06	0.08	6	0	0	0.07
26	8	0.08	0.10	6	0	0	8	0.08	0.10	6	0	0	0.08
27	8	0.08	0.11	6	0	0	8	0.08	0.09	6	0	0	0.08
28	8	0.09	0.11	6	0	0	8	0.08	0.09	6	0	0	0.11
29	8	0.10	0.18	6	0	0	8	0.08	0.10	6	0	0	0.09
30	7	0.09	0.12	6	0	0	7	0.09	0.13	6	0	0	0.11
31	7	0.08	0.11	6	0	0	7	0.08	0.10	6	0	0	0.10
Avg.	7	0.07	0.10	6	0	0	7	0.07	0.09	6	0	0	
Max.	8	0.10	0.18	6	0	0	8	0.09	0.13	6	0	0	0.11
Min.	4	0.06	0.06	4	0	0	4	0.06	0.07	4	0	0	

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.5	0.19	0.69		1.9	2.5	4.4	0.6	0.8	2.0	2.4	1.7	2.0
2	0.6	0.19	0.74		1.4	2.9	4.3	0.2	0.5	1.8	2.0	1.6	1.8
3	0.6	0.20	0.75		1.4	3.1	4.5	0.2	0.4	1.8	2.0	1.8	2.0
4	0.5	0.19	0.74		1.4	3.2	4.6	0.2	0.4	2.1	2.3	2.0	2.3
5	0.5	0.20	0.73		1.4	3.0	4.4	0.3	0.5	2.0	2.2	2.0	2.2
6	0.5	0.21	0.69	0.69	1.2	2.9	4.1	0.4	0.6	1.8	2.1	1.6	1.8
7	0.5	0.19	0.70		1.2	3.1	4.3	0.3	0.5	1.8	2.1	1.7	1.9
8	0.5	0.20	0.68		1.1	3.3	4.4	0.6	0.8	1.7	2.1	1.4	1.7
9	0.6	0.20	0.75		1.1	3.5	4.6	0.5	0.6	1.7	1.9	1.7	1.9
10	0.6	0.18	0.74		1.1	3.2	4.3	0.4	0.7	1.8	2.2	1.3	1.6
11	0.6	0.19	0.78		1.0	3.5	4.5	0.4	0.6	1.5	1.8	1.1	1.4
12	0.6	0.19	0.79		0.7	3.9	4.6	0.4	0.5	1.7	2.1	1.6	2.0
13	0.6	0.19	0.79	0.74	0.7	4.1	4.8	0.4	0.6	2.1	2.4	1.8	2.0
14	0.6	0.20	0.79		0.7	3.4	4.1	0.3	0.4	1.9	2.3	1.8	2.2
15	0.6	0.20	0.82		0.7	3.4	4.1	0.4	0.5	1.6	2.0	1.5	1.9
16	0.6	0.20	0.82		0.7	3.4	4.1	0.4	0.6	1.8	2.1	1.7	2.1
17	0.5	0.17	0.76		0.7	3.2	3.9	0.3	0.5	1.5	1.8	1.5	1.8
18	0.6	0.20	0.76		0.7	3.6	4.3	0.3	0.5	1.8	2.1	1.3	1.5
19	0.6	0.18	0.73		0.7	3.5	4.2	0.5	0.6	1.8	2.0	1.7	1.9
20	0.5	0.18	0.75	0.73	0.9	2.4	3.3	0.4	0.5	1.9	2.2	0.6	0.8
21	0.6	0.19	0.78		1.6	3.2	4.8	0.5	0.7	1.9	2.2	1.8	2.1
22	0.5	0.20	0.78		1.6	3.0	4.6	0.2	0.8	2.0	2.4	0.9	1.1
23	0.5	0.19	0.72		1.7	4.0	5.7	0.5	0.6	1.6	1.9	1.6	1.7
24	0.6	0.19	0.76		2.0	2.8	4.8	0.4	0.6	1.6	1.7	1.6	1.8
25	0.6	0.21	0.79		2.0	2.5	4.5	0.5	0.7	1.9	2.2	1.7	2.0
26	0.6	0.20	0.79		2.2	2.9	5.1	0.3	0.5	1.4	1.6	1.4	1.6
27	0.5	0.18	0.74	0.73	2.1	3.2	5.3	0.6	0.9	1.6	1.8	1.5	1.9
28	0.5	0.20	0.70		2.5	3.1	5.6	0.5	0.6	1.9	2.2	1.8	2.2
29	0.5	0.22	0.75		2.7	2.8	5.5	0.6	0.8	1.8	2.2	1.8	2.2
30	0.6	0.18	0.78		2.9	3.2	6.1	0.4	0.5	1.6	1.8	1.6	1.8
31	0.6	0.18	0.77		2.8	2.8	5.6	0.3	0.5	2.2	2.5	2.3	2.5

Avg.	0.56	0.19	0.75	0.72	1.4	3.2	4.6	0.4	0.6	1.8	2.1	1.6	1.9
Max.	0.60	0.22	0.82	0.74	2.9	4.1	6.1	0.6	0.9	2.2	2.5	2.3	2.5
Min.	0.50	0.17	0.68	0.69	0.7	2.4	3.3	0.2	0.4	1.4	1.6	0.6	0.8

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	7.91	7.88	265	163	214	61	51	102	84.2	48.9	14.1	8.3	47	92
2	7.88	7.82	267	163	214	60	53	103	89.8	54.5	10.7	6.3	46	92
3	7.91	7.75	278	178	219	73	59	105	96.2	64.9	8.3	4.9	50	96
4	7.88	7.75	270	171	218	66	52	105	90.6	55.3	10.2	7.8	50	90
5	7.80	7.68	270	166	218	66	52	100	81.0	60.9	16.5	3.3	51	92
6	7.81	7.70	266	161	216	64	50	97	88.2	57.7	11.2	4.1	48	84
7	7.74	7.67	266	172	216	70	50	102	88.2	60.9	11.2	4.9	50	88
8	7.82	7.68	268	164	218	60	50	104	81.8	54.5	15.6	6.8	49	88
9	7.79	7.51	265	168	214	65	51	103	94.6	59.3	8.7	4.9	46	93
10	7.83	7.58	267	172	216	66	51	106	92.2	64.9	8.7	2.4	47	90
11	7.78	7.48	260	170	217	65	43	105	81.8	59.3	15.6	4.4	49	91
12	7.80	7.53	268	162	216	56	52	106	97.0	63.3	6.3	1.0	48	90
13	7.88	7.35	266	174	216	70	50	104	95.4	60.1	6.8	4.4	46	92
14	7.77	7.56	274	158	216	50	58	108	95.4	60.1	8.7	1.9	44	90
15	7.92	7.57	270	167	220	64	50	103	90.6	64.1	10.7	2.4	46	90
16	7.85	7.56	270	185	220	80	50	105	80.2	72.1	17.0	2.4	46	91
17	7.88	7.55	266	163	220	54	46	109	94.6	56.9	7.3	2.4	44	87
18	7.85	7.43	272	156	222	44	50	112	81.8	56.9	16.5	3.4	47	91
19	7.89	7.54	278	175	219	64	59	111	94.6	63.3	10.7	3.0	46	88
20	7.87	7.63	275	176	218	74	57	102	82.6	69.7	17.5	1.9	45	90
21	7.85	7.53	276	159	220	52	56	107	78.6	56.9	18.9	4.9	46	92
22	7.94	7.45	272	148	218	40	54	108	90.6	54.5	11.2	2.9	47	93
23	7.86	7.44	276	168	217	54	59	114	94.6	60.9	9.7	3.9	46	93
24	7.92	7.51	275	175	215	63	60	112	96.2	65.7	8.7	2.4	46	89
25	7.94	7.65	275	170	221	58	54	112	94.6	64.9	9.7	2.9	46	91
26	7.90	7.57	276	177	224	68	52	109	85.8	61.7	15.1	5.3	47	93
27	7.87	7.61	278	161	224	54	54	107	81.0	57.7	18.4	4.4	47	91
28	8.20	7.60	279	175	233	71	46	104	97.0	60.1	8.3	5.8	46	86
29	8.25	7.60	274	164	220	64	54	100	80.2	56.9	18.0	5.3	51	90
30	8.21	7.68	278	192	222	86	56	106	94.6	64.9	10.2	6.8	47	85
31	8.17	7.69	275	182	220	68	55	114	93.0	60.1	11.2	8.3	45	84
Avg.	7.90	7.60	271	169	219	63	53	106	89.3	60.4	12.0	4.3	47	90
Max.	8.25	7.88	279	192	233	86	60	114	97.0	72.1	18.9	8.3	51	96
Min.	7.74	7.35	260	148	214	40	43	97	78.6	48.9	6.3	1.0	44	84

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	70	12	0	1	0	195	< 2	0.46	11.1				
2	1	61	12	0	1	0	239	< 2	0.45	11.9				
3	1	79	12	0	1	0	248	< 2	0.48	12.7				
4	1	88	12	0	1	0	202	< 2	0.46	14.3				
5	1	67	12	0	1	0	202	< 2	0.46	14.3				
6	1	86	12	0	1	0	231	< 2	0.46	13.9				
7	1	88	12	0	1	0	372	< 2	0.48	14.5				
8	1	142	12	1	1	0	392	< 2	0.46	14.4				
9	1	199	12	0	1	0	555	< 2	0.50	15.7				
10	1	138	12	1	1	0	440	< 2	0.47	15.7				
11	1	548	12	0	1	0	299	< 2	0.46	15.9				
12	1	921	12	3	1	0	738	< 2	0.46	15.4				
13	1	253	12	1	1	0	260	< 2	0.50	14.9				
14	1	225	12	6	1	0	738	< 2	0.44	14.7				
15	1	365	12	6	1	0	> 738	< 2	0.48	14.9				
16	1	722	12	4	1	0	> 738	< 2	0.47	15.1				
17	1	225	12	6	1	0	> 738	< 2	0.41	16.6				
18	1	262	12	2	1	0	2400	< 2	0.44	16.5				
19	1	292	12	2	1	0	1940	< 2	0.46	16.4				
20	1	134	12	0	1	0	830	< 2	0.46	16.2				
21	1	185	12	0	1	0	1160	< 2	0.47	15.8				
22	1	328	12	0	1	0	324	< 2	0.44	15.7				
23	1	199	12	0	1	0	150	< 2	0.48	16.7				
24	1	199	12	0	1	0	400	< 2	0.47	17.6				
25	1	272	12	0	1	0	590	< 2	0.46	17.0				
26	1	218	12	0	1	0	510	< 2	0.46	17.8				
27	1	365	12	0	1	0	470	< 2	0.43	18.3				
28	1	980	12	0	1	0	555	< 2	0.47	20.9				
29	1	909	12	0	1	0	1120	< 2	0.47	21.4				
30	1	5794	12	0	1	0	1040	< 2	0.49	22.7				
31	1	4884	12	0	1	0	1000	< 2	0.49	20.1				

Avg.									0.46	16.1				
Max.		5794					2400	< 2	0.50	22.7				
Min.									0.41	11.1				

001390

WSSN: 2310

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3											0
4											0
5	0.4	1.0	1.2	1.1	0.8	0.4	0.5	1.5	0.3	1.5	10
6	0.3	1.1	1.2	1.0	0.6	0.3	0.4	1.6	0.7	1.3	10
7	0.5	0.8	1.0	0.8	0.5	0.7	0.4	1.5	0.2	1.2	10
8											0
9											0
10											0
11											0
12	0.6	0.7	1.0	0.6	0.1	0.6	0.7	1.3	0.1	1.2	10
13	0.1	0.8	1.0	0.8	0.6	0.4	0.6	1.1	0.7	1.0	10
14	1.5	1.2	1.0	1.0	0.5	0.4	1.0	1.4	0.1	1.3	10
15											0
16											0
17											0
18	1.2	1.0	0.9	0.7	0.4	0.2	0.7	1.1	0.6	1.1	10
19											0
20	1.0	0.9	1.3	1.0	0.2	0.3	0.9	1.3	0.7	0.1	10
21											0
22											0
23											0
24											0
25											0
26	0.3	0.6	1.0	0.8	0.4	0.3	0.6	1.3	0.6	1.0	10
27	0.2	0.6	1.0	0.7	0.3	0.3	0.5	1.2	0.4	0.3	10
28											0
29											0
30											0
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	100
Total # of routine distribution samples required	100

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	0.76

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3											0
4											0
5	0.6	1.2	1.5	1.4	1.0	0.7	0.7	1.8	0.5	1.8	10
6	0.5	1.4	1.5	1.3	1.0	0.5	0.6	1.8	1.0	1.6	10
7	0.8	1.0	1.3	1.0	0.8	1.0	0.7	1.7	0.4	1.4	10
8											0
9											0
10											0
11											0
12	0.9	1.0	1.3	1.0	0.2	0.7	0.9	1.5	0.2	1.5	10
13	0.3	1.0	1.3	1.0	0.8	0.6	0.8	1.3	1.0	1.3	10
14	1.8	1.5	1.4	1.3	0.7	0.6	1.3	1.7	0.3	1.7	10
15											0
16											0
17											0
18	1.6	1.4	1.3	1.0	0.6	0.4	0.9	1.5	0.9	1.4	10
19											0
20	1.4	1.3	1.7	1.3	0.5	0.5	1.1	1.5	1.1	0.4	10
21											0
22											0
23											0
24											0
25											0
26	0.4	1.0	1.4	1.1	0.7	0.4	0.9	1.6	0.9	1.4	10
27	0.4	1.0	1.2	1.0	0.5	0.4	0.7	1.4	0.5	0.5	10
28											0
29											0
30											0
31											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.0

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Wednesday, June 10, 2015 10:40 AM
To:	Rosenthal, Adam (DEQ)
Subject:	FW: Lead-Copper info
Attachments:	Consumer Notice of Lead Results.docx

From Flint regarding lead and copper.....

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Wednesday, June 10, 2015 10:37 AM
To: Prysby, Mike (DEQ)
Subject: Re: Lead-Copper info

Mike,

To answer your questions:

1. I'm trying to compile the list.

2. There were a couple of Apartment residences that were used in the first sampling pool. These would be tier 2 sites. the majority were Tier 1.

3. A copy of the consumer notice is attached below.

4. This was in response to a customer complaint, and it is a business. I would only use the Utility sink as a site if we are short a sample, and would be a Tier 3. This is not in our sample pool, but is served by lead service line.

On Tue, Jun 9, 2015 at 10:14 AM, Prysby, Mike (DEQ) <PRYSBYM@michigan.gov> wrote:

Mike,

I was trying to contact you regarding Lead and Copper info that we may need. I don't have your cell number....and the WTP main phone was not switching over to the option to have my incoming call forwarded to the lab. I wish to discuss the following:

1. Basically, we need a listing of Flint's PB&CU sampling pool (around 120 sites) with the Tier designation (Tier 1, Tier 2, or Tier 3) and those sites with lead services. It is possible that you may have sent us this information last summer as part of revising the lead & copper monitoring program.

2. The lead & copper reporting form for the July 2014 – Dec 2014 monitoring period states that not all sites were Tier 1; however, the listing of all 100 locations on the subsequent pages show all locations being Tier 1. Please clarify

3. Please provide us a copy of the consumer lead notice that was mailed to each customer in your sampling pool….we only need a copy of one notice.

4. We have received 28 of the 100 samples for the Jan-June 2015 round of lead/copper monitoring. Four of the samples were above the lead action level; however the PURPOSE of monitoring for two of these was noted as "OTHER" instead of ROUTINE MONITORING. The address of these 2 locations are: 625 S. Grand Traverse (Utility Sink) and 625 S. Grand Traverse (Bathroom). Is this site part of the sampling pool or was this location sampled based on a customer complaint and/or concern?

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

--

Mike Glasgow
Utilities Administrator
City of Flint

Consumer Notice of Lead & Copper Results in Drinking Water

Water Supply Name: City of Flint

County: Genesee WSSN: 2310

Sample Location 2205 Flushing Rd. Date Sampled: 11/19/2014

Thank you for participating in the lead and copper monitoring of drinking water. The levels of lead and copper found at your location are in the table below.

Key to Table	Contaminant	AL	MCLG	Your Result
Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow. **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water which there is no known or expected risk to health. MCLG's allow for a margin of safety. **ppb:** parts per billion or micrograms per liter.	Lead (ppb)	15	0	Not Detected
	Copper (ppb)	1300	1300	110

Lead can cause serious health problem if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and it can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects on the brain with lower IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

To reduce exposure to lead in drinking water:

- Run your water to flush out lead. Run the water until it becomes cold.
- Use cold water for cooking and preparing baby formula. Do not cook with or drink water from the hot tap; lead dissolves more easily in hot water.
- Do not boil water to remove lead. Boiling water will not reduce lead levels.
- Look for an alternative sources or treatment of water. If your lead result is above 15 ppb, you may want to consider purchasing bottled water or a water filter. Read the package to be sure the filter is approved to reduce lead or contact NSF International at 800-NSF-8010, or www.nsf.org for information on performance standards for water filters.
- Identify if your plumbing fixtures contain lead. New faucets, fittings, and valves, may contain up to 8 percent lead including those advertised as lead-free" and may contribute lead to drinking water. Consumers should be aware of this when choosing fixtures and take appropriate precautions.

Although the primary sources of lead exposure for most children are deteriorating lead-based paint, lead-contaminated dust, and lead contaminated soil, the U.S. EPA estimates that 10 to 20 percent of human exposure to lead may come from drinking water.

For more information, contact us at: City of Flint Water Plant (810)787-6537.

For more information on reducing lead exposure around your home ant the health effects of lead, visit the U.S. EPA's Web site at www.epa.gov/lead, call the National Lead Information Center at 800-424-LEAD, or contact your health care provider.

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Wednesday, June 10, 2015 10:40 AM
To:	Michael Glasgow
Subject:	RE: Lead-Copper info

Thanks Michael

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Wednesday, June 10, 2015 10:37 AM
To: Prysby, Mike (DEQ)
Subject: Re: Lead-Copper info

Mike,

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1. I'm trying to compile the list.

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may have sent us this information last summer as part of revising the lead & copper monitoring program.

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Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

--

Mike Glasgow
Utilities Administrator
City of Flint

Rennaker, Joanne (DEQ)

From: Michael Glasgow <mglasgow@cityofflint.com>
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Subject: Re: Lead-Copper info
Attachments: Consumer Notice of Lead Results.docx

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Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

--

Mike Glasgow
Utilities Administrator
City of Flint

Consumer Notice of Lead & Copper Results in Drinking Water

Water Supply Name: City of Flint

County: Genesee WSSN: 2310

Sample Location 2205 Flushing Rd. Date Sampled: 11/19/2014

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Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, June 10, 2015 9:49 AM
To: Michael Glasgow; 'bwright@cityofflint.com'
Subject: Flint Lead & Copper

Michael, Brent

Any info yet on my email from yesterday? Hate to bug you; however, I have an 11am meeting today that includes Flint's lead & copper status....

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

Rennaker, Joanne (DEQ)

From:	Busch, Stephen (DEQ)
Sent:	Tuesday, June 09, 2015 12:39 PM
To:	Howes, Sarah (DEQ); Pallone, Maggie (DEQ); Wurfel, Brad (DEQ)
Cc:	Prysby, Mike (DEQ); Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ); Rosenthal, Adam (DEQ); Thelen, Mary Beth (DEQ); Devereaux, Tracy Jo (DEQ)
Subject:	Flint Drinking Water TTHM Standard Violation - 2nd quarter 2015
Attachments:	Flint VN TTHM 6_9_15.pdf

Attached is a copy of the Violation Notice and Public Notice Template being mailed to the City of Flint by the DEQ Office of Drinking Water and Municipal Assistance regarding an exceedance of the Maximum Contaminant Level (MCL) standard for Total Trihalomethanes at certain locations within the City's drinking water distribution system.

This violation notice is in response to updated monitoring completed in May 2015, which shows the locational running annual average for one of the City's eight compliance sampling locations continues to exceed MCL standard of 0.080 mg/L. It is however, important to note that all individual compliance sample results collected in both May and February were below the 0.080 mg/L levels.

You are being provided an electronic copy of this notice as exceedance of this drinking water standard is expected to generate inquiries from water system customers, news media, and the general public.

Sarah Howes or Maggie Pallone will be informing members of the Michigan legislature.

If you have any questions or would like any additional information, you may contact Michael Prysby, District Engineer, DEQ-ODWMA at 517-290-8817, or you may contact me at the number below.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

June 9, 2015

Mr. Brent Wright, Operations Supervisor
City Of Flint – Department of Public Works
Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Violation Notice (VN) – Maximum Contaminant Level for Total Trihalomethanes (TTHM)
2nd Quarter 2015 Monitoring Period

The Department of Environmental Quality (DEQ), Office of Drinking Water and Municipal Assistance (ODWMA), records show that the city of Flint (City) is in violation of the Safe Drinking Water Act,1976 PA 399, as amended (Act 399); R 325.10610, *Maximum contaminant levels for disinfection byproducts (MCLs)*, of the 1979 Administrative Code.

In accordance with R 325.10610, *MCLs*, of the 1979 Administrative Code, the MCL for disinfection byproduct TTHM is 0.080 milligrams per liter (mg/L) as a Locational Running Annual Average (LRAA) at each monitoring location. As listed in the table below, our records show that the City's highest TTHM LRAA, based on the last four quarters, ending June 30, 2015, is 0.094 mg/L which exceeds the standard, and at this time only one of the eight sample site locations exceed the LRAA standard of 0.080 mg/L.

Our investigation consisted of a review of ODWMA files for laboratory reports received for compliance monitoring. Our investigation is considered complete. This violation began on June 1, 2015, and will continue until the TTHM LRAA is below the MCL at all sample sites.

TTHM Results (mg/L)						
	8/21/14	11/20/14	2/17/15	5/18/15	LRAA	OEL
DBP1 McDonalds 3719 Davison	**0.145**	0.059	0.0162	0.0514	0.068	0.044
DBP2 Liquor Palace 3302 South Dort Highway	**0.127**	0.033	0.0168	0.0635	0.060	0.044
DBP3 North Flint Auto 6204 North Saginaw St.	**0.118**	0.041	0.0149	0.0452	0.055	0.037
DBP4 University Market 2501 Flushing Road	**0.196**	**0.094**	0.0245	0.0598	**0.094**	0.059
DBP5 Taco Bell 3606 Corunna Road	**0.181**	0.034	0.0151	0.0547	0.072	0.040
DBP6 Rite-Aid Pharmacy 5018 Clio Road	**0.144**	0.054	0.0192	0.0605	0.069	0.048
DBP7 Salem Housing 3216 MLK Boulevard	**0.112**	0.050	0.0285	0.0727	0.066	0.056
DBP8 BP Gas Station 822 South Dort Highway	**0.112**	0.036	0.0199	0.0461	0.054	0.037

We are encouraged by the results from the most recent round of compliance samples collected on May 18, 2015, which again show individual TTHM levels below 0.080 mg/L at all locations throughout the City's system. Operational Evaluation Reports from December 2014, February 2015, and May 2015, have identified possible causes and corrective measures for the previous elevated TTHM levels which we encourage the City to continue implementing. These modifications have likely contributed in part to the reduction in TTHM levels reported for the most recent quarter in comparison to levels in May 2014, and suggest the City may be able to achieve compliance with the TTHM standard at all sites by continuing these efforts.

Our office is currently reviewing the Operational Evaluation Report dated May 29, 2015, and will provide the City and their consultant with comments, as needed, to help address this MCL violation.

Further, the TTHM operational evaluation level (OEL) calculated in accordance with R 325.10719l, *Disinfection byproducts: operational evaluation levels*, of the 1979 Administrative Code, is now below the 0.080 mg/L operational evaluation trigger at all eight sample site locations. However, our office is requesting that an operational evaluation again be conducted incorporating the most recent sample results, given the increase in TTHM levels from February 2015 results, and that the next monitoring period of August has been identified as the City's peak month for TTHM levels. **Please provide our office with an updated Operational Evaluation Report by Monday, August 31, 2015.**

If you have any other factual information you would like us to consider regarding the violation identified in this VN, please provide them in a written response by June 23, 2015.

Administrative rule R 325.10403 of Act 399 requires that suppliers provide public notice (PN) as soon as practical, but no later than thirty (30) days after the supplier learns of this type of violation, by mail or direct delivery **and** by any other means reasonably calculated to reach customers not normally reached by mail. Enclosed is a sample PN which contains the minimum required language. The City is encouraged to include additional information regarding its response efforts to this violation. **Please notify your consumers by July 1, 2015, and send us a signed and dated copy of the notice that you issued within ten (10) days of distributing the PN**. This violation must also be included in your 2015 Consumer Confidence Report, due by July 1, 2016. The PN must be repeated every quarter until you no longer exceed the TTHM standard. Failure to issue a PN for this violation will result in a fine of at least $1,000 per event, with a maximum of $5,000 per violation.

We anticipate and appreciate your continued cooperation in resolving this matter. If you have any questions regarding this VN, please contact us at the numbers below; at prysbym@michigan.gov; or rosenthala@michigan.gov; or at DEQ, P.O. Box 30242, Lansing, Michigan 48909-7742.

Sincerely,

Michael F. Prysby, P.E., District Engineer
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-290-8817

Adam Rosenthal, Environmental Quality Analyst
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-284-6644

Enclosure

cc: Ms. Jennifer Crooks, U.S. Environmental Protection Agency, Region 5
Mr. Robert Bincsik, City of Flint
Mr. Howard Croft, City of Flint
Mr. Michael Glascow, City of Flint
Genesee County Health Department
Ms. Liane Shekter Smith, DEQ
Mr. Richard Benzie, DEQ
Mr. Stephen Busch, DEQ

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (August 21, November 20 of 2014, and February 17 & May 18 of 2015). The average of the results at **ANY** of the eight locations must not exceed the maximum contaminant level (MCL) for TTHMs, otherwise our water system exceeds the MCL. The standard for TTHMs is 80 micro grams per liter (µg/L). The location reporting the highest TTHM level was 94 ug/L; thus, our water system exceeds the TTHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem in 2015. Our most recent individual sample results were all less than the 80 µg/L standard, however since compliance is calculated using a locational running annual average (LRAA) of the most recent four quarters, we are still out of compliance with the MCL at one of eight locations.

For more information, please contact Mr. Brent Wright at 517-787-6537, or the Flint Water Plant at 4500 North Dort Highway, Flint, Michigan 48505.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Flint.

CERTIFICATION: WSSN: 02310

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

Signature	Title	Date Distributed

Reminder to water supplier: This notice/certification must be sent to the Department of Environmental Quality.

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Tuesday, June 09, 2015 10:14 AM
To:	Michael Glasgow
Cc:	'bwright@cityofflint.com'
Subject:	Lead-Copper info

Mike,

I was trying to contact you regarding Lead and Copper info that we may need. I don't have your cell number....and the WTP main phone was not switching over to the option to have my incoming call forwarded to the lab. I wish to discuss the following:

1. Basically, we need a listing of Flint's PB&CU sampling pool (around 120 sites) with the Tier designation (Tier 1, Tier 2, or Tier 3) and those sites with lead services. It is possible that you may have sent us this information last summer as part of revising the lead & copper monitoring program.
2. The lead & copper reporting form for the July 2014 – Dec 2014 monitoring period states that not all sites were Tier 1; however, the listing of all 100 locations on the subsequent pages show all locations being Tier 1. Please clarify
3. Please provide us a copy of the consumer lead notice that was mailed to each customer in your sampling pool....we only need a copy of one notice.
4. We have received 28 of the 100 samples for the Jan-June 2015 round of lead/copper monitoring. Four of the samples were above the lead action level; however the PURPOSE of monitoring for two of these was noted as "OTHER" instead of ROUTINE MONITORING. The address of these 2 locations are: 625 S. Grand Traverse (Utility Sink) and 625 S. Grand Traverse (Bathroom). Is this site part of the sampling pool or was this location sampled based on a customer complaint and/or concern?

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

Rennaker, Joanne (DEQ)

Subject: Note Time Chg to 11amEST; 10amCST: Michigan semi-annual call
Location: R5Metcalfe-ConfRm-R1515B/R5-Metcalfe---15th-Floor; R5WD-ConfCallLine-C/Conference-Call-Line/R5-WATER

Start: Wed 6/10/2015 11:00 AM
End: Wed 6/10/2015 12:30 PM
Show Time As: Tentative

Recurrence: (none)

Organizer: Crooks, Jennifer

Tom Poy just had a conflict arise; I hope the one hour later works for everyone. Agenda is below. If you have additional items to discuss, please let me know.

The call-in number is:
Call-in no.: 877-226-9607
Code: 1896350612

Agenda Topics for Michigan Semi-Annual Call on Wednesday June 10, 9am CST

Changes in Lead Disinvestments and Commitments for FY 2016 ARDP—for discussion: Due to our extreme focus on lead in drinking water, this is the consensus here.

1. Consumer notification of tap results at NTNCWSs:

(Suggested wording) The NCWS program commits to full implementation of the lead consumer notification of tap results requirement, to begin in CY 2016. Region 5 will assist in a notification outreach effort in late FY 2015 to remaining 698 NTNCWSs that are not schools/daycares, to begin providing lead consumer notice in CY 2016. NCWS program commits to include information on providing lead consumer notice in the annual monitoring letter sent to all NTNCWSs for CY 2016.

2. Collection of Lead samples at NTNCWSs during June – September 2016 timeframe

(Suggested wording) NCWS program commits to including information in the applicable NTNCWS annual monitoring letters of the requirement to collect their annual/triennial lead sample between June and September only, during CY 2016. The MDEQ currently does not have the capability to track lead sampling compliance within this specific timeframe.

3. Follow-up Actions for NTNCWSs that sample outside of June-September 2015 timeframe

(From 5/5/15 call notes w/EPA) MDEQ commits to providing Region 5 with all CY 2015 lead (and copper?) sample data for all NTNCWSs by March 2016 so that EPA can analyze how many PWSs monitored outside the June through October timeframe. EPA commits to follow-up with MDEQ to discuss follow-up actions.

4. Submittal of the lead and copper reporting form

(Suggested wording) MDEQ commits to requiring CWSs and NTNCWSs to submit the lead and copper reporting form via the annual monitoring letters to each system, tracking CWSs and NTNCWSs submittal of the lead and copper reporting form, and commits to issuing violations for failure to submit the lead and copper reporting form. The reporting form provides the address of the sample site, designates sampling site selection criteria, and explanation(s) for any changes in sampling sites.

1. Enforcement Update with Heather

NTNCWSs under Bottled Water agreements due to Arsenic MCL violations:

Per discussions with Region 5 and the February 2014 EPA/OECA memo, MDEQ has closed the old Arsenic open-ended MCL violations; however, no further quarterly monitoring is being conducted at the (±27) systems that are still under bottled water agreements. Thus, no more arsenic MCL violations will be reported for these systems and these systems will not become priority systems (ETT score of 11 or more) since only one arsenic MCL violation will be reported (5 points) even though they have a longstanding issue with arsenic noncompliance. The Region would like to discuss the pros and cons of placing these PWSs with arsenic MCL violations on quarterly monitoring as required under 40 CFR Section 141.23(c)(7); and brainstorm possible solutions.

2. Status of Flint
3. TTHM levels for May—Due to MDEQ district engineer June 10
4. Lead in Flint

Our discussions with MDEQ indicate that no phosphates/corrosion control has been added to the system since April 2014 when the source of drinking water changed to the Flint River. We understand that the City is just finishing up its second set of 6-month initial monitoring for lead; where the results will probably warrant a Corrosion Control Study to be conducted. Since Flint has lead service lines, we understand some citizen-requested lead sampling is exceeding the Action Level, and the source of drinking water will be changing again in 2016, so to start a Corrosion Control Study now doesn't make sense. The idea to ask Flint to simply add phosphate may be premature; there are many other issues and factors that must be taken into account which would require a comprehensive look at the water quality and the system before any treatment recommendations can/should be made. Miguel is recommending MDEQ and EPA? approach Flint about formally requesting EPA's Office of Research and Development in Cincinnati support on the lead in Flint drinking water issue, and request that Mike Schock, ORD, and possibly Darren Lytle, ORD, to participate in Flint's drinking water advisory committee so that a comprehensive evaluation on how to proceed can be discussed.

3. Update on WaterTrack to SDWIS-State: The migration of WaterTrack data to SDWIS-State was number 39 on the Dept of Technology Management and Budget's (DTMB) project list last year; this year it is

number 30. It doesn't appear this project has a high priority. Does the State have any new information on the progress of this project?

4. Consequences of cutting the State drinking water program to a "minimal program"

Jennifer had a discussion with Richard Benzie regarding the possibility of the Michigan State Legislature looking to have just a minimal drinking water program, meaning only a program with activities that are required by the Federal SDWA. Jennifer ultimately discussed this internally with Tom Poy. The minimal program suggested would cut out Operator Certification, Capacity Development, Plan Review, Cross Connection Control, Source Water Protection, among other programs that are State required. Operator Certification and Capacity Development, while not required by the Federal regulations, do have financial strings attached. And Plan review/construction permits are required by the SRF program for a loan. Any recent communication with the State Legislature that they might proceed and make this possibility a reality?

5. EPA's Resource Message at the LHD Workshop in April

From the 2014 analysis of Shared Goals 2013 data, which is compliance data, for noncommunity systems, there are increasing trends of nitrate M/R violations for both NTNCWSs and TNCWSs. We discussed this on the last semi-annual call. Analysis of the 2015 Shared Goals 2014 data (April 2015) shows an improvement—that of decreasing numbers of bacti/nitrate M/R violations.

However, in light of the upcoming implementation of RTCR in 2016, the question raised here in the Region is:
Does the State have a plan with the LHDs as to what activities must be prioritized, and what will fall off the plate? Not all LHDs will need to disinvest based upon each LHD's resources, but some poorly funded LHDs may have to disinvest in some activities/drop activities that have no risk to public health.

Thank you!

Jennifer

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Monday, June 08, 2015 11:19 AM
To: Shekter Smith, Liane (DEQ); Benzie, Richard (DEQ); Philip, Kris (DEQ); Cook, Pat (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ); DeBruyn, Dana (DEQ); Monosmith, Carrie (DEQ); Dettweiler, Dan (DEQ)
Cc: Poy, Thomas; Bair, Rita; Damato, Nicholas; Shoven, Heather; Murphy, Thomas; Porter, Andrea; Deltoral, Miguel; Kuefler, Janet; McElhinney, Cary; Noureldin, Mostafa
Subject: Agenda for MI Semi-Annual Call on Wed 6/10 at 10am EST; 9am CST

Importance: High

Good morning! Below is the Agenda I came up with for our semi-annual call this Wed morning. Please let me know if you would like to add additional items for us to discuss. Please note that I have invited Steve Busch, Mike Prysby and Pat Cook to discuss item no. 3 regarding Flint.

Jennifer

Agenda Topics for Michigan Semi-Annual Call on Wednesday June 10, 9am CST

Call-in no: 877-226-9607
Code: 1896350612

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   However, in light of the upcoming implementation of RTCR in 2016, the question raised here in the Region is: Does the State have a plan with the LHDs as to what activities must be prioritized, and what will fall off the plate? Not all LHDs will need to disinvest based upon each LHD's resources, but some poorly funded LHDs may have to disinvest in some activities/drop activities that have no risk to public health.

Jennifer

Rennaker, Joanne (DEQ)

From:	Rosenthal, Adam (DEQ)
Sent:	Monday, June 08, 2015 9:32 AM
To:	Prysby, Mike (DEQ)
Subject:	RE: more customer lead samples over the AL?

We have 28 samples, 4 are over the AL for lead, (42, 22, 20 & 17 ppb), 2 in red are marked other though. If they count, the 90th would be 17.6 rounding to 18 ppb. If they don't, then the 90th would be 11.2 or 11 ppb. They are required 100 samples for this 2nd 6 month round. Hopefully the rest are below.

Adam

From: Prysby, Mike (DEQ)
Sent: Friday, June 05, 2015 7:16 AM
To: Rosenthal, Adam (DEQ)
Subject: FW: more customer lead samples over the AL?

Adam,

Do a quick check as to where Flint is at on their PB/Cu monitoring (Jan 1 – June 30th round) and whether we have all (or most) of the sample results in to determine where their AL is at..... If this issue heats up again...it would be helpful to know that the city continues to meet the PB/CU ALs.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Deltoral, Miguel [mailto:deltoral.miguel@epa.gov]
Sent: Friday, June 05, 2015 7:09 AM
To: Crooks, Jennifer; Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Poy, Thomas
Subject: Re: more customer lead samples over the AL?

Slight correction...most old pipe from the home ***to the shut-off*** is galvanized, and the majority of lead they have seen is from the shut-off to the main. Apologies for not getting this report written up, but I keep getting sidetracked with NDWAC LCR and RTCR primacy packages. I will try to get that written up and out to you in the next week.

If I get copies of the latest results I will forward them, but my understanding is that the DEQ lab runs the samples, so they should be available within DEQ as well.

Miguel A. Del Toral

Regulations Manager
U.S. EPA R5 GWDWB
77 West Jackson Blvd, (WG-15J)
Chicago, IL 60604
Phone: (312) 886-5253

From: Crooks, Jennifer
Sent: Thursday, June 4, 2015 03:05 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); cookp@michigan.gov
Cc: Deltoral, Miguel; Poy, Thomas
Subject: more customer lead samples over the AL?

I talked with Miguel this week; he learned that there have been 2 more customer-requested lead samples that have come back over the AL: 22ppb and 40 ppb. These were customer-requested samples taken by Mike Glasgow and analyzed at the Flint lab. When I receive the lab reports, I'll email them to you—or Mike Glasgow should have copies of all the customer-requested lead sample results he's taken. Greg Waldorf, the contractor that replaced Ms. Walters' service line on Wed May 6, said that many of the customer services are galvanized from the customer to the water main, but they also have a lead line that connects the shut-off valve with the water main—which would make the lead piping City-owned.

Jennifer

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Cc: Deltoral, Miguel; Poy, Thomas
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I talked with Miguel this week; he learned that there have been 2 more customer-requested lead samples that have come back over the AL: 22ppb and 40 ppb. These were customer-requested samples taken by Mike Glasgow and analyzed at the Flint lab. When I receive the lab reports, I'll email them to you—or Mike Glasgow should have copies of all the customer-requested lead sample results he's taken. Greg Waldorf, the contractor that replaced Ms. Walters' service line on Wed May 6, said that many of the customer services are galvanized from the customer to the water main, but they also have a lead line that connects the shut-off valve with the water main—which would make the lead piping City-owned.

Jennifer

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Thursday, June 04, 2015 4:06 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Deltoral, Miguel; Poy, Thomas
Subject: more customer lead samples over the AL?

I talked with Miguel this week; he learned that there have been 2 more customer-requested lead samples that have come back over the AL: 22ppb and 40 ppb. These were customer-requested samples taken by Mike Glasgow and analyzed at the Flint lab. When I receive the lab reports, I'll email them to you—or Mike Glasgow should have copies of all the customer-requested lead sample results he's taken. Greg Waldorf, the contractor that replaced Ms. Walters' service line on Wed May 6, said that many of the customer services are galvanized from the customer to the water main, but they also have a lead line that connects the shut-off valve with the water main—which would make the lead piping City-owned.

Jennifer

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Tuesday, June 02, 2015 8:28 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Benzie, Richard (DEQ); Philip, Kris (DEQ); Shekter Smith, Liane (DEQ)
Subject: April 27 Flint Sampling Update from Miguel

Mea culpa.... I totally missed this email. Just saw it today. You already know the general information, but here is directly from Miguel.
Jennifer

From: Deltoral, Miguel
Sent: Monday, April 27, 2015 6:53 AM
To: Poy, Thomas
Cc: Porter, Andrea; Bair, Rita; Crooks, Jennifer
Subject: Flint Sampling Update

Good morning, Tom

Just an update on the Flint sampling so folks know what's going on. As we had initially discussed, the only way to really see what the lead levels are throughout and where the lead is actually coming from at Ms. Walters' place is to do sequential sampling prior to the removal of the LSL. I spoke to Ms. Walters and she said that the water was shut off inside her home, so it can actually be turned back on, so Jennifer and I picked up sample bottles from the R5 office and we will be dropping them off at Ms. Walters place today on the way home from the MDEQ RTCR meeting. Pat Cook has confirmed that following the disconnection from Detroit, Flint has not been operating any corrosion control treatment, which is very concerning given the likelihood of LSLs in the city. We do not know how many LSLs there are in Flint and according to Ms. Walters, neither does the city. She said that they do not know where any LSLs are, based on their records, so other than what appears to be a very long one at Ms. Walters' place, we don't have confirmation of any others at this point. Since they were used extensively here in R5, it is likely there are more. No idea how many, though.

Marc Edwards (from Virginia Tech) was kind enough to offer to analyze this round of samples so she will shipping the samples to Marc for analysis. I asked that he measure phosphate as well, so that we have some data on that. As we discussed, R5 will send an additional set of bottles to Ms. Walters for the follow-up monitoring once the LSL is removed. I spoke to Mike Prysby on Friday and he said that the city was going to remove the LSL fully this Wednesday. I also brought a camera with me and will take some pictures while we are at Ms. Walters place as well.

Apparently, according to Ms. Walters, the water director appears to be telling residents that the high lead from Ms. Walters residence is from the internal plumbing and that a reporter she was talking to, as well as others, has confirmed that this is what residents are being told. Ms. Walters indicated that the line coming into the home appears to be galvanized pipe. If this is true, it is possible that her portion of the service line, from the home to the property line, is not lead and that the city-owned portion of the service line is the only source of lead here. The sample results should help to clarify where the lead is coming from.

Call me on the cell if you need to: 312.659.5827

Miguel A. Del Toral
Regulations Manager
U.S. EPA R5 GWDWB
77 West Jackson Blvd, (WG-15J)
Chicago, IL 60604
Phone: (312) 886-5253

Rennaker, Joanne (DEQ)

From:	Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent:	Tuesday, June 02, 2015 8:18 AM
To:	Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc:	Benzie, Richard (DEQ); Philip, Kris (DEQ); Shekter Smith, Liane (DEQ)
Subject:	FW: Ms. Walters' Follow-up sampling results
Attachments:	1505006 FINAL EXCEL 28 May 15 1621.xls; 1505006 FINAL May 28 15 1621.PDF; 1505006_work order.pdf

FYI from Miguel.

From: Deltoral, Miguel
Sent: Thursday, May 28, 2015 5:49 PM
To: Poy, Thomas
Cc: Bair, Rita; Damato, Nicholas; Porter, Andrea; Crooks, Jennifer
Subject: Ms. Walters' Follow-up sampling results

Attached are the results from Ms. Walters' testing following the replacement of her service line. Lead levels look good and copper is less than 1/2 the action level through the new copper service line.

The first 15 samples were the sequential samples (kitchen tap to water main) which came back fine. Sample 16 is the bathroom tap which came back fine. Samples 17 and 18 were from the hot water heater where one result was high, likely from residual particulate lead from before the service line work.

Miguel A. Del Toral
Regulations Manager
U.S. EPA R5 GWDWB
77 West Jackson Blvd, (WG-15J)
Chicago, IL 60604
Phone: (312) 886-5253

From: Griffin, Sylvia
Sent: Thursday, May 28, 2015 04:29 PM
To: Deltoral, Miguel
Cc: Wroble, Amanda
Subject: FW: 1505006; ICP-MS metals (DW) (Cu, Pb, Zn); Flint, MI

Please see the final results report. Should you encounter any problems with this transmittal, please email or give me a call.

Thank you.

-Sylvia

From: Wroble, Amanda
Sent: Thursday, May 28, 2015 4:26 PM
To: Griffin, Sylvia
Subject: 1505006; ICP-MS metals (DW) (Cu, Pb, Zn); Flint, MI

Amanda Wroble, Ph.D.
Chemist and Sample Coordinator
USEPA Region 5 Chicago Regional Laboratory
536 S. Clark St. ML-10C
Chicago, IL 60605
(312) 353-0375

SAMPDATA

CLIENT	PROJECT	PROJECT	LabName	SAMPLEN	LABSAMPI	MATRIX	RPTMATR	SAMPDAT
Water Divi	Flint, Michi	[none]	US EPA R	1	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	1	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	1	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	2	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	2	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	2	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	3	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	3	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	3	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	4	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	4	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	4	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	5	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	5	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	5	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	6	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	6	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	6	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	7	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	7	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	7	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	8	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	8	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	8	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	9	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	9	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	9	1505006-0	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	10	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	10	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	10	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	11	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	11	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	11	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	12	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	12	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	12	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	13	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	13	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	13	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	14	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	14	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	14	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	15	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	15	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	15	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	16	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	16	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	16	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	17	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	17	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	17	1505006-1	Water	Water	05/13/2015

SAMPDATA

Water Divi	Flint, Michi	[none]	US EPA R	18	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	18	1505006-1	Water	Water	05/13/2015
Water Divi	Flint, Michi	[none]	US EPA R	18	1505006-1	Water	Water	05/13/2015

SAMPDATA

PREPDAT	ANADATE	BATCH	METHODC	METHODN	PREPNAM	ANALYTE	CASNUMB	SURROGA
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
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05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
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05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
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05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/20/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/20/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
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05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
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05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/20/2015	B15E029	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE

SAMPDATA

05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE

SAMPDATA

TIC	Result	DL	RL	UNITS	RPToMDL	BASIS	DILUTION	SPIKELEV
FALSE	1.30	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	13.1	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	70.9	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.687	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	20.1	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	23.2	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.01	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	141	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	76.8	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	1.76	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	336	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	45.4	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	1.17	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	419	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	32.2	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	1.03	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	463	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	24.8	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.800	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	529	0.220	10.0	ug/L	FALSE	NA	10	
FALSE	19.6	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.666	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	554	0.220	10.0	ug/L	FALSE	NA	10	
FALSE	14.9	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.07	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	571	0.220	10.0	ug/L	FALSE	NA	10	
FALSE	11.6	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.93	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	345	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	10.3	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	1.94	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	233	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	1.17	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	171	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.864	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	139	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.670	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	110	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.505	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	91.5	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	5.52	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	29.7	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	71.3	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	31.7	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	70.4	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	883	1.90	100	ug/L	FALSE	NA	10	

SAMPDATA

FALSE	9.74	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	35.0	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	346	0.190	10.0	ug/L	FALSE	NA	1	

SAMPDATA

RECOVER	UPPERCL	LOWERCL	ANALYST	PSOLIDS	LNOTE	ANOTE	LATITUDE	LONGITUI
			AW					
			AW					
			AW					
			AW					
			AW					
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SAMPDATA

sComment	SNOTE1	SNOTE2	SNOTE3	SNOTE4	SNOTE5	SNOTE6	SNOTE7	SNOTE8

SAMPDATA

SNOTE9	SNOTE10	ANALYTEORDER	
		1	
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QCDATA

LABNAME	LABSAMP	QCTYPE	MATRIX	PREPDAT	ANADATE	BATCH	METHODC	METHODN
US EPA R	B15E029-E	Blank	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-E	Blank	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-E	Blank	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-E	LCS	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-E	LCS	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-E	LCS	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-D	Duplicate	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-D	Duplicate	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-D	Duplicate	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-D	Duplicate	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-D	Duplicate	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-D	Duplicate	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-N	Matrix Spik	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-N	Matrix Spik	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-N	Matrix Spik	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-N	Matrix Spik	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-N	Matrix Spik	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	
US EPA R	B15E029-N	Matrix Spik	Water	05/19/2015	05/19/2015	B15E029	Metals ICP-MS (DW)	

QCDATA

PREPNAM	ANALYTE	CASNUMB	SURROGA	TIC	RESULT	DL	RL	UNITS
200.8/no di	Lead	7439-92-1	FALSE	FALSE	U	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	U	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	U	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	18.9	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	18.9	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	18.9	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	1.28	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	13.0	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	70.9	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	1.94	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	237	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	8.23	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	21.2	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	32.9	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	92.3	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	22.1	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	256	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	28.8	0.190	10.0	ug/L

QCDATA

RPToMDL	BASIS	DILUTION	SOURCEII	SOURCER	SPIKELEV	RECOVER	RPD	UPPERCL
FALSE	NA	1						
FALSE	NA	1						
FALSE	NA	1						
FALSE	NA	1			20.00	94.4		115
FALSE	NA	1			20.00	94.6		115
FALSE	NA	1			20.00	94.5		115
FALSE	NA	1	1505006-0	1.30			1.77	
FALSE	NA	1	1505006-0	13.1			0.326	
FALSE	NA	1	1505006-0	70.9			0.0163	
FALSE	NA	1	1505006-1	1.94			0.129	
FALSE	NA	1	1505006-1	233			1.76	
FALSE	NA	1	1505006-1	8.14			1.11	
FALSE	NA	1	1505006-0	1.30	20.00	99.6		125
FALSE	NA	1	1505006-0	13.1	20.00	99.2		125
FALSE	NA	1	1505006-0	70.9	20.00	107		125
FALSE	NA	1	1505006-1	1.94	20.00	101		125
FALSE	NA	1	1505006-1	233	20.00	115		125
FALSE	NA	1	1505006-1	8.14	20.00	103		125

QCDATA

LOWERCL	RPDCL	ANALYST	PSOLIDS	LNOTE	ANOTE	ANALYTEORDER	
		AW				1	
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85		AW				4	
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75		AW				1	
75		AW				2	
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75		AW				4	

LNOTE

QUALIFIER	DESCRIPTION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5 CHICAGO REGIONAL LABORATORY
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605

Date:	**5/28/2015**
Subject:	**Review of Region 5 Data for Flint, Michigan**
To:	**Water Division, Drinking Water** **77 West Jackson Boulevard** **Chicago, IL 60604**
From:	**Amanda Wroble, Chemist** **US EPA Region 5 Chicago Regional Laboratory**

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with EPA's *Guidance on Environmental Data Verification and Data Validation* (Document EPA QA/G-8), CRL verified and validated the data but does not perform data quality assessment based on project plans.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X ____

Please contact the analyst with any technical report issues, Amanda Wroble at (312)-353-0375 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

Attached are Results for: Flint, Michigan

______________________________ / /

Data Management Coordinator and DateTransmitted

Analyses included in this report:

Metals ICP-MS (DW)

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-28-15 16:21

ANALYSIS CASE NARRATIVE

GENERAL INFORMATION

CRL received 18 drinking water samples for copper, lead, and zinc analysis by inductively coupled plasma-mass spectrometry (ICP-MS) on 14 May 2015 that were assigned to work order 1505006. The designated analyst for these samples, Amanda Wroble, can be reached at 312.353.0375.

The samples were received unpreserved. Therefore, 2 mL of nitric acid was added to each 1 L sample. At least twenty-four hours elapsed before subsampling began. All holding times were met.

No digestion is required for drinking water samples. Samples were analyzed in batch B15E029 over two runs using CRL SOP METALS001 (EPA Method 200.8), Revision 3. Copper dilutions for samples 1505006-07 thru -09 and a zinc dilution for sample 1505006-17 were reported from Run 2.

SAMPLE ANALYSIS AND RESULTS

The data reported herein meet the data quality objectives referenced in personal email communication with the project manager dated May 12, 2015 and the quality assurance project plan "Impacts on Lead Concentration in Drinking Water Samples Due to Sample Location and Sample Collection Protocols" dated January 20, 2011 referenced therein.

QUALITY CONTROL

All quality control audits were within CRL limits for the requested analytes or did not result in qualification of the data.

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	Reported:
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-28-15 16:21

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
1	1505006-01	Water	May-13-15 09:00	May-14-15 11:00
2	1505006-02	Water	May-13-15 09:00	May-14-15 11:00
3	1505006-03	Water	May-13-15 09:01	May-14-15 11:00
4	1505006-04	Water	May-13-15 09:01	May-14-15 11:00
5	1505006-05	Water	May-13-15 09:02	May-14-15 11:00
6	1505006-06	Water	May-13-15 09:02	May-14-15 11:00
7	1505006-07	Water	May-13-15 09:03	May-14-15 11:00
8	1505006-08	Water	May-13-15 09:03	May-14-15 11:00
9	1505006-09	Water	May-13-15 09:04	May-14-15 11:00
10	1505006-10	Water	May-13-15 09:04	May-14-15 11:00
11	1505006-11	Water	May-13-15 09:05	May-14-15 11:00
12	1505006-12	Water	May-13-15 09:05	May-14-15 11:00
13	1505006-13	Water	May-13-15 09:07	May-14-15 11:00
14	1505006-14	Water	May-13-15 09:07	May-14-15 11:00
15	1505006-15	Water	May-13-15 09:08	May-14-15 11:00
16	1505006-16	Water	May-13-15 20:15	May-14-15 11:00
17	1505006-17	Water	May-13-15 20:16	May-14-15 11:00
18	1505006-18	Water	May-13-15 21:19	May-14-15 11:00

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-28-15 16:21

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

1 (1505006-01) Water Sampled: May-13-15 09:00 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**1.30**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**13.1**			1.00	"	"	"	"	"
Zinc	**70.9**			10.0	"	"	"	"	"

2 (1505006-02) Water Sampled: May-13-15 09:00 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**0.687**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**20.1**			1.00	"	"	"	"	"
Zinc	**23.2**			10.0	"	"	"	"	"

3 (1505006-03) Water Sampled: May-13-15 09:01 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**3.01**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**141**			1.00	"	"	"	"	"
Zinc	**76.8**			10.0	"	"	"	"	"

4 (1505006-04) Water Sampled: May-13-15 09:01 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**1.76**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**336**			1.00	"	"	"	"	"
Zinc	**45.4**			10.0	"	"	"	"	"

5 (1505006-05) Water Sampled: May-13-15 09:02 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**1.17**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**419**			1.00	"	"	"	"	"
Zinc	**32.2**			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	Reported:
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-28-15 16:21

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

6 (1505006-06) Water Sampled: May-13-15 09:02 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	1.03			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	463			1.00	"	"	"	"	"
Zinc	24.8			10.0	"	"	"	"	"

7 (1505006-07) Water Sampled: May-13-15 09:03 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.800			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	529			10.0	"	10	"	"	May-20-15
Zinc	19.6			10.0	"	1	"	"	May-19-15

8 (1505006-08) Water Sampled: May-13-15 09:03 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.666			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	554			10.0	"	10	"	"	May-20-15
Zinc	14.9			10.0	"	1	"	"	May-19-15

9 (1505006-09) Water Sampled: May-13-15 09:04 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.07			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	571			10.0	"	10	"	"	May-20-15
Zinc	11.6			10.0	"	1	"	"	May-19-15

10 (1505006-10) Water Sampled: May-13-15 09:04 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.93			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	345			1.00	"	"	"	"	"
Zinc	10.3			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

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Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	Reported:
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-28-15 16:21

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

11 (1505006-11) Water Sampled: May-13-15 09:05 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	1.94			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	233			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

12 (1505006-12) Water Sampled: May-13-15 09:05 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	1.17			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	171			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

13 (1505006-13) Water Sampled: May-13-15 09:07 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.864			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	139			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

14 (1505006-14) Water Sampled: May-13-15 09:07 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.670			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	110			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

15 (1505006-15) Water Sampled: May-13-15 09:08 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.505			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	91.5			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

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Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-28-15 16:21

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

16 (1505006-16) Water Sampled: May-13-15 20:15 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**5.52**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**29.7**			1.00	"	"	"	"	"
Zinc	**71.3**			10.0	"	"	"	"	"

17 (1505006-17) Water Sampled: May-13-15 20:16 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**31.7**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**70.4**			1.00	"	"	"	"	"
Zinc	**883**			100	"	10	"	"	May-20-15

18 (1505006-18) Water Sampled: May-13-15 21:19 Received: May-14-15 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	**9.74**			0.500	ug/L	1	B15E029	May-19-15	May-19-15
Copper	**35.0**			1.00	"	"	"	"	"
Zinc	**346**			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	Reported: May-28-15 16:21

Metals by ICP-MS using EPA 200.8 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B15E029 - 200.8/no digestion

Blank (B15E029-BLK1) Prepared & Analyzed: May-19-15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	U			0.500	ug/L						
Copper	U			1.00	"						
Zinc	U			10.0	"						

LCS (B15E029-BS1) Prepared & Analyzed: May-19-15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	18.9			0.500	ug/L	20.00		94.4%	85-115		
Copper	18.9			1.00	"	20.00		94.6%	85-115		
Zinc	18.9			10.0	"	20.00		94.5%	85-115		

Duplicate (B15E029-DUP1) Source: 1505006-01 Prepared & Analyzed: May-19-15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	1.28			0.500	ug/L		1.30			1.77	20
Copper	13.0			1.00	"		13.1			0.326	20
Zinc	70.9			10.0	"		70.9			0.0163	20

Duplicate (B15E029-DUP2) Source: 1505006-11 Prepared & Analyzed: May-19-15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	1.94			0.500	ug/L		1.94			0.129	20
Copper	237			1.00	"		233			1.76	20
Zinc	8.23			10.0	"		8.14			1.11	20

Matrix Spike (B15E029-MS1) Source: 1505006-01 Prepared & Analyzed: May-19-15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	21.2			0.500	ug/L	20.00	1.30	99.6%	75-125		
Copper	32.9			1.00	"	20.00	13.1	99.2%	75-125		
Zinc	92.3			10.0	"	20.00	70.9	107%	75-125		

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-28-15 16:21

Metals by ICP-MS using EPA 200.8 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B15E029 - 200.8/no digestion

Matrix Spike (B15E029-MS2) **Source: 1505006-11** **Prepared & Analyzed: May-19-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	22.1			0.500	ug/L	20.00	1.94	101%	75-125		
Copper	256			1.00	"	20.00	233	115%	75-125		
Zinc	28.8			10.0	"	20.00	8.14	103%	75-125		

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Water Division, Drinking Water	Project:	Flint, Michigan	
77 West Jackson Boulevard	Project Number:	[none]	**Reported:**
Chicago IL, 60604	Project Manager:	Miguel Del Toral	May-28-15 16:21

Notes and Definitions

U	Not Detected
NR	Not Reported

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

WORK ORDER

1505006

Printed: 5/20/2015 8:35:08AM

US EPA Region 5 Chicago Regional Laboratory

Client: Water Division, Drinking Water
Project: Flint, Michigan
Project Manager: Greg Mitsakopoulos
Project Number: [none]

Report To:
Miguel Del Toral
Water Division, Drinking Water
77 West Jackson Boulevard
Chicago, IL 60604
Phone: (312) 886-5253
Fax: (312) 886-2001

Date Due: Jul-15-15 15:00 (60 day TAT)
Received By: Robert Snyder
Date Received: May-14-15 11:00
Logged In By: Robert Snyder
Date Logged In: May-14-15 16:20

Samples Received at:	17.9°C
Sample tags/labels	Yes
Seals Intact	Yes
Received on ice	No
Paperwork Included	Yes

Analysis	Due	TAT	Expires	Comments
1505006-01 1 [Water] Sampled May-13-15 09:00 (GMT-06:00) Central Time (US & Canada)				
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:00	pH = 6
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:00	pH = 6
1505006-02 2 [Water] Sampled May-13-15 09:00 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:00	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:00	pH = 6
1505006-03 3 [Water] Sampled May-13-15 09:01 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:01	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:01	pH = 6
1505006-04 4 [Water] Sampled May-13-15 09:01 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:01	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:01	pH = 6
1505006-05 5 [Water] Sampled May-13-15 09:02 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:02	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:02	pH = 6

WORK ORDER

1505006

Printed: 5/20/2015 8:35:08AM

US EPA Region 5 Chicago Regional Laboratory

Client: Water Division, Drinking Water
Project: Flint, Michigan
Project Manager: Greg Mitsakopoulos
Project Number: [none]

Analysis	Due	TAT	Expires	Comments
1505006-06 6 [Water] Sampled May-13-15 09:02 (GMT-06:00) Central Time (US & Canada)				
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:02	pH = 6
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:02	pH = 6
1505006-07 7 [Water] Sampled May-13-15 09:03 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:03	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:03	pH = 6
1505006-08 8 [Water] Sampled May-13-15 09:03 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:03	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:03	pH = 6
1505006-09 9 [Water] Sampled May-13-15 09:04 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:04	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:04	pH = 6
1505006-10 10 [Water] Sampled May-13-15 09:04 (GMT-06:00) Central Time (US & Canada)				
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:04	pH = 6
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:04	pH = 6
1505006-11 11 [Water] Sampled May-13-15 09:05 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:05	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:05	pH = 6
1505006-12 12 [Water] Sampled May-13-15 09:05 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:05	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:05	pH = 6
1505006-13 13 [Water] Sampled May-13-15 09:07 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:07	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:07	pH = 6
1505006-14 14 [Water] Sampled May-13-15 09:07 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:07	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:07	pH = 6

WORK ORDER

1505006

Printed: 5/20/2015 8:35:08AM

US EPA Region 5 Chicago Regional Laboratory

Client: Water Division, Drinking Water
Project: Flint, Michigan
Project Manager: Greg Mitsakopoulos
Project Number: [none]

Analysis	Due	TAT	Expires	Comments
1505006-15 15 [Water] Sampled May-13-15 09:08 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 09:08	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 09:08	pH = 6
1505006-16 16 [Water] Sampled May-13-15 20:15 (GMT-06:00) Central Time (US & Canada)				
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 20:15	pH = 6
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 20:15	pH = 6
1505006-17 17 [Water] Sampled May-13-15 20:16 (GMT-06:00) Central Time (US & Canada)				
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 20:16	pH = 6
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 20:16	pH = 6
1505006-18 18 [Water] Sampled May-13-15 21:19 (GMT-06:00) Central Time (US & Canada)				
Metals ICP (DW)	Jul-15-15 12:00	60	Nov-09-15 21:19	pH = 6
Metals ICP-MS (DW)	Jul-15-15 12:00	60	Nov-09-15 21:19	pH = 6

Reviewed By ____________________ Date ____________

Rennaker, Joanne (DEQ)

From: Hansen, Jeff <jrhansen@lan-inc.com>
Sent: Friday, May 29, 2015 10:05 AM
To: Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ); Brent Wright (bwright@cityofflint.com); mglasgow@cityofflint.com; Matta, Samir; Green, Warren
Subject: OER
Attachments: Flint-TTHM-OER-FINAL-3-01.pdf; March 1st, 2015 OEL Report - DEQ Comments.doc

Hi Mike,

You will be receiving hard copies of the attached OER today. I also wanted to respond to the written comments you provided on the last OER submitted. The following correspond to your numbered comments which I have also attached:

1. All tables in the report have been revised to correlate the TTHM results to the sample site numbers matching MDEQ records. References to the number of exceedences have also been revised accordingly.
2. The average ozone dosage for April 2015 was 2.4 mg/l. The system is capable of much more than that, but higher dosages are not necessary and bromate formation is a concern.
3. The current model is adequate to evaluate the transmission main size along Dupont and Bishop from a conservative standpoint. Although all model domestic demands have not been revised yet, the fire flow demand is much larger and dictates the main size. Additionally, domestic demands will be decreasing.
4. Veolia provided recommendations in a Technical Memo dated 3/30/15. In that memo Veolia recommended a permanganate dosage of about 1.0 mg/l and referred to 10% TOC removal improvement. Pages 4 and 17 of the report have been revised accordingly.
5. Comment noted – no changes to report needed.
6. City staff are investigating the existence of valves shown on the system map for the pressure zone.
7. Comment noted – no changes to report needed.
8. Agree. Options in the report to reduce storage used have been revised so as not to limit the volume of Reservoir #3.
9. Comment noted – no changes to report needed.

Jeffrey R. Hansen
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
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www.lan-inc.com • JRHansen@lan-inc.com

LOCKWOOD, ANDREWS & NEWNAM, INC.
FINAL

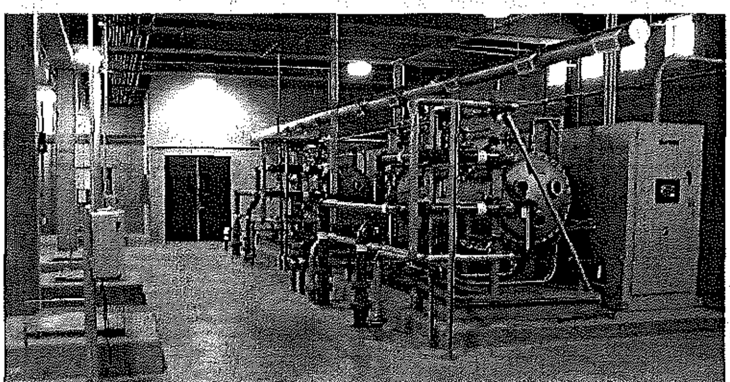
Operational Evaluation Report
City of Flint

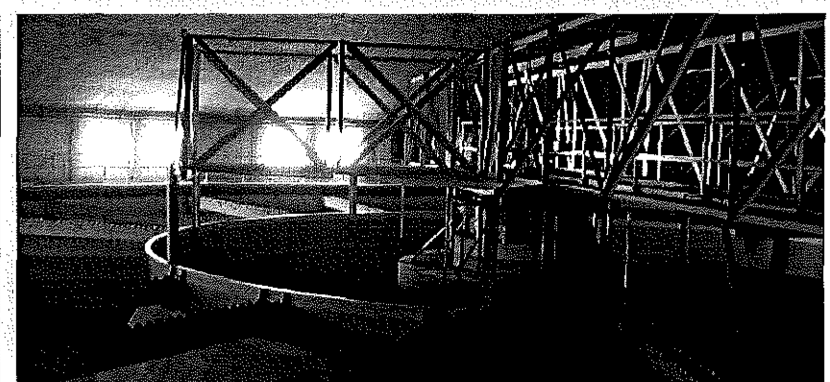
CITY OF FLINT, MICHIGAN 1855

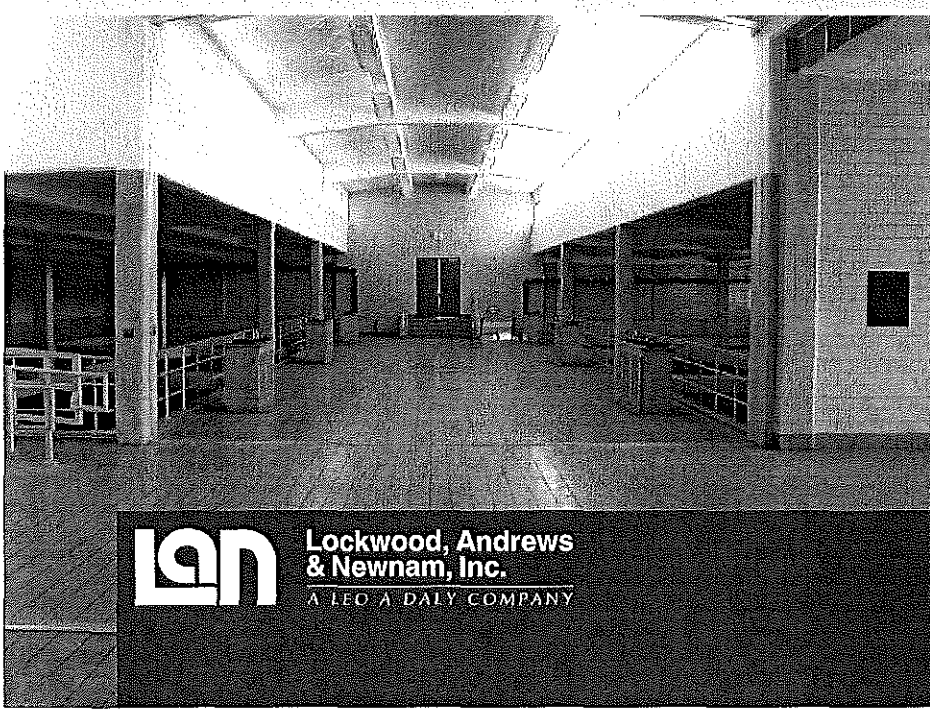
Trihalomethane Formation Concern

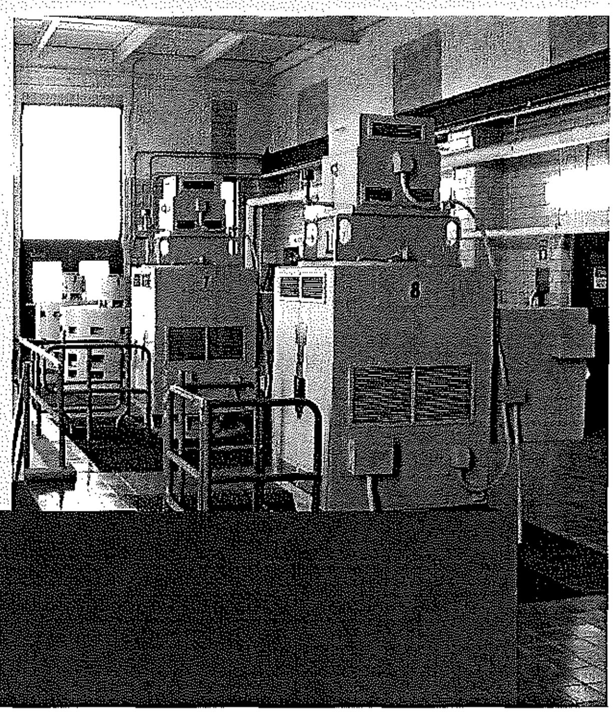
May 29, 2015

In Response to February 2015 Sample Results









Lockwood, Andrews & Newnam, Inc.
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EXECUTIVE SUMMARY

Environmental Protection Agency (EPA) and Michigan Department of Environmental Quality (MDEQ) regulations require that public water suppliers test drinking water quarterly throughout the distribution system for disinfectant by-products (DBP's). Two categories of DBP's, tri-halomethanes (THM) and halo-acetic acids (HAA5), are regulated and must be tested for. The City of Flint began operation of their water treatment plant (WTP) full time with the Flint River as the source on April 25, 2014. Since that time, five quarters of samples taken have resulted in annual average violations for total THM. Prior to the first violation (Nov. 2014), the City hired Lockwood, Andrews & Newnam, Inc. (LAN) to complete this Operational Evaluation Report (OER) in conformance with EPA guidelines with the goal to determine the cause(s) of high levels of THM and evaluate possible solutions.

The EPA promulgated the Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) in January 2006 which set maximum contaminant levels (MCLs) for total trihalomethanes (TTHM) and HAA5 based on an annual running average, tested quarterly, for a given sampling location. The City of Flint reports levels from 8 sampling test locations. Of the five quarterly sampling cycles since Flint began operating the WTP full time, HAA5 levels have been acceptable but TTHM levels have exceeded the MCL. Four sampling sites were in violation following the third sampling cycle and those sites in violation have been reduced to a single site for the most recent cycle.

A number of issues were identified as possibly contributing to the high THM levels measured.

1. Inefficient ozone system functionality which led to in increased chlorine feed.
2. Upstream source influences in terms of increased chlorine demand.
3. Bypass stream around softening contributed to chlorine demand and increased total organic carbon (TOC) levels in the effluent.
4. Unlined cast iron pipes in the distribution system contributing to chlorine demand.
5. High water age in the distribution system due to:
    a. Broken valves causing less than ideal flow patterns
    b. Inefficient pump station pressure zones
    c. Water storage volumes in excess of that needed for today's demands
    d. Oversized water mains
    e. Low water demands
6. High chlorine demand in filters.
7. High THM formation potential (THMFP) in source water.
8. Less than optimal removal of THM precursors.

A graphical representation of how the factors above relate to the timing of THM compliance sampling is shown as Table 1. Compliance sampling dates are hatched. Each row in Table 1 describes a factor than can lead to increased THM levels and the table defines when each of those factors applied. Note the convergence of nearly all factors around the second sampling period on August 21, 2014 to create what appears to be a worst case scenario. The table also shows that the factors listed as those that the City can control have been addressed prior to 2015 sampling periods. Monthly operating report data up to May 1, 2015 is depicted on the Table.

TABLE 1 - SUMMARY OF NEGATIVE INFLUENCES ON THM COMPLIANCE SAMPLING													
FACTOR	2014								2015				
	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Softening bypass stream over 20% of plant flow													
Ozone system not feeding optimally													
Using full water storage capacity of WSR & CSR													
Chlorine feed at WTP 7.0 mg/l or more													
Ferric chloride feed rate less than 10 mg/l Fe3+													
Raw water temp 23 degrees C or more													
Raw water TOC levels above 8.0 mg/l													
Raw water coliform over 5000 counts/day													
Positive bacteria test in dist. system (boil water notice)													
Water demand less than 15 mgd													

Dates of occurrence
Dates of occurrence and expected to repeat in future years
Compliance sampling date

Factors under Flint staff control
Flint River characteristics
System factors

Lockwood, Andrews & Newnam, Inc.
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ACTION PLAN

The City of Flint has signed an agreement with the Karegnondi Water Authority (KWA) to purchase raw water drawn from Lake Huron. The KWA system is currently under construction and expected to be operational by late 2016. The water supply from Lake Huron will have entirely different water quality characteristics from the Flint River and those characteristics are expected to yield drastically reduced DPB formation. With that, non-structural options to help reduce THM levels are much preferred over solutions requiring new construction. Therefore, two categories of actions have been devised: Stage 1 being actions that can be completed relatively quickly without major construction and Stage 2 consisting of either long term actions or solutions requiring major construction. The City is actively working to complete Stage 1 actions as soon as possible. Stage 2 actions are to be implemented only if Stage 1 actions are ineffective in adequately reducing TTHM levels and therefore Stage 2 is contingent upon the outcome of Stage 1. As of the date of this report, status updates for action items are shown in red.

Stage 1 – Immediate Actions

- Hire third party water quality expert to complete independent 'water audit'
  - The City hired Veolia Water to review all water quality related operations, procedures, actions taken and planned responses. Recommendations from Veolia were provided in a report and technical memo dated 3/12/15 and 3/30/15 respectively.
- Obtain an in house THM analyzer to allow regular operational monitoring of THM levels
  - THM analyzer was installed 2/17/15.
- Hire ozone system manufacturer to troubleshoot ozone system
  - Manufacturer and controls programmers performed on site evaluations followed by corrective modifications in January 2015.
- Bench scale jar testing
  - Match existing process and assess possible areas of improvement
    - Existing process was simulated and an evaluation of existing chemical feed dosages has been completed by LAN.
    - Existing process TOC profile was developed by Veolia.
  - Simulate potential modifications to treatment process
    - Soda ash softening evaluation completed and PAC feed testing completed by LAN.
  - Evaluate coagulation and flocculation polymer aid feeds to assist with TOC removal
    - Evaluations of polymer aids completed by LAN and PVS Technologies.
- WTP operational changes
  - Discontinue softening bypass stream to reduce chlorine demand
    - Operational directive has been set to soften no less than 80% of flow.
  - Disinfection of filter beds to reduce chlorine demand
    - Utility Service Group contracted by City and condition assessment completed. Controls improvements have been completed.
  - Begin coagulation and flocculation polymer aid feeds to assist with TOC removal if bench scale test results are positive
    - Jar testing completed to date has not indicated a meaningful benefit to feeding coagulation/flocculation polymer aids. Increased ferric doses have been implemented at the WTP based on positive jar test results.

- Increase water main flushing efforts to minimize stagnant water
  - Flushing efforts are ongoing as needed based on chlorine residual levels measured in the system.
- Water system modeling to identify areas with high water age and potential solutions
  - The water model has been improved and preliminary results, including system wide water age, have been produced. Water demand updates and reconciliation with operator's data are underway with expected completion in mid June, 2015.
  - Cedar Street Pump Station potential recirculation
    - Water model analysis to be completed in June 2015.
  - West Side Pump Station potential recirculation
    - Water model analysis to be completed in June 2015.
  - Storage tank volume use
    - Operating levels of West Side and Cedar Street reservoirs have been lowered to reduce water age
  - Possible broken closed valve locations
    - Model has been updated with known broken valve locations. Model results are being evaluated for indications of other possible broken valves. City has also initiated valve assessment program.
  - Locations in need of flushing
    - High water age areas have been identified in the water model. Further evaluation is expected to be done by July 1, 2015 to determine most effective flushing points.

Stage 2 – Contingent Actions

- Fix ozone system
  - Repairs have been made to gauges and programming and the system is producing proper ozone and functioning under manual operation. Further minor repairs are planned for the 1st quarter 2015 to allow automatic operation.
- Start feeding coagulation and flocculation polymer aids to lower TOC, if not completed in Stage 1
  - Polymers evaluated by LAN did not demonstrate notable benefit.
  - PVS Technologies evaluated a proprietary polymer that showed little benefit.
- Convert to lime and soda ash softening
  - Cost effective analysis to be developed, if necessary, based on effectiveness of new GAC filter media.
- Change disinfectant to chloramine or chlorine dioxide until KWA
  - Cost effective analysis to be developed, if necessary, based on effectiveness of new GAC filter media.
- Install pre-oxidant feed at intake to optimize ozone disinfection
  - Permanganate feed at intake was evaluated and recommended by Veolia to help with TOC removal.
- Replace filter media with granular activated carbon (GAC) media
  - Design of filter anthracite media replacement with GAC media is in progress. GAC media is expected to be installed by mid July 2015.
- Implement advanced treatment for THM precursor removal
  - Cost effective analysis to be developed, if necessary, based on effectiveness of new GAC filter media.

- Increased main flushing based on water modeling results
  - Water model analysis to be completed in June 2015.
- Continue valve replacements with water model assistance
  - Water model analysis to be completed in June 2015.
- Emphasize cast iron pipes on water main replacement priority list
  - Flint has bid replacement of over 2 miles of 24" steel pipe along Dupont and Bishop Streets to be completed this coming construction season if the City can allocate funds. The water main section is considered a critical transmission main, and is expected to contribute to decreases in water age when complete.

THM samples have been taken and tested 5 times for regulatory reporting since the City began using the Flint River for supply. Numerous additional sets of samples have been taken by the City for internal operational monitoring. Compliance samples were taken in May 2014, August 2014, November 2014, January 2015, February 2015, and May 2015. The average of all eight sample sites in May 2014 was 100.2 ug/l and the most recent average of samples taken in May 2015 was 56.7 ug/l. The MCL defined by the EPA is 80 ug/l.

I. BACKGROUND

The City of Detroit Water and Sewer Department (DWSD) has historically provided drinking water for the City of Flint and Genesee County. In the late 1990's growing concern regarding the reliability of the DWSD supply prompted the City of Flint to upgrade their existing water treatment plant (WTP). Those improvements, defined as Phase I, were completed in 2005 and were intended to allow the Flint WTP to operate, using the Flint River as the source, for an extended period of time in the event that supply from the DWSD was temporarily interrupted. Additionally, the Phase I improvements set the stage for Flint to break free from dependence on the DWSD supply and water charges over which they had no control.

A. WATER SUPPLY TRANSITION

1. Detroit Water and Sewer Department (DWSD)

Until recently the Genesee County and Flint region had been provided drinking water by the DWSD. However, due to excessive cost increases and reliability issues with the DWSD system other options had to be explored.

2. Karegnondi Water Authority (KWA)

In 2010 the Karegnondi Water Authority (KWA) was formed for the purpose of developing a new water supply from Lake Huron to serve the region in lieu of the DWSD supply and the City of Flint elected to join. The KWA expects the new system which is currently being constructed to become operational by the fall of 2016.

3. Flint River – Interim Period

With a renewing water supply agreement between Flint and the DWSD being terminated by the DWSD (effective April 30, 2014) and the KWA system not expected to be operational until late 2016, the City of Flint decided to initiate operation of the existing WTP full time utilizing the Flint River as the interim water source. A variety of WTP improvements were necessary for the Flint plant to become a full time plant. For purposes of this report, Phase II improvements to the Flint WTP are improvements intended to allow the plant to operate full time with either the Flint River as the source or the KWA supply as the source.

B. TTHM VIOLATIONS

The EPA and MDEQ method of determining if TTHM sample results exceed the MCL uses a locational running annual average (LRAA). Flint's first TTHM violation was cited by the MDEQ following the third cycle of sampling completed in November 2014. Of the 8 sampling sites, 4 were in violation. At that time the MDEQ used the following calculation for determining if the MCL had been violated:

(2 x current quarter value + previous 2 quarter values) / 4 = Operational Evaluation Value

Flint has now completed tests for 5 quarters and a straight annual running average applies. Based on samples taken on May 18, 2015 the number of sites in violation of the THM MCL limit has decreased to one. The May 2014 average across all test sites was 100.2 ug/l and the May 2015 average is 56.7 ug/l with the highest individual site result of 72.4 ug/l. Test results are tabulated in Table 2. HAA5 sample results are shown in Table 3, of which Flint has had no violations.

TABLE 2 – TTHM TEST RESULTS (ug/L)							
Sample Location	5/21/14	8/21/14	11/21/14	2/17/15	5/18/15	Feb/15 LRAA	May/15 LRAA
WTP Tap	56	86	33	-	~35	n/a	n/a
1) 3719 Davison McDonalds	162.4	145.3	58.6	16.2	51.4	95.6	67.9
2) 822 S. Dort Hwy BP Gas Sta.	75.1	112.0	36.2	19.9	46.1	60.8	53.6
3) 3302 S. Dort Hwy Liquor Palace	111.6	127.2	33.3	16.8	63.5	72.2	60.2
4) 3606 Corunna Taco Bell	79.2	181.3	33.9	18.1	54.7	78.1	72.0
5) 2501 Flushing Univ. Market	106.4	196.2	93.6	24.5	59.8	105.2	93.5
6) 3216 MLK Salem Housing	82.2	112.4	50.1	28.5	72.7	68.3	65.9
7) 5018 Clio Rite Aid	88.2	144.4	53.6	19.2	60.5	76.4	69.4
8) 6204 N. Saginaw N. Flint Auto	96.5	118.3	41.1	14.9	45.2	67.7	54.9

TTHM MCL = 80 ug/l

TABLE 3 – HAA5 TEST RESULTS (ug/L)							
Sample Location	5/21/14	8/21/14	11/21/14	2/17/15	5/18/15	Feb/15 LRAA	May/15 LRAA
WTP Tap	36 (taken June 14, 2014)					n/a	n/a
1) 3719 Davison McDonalds	64	43	16	9.0	16	33.0	21.0
2) 822 S. Dort Hwy BP Gas Sta.	38	40	21	9.0	16	27.0	21.5
3) 3302 S. Dort Hwy Liquor Palace	52	31	15	9.0	17	26.8	18.0
4) 3606 Corunna Taco Bell	50	24	15	9.0	16	24.5	16.0
5) 2501 Flushing Univ. Market	55	17	24	9.0	15	26.3	16.3
6) 3216 MLK Salem Housing	41	25	5	2.0	10	18.3	10.5
7) 5018 Clio Rite Aid	49	30	17	9.0	22	26.3	19.5
8) 6204 N. Saginaw N. Flint Auto	48	37	18	9.0	17	28.0	20.3

HAA5 MCL = 60 ug/l

C. WATER TREATMENT PLANT RECENT IMPROVEMENTS & STATUS

1. Phase I WTP Improvements

Since 1965, the Flint WTP has remained a secondary or backup supply system to the DWSD primary supply. Typically the secondary supply for a public water system is expected to be needed only during emergency situations and normally is designed for short term operation such as providing the average daily demand for a few days. Conversely, Phase I improvements were designed with the intent to upgrade the Flint WTP in order to allow for an extended short term period (6 weeks) because of the perceived high risk that the DWSD supply would fail and remain out of service for an extended duration. Regardless, the Flint WTP was still intended to serve as a standby plant and as such the Phase I improvements lacked redundancies that would be required for a primary supply WTP.

2. Past Pilot Study & Testing

During design of the Phase I improvements a treatability study was completed by Alvord, Burdick & Howson, LLC (AB&H) in 2002. The Treatability Study evaluated the current treatment processes that are in place at the Flint WTP today with the Flint River as the source. The report recommended the following:

TABLE 4 – 2002 WTP TREATMENT RECOMMENDATIONS

Treatment	Purpose	Point of Application	Dosage (mg/l)
Sodium permanganate	Zebra mussel control	Intake	0.3
Ozone	Taste & odor removal, disinfection	Diffusor basin	1.5
Ferric chloride	Coagulation	Rapid mix	40
Coag aid polymer	Turbidity & TOC removal	Rapid mix	2.0
Floc aid polymer	Turbidity & TOC removal	Floc basin	0.05
Lime	Softening	Softening basin	175
Soda ash	Softening	Softening basin	52
Carbon dioxide	pH adjustment	Recarb basin	37
Media filters	Filtration	N/A	Na
Chlorine	Disinfection	Filter effluent	1.0

Of the recommended items, zebra mussel control, coagulant and flocculation polymer aids, and soda ash feed have not been incorporated into the treatment process.

3. Phase II WTP Improvements for Full Time Operation

Phase II WTP improvements are those needed to convert the Flint WTP from a back-up supply to a primary supply plant. A number of improvements have already been constructed as they were necessary to operate full time when treating water from the Flint River. The improvements under the title of Phase II that have been completed or are nearly complete include installation of the future raw water feed connection point and valving for the KWA supply, upgrades to the lime sludge lagoon, the lime sludge lagoon decant and disposal system, decant pump station and force main, installation of mid-point chlorination before filtration, and upgrade of the electric feed sub-station.

Additional improvements to the Flint WTP that are to be completed to become part of the normal treatment process using water supplied by the KWA are:

- New oxygen and nitrogen storage facilities for the ozone system (under construction)
- New coagulant feed system
- Electrical
    - o Pump Station #4 upgrades (under construction)
    - o SCADA and controls upgrades
    - o Filter transfer pump station feeders
- Pump replacements and VFD installation in the low and high service pump station (under construction)
- Filter transfer pump station to Dort Reservoir
- Facility security improvements

II. SOURCE WATER EVALUATION

A. DATA ANALYSIS

Based on past data collected and the 2002 Treatability Study by AB&H, the Flint River water quality varies seasonally with higher hardness and alkalinity experienced in the winter. Higher magnesium concentrations are also experienced in the winter, adding difficulty to the settling process due to neutrally buoyant floc. General water quality average characteristics recorded for the 2002 Treatability Study as compared with average characteristics recorded in 2014 are shown in Table 5 below.

TABLE 5 – FLINT RIVER WATER QUALITY CHARACTERISTICS

Period	Turbidity NTU	TOC Mg/l	Alk. Mg/l	Hardness Mg/l as $CaCO_3$	pH	Total Col. Count/day	THMFP Mg/l
2001 Apr–Oct	7.9	9.4	215	272	8.1	870-1230 (7300 max)	410
2014 May–Oct	8.3	10.3 5/22/14	207	252	8.2	1900-9000 (48,300 max)	187

The Flint River characteristics do not appear to have changed significantly over the past 10+ years. Note that near the time Flint initiated withdrawal from the Flint River investigation by City staff revealed a sewer leak upstream of the plant that may have contributed to the total Coliform count. The leak was subsequently repaired.

B. CONCLUSIONS

Considering the minor changes in Flint River water quality, much of the information contained in the 2002 Treatability Study by AB&H remains relevant today. Data from that report assumed to be consistent today include the following:

- Flint River is influenced by groundwater from a dolomitic aquifer
- Hardness varies seasonally with higher hardness and alkalinity in the winter
- Hardness, alkalinity, magnesium concentrations tend to be reduced by run-off

In development of the 2002 Treatability Study, processes were simulated which resulted in low THM levels. Therefore, information contained in that report was used to assist with establishing a baseline jar testing procedure as discussed further in Section III.

III. TREATMENT PROCESS EVALUATION

A. EXISTING PROCESS DESCRIPTION

The existing WTP consists of an intake with screening from the Flint River, low lift pumping, ozonation, rapid mix, flocculation, settling, softening, recarbonation, filtration, storage and high service pumping. A process diagram is shown as Figure 1.

1. Intake

A 72" diameter pipe draws water from the Flint River through 2 traveling screens to the low lift pump structure. No chemicals are currently fed for Zebra mussel control or pre-oxidation as recommended by the 2002 Treatability Study. Manual removal of zebra mussels is more economical than installation of chemical feed equipment considering the short term need.

2. Ozone

There are 2 ozone generators designed to provide adequate ozone for a WTP flow of up to 36 mgd. There are 3 ozone contact basins. The ozone generators were designed to produce 900 lbs/day at 10% concentration and up to 1300 lbs/day at 6% concentration each. Prior to recent repairs, readings indicated a production rate of approximately 700 lbs/day at 4% concentration. It is possible that before the recent improvements the ozone feed might not have been optimized. In fact, it is known that less than optimal ozonation previously led to increased chlorine feed which would have contributed to THM formation.

3. Rapid Mix

East and West rapid mix chambers allow chemical feed prior to the flocculation basins. Each rapid mix chamber is equipped with a 5 hp mixer.

4. Coagulation / Flocculation

The WTP contains two equally sized flocculation basins, east and west, and each basin provides tapered or gradually slowed mixing from inlet to outlet. There are fifteen 2 hp mixers for each basin with VFDs to control mixing speed. The 2002 Treatability Study recommended feeding both coagulation and flocculation polymer aids. Neither polymer aid is being used today because turbidity and TOC removals have been sufficient to meet regulatory requirements.

5. Settling

Primary clarification takes place within 3 basins containing plate settlers. The settlers are operating as designed but are due for cleaning.

6. Softening

Again, there are two basins for softening: east and west. Each basin is 120' in diameter and contains a solids contact softening unit. Each softening basin/unit has a design capacity of 18 mgd. The east clarifier has an effluent weir imbalance that the City intends to fix when low demands allow for construction. Low lift pumping limitations, flow control to the basins, malfunctioning polymer feed pumps, control restrictions on residuals removal, and fluctuating demands have made it difficult for WTP staff to stabilize the softening process. Softening is accomplished by feeding lime. The decision was made by the City not to feed soda ash in order to remove non-carbonate hardness because acceptable hardness levels could be achieved with lime feed only and softening is short term until Lake Huron water becomes available. Lime and soda ash softening is a possible consideration to assist with TOC removal and thus reduce THM formation.

7. Recarbonation
Recarbonation for pH adjustment is accomplished in east and west recarbonation basins between and to the north of the softening basins. Carbon dioxide storage and feed equipment is located west of the recarbonation basins.

8. Filtration
Filtration is accomplished with 12 dual media filters, equally sized and designed to filter 3.0 mgd each. Media consists of 12" of sand and 18" of anthracite. The filters have been operated intermittently over the years due to the standby nature of the WTP and until recently, chlorine injection took place downstream of the filters. It is possible some microbial growth had developed in the filters leading to increased chlorine demand. Late 2014, the City recently hired a contractor to upgrade the electrical controls for the filters and that work has been completed.

9. Disinfection
Disinfection is provided by ozonation and by feeding chlorine. Ozonation occurs at the front end of the WTP. Chlorine is fed prior to filtration and prior to finish water storage / high service pumping. The intermediate chlorine injection location was recently constructed under the Phase II, Segment 1 contract.

10. Clear Well & Pumping
The pump building sits adjacent to a 3 MG clear well and contains both low and high service pumps.

B. JAR TESTS / EXPERIMENTS

1. Approach
There are several well practiced methods by which DBPs can be reduced. First, the disinfectant can be changed to an alternate that has a lower tendency to form DBPs. Second, additional treatment systems such as activated carbon or air stripping (depending on the nature of the precursors) can be added to remove DBP precursors. Lastly, the existing treatment processes can be optimized to remove as much DBP precursor as possible. Of these options, optimizing existing treatment processes is the only strategy that does not require the construction of new and expensive facilities. It is anticipated that Flint will be receiving Lake Huron water by late 2016 and this water will have a completely different chemistry from the Flint River. Major process changes instituted to address THM levels using Flint River water are likely to be unnecessary for Lake Huron water and may even be inappropriate. Therefore, those options which require addition of new treatment processes are undesirable at this time. In recognition of this upcoming change in water source, efforts for this study have concentrated on improving the existing processes, rather than adding new ones. New treatment processes will only be recommended if operational changes to the existing treatment train prove ineffective.

Recent sample test results suggest that most of the DBPs are formed in the distribution system rather than within the treatment plant. Therefore, the most logical approach is to reduce the DBP formation potential (DBPFP) rather than simply lowering the levels of DBPs leaving the plant. During bench scale testing, formation potential (FP) levels were the primary indicator of success or failure of proposed process modifications.

2. Protocol
Bench scale pilot testing is intended to reflect actual plant operating and hydraulic conditions so the bench scale treatment units were sized based on various

dimensionless factors to ensure the pilot treatment matched the actual system. Bench scale ozonation was not practical due to time and cost limitations. Therefore, water samples were withdrawn from the plant ozone basin effluent. These samples were transported to the laboratory and dispensed into square testing jars. The jars were used to simulate rapid mix, three-stage flocculation, and settling. Rapid mix and flocculation conditions were matched to the plant based on "Gt" values. The "G" value is a measure of the mixing intensity and is a function of mix time, viscosity of the liquid, and mixing power applied to the water. "Gt" then, is a size scaling factor where time has been accounted for. Settling time was scaled to match the shorter settling depth of the testing jars. After settling, samples were decanted from the test jars. The decanted samples were then lime softened; softening conditions were similarly matched on the basis of "Gt". Carbon dioxide was sparged into the samples to reduce the pH. The water was then vacuum filtered through filter paper, sized to simulate the plant's dual media filters. The samples were dosed with excess chlorine and allowed to react for seven days at 25° C before testing for DBPs to determine the formation potential.

The following conditions were applied during testing to properly match small scale testing to actual plant processes.

TABLE 6 – BENCH SCALE TEST MIXING INTENSITIES

Process	G	Duration	Mix RPM
Ozonation	Plant	-	-
Rapid Mix	200	44 sec	160
Flocculation, Stage 1	50	9 min	55
Flocculation, Stage 1	25	9 min	30
Flocculation, Stage 1	12	9 min	19
Settling	N/A	10 min	-
Softening	TBD	10 min	-
Recarbonation	N/A	N/A	-

The primary variables during testing were chemical additions and chemical dosages. Specific chemicals and dosages used for initial testing conditions were selected to reflect current plant usage and the recommendations of the 2002 Treatability Study:

TABLE 7 – BENCH SCALE TEST CHEMICAL FEED RATES

Chemical	Current Usage	2002 Study	Test Values
Ozonation	4.66 mg/l	1.5 mg/l	
Ferric Chloride	7.7 mg/l Fe3+	40 mg/l Fe3+	7.7 – 80 mg/l Fe3+
Coagulant Aid Polymer	Not used	2.0 mg/l	1 – 2 mg/l
Flocculation Aid Polymer	Not used	0.05 mg/l	0 – 0.05 mg/l
Powdered Activated Carbon	Not used	N/A	20 – 100 mg/l
Lime	120 mg/l	175 mg/l	120 – 175 mg/l
Soda Ash	Not used	52 mg/l	0 – 52 mg/l
Cationic Softening Polymer	3.13 mg/l	Not used	3.13 mg/l
Anionic Softening Polymer	0.88 mg/l	Not used	0.88 mg/l
Fluoride	0.45 mg/l	1 mg/l	Not used
Carbon Dioxide	32 mg/l	37 mg/l	Fed to reach pH of 7.5 +- 0.3
Chlorine	6.3 mg/l	1 mg/l	10 mg/l

3. Considerations

The 2002 Treatability Study did not note significant formation of DBPs. This may be a function of different Flint River water chemistry at that time. However, recognizing the considerable differences in chemical usage and dosages between that study and current operations, those differences in chemical use and dosage are an obvious starting point for optimizing treatment to prevent DBP limit exceedance.

Although it is believed that optimization of current treatment can correct the DBP issue, should optimization of present treatment prove insufficient, alternate residual disinfectants (chloramines and chlorine dioxide) will be investigated as additional treatment measures.

4. LAN Test Results

Two rounds of jar testing were completed by LAN during the weeks of December 15, 2014 and January 26, 2015. Detailed test data is included in Appendix A. Testing results can be summarized as follows:

- Increased dosages of ferric chloride resulted in higher reduction of THMFP.
- The currently utilized feed rate of lime at 120 mg/l is appropriate
- Softening with soda ash in addition to lime resulted in minor additional THMFP reduction – in the range of 0% - 10%.
- The benefits of using a cationic polymer during softening at a dosage range of 0.31 - 3.13 mg/l to help reduce THM's are unclear
- The benefits of using an anionic polymer during softening at a dosage range of 0.09 – 0.88 mg/l to help reduce THM's are unclear
- Feeding PAC was ineffective in reducing THMFP within the dosage range of 20 – 100 mg/l.

5. Testing by Others

In addition to jar testing completed by LAN, the chemical supplier who provides ferric chloride for the City, PVS Technologies, ran tests using their recommended flocculant polymer aid. Plus, Veolia Water completed jars testing of their own the week of February 16th to analyze other process details and current WTP parameters. Experiments completed by PVS Technologies showed very little TOC removal beyond that obtained with straight ferric chloride feed.

6. Conclusions

Increasing the dose rate of ferric chloride is an operational change that can easily be implemented without the need for any additional equipment. Test results show that over 40% THMFP removal can be obtained with a dosage of 60 mg/l Fe^{3+} or higher. Increased dosing of ferric chloride would be most ideal coupled with regular raw water TOC monitoring so that TOC levels would dictate the appropriate ferric chloride feed rate.

Softening with soda ash in addition to lime is another option the City should consider if increased ferric chloride doses are not adequate to maintain THM levels under the MCL, particularly during warmer months. Again, monitoring of TOC in the raw water could provide useful information of when lime/soda ash softening is necessary.

IV. DISTRIBUTION SYSTEM EVALUATION

EPA guidance for the distribution evaluation portion of an OER is focused on identification and isolation of a specific portion of the distribution system that led to the exceedance. The circumstances of Flint's apparent pending TTHM exeedances are unusual in that a new supply has been implemented which clearly corresponds to the high TTHM sample results. Although the new source is one element in increased TTHM levels, value remains in evaluating the distribution system since water age is also a critical factor. Additionally, there may be distribution improvements that can be made to help alleviate the problem.

A. INFRASTRUCTURE

1. Piping

According to the most recent MDEQ Sanitary Survey, the distribution system is estimated to contain 70% cast iron, 20% ductile iron, 2% concrete and 8% steel water mains. Based on discussions with City staff, the percentage of cast iron pipe may be higher than that stated in the MDEQ Sanitary Survey. Unlined cast iron pipe can become pitted, allowing colonization sites for microorganisms leading to chlorine demand. Additionally, much of the piping in the system is aged and in poor condition. Increased chlorine demand could be resulting from biofilm in older pipes and from main breaks/repairs. The extent of contribution is not known but any water main replacement project will decrease chlorine demand somewhat if constructed properly. Unfortunately, water main breaks may also assist with decreasing water age by providing unintentional flushing. All things considered, it is impossible to quantify the impact existing piping has on THM formation.

The City utilizes City Point software and GPS equipment to document main breaks and prioritize replacements. However, main break information is more pertinent to rusty water complaints and has little relevance to THM levels. Areas that have been targeted for main replacements include the transmission main from the WTP west to Dupont and south to the West Side reservoir, Fenton Road, Atherton Road, Dort Highway, Averil Street, and Boulevard Drive.

2. Storage

There are 4 finish water storage tanks and 1 raw water tank as tabulated below:

TABLE 8 – STORAGE TANKS

Name	Type	Water	Volume (MG)	Operating		Absolute	
				LWL	HWL	Bottom	OF
Dort Reservoir	Ground	Raw	20	-	-	730	750
WTP Tank	Elevated	Finished	2	883.0	896.0	863.0	898.0
WTP Clear Well – PS #4	Ground	Finished	3	11′	15′	708.5	726.0
Cedar Street Reservoir	Ground	Finished	20	-	11′	737.2	757.2
Westside Reservoir	Ground	Finished	12	-	12′	761.8	779.0

The MDEQ typically recommends providing a minimum finish water storage volume of 1/3 the maximum daily demand (MDD). According to the 2013 MDEQ Sanitary Survey, the 5 and 10 year MDDs are 21.57 mgd and 30.05 mgd respectively. A common rule of thumb for clear well storage volume at a WTP is 10% of the design flow rate. Another general guideline for reliability is to provide total storage to allow for 2 X the average daily demand plus fire flow demand. For this analysis, fire flow is assumed to be 2,500 gpm for either one industrial fire (2,500 gpm) or a combination of one residential (1,000 gpm) and one commercial (1,500 gpm) fire at a 4 hour duration which results in a total volume of 600,000 gallons. These go-by approximations are summarized below with the applicable flow rates and are compared to the existing storage volumes currently being utilized.

Common Practice	Flow Rate	Recommended Volume by ROT	Volume In Use
Clear well 10% of Design Flow	18 MGD	1.8 MG	3.0 MG
Finish Storage = 1/3 MDD	30.05 MGD	10.0 MG	37 MG
Total Storage = 2 * ADD + FFD	13.87 MGD	28.3 MG	57 MG

Based on the values above, it appears the storage volume used in the Flint system could be decreased without negatively effecting reliability. The appropriate volumes of individual tanks will be further evaluated using the water system model and discussed in Section V (C).

All reservoirs have baffling to minimize stagnant water. Also, all tanks have been maintained and are in reasonable condition. The Westside reservoir has an exposed roof that is in need of rehabilitation, but its current condition has no influence on THM formation.

3. Pump Stations
All pump stations are in good condition but pumps are generally oversized. As an independent consideration, oversized pumps are not a contributing factor to high THM levels. Control of pumps and pressure zones are discussed in detail below.

B. OPERATIONS AND MAINTENANCE

1. Pump Station & Storage Operations
Pump stations and storage tank levels are controlled as shown in Table 9.

TABLE 9 – PUMP STATION CONTROLS

PS Name	Control Point	On Point	Off Point
PS No. 4 Raw	Operator	-	-
PS No. 4 Finish	Match plant flow	-	-
Westside	System pressure (elevated tank)	22.5′	33′
Cedar Street	System pressure (elevated tank)	22.5′	33′
Torrey Road	Distr. – Brown/Bradley	< 45 psi	> 45 psi

Cedar Street and Westside pump stations are operated as needed and they are alternated. Typically, Cedar Street is run in the morning and Westside is run in the evening and reservoirs for each are filled during low demand periods at night.

Westside, Cedar Street and Torrey Road pump stations are used to boost system pressure when high demands warrant it, but there are not well defined pressure zones within the system. Therefore, the possibility exists that water is being recirculated allowing for increased water age.

2. Booster Disinfection Practices
Booster disinfection is provided at the Cedar Street and Westside pump stations. When sustained residuals are not provided by chlorine feed at the WTP, sodium hypochlorite is applied at the reservoirs while being filled.

3. Changes in System Demands

Water demands in the City have been declining since the 1960's as the population has dropped. As a result, many of the water system components are oversized including storage tanks and water mains which both increase the time for water to reach the user.

From a short term perspective, Flint demands tend to increase in summer as is ordinarily expected but also in the winter due to water main breaks. The MDD for Flint often occurs in winter. Regarding THM formation, with lower temperatures and higher flows in the winter, THM levels taken at the distribution sample points are expected to be lowest for February sampling quarters than all others.

C. WATER SYSTEM HYDRAULIC MODELING

As part of this report, the City provided a hydraulic water model, originally developed by Potter Consulting, for LAN to update. Thus far, LAN has modified the model to be capable of extended period simulations, modified controls to reflect current operations, revised the piping to include known broken valve locations, updated pump curves, checked pipe diameters, and developed preliminary water age results throughout the entire system. Water age shown in the revised model corresponds for the most part to TTHM levels at the sampling sites. However, LAN has also identified several deficiencies within the model that require further adjustments to allow for usable and reliable results. Those model deficiencies include outdated demands, improperly located appurtenances, and incorrect flow patterns. Preliminary water age results are presented in Table 10. Revised results will be provided when the hydraulic model has been fully updated.

TABLE 10 – PRELIMINARY WATER AGE FROM WATER MODEL

Sample Point	Location	Address	Water Age (Hrs)	May/15 LRAA THM (ug/l)
1	McDonalds	3719 Davison	23	68
2	BP Gas Station	822 S. Dort Hwy	18	54
3	Liquor Palace	3302 S. Dort Hwy	15	60
4	Taco Bell	3606 Corunna	128	72
5	Univ. Market	2501 Flushing	178	94
6	Salem Housing	3216 MLK	50	66
7	Rite Aid	5018 Clio	78	69
8	N. Flint Auto	6204 N. Saginaw	71	55

It is anticipated that topics shown below in italicized font will be detailed after the model is updated in March 2015.

1. Simulation of Existing System

Match existing conditions. Chlorine and THM data may be used to verify model results. We have chlorine feed data at plant and residuals at 10 locations in each MOR, May 2014 – April 2015.

2. Identification of Water System Deficiencies

Specific issues to look at:

Worst case at minimum daily demands
Water age in entire system
Possible recirculating water through pump stations
Use of storage tanks – volumes in particular
Indications of broken valves
Effectiveness of booster disinfection

V. RECOMMENDATIONS TO MINIMIZE FUTURE OEL EXCEEDANCES

A. SOURCE

The City of Flint has already committed to the change from the Flint River as the water source to Lake Huron under the KWA system, planned for late 2016. The risk of future TTHM limit violations will decline substantially with the use of water from Lake Huron due to much lower DBP precursors. It is important to recognize that the Flint River will become strictly an emergency supply when the KWA supply becomes available and any investments toward the Flint River should be contemplated accordingly. Recommendations discussed below in this section apply to the Flint River as the source.

Reverting to supply from the DWSD until the KWA supply is available as an option. However, based on information provided by the City of Flint, the annual cost to receive water from the DWSD would be at least $16,000,000/year or $1,333,000/month. Therefore, utilizing the DWSD for interim supply is cost prohibitive under the terms defined by the DWSD.

1. Watershed Management

A volunteer group entitled the Watershed Coalition performs various tasks related to managing the Flint River watershed such as spring cleanups and annual benthic studies to evaluate the river 'health'. No additional action is recommended at this time.

2. Monitoring

The City documents daily raw water flow, pH, alkalinity, carbonate and non-carbonate hardness, chloride, temperature, turbidity and coliform count as part of standard preparation of Monthly Operating Reports (MOR). WTP staff have obtained and installed TOC and THM analyzers. The THM analyzer is set up as an on-line plant tap monitor and operations personnel have begun taking samples most days to track TOC levels throughout the treatment process. It is recommended to implement TOC tracking as a strict daily procedure which would provide staff the data needed to establish correlations to predict distribution system THM formation.

3. Intake Operations

The 2002 Treatability Study recommended pre-oxidation in the form of sodium permanganate as a feed at the intake. It is possible the addition of a pre-oxidant such as hydrogen peroxide or some type of permanganate could enhance the ozone process. Veolia evaluated permanganate demand during jar testing the week of February 16th, 2014 and recommended implementation at a dosage of 0.5 mg/l – 1.2 mg/l to achieve 10% additional TOC removal.

4. Seasonal Strategies

Past data indicates the Flint River is influenced by groundwater and in particular, dolomitic spring water. The result is hard water with high concentrations of magnesium and sulfate. Also, hardness and alkalinity are higher during the winter. Upon initiation of supply from the Flint River, the City made the decision to soften with just lime to focus on removal of carbonate hardness. One potential modification that could assist with TOC removal and thus decrease THMFP would be lime and soda ash softening. A temporary caustic soda feed system is recommended to be put in place in case the need for optimized softening arises.

5. Upstream Contamination Issues

Upstream contamination issues are extremely difficult to prevent and even if detected are difficult to locate. Evaluation of raw water data collected for MORs is the easiest manner in which to detect upstream contamination issues because the data is already collected for treatment purposes. In fact, high total Coliform readings in the past have signaled potential issues that the City was able to identify and remove.

An upstream monitoring and warning system could be established to attempt to detect water quality issues or spill event type contamination early enough to adjust treatment procedures or cease intake prior to the contamination reaching the WTP. However, given the imminent conversion to the KWA supply, the period of full time use would likely be far too short to achieve payback on the capital expenditures.

B. TREATMENT PROCESS

1. Operational Recommendations

- Increase ferric chloride dosage: Previous testing in the 2002 Treatability Study, jar testing completed by LAN, and a review of 2014 ferric chloride dosages compared to THM levels leaving the WTP support that increasing the ferric chloride dosage would help reduce THM formation.
- Increased monitoring: Currently, the MDEQ does not require daily reporting of raw water TOC or finished water TTHM levels. However, daily tracking of such levels would allow the City to develop a correlation between the two, thus providing a predictive tool to help manage TTHM levels.
- Coagulation and flocculation polymer aids: The 2002 Treatability Study suggested the use of coagulation and flocculation polymer aids. These polymer aids were shown in the 2002 Treatability Study to increase TOC removal and thereby reduce THMFP but jar testing by LAN and PVS Technologies did not indicate clearly defined benefits. Addition of coagulation and flocculation polymer aids should be categorized as a future consideration that would require further evaluation.
- Discontinue softening bypass: In early summer of 2014 the City was bypassing a portion of flow around the softening basins because hardness levels did not warrant softening of the full stream. However, this practice was discontinued because it was believed the bypass stream was contributing to chlorine demand and preliminary data has supported that belief. Chlorine demand dropped 0.5 – 1.0 mg/l following elimination of the bypass stream in early November 2014.
- Soften with lime and soda ash: Research has shown that enhanced softening with both lime and soda ash may provide additional TOC removal. Veolia did not recommend this option after conducting jar tests.
- Disinfection of filter beds: In case there has been microbial growth it is recommended the filters be 'shock' treated with chlorine and rinsed. A chlorine injection point was added upstream of the filters during the first segment of Phase II so future growth in the filters should not be an issue.
- Optimization of all existing treatment processes: Depending on bench scale testing conditions and results, slight modifications to all treatment processes might in order to replicate lower DPBFP.
- Discontinue or adjust softening anionic polymer feed: Some anionic polymers have been found to increase TOC. However, Veolia provided no recommendation to change polymers following their evaluation.

2. Infrastructure Change Recommendations

- Fix and/or replace faulty ozone equipment: Since the ozone equipment was installed it had not been used extensively on a full time basis. Following minor complications, the City hired the equipment manufacturer and a programmer to troubleshoot the system. Replacement of faulty gauges and redesign of the control program have allowed the system to operate properly since January 2015.
- Replace filter media with GAC media: GAC media could help reduce THM levels by reducing both TOC and chlorine demand. For this consideration, the intermediate chlorine feed location should be relocated to a point downstream of the filters. The City has elected to pursue this option and design is currently underway by LAN with installation expected in mid July 2015. Provisions are also being considered for adding more GAC media and/or regeneration of media next summer.
- Change disinfectant to chloramine or chlorine dioxide: If other options prove to be ineffective, conversion to another disinfectant should be fully evaluated. Various characteristics of chloramination indicate an advantage over chlorine dioxide, but a full analysis would provide clarity as to which would be preferred.
- Install pre-oxidant chemical feed: Hydrogen peroxide or a form of permanganate as a pre-oxidant can enhance the activity of the ozone. Chemical feed could be installed at the intake structure or low service pump station, depending on the reaction time required. Use of a pre-oxidant at the intake might also provide the additional benefit of disinfection credit for ozonation with the MDEQ if an ozone residual can be obtained at the ozone process effluent as a result.
- Repair upstream sewer leak: a sewer leak upstream of the WTP intake was discovered in early summer 2014 and has been repaired by the City.

C. DISTRIBUTION SYSTEM

Potential distribution issues related to water quality issues discussed in Section IV included old cast iron pipe, oversized infrastructure, and remote storage/pump station locations and operations that might be less than ideal. Recommendations to address those issues are offered in this section.

1. Manage Water Age

a) Storage Tanks

Considering the excess storage capacity discussed in Section IV, in the short term it is recommended that operational changes be implemented immediately to reduce the overall volume of water stored to decrease water age. Immediate operational recommendations include lowering high water levels of reservoirs other than the elevated tank, to reduce the total system wide usable storage volume to 30-37 MG.

In the long term, LAN recommends development of the most ideal options for water model evaluation. Excess storage volume and tank locations within the water system afford Flint numerous options to reduce the amount of storage volume utilized. As a starting point, two recommendations are presented below.

Option 1
- Take West Side reservoir and pump station out of service
- Cut storage volume used in half at Cedar Street reservoir
- Adjusted system wide storage volume would be 35 MG

Option 2
- Take Cedar Street reservoir and pump station out of service
- Adjusted system wide storage volume would be 37 MG

b) Residence Time in Pipes

Completely redesigning and replacing the water system to match today's demands is not feasible financially and would be a waste of infrastructure with remaining useful life. Going forward, it is recommended that any future main replacement projects be evaluated for possible downsizing. When the water model is fully updated, it will provide a valuable tool in determining which mains can be downsized and to what extent. Replacement of broken valves and valve exercising are also recommended, which are programs that have already been implemented into Flint's regular operations.

Operationally, hydrant flushing is recommended as needed to minimize water age in low flow areas. Again, the updated water model should be used to locate high water age areas and optimal flushing points.

2. Reduce Disinfectant Demand

Recommendations to reduce disinfectant demand are similar to those described above to reduce water age. Replacement of old cast iron pipes would lead to a reduction of disinfectant demand on the distribution side, but realistically can only be accomplished over a prolonged period of time. In the meantime, hydrant flushing is the most viable means of reducing disinfectant demand in piping. From a storage standpoint, all reservoirs and tanks should be regularly inspected and maintained to prevent entrance of any outside contamination that would contribute to disinfectant demand. Cleaning of all tanks is recommended as well as investigation into stagnant water prevention options.

3. Water Modeling of Recommendations [yet to be completed]

Determine best flushing locations to reduce water age
Evaluate changes in storage tank operations to reduce water age
Valves to close/add to improve pressure zones, reduce recirculation
Optimization of pump station use – smaller pumps? Shut down?
Evaluate booster disinfection

D. BOOSTER DISINFECTION

Decreasing chlorine feed at the WTP and adding booster disinfection in the distribution system is an alternative intended to reduce the reaction time at higher concentrations of chlorine to reduce DPB formation. Extensive looping and branching within the existing system complicate how to best implement and utilize booster disinfection. Water system modeling is recommended to gage the effectiveness of existing feed point locations and dosages. Further discussion and details will be provided when the distribution evaluation results are available.

E. CATEGORIZATION OF ACTIONS

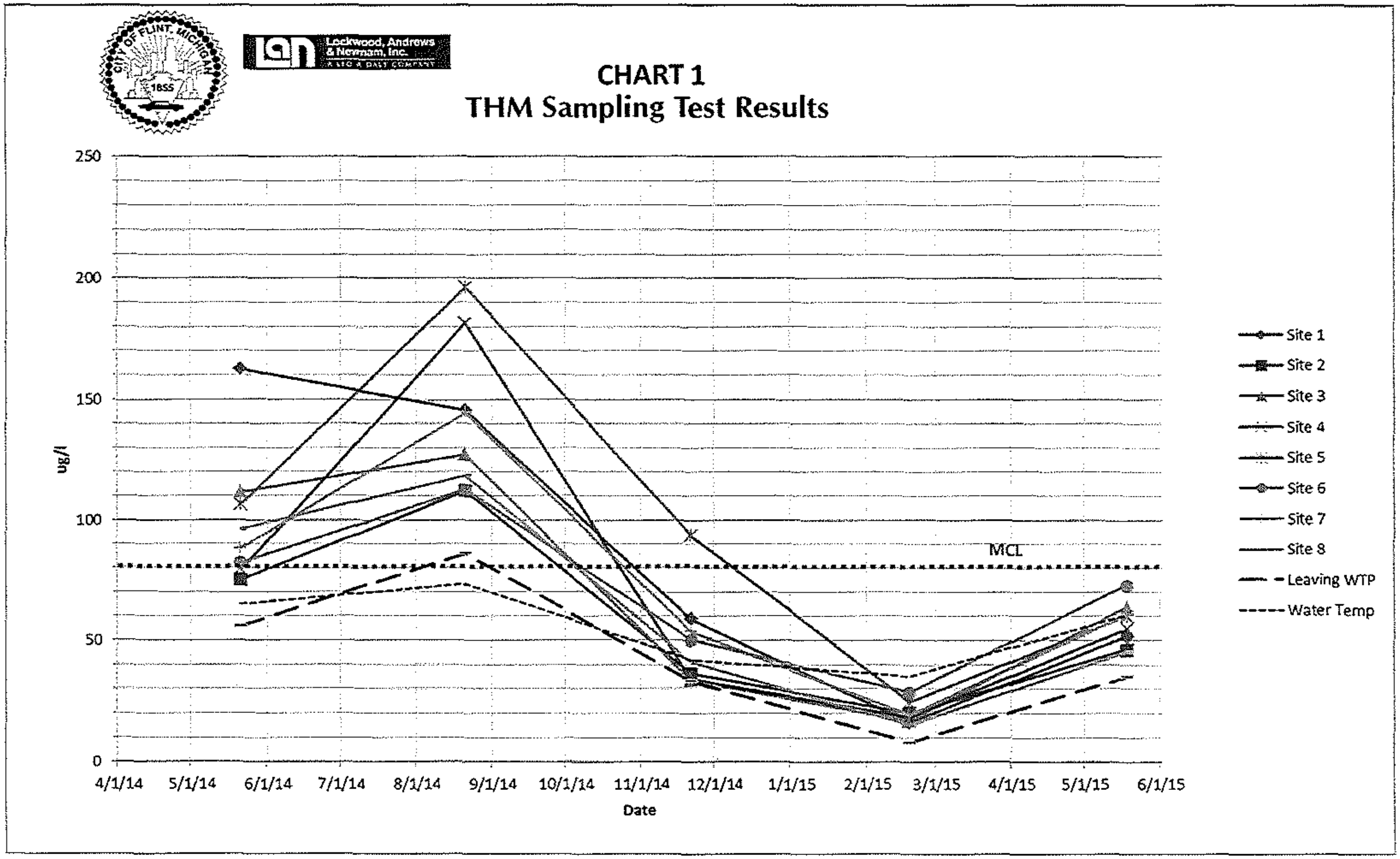
Considering that the Flint River is being used as the water source only until the KWA supply is available (expected late 2016), options to address high THM formation that require new construction or extensive time to implement are not preferred. On the other hand, the City understands THM sample results to date dictate that some action is necessary. Two categories have been developed to assist the City in prioritizing actions to take. Stage 1 consists of actions that can be completed relatively quickly without major construction and Stage 2 actions are either long term actions or solutions requiring major construction. Stage 1 actions are to be completed first followed by evaluation of the results prior to consideration of Stage 2 actions. Grouping of actions are shown in the table below.

TABLE 11 – ACTION PLAN

	Action	Purpose	Status
Stage 1	Hire water consultant to complete 'water audit'	Third party review of actions and operations to make sure no options are being missed	Complete
	Increased water quality monitoring – obtain THM and TOC analyzers	Provide information needed to adjust WTP operations to match changing raw water quality	Complete
	Troubleshoot ozone feed system	Reduce chlorine feed and increase TOC removal	Complete
	Bench scale jar testing	Optimize treatment process and evaluate possible modifications	Complete
	Discontinue softening bypass	Reduce chlorine demand	Complete
	Disinfect filters	Reduce chlorine demand	Incomplete
	Increased water main flushing	Reduce water age / stagnant water	Ongoing
	Water system modeling evaluation	Determine areas with high water age and reasons	Partially complete
	Modify booster disinfection feeds, if appropriate	Decrease water age	Not yet evaluated
Stage 2	Repair ozone system	Reduce chlorine feed and increase TOC removal	Complete
	Continue increased water main flushing	Reduce water age / stagnant water	Ongoing
	Convert to lime and soda ash softening	Increase TOC removal	Future consideration
	Continue valve replacements based on water model	Reduce water age / stagnant water	Ongoing
	Replace filter media with GAC	Reduce TOC and chlorine demand	Design underway
	Change disinfectant to chlorine dioxide	Reduce THMFP	Future consideration
	Install pre-oxidant feed at intake	Optimize ozone disinfection, reduce chlorine	Future consideration
	Implement coag. & floc. polymer aids, if appropriate	Increase TOC removal	Future consideration
	Place priority on replacing cast iron water mains	Reduce chlorine demand	Ongoing

Samples were taken May 18th, 2015 for the latest round of quarterly testing. The City has implemented many of the Stage 1 actions and THM test results have significantly improved (decreased) since May and August 2014. All sampling results are shown on Chart 1.

001478


Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
CHART 1
THM Sampling Test Results
250
200
150
100
50
0
ug/l
4/1/14
5/1/14
6/1/14
7/1/14
8/1/14
9/1/14
10/1/14
11/1/14
12/1/14
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
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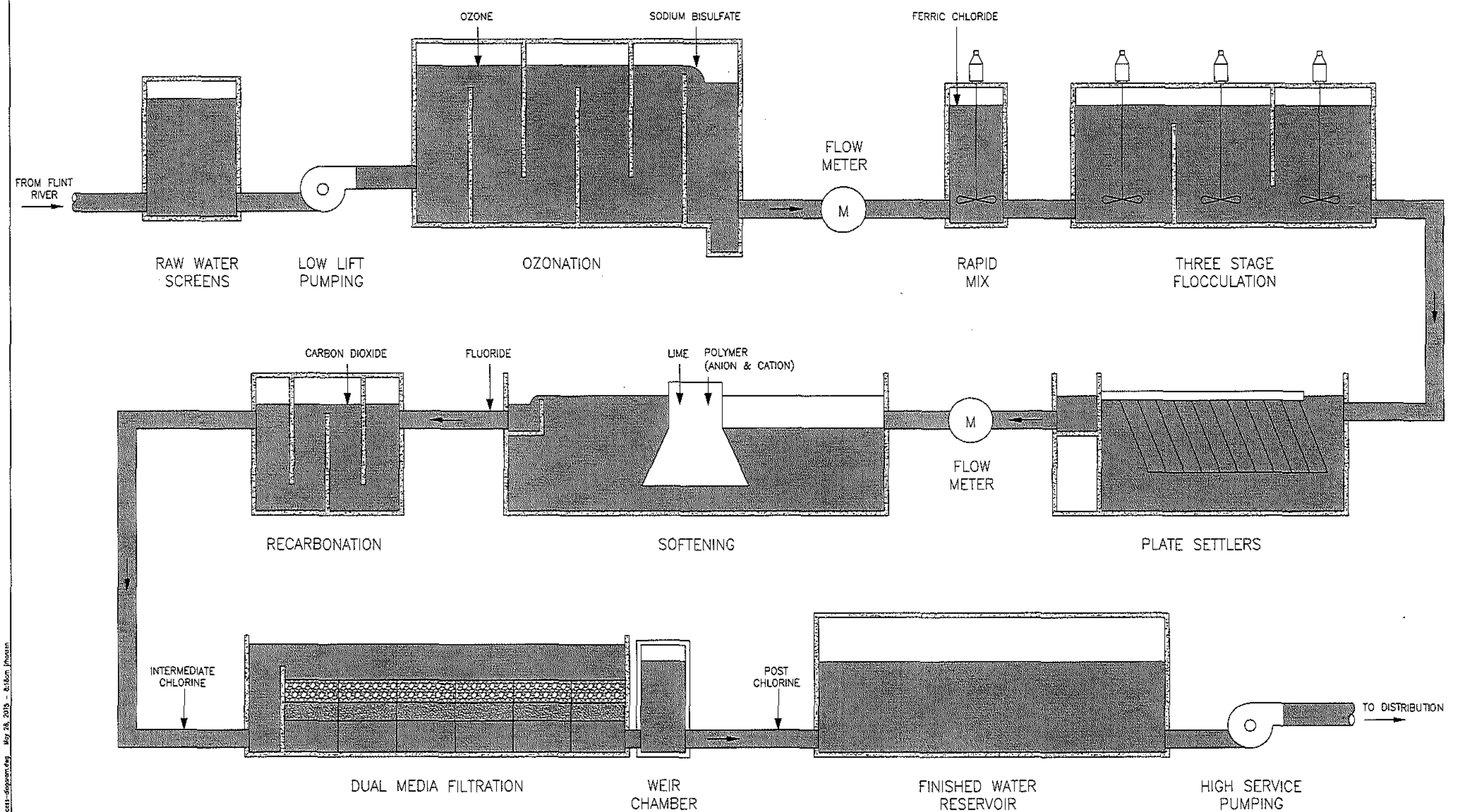
Date
MCL
Site 1
Site 2
Site 3
Site 4
Site 5
Site 6
Site 7
Site 8
Leaving WTP
Water Temp

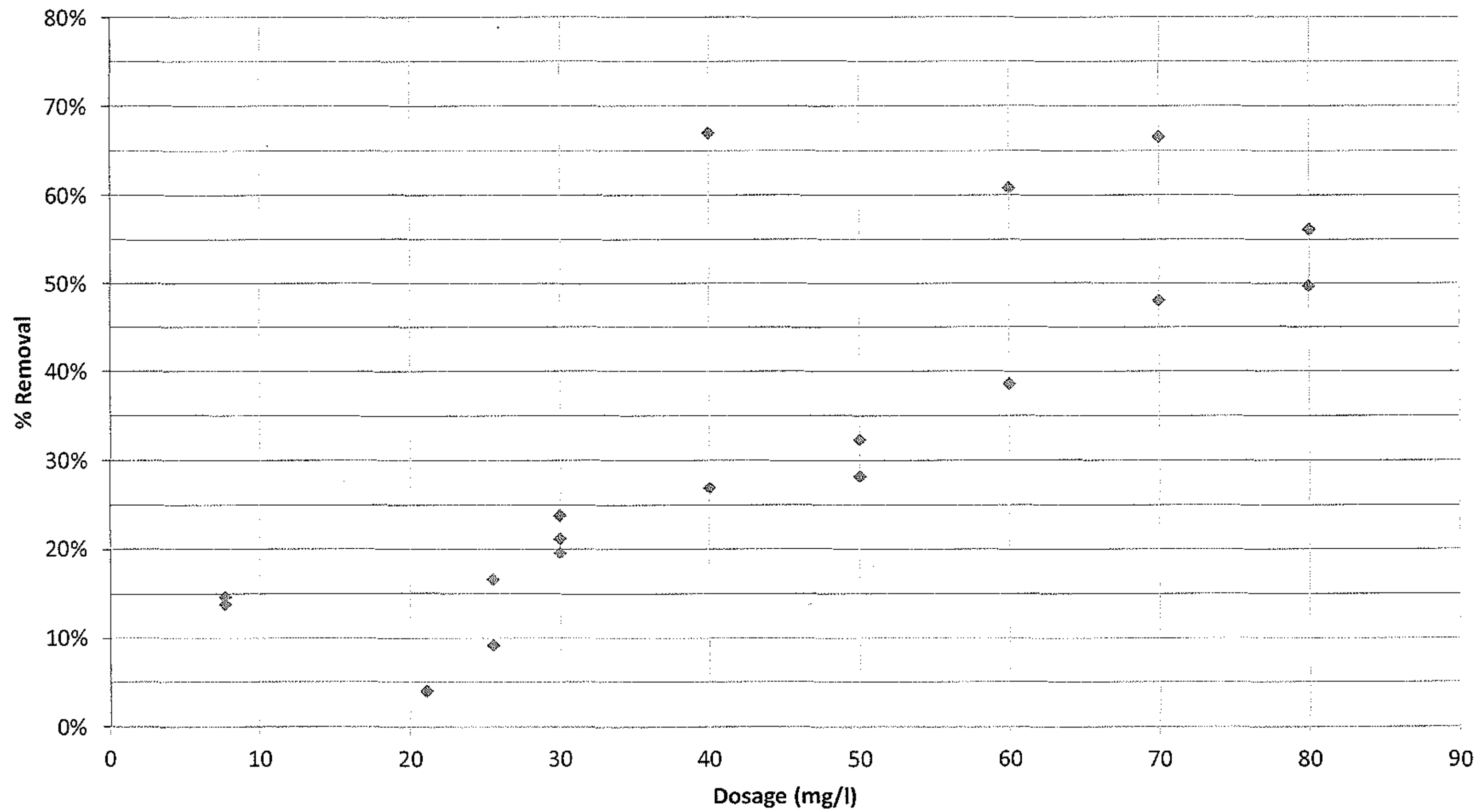


Genesee County	Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY 1311 S. Linden Road, Suite B Tel 810-820-2682 Fax 810-820-2703 www.lan-inc.com	CITY OF FLINT WATER TREATMENT PLANT	REVISIONS	FILE LOG	WATER TREATMENT PLANT PROCESS DIAGRAM	Project No. 130-10701-001 Date Nov. 21, 2014 Sheet FIG 1

C:\projects\se\phonsen\03263765\Process-diagram.dwg May 28, 2015 - 8:18am jhonsen

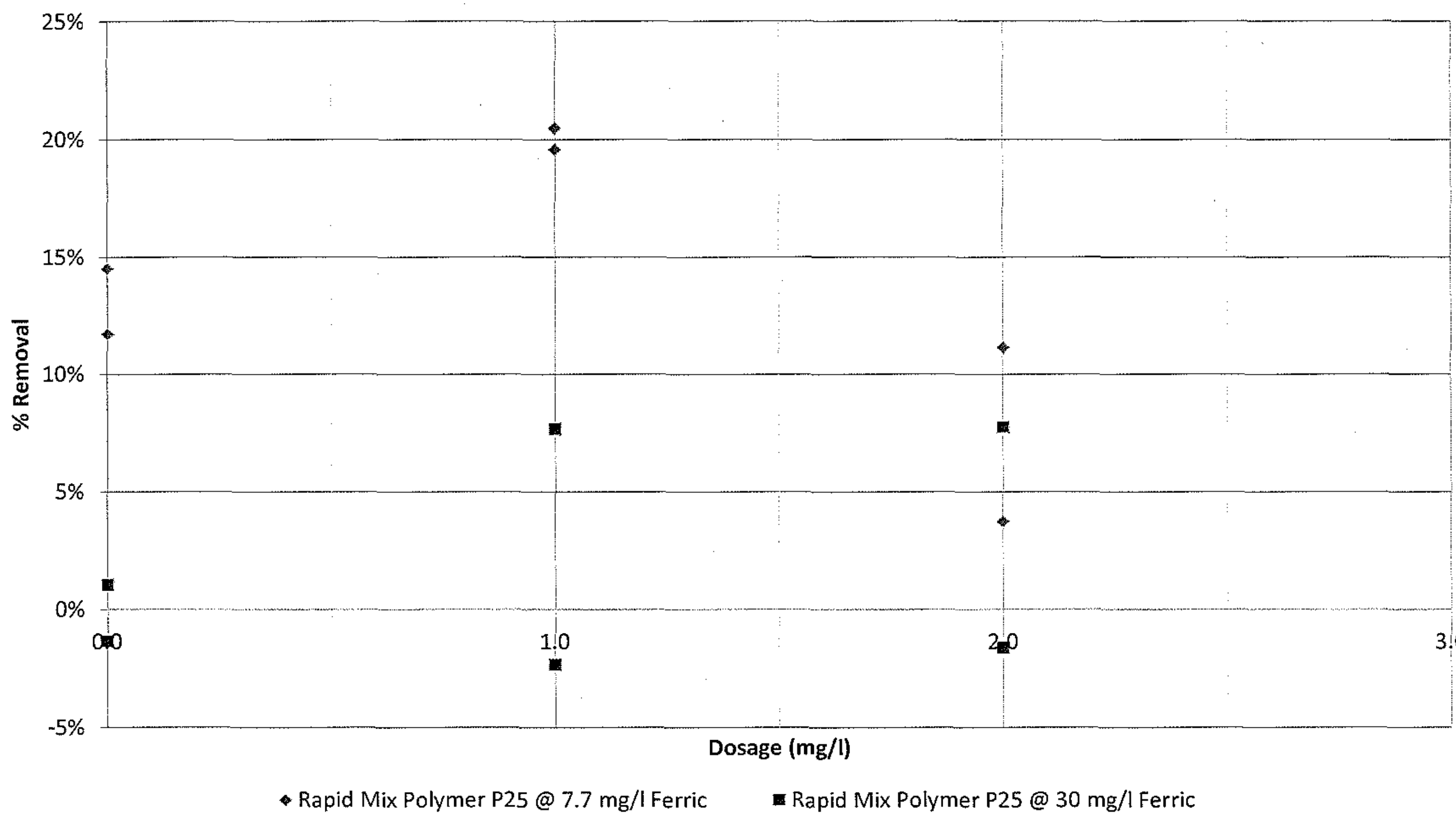
APPENDIX A
JAR TEST DATA

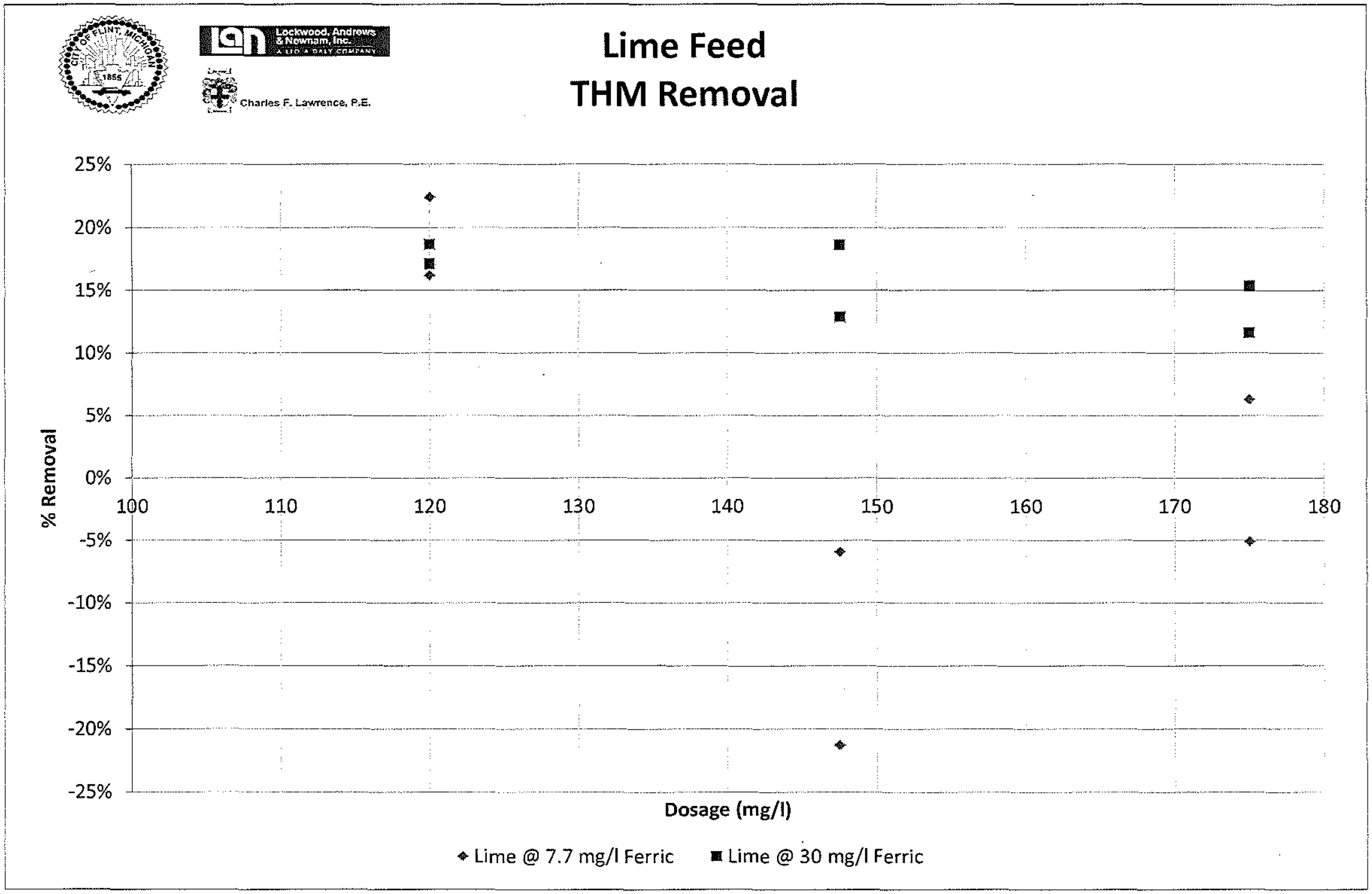
Ferric Chloride Feed
THM Removal



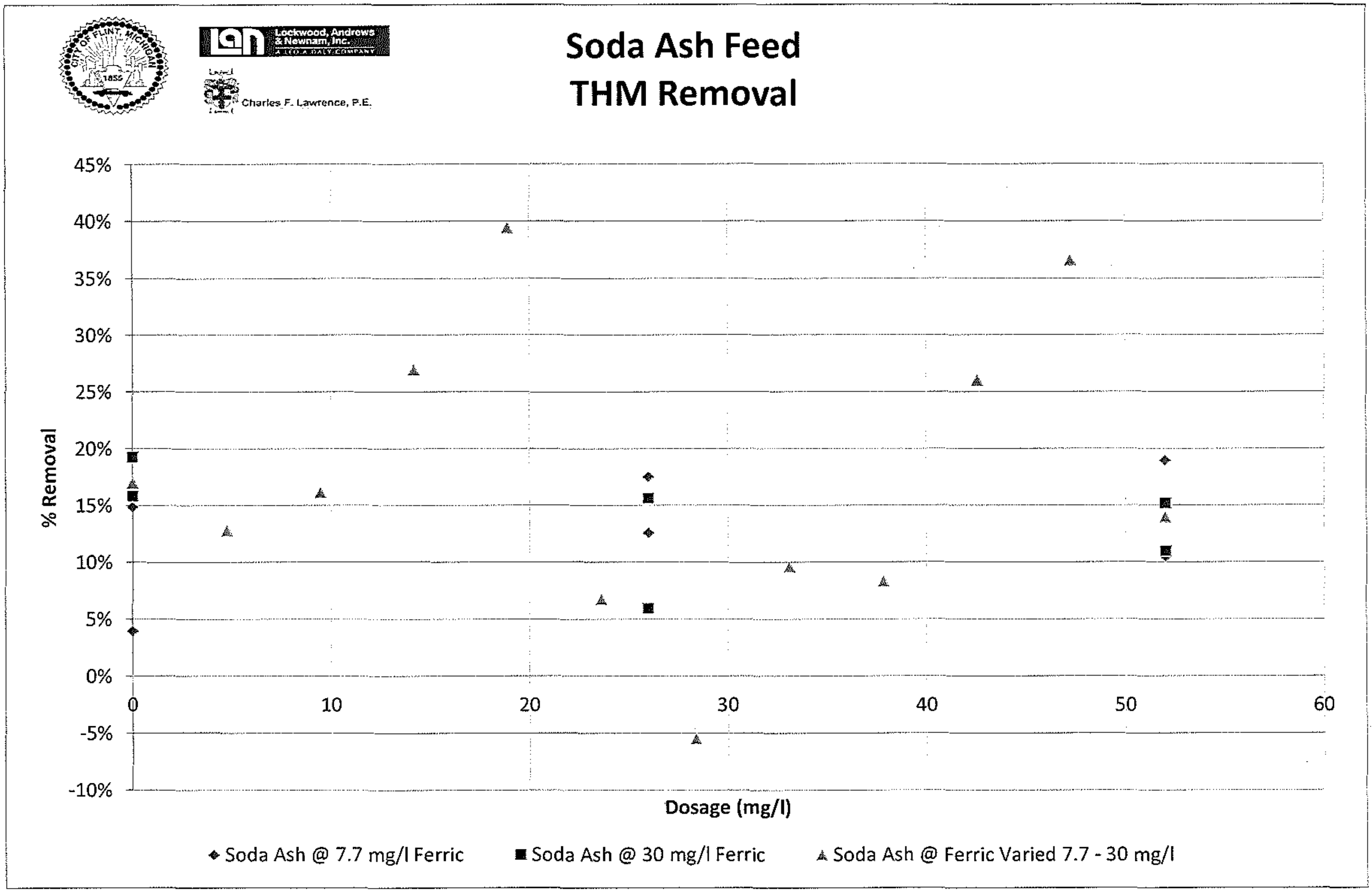
Charles F. Lawrence, P.E.

Coag/Floc Polymer Aid
THM Removal

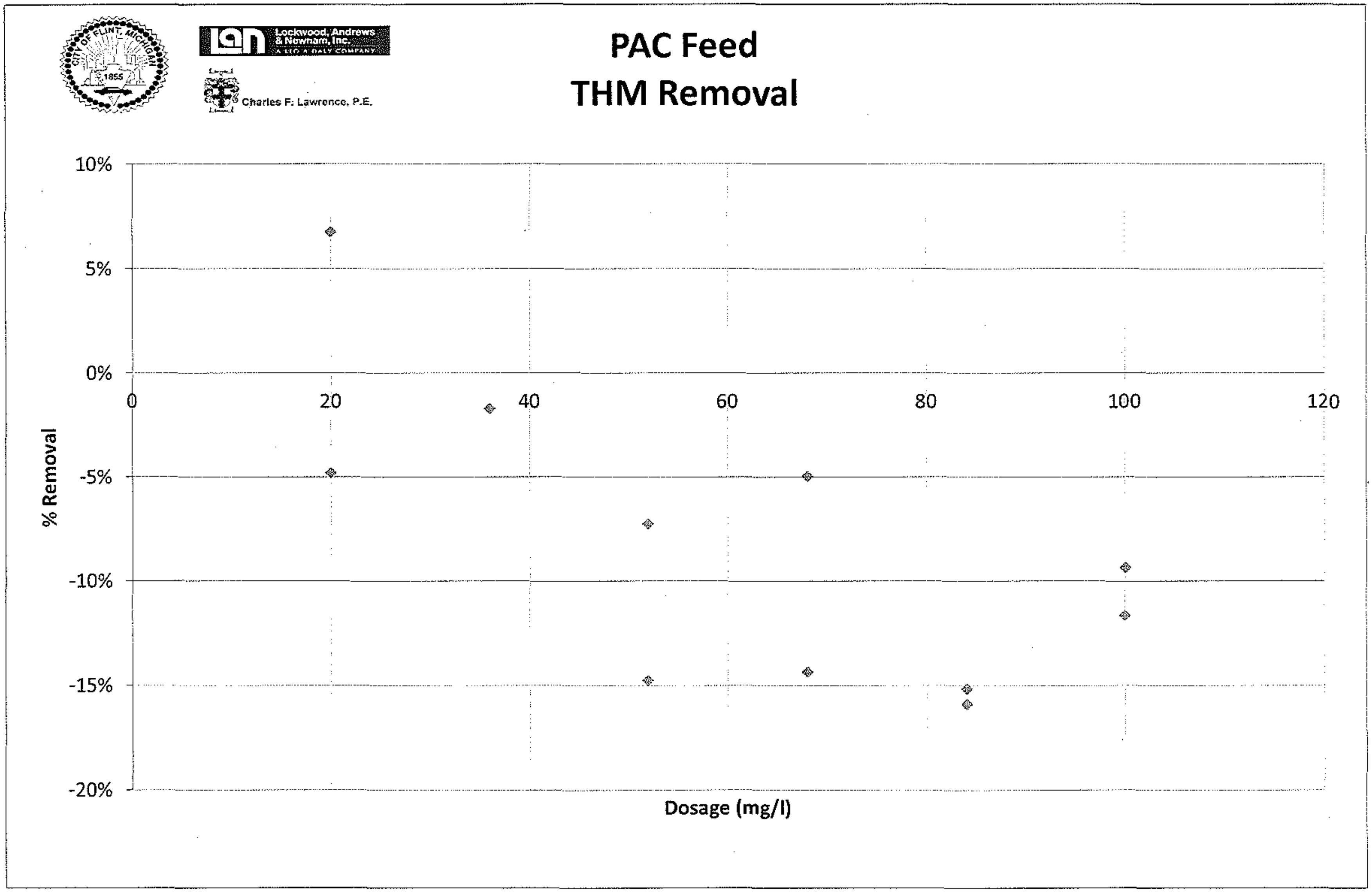




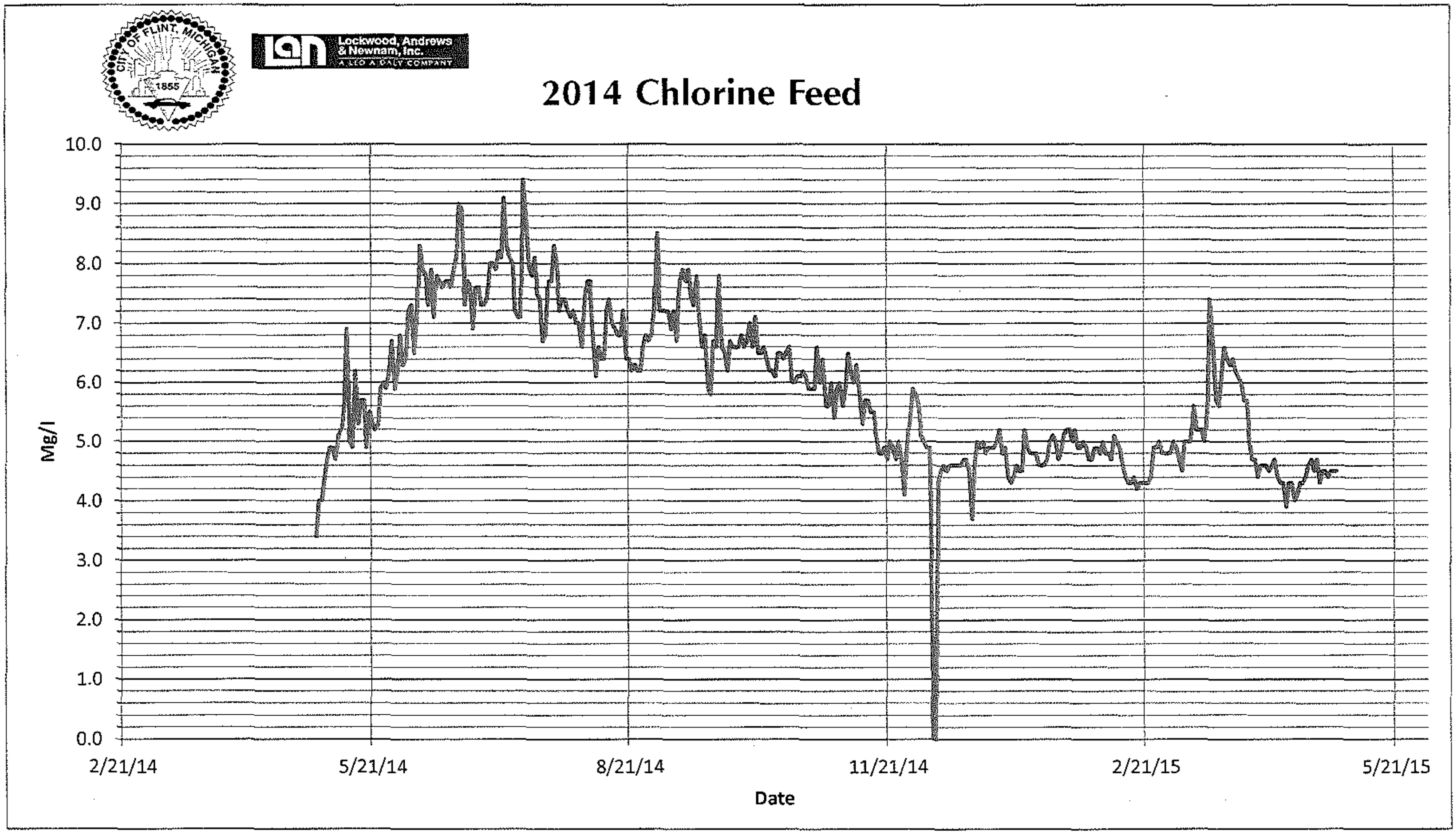
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
Charles F. Lawrence, P.E.
Lime Feed
THM Removal
25%
20%
15%
10%
5%
0%
-5%
-10%
-15%
-20%
-25%
% Removal
100
110
120
130
140
150
160
170
180
Dosage (mg/l)
Lime @ 7.7 mg/l Ferric
Lime @ 30 mg/l Ferric



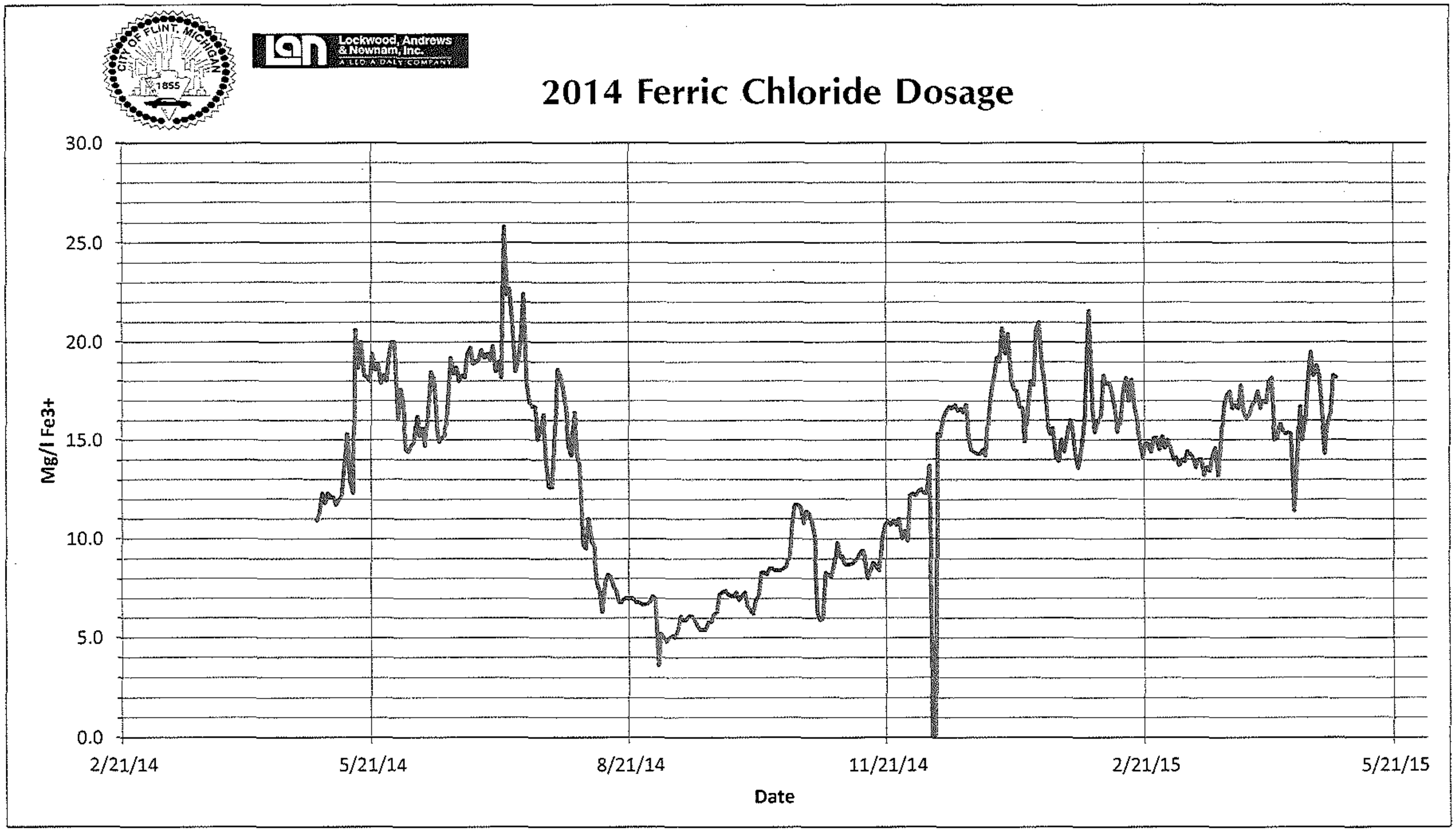
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
Charles F. Lawrence, P.E.
Soda Ash Feed
THM Removal
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
-5%
-10%
% Removal
0
10
20
30
40
50
60
Dosage (mg/l)
Soda Ash @ 7.7 mg/l Ferric
Soda Ash @ 30 mg/l Ferric
Soda Ash @ Ferric Varied 7.7 - 30 mg/l


Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
Charles F. Lawrence, P.E.
PAC Feed
THM Removal
10%
5%
0%
-5%
-10%
-15%
-20%
% Removal
0
20
40
60
80
100
120
Dosage (mg/l)

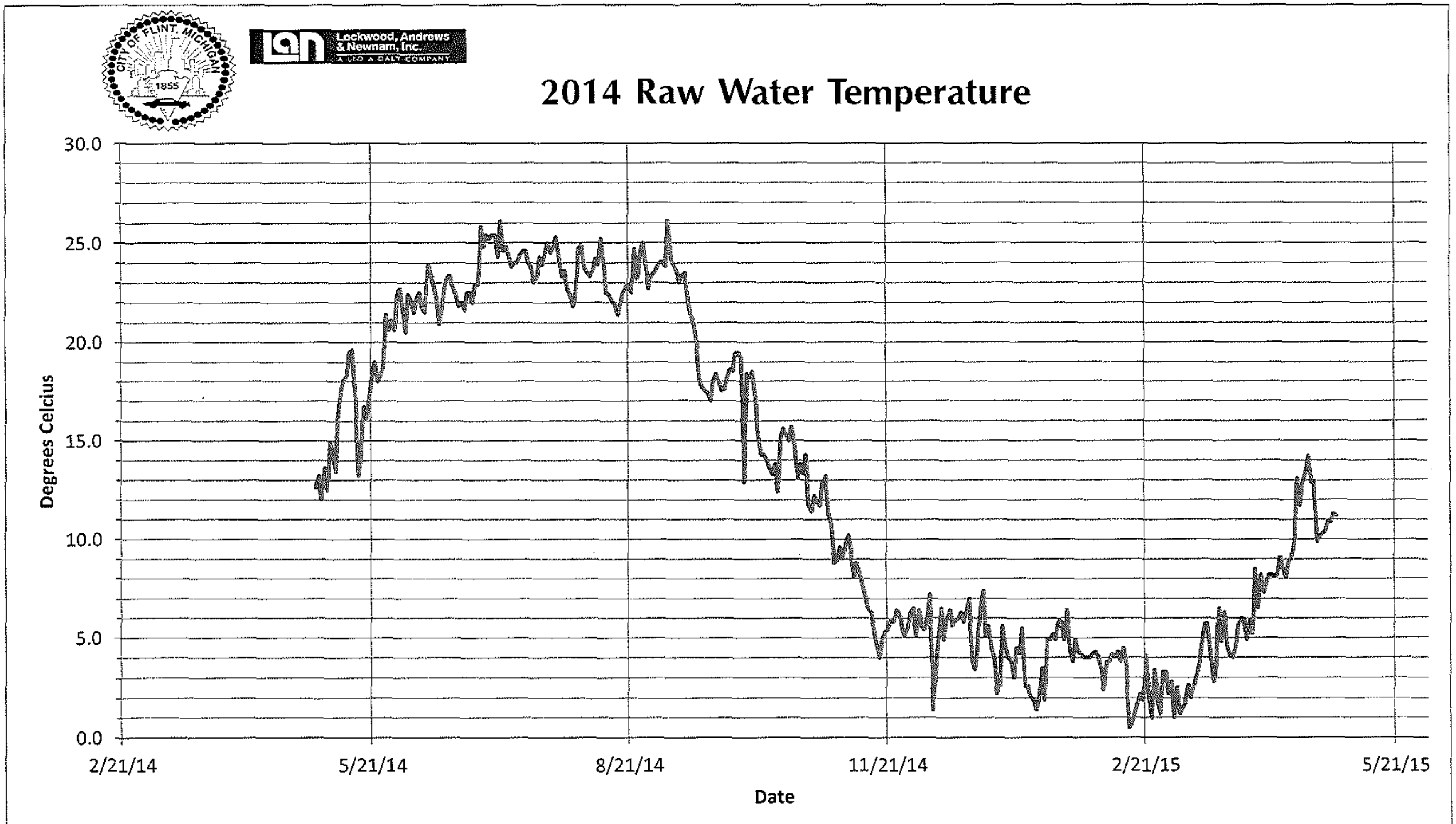
APPENDIX B
WTP DATA

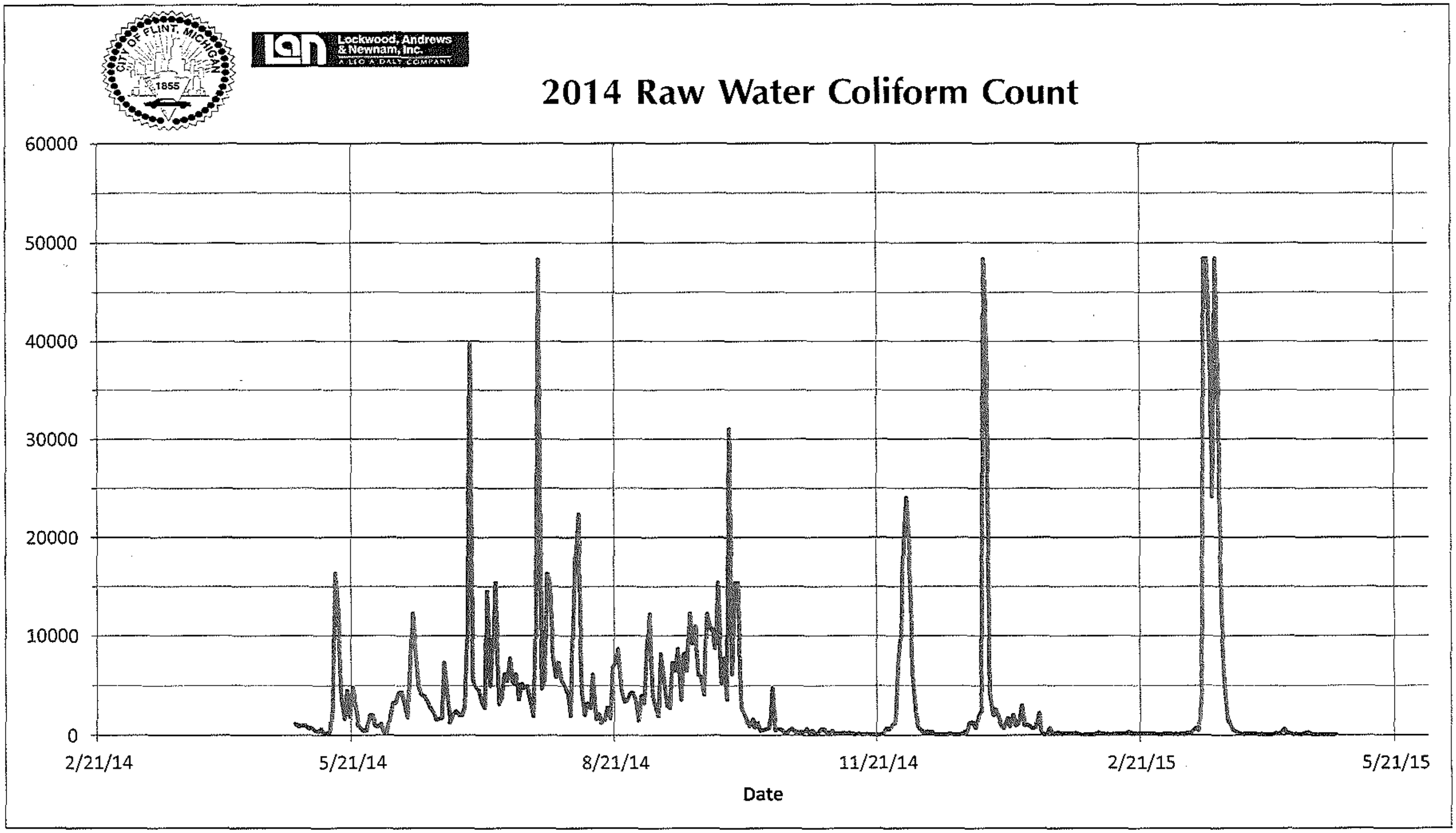


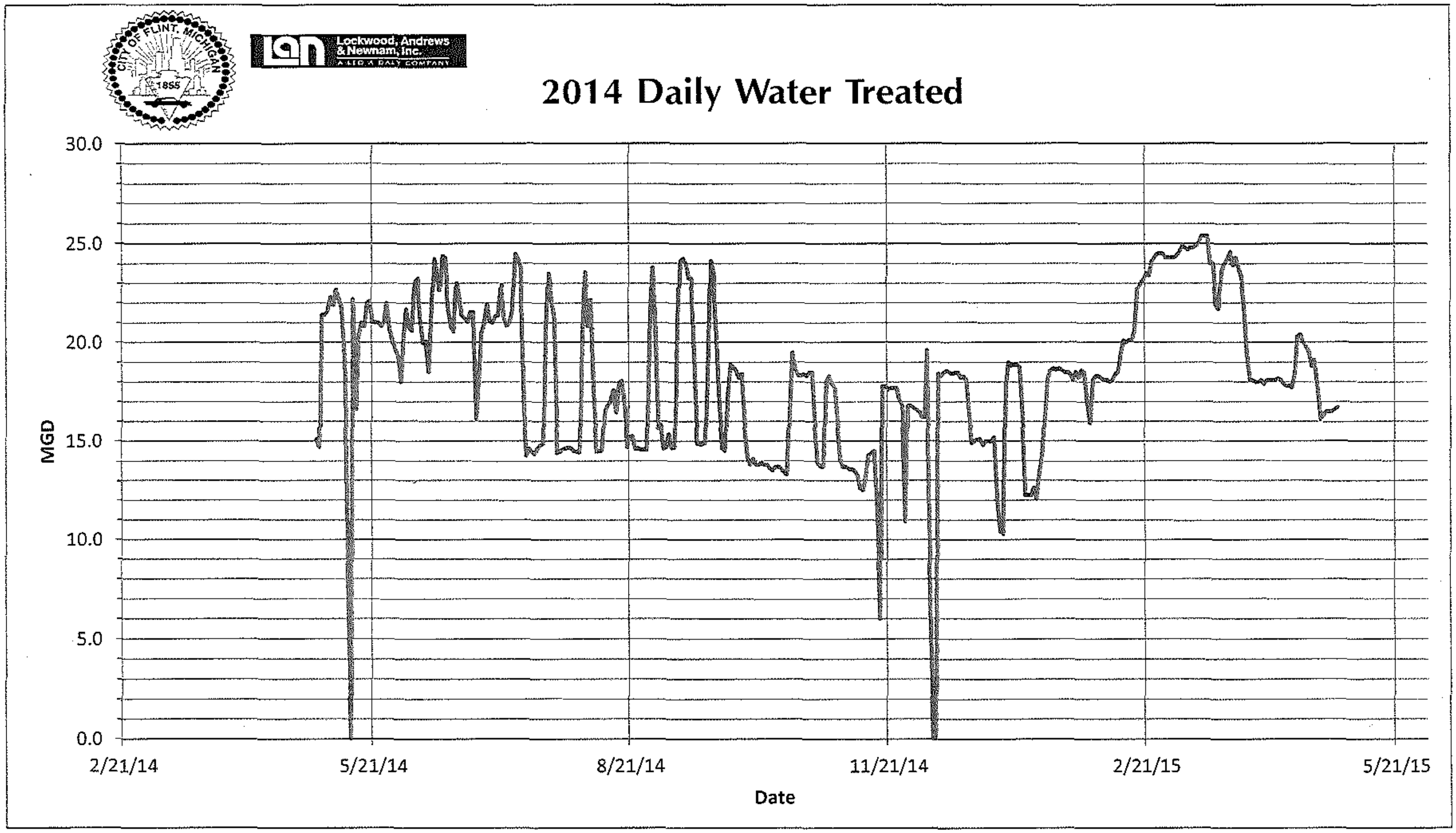
CITY OF FLINT, MICHIGAN
1855
LAN Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
2014 Chlorine Feed
Mg/l
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2/21/14
5/21/14
8/21/14
11/21/14
2/21/15
5/21/15
Date



Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
2014 Ferric Chloride Dosage
Mg/l Fe3+
30.0
25.0
20.0
15.0
10.0
5.0
0.0
2/21/14
5/21/14
8/21/14
11/21/14
2/21/15
5/21/15
Date


Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
2014 Raw Water Temperature
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Degrees Celcius
2/21/14
5/21/14
8/21/14
11/21/14
2/21/15
5/21/15
Date


Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
2014 Raw Water Coliform Count
60000
50000
40000
30000
20000
10000
0
2/21/14
5/21/14
8/21/14
11/21/14
2/21/15
5/21/15
Date


Lockwood, Andrews & Newnam, Inc.
2014 Daily Water Treated
30.0
25.0
20.0
15.0
10.0
5.0
0.0
MGD
2/21/14
5/21/14
8/21/14
11/21/14
2/21/15
5/21/15
Date

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, May 27, 2015 3:30 PM
To: Busch, Stephen (DEQ)
Subject: Flint File Letters
Attachments: Flint letter.pdf; Flint ltr 2.pdf; Flint Ltr 3.pdf

Steve,

Attached are three correspondence letters from the ODWMA to the city of Flint since February 1, 2015.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

May 11, 2015

Mr. Howard Kroft, Director of Public Works
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502

WSSN: 02310

Dear Mr. Kroft:

SUBJECT: Flint Cross Connection Control Program

This letter confirms my site visit on April 29, 2015, with Mr. Glen Thomas, Utilities/Cross Connection Division Inspector for the city of Flint. Mr. Stephen Busch from our office was also present. The purpose of the visit, in part, was to discuss the city's Cross Connection Control Program (CCCP).

The city of Flint has made significant progress in recent years regarding the implementation of the city's approved CCCP. This effort has included identification of accounts, inspection and re-inspection of accounts at the approved frequencies, and ensuring the testing of backflow prevention assemblies in accordance with approved frequencies. However, the city's most recent report of annual CCCP activities for 2014 indicates a significant decrease in these activities below minimum requirements, and this deficiency must be address.

Our office fully recognizes the recent staffing loss of the city's previous plumbing inspector and the importance of these plumbing inspection services in providing public health protection, but these activities should not be borne at the cost of the city's CCCP and the protections it provides. Given the bacterial detections that occurred in the city's water distribution system in August and September 2014, along with customer complaints regarding aesthetic water quality, the need for protection through cross connection control are very evident.

We also realize that implementing a CCCP of for a community water system of this magnitude requires a significant commitment of time and personnel. We encourage the city to review CCCP staffing needs and authorize the workforce necessary to comply with the city's approved CCCP requirements.

Should you require further information, please contact me at the telephone number below; via e-mail at prysbym@michigan.gov; or Department of Environmental Quality, P.O. Box 30242, Lansing, Michigan 48909.

Sincerely,

Michael Prysby

Michael F. Prysby, P.E.
District Engineer
Office of Drinking Water and
Municipal Assistance
Lansing District Office
(517) 290-8817

mfp/jlr

cc: Mr. Glen Thomas, City of Flint
Mr. Stephen Busch, P.E.

2310

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 3, 2015

Mr. Brent Wright
City of Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

Dear: Mr. Wright

SUBJECT: Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule)
2nd Round of Source Water Monitoring Requirements

The LT2 Rule was promulgated by the United States Environmental Protection Agency on January 5, 2006. The Department of Environmental Quality (DEQ) adopted this rule into the Administrative Rules in December, 2009. All public water systems that are supplied by a surface water source, and systems supplied by a ground water source under the direct influence of surface water (GWUDI), are subject to this rule.

According to the LT2 Rule, systems are required to conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. Please keep in mind that grandfathering data will not be accepted for the second round of monitoring. This monitoring includes at least one source water *Cryptosporidium*, *E. coli*, and turbidity sample per month for a period of 24 months for systems serving populations greater than 10,000 people. Systems will be assigned to a "treatment bin" based on the results of source water monitoring. The treatment bin specifies the level of *Cryptosporidium* removal and/or inactivation that the system must achieve.

Our records indicate that your system is required to comply with the source water monitoring requirements on Schedule 2 as stated below in Table 1. Therefore, your system is required to submit to the DEQ, a source water monitoring plan for each plant by July 1, 2015, and start the 2nd round of monitoring in October, 2015.

Table 1 – LT2 Milestone Dates for 2nd Round of Source Water Sampling

System Population	Schedule	Must submit Source Water Sampling Plan by...	Must begin second round of source water monitoring...
At least 100,000	1	January 1, 2015	April 1, 2015
50,000 – 99,999	2	July 1, 2015	October 1, 2015
10,000 – 49,999	3	July 1, 2016	October 1, 2016
<10,000	4	July 1, 2017	October 1, 2017

Enclosed with this letter is a Source Water Sampling Plan template that you can complete and submit to this office to comply with the July 1, 2015, deadline. The template includes instructions and a worksheet that will assist the DEQ in determining if your plan meets the requirements of the LT2 Rule.

If you have any questions about this subject, feel free to contact me at 517-290-8817; prysbym@michigan.gov; or Department of Environmental Quality, Office of Drinking Water and Municipal Assistance, Lansing District Office, 525 West Allegan Street, 1st Floor South, P.O. Box 30242, Lansing, Michigan 48909-7742.

Sincerely,

Michael F. Prysby, P.E.
District Engineer
Field Operations Section
Office of Drinking Water and
Municipal Assistance

Enclosures

cc: Mr. Howard Kroft, City of Flint

2310

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

February 13, 2015

Mr. Brent Wright
City Of Flint - D P W
Flint Water Plant
4500 North Dort Highway
Flint, MI 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Drinking Water Monitoring Schedule – 2015
Annual Reports

Enclosed is your Drinking Water Monitoring Schedule for calendar year 2015 outlining the minimum requirements for your public water supply. Collect samples early in the monitoring period of the year indicated on the schedule. If you use a private laboratory you are required to report the results to us within the first ten days of the month following the month that you received the results. To receive credit for monitoring, the **"WSSN"** (water supply serial number), the **"Site Code,"** and **"County"** must appear on the sample result. Bottles will NOT be mailed automatically. If you use the DEQ Laboratory, you can order bottles by calling 517-335-8184. Be certain of the EPA sampling and analysis method requirements for hold times.

The Michigan Safe Drinking Water Act requires certain reports to be submitted to this office each year. Please remember that cross connection reports and annual pumpage reports are due by March 31, and the **Consumer Confidence Report** is due by July 1.

Also enclosed is the document "2015 Monitoring and Reporting Requirements." This provides additional details about monitoring and reporting requirements. If you have any questions, please contact us by telephone or email using the information below.

Michael F. Prysby, P.E., District Engineer
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-290-8817

Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-284-6644

MFP:AR:JR

Enclosure
cc/encl: Mr. Mike Glasgow, City Of Flint

2015 Monitoring Schedule

FLINT, CITY OF **WSSN: 02310**

Collect samples early in the monitoring period. This schedule reflects your expected routine monitoring and is subject to change. To receive credit for monitoring, include the **WSSN**, **Site Code**, and **County** on your request for analysis form. Collect Bacteriological and Automated Partial Chemistry samples close to the shipping time and send overnight delivery. Send all sample results to your Department of Environmental Quality (DEQ) district office unless you use the DEQ laboratory. Test codes, sample units, and costs are listed to help you complete the DEQ laboratory form. Prices are subject to change without notice. The DEQ laboratory is closed on state holidays.

Location: Plant Tap

Collect these samples at the entry point to the distribution system (after treatment, if applicable.)

Sample Type	# Samples/ Frequency	Collect Before	Site Code	Fee	Unit Number	Test Code
Automated Partial Chemistry	This DEQ lab scan includes nitrate, nitrite, fluoride, and sodium whose monitoring frequency requirements differ from one another. Before requesting analyses from a laboratory other than the DEQ laboratory, check with your DEQ district staff for the specific monitoring requirements.					
	1/3 months	Quarterly	TP001	$18.00	32	R
Volatile Organic Compounds	1/3 months	Quarterly	TP001	$100.00	36VO	CXVO
Complete Metals	1/36 months	09/30/2017	TP001	$102.00	36ME	CMET2
Arsenic	1/3 months	Quarterly	TP001	$18.00	36ME	CAS
Cyanide	1/3 months	Quarterly	TP001	$25.00	36CNa	CCN
SOC – Pesticides	1/3 months	Quarterly	TP001	$125.00	36PT	CXPT
SOC – Herbicides	1/3 months	Quarterly	TP001	$120.00	36HB	CXHB
SOC – Carbamates	1/3 months	Quarterly	TP001	$120.00	36LP	CXLP
Bromate	1/1 months	Monthly	TP001	Not performed at the DEQ Laboratory. A list of certified labs is at www.michigan.gov/DEQ. Select Water, Drinking Water, Community Water Supply, then Certified Labs under Programs and Activities.		
Gross Alpha (Radiological)	1/3 months	Quarterly	TP001			
Radium 226 & Radium 228	1/3 months	Quarterly	TP001			
Water Quality Parameters	25/3 months	Quarterly	TP001	Various	Various	Various
Total Organic Carbon (TOC)	Pair/Monthly	Monthly	TP001	$35.00	36TO	CTOC
	Monitor for TOC in the source water before any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as "paired samples." Collect the treated water sample not later than the point of combined filter effluent turbidity monitoring and representative of treated water.					
Expanded SOCs						
Dalapon & Haloacetic Acids	1/12 months	Between 04/01 and 09/30/2015	TP001	$130.00	36HA	CXHA
Diquate	1/12 months	Between 04/01 and 09/30/2015	TP001	$150.00	36DQ	CXDQ
Endothall	1/12 months	Between 04/01 and 09/30/2015	TP001	$150.00	36EN	CXEN
EDB & DBCP	1/12 months	Between 04/01 and 09/30/2015	TP001	$70.00	36VO	CXEV

2015 Monitoring Schedule

FLINT, CITY OF WSSN: 02310

Collect samples early in the monitoring period. This schedule reflects your expected routine monitoring and is subject to change. To receive credit for monitoring, include the WSSN, Site Code, and County on your request for analysis form. Collect Bacteriological and Automated Partial Chemistry samples close to the shipping time and send overnight delivery. Send all sample results to your Department of Environmental Quality (DEQ) district office unless you use the DEQ laboratory. Test codes, sample units, and costs are listed to help you complete the DEQ laboratory form. Prices are subject to change without notice. The DEQ laboratory is closed on state holidays.

Location: Distribution System

Sample Type	Collect Samples According to the	# Samples/ Frequency	Collect	Site Code	Fee	Unit Number	Test Code
Bacteriological -- coliforms	TCR Sampling Site Plan	100/Monthly	Monthly	DIST	$16.00	30	BPTC
Chlorine Residual	DBP Monitoring Plan	If serving chlorinated water, measure the residual disinfectant level at the same point and at the same time as the bacteriological sample and report the average to the DEQ.					
Total Trihalomethanes	DBP Monitoring Plan	8/3 months	During February, May, August and November 2015	See DBP Monitoring Plan	$65.00	36VO	CXTM
Haloacetic Acids		8/3 months	During February, May, August and November 2015	See DBP Monitoring Plan	$130.00	36HA	CXHA
/ater Quality Parameters	Representative Sites	25/Quarterly	Quarterly	DIST	Various	Various	Various
Lead Copper for Corrosion Control	Lead and Copper Sampling Pool	100/6 months	Between 1/1 and 6/30/2015	DIST	$26.00	36CC	CCUB

Community Water Supply
2015 Monitoring and Reporting Requirements

Please Monitor Early: Collect samples early in the monitoring period (month, quarter, year) of the year indicated on the schedule. Bacteriological and partial chemistry samples should be collected close to the shipping time and sent overnight delivery to assure sample holding times are not exceeded (30 and 48 hour hold times respectively). We also recommend avoiding mailing bacteriological samples immediately preceding or following a holiday because samples tend to exceed the 30 hour hold time. When this occurs, a repeat sample must be collected as soon as possible upon notification.

If you use a private laboratory please report the results to us within the first ten days of the month following the month that you received the results. A list of certified laboratories is available on request. If samples are not collected as indicated on your monitoring schedule, you will incur a monitoring violation and possibly a fine. For information on the fines policy, visit http://michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, and Administrative Fines (under Laws and Rules).

To receive credit for monitoring, you must include the **"WSSN"** (water supply serial number), the **"Site Code,"** and the **"County"** when you submit samples for analysis. Site codes are listed on your monitoring schedule.

Special Instructions If You Use The DEQ Laboratory: Bottles will NOT be mailed automatically. To order bottles, call the DEQ Laboratory at 517-335-8184 or download the form EQP 2301 *Requisition for Water Sample Units* from www.michigan.gov/deq. Click on Key Topics, Laboratory Services, Drinking Water, Obtaining The Necessary Sampling Units, and 'test list'. Please note that the DEQ laboratory is closed on most state holidays. The DEQ laboratory prices are subject to change without notice.

Special Instructions For Automated Partial Chemistry, VOC and TTHM Samples: These sample bottles must be cooled and preserved during shipment to the laboratory. If you use the DEQ laboratory, you will receive the ice pack, acid dropper (if necessary) and small cooler when you request the bottles. Samples must be preserved correctly to be used for compliance purposes. To avoid resampling follow instructions contained with the sample bottle. If you would like more information, contact the DEQ lab, at 517-335-8184, or contact this office.

Cyanide: Previously, supplies that chlorinated the water were waived from monitoring for cyanide. The U.S. EPA now requires all supplies to sample the entry point for cyanide.

UCMR3 Monitoring: You may have monitoring requirements in 2015 under the third Unregulated Contaminant Monitoring Rule (UCMR3). The U.S. EPA will contact you directly if your water supply is required to monitor in 2015. A list of laboratories certified to analyze the samples collected for UCMR3 is available at http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/upload/lablist.pdf. Contact the U.S. EPA with questions.

Reminder if Lead and Copper Monitoring Due This Year: Provide individual lead tap results to people who receive water from sites that you sampled, even if lead was not detected, within 30 days of learning the results. Send us a certification that you met all the delivery requirements along with a sample copy of the customer notice within 3 months after the end of the monitoring period. Water supplies that failed to distribute the Consumer Notice of Lead Results must include the following statement in their CCR, "During the year, we failed to provide lead results to persons served at the sites that were tested as required by the Lead and Copper Rule." To download the *Lead and Copper Report and Consumer Notice of Lead Result Certificate* in Microsoft Word or PDF format, visit www.michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, and Reporting Forms (under Manuals, Forms & Brochures).

Annual Reports: These reports are due to this office each year.

- The **Cross Connection Report**, due by March 31, describes the status of your local cross connection control program. Manufactured housing communities are exempt from this requirement until 2016.

  Each year, water supplies must submit this report, even if a formal program has not been implemented. If cross connections do not exist in your water system, indicate so on the report. Download the Cross Connection Report form from http://michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, Reporting Forms (under Manuals, Forms & Brochures). Instructions are included with the form.

- The **Annual Pumpage/Usage Report**, due by March 31, is required of water supplies that do not submit monthly operation reports.

  This summary of water pumpage and water use must be submitted by each water supply that does not submit a monthly operation report. To manage our natural resources, pumpage data are compiled to determine water use demands in Michigan. Download the Annual Pumpage/Usage Report form from http://michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, Reporting Forms (under Manuals, Forms & Brochures). Please be sure to indicate the appropriate units on the report (e.g. million gallons or gallons).

- The **Consumer Confidence Report**, due by July 1 to your customers, to your local health department and to this office, describes the quality of the water and characterizes the risks, if any, from exposure to contaminants detected..

  Electronic delivery methods may be used to distribute the CCR to bill-paying customers, provided the method is direct. A paper copy must be delivered to bill-paying customers who request it or known to be unable to receive the CCR electronically. For more information on e-delivery, visit www.michigan.gov/deqwater. Click on Drinking Water, Community Water Supply, Consumer Confidence Report Rule (under Laws and Rules).

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Wednesday, May 27, 2015 1:58 PM
To: Cook, Pat (DEQ); Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Cc: Benzie, Richard (DEQ); Philip, Kris (DEQ); Deltoral, Miguel; Poy, Thomas
Subject: Flint sample results/2 houses for (dw) metals (Cu, Pb, Zn)
Attachments: 1505003_work order.pdf; 1505003,1505004 FINAL EXCEL 26 May 15 0943.xls; 1505003,1505004 FINAL May 26 15 0943.PDF; 1505004_work order.pdf

Importance: High

Pat, Steve, Mike: When Miguel was in Flint observing Ms Walters' service line being replaced, he also sampled 2 homes connected to the water main Ms. Walters' home was connected to. The Excel spreadsheet attached provides the sample results, 15 samples per house. The 5th column, Sample No., is from 1-15 which is Home 1, then the numbers start again at 1 and go through 15, which is Home 2. These are the 2 homes connected to the water main that Ms. Walters' 136 ft service line (iron pipe) was connected to. Her home also had the lead line connecting the shut-off to the main, as does Home 1. I know I talked with Pat about the sequential sampling in late April at Ms. Walters' home, prior to her service line being replaced, but I don't think I sent you those sample results—they were in the thousands of ppb, probably particulate lead. I will get with Miguel and communicate with you his ideas concerning the source of this lead in Ms. Walters' service line. See Miguel's email below regarding these 2 homes' sample results.
If you have questions, please let me or Miguel know.
Jennifer
312-886-0244
Miguel
312-886-5253

From: Deltoral, Miguel
Sent: Tuesday, May 26, 2015 11:42 AM
To: Poy, Thomas
Cc: Porter, Andrea; Marc Edwards; Schock, Michael
Subject: Fw: 1505003 & 1505004; ICP-MS (dw) metals (Cu, Pb, Zn); Flint MI

Here are the results from the two homes sampled in Flint. Nothing horrific which is good. One home does not appear to have a LSL at all (Home 2). The other home (Home 1) appears to have a short LSL, consistent with the practice in Flint (curb to main only). Highest result from the LSL home (Home 1) was 22 ug/L using the standard analytical protocol. They will now get shipped to Marc Edwards at Virginia Tech to see if our protocol is missing particulate lead, which made up the majority of the lead in Ms. Walters sample results.

I forgot to mention that all along the block where Ms. Walters lives, there are patches in the street from non-water-related utility excavation right up to the curb, so fairly recent physical disturbances to Ms. Walters service line are likely. I think it was gas work, but I have to check.

Miguel A. Del Toral
Regulations Manager
U.S. EPA R5 GWDWB
77 West Jackson Blvd, (WG-15J)
Chicago, IL 60604
Phone: (312) 886-5253

From: Griffin, Sylvia
Sent: Tuesday, May 26, 2015 10:03 AM
To: Deltoral, Miguel
Cc: Wroble, Amanda
Subject: FW: 1505003 & 1505004; ICP-MS (dw) metals (Cu, Pb, Zn); Flint MI

Please see the attached final results reports. Should you have any questions regarding this transmittal, please email or call me.

Thank you.

-Sylvia
3-9073

From: Wroble, Amanda
Sent: Tuesday, May 26, 2015 9:58 AM
To: Griffin, Sylvia
Subject: 1505003 & 1505004; ICP-MS (dw) metals (Cu, Pb, Zn); Flint MI

Amanda Wroble, Ph.D.
Chemist and Sample Coordinator
USEPA Region 5 Chicago Regional Laboratory
536 S. Clark St. ML-10C
Chicago, IL 60605
(312) 353-0375

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

WORK ORDER **Printed: 5/18/2015 2:55:56PM**

1505003

US EPA Region 5 Chicago Regional Laboratory

Client: Water Division, Drinking Water
Project: Flint, Michigan
Project Manager: Greg Mitsakopoulos
Project Number: [none]

Report To:

Miguel Del Toral
Water Division, Drinking Water
77 West Jackson Boulevard
Chicago, IL 60604
Phone: (312) 886-5253
Fax: (312) 886-2001

Date Due: Jul-12-15 15:00 (60 day TAT)

Received By: Robert Snyder
Date Received: May-11-15 10:12

Logged In By: Robert Snyder
Date Logged In: May-11-15 16:42

Samples Received at:	21.8°C
Sample tags/labels	Yes
Seals Intact	Yes
Received on ice	No
Paperwork Included	Yes

Analysis	Due	TAT	Expires	Comments
1505003-01 1 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-02 2 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-03 3 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-04 4 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-05 5 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	

WORK ORDER

Printed: 5/18/2015 2:55:56PM

1505003

US EPA Region 5 Chicago Regional Laboratory

Client:	**Water Division, Drinking Water**	**Project Manager:**	**Greg Mitsakopoulos**
Project:	**Flint, Michigan**	**Project Number:**	**[none]**

Analysis	Due	TAT	Expires	Comments
1505003-06 6 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-07 7 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-08 8 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-09 9 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-10 10 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-11 11 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-12 12 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-13 13 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
1505003-14 14 [Water] Sampled May-06-15 07:20 (GMT-06:00) Central Time (US & Canada)				pH = 7
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:20	

WORK ORDER

1505003

Printed: 5/18/2015 2:55:56PM

US EPA Region 5 Chicago Regional Laboratory

Client:	**Water Division, Drinking Water**	**Project Manager:**	**Greg Mitsakopoulos**
Project:	**Flint, Michigan**	**Project Number:**	**[none]**

Analysis	Due	TAT	Expires	Comments
1505003-15 15 [Water] Sampled May-06-15 07:25 (GMT-06:00) Central Time (US & Canada)				**pH = 7**
Metals ICP-MS (DW)	Jul-12-15 12:00	60	Nov-02-15 07:25	
Metals ICP (DW)	Jul-12-15 12:00	60	Nov-02-15 07:25	

Reviewed By

Date

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5 CHICAGO REGIONAL LABORATORY

536 SOUTH CLARK STREET

CHICAGO, ILLINOIS 60605

Date:	**5/26/2015**
Subject:	**Review of Region 5 Data for Flint, Michigan**
To:	**Water Division, Drinking Water** **77 West Jackson Boulevard** **Chicago, IL 60604**
From:	**Amanda Wroble, Chemist** **US EPA Region 5 Chicago Regional Laboratory**

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with EPA's *Guidance on Environmental Data Verification and Data Validation* (Document EPA QA/G-8), CRL verified and validated the data but does not perform data quality assessment based on project plans.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X ____

Please contact the analyst with any technical report issues, Amanda Wroble at (312)-353-0375 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

Attached are Results for: Flint, Michigan

____ / /

Data Management Coordinator and DateTransmitted

Analyses included in this report:

Metals ICP-MS (DW)

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-26-15 09:43

ANALYSIS CASE NARRATIVE

GENERAL INFORMATION

CRL received 30 drinking water samples for copper, lead, and zinc analysis by inductively coupled plasma-mass spectrometry (ICP-MS) on 11 May 2015 that were assigned to work orders 1505003 and 1505004. The designated analyst for these samples, Amanda Wroble, can be reached at 312.353.0375.

The samples were received unpreserved. Therefore, 2 mL of nitric acid was added to each 1 L sample. At least twenty-four hours elapsed before subsampling began. All holding times were met.

No digestion is required for drinking water samples. Samples were analyzed in batches B15E026 and B15E027 over three runs using CRL SOP METALS001 (EPA Method 200.8), Revision 3.

Work orders 1505003 and 1505004 were analyzed together. All supporting data are filed under work order 1505003.

SAMPLE ANALYSIS AND RESULTS

The data reported herein meet the data quality objectives referenced in personal email communication with the project manager dated May 12, 2015 and the quality assurance project plan "Impacts on Lead Concentration in Drinking Water Samples Due to Sample Location and Sample Collection Protocols" dated January 20, 2011 referenced therein.

QUALITY CONTROL

All quality control audits were within CRL limits for the requested analytes or did not result in qualification of the data.

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-26-15 09:43

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	Reported: May-26-15 09:43

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
1	1505003-01	Water	May-06-15 07:20	May-11-15 10:12
2	1505003-02	Water	May-06-15 07:20	May-11-15 10:12
3	1505003-03	Water	May-06-15 07:20	May-11-15 10:12
4	1505003-04	Water	May-06-15 07:20	May-11-15 10:12
5	1505003-05	Water	May-06-15 07:20	May-11-15 10:12
6	1505003-06	Water	May-06-15 07:20	May-11-15 10:12
7	1505003-07	Water	May-06-15 07:20	May-11-15 10:12
8	1505003-08	Water	May-06-15 07:20	May-11-15 10:12
9	1505003-09	Water	May-06-15 07:20	May-11-15 10:12
10	1505003-10	Water	May-06-15 07:20	May-11-15 10:12
11	1505003-11	Water	May-06-15 07:20	May-11-15 10:12
12	1505003-12	Water	May-06-15 07:20	May-11-15 10:12
13	1505003-13	Water	May-06-15 07:20	May-11-15 10:12
14	1505003-14	Water	May-06-15 07:20	May-11-15 10:12
15	1505003-15	Water	May-06-15 07:25	May-11-15 10:12
1	1505004-01	Water	May-11-15 07:00	May-11-15 10:12
2	1505004-02	Water	May-11-15 07:00	May-11-15 10:12
3	1505004-03	Water	May-11-15 07:00	May-11-15 10:12
4	1505004-04	Water	May-11-15 07:00	May-11-15 10:12
5	1505004-05	Water	May-11-15 07:00	May-11-15 10:12
6	1505004-06	Water	May-11-15 07:00	May-11-15 10:12
7	1505004-07	Water	May-11-15 07:00	May-11-15 10:12
8	1505004-08	Water	May-11-15 07:00	May-11-15 10:12

Environmental Protection Agency Region 5

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Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-26-15 09:43

9	1505004-09	Water	May-11-15 07:00	May-11-15 10:12
10	1505004-10	Water	May-11-15 07:00	May-11-15 10:12
11	1505004-11	Water	May-11-15 07:00	May-11-15 10:12
12	1505004-12	Water	May-11-15 07:00	May-11-15 10:12
13	1505004-13	Water	May-11-15 07:00	May-11-15 10:12
14	1505004-14	Water	May-11-15 07:00	May-11-15 10:12
15	1505004-15	Water	May-11-15 07:05	May-11-15 10:12

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified)

US EPA Region 5 Chicago Regional Laboratory

1 (1505003-01) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	2.63			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	40.7			1.00	"	"	"	"	"
Zinc	132			10.0	"	"	"	"	"

2 (1505003-02) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	4.77			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	44.4			1.00	"	"	"	"	"
Zinc	55.3			10.0	"	"	"	"	"

3 (1505003-03) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	4.79			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	39.3			1.00	"	"	"	"	"
Zinc	88.8			10.0	"	"	"	"	"

4 (1505003-04) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	6.26			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	66.8			1.00	"	"	"	"	"
Zinc	57.2			10.0	"	"	"	"	"

5 (1505003-05) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.07			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	272			1.00	"	"	"	"	"
Zinc	34.2			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

6 (1505003-06) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.70			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	362			1.00	"	"	"	"	"
Zinc	21.4			10.0	"	"	"	"	"

7 (1505003-07) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	11.7			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	331			1.00	"	"	"	"	"
Zinc	19.5			10.0	"	"	"	"	"

8 (1505003-08) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	22.5			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	69.9			1.00	"	"	"	"	"
Zinc	16.6			10.0	"	"	"	"	"

9 (1505003-09) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	12.7			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	42.5			1.00	"	"	"	"	"
Zinc	15.1			10.0	"	"	"	"	"

10 (1505003-10) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.94			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	38.4			1.00	"	"	"	"	"
Zinc	14.4			10.0	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

11 (1505003-11) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.72			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	37.5			1.00	"	"	"	"	"
Zinc	14.5			10.0	"	"	"	"	"

12 (1505003-12) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.39			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	34.8			1.00	"	"	"	"	"
Zinc	13.6			10.0	"	"	"	"	"

13 (1505003-13) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.23			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	33.1			1.00	"	"	"	"	"
Zinc	13.1			10.0	"	"	"	"	"

14 (1505003-14) Water Sampled: May-06-15 07:20 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.20			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	32.8			1.00	"	"	"	"	"
Zinc	13.0			10.0	"	"	"	"	"

15 (1505003-15) Water Sampled: May-06-15 07:25 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	3.00			0.500	ug/L	1	B15E026	May-18-15	May-18-15
Copper	31.4			1.00	"	"	"	"	"
Zinc	12.3			10.0	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

1 (1505004-01) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	8.11			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	31.1			1.00	"	"	"	"	"
Zinc	64.0			10.0	"	"	"	"	"

2 (1505004-02) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	1.46			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	14.7			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

3 (1505004-03) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	1.72			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	20.0			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

4 (1505004-04) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.933			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	13.0			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

5 (1505004-05) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.862			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	12.3			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

6 (1505004-06) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.795			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	14.2			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

7 (1505004-07) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.769			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	14.2			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

8 (1505004-08) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.691			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	13.3			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

9 (1505004-09) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.774			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	9.60			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

10 (1505004-10) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.715			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	7.57			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

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Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified)
US EPA Region 5 Chicago Regional Laboratory

11 (1505004-11) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.611			0.500	ug/L	1	B15E027	May-18-15	May-18-15
Copper	7.04			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

12 (1505004-12) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.655			0.500	ug/L	1	B15E027	May-18-15	May-19-15
Copper	7.30			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

13 (1505004-13) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.644			0.500	ug/L	1	B15E027	May-18-15	May-19-15
Copper	7.37			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

14 (1505004-14) Water Sampled: May-11-15 07:00 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.631			0.500	ug/L	1	B15E027	May-18-15	May-19-15
Copper	7.09			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

15 (1505004-15) Water Sampled: May-11-15 07:05 Received: May-11-15 10:12

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Lead	0.621			0.500	ug/L	1	B15E027	May-18-15	May-19-15
Copper	7.05			1.00	"	"	"	"	"
Zinc	U			10.0	"	"	"	"	"

Environmental Protection Agency Region 5

Chicago Regional Laboratory

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Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B15E026 - 200.8/no digestion

Blank (B15E026-BLK1) **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	U			0.500	ug/L						
Copper	U			1.00	"						
Zinc	U			10.0	"						

LCS (B15E026-BS1) **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	19.3			0.500	ug/L	20.00		96.6%	85-115		
Copper	19.1			1.00	"	20.00		95.4%	85-115		
Zinc	19.0			10.0	"	20.00		95.2%	85-115		

Duplicate (B15E026-DUP1) **Source: 1505003-01** **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	2.60			0.500	ug/L		2.63			1.27	20
Copper	40.9			1.00	"		40.7			0.294	20
Zinc	131			10.0	"		132			0.892	20

Duplicate (B15E026-DUP2) **Source: 1505003-11** **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	3.55			0.500	ug/L		3.72			4.68	20
Copper	36.4			1.00	"		37.5			2.94	20
Zinc	14.1			10.0	"		14.5			2.36	20

Matrix Spike (B15E026-MS1) **Source: 1505003-01** **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	22.9			0.500	ug/L	20.00	2.63	101%	75-125		
Copper	61.0			1.00	"	20.00	40.7	101%	75-125		
Zinc	153			10.0	"	20.00	132	105%	75-125		

Environmental Protection Agency Region 5

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Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	**Reported:** May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified) - Quality Control

US EPA Region 5 Chicago Regional Laboratory

Batch B15E026 - 200.8/no digestion

Matrix Spike (B15E026-MS2) **Source: 1505003-11** **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	23.5			0.500	ug/L	20.00	3.72	98.8%	75-125		
Copper	56.3			1.00	"	20.00	37.5	93.9%	75-125		
Zinc	33.8			10.0	"	20.00	14.5	96.9%	75-125		

Batch B15E027 - 200.8/no digestion

Blank (B15E027-BLK1) **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	U			0.500	ug/L						
Copper	U			1.00	"						
Zinc	U			10.0	"						

LCS (B15E027-BS1) **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	19.4			0.500	ug/L	20.00		97.2%	85-115		
Copper	18.3			1.00	"	20.00		91.6%	85-115		
Zinc	18.6			10.0	"	20.00		93.1%	85-115		

Duplicate (B15E027-DUP1) **Source: 1505004-01** **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	8.13			0.500	ug/L		8.11			0.278	20
Copper	31.4			1.00	"		31.1			1.09	20
Zinc	64.7			10.0	"		64.0			1.01	20

Duplicate (B15E027-DUP2) **Source: 1505004-11** **Prepared: May-18-15 Analyzed: May-19-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	0.734			0.500	ug/L		0.611			18.3	20
Copper	7.43			1.00	"		7.04			5.32	20
Zinc	3.23			10.0	"		3.04			6.13	20

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Water Division, Drinking Water 77 West Jackson Boulevard Chicago IL, 60604	Project: Flint, Michigan Project Number: [none] Project Manager: Miguel Del Toral	Reported: May-26-15 09:43

Metals by ICP-MS using EPA 200.8 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B15E027 - 200.8/no digestion

Matrix Spike (B15E027-MS1) **Source: 1505004-01** **Prepared & Analyzed: May-18-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	28.4			0.500	ug/L	20.00	8.11	101%	75-125		
Copper	50.7			1.00	"	20.00	31.1	98.2%	75-125		
Zinc	84.3			10.0	"	20.00	64.0	101%	75-125		

Matrix Spike (B15E027-MS2) **Source: 1505004-11** **Prepared: May-18-15 Analyzed: May-19-15**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Lead	21.1			0.500	ug/L	20.00	0.611	102%	75-125		
Copper	26.6			1.00	"	20.00	7.04	97.8%	75-125		
Zinc	23.1			10.0	"	20.00	3.04	100%	75-125		

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Water Division, Drinking Water	Project: Flint, Michigan	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60604	Project Manager: Miguel Del Toral	May-26-15 09:43

Notes and Definitions

U Not Detected

NR Not Reported

SAMPDATA

CLIENT	PROJECT	PROJECT	LabName	SAMPLEN	LABSAMP	MATRIX	RPTMATR	SAMPDAT
Water Divi	Flint, Michi	[none]	US EPA Re	1	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	1	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	1	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	2	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	2	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	2	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	3	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	3	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	3	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	4	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	4	1505003-0	Water	Water	05/06/2015
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Water Divi	Flint, Michi	[none]	US EPA Re	6	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	6	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	7	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	7	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	7	1505003-0	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	8	1505003-0	Water	Water	05/06/2015
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Water Divi	Flint, Michi	[none]	US EPA Re	9	1505003-0	Water	Water	05/06/2015
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Water Divi	Flint, Michi	[none]	US EPA Re	9	1505003-0	Water	Water	05/06/2015
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Water Divi	Flint, Michi	[none]	US EPA Re	10	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	11	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	11	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	11	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	12	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	12	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	12	1505003-1	Water	Water	05/06/2015
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Water Divi	Flint, Michi	[none]	US EPA Re	13	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	13	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	14	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	14	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	14	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	15	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	15	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	15	1505003-1	Water	Water	05/06/2015
Water Divi	Flint, Michi	[none]	US EPA Re	1	1505004-0	Water	Water	05/11/2015
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Water Divi	Flint, Michi	[none]	US EPA Re	2	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA Re	2	1505004-0	Water	Water	05/11/2015

SAMPDATA

Water Divi	Flint, Michi	[none]	US EPA R	3	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	3	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	3	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	4	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	4	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	4	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	5	1505004-0	Water	Water	05/11/2015
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Water Divi	Flint, Michi	[none]	US EPA R	6	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	6	1505004-0	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	6	1505004-0	Water	Water	05/11/2015
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Water Divi	Flint, Michi	[none]	US EPA R	9	1505004-0	Water	Water	05/11/2015
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Water Divi	Flint, Michi	[none]	US EPA R	10	1505004-1	Water	Water	05/11/2015
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Water Divi	Flint, Michi	[none]	US EPA R	12	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	13	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	13	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	13	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	14	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	14	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	14	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	15	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	15	1505004-1	Water	Water	05/11/2015
Water Divi	Flint, Michi	[none]	US EPA R	15	1505004-1	Water	Water	05/11/2015

SAMPDATA

PREPDAT	ANADATE	BATCH	METHODC	METHODN	PREPNAM	ANALYTE	CASNUMB	SURROGA
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)		200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)		200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)		200.8/no di	Zinc	7440-66-6	FALSE

05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Lead	7439-92-1	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Copper	7440-50-8	FALSE
05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	200.8/no di	Zinc	7440-66-6	FALSE

SAMPDATA

TIC	Result	DL	RL	UNITS	RPToMDL	BASIS	DILUTION	SPIKELEV
FALSE	2.63	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	40.7	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	132	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	4.77	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	44.4	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	55.3	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	4.79	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	39.3	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	88.8	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	6.26	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	66.8	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	57.2	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.07	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	272	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	34.2	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.70	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	362	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	21.4	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	11.7	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	331	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	19.5	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	22.5	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	69.9	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	16.6	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	12.7	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	42.5	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	15.1	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.94	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	38.4	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	14.4	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.72	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	37.5	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	14.5	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.39	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	34.8	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	13.6	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.23	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	33.1	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	13.1	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.20	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	32.8	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	13.0	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	3.00	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	31.4	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	12.3	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	8.11	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	31.1	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	64.0	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	1.46	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	14.7	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	

FALSE	1.72	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	20.0	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.933	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	13.0	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.862	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	12.3	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.795	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	14.2	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.769	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	14.2	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.691	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	13.3	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.774	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	9.60	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.715	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	7.57	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.611	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	7.04	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.655	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	7.30	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.644	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	7.37	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.631	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	7.09	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	
FALSE	0.621	0.0140	0.500	ug/L	FALSE	NA	1	
FALSE	7.05	0.0220	1.00	ug/L	FALSE	NA	1	
FALSE	U	0.190	10.0	ug/L	FALSE	NA	1	

RECOVER	UPPERCL	LOWERCL	ANALYST	PSOLIDS	LNOTE	ANOTE	LATITUDE	LONGITUD
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sComment	SNOTE1	SNOTE2	SNOTE3	SNOTE4	SNOTE5	SNOTE6	SNOTE7	SNOTE8
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SNOTE9	SNOTE10	ANALYTEORDER	
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QCDATA

LABNAME	LABSAMP	QCTYPE	MATRIX	PREPDAT	ANADATE	BATCH	METHODC	METHODN
US EPA R	B15E026-B	Blank	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-B	Blank	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-B	Blank	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-B	LCS	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-B	LCS	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-B	LCS	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-D	Duplicate	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-D	Duplicate	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-D	Duplicate	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-D	Duplicate	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-D	Duplicate	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-D	Duplicate	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E026-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E026	Metals ICP-MS (DW)	
US EPA R	B15E027-B	Blank	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-B	Blank	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-B	Blank	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-B	LCS	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-B	LCS	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-B	LCS	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-D	Duplicate	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-D	Duplicate	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-D	Duplicate	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-D	Duplicate	Water	05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-D	Duplicate	Water	05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-D	Duplicate	Water	05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-M	Matrix Spik	Water	05/18/2015	05/18/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-M	Matrix Spik	Water	05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-M	Matrix Spik	Water	05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	
US EPA R	B15E027-M	Matrix Spik	Water	05/18/2015	05/19/2015	B15E027	Metals ICP-MS (DW)	

QCDATA

PREPNAM	ANALYTE	CASNUMB	SURROGA	TIC	RESULT	DL	RL	UNITS
200.8/no di	Lead	7439-92-1	FALSE	FALSE	U	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	U	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	U	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	19.3	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	19.1	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	19.0	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	2.60	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	40.9	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	131	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	3.55	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	36.4	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	14.1	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	22.9	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	61.0	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	153	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	23.5	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	56.3	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	33.8	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	U	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	U	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	U	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	19.4	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	18.3	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	18.6	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	8.13	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	31.4	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	64.7	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	0.734	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	7.43	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	3.23	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	28.4	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	50.7	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	84.3	0.190	10.0	ug/L
200.8/no di	Lead	7439-92-1	FALSE	FALSE	21.1	0.0140	0.500	ug/L
200.8/no di	Copper	7440-50-8	FALSE	FALSE	26.6	0.0220	1.00	ug/L
200.8/no di	Zinc	7440-66-6	FALSE	FALSE	23.1	0.190	10.0	ug/L

QCDATA

RPToMDL	BASIS	DILUTION	SOURCEI[	SOURCER	SPIKELEV	RECOVER	RPD	UPPERCL
FALSE	NA	1						
FALSE	NA	1						
FALSE	NA	1						
FALSE	NA	1			20.00	96.6		115
FALSE	NA	1			20.00	95.4		115
FALSE	NA	1			20.00	95.2		115
FALSE	NA	1	1505003-0	2.63			1.27	
FALSE	NA	1	1505003-0	40.7			0.294	
FALSE	NA	1	1505003-0	132			0.892	
FALSE	NA	1	1505003-1	3.72			4.68	
FALSE	NA	1	1505003-1	37.5			2.94	
FALSE	NA	1	1505003-1	14.5			2.36	
FALSE	NA	1	1505003-0	2.63	20.00	101		125
FALSE	NA	1	1505003-0	40.7	20.00	101		125
FALSE	NA	1	1505003-0	132	20.00	105		125
FALSE	NA	1	1505003-1	3.72	20.00	98.8		125
FALSE	NA	1	1505003-1	37.5	20.00	93.9		125
FALSE	NA	1	1505003-1	14.5	20.00	96.9		125
FALSE	NA	1						
FALSE	NA	1						
FALSE	NA	1						
FALSE	NA	1			20.00	97.2		115
FALSE	NA	1			20.00	91.6		115
FALSE	NA	1			20.00	93.1		115
FALSE	NA	1	1505004-0	8.11			0.278	
FALSE	NA	1	1505004-0	31.1			1.09	
FALSE	NA	1	1505004-0	64.0			1.01	
FALSE	NA	1	1505004-1	0.611			18.3	
FALSE	NA	1	1505004-1	7.04			5.32	
FALSE	NA	1	1505004-1	3.04			6.13	
FALSE	NA	1	1505004-0	8.11	20.00	101		125
FALSE	NA	1	1505004-0	31.1	20.00	98.2		125
FALSE	NA	1	1505004-0	64.0	20.00	101		125
FALSE	NA	1	1505004-1	0.611	20.00	102		125
FALSE	NA	1	1505004-1	7.04	20.00	97.8		125
FALSE	NA	1	1505004-1	3.04	20.00	100		125

QCDATA

LOWERCL	RPDCL	ANALYST	PSOLIDS	LNOTE	ANOTE	ANALYTEORDER	
		AW				1	
		AW				2	
		AW				4	
85		AW				1	
85		AW				2	
85		AW				4	
	20	AW				1	
	20	AW				2	
	20	AW				4	
	20	AW				1	
	20	AW				2	
	20	AW				4	
75		AW				1	
75		AW				2	
75		AW				4	
75		AW				1	
75		AW				2	
75		AW				4	
		AW				1	
		AW				2	
		AW				4	
85		AW				1	
85		AW				2	
85		AW				4	
	20	AW				1	
	20	AW				2	
	20	AW				4	
	20	AW				1	
	20	AW				2	
	20	AW				4	
75		AW				1	
75		AW				2	
75		AW				4	
75		AW				1	
75		AW				2	
75		AW				4	

LNOTE

QUALIFIER	DESCRIPTION

Rennaker, Joanne (DEQ)

From: Howard Croft <hcroft@cityofflint.com>
Sent: Wednesday, May 27, 2015 9:55 AM
To: Brent Wright; donna. cole; gdn2@aol.com; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Norb Birchmeier; Pete Levine; Robert Bincsik; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green; Liz Murphy; Kaufman, Marty; Michael Sargent
Cc: Dayne Walling; Natasha Henderson
Subject: May_Technical Advisory meeting summary
Attachments: 2015-05-20 TAC Meeting Summary.pdf; Flint-water-age (1).pdf

Technical Advisory Team,

I want to thank each of you for another substantive and productive meeting last week and as a follow up, I have assembled a summary review of the meeting that also highlights the direction and timing of the next two meetings. Please take a moment and review the summary and feel free to send me any comments. I have also included a copy of the water age map that was requested at the meeting.

Please be aware that our May TTHM samples have been returned from the lab and we are officially under the Maximum Containment Level at all eight sites for the second straight quarter. There is one site where the running average remains over the limit and we will need to send a notice by July which we anticipate going out with our annual CCR report as discussed.

The TTHM results ranged from the low 30's up to 72 which highlights the importance of having Granulated Activated Carbon installed this summer. The installation is currently ahead of schedule and we are expecting this to play a significant role in our next quarterly tests.

Finally, the water page that was previewed at the meeting should be live on the City website this week and can be found under the "RESIDENTS" tab or on the PUBLIC WORKS - UTILITIES page.

Thank you all again,

--
Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

City of Flint
Technical Advisory Committee

5/20/2015 Meeting Summary

-Introductions

- ✓ Introduced the new Utilities Administrator Mike Glasgow
- ✓ Introduced the City Administrator Natasha Henderson
- ✓ Roundtable introductions of other participants

-Updates

- ✓ Update on current water status (Mike Glasgow, Utilities Administrator).
  - o Water is not as hard (hardness between 150 – 180) down from 210- 230
  - o Quarterly TTHM testing submitted and expecting all eight sites to be below the MCL
- ✓ Update on GAC installation (Samir Matta, LAN).
  - o Installation ahead of schedule
  - o Design has been submitted to DEQ, quick approval expected
  - o Vendor is identified and capable of supply and installation
  - o Vendor is testing flint water samples
  - o Flint will install one filter ahead of time for actual results
  - o Full installation now scheduled for late June (moved up from mid-July)
- ✓ Update on remaining initiatives, (Howard Croft, DPW Director).
  - o Leak detection is expected to begin by July(will take 10 – 14 weeks to complete)
  - o New pipe installation has been tentatively pushed back to a July start
  - o Aggressive water meter installation (9,000 meters in one year) is on track to start in July
  - o New "water webpage" chronicling all events set to launch in the next week

-Discussions

- ➢ Genessee County Health Department, Flint Water Plant, & Flint City Hall have received no water complaint calls in over 60 days.
- ➢ Health department has listed several items such as "hard water rash" on the front page of their website with explanations.
- ➢ Some attention has shifted to lead and copper concerns, recent internal testing numbers still show approximately 2 -3 out of 100 with high levels.
- ➢ Lead and copper issues trace back to household plumbing and service lines nationally.
- ➢ All independent area testing continues to show water quality to be in line with EPA standards.
- ➢ A question was raised about "Bromite" levels in the water, Mike Glasgow will address how the implementations are addressing this in the next meeting.
- ➢ The DEQ acknowledged that requirements for notifications are the minimum levels and additional efforts can be undertaken.

-Objectives

- ✓ The health department will present a proposal to the City of Flint DPW to partner in a social media campaign designed for community outreach.
- ✓ A plan was set to maintain a 24 hr. advance notification to this group of future low residuals, or potentials of boil water advisories.
- ✓ The annual Consumer Confidence report will go out in July and if a violation notice is required then it will go with this report. (DEQ agrees with this approach).

-Next Steps

- Next meeting is targeted for late July or Early August after the GAC has been installed.

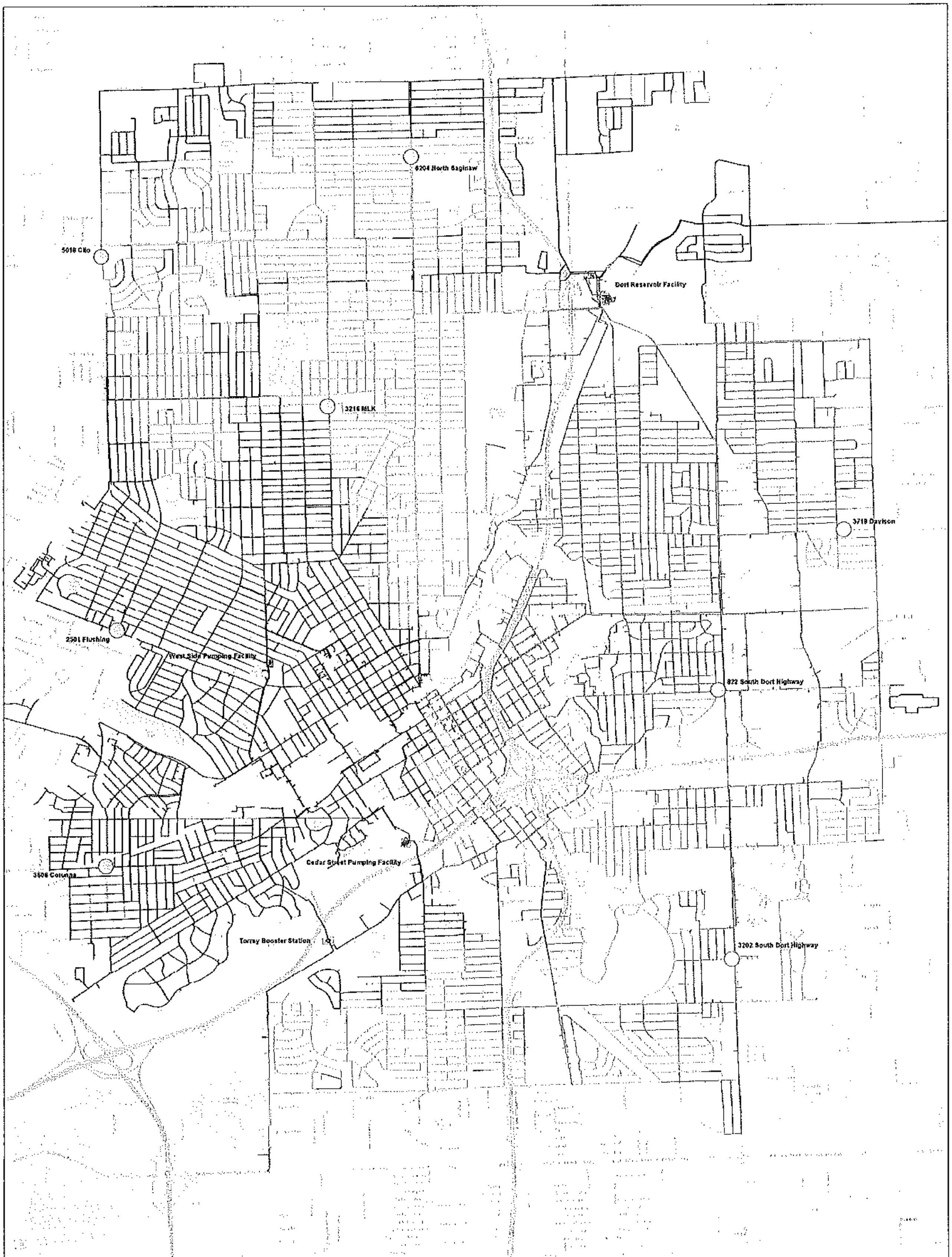
- Meeting will focus on the results of the implementation measures and what internal testing is showing for water quality in the late summer months.

- We plan to invite several community leaders to participate in this forum, candidates are:
  - Mike Sargent – Flint Strong
  - Pastor Harris – Concerned Pastors
  - Rebecca Fedewa / Jack Minore – Flint River Watershed Coalition

- The subsequent meeting is targeted for September (after the late summer TTHM results are in) and we intend to start directing attention towards Lake Huron water and the upcoming transition to the KWA.

-Attendees

Hilda McShane - Genesee County Health Department
Jim Henry - Genesee County Health Department
Samir Matta – LAN Engineering
Warren Green – LAN Engineering
Larry Kohler – Mott Community College
Mike Lane – University of Michigan Flint
Rusty Hudson – McLaren Hospital
Norb Birchmeier – Hurley Hospital
Gerald Natzke – DO-Genesys Regional Medical Center
Kirk Smith – Greater Flint Health Coalition
Pete Levine – Genesee County Medical Society
Mike Prysby – Department of Environmental Quality
Dr. Michael Wright - Environmental Protection Agency
Mike Glasgow – City of Flint - Utilities Administrator
Howard Croft – City of Flint - DPW Director
Natasha Henderson – City of Flint - City Administrator



CITY OF FLINT MAJOR WATER INFRASTRUCTURE

WATER AGE & WATER SAMPLE LOCATION MAP

January 21, 2015

Legend
Water Quality (Hrs)

- less than 24.0
- 24.0 to 72.0
- 73.0 to 144.0
- greater than 144.0
- Water sample location

N

0 550 1,100 2,200 3,300 4,400 Feet

Rennaker, Joanne (DEQ)

From: Rosenthal, Adam (DEQ)
Sent: Tuesday, May 26, 2015 2:52 PM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Flint 2nd qtr15 TTHM MCL letter
Attachments: Flint DBP MCL 2Q15.doc

This is located in the Flint/TTHM folder on the district drive.

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

XXXX, 2015

Mr. Brent Wright, Operations Supervisor
City Of Flint - DPW
Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Violation Notice (VN) – Maximum Contaminant Level for Total Trihalomethanes (TTHM)
Operational Evaluation – Total Trihalomethanes
2nd Quarter 2015 Monitoring Period

The Department of Environmental Quality (DEQ), Office of Drinking Water and Municipal Assistance (ODWMA), records show that the city of Flint (City) is in violation of the Safe Drinking Water Act,1976 PA 399, as amended (Act 399); R 325.10610, *Maximum contaminant levels for disinfection byproducts (MCLs)*, of the 1979 Administrative Code.

In accordance with R 325.10610, *MCL*s, of the 1979 Administrative Code, the MCL for disinfection byproduct TTHM is 0.080 milligrams per liter (mg/L) as a Locational Running Annual Average (LRAA) at each monitoring location. As listed in the table below, our records show that the City's highest TTHM locational running annual average (LRAA), based on the last four quarters, ending June 30, 2015, is 0.094 mg/L which exceeds the standard, however all eight sample site locations for the 2nd quarter 2015 are below the standard of 0.080 mg/L.

Further, in accordance with R 325.10719l, *Disinfection byproducts: operational evaluation levels*, of the 1979 Administrative Code, when an operational evaluation level (OEL) at a monitoring location for TTHM exceeds 0.080 mg/L, a supply shall conduct an operational evaluation and submit a written report of the evaluation to the DEQ not later than 90 days after being notified of the analytical result that causes the supply to exceed the operational evaluation level. As listed in the table below, our records show that the TTHM OELs for the City exceed 0.080 mg/L at one of the City's eight sample site locations.

TTHM Results (mg/L)						
	8/21/14	11/20/14	2/17/15	5/18/15	LRAA	OEL
DBP1 McDonalds 3719 Davison	**0.145**	0.059	0.0162	0.0514	0.068	0.044
DBP2 Liquor Palace 3302 S. Dort Highway	**0.127**	0.033	0.0168	0.0635	0.060	0.044
DBP3 North Flint Auto 6204 N. Saginaw St.	**0.118**	0.041	0.0149	0.0452	0.055	0.037
DBP4 University Market 2501 Flushing Road	**0.196**	**0.094**	0.0245	0.0598	**0.094**	0.059
DBP5 Taco Bell 3606 Corunna Road	**0.181**	0.034	0.0151	0.0547	0.072	0.040
DBP6 Rite-Aid Pharmacy 5018 Clio Road	**0.144**	0.054	0.0192	0.0605	0.069	0.048
DBP7 Salem Housing 3216 MLK Boulevard	**0.112**	0.050	0.0285	0.0727	0.066	0.056
DBP8 BP Gas Station 822 S. Dort Highway	**0.112**	0.036	0.0199	0.0461	0.054	0.037

Our investigation consisted of a review of ODWMA files for laboratory reports received for compliance monitoring. Our investigation is considered complete. This violation began on XXXX, 2015, and will continue until TTHM LRAA is below the MCL at all sample sites.

We are encouraged by the results from the most recent round of compliance samples collected on May 18, 2015, which now show individual TTHM levels below the 0.080 mg/L standard at all locations throughout the City's system. Operational Evaluation Reports from December 2014, and February 2015, have identified possible causes and corrective measures for the previous elevated TTHM levels which we encourage the City to continue implementing. These modifications have likely contributed in part to the reduction in TTHM levels reported in the most recent quarter, and suggest the City may be able to achieve compliance with the TTHM standard at all sites by continuing these efforts.

Our office is currently reviewing the Operational Evaluation Report dated February 27, 2015, and will provide the City and their consultant with comments, as needed, to help address this MCL violation.

Water systems that exceed the OEL must complete and submit an Operational Evaluation in accordance with Administrative Rule 719l (R 325.10719l) within 90 days of being notified of the violation. **An updated Operational Evaluation report, which incorporates the most recent sample results, must now be completed and received by our office by no later than Friday, May 29, 2015.**

If you have any other factual information you would like us to consider regarding the violation identified in this VN, please provide them in a written response by XXXX, 2015.

Administrative rule R 325.10403 of Act 399 requires that suppliers provide public notice (PN) as soon as practical, but no later than thirty (30) days after the supplier learns of this type of violation, by mail or direct delivery **and** by any other means reasonably calculated to reach customers not normally reached by mail. Enclosed is a sample PN which contains the minimum required language. The City is encouraged to include additional information regarding its response efforts to this violation. **Please notify your consumers by July 1, 2015, and send us a signed and dated copy of the notice that you issued within ten (10) days of distributing the public notice**. This violation must also be included in your 2015 Consumer Confidence Report, due by July 1, 2016. The PN must be repeated every quarter until you no longer exceed the TTHM standard. Failure to issue a PN for this violation will result in a fine of at least $1,000 per event, with a maximum of $5,000 per violation.

We anticipate and appreciate your continued cooperation in resolving this matter. If you have any questions regarding this VN, please contact us at the numbers below; at prysbym@michigan.gov; or rosenthala@michigan.gov; or at DEQ, P.O. Box 30242, Lansing, Michigan 48909-7742.

Sincerely,

Michael F. Prysby, P.E., District Engineer
Lansing District Office
Office of Drinking Water and Municipal Assistance
517-290-8817

Adam Rosenthal, Environmental Quality Analyst
Lansing District Office
Office of Drinking Water and Municipal Assistance
517-284-6644

Enclosure

cc: Ms. Jennifer Crooks, U.S. Environmental Protection Agency, Region 5
Mr. Jerry Ambrose, Emergency Manager, City of Flint
Mr. Robert Bincsik, City of Flint
Mr. Howard Croft, City of Flint
Mr. Daughtry Johnson, City of Flint
Genesee County Health Department
Ms. Liane Shekter Smith, DEQ
Mr. Richard Benzie, DEQ
Mr. Stephen Busch, DEQ

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (August 21, November 20 of 2014, and February 17 & May 18 of 2015). The average of the results at **ANY** of the eight locations must not exceed the maximum contaminant level (MCL) for TTHMs, otherwise our water system exceeds the MCL. The standard for TTHMs is 80 micro grams per liter (µg/L). The location reporting the highest TTHM level was 94 ug/L; thus, our water system exceeds the TTHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem in 2015. Our most recent individual sample results were all less than the 80 µg/L standard, however since compliance is calculated using a locational running annual average (LRAA) of the most recent four quarters, we are still out of compliance with the MCL at one of eight locations.

For more information, please contact Mr. Brent Wright at 517-787-6537, or the Flint Water Plant at 4500 North Dort Highway, Flint, Michigan 48505.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Flint.

CERTIFICATION: WSSN: 02310

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

Signature	Title	Date Distributed

Reminder to water supplier: This notice/certification must be sent to the Department of Environmental Quality.

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Thursday, May 21, 2015 4:10 PM
To:	Busch, Stephen (DEQ)
Subject:	FW: Flint Filter Media Change to GAC
Attachments:	GAC-basis-of-design.pdf

Steve,

Below is Jeff's message regarding the use of GAC (Filtrasorb series) at some of our WTPs in Michigan.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Hansen, Jeff [mailto:jrhansen@lan-inc.com]
Sent: Wednesday, May 20, 2015 11:20 AM
To: Prysby, Mike (DEQ)
Cc: Matta, Samir; Green, Warren; Brent Wright (bwright@cityofflint.com); mglasgow@cityofflint.com
Subject: Flint Filter Media Change to GAC

Hi Mike,

Attached is our preliminary basis of design. We are currently working through details with GAC suppliers to determine the best specific media for Flint, but the Filtrasorb 300 and 400 series from Calgon or equivalent appear to be the best suited. Please note that both meet AWWA B604, but are questionable by Ten States Standards (TSS) as TSS are non-specific for GAC capping. According to Calgon, their Filtrasorb product has been approved by DEQ at numerous plants including Ann Arbor, Grosse Pointe Farms, Manistique, and Alpena.

Also note we intend to add a chlorine feed point following filtration while maintaining the intermediate feed point, with valving, so chlorine can be added at either point. The intermediate feed point prior to filtration can then be used as a means of disinfecting the filters in the future, if necessary.

Jeffrey R. Hansen
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B • Flint, MI 48532
T 810.820.2682 **C** 810.333.3201
www.lan-inc.com • JRHansen@lan-inc.com

CITY OF FLINT WTP
Filter Media Replacement
Basis of Design

				Notes
Max. Expected Flow Rate =	30.0 mgd =	20,833 gpm =	2,785 cft/min	
Max. Day May 2014 - April 2015 =	25.4 mgd =	17,639 gpm =	2,358 cft/min	
Avg. Day May 2014 - April 2015 =	18.3 mgd =	12,708 gpm =	1,699 cft/min	
Design Flow Rate =	24.0 mgd =	16,667 gpm =	2,228 cft/min	
Min. Expected Flow Rate =	8.0 mgd =	5,556 gpm =	743 cft/min	

Area / Filter =	700 sft
Number of Filters =	12

mgd	30.0	24.0	8.0
Loading (gpm/sft) =	2.48	1.98	0.66

				Notes
Top of Underdrain elev =	723.58			
Washwater Trough Weir elev =	730.67			
Operating Water Level =	734.00			
Top of Filter Basin / Floor elev =	736.00			
Filter BW Dimensional D =	7.08			
Existing Sand D =	12.00 inches =	1.00 ft		
Existing Anthracite D =	18.00 inches =	1.50 ft		
Proposed Sand D =	12.00 inches =	1.00 ft		
Proposed GAC D =	18.00 inches =	1.50 ft		See following pages for details
Proposed Water Depth =		7.92 ft		
Max Cold BW Flow rate / filter =	9800 gpm =	14.0 gpm/sft		To match current BW flow rate
Max Warm BW Flow rate / filter =	14000 gpm =	20.0 gpm/sft		Use when water temp > 65 degrees
Max Sand Expanded D =	14.2 inches =	1.18 ft =	18%	Occurs at cold temps
Max GAC Expanded D =	34.20 inches =	2.85 ft =	90%	
Total BW Expanded D =	48.40 inches =	4.03 ft		
Proposed BW Freeboard =		3.05 ft		
Proposed # of Filters to Replace	12			
GAC Volume =	12,600 cft			
GAC apparent density =	33.7 lbs/cft			
GAC Total Weight =	424,620 lbs =	212.3 tons		

mgd	30.0	24.0	8.0
EBCT (min) =	4.5	5.7	17.0

Propose to relocate intermediate chlorine feed to inlet side of weir chamber following filtration
Intermediate CL2 feed point to remain in place as means to disinfect filters in the future, if needed

mgd	30.0	24.0	8.0	Notes
Contact time (min) =	55.0	68.8	206.3	
CT =	99.0	123.8	371.4	Calculations attached separately

Required CT at 1.8 mg/l chlorine, less than 0.5 degrees C, and pH of 8.0 = 56 OK

CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation
Filter Media Analysis 2015 1st Stage

Date: 05/20/15
By: JRH
Data Entry:

WATER INPUT DATA	
Backwash Rate (gpm/sf)	14.0
Water Temperature (F°)	32
Viscosity (centipoise)	1.79355
Dynamic Viscosity (# -sec/sf)	3.746E-05
Water Density (#/cf)	62.42
Mass Density (# -sec/ft^4)	1.940

COMMENTS

SITE LOCATION	10 States		10 States Interpreted		Filtrasorb 400		Filtrasorb 300		Alt	
Media Type	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC
Bed Depth (in)	12	18	12	18	12	18	12	18	12	18
Uniformity Coefficient	2.30	1.65	2.30	1.40	2.30	1.90	2.30	2.10	2.30	1.50
Effective Size (mm)	0.400	0.550	0.40	0.800	0.40	0.650	0.40	0.800	0.40	0.650
d60% Size (mm)	0.920	0.908	0.920	1.120	0.920	1.235	0.920	1.680	0.920	0.975
d90% Size (mm)	1.607	1.269	1.607	1.403	1.607	1.899	1.607	2.762	1.607	1.279
Porosity	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50
Specific Gravity	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45
Media Density (#/cf)	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.13	7.03	3.74	7.03	6.55	7.03	2.43
Reynolds Number	2.447	0.734	2.447	1.329	2.447	1.750	2.447	4.168	2.447	0.899
Correction Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.13	7.03	3.74	7.03	6.55	7.03	2.43
Unhindered Settling Vel. (ft/sec)	20.68	6.20	20.68	11.23	20.68	14.79	20.68	35.22	20.68	7.59
Expansion Coefficient (n)	3.287	3.708	3.287	3.494	3.287	3.399	3.287	3.117	3.287	3.633
Bed Porosity Coefficient (k)	142.82	27.92	142.82	35.31	142.82	39.49	142.82	56.85	142.82	30.22
Porosity (expanded)	0.493	0.830	0.493	0.767	0.493	0.737	0.493	0.638	0.493	0.809
Bed Depth Expanded (in)	14.2	53.0	14.2	38.7	14.2	34.2	14.2	24.9	14.2	47.2
% Expanded Bed	18.4	194.4	18.4	115.0	18.4	90.1	18.4	38.1	18.4	162.0
d90gac/d10s Ratio	3.173		3.508		4.746		6.905		3.198	
Discussion/Notes										

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

PCL XL error

Subsystem: IMAGE

Error: MissingData

Operator: ReadImage

Position: 1726

Rennaker, Joanne (DEQ)

From: Hansen, Jeff <jrhansen@lan-inc.com>
Sent: Wednesday, May 20, 2015 11:20 AM
To: Prysby, Mike (DEQ)
Cc: Matta, Samir; Green, Warren; Brent Wright (bwright@cityofflint.com); mglasgow@cityofflint.com
Subject: Flint Filter Media Change to GAC
Attachments: GAC-basis-of-design.pdf

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Jeffrey R. Hansen
Senior Project Manager

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CITY OF FLINT WTP
Filter Media Replacement
Basis of Design

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Number of Filters =	12				
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Loading (gpm/sft) =	2.48	1.98	0.66		
Top of Underdrain elev =	723.58				
Washwater Trough Weir elev =	730.67				
Operating Water Level =	734.00				
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Existing Sand D =	12.00 inches =	1.00 ft			
Existing Anthracite D =	18.00 inches =	1.50 ft			
Proposed Sand D =	12.00 inches =	1.00 ft			
Proposed GAC D =	18.00 inches =	1.50 ft			See following pages for details
Proposed Water Depth =		7.92 ft			
Max Cold BW Flow rate / filter =	9800 gpm =	14.0 gpm/sft			To match current BW flow rate
Max Warm BW Flow rate / filter =	14000 gpm =	20.0 gpm/sft			Use when water temp > 65 degrees
Max Sand Expanded D =	14.2 inches =	1.18 ft =	18%		Occurs at cold temps
Max GAC Expanded D =	34.20 inches =	2.85 ft =	90%		
Total BW Expanded D =	48.40 inches =	4.03 ft			
Proposed BW Freeboard =		3.05 ft			
Proposed # of Filters to Replace	12				
GAC Volume =	12,600 cft				
GAC apparent density =	33.7 lbs/cft				
GAC Total Weight =	424,620 lbs =	212.3 tons			
mgd	30.0	24.0	8.0		
EBCT (min) =	4.5	5.7	17.0		

Propose to relocate intermediate chlorine feed to inlet side of weir chamber following filtration
Intermediate CL2 feed point to remain in place as means to disinfect filters in the future, if needed

mgd	30.0	24.0	8.0	Notes
Contact time (min) =	55.0	68.8	206.3	
CT =	99.0	123.8	371.4	Calculations attached separately

Required CT at 1.8 mg/l chlorine, less than 0.5 degrees C, and pH of 8.0 = 56 OK

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation
Filter Media Analysis 2015 1st Stage

Date: 05/20/15
By: JRH
Data Entry:

WATER INPUT DATA	
Backwash Rate (gpm/sf)	14.0
Water Temperature (F°)	32
Viscosity (centipoise)	1.79355
Dynamic Viscosity (# -sec/sf)	3.746E-05
Water Density (#/cf)	62.42
Mass Density (# -sec/ft^4)	1.940

COMMENTS

SITE LOCATION	10 States		10 States Interpreted		Filtrasorb 400		Filtrasorb 300		Alt	
Media Type	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC
Bed Depth (in)	12	18	12	18	12	18	12	18	12	18
Uniformity Coefficient	2.30	1.65	2.30	1.40	2.30	1.90	2.30	2.10	2.30	1.50
Effective Size (mm)	0.400	0.550	0.40	0.800	0.40	0.650	0.40	0.800	0.40	0.650
d60% Size (mm)	0.920	0.908	0.920	1.120	0.920	1.235	0.920	1.680	0.920	0.975
d90% Size (mm)	1.607	1.269	1.607	1.403	1.607	1.899	1.607	2.762	1.607	1.279
Porosity	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50
Specific Gravity	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45
Media Density (#/cf)	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.13	7.03	3.74	7.03	6.55	7.03	2.43
Reynolds Number	2.447	0.734	2.447	1.329	2.447	1.750	2.447	4.168	2.447	0.899
Correction Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Min. Fluidization Rate (gpm/sf)	7.03	2.14	7.03	3.13	7.03	3.74	7.03	6.55	7.03	2.43
Unhindered Settling Vel. (ft/sec)	20.68	6.20	20.68	11.23	20.68	14.79	20.68	35.22	20.68	7.59
Expansion Coefficient (n)	3.287	3.708	3.287	3.494	3.287	3.399	3.287	3.117	3.287	3.633
Bed Porosity Coefficient (k)	142.82	27.92	142.82	35.31	142.82	39.49	142.82	56.85	142.82	30.22
Porosity (expanded)	0.493	0.830	0.493	0.767	0.493	0.737	0.493	0.638	0.493	0.809
Bed Depth Expanded (in)	14.2	53.0	14.2	38.7	14.2	34.2	14.2	24.9	14.2	47.2
% Expanded Bed	18.4	194.4	18.4	115.0	18.4	90.1	18.4	38.1	18.4	162.0
d90gac/d10s Ratio	3.173		3.508		4.746		6.905		3.198	
Discussion/Notes										

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

001557

CITY OF FLINT- DEPARTMENT OF PUBLIC UTILITIES

GAC Filter Evaluation
Filter Media Analysis 2015 1st Stage

Date: 05/20/15
By: JRH
Data Entry:

WATER INPUT DATA	
Backwash Rate (gpm/sf)	20.0
Water Temperature (F°)	80
Viscosity (centipoise)	0.86134
Dynamic Viscosity (# -sec/sf)	1.799E-05
Water Density (#/cf)	62.22
Mass Density (# -sec/ft^4)	1.927

COMMENTS

SITE LOCATION	10 States		10 States Interpreted		Filtrasorb 400		Filtrasorb 300		Alt	
Media Type	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC	Ex. Sand	GAC
Bed Depth (in)	12	18	12	18	12	18	12	18	12	18
Uniformity Coefficient	2.30	1.65	2.30	1.40	2.30	1.90	2.30	2.10	2.30	1.50
Effective Size (mm)	0.400	0.550	0.400	0.800	0.400	0.650	0.400	0.800	0.400	0.650
d60% Size (mm)	0.920	0.908	0.920	1.120	0.920	1.235	0.920	1.680	0.920	0.975
d90% Size (mm)	1.607	1.269	1.607	1.403	1.607	1.899	1.607	2.762	1.607	1.279
Porosity	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50	0.40	0.50
Specific Gravity	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45	2.554	1.45
Media Density (#/cf)	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5	159.4	90.5
Min. Fluidization Rate (gpm/sf)	13.38	4.09	13.38	6.00	13.38	7.16	13.38	12.54	13.38	4.66
Reynolds Number	9.640	2.905	9.640	5.259	9.640	6.928	9.640	16.499	9.640	3.557
Correction Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.828	1.000	1.000
Min. Fluidization Rate (gpm/sf)	13.38	4.09	13.38	6.00	13.38	7.16	13.38	10.39	13.38	4.66
Unhindered Settling Vel. (ft/sec)	81.46	24.55	81.46	44.44	81.46	58.54	81.46	139.42	81.46	30.06
Expansion Coefficient (n)	2.866	3.231	2.866	3.045	2.866	2.962	2.866	2.716	2.866	3.166
Bed Porosity Coefficient (k)	184.94	38.40	184.94	49.50	184.94	55.84	184.94	68.25	184.94	41.83
Porosity (expanded)	0.460	0.817	0.460	0.743	0.460	0.707	0.460	0.636	0.460	0.792
Bed Depth Expanded (in)	13.3	49.2	13.3	35.0	13.3	30.7	13.3	24.8	13.3	43.3
% Expanded Bed	11.2	173.5	11.2	94.3	11.2	70.7	11.2	37.5	11.2	140.5
d90gac/d10s Ratio	3.173		3.508		4.746		6.905		3.198	
Discussion/Notes										

CITY OF FLINT, MICHIGAN 1855

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

CITY OF FLINT WTP

CT CALCS

TIME FROM FILTERS EFFLUENT TO 1ST TAP

Label	Location	Diameter in	Diameter ft	L ft	W ft	D ft	Bottom elev	Vol cft	Flow Rate mgd	Flow Rate cft/s	Baffle Factor	Time min	Velocity fps	Flow Rate mgd	Flow Rate cft/s	Time min	Flow Rate mgd	Flow Rate cft/s	Time min
A	Weir chamber, pre-baffle			26.75	13.08	15.5	709.00	5423	30.0	46.4	1.0	1.95	0.23	24.0	37.1	2.43	8.0	12.4	7.30
B	Weir chamber, post-baffle			26.75	8.5	10.0	709.00	2274	30.0	46.4	1.0	0.82	0.55	24.0	37.1	1.02	8.0	12.4	3.06
	Effluent pipe																		
C	wc - bldg face	48	4.00	16.00				201	30.0	46.4	1.0	0.07	3.69	24.0	37.1	0.09	8.0	12.4	0.27
D	bldg face - junct well	48	4.00	401.00				5039	30.0	46.4	1.0	1.81	3.69	24.0	37.1	2.26	8.0	12.4	6.79
	Res. 3																		
E	Junct well			12.00	18.00	15.0	704.00	3240	30.0	46.4	1.0	1.16	0.17	24.0	37.1	1.45	8.0	12.4	4.36
F	Clear well			140.00	177	10.0	709.00	247,800	30.0	46.4	0.5	44.49	0.05	24.0	37.1	55.61	8.0	12.4	166.83
G	Transfer chamber			7.00	55.25	15.0	704.00	5,801	30.0	46.4	1.0	2.08	0.06	24.0	37.1	2.60	8.0	12.4	7.81
H	Suction well			9.00	25.75	15.0	704.00	3,476	30.0	46.4	1.0	1.25	0.12	24.0	37.1	1.56	8.0	12.4	4.68
	Pump																		
I	Suction pipe	36	3.00	12.00				85	30.0	46.4	1.0	0.03	6.57	24.0	37.1	0.04	8.0	12.4	0.11
J	Discharge pipe	30	2.50	20.00				98	30.0	46.4	1.0	0.04	9.46	24.0	37.1	0.04	8.0	12.4	0.13
K	Dis. pipe (to bldg face)	42	3.50	34.00				327	30.0	46.4	1.0	0.12	4.82	24.0	37.1	0.15	8.0	12.4	0.44
	Finish main 1																		
L1	bldg face - 1st tee	42	3.50	208.00				2001	30.0	46.4	1.0	0.72	4.82	24.0	37.1	0.90	8.0	12.4	2.69
M1	tee - WTP tap	42	3.50	223.00				2146	30.0	46.4	1.0	0.77	4.82	24.0	37.1	0.96	8.0	12.4	2.89
N1	WTP tap - bldg face	12	1.00	19.00				15	30.0	46.4	1.0	0.005	59.10	24.0	37.1	0.01	8.0	12.4	0.02
	Subtotal											1.49				1.87			5.60
	Finish main 2																		
L2	bldg face - 1st tee	42	3.50	73.00				702	30.0	46.4	1.0	0.25	4.82	24.0	37.1	0.32	8.0	12.4	0.95
M2	tee - 1st split	42	3.50	277.00				2665	30.0	46.4	1.0	0.96	4.82	24.0	37.1	1.20	8.0	12.4	3.59
	Subtotal											1.21				1.51			4.53
								Total CT time	@ 36 mgd =			55.0		@ 24 mgd =		68.8	@ 12 mgd =		206.3

	2014								2015						
Month	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Min	Avg	Max
Cl2	5.0	4.7	3.9	3.3	3.1	2.5	2.0	1.8	1.8	2.1	2.4	2.0	1.8	2.9	5.0
pH	7.37	7.48	7.62	7.78	7.82	7.71	7.87	8.07	7.74	7.84	7.89	7.83	7.4	7.8	8.1

Flow (mgd)	30.0	24.0	8.0
CT =	99.0	123.8	371.4

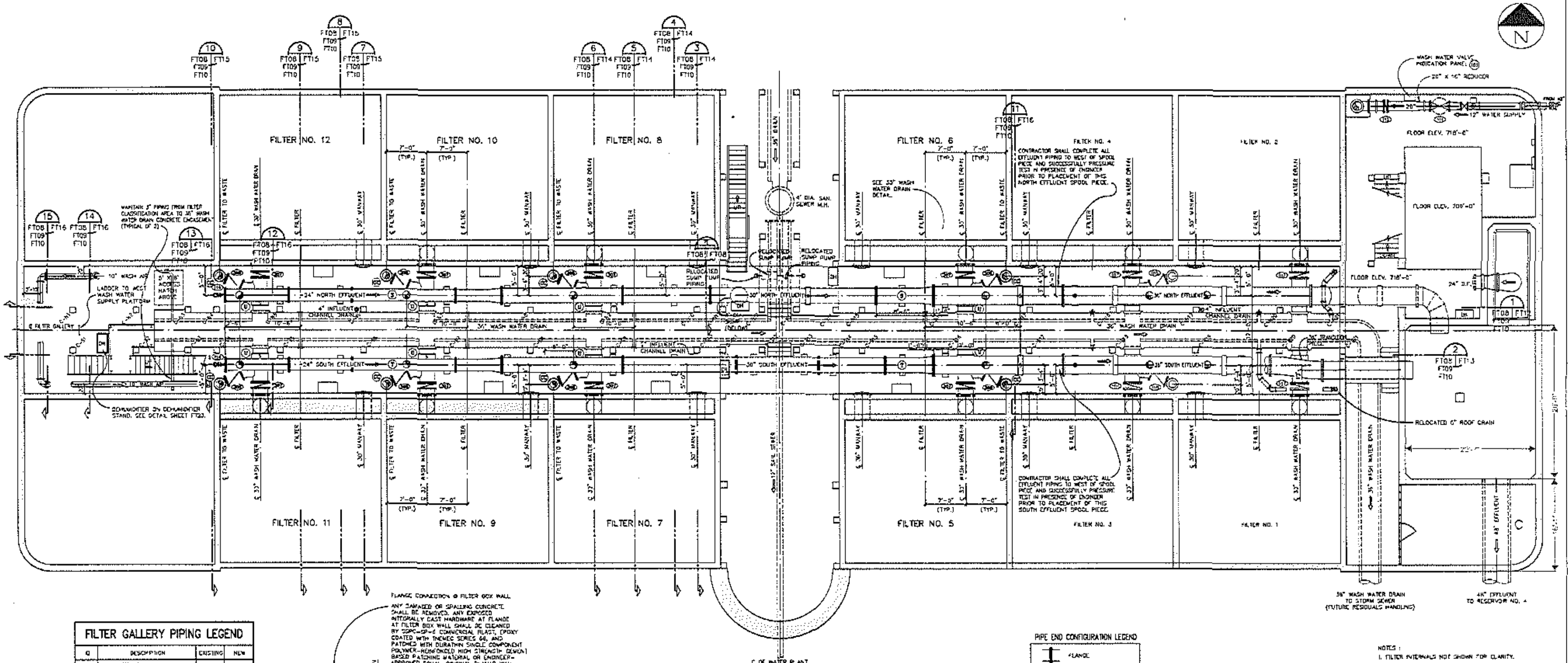
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Table C-1. CT Values for Inactivation of *Giardia* Cysts by Free Chlorine at 0.5°C or Lower

CHLORINE CONCENTRATION	pH<=6 Log Inactivation						pH=6.5 Log Inactivation						pH=7.0 Log Inactivation						pH=7.5 Log Inactivation					
(mg/L)	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	23	46	69	91	114	137	27	54	82	109	136	163	33	65	98	130	163	195	40	79	119	158	198	237
0.6	24	47	71	94	118	141	28	56	84	112	140	169	33	67	100	133	167	200	40	80	120	159	199	239
0.8	24	48	73	97	121	145	29	57	86	115	143	172	34	68	103	137	171	205	41	82	123	164	205	246
1	25	49	74	99	123	148	29	59	88	117	147	176	35	70	105	140	175	210	42	84	127	169	211	253
1.2	25	51	76	101	127	152	30	60	90	120	150	180	36	72	108	143	179	215	43	86	130	173	216	259
1.4	26	52	78	103	129	155	31	61	92	123	153	184	37	74	111	147	184	221	44	89	133	177	222	266
1.6	26	52	79	105	131	157	32	63	95	126	155	189	38	75	113	151	188	226	46	91	137	182	228	273
1.8	27	54	81	108	135	162	32	64	97	129	161	193	39	77	116	154	193	231	47	93	140	186	233	279
2	28	55	83	110	138	165	33	66	99	131	164	197	39	79	118	157	197	236	48	95	143	191	238	286
2.2	28	56	85	113	141	169	34	67	101	134	169	201	40	81	121	161	202	242	50	99	149	198	248	297
2.4	29	57	86	115	143	172	34	68	103	137	171	205	41	82	124	165	206	247	50	99	149	199	248	298
2.6	29	58	88	117	146	175	35	70	105	139	174	209	42	84	126	168	210	252	51	101	152	203	253	304
2.8	30	59	89	119	148	178	36	71	107	142	178	213	43	86	129	171	214	257	52	103	155	207	258	310
3	30	60	91	121	151	181	36	72	109	145	181	217	44	87	131	174	218	261	53	105	158	211	263	316

CHLORINE CONCENTRATION	pH=8.0 Log Inactivation						pH=8.5 Log Inactivation						pH=9.0 Log Inactivation					
(mg/L)	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	46	92	139	185	231	277	55	110	165	219	274	329	65	130	195	260	325	390
0.6	48	95	143	191	238	286	57	114	171	228	285	342	68	136	204	271	339	407
0.8	49	98	148	197	246	295	59	113	177	236	295	354	70	141	211	281	352	422
1	51	101	152	203	253	304	61	122	183	243	304	365	73	146	219	291	364	437
1.2	52	104	157	209	261	313	63	125	188	251	313	376	75	150	226	301	376	451
1.4	54	107	161	214	268	321	65	129	194	258	323	387	77	155	232	309	387	464
1.6	55	110	165	219	274	329	66	132	199	265	331	397	80	159	239	318	398	477
1.8	56	113	169	225	282	338	68	136	204	271	339	407	82	163	245	326	408	489
2	55	115	173	231	288	346	70	139	209	278	348	417	83	167	250	333	417	500
2.2	59	118	177	235	294	353	71	142	213	284	355	426	85	170	256	341	426	511
2.4	60	120	181	241	301	361	73	145	218	290	363	435	87	174	261	348	435	522
2.6	61	123	184	245	307	368	74	148	222	296	370	444	89	178	267	355	444	533
2.8	63	125	188	250	313	375	75	151	226	301	377	452	91	181	272	362	453	543
3	64	127	191	255	318	382	77	153	230	307	383	460	92	184	276	369	460	552

Source: AWWA, 1991.

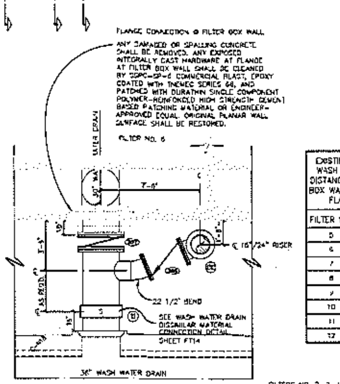


NOTES :

1. FILTER INTERNALS NOT SHOWN FOR CLARITY.
2. SUPPORT MECHANISMS FOR VALVES, ACTUATORS, & PIPING NOT SHOWN FOR CLARITY. REFER TO 1/4 SCALE SECTIONS FOR SUPPORT LOCATIONS.
3. HANDRAIL NOT SHOWN FOR CLARITY. SEE NEW FILTER GALLERY SECTION FOR NEW HANDRAIL AT FLOOR ELEV. 718'± AT TOP OF 36" WASH WATER DRAIN CONCRETE ENCASEMENT.

FILTER GALLERY PIPING LEGEND

Q	DESCRIPTION	EXISTING	NEW
P	WASH WATER SUPPLY – GALLERY SERVING FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
Q	REWASH FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	NO
R	EFFLUENT FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
S	NORTH EFFLUENT	YES	YES
T	SOUTH EFFLUENT	YES	YES
U	WASH WATER DRAIN FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
V	INFLUENT FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	YES
W	SURFACE WASH FILTERS NO. 5 – NO. 12, INCLUSIVE	YES	NO
X	PLANT WATER AND SURFACE WASH	YES	NO
AA	WASH AIR SUPPLY – GALLERY	YES	NO
BB	WASH AIR SUPPLY FILTERS NO. 5 – NO. 12, INCLUSIVE	NO	YES
CC	FILTER TO WASTE SERVING FILTERS NO. 5 – NO. 12, INCLUSIVE	NO	YES
DD	PROCESS WATER	NO	YES
EE	WASH WATER SUPPLY – WEST	NO	YES



EXISTING CAST IRON WASH WATER DRAIN DISTANCE FROM FILTER BOX WALL TO FLANGE/ FLANGE FACE	
FILTER NO.	DISTANCE "D"
5	8.5"±
6	10"±
7	8.5"±
8	8.5"±
9	8.5"±
10	6"±
11	9.75"±
12	8.5"±

FILTERS NO. 7, 9, & 11 SIMILAR.
FILTERS NO. 5, 8, 10, & 12 OPPOSITE HAND.

30" WASH WATER DRAIN DETAIL

SCALE : 1/4" = 1'-0"

FILTER PLAN – EL. 720'-0"

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

GENERAL NOTE

ALL DRAWINGS ARE A REPRESENTATION OF ACTUAL CONDITIONS BASED ON 1952 CONSTRUCTION PLAN DRAWINGS. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, SIZES, AND LOCATIONS OF ALL RELEVANT ITEMS.

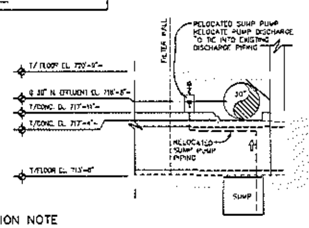
GENERAL NOTE NO. 1

THIS NOTE APPLIES TO DRAWINGS FT01 THROUGH FT28

THE WORK ARE FOR ALL CONCRETE SURFACES THAT ARE REPAIRED, INFILLED OR PATCHED SHALL BE SMOOTH AND FLUSH WITH SURROUNDING CONCRETE SURFACES. IF NECESSARY THE CONTRACTOR SHALL GRIND THE NEW SURFACES TO BE FLUSH WITH THE ADJOINING SURFACES.

PIPE END CONFIGURATION LEGEND

- FLANGE
- GROOVED END COUPLING
- SLEEVE TYPE COUPLING

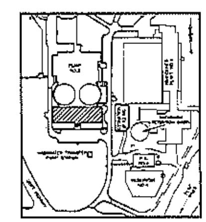


GENERAL CONSTRUCTION NOTE

NO MOUNTING OR FASTENING OF ANY TEMPORARY OR PERMANENT EQUIPMENT, SUPPORTS, OR DEVICES TO THE CONCRETE OF THE FILTER BOXES OR INFLUENT CHANNEL IS PERMITTED.

SECTION 1 FT08 FT08

SCALE : 1/4" = 1'-0"



KEY PLAN

THE DLZ TEAM

FLINT — MICHIGAN

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS & UTILITIES

WATER TREATMENT PLANT REHABILITATION
PHASE I, SEGMENT 4

FILTER REHABILITATION
NEW FILTER PLAN – EL. 720'-0"

DRAWN	J.B.P.
CHK'D.	C.A.P.
APPR'D	C.A.P.
DATE	JUNE 2002
PROJECT NUMBER	7019-04

NO.	REVISION	BY	DATE
1	ADDENDUM NO. 1 REVISION	JO	10/03
2	AS-BUILT	DJV	8/05

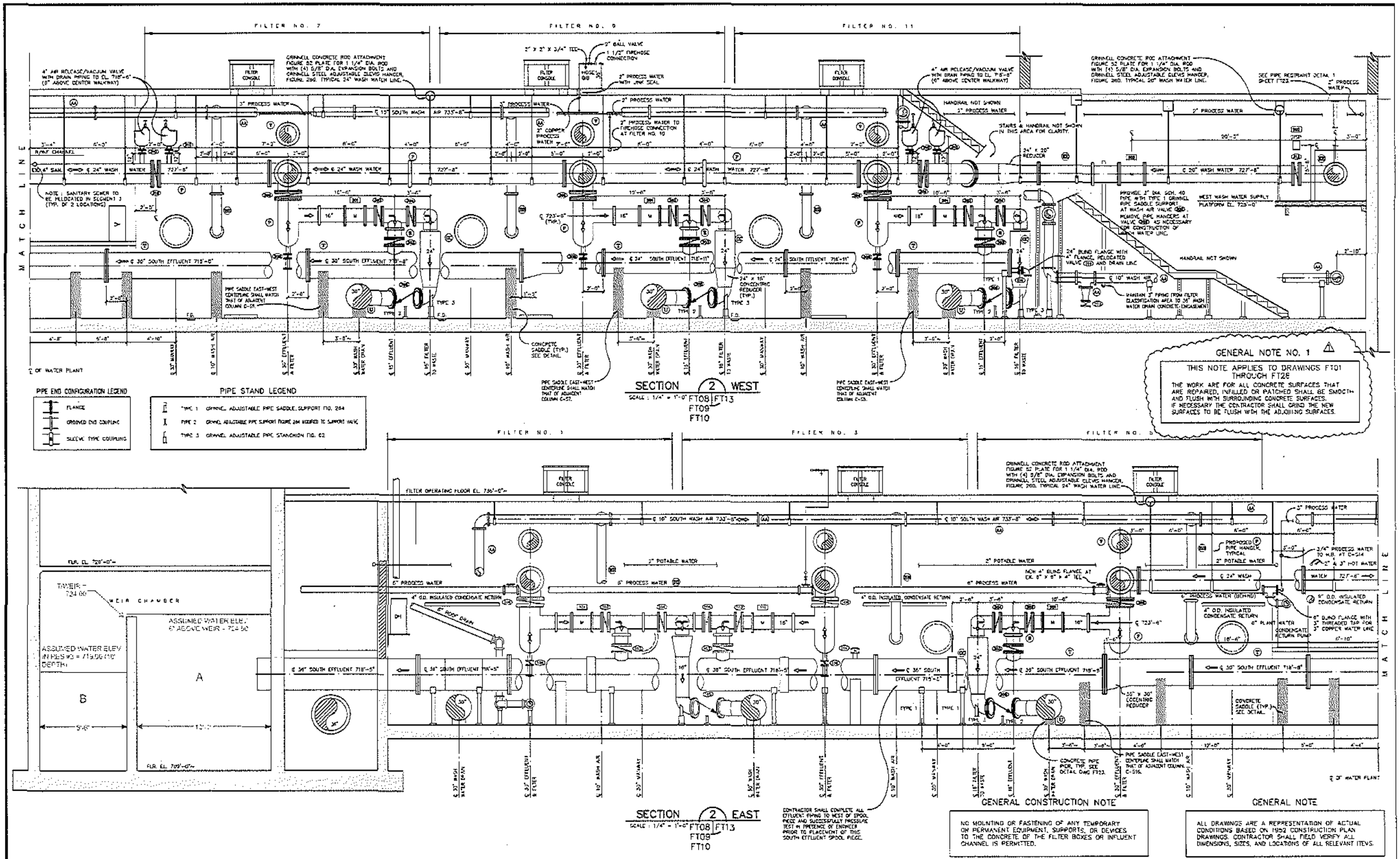
SHEET

OF

DRAWING NUMBER

FT08

001561



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GENERAL NOTE

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THE DLZ TEAM

FLINT MICHIGAN

CITY OF FLINT
DEPARTMENT OF PUBLIC WORKS & UTILITIES

WATER TREATMENT PLANT REHABILITATION
PHASE I, SEGMENT 4

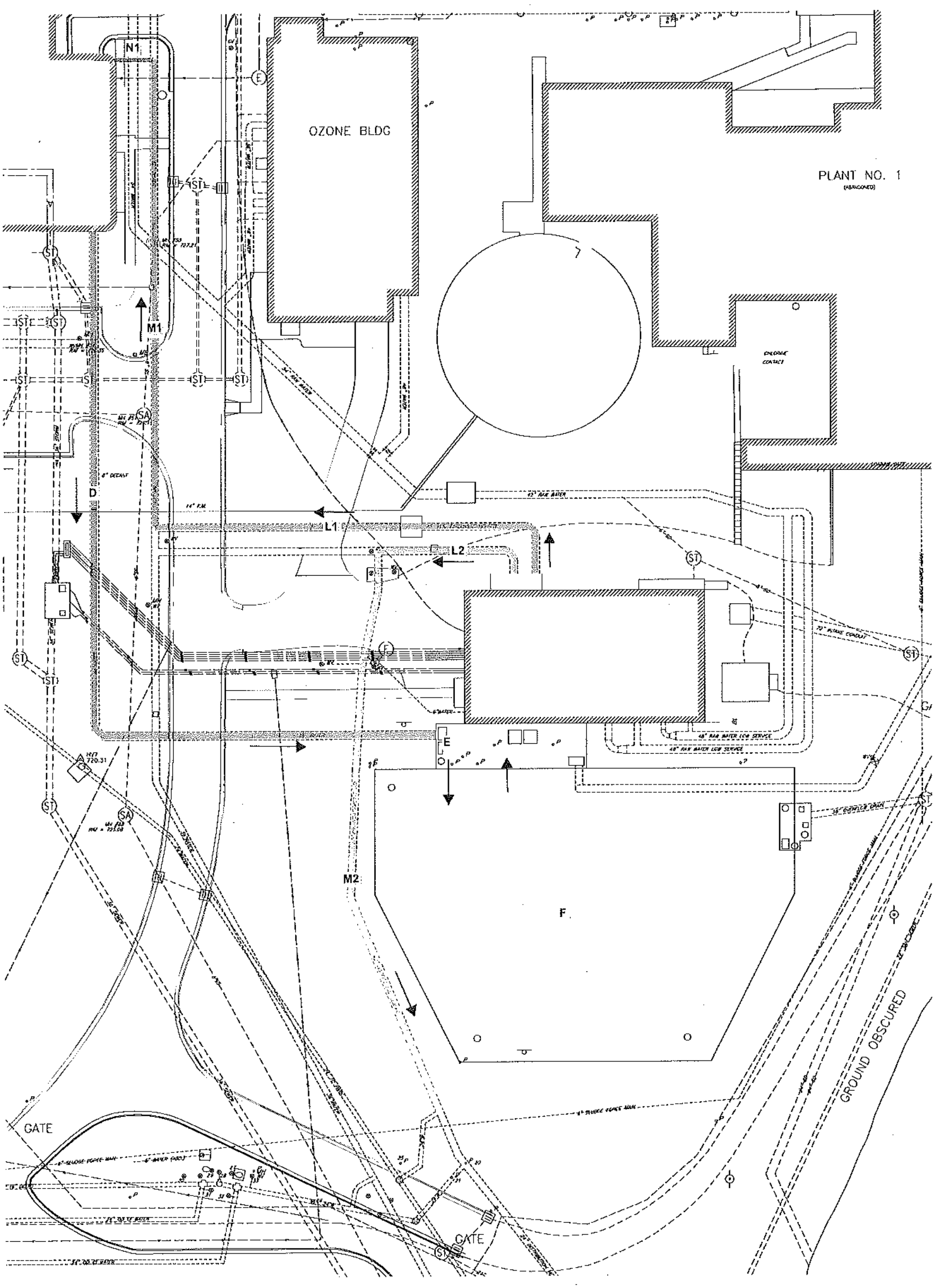
FILTER REHABILITATION
NEW FILTER GALLERY SECTIONS

DRAWN	J.B.P.
CHK'D.	C.A.P.
APPR'D	C.A.P.
DATE	JUNE 2002
PROJECT NUMBER	7019-04

NO.	REVISION	BY	DATE
1	ADDENDUM NO. 1 REVISION	JO	10/03
	AS-BUILT	DJM	8/05

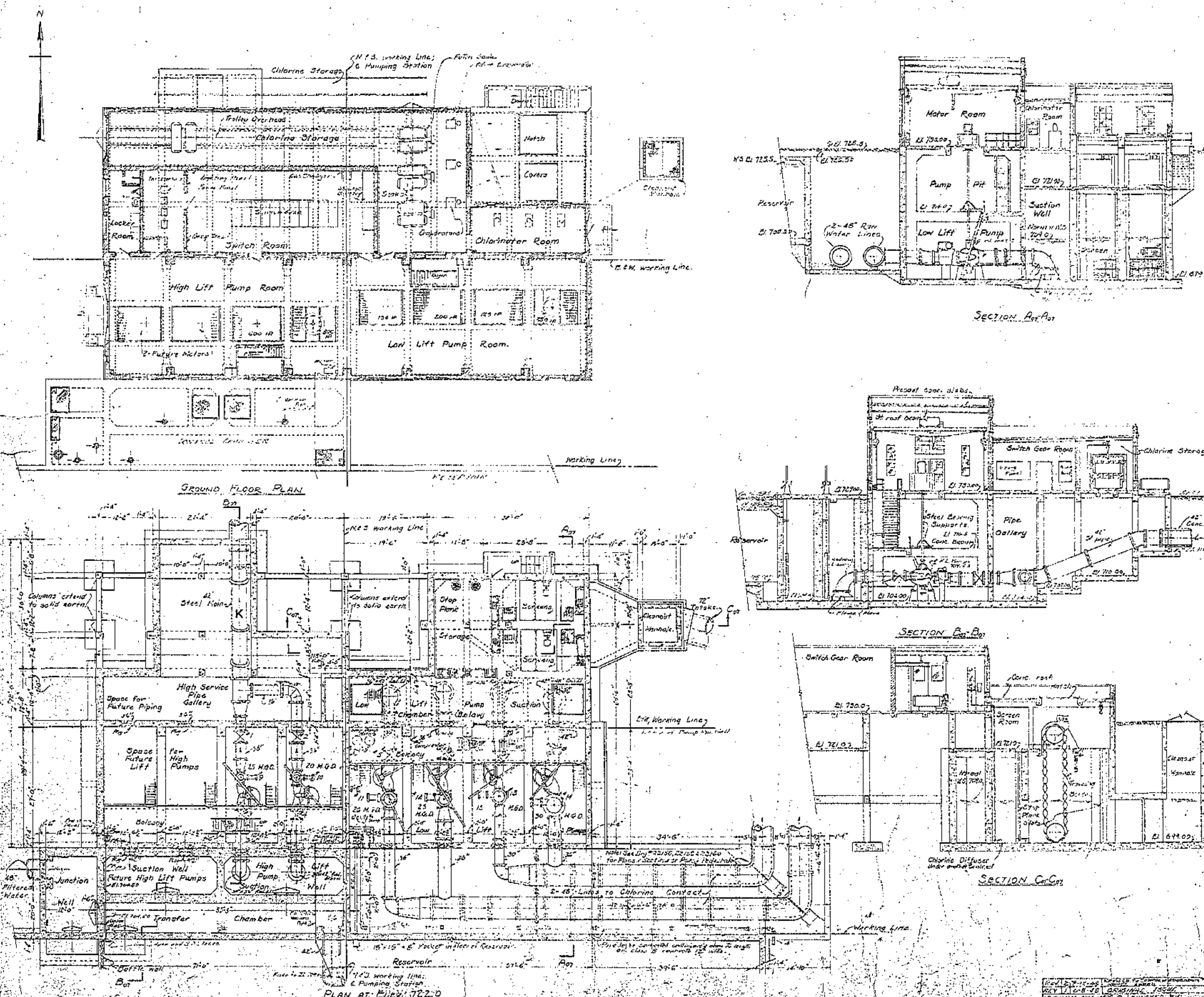
SHEET
OF
DRAWING NUMBER
FT13

001562


OZONE BLDG
PLANT NO. 1
N1
M1
D
L1
L2
E
F
M2
GATE
GATE
GROUND OBSCURED


CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
GENERAL PLAN
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
JUNE, 1948
22101-2
Note:
Existing Structures are dotted.
Structures under this Contract are shaded.
FLINT RIVER
INTAKE
PUMPING STATION No. 3
UNDERGROUND RESERVOIR No. 3
EXISTING CLARIFIER
CHLORINE CONTACT
EXISTING SOFTENING PLANT
CONNECTION TO OLD CHLORINE CONTACT
INLET CHAMBER OLD RESERVOIR
Lift Station
Here or Here
Relocate 6" Sludge Force Main
Existing Drive
Existing Fence
Construction Baseline "B"
Construction Baseline "A"

001564



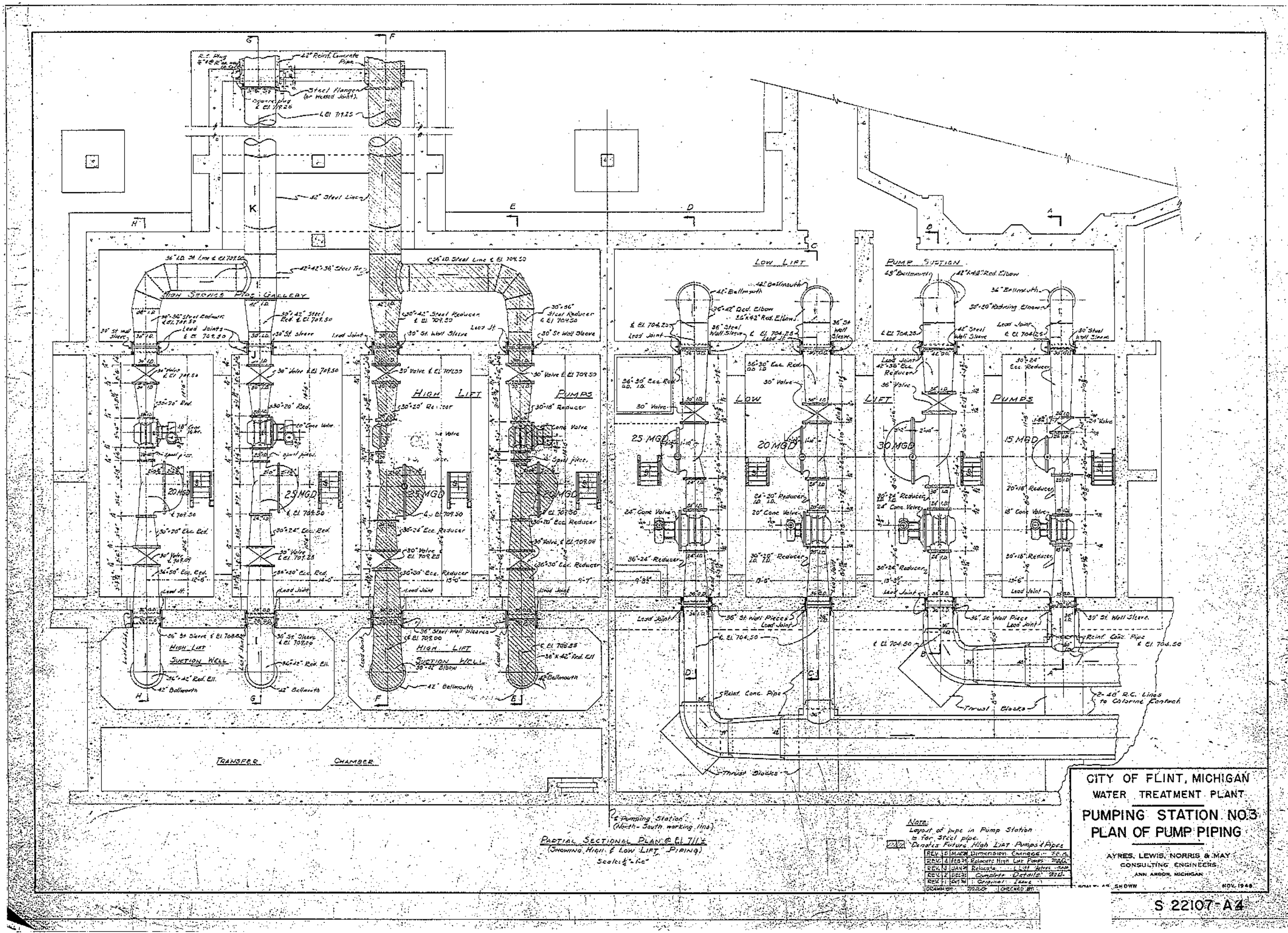
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT

PUMPING STATION NO. 3
GENERAL PLAN

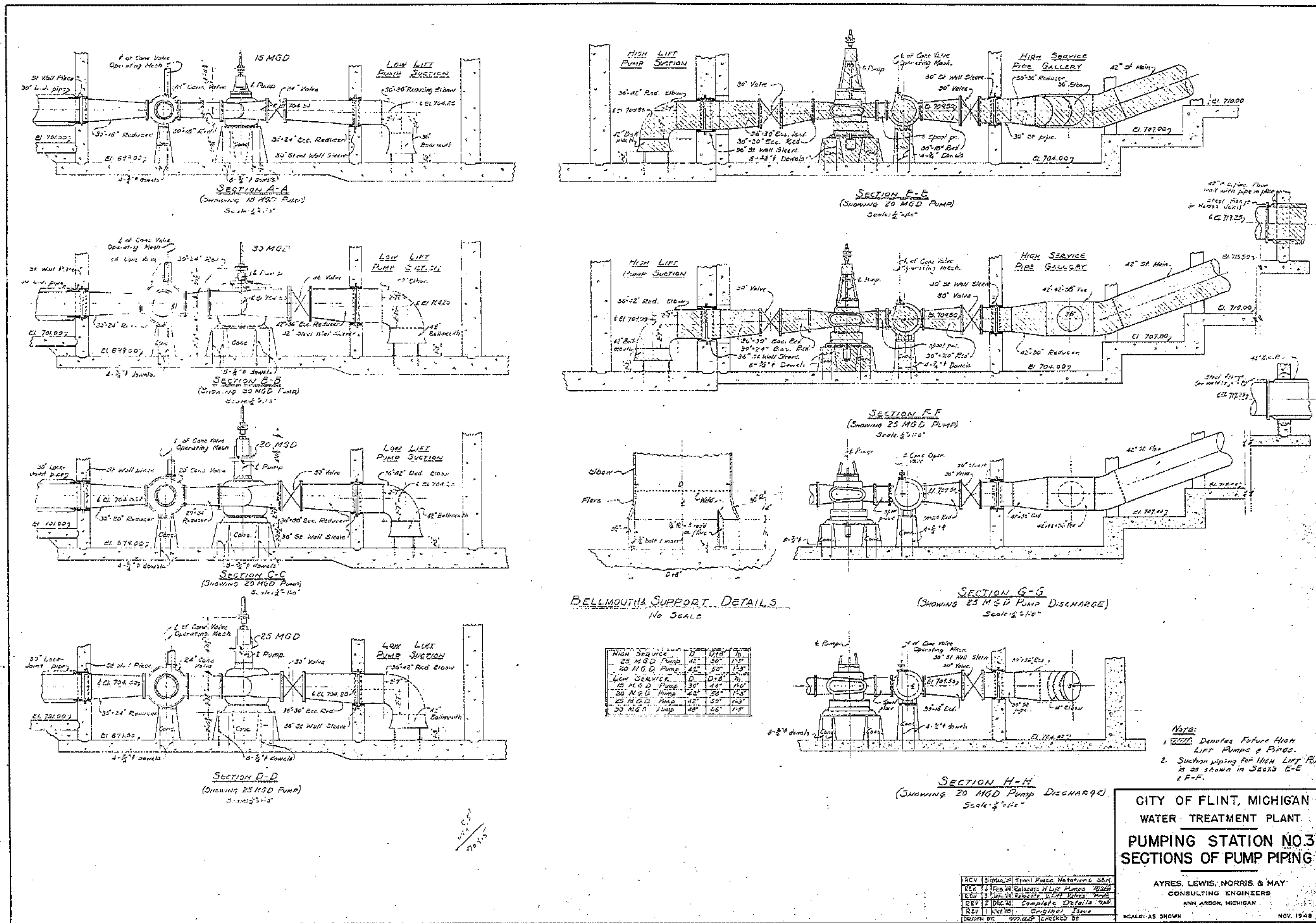
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN

SCALE: 1" = 10'-0"   JUNE 1948

22107-2

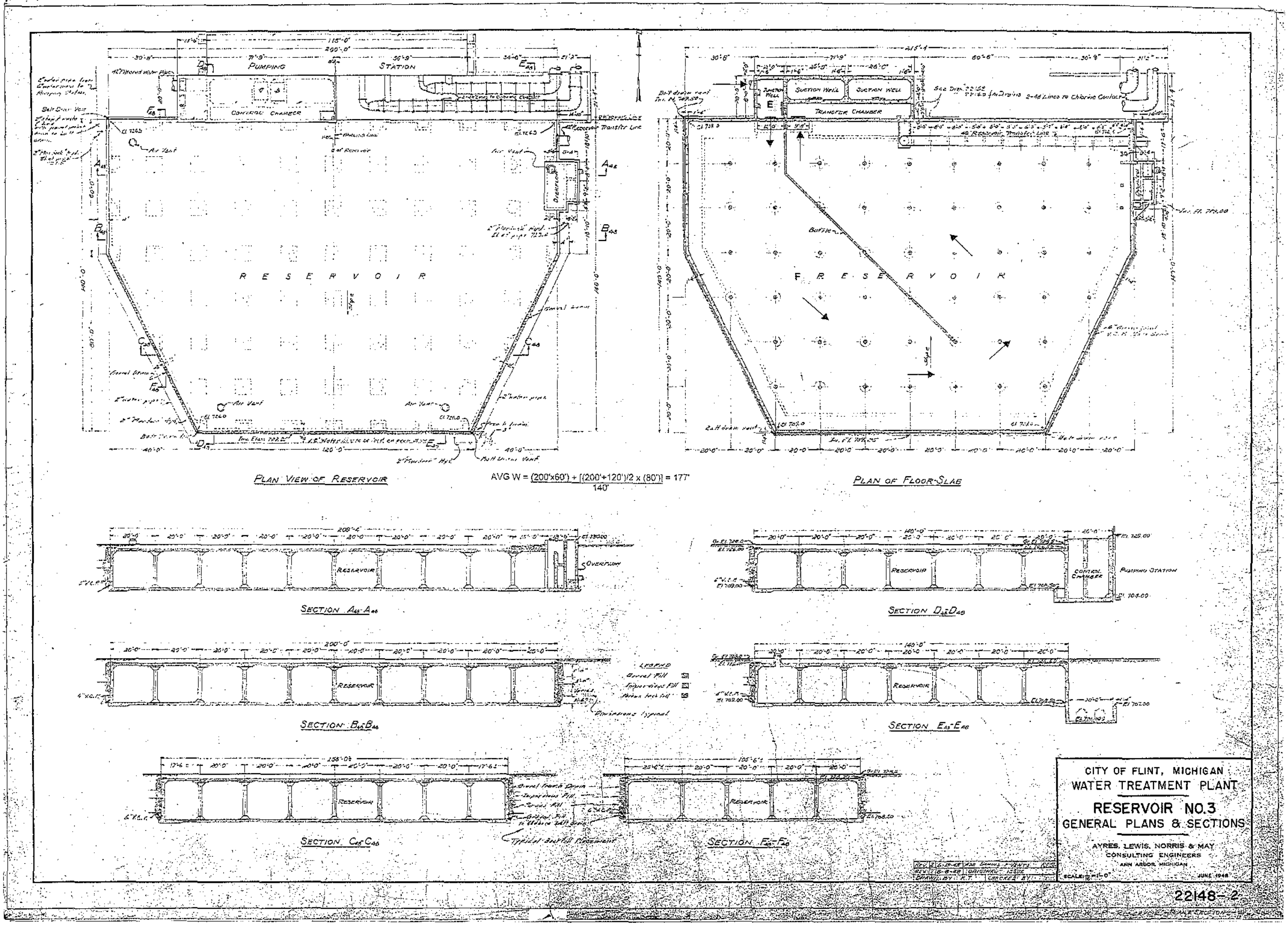

CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
PUMPING STATION NO.3
PLAN OF PUMP PIPING
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
NOV. 1948
S 22107-A4
PARTIAL SECTIONAL PLAN @ EL 711½
(SHOWING HIGH & LOW LIFT PIPING)
Note:
Layout of pipe in Pump Station is for Steel pipe.
Denotes Future High Lift Pumps & Pipes
HIGH SERVICE PIPE GALLERY
HIGH LIFT PUMPS
HIGH LIFT SUCTION WELL
TRANSFER CHAMBER
LOW LIFT
PUMP SUCTION
LOW LIFT PUMPS
25 MGD
20 MGD
30 MGD
15 MGD
42" Steel Line
42" Reinf. Concrete Pipe
2-40" R.C. Lines to Chlorine Contact
Thrust Blocks
Reinf. Conc. Pipe
Pumping Station (North-South working line)

001566



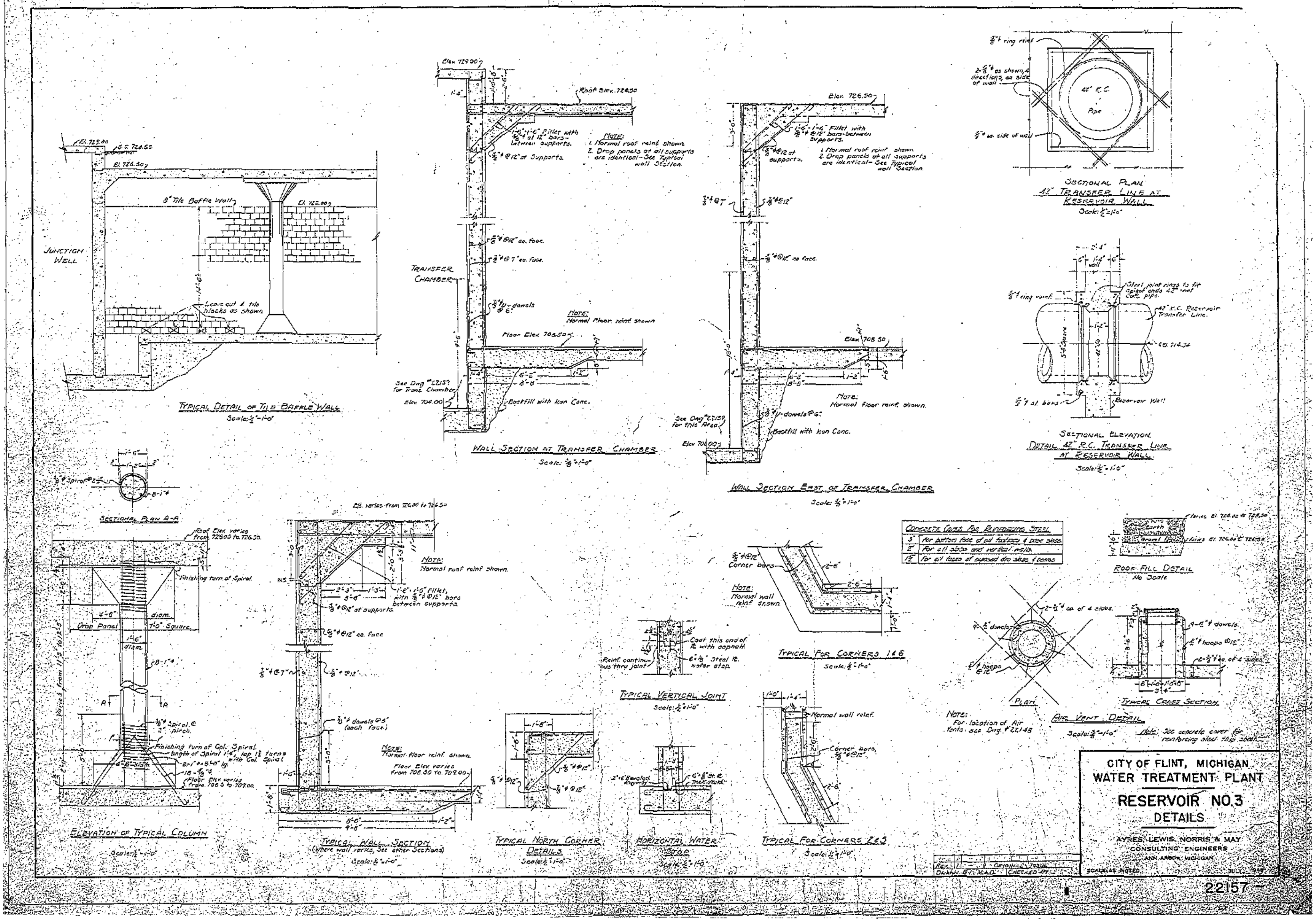
High Service	D	D+8"	h
25 M.G.D. Pump	42"	50"	1'-3"
20 M.G.D. Pump	42"	50"	1'-3"
Low Service	D	D+8"	h
15 M.G.D. Pump	36"	44"	1'-0"
20 M.G.D. Pump	42"	50"	1'-5"
25 M.G.D. Pump	42"	50"	1'-3"
30 M.G.D. Pump	48"	56"	1'-5"

001567

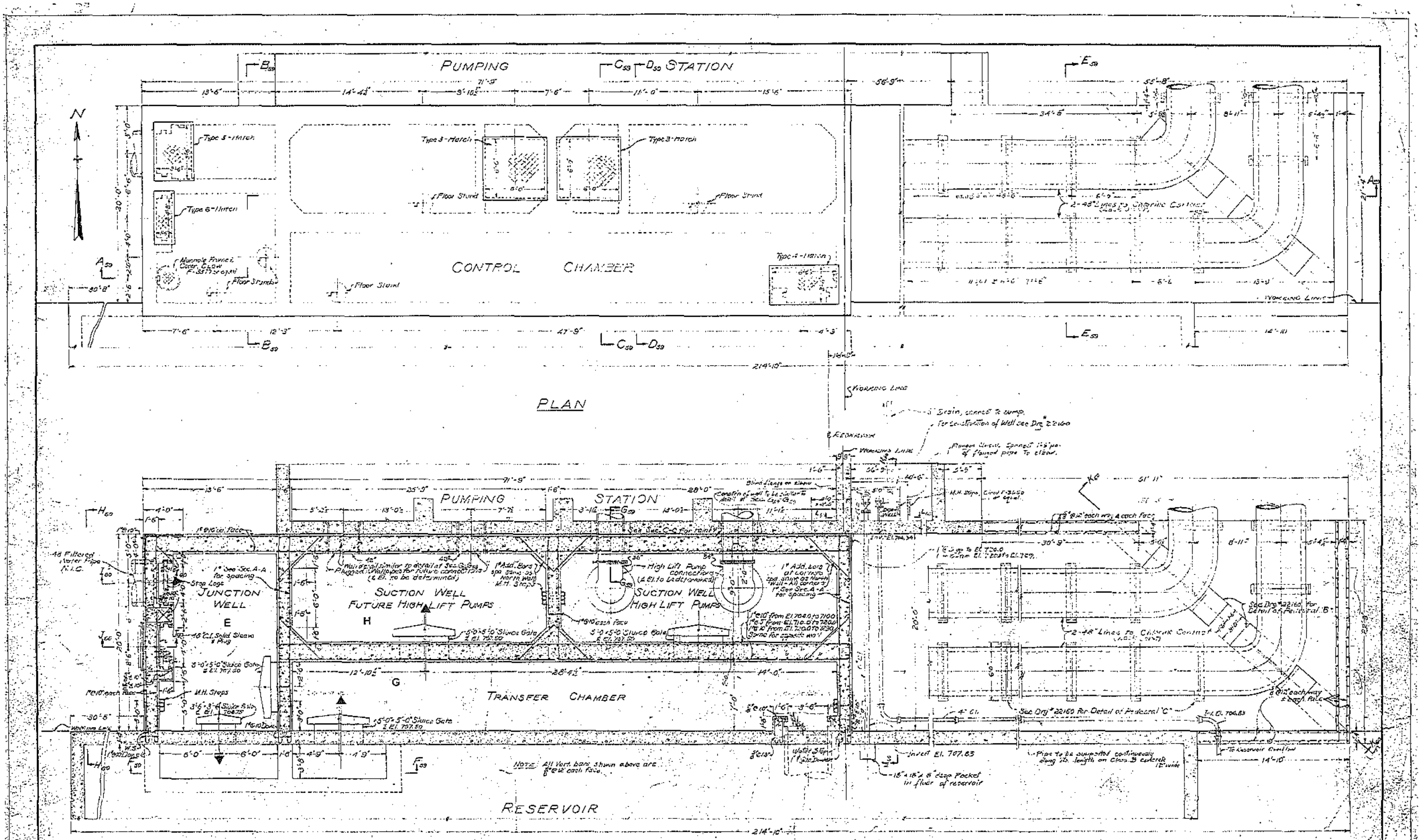


AVG W = (200'x60') + [(200'+120')/2 x (80')] = 177'
140'

001568



TYPICAL DETAIL OF TILE BAFFLE WALL
Scale: ½"=1'-0"
JUNCTION WELL
8" Tile Baffle Wall
Leave out 4 tile blocks as shown.
WALL SECTION AT TRANSFER CHAMBER
Scale: ⅜"=1'-0"
TRANSFER CHAMBER
Roof Slab Elev. 726.50
Note:
1. Normal roof reinf. shown.
2. Drop panels at all supports are identical - See Typical wall Section.
Normal floor reinf. shown
Floor Elev. 706.50
Backfill with lean Conc.
WALL SECTION EAST OF TRANSFER CHAMBER
Scale: ⅜"=1'-0"
Elev. 726.50
Elev. 705.50
Elev. 701.00
Normal floor reinf. shown.
SECTIONAL PLAN 42" TRANSFER LINE AT RESERVOIR WALL
Scale: ½"=1'-0"
42" R.C. Pipe
SECTIONAL ELEVATION DETAIL 42" R.C. TRANSFER LINE AT RESERVOIR WALL
Scale: ½"=1'-0"
Steel joint rings to fit spigot ends 42" reinf. conc. pipe.
42" R.C. Reservoir Transfer Line.
Reservoir Wall
SECTIONAL PLAN A-A
ELEVATION OF TYPICAL COLUMN
Scale: ½"=1'-0"
Drop Panel
7'-0" Square.
Finishing turn of Spiral.
TYPICAL WALL SECTION
(Where wall varies, see other Sections)
Scale: ⅜"=1'-0"
Normal roof reinf. shown.
Normal floor reinf. shown.
Floor Elev. varies from 708.50 to 709.00
CONCRETE COVER FOR REINFORCING STEEL
3" For bottom face of all footings & base slabs.
2" For all slabs and vertical walls.
1½" For all faces of exposed drop slabs & columns
TYPICAL FOR CORNERS 1 & 6
Scale: ½"=1'-0"
Normal wall reinf. shown.
TYPICAL VERTICAL JOINT
Scale: ½"=1'-0"
Coat this end of PL with asphalt.
6"×⅛" Steel PL water stop
Reinf. continuous thru joint
TYPICAL NORTH CORNER DETAILS
Scale: ½"=1'-0"
HORIZONTAL WATER STOP
Scale: ½"=1'-0"
TYPICAL FOR CORNERS 2 & 5
Scale: ½"=1'-0"
Normal wall reinf.
ROOF FILL DETAIL
No Scale
AIR VENT DETAIL
Scale: ½"=1'-0"
PLAN
TYPICAL CROSS SECTION
Note: For location of Air Vents see Dwg. #22148
Note: See concrete cover for reinforcing steel this sheet.
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO. 3
DETAILS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
SCALE AS NOTED
22157



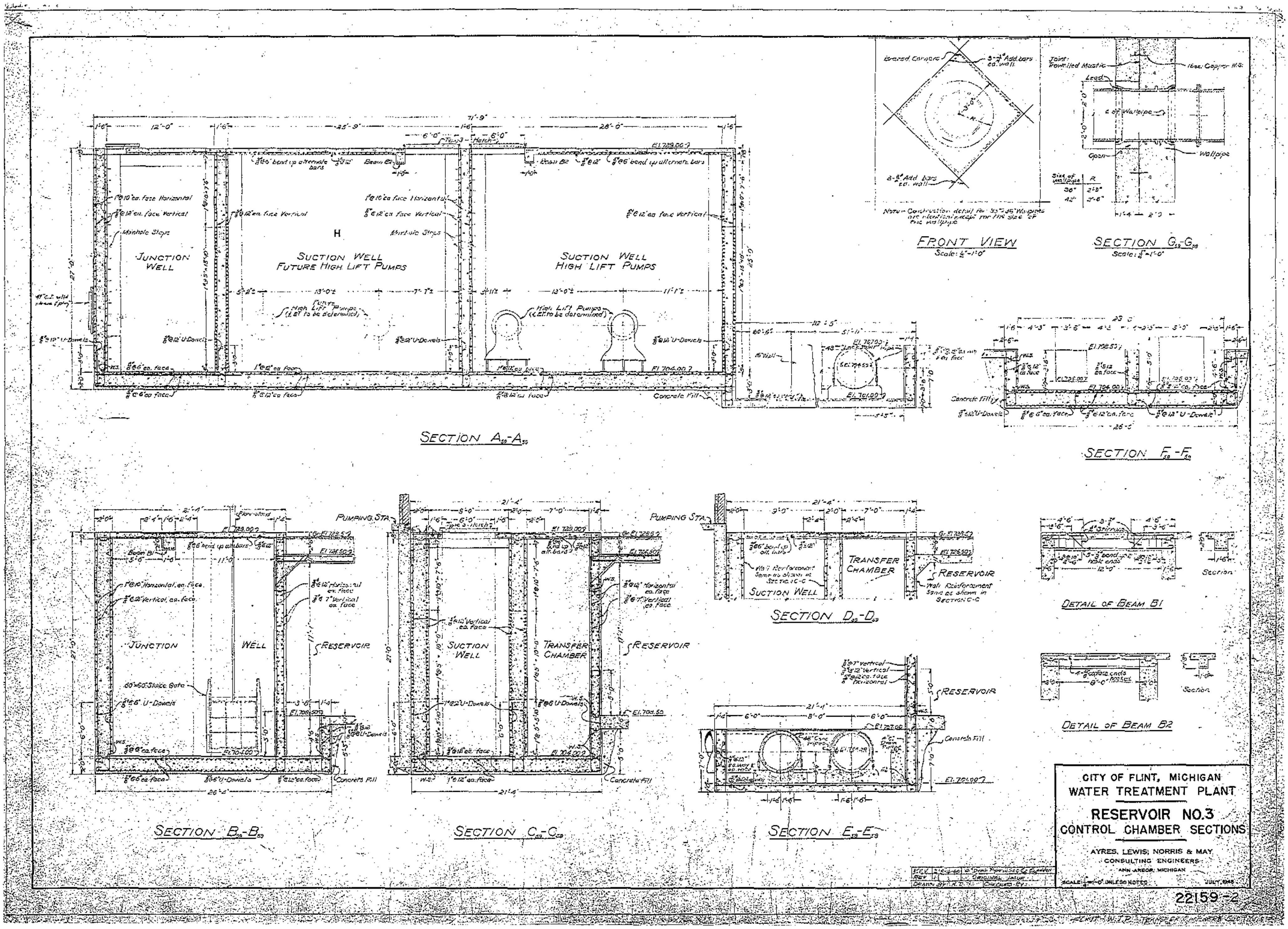
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT

RESERVOIR NO.3
CONTROL CHAMBER PLANS

AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN

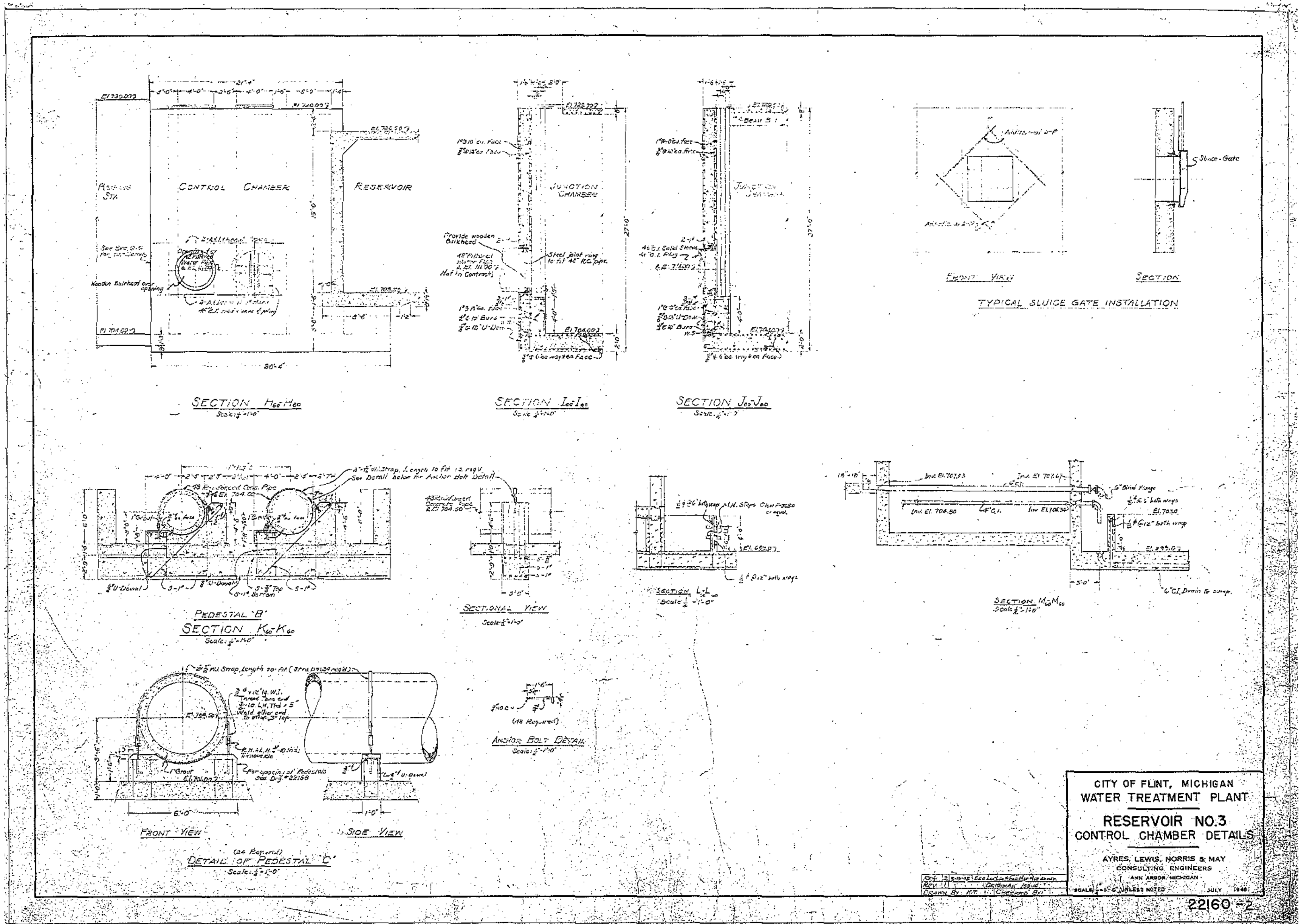
22158-2

001570



JUNCTION WELL
SUCTION WELL FUTURE HIGH LIFT PUMPS
SUCTION WELL HIGH LIFT PUMPS
SECTION A59-A59
FRONT VIEW
Scale: ½"=1'-0"
SECTION G59-G59
Scale: ½"=1'-0"
SECTION F59-F59
JUNCTION WELL
RESERVOIR
SECTION B59-B59
SUCTION WELL
TRANSFER CHAMBER
RESERVOIR
SECTION C59-C59
TRANSFER CHAMBER
SUCTION WELL
RESERVOIR
SECTION D59-D59
RESERVOIR
SECTION E59-E59
DETAIL OF BEAM B1
DETAIL OF BEAM B2
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
CONTROL CHAMBER SECTIONS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
22159-2

001571


CONTROL CHAMBER
RESERVOIR
JUNCTION CHAMBER
SECTION H60-H60
SECTION I60-I60
SECTION J60-J60
FRONT VIEW
SECTION
Sluice-Gate
TYPICAL SLUICE GATE INSTALLATION
PEDESTAL "B"
SECTION K60-K60
SECTIONAL VIEW
SECTION L60-L60
SECTION M60-M60
6" Blind Flange
6" C.I. Drain to sump
ANCHOR BOLT DETAIL
(48 Required)
FRONT VIEW
SIDE VIEW
(24 Required)
DETAIL OF PEDESTAL "C"
CITY OF FLINT, MICHIGAN
WATER TREATMENT PLANT
RESERVOIR NO.3
CONTROL CHAMBER DETAILS
AYRES, LEWIS, NORRIS & MAY
CONSULTING ENGINEERS
ANN ARBOR, MICHIGAN
JULY 1946
22160-2

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, May 19, 2015 3:42 PM
To: Hansen, Jeff (jrhansen@lan-inc.com)
Subject: FW: Flint OEL - MDEQ Comments
Attachments: March 1st, 2015 OEL Report - DEQ Comments.doc

Jeff,

I am trying this address....your old one was undeliverable.....

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Prysby, Mike (DEQ)
Sent: Tuesday, May 19, 2015 3:36 PM
To: Jeff Hansen
Subject: Flint OEL - MDEQ Comments

Jeff,

In looking at some of the Flint TTHM material for tomorrow's TAC meeting.....I noted our March 1, 2015 comments pertaining to the most recent Operation Evaluation Report prepared for Flint. I didn't see an electronic "sent date" to you on this document. It may be that I hand delivered our comments to LAN during our first TAC meeting on March 4th. If not, attached are our comments and I apologize in the delay. These comments can be addressed in the next report due on May 29, 2015.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

City of Flint
Operational Evaluation Report
March 1, 2015
MDEQ Comments

1. Revise Tables 2 and 3 on Page 7 to account for proper alignment of DDBP samples (results, location, site code). Also, revise statement on Page 1 regarding the number of sites exceeding the TTHM MCL following the 4th quarter sample cycle.

2. The ozone system was recently repaired. (Page 10 & 19). What is the ozone system's current production rate?

3. The city's hydraulic model (prepared by Potter Consulting) is being updated (Page 16). Is the model currently sufficient in determining proper sizing for the transmission main replacement in DuPont & Bishop Street corridor? (currently sized at 24-inch) (Pages 5, 16, and 20)

4. Are the potassium permanganate results & conclusions available? (Pages 4 and 17)

5. We agree that some reduction in storage volume could be achieved without compromising reliability; however given high usage, main breaks, and "let runs" during the winter, storage volume remains important. We agree with the need to determine adequate storage volume which will likely differ between summer and winter. (Page 15)

6. We agree with the concern of re-circulation of water pumped from the booster pump stations; however, we were recently informed of existing distribution system check valves to prevent recirculation. These appurtenances and their condition need to be confirmed. The hydraulic model may also need to be updated to include these valves. (Page 15)

7. We concur with the recommendation to provide the ability to monitor raw water TOC and PTAP TTHM. (Pages 17 & 18)

8. Page 20 provides 2 options to manage water age and each option includes reducing the utilized storage volume of the 3 MGAL well to 2 MGAL. The reduction in storage volume limits the WTP's ability to meet CT under worst case conditions (low temp, high pH, 30 MGD pumping rate from reservoir).

9. Table 11 on Page 21 outlines an Action Plan for Stage 1 and Stage 2 actions. Several actions listed in Stage 2 including; repair of ozone system, continued valve replacement, and replacement of deteriorated watermains are longer term solutions; however, they need to proceed regardless of the outcome of TTHM reduction.

Rennaker, Joanne (DEQ)

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Sent: Tuesday, May 19, 2015 3:36 PM
To: Jeff Hansen
Subject: Flint OEL - MDEQ Comments
Attachments: March 1st, 2015 OEL Report - DEQ Comments.doc

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Office of Drinking Water and Municipal Assistance
517 290-8817

City of Flint
Operational Evaluation Report
March 1, 2015
MDEQ Comments

1. **Revise Tables 2 and 3 on Page 7 to account for proper alignment of DDBP samples (results, location, site code). Also, revise statement on Page 1 regarding the number of sites exceeding the TTHM MCL following the 4th quarter sample cycle.**

2. **The ozone system was recently repaired. (Page 10 & 19). What is the ozone system's current production rate?**

3. **The city's hydraulic model (prepared by Potter Consulting) is being updated (Page 16). Is the model currently sufficient in determining proper sizing for the transmission main replacement in DuPont & Bishop Street corridor? (currently sized at 24-inch) (Pages 5, 16, and 20)**

4. **Are the potassium permanganate results & conclusions available? (Pages 4 and 17)**

5. **We agree that some reduction in storage volume could be achieved without compromising reliability; however given high usage, main breaks, and "let runs" during the winter, storage volume remains important. We agree with the need to determine adequate storage volume which will likely differ between summer and winter. (Page 15)**

6. **We agree with the concern of re-circulation of water pumped from the booster pump stations; however, we were recently informed of existing distribution system check valves to prevent recirculation. These appurtenances and their condition need to be confirmed. The hydraulic model may also need to be updated to include these valves. (Page 15)**

7. **We concur with the recommendation to provide the ability to monitor raw water TOC and PTAP TTHM. (Pages 17 & 18)**

8. **Page 20 provides 2 options to manage water age and each option includes reducing the utilized storage volume of the 3 MGAL well to 2 MGAL. The reduction in storage volume limits the WTP's ability to meet CT under worst case conditions (low temp, high pH, 30 MGD pumping rate from reservoir).**

9. **Table 11 on Page 21 outlines an Action Plan for Stage 1 and Stage 2 actions. Several actions listed in Stage 2 including; repair of ozone system, continued valve replacement, and replacement of deteriorated watermains are longer term solutions; however, they need to proceed regardless of the outcome of TTHM reduction.**

Rennaker, Joanne (DEQ)

From:	Howard Croft <hcroft@cityofflint.com>
Sent:	Tuesday, May 19, 2015 9:40 AM
To:	Brent Wright; donna. cole; Elizabeth Murphy; gdn2@aol.com; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Norb Birchmeier; Pete Levine; Robert Bincsik; Robert Nicholas; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green
Cc:	Dayne Walling; Natasha Henderson
Subject:	Technical Advisory Team Meeting _ May
Attachments:	2015-05-20 TAC Agenda.pdf

All,

I am sending everyone the TAC team agenda for Wednesday's meeting, there is room left for general conversation regarding next steps and future agenda's. We look forward to seeing everyone that can make it to City Hall tomorrow.

Thank you,

--
Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

Flint Water
Technical Advisory Committee
May 20, 2015
Flint City Hall

Agenda

2:00 pm	**Welcome**
	Purpose of the Technical Advisory Committee: Provide a respectful means of sharing factual information and having dialogue around the City of Flint water.
2:05 pm	**Introductions**
2:10pm	**Current water status information – M. Glasgow, Operator In Charge (F-1)**
2:20 pm	**Improvements Information – H. Croft, Director Department of Public Works**
	New filter media installation Leak detection New pipe installation Water meter installation New water page on City website
2:40 pm	**Discussion on next TTHM testing expectations**
2:50pm	**Discussion on current health concerns, including lead and copper testing**
3:30pm	**Next Steps** Next meeting, one month or two months?
3:35 pm	**Adjourn**

Sources of Information:

City Website: CityofFlint.com See Residents: WATER or Departments: Public Works: Utilities - many links to reports, Q&A and other useful information.

If you, or another Flint resident, would like to have their water tested: call 810-766-7135 ext 2606

Rennaker, Joanne (DEQ)

From: Hansen, Jeff <jrhansen@lan-inc.com>
Sent: Thursday, May 14, 2015 9:19 AM
To: Prysby, Mike (DEQ)
Subject: Flint

Hi Mike,

I have a couple questions that I think you can easily answer:

1. Flint needs 0.5 log inactivation by disinfection after treatment, right?
2. For the replacement of anthracite with GAC, is there a minimum EBCT you will want to see?

Thanks,

Jeffrey R. Hansen
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B • Flint, MI 48532
T 810.820.2682 **C** 810.333.3201
www.lan-inc.com • JRHansen@lan-inc.com

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Monday, May 11, 2015 10:09 AM
To:	sheila.bw@hotmail.com
Cc:	Busch, Stephen (DEQ); Benzie, Richard (DEQ); Devereaux, Tracy (DEQ); Smith, Laura (DEQ)
Subject:	Ticket #23002-490657
Attachments:	Flint 2013 CCR.pdf

Shelia,

Based on the e-mail thread, Flint's Consumer Confidence Report (CCR) provided to Flint residents may address your question. Attached is Flint's 2013 CCR that summarizes the quality of the drinking water provided to residents (including detected contaminants) for the 2012 calendar year. We have not received Flint's 2015 CCR since the deadline for the city to distribute it to residents and the MDEQ is July 1, 2015. Also, our department is not involved with or have control on how monitoring results and/or violations are presented on other websites that may contain information on Flint's water quality . As always, if you have further questions concerning Flint's drinking water quality and detected contaminates, feel free to contact me.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

001580

2310

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name: City of Flint	County: Genesee	WSSN: 2310
Population: ☐ 500 or fewer people	☐ 501 – 9,999 people	☒ 10,000 or more people

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). Return the certification to the appropriate DEQ district office by October 1. For addresses, visit www.michigan.gov/deq, click on Locations.

Method of delivery to DEQ

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other ______ Date delivered: 6/25/2014

Method of delivery to Local Health Department

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other ______ Date delivered: 6/25/2014

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

☒ Mail or hand deliver a paper copy of CCR. Date(s) mailed or hand delivered: 6/24/2014
☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: ______
☐ Email notification that CCR is available at direct URL: Date(s) emailed: ______
☐ Email notification that CCR is attached to the email. Date(s) emailed: ______
☐ Email notification that CCR is embedded in the email. Date(s) emailed: ______

If using notification of CCR availability:

1. Mail a paper CCR to customers who request it and to customers known to be incapable of receiving electronically.
2. Include a copy of the notification to the DEQ district office with this certification form.
3. Explain the nature of the notification, prominently display the direct URL, include statement how to request a paper copy.

> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
> Message: Your annual report on the source and quality of your drinking water is available on the Web at **www.anytown.gov/waterqualityreport.** To have a copy mailed to you, contact Anytown at 555-111-1111 or water@anytown.gov.

☐ **Option for supplies serving fewer than 10,000 persons:** Publish entire report in newspaper, and notify customers via newspaper(s) in which CCR published, mail, email or hand delivery that individual copies will not be mailed, and include statement how to request a paper copy.
Date(s) of publication: ______

☐ **Option for supplies serving 500 or fewer persons:** Notify customers via mail, email, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply on request.
Date(s) of notification: ______

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: www.cityofflint.com/utilities/utilities.asp Date accessible: 6/26/2014

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: ______
☒ Mail to each service connection physical address. Date(s) mailed: 6/24/2014
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☐ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☐ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☐ Deliver the report to community organizations.
☐ Other: ______

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

A Tier 3 Public Notice is Distributed with this CCR

☐ This CCR is being used to deliver a Tier 3 Public Notice for one or more violations. To use this Tier 3 delivery option, the CCR must be directly delivered to each bill paying customer or, with DEQ approval, continuously posted, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent F. Wright / Water Plant Supervisor

Signature: [signature] Date: 6/25/2014

DEQ
~~RESOURCE MANAGEMENT DIVISION~~
JUN 27 2014
LANSING DISTRICT

See reverse side for U.S. EPA Expectations for Electronic Delivery of CCR

EQP 5943 (Rev. 5/2014)

001581

02310

CUSTOMER SERVICE CENTER
CITY HALL
1101 S. SAGINAW ST.
FLINT, 48501

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 27 2014
LANSING DISTRICT

Department of Utilities

FLINT WATER PLANT

City of Flint
Water Plant & Facilities

2013 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities operates and maintains a certified drinking water laboratory to assure compliance with all state and federal regulations and is committed to prompt and thorough notification to the consumers if there is any reason for concern about the quality of the drinking water.

Information about your drinking water is available at the City of Flint web page on the Internet at www.cityofflint.com or by calling the Flint Water Plant & Facilities at (810) 787-6537. The Safe Drinking Water Hotline at (800) 426-4791 is a resource for health related questions and water quality issues. General drinking water information can be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

In 2013, The City of Flint purchased drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Lake Huron Water Treatment Plant

2L ⌟ Regulated Detected Contaminants .bles

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation	Major Sources in Drinking Water
Inorganic Chemicals – Monitoring at Plant Finished Water Tap								
Fluoride	05/13/2013	ppm	4	4	0.55	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	05/13/2013	ppm	10	10	0.32	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Barium	6/9/2008	ppm	2	2	0.01	n/a	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits

Disinfection By-Products – Monitoring in Distribution System

Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest LRAA	Range of Detection	Violation	Major Sources in Drinking Water
Total Trihalomethanes (TTHM)	2013	ppb	n/a	80	37.8	11.5 – 43.8	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	2013	ppb	n/a	60	17.0	6.0 – 19.0	No	By-product of drinking water disinfection

Disinfectant Residuals Monitoring in Distribution System

Contaminant	Test Date	Units	Health Goal	Allowed Level	Highest RAA	Range of Detection	Violation	Major Sources in Drinking Water
Disinfectant Total Chlorine Residual	Jan-Dec 2013	ppm	MRDGL 4	MRDL 4	0.81	0.65-0.93	No	Water additive used to control microbes

2013 Turbidity – Monitored every 4 hours at Plant Finished Water Tap

Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)	Violation	Major Sources in Drinking Water
0.26 NTU	100%	No	Soil Runoff

Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

2013 Microbiological Contaminants – Monthly Monitoring in Distribution System

Regulated Contaminant	MCLG	MCL	Highest Number Detected	Violation	Major Sources in Drinking Water
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	in one month 1	No	Naturally present in the environment.
E.coli or Fecal Coliform Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	entire year 0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Action Level AL	90^{th} Percentile Value*	Number of Samples Over AL	Violation	Major Sources in Drinking Water
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.10	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.

Regulated Contaminant	Treatment Technique	Typical Source of Contaminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.	Erosion of natural deposits

2013 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.52	Erosion of natural deposits

Collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen

Additional sample result information provided by the City of Flint Water Plant Laboratory, M Glasgow

2013 Key to the Detected Contaminant Tables		
Symbol	Abbreviation for	Definition/Explanation
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Thursday, May 07, 2015 4:54 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Shekter Smith, Liane (DEQ); Benzie, Richard (DEQ); Philip, Kris (DEQ); Deltoral, Miguel; Poy, Thomas; Porter, Andrea
Subject: Flint

Steve and Mike—I mentioned this briefly to Liane last week at our State Directors' meeting when Liane was here in Chicago, and I want to keep you all in the loop as to what we're doing here: After Miguel and I went to Bay City to give presentations at the Local Health Dept workshop on Monday afternoon last week, we stopped at Ms. LeeAnne Walters' home in Flint Monday to take her sample bottles for a sampling study. We stayed several hours to check out the plastic plumbing in her home, the piping out of her house, what mains the other homes in the neighborhood were likely to be getting their water from, etc, and Miguel took many pictures. Miguel is working with Mark Edwards at Virginia Tech, a well-known national expert in the area of lead, and Mike Schock at EPA's Office of Research and Development in Cincinnati.

Miguel drove back to Flint yesterday to be present when the City replaced Ms. Walters' water service line. Miguel took a piece of the service line pipe for analysis and to study the scale on the inside of the pipe.

Miguel is putting together a summary of his findings, which he will complete next week. He will send his summary to you all for your review. I will be out of the office tomorrow, but back in the office next Monday – Thursday, in case you have questions; or you can contact Tom Poy tomorrow.

Jennifer

Jennifer Kurtz Crooks
Michigan Program Manager
Ground Water and Drinking Water Branch
U.S. EPA Region 5
77 West Jackson Blvd.
Chicago, Illinois 60604
312.886.0244
crooks.jennifer@epa.gov
312.582.5853 (fax)

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Monday, May 04, 2015 3:23 PM
To:	Busch, Stephen (DEQ)
Subject:	RE: Flint 24inch transmission

Steve,

Thanks for the info....will add this specific site to favorites...

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Busch, Stephen (DEQ)
Sent: Monday, May 04, 2015 3:04 PM
To: Prysby, Mike (DEQ)
Subject: Flint 24inch transmission

Mike,

After doing a little digging, Phase 1 of the transmission main replacement project is out to bid and will close on May 14. The contractor will have 6 months to finish once awarded the contract.

The City has also budgeted $2.5 million for each of FY16, FY17, and FY18 for the other 3 phases of the project.

We can keep an eye on it for now until the bid closing
http://flintweb2.cityofflint.com/Purchasing/bids.asp

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

Rennaker, Joanne (DEQ)

From:	Howard Croft <hcroft@cityofflint.com>
Sent:	Monday, May 04, 2015 2:06 PM
To:	Brent Wright; Daugherty Johnson; donna. cole; Elizabeth Murphy; gdn2@aol.com; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Norb Birchmeier; Pete Levine; Robert Bincsik; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green; Michael Sargent
Cc:	Natasha Henderson
Subject:	May_Technical Advisory Meeting

Technical Advisory team,

We are planning to hold our next advisory meeting on Wednesday May 20th 2:00 pm at City Hall. The focus points of the meeting will be to convey the advancements in the current water quality, the summer implementation plans and timelines, and the latest information on test results.

We continue to offer testing and to look for any residential concerns about the water. I encourage all of the hospital and college representatives to bring forward any recent issues that may have arisen and we will look to discuss those as well as any other situations that we are aware of. I will send out an agenda early next week and we will plan on having a conference line available to call in.

Please send any questions or comments to me if there are items that you would like to see addressed.

Thank you,

--

Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Monday, May 04, 2015 12:16 PM
To: Busch, Stephen (DEQ)
Subject: FW: City of Flint - April Bromate Results
Attachments: April 2015 Bromate Results.pdf

Steve,

Flint's April 2015 Bromate result – non-detect ....lets get a few more of these....

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Monday, May 04, 2015 8:33 AM
To: Prysby, Mike (DEQ); Rosenthal, Adam (DEQ)
Subject: City of Flint - April Bromate Results

Gentleman,

Here is the bromate test result for April 2015.

Mike

NSF International
789 N. Dixboro Rd. Ann Arbor, MI 48105, USA
1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org

Live Safer™

TEST REPORT

Send To: C0211289
Mr. Michael Glasgow
City of Flint, Municipality
1101 South Saginaw Street
Flint, MI 48502

Facility: C0211290
City of Flint Water Plant
4500 North Dort Highway
Flint MI 48505
United States

Result	**COMPLETE**	Report Date	30-APR-2015
Customer Name	City of Flint, Municipality		
Tested To	USFDA CFR Title 21 Part 165.110		
Description	Municipal Water		
Test Type	Test Only		
Job Number	J-00173938		
Project Number	10005233 (CL04)		
Project Manager	Anna Ciechanowski		

Thank you for having your product tested by NSF International.

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

Report Authorization Kerri L. Levanseler **Date** 30-APR-2015

Kerri Levanseler - Director, Chemistry Laboratory

General Information

Standard: USFDA CFR Title 21 Part 165.110
Date and Time Sampled: 4/20/2015 08:10 EDT
Product Description: Municipal Water
Test Description: Bromate - April 2015

Sample Id: **S-0001148608**
Description: Municipal Water - 4/20/2015 08:10 EDT
Sampled Date: 04/20/2015
Received Date: 04/21/2015

Testing Parameter	Reporting Limit	Result	FDA SOQ	Units	P / F
Disinfection Residuals/Disinfection By-Products					
Bromate	10	ND	10	ug/L	Pass

<<Additional Information>>

Sample Id: S-0001148608

Test Parameter	Date Analyzed	Time Analyzed	Date Prepared/ Processed
Disinfection Residuals/Disinfection By-Products			
Bromate (Ref: EPA 300.1)	21-APR-2015		

Testing Laboratories:

	Flag	Id	Address
All work performed at: (Unless otherwise specified)	→	NSF_AA	NSF International 789 N. Dixboro Road Ann Arbor MI 48105

References to Testing Procedures:

NSF Reference	Parameter / Test Description
C3015	Bromate (Ref: EPA 300.1)

Certifications:

Arizona (# AZ0655)	California (# 03214 CA)	Connecticut (# PH-0625)
Florida (# E-87752 FL)	Hawaii	Indiana
Maryland (# 201)	Michigan (# 0048)	North Carolina (# 26701)
New Jersey (# MI770)	Nevada (# MI000302010A)	New York (# 11206)
Pennslyvania (# 68-00312)	South Carolina (# 81005)	Virginia (# 00045)
Vermont (# VT 11206)		

Test descriptions preceded by an asterisk "*" indicate that testing has been performed per NSF International requirements but is not within its scope of accreditation.

The reported result for Odor, Phenolics, Potassium, Specific Conductance and Total Residual Chlorine cannot be used for compliance purposes within the State of Arizona.

Notes:

1) Bottled water sold in the United States shall not contain Fluoride in excess of the levels published by the USFDA in 21 CFR Part 165.110. These levels are based on the annual average of maximum daily air temperatures at the location where the bottled water is sold at retail. Please refer to the most current edition of the regulation to determine the Fluoride maximum level that pertains to your product.
2) A blank on the FDA SOQ column indicates that no maximum level has been established by the FDA for that contaminant.
3) An ND result means that the contaminant was not detected at or above the reporting limit.

For a list of NSF International Method Detection Limits refer to
http://www.nsf.org/media/enews/documents/minimum_detection_level_spreadsheet.pdf.

Rennaker, Joanne (DEQ)

From: Michael Glasgow <mglasgow@cityofflint.com>
Sent: Monday, May 04, 2015 8:33 AM
To: Prysby, Mike (DEQ); Rosenthal, Adam (DEQ)
Subject: City of Flint - April Bromate Results
Attachments: April 2015 Bromate Results.pdf

Gentleman,

Here is the bromate test result for April 2015.

Mike

NSF International
789 N. Dixboro Rd. Ann Arbor, MI 48105, USA
1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org
Live Safer™

TEST REPORT

Send To: C0211289
Mr. Michael Glasgow
City of Flint, Municipality
1101 South Saginaw Street
Flint, MI 48502

Facility: C0211290
City of Flint Water Plant
4500 North Dort Highway
Flint MI 48505
United States

Result	**COMPLETE**	Report Date	30-APR-2015
Customer Name	City of Flint, Municipality		
Tested To	USFDA CFR Title 21 Part 165.110		
Description	Municipal Water		
Test Type	Test Only		
Job Number	J-00173938		
Project Number	10005233 (CL04)		
Project Manager	Anna Ciechanowski		

Thank you for having your product tested by NSF International.

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

Report Authorization Kerri L.K. Vanseler **Date** 30-APR-2015

Kerri Levanseler - Director, Chemistry Laboratory

General Information

Standard: USFDA CFR Title 21 Part 165.110
Date and Time Sampled: 4/20/2015 08:10 EDT
Product Description: Municipal Water
Test Description: Bromate - April 2015

Sample Id:	**S-0001148608**
Description:	Municipal Water - 4/20/2015 08:10 EDT
Sampled Date:	04/20/2015
Received Date:	04/21/2015

Testing Parameter	Reporting Limit	Result	FDA SOQ	Units	P / F
Disinfection Residuals/Disinfection By-Products					
Bromate	10	ND	10	ug/L	Pass

<<Additional Information>>

Sample Id: S-0001148608

Test Parameter	Date Analyzed	Time Analyzed	Date Prepared/ Processed
Disinfection Residuals/Disinfection By-Products			
Bromate (Ref: EPA 300.1)	21-APR-2015		

Testing Laboratories:

	Flag	Id	Address
All work performed at: (Unless otherwise specified)	→	NSF_AA	NSF International 789 N. Dixboro Road Ann Arbor MI 48105

References to Testing Procedures:

NSF Reference	Parameter / Test Description
C3015	Bromate (Ref: EPA 300.1)

Certifications:

Arizona (# AZ0655)	California (# 03214 CA)	Connecticut (# PH-0625)
Florida (# E-87752 FL)	Hawaii	Indiana
Maryland (# 201)	Michigan (# 0048)	North Carolina (# 26701)
New Jersey (# MI770)	Nevada (# MI000302010A)	New York (# 11206)
Pennslyvania (# 68-00312)	South Carolina (# 81005)	Virginia (# 00045)
Vermont (# VT 11206)		

Test descriptions preceded by an asterisk "*" indicate that testing has been performed per NSF International requirements but is not within its scope of accreditation.

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Rennaker, Joanne (DEQ)

From: Cook, Pat (DEQ)
Sent: Monday, April 27, 2015 9:35 AM
To: Busch, Stephen (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: RE: Flint Corrosion Control?

Hi Steve – I agree, the constant second guessing of how we interpret and implement our rules is getting tiresome. I think what Miguel is saying is that since Flint did not comply with "optimal" criteria stated below (Rule 604(f)(2)(b)(D)(iii) in Act 399) in the first 6 month monitoring period, they cannot meet it for two consecutive 6 month periods that is required. However, we have always waited for 2 rounds of results before making that decision.

Any ways, when you have a minute please give me a call so we can figure out how to respond to Miguel.

Patrick Cook, P.E.
Community Drinking Water Unit
Office of Drinking Water & Municipal Assistance
Michigan Department of Environmental Quality
Phone: (517) 284-6514
cookp@michigan.gov

From: Busch, Stephen (DEQ)
Sent: Monday, April 27, 2015 8:27 AM
To: Cook, Pat (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: RE: Flint Corrosion Control?

He continues to base his concern on a single location which has/had a lead service line and "pre-flushing" concerns which are not part of the current regulations.

Flint is now below the criteria for a large system. Technically they don't have to do any of this.

Flint has also only been through one round of lead copper sample not the two rounds needed to make the determination he lists below.

If he continues to persist we may need Liane or Director Wyant to make a call to EPA to help address his over-reaches.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Cook, Pat (DEQ)
Sent: Monday, April 27, 2015 7:59 AM
To: Busch, Stephen (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: FW: Flint Corrosion Control?

Hi Steve and Mike - I knew this was going to happen. Miguel is questioning that Flint is in compliance with optimal corrosion control. Please read the below email and let me know what you think. While it's not a big hurry at this time since Miguel is out till next week, we eventually will have to respond to him.

pat

From: Deltoral, Miguel [mailto:deltoral.miguel@epa.gov]
Sent: Saturday, April 25, 2015 10:11 AM
To: Cook, Pat (DEQ)
Cc: Porter, Andrea; Crooks, Jennifer; Poy, Thomas
Subject: Re: Flint Corrosion Control?

Hi Pat,

I'll be heading out to MI for RTCR tomorrow and won't see email until next Tuesday, but I wanted to follow up on this because Flint has essentially not been using any corrosion control treatment since April 30, 2014 and they have LSLs. Given the very high lead levels found at one home and the pre-flushing happening at Flint, I'm worried that the whole town may have much higher lead levels than the compliance results indicated, since they are using pre-flushing ahead of their compliance sampling.

If the source water lead is non-detect (zero), then according to 141.89(a)(3) they should use zero for that source water value:

"All lead and copper levels measured between the PQL and MDL must be either reported as measured or they can be reported as one-half the PQL specified for lead and copper in paragraph (a)(1)(ii) of this section. All levels below the lead and copper MDLs must be reported as zero."

As far as the treatment determination, there are only two scenarios for a large system to be deemed to have optimized corrosion control without treatment and Flint does not appear to meet either:

The first is at 141.81(b)(3)

Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with § 141.86 and source water monitoring conducted in accordance with § 141.88 that demonstrates for two consecutive 6-month monitoring periods that the difference between the 90th percentile tap water lead level computed under §141.80(c)(3), and the highest source water lead concentration is less than the Practical Quantitation Level for lead specified in § 141.89(a)(1)(ii).

If Flint's highest source water lead was zero, and their 90th percentile was 0.006, then Flint does not meet this criteria, because the difference must be LESS THAN the PQL (i.e., 0.004 or less). 0.006 - 0 = 0.006.

The second is at 141.81(b)(3)(i):

Those systems whose highest source water lead level is below the Method Detection Limit may also be deemed to have optimized corrosion control under this paragraph if the 90th percentile tap water lead level is less than or equal to the Practical Quantitation Level for lead for two consecutive 6-month monitoring periods.

Although Flint's source water lead was non-detect (zero), the 90th percentile lead level is 0.006 which is above the PQL of 0.005, so Flint would not meet this criteria either.

Am I missing something?

Miguel A. Del Toral
Regulations Manager
U.S. EPA R5 GWDWB
77 West Jackson Blvd, (WG-15J)
Chicago, IL 60604
Phone: (312) 886-5253

From: Cook, Pat (DEQ) <COOKP@michigan.gov>
Sent: Friday, April 24, 2015 12:45 PM
To: Deltoral, Miguel
Subject: RE: Flint Corrosion Control?

Total Lead collected from the plant tap on 5/22/14 was zero.

pat

From: Deltoral, Miguel [mailto:deltoral.miguel@epa.gov]
Sent: Friday, April 24, 2015 11:59 AM
To: Cook, Pat (DEQ)
Cc: Poy, Thomas; Porter, Andrea
Subject: Re: Flint Corrosion Control?

What was the source water lead level?

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Chicago, IL 60604
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If you have any further questions, please contact the Lansing District Supervisor, Steve Busch at (517) 643-2314 or at buschs@michigan.gov.

Have a good (and hopefully warm) weekend!

Patrick Cook, P.E.
Community Drinking Water Unit
Office of Drinking Water & Municipal Assistance
Michigan Department of Environmental Quality
Phone: (517) 284-6514
cookp@michigan.gov

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Miguel A. Del Toral
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Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, April 24, 2015 11:56 AM
To: Cook, Pat (DEQ)
Cc: Busch, Stephen (DEQ); Rosenthal, Adam (DEQ)
Subject: Re: Flint Corrosion Control?

Pat,
You are correct, I received a call from Miguel regarding his concerns with the lead/copper sampling procedure from lead services and how he believes it is skewing down the lead level results from sites with lead services. I briefed Steve on the call and we can discuss in more detail next Tues.

Sent from my iPhone

On Apr 24, 2015, at 11:16 AM, Cook, Pat (DEQ) <COOKP@michigan.gov> wrote:

> I agree. I'll forward this info to Miguel. However, don't be surprised if you get a call from him disagreeing with our position.
> Thank you all for the quick replies.
> pat
>
> ---
>
> **From:** Busch, Stephen (DEQ)
> **Sent:** Friday, April 24, 2015 10:54 AM
> **To:** Prysby, Mike (DEQ); Cook, Pat (DEQ)
> **Cc:** Rosenthal, Adam (DEQ)
> **Subject:** RE: Flint Corrosion Control?
> Based on the matrix of recommended corrosion control study components for Large PWS's for both Lead and Copper, there are no additional requirements for the City of Flint based on the levels of lead and copper in the current source water and the results of the lead and copper distribution monitoring.
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> I believe this condition has been met.
> Stephen Busch, P.E.
> Lansing and Jackson District Supervisor
> Office of Drinking Water and Municipal Assistance
> MDEQ
> 517-643-2314
>
> ---
>
> **From:** Prysby, Mike (DEQ)
> **Sent:** Friday, April 24, 2015 10:32 AM
> **To:** Cook, Pat (DEQ)
> **Cc:** Busch, Stephen (DEQ); Rosenthal, Adam (DEQ)
> **Subject:** RE: Flint Corrosion Control?
> Pat,

As we discussed, Flint is not practicing corrosion control treatment at the WTP. They are conducting lead & copper monitoring at 100 locations. WQ monitoring is also being conducted. The first round of samples after switch-over (July 1, 2014 – Dec 31, 2014) had 90th percentile results as follows: Lead: 6 ppb, Copper 110 ppb The second round of samples (Jan 1, 2015 – June 30, 2015) is underway with approx. 20 of the 100 sample site results in. The highest lead result out of the 20 received thus far is 13 ppb.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Cook, Pat (DEQ)
Sent: Thursday, April 23, 2015 12:48 PM
To: Prysby, Mike (DEQ)
Subject: Flint Corrosion Control?

Hi Mike – I have a quick question for you: what is Flint doing now (post Detroit) for corrosion control treatment?
Pat

Rennaker, Joanne (DEQ)

From: Cook, Pat (DEQ)
Sent: Friday, April 24, 2015 11:16 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Cc: Rosenthal, Adam (DEQ)
Subject: RE: Flint Corrosion Control?

I agree. I'll forward this info to Miguel. However, don't be surprised if you get a call from him disagreeing with our position.

Thank you all for the quick replies.

pat

From: Busch, Stephen (DEQ)
Sent: Friday, April 24, 2015 10:54 AM
To: Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Rosenthal, Adam (DEQ)
Subject: RE: Flint Corrosion Control?

Based on the matrix of recommended corrosion control study components for Large PWS's for both Lead and Copper, there are no additional requirements for the City of Flint based on the levels of lead and copper in the current source water and the results of the lead and copper distribution monitoring.

"The only provision of the Rule which classifies the existing treatment of large PWSs as optimized for corrosion control is when the difference between the 90% Pb-TAP and Pb-POE is less than the lead PQL for each six-month period of the initial monitoring program. By definition, the PQL for lead is 0.005 mg/L; and the lead value for the source water used in this determination is the highest source water lead concentration. If this condition is met, then no study or testing is required. However States may consider the presence of copper in tap samples when determining whether the existing treatment is optimized."

I believe this condition has been met.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Prysby, Mike (DEQ)
Sent: Friday, April 24, 2015 10:32 AM
To: Cook, Pat (DEQ)
Cc: Busch, Stephen (DEQ); Rosenthal, Adam (DEQ)
Subject: RE: Flint Corrosion Control?

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The second round of samples (Jan 1, 2015 – June 30, 2015) is underway with approx. 20 of the 100 sample site results in. The highest lead result out of the 20 received thus far is 13 ppb.

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District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

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Sent:	Friday, April 24, 2015 10:55 AM
To:	Busch, Stephen (DEQ)
Subject:	RE: Flint Corrosion Control?

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517 290-8817

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Rennaker, Joanne (DEQ)

From:	Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent:	Thursday, April 16, 2015 1:56 PM
To:	Philip, Kris (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject:	FW: Flint control AX-15-000-7426 WH
Attachments:	Control AX 15 000 7426 WH Durand 41615.pdf

Our latest attempt at responding to a citizen's concerns.
Jen

From: Sulej, Erik
Sent: Thursday, April 16, 2015 12:54 PM
To: Crooks, Jennifer; Murphy, Thomas; Shoven, Heather
Subject: Flint control AX-15-000-7426 WH

For your records.

Erik S. Sulej
Ground Water and Drinking Water Branch
U.S. Environmental Protection Agency, Region 5
77 W. Jackson Blvd (WG-15J), Chicago, IL 60604
Phone: (312) 886-3473 / Email: sulej.erik@epa.gov

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

APR 15 2015 WG-15J

Mr. John D. Durand
1008 Woodside Drive
Flint, Michigan 48503

Dear Mr. Durand:

Thank you for your January 13, 2015 letter to President Obama concerning the quality of the drinking water in the City of Flint, Michigan (Flint). Your letter was forwarded to me for a response, since Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To respond to your letter, my staff contacted the Michigan Department of Environmental Quality (MDEQ) District Supervisor for the Lansing District, Steve Busch, to discuss Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. Since April 2014, Flint exceeded the health standards for *E. coli* in August 2014, for total coliform bacteria in September 2014, and TTHMs in the fourth quarter of 2014; all other regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts (SDWA). Flint conducted the proper follow-up to the above violations as required by Federal and State regulations. Flint has returned to compliance the bacteria MCL violations that occurred in August and September 2014.

Compliance with the TTHM health standard is based upon the average of one year of sample data, from the most recent four quarters, at each sampling location. The initial monitoring in early summer 2014 reported elevated levels of TTHM compounds throughout Flint's distribution system. The MDEQ's Lansing District office advised Flint that it needed to immediately implement operational techniques at the drinking water treatment plant and in the distribution system to reduce the formation of TTHM compounds. Flint's actions have reduced TTHM concentrations to the point where the most recent results at all eight sample locations are below the drinking water TTHM health standard. Due to the exceedances in 2014, Flint must continue to provide quarterly public notification of TTHM concentrations. Flint continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

In your letter, you suggested that the source of drinking water should be switched back to Detroit drinking water which comes from Lake Huron. EPA does not have the authority to require Flint to change its source of drinking water back to Detroit drinking water. The decision to change the source of Flint's drinking water was a local decision, and continues to be a local decision only. However, Flint is obligated to take actions necessary to meet drinking water standards.

Your letter indicated that you received a letter of alert regarding refrigerant and cleaning solvents found in the Flint River. We believe the letter of alert to be the public notice dated January 2, 2015 that was sent to you by Flint regarding the drinking water TTHM violation, as required by Federal and State SDWAs; however it did not reference refrigerant and cleaning solvents. To clarify, the TTHMs found in Flint's drinking water are a by-product of the chlorination process which begins at the Flint water treatment plant as chlorine reacts with naturally occurring organic compounds from the Flint River. Refrigerants and solvents are not the contributing organic compounds of TTHM formation found in Flint drinking water.

Additional information is enclosed for your information.

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

Additional Information April 2015

The source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron, and requires additional treatment to ensure an acceptable quality drinking water. The MDEQ has been working closely with the Operator-in-Charge at the Flint Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

Some citizens have noted concerns regarding the health effects of TTHMs. By law, Flint must inform consumers of health standard exceedances. The risk of developing long-term health problems from TTHM exposure is low for those in general good health and can be a concern after years of ingestion. The risk of developing health problems is higher for some sub-populations, such as the immune-compromised and pregnant women; therefore, this group may want to seek alternative sources of water, such as bottled water, or purchase a home water treatment device. Consumers may want to talk with their doctors to help them make individual health decisions.

There has also been a concern regarding the high cost for drinking water in Flint. A part of the water rate is based upon the amount of water the resident is using; however, the base rate/service charge includes debt service charges and operation and maintenance costs of the water supply. The Michigan Department of Treasury conducts annual financial audits of local units of government in accordance with U.S. government auditing standards and Michigan Public Act 34 of 2001, the Municipal Finance Act. This includes Flint and its proprietary utility funds. While these audits do not set the rate structure, they do ensure that funds generated through water rates are accounted and directed in accordance with applicable laws.

Copies of these audits can be obtained online at the following location:

https://treas-secure.state.mi.us/LAFDocSearch/

There is currently no Federal regulatory oversight of water utility rates in Michigan.

Telephone numbers for citizens to call if they have further concerns about their drinking water quality:

Flint Water Service Center deals with problems in the distribution system: (810) 766-7202

Flint Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: (810) 787-6537

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Wednesday, April 15, 2015 1:10 PM
To: Shekter Smith, Liane (DEQ); Benzie, Richard (DEQ); Philip, Kris (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Cc: Poy, Thomas; Kuefler, Janet
Subject: R5 Regional Administrator to visit Flint area this Friday

Our Regional Administrator, Susan Hedman, will be traveling to Flint this Friday to discuss Brownfields. Of course, we think the discussion will more likely be about the drinking water. Tom Poy and I briefed the RA yesterday on the pertinent issues. I will forward the briefing when it is final. Please don't hesitate to contact Tom Poy (312-886-5991; poy.thomas@epa.gov) or myself if you have questions.

Jennifer
(312.886.0244)

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Tuesday, April 14, 2015 3:03 PM
To:	Crooks, Jennifer (crooks.jennifer@epa.gov)
Cc:	Busch, Stephen (DEQ)
Subject:	March MOR, Flushing
Attachments:	March 2015 MOR.pdf

Jennifer,

Attached is the Flint WTP March 2015 MOR. Upon closer review of the MOR, CFE and PTAP turbidities slightly above 0.3 NTUs were noted in and around the 20th of the month (Pages 2 and 3). As the run-off component of water flow into the Flint River watershed increased due to snow-melt, raw water hardness dropped; thus, calling for the need to adjust the softening process. Raw water turbidities also increased around this time due the increased run-off. Operators may have been slow to react to the change in hardness as it appears over-softening and lime-carry over occurred on the 20th. CFE turbidities; however, were below 0.3 NTUs in more than 98% of the samples for the month. There were also no detects for total or fecal coliform (PTAP or distribution), and adequate free chlorine residuals were maintained (PTAP & distribution). We plan to discuss plant operation in more detail with the operators and provide assistance in establishing a protocol for spring run-off conditions in order to avoid future upsets in the treatment process.

I also had the opportunity to discuss distribution system flushing with the distribution system OIC. Historically (while purchasing water from Detroit), Water Service Center (WSC) staff flushed in conjunction with winterizing hydrants; however, there was no order to flushing and their main intent was to "move water around". Given the recent TTHM issues (aggravated by stagnation) and WQ complaints, WSC staff are working at improving their flushing program by implementing unidirectional flushing. They are also targeting specific areas and work to flush from transmission mains out to the end of smaller distribution system mains. The program is still evolving as WSC continues to encounter valves that either do not function properly or are set in the wrong position.

If you have any further questions concerning the MOR, flushing, or other water related matters, please don't hesitate to contact me.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	**March 2015**
Operator-in-Charge	Month/Year
F-1R, F-2	**F-1**
Certification of Operator-in-Charge	Water Plant Classification
Michael Glasgow	**Genesee**
Signature of Operator-in-Charge	County

Treatment Rate and Filter Data

Maximum Treatment Rate:	**25.4**	Million Gallons per Day
Rated Plant Capacity:	**36**	Million Gallons per Day
Average Filter Run:	**96**	Hours
Average Head Loss:	**n/a**	Feet *(filter head loss meters not operational)
Average Filtration Rate:	**2.3**	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	**3.3**	Gallons Per Square Feet per Minute
Average Wash Water Use:	**1.3%**	Percent of Treated Water

Chemical Data

Chlorine on hand:	**20,000**	lb.	Est. supply:	**19**	days
Primary Coagulant (Ferric Chloride) on hand:	**157,700**	lb.	Est. supply:	**9**	days
Lime (CaO) on hand:	**348**	tons	Est. supply:	**29**	days
Fluoride on Hand:	**23,300**	lb.	Est. supply:	**48**	days
Cost of All Chemicals per Million Gallons:	**n/a**	dollars			
Total Power Cost per Million Gallons:	**n/a**	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	**2**	**4**
Number of filter confluence samples collected:	**242**	**242**
Percent of filter confluence samples > 0.3 NTU:	**0.8%**	**1.7%**
Number of filter confluence samples > 1 NTU	**0**	**0**

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **If yes**, attach specific filter(s) information and indicate required follow-up status.	**NO**
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **If yes**, attach specific filter(s) information and indicate required follow-up status.	**NO**
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	**NO**
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	**NO**
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	**NO**
Did POE disinfectant residual fall below 0.2 ppm during the month? **If yes**, indicate date(s) and duration on a separate sheet.	**NO**
Was minimum C*T credit achieved for the entire month? **If no**, indicate on a separate sheet the date(s) not achieved.	**YES**
Was continuous POE chlorine residual monitoring equipment off-line during the month? **If yes**, indicate date(s) and duration on a separate sheet.	**NO**

Coagulation Parameters & Softening Chemical Application City of Flint Water Treatment Plant March 2015

WSSN: 2310

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units				
							Raw			Plate Settler	Applied
							Number of Samples	Avg.	Max.	Effluent Avg.	Applied Avg.
1	24.3	4.9	15.0	121.0	3.8	0.40	8	12.4	47.2	5.63	1.69
2	24.3	4.9	14.6	121.0	4.0	0.41	8	4.4	15.6	5.73	1.61
3	24.3	4.9	14.0	132.1	3.8	0.41	8	4.1	13.3	5.42	1.45
4	24.4	4.9	14.1	123.0	3.9	0.41	8	2.5	3.9	5.54	1.32
5	24.6	4.9	13.7	120.0	3.8	0.43	8	3.2	6.1	5.43	1.47
6	24.9	4.9	14.0	120.4	3.8	0.46	8	2.4	3.0	5.95	1.54
7	24.8	4.9	13.9	117.7	3.7	0.43	8	2.4	3.0	5.89	1.57
8	24.7	4.9	14.4	117.5	3.8	0.40	8	4.6	15.3	5.75	1.62
9	24.8	4.0	14.3	119.3	3.7	0.43	8	4.4	7.5	5.52	1.62
10	24.8	4.7	14.1	116.0	3.7	0.44	8	6.0	8.1	5.31	1.66
11	24.9	4.7	13.6	113.1	3.7	0.44	8	8.9	15.4	4.79	1.87
12	25.1	4.6	14.0	119.2	3.7	0.43	8	4.6	5.5	4.79	1.73
13	25.4	4.9	14.0	108.8	3.7	0.39	8	3.6	4.1	4.79	1.52
14	25.4	4.8	13.2	108.9	3.8	0.39	8	4.6	5.7	6.77	1.52
15	25.4	4.9	13.6	106.0	3.8	0.40	8	15.2	38.1	1.91	2.46
16	24.0	5.0	13.4	104.2	4.0	0.44	8	15.9	21.0	2.87	2.21
17	24.0	4.5	14.2	108.5	4.0	0.43	8	12.5	28.5	2.02	1.60
18	21.9	4.5	14.6	135.0	4.5	0.57	8	10.8	16.0	1.48	1.28
19	21.7	4.6	13.2	104.6	2.1	0.46	8	20.5	36.8	1.96	33.9
20	23.6	4.4	14.8	116.9	1.6	0.35	8	11.6	13.5	2.63	4.11
21	24.0	4.5	16.7	38.4	1.8	0.41	8	11.1	12.3	1.96	2.15
22	24.2	3.8	17.3	41.4	1.5	0.41	8	13.4	19.6	1.98	1.97
23	24.6	3.6	17.5	58.1	1.7	0.34	8	11.8	21.6	1.95	1.65
24	23.9	3.8	16.6	62.6	2.2	0.37	8	9.8	10.7	2.20	1.94
25	24.3	3.5	16.8	64.2	2.2	0.37	8	11.7	17.3	1.79	1.45
26	23.8	3.8	16.6	66.7	2.4	0.34	8	8.2	9.8	1.75	1.40
27	23.3	1.5	17.8	69.3	2.9	0.38	8	8.3	10.8	1.50	1.24
28	22.0	3.0	16.4	74.1	2.6	0.47	8	6.9	8.0	1.52	1.28
29	19.6	4.6	16.1	87.3	4.0	0.53	8	11.0	30.7	1.26	1.08
30	18.1	5.0	16.3	99.2	4.4	0.56	8	9.4	13.6	1.19	1.19
31	18.1	3.0	16.8	106.0	4.4	0.58	8	15.0	42.7	1.14	0.95
Avg.	23.7	4.4	15.0	100.0	3.3	0.43	8	8.7			2.71
Max.	25.4	5.0	17.8	135.0	4.5	0.58	8	20.5	47.2	6.77	33.9
Min.	18.1	1.5	13.2	38.4	1.5	0.34	8	2.4			0.95
Total	733.2										

Filter turbiditiy

City of Flint Water Treatment Plant
WSSN: 2310

March 2015

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.15	0.18	6	0	0	8	0.11	0.15	6	0	0	0.16
2	8	0.10	0.15	6	0	0	8	0.09	0.14	6	0	0	0.11
3	8	0.11	0.16	6	0	0	8	0.11	0.18	6	0	0	0.11
4	8	0.14	0.20	6	0	0	8	0.12	0.18	6	0	0	0.14
5	8	0.16	0.20	6	0	0	8	0.11	0.17	6	0	0	0.12
6	8	0.11	0.20	6	0	0	8	0.15	0.29	6	0	0	0.16
7	8	0.09	0.13	6	0	0	8	0.07	0.09	6	0	0	0.12
8	8	0.14	0.19	6	0	0	8	0.11	0.18	6	0	0	0.13
9	8	0.12	0.20	6	0	0	8	0.10	0.14	6	0	0	0.13
10	8	0.10	0.13	6	0	0	8	0.13	0.17	6	0	0	0.12
11	8	0.12	0.18	6	0	0	8	0.09	0.11	6	0	0	0.11
12	8	0.12	0.16	6	0	0	8	0.10	0.13	6	0	0	0.11
13	8	0.10	0.12	6	0	0	8	0.12	0.15	6	0	0	0.11
14	8	0.11	0.15	6	0	0	8	0.08	0.09	6	0	0	0.10
15	8	0.12	0.17	6	0	0	8	0.14	0.20	6	0	0	0.14
16	8	0.15	0.17	6	0	0	8	0.14	0.17	6	0	0	0.17
17	8	0.11	0.18	6	0	0	8	0.09	0.12	6	0	0	0.16
18	2	0.07	0.07	1	0	0	2	0.07	0.07	1	0	0	0.08
19	8	0.14	0.22	6	0	0	8	0.14	0.22	6	0	0	0.19
20	8	0.27	0.35	6	1	2	8	0.29	0.36	6	3	4	0.42
21	8	0.15	0.16	6	0	0	8	0.15	0.20	6	0	0	0.33
22	8	0.20	0.23	6	0	0	8	0.18	0.20	6	0	0	0.35
23	8	0.19	0.23	6	0	0	8	0.17	0.23	6	0	0	0.37
24	8	0.19	0.20	6	0	0	8	0.16	0.18	6	0	0	0.23
25	8	0.16	0.21	6	0	0	8	0.12	0.15	6	0	0	0.14
26	8	0.17	0.22	6	0	0	8	0.10	0.12	6	0	0	0.15
27	8	0.13	0.16	6	0	0	8	0.14	0.24	6	0	0	0.13
28	8	0.11	0.17	6	0	0	8	0.10	0.12	6	0	0	0.09
29	8	0.09	0.13	6	0	0	8	0.09	0.12	6	0	0	0.07
30	8	0.09	0.12	6	0	0	8	0.08	0.09	6	0	0	0.10
31	8	0.07	0.09	6	0	0	8	0.08	0.12	6	0	0	0.11
Avg.	8	0.13	0.17	6	0	0	8	0.12	0.16	6	0	0	
Max.	8	0.27	0.35	6	1	2	8	0.29	0.36	6	3	4	0.42
Min.	2	0.07	0.07	1	0	0	2	0.07	0.07	1	0	0	

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Fluoridation & Chlorination

City of Flint Water Treatment Plant

WSSN: 2310

March 2015

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.3	0.24	0.60		2.3	2.5	4.8	0.6	0.7	2.4	2.7	1.9	2.1
2	0.3	0.25	0.62		2.2	2.6	4.8	0.4	0.6	2.5	2.8	2.0	2.4
3	0.3	0.23	0.57	0.55	2.2	2.8	5.0	0.6	0.7	2.5	2.9	2.0	2.5
4	0.3	0.24	0.59		2.3	2.6	4.9	0.5	0.7	2.3	2.9	2.1	2.3
5	0.3	0.22	0.57		2.2	2.5	4.7	0.5	0.7	2.7	3.1	2.3	2.8
6	0.3	0.25	0.58		2.2	2.3	4.5	0.4	0.6	2.5	3.0	1.9	2.5
7	0.3	0.23	0.56		2.2	2.8	5.0	0.4	0.7	2.3	2.7	1.8	2.3
8	0.3	0.23	0.61		2.2	2.8	5.0	0.6	0.8	2.5	2.8	2.5	2.8
9	0.3	0.26	0.64		2.2	2.8	5.0	0.5	0.7	2.5	2.8	2.5	2.8
10	0.3	0.23	0.56		2.7	2.9	5.6	0.4	0.6	2.6	3.2	2.2	2.7
11	0.3	0.23	0.52		2.2	3.0	5.2	0.6	0.8	2.4	2.7	2.2	2.6
12	0.3	0.23	0.53	0.50	2.3	2.9	5.2	0.4	0.6	2.8	3.1	2.3	2.7
13	0.3	0.24	0.54		2.3	2.9	5.2	0.4	0.7	2.6	3.3	2.0	2.5
14	0.3	0.24	0.52		2.3	2.7	5.0	0.6	0.8	3.2	3.5	2.0	2.4
15	0.3	0.21	0.49		2.3	3.4	5.7	1.0	1.4	1.7	2.0	1.8	2.0
16	0.3	0.19	0.52		2.5	4.9	7.4	1.6	1.9	2.0	2.3	2.0	2.2
17	0.3	0.21	0.54		2.4	4.3	6.7	0.6	1.0	2.8	3.1	2.5	3.1
18	0.3	0.21	0.51	0.52	2.3	3.4	5.7	0.3	0.5	3.0	3.5	3.0	3.5
19	0.3	0.20	0.52		2.4	3.2	5.6	0.6	1.1	3.0	3.3	2.5	2.8
20	0.3	0.17	0.55		2.2	3.9	6.1	0.3	1.0	2.9	3.3	1.3	1.6
21	0.3	0.17	0.48		2.5	4.1	6.6	0.6	1.3	2.6	3.3	1.7	2.3
22	0.3	0.14	0.51		2.7	3.7	6.4	0.5	1.4	2.6	2.9	2.5	2.8
23	0.3	0.16	0.55		2.7	3.6	6.3	0.5	1.3	2.6	3.0	2.6	2.9
24	0.4	0.16	0.58		2.9	3.5	6.4	0.3	0.8	2.7	3.2	2.5	2.9
25	0.4	0.17	0.62	0.53	2.8	3.4	6.2	0.3	0.7	2.5	2.9	2.3	3.0
26	0.4	0.15	0.56		2.8	3.3	6.1	0.3	0.5	2.8	3.3	2.4	2.8
27	0.5	0.19	0.64		2.9	3.1	6.0	0.3	0.5	2.5	3.1	2.0	2.6
28	0.5	0.16	0.66		2.9	2.8	5.7	0.6	0.8	3.0	3.5	2.3	3.0
29	0.5	0.14	0.59		2.9	2.8	5.7	0.5	0.7	2.7	3.1	2.5	3.0
30	0.4	0.18	0.66		2.5	2.5	5.0	0.8	1.0	2.6	3.0	2.6	3.0
31	0.5	0.17	0.65		2.1	2.6	4.7	0.5	0.7	2.4	2.7	2.0	2.3
Avg.	0.34	0.20	0.57	0.53	2.4	3.1	5.6	0.5	0.8	2.6	3.0	2.2	2.6
Max.	0.50	0.26	0.66	0.55	2.9	4.9	7.4	1.6	1.9	3.2	3.5	3.0	3.5
Min.	0.30	0.14	0.48	0.50	2.1	2.3	4.5	0.3	0.5	1.7	2.0	1.3	1.6

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WSSN: 2310

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.27	8.09	366	229	297	122	69	107	113.0	72.1	20.4	11.2	51	89
2	7.95	8.06	358	243	295	111	63	132	110.6	68.9	20.4	18.5	52	88
3	7.95	7.74	360	234	297	122	63	112	116.2	71.3	16.5	14.1	52	87
4	7.81	7.82	354	243	285	129	69	114	129.1	89.8	8.3	4.4	54	85
5	7.97	7.77	360	235	290	126	70	109	117.0	71.3	16.5	13.6	54	95
6	7.55	7.69	362	239	288	124	74	115	133.1	89.0	7.3	2.9	55	89
7	7.90	7.94	351	234	288	124	63	110	126.7	87.4	18.0	13.6	54	87
8	7.93	8.26	363	235	288	123	75	112	120.2	74.5	15.6	11.7	48	87
9	7.96	7.84	357	237	286	125	71	112	116.2	74.5	16.5	12.2	57	95
10	8.01	8.08	349	233	273	129	76	104	122.6	81.0	10.7	7.3	64	98
11	7.92	8.29	347	233	281	117	66	116	115.4	72.1	13.6	11.2	61	95
12	8.00	7.94	345	233	279	127	66	106	125.0	84.2	8.7	5.3	54	91
13	8.07	7.92	348	235	282	127	66	108	126.7	84.2	7.8	5.3	54	88
14	7.99	8.11	343	226	273	112	70	114	123.4	81.8	8.7	3.9	54	85
15	8.00	8.15	309	210	236	99	73	111	97.0	65.7	17.5	12.6	51	87
16	8.00	7.97	251	176	198	78	53	98	79.4	50.5	15.1	12.2	42	76
17	7.99	7.66	305	191	242	92	63	99	97.8	55.3	14.1	11.7	46	76
18	8.00	7.95	270	203	223	104	47	99	89.0	72.1	12.6	4.4	46	84
19	7.90	9.90	256	151	204	58	52	93	79.4	38.5	15.6	12.2	41	78
20	7.85	7.30	240	240	189	135	51	105	81.8	87.4	8.7	5.3	38	70
21	7.97	7.34	214	210	175	119	39	91	78.6	81.8	5.3	1.5	34	73
22	7.95	7.37	219	211	173	104	46	107	63.3	60.9	15.6	14.1	33	69
23	8.01	7.53	212	187	173	92	39	95	64.9	59.3	12.6	9.7	34	69
24	7.94	7.45	211	170	171	77	40	93	74.5	59.3	6.3	5.3	33	69
25	8.01	7.80	218	173	172	77	46	96	67.3	56.1	11.7	9.2	32	72
26	8.03	7.72	214	171	173	78	41	93	71.3	59.3	9.7	5.3	31	69
27	8.02	7.67	215	168	174	77	41	91	75.4	60.1	6.8	4.4	31	68
28	8.05	7.73	218	169	174	77	44	92	78.6	63.3	5.8	1.5	30	72
29	8.12	7.95	229	177	182	80	47	97	71.3	53.7	12.6	9.7	31	73
30	8.18	7.85	229	171	182	79	47	92	73.7	53.7	11.7	8.7	34	71
31	8.08	7.80	228	168	183	70	45	98	68.9	52.1	13.6	10.7	33	72
Avg.	7.98	7.89	290	208	233	104	57	104	97.0	68.7	12.4	8.8	45	81
Max.	8.27	9.90	366	243	297	135	76	132	133.1	89.8	20.4	18.5	64	98
Min.	7.55	7.30	211	151	171	58	39	91	63.3	38.5	5.3	1.5	30	68

Bacteriological & Physical Parameters | City of Flint Water Treatment Plant | March 2015 |

WSSN: 2310

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	155	12	0	1	0	120	< 2	0.60	2.2				
2	1	135	12	0	1	0	146	< 2	0.60	2.8				
3	1	214	12	0	1	0	83	< 2	0.58	1.0				
4	1	84	12	0	1	0	100	< 2	0.61	2.5				
5	1	118	12	0	1	0	120	< 2	0.64	1.2				
6	1	79	12	0	1	0	43	< 2	0.62	1.5				
7	1	162	12	0	1	0	51	< 2	0.60	1.7				
8	1	86	12	0	1	0	100	< 2	0.62	2.6				
9	1	225	12	0	1	0	189	< 2	0.64	2.0				
10	1	205	12	0	1	0	248	< 2	0.64	2.6				
11	1	387	12	0	1	0	339	< 2	0.61	3.2				
12	1	770	12	0	1	0	440	< 2	0.31	3.7				
13	1	442	12	0	1	0	340	< 2	0.43	4.7				
14	1	4196	12	0	1	0	1120	< 2	0.58	5.7				
15	1	48392	12	0	1	0	> 14760	< 2	0.56	5.7				
16	1	> 48392	12	0	1	0	> 14760	< 2	0.43	4.2				
17	1	39726	12	0	1	0	12460	< 2	0.45	2.8				
18	1	24066	12	0	1	0	> 14760	< 2	0.55	3.6				
19	1	> 48392	12	0	1	0	11100	< 2	0.38	6.5				
20	1	34658	12	0	1	0	7100	< 2	0.56	4.8				
21	1	12262	12	0	1	0	9400	< 2	0.49	6.3				
22	1	4764	12	0	1	0	2920	< 2	0.49	4.5				
23	1	1596	12	0	1	0	1940	< 2	0.45	4.1				
24	1	1182	12	0	1	0	960	< 2	0.41	4.0				
25	1	550	12	0	1	0	1060	< 2	0.41	4.5				
26	1	399	12	0	1	0	560	< 2	0.41	5.6				
27	1	195	12	0	1	0	450	< 2	0.40	6.0				
28	1	122	12	0	1	0	400	< 2	0.41	5.9				
29	1	98	12	0	1	0	480	< 2	0.42	4.9				
30	1	201	12	0	1	0	> 738	< 2	0.40	5.9				
31	1	187	12	0	1	0	507	< 2	0.42	5.2				
Avg.									0.51	3.9				
Max.		48392					12460	< 2	0.64	6.5				
Min.									0.31	1.0				

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Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	1.5	1.3	1.8	1.4	1.5	0.3	1.1	1.8		2.6	9
4	1.5	1.3	1.9	1.5	1.5	0.4	1.7	2.1		1.3	9
5	1.0	0.9	1.7	0.9	1.5	0.4	1.0	2.1		1.3	9
6											0
7											0
8											0
9											0
10	1.8	1.2	1.5	1.2	1.4	0.4	1.4	1.9		2.1	9
11	1.4	0.5	1.7	1.3	1.1	0.6	1.5	1.8	1.5	1.1	10
12	1.7	1.0	1.6	1.7	1.6	0.5	1.5	2.0		2.1	9
13											0
14											0
15											0
16											0
17	1.2	1.2	1.6	1.7	1.1	0.6	1.0	2.2	0.7	2.2	10
18	2.0	1.2	2.0	1.9	1.3	0.5	1.7	2.8		0.9	9
19	1.1	1.7	2.2	1.5	0.7	0.5	1.1	0.9		0.9	9
20											0
21											0
22											0
23											0
24	1.9	1.1	2.0	1.9	0.8	0.5	1.7	1.9		2.0	9
25	1.4	1.7	2.1	1.9	1.7	0.6	1.4	1.7		2.0	9
26	1.9	1.4	1.4	1.8	1.3	0.5	1.4	1.9		1.9	9
27											0
28											0
29											0
30											0
31	1.7	0.9	1.6	1.9	1.7	0.7	0.9	1.5		1.0	9

Distribution Sample Summary	
Total # of routine distribution samples analyzed	119
Total # of routine distribution samples required	100

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.42

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	1.7	1.6	2.2	1.6	1.6	0.4	1.5	2.0		2.8	9
4	1.8	1.6	2.2	1.7	1.8	0.6	2.0	2.3		1.6	9
5	1.7	1.3	2.2	1.2	1.8	0.5	1.7	2.5		1.5	9
6											0
7											0
8											0
9											0
10	2.1	1.5	1.7	1.5	1.6	0.5	1.7	2.2		2.4	9
11	1.7	0.7	2.0	1.6	1.5	0.7	1.7	2.4	1.7	1.4	10
12	2.0	1.2	1.9	2.0	1.9	0.6	1.7	2.3		2.3	9
13											0
14											0
15											0
16											0
17	1.7	1.5	2.0	1.9	1.4	0.7	1.5	2.7	0.9	2.6	10
18	2.3	1.4	2.3	2.2	1.5	0.6	1.9	3.0		1.1	9
19	1.4	1.9	2.7	1.8	1.0	0.7	1.4	1.5		1.1	9
20											0
21											0
22											0
23											0
24	2.4	1.4	2.3	2.3	1.1	0.7	2.0	2.4		2.5	9
25	1.6	2.3	2.7	2.5	1.9	0.8	1.7	1.9		2.5	9
26	2.4	1.8	1.9	2.1	1.6	0.7	1.8	2.2		2.3	9
27											0
28											0
29											0
30											0
31	2.2	1.2	1.9	2.6	1.9	0.9	1.3	1.8		1.3	9

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.7

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Monday, April 13, 2015 4:30 PM
To:	Michael Glasgow
Subject:	RE: City of Flint March 2015 MOR

Thanks Michael....

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Monday, April 13, 2015 4:21 PM
To: Prysby, Mike (DEQ)
Subject: City of Flint March 2015 MOR

Mike,

Here is the completed MOR for March.

Mike Glasgow
City of Flint Water Plant

Rennaker, Joanne (DEQ)

From: Michael Glasgow <mglasgow@cityofflint.com>
Sent: Monday, April 13, 2015 4:21 PM
To: Prysby, Mike (DEQ)
Subject: City of Flint March 2015 MOR
Attachments: March 2015 MOR.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Mike,

Here is the completed MOR for March.

Mike Glasgow
City of Flint Water Plant

001635

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT
WSSN: 2310

Michael Glasgow	March 2015
Operator-in-Charge	Month/Year
F-1R, F-2	F-1
Certification of Operator-in-Charge	Water Plant Classification
	Genesee
Signature of Operator-in-Charge	County

Treatment Rate and Filter Data

Maximum Treatment Rate:	25.4	Million Gallons per Day
Rated Plant Capacity:	36	Million Gallons per Day
Average Filter Run:	96	Hours
Average Head Loss:	n/a	Feet *(filter head loss meters not operational)
Average Filtration Rate:	2.3	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.3	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.3%	Percent of Treated Water

Chemical Data

Chlorine on hand:	20,000	lb.	Est. supply:	19	days
Primary Coagulant (Ferric Chloride) on hand:	157,700	lb.	Est. supply:	9	days
Lime (CaO) on hand:	348	tons	Est. supply:	29	days
Fluoride on Hand:	23,300	lb.	Est. supply:	48	days
Cost of All Chemicals per Million Gallons:	n/a	dollars			
Total Power Cost per Million Gallons:	n/a	dollars			

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	2	4
Number of filter confluence samples collected:	242	242
Percent of filter confluence samples > 0.3 NTU:	0.8%	1.7%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Date	Million Gallons Treated	Ozone Dosage (mg/L)	Ferric as Fe3+ mg/L	Lime Dosage (mg/L)	PW-340 Cationic Polymer Dosage (mg/L)	P-142PWG Anionic Polymer Dosage (mg/L)	Turbidity, Units: Raw: Number of Samples	Turbidity, Units: Raw: Avg.	Turbidity, Units: Raw: Max.	Turbidity, Units: Plate Settler: Effluent Avg.	Turbidity, Units: Applied: Applied Avg.
1	24.3	4.9	15.0	121.0	3.8	0.40	8	12.4	47.2	5.63	1.69
2	24.3	4.9	14.6	121.0	4.0	0.41	8	4.4	15.6	5.73	1.61
3	24.3	4.9	14.0	132.1	3.8	0.41	8	4.1	13.3	5.42	1.45
4	24.4	4.9	14.1	123.0	3.9	0.41	8	2.5	3.9	5.54	1.32
5	24.6	4.9	13.7	120.0	3.8	0.43	8	3.2	6.1	5.43	1.47
6	24.9	4.9	14.0	120.4	3.8	0.46	8	2.4	3.0	5.95	1.54
7	24.8	4.9	13.9	117.7	3.7	0.43	8	2.4	3.0	5.89	1.57
8	24.7	4.9	14.4	117.5	3.8	0.40	8	4.6	15.3	5.75	1.62
9	24.8	4.0	14.3	119.3	3.7	0.43	8	4.4	7.5	5.52	1.62
10	24.8	4.7	14.1	116.0	3.7	0.44	8	6.0	8.1	5.31	1.66
11	24.9	4.7	13.6	113.1	3.7	0.44	8	8.9	15.4	4.79	1.87
12	25.1	4.6	14.0	119.2	3.7	0.43	8	4.6	5.5	4.79	1.73
13	25.4	4.9	14.0	108.8	3.7	0.39	8	3.5	4.1	4.79	1.52
14	25.4	4.8	13.2	108.9	3.8	0.39	8	4.6	5.7	6.77	1.52
15	25.4	4.9	13.6	106.0	3.8	0.40	8	15.2	38.1	1.91	2.45
16	24.0	5.0	13.4	104.2	4.0	0.44	8	15.9	21.0	2.87	2.21
17	24.0	4.5	14.2	108.5	4.0	0.43	8	12.5	28.5	2.02	1.60
18	21.9	4.5	14.6	135.0	4.5	0.57	8	10.8	16.0	1.48	1.28
19	21.7	4.6	13.2	104.6	2.1	0.46	8	20.5	35.8	1.96	33.9
20	23.6	4.4	14.8	116.9	1.6	0.35	8	11.6	13.5	2.63	4.11
21	24.0	4.5	16.7	38.4	1.8	0.41	8	11.1	12.3	1.96	2.15
22	24.2	3.8	17.3	41.4	1.5	0.41	8	13.4	19.6	1.98	1.97
23	24.6	3.6	17.5	58.1	1.7	0.34	8	11.8	21.6	1.95	1.65
24	23.9	3.8	16.6	62.6	2.2	0.37	8	9.8	10.7	2.20	1.94
25	24.3	3.5	16.8	64.2	2.2	0.37	8	11.7	17.3	1.79	1.45
26	23.8	3.8	16.6	66.7	2.4	0.34	8	8.2	9.8	1.75	1.40
27	23.3	1.5	17.8	69.3	2.9	0.38	8	8.3	10.8	1.50	1.24
28	22.0	3.0	16.4	74.1	2.6	0.47	8	6.9	8.0	1.52	1.28
29	19.6	4.6	16.1	87.3	4.0	0.53	8	11.0	30.7	1.26	1.08
30	18.1	5.0	16.3	99.2	4.4	0.56	8	9.4	13.6	1.19	1.19
31	18.1	3.0	16.8	106.0	4.4	0.58	8	15.0	42.7	1.14	0.95
Avg.	23.7	4.4	15.0	100.0	3.3	0.43	8	8.7			2.71
Max.	25.4	5.0	17.8	135.0	4.5	0.58	8	20.5	47.2	6.77	33.9
Min.	18.1	1.5	13.2	38.4	1.5	0.34	8	2.4			0.95
Total	733.2										

001637

Filter turbiditiy

City of Flint Water Treatment Plant

WSSN: 2310

March 2015

Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Number of Samples	Avg.	Max	No. of 4 Hr. Compliance periods	No. of 4 Hr. Compliance periods >0.3 NTU	No. of Samples >0.3 NTU	Plant Tap NTU
1	8	0.15	0.18	6	0	0	8	0.11	0.15	6	0	0	0.16
2	8	0.10	0.15	6	0	0	8	0.09	0.14	6	0	0	0.11
3	8	0.11	0.16	6	0	0	8	0.11	0.18	6	0	0	0.11
4	8	0.14	0.20	6	0	0	8	0.12	0.18	6	0	0	0.14
5	8	0.16	0.20	6	0	0	8	0.11	0.17	6	0	0	0.12
6	8	0.11	0.20	6	0	0	8	0.15	0.29	6	0	0	0.16
7	8	0.09	0.13	6	0	0	8	0.07	0.09	6	0	0	0.12
8	8	0.14	0.19	6	0	0	8	0.11	0.18	6	0	0	0.13
9	8	0.12	0.20	6	0	0	8	0.10	0.14	6	0	0	0.13
10	8	0.10	0.13	6	0	0	8	0.13	0.17	6	0	0	0.12
11	8	0.12	0.18	6	0	0	8	0.09	0.11	6	0	0	0.11
12	8	0.12	0.16	6	0	0	8	0.10	0.13	6	0	0	0.11
13	8	0.10	0.12	6	0	0	8	0.12	0.15	6	0	0	0.11
14	8	0.11	0.15	6	0	0	8	0.08	0.09	6	0	0	0.10
15	8	0.12	0.17	6	0	0	8	0.14	0.20	6	0	0	0.14
16	8	0.15	0.17	6	0	0	8	0.14	0.17	6	0	0	0.17
17	8	0.11	0.18	6	0	0	8	0.09	0.12	6	0	0	0.16
18	2	0.07	0.07	1	0	0	2	0.07	0.07	1	0	0	0.08
19	8	0.14	0.22	6	0	0	8	0.14	0.22	6	0	0	0.19
20	8	0.27	0.35	6	1	2	8	0.29	0.36	6	3	4	0.42
21	8	0.15	0.16	6	0	0	8	0.15	0.20	6	0	0	0.33
22	8	0.20	0.23	6	0	0	8	0.18	0.20	6	0	0	0.35
23	8	0.19	0.23	6	0	0	8	0.17	0.23	6	0	0	0.37
24	8	0.19	0.20	6	0	0	8	0.16	0.18	6	0	0	0.23
25	8	0.16	0.21	6	0	0	8	0.12	0.15	6	0	0	0.14
26	8	0.17	0.22	6	0	0	8	0.10	0.12	6	0	0	0.15
27	8	0.13	0.16	6	0	0	8	0.14	0.24	6	0	0	0.13
28	8	0.11	0.17	6	0	0	8	0.10	0.12	6	0	0	0.09
29	8	0.09	0.13	6	0	0	8	0.09	0.12	6	0	0	0.07
30	8	0.09	0.12	6	0	0	8	0.08	0.09	6	0	0	0.10
31	8	0.07	0.09	6	0	0	8	0.08	0.12	6	0	0	0.11
Avg.	8	0.13	0.17	6	0	0	8	0.12	0.16	6	0	0	
Max.	8	0.27	0.35	6	1	2	8	0.29	0.36	6	3	4	0.42
Min.	2	0.07	0.07	1	0	0	2	0.07	0.07	1	0	0	

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.3	0.24	0.60		2.3	2.5	4.8	0.6	0.7	2.4	2.7	1.9	2.1
2	0.3	0.25	0.62		2.2	2.6	4.8	0.4	0.6	2.5	2.8	2.0	2.4
3	0.3	0.23	0.57	0.55	2.2	2.8	5.0	0.6	0.7	2.5	2.9	2.0	2.5
4	0.3	0.24	0.59		2.3	2.6	4.9	0.5	0.7	2.3	2.9	2.1	2.3
5	0.3	0.22	0.57		2.2	2.5	4.7	0.5	0.7	2.7	3.1	2.3	2.8
6	0.3	0.25	0.58		2.2	2.3	4.5	0.4	0.6	2.5	3.0	1.9	2.5
7	0.3	0.23	0.56		2.2	2.8	5.0	0.4	0.7	2.3	2.7	1.8	2.3
8	0.3	0.23	0.61		2.2	2.8	5.0	0.6	0.8	2.5	2.8	2.5	2.8
9	0.3	0.26	0.64		2.2	2.8	5.0	0.5	0.7	2.5	2.8	2.5	2.8
10	0.3	0.23	0.56		2.7	2.9	5.6	0.4	0.6	2.6	3.2	2.2	2.7
11	0.3	0.23	0.52		2.2	3.0	5.2	0.6	0.8	2.4	2.7	2.2	2.6
12	0.3	0.23	0.53	0.50	2.3	2.9	5.2	0.4	0.6	2.8	3.1	2.3	2.7
13	0.3	0.24	0.54		2.3	2.9	5.2	0.4	0.7	2.6	3.3	2.0	2.5
14	0.3	0.24	0.52		2.3	2.7	5.0	0.6	0.8	3.2	3.5	2.0	2.4
15	0.3	0.21	0.49		2.3	3.4	5.7	1.0	1.4	1.7	2.0	1.8	2.0
16	0.3	0.19	0.52		2.5	4.9	7.4	1.6	1.9	2.0	2.3	2.0	2.2
17	0.3	0.21	0.54		2.4	4.3	6.7	0.6	1.0	2.8	3.1	2.5	3.1
18	0.3	0.21	0.51	0.52	2.3	3.4	5.7	0.3	0.5	3.0	3.5	3.0	3.5
19	0.3	0.20	0.52		2.4	3.2	5.6	0.6	1.1	3.0	3.3	2.5	2.8
20	0.3	0.17	0.55		2.2	3.9	6.1	0.3	1.0	2.9	3.3	1.3	1.6
21	0.3	0.17	0.48		2.5	4.1	6.6	0.6	1.3	2.6	3.3	1.7	2.3
22	0.3	0.14	0.51		2.7	3.7	6.4	0.5	1.4	2.6	2.9	2.5	2.8
23	0.3	0.16	0.55		2.7	3.6	6.3	0.5	1.3	2.6	3.0	2.6	2.9
24	0.4	0.16	0.58		2.9	3.5	6.4	0.3	0.8	2.7	3.2	2.5	2.9
25	0.4	0.17	0.62	0.53	2.8	3.4	6.2	0.3	0.7	2.5	2.9	2.3	3.0
26	0.4	0.15	0.56		2.8	3.3	6.1	0.3	0.5	2.8	3.3	2.4	2.8
27	0.5	0.19	0.64		2.9	3.1	6.0	0.3	0.5	2.5	3.1	2.0	2.6
28	0.5	0.16	0.66		2.9	2.8	5.7	0.6	0.8	3.0	3.5	2.3	3.0
29	0.5	0.14	0.59		2.9	2.8	5.7	0.5	0.7	2.7	3.1	2.5	3.0
30	0.4	0.18	0.66		2.5	2.5	5.0	0.8	1.0	2.6	3.0	2.6	3.0
31	0.5	0.17	0.65		2.1	2.6	4.7	0.5	0.7	2.4	2.7	2.0	2.3

Avg.	0.34	0.20	0.57	0.53	2.4	3.1	5.6	0.5	0.8	2.6	3.0	2.2	2.6
Max.	0.50	0.26	0.66	0.55	2.9	4.9	7.4	1.6	1.9	3.2	3.5	3.0	3.5
Min.	0.30	0.14	0.48	0.50	2.1	2.3	4.5	0.3	0.5	1.7	2.0	1.3	1.6

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.27	8.09	366	229	297	122	69	107	113.0	72.1	20.4	11.2	51	89
2	7.95	8.06	358	243	295	111	63	132	110.6	68.9	20.4	18.5	52	88
3	7.95	7.74	360	234	297	122	63	112	116.2	71.3	16.5	14.1	52	87
4	7.81	7.82	354	243	285	129	69	114	129.1	89.8	8.3	4.4	54	85
5	7.97	7.77	360	235	290	126	70	109	117.0	71.3	16.5	13.6	54	95
6	7.55	7.69	362	239	288	124	74	115	133.1	89.0	7.3	2.9	55	89
7	7.90	7.94	351	234	288	124	63	110	126.7	87.4	18.0	13.6	54	87
8	7.93	8.26	363	235	288	123	75	112	120.2	74.5	16.6	11.7	48	87
9	7.96	7.84	357	237	286	125	71	112	116.2	74.5	16.5	12.2	57	95
10	8.01	8.08	349	233	273	129	76	104	122.6	81.0	10.7	7.3	64	98
11	7.92	8.29	347	233	281	117	66	116	115.4	72.1	13.6	11.2	61	95
12	8.00	7.94	345	233	279	127	66	106	125.0	84.2	8.7	5.3	54	91
13	8.07	7.92	348	235	282	127	66	108	126.7	84.2	7.8	5.3	54	88
14	7.99	8.11	343	226	273	112	70	114	123.4	81.8	8.7	3.9	54	85
15	8.00	8.15	309	210	236	99	73	111	97.0	65.7	17.5	12.6	51	87
16	8.00	7.97	251	176	198	78	53	98	79.4	50.5	15.1	12.2	42	76
17	7.99	7.66	305	191	242	92	63	99	97.8	55.3	14.1	11.7	46	76
18	8.00	7.95	270	203	223	104	47	99	89.0	72.1	12.6	4.4	46	84
19	7.90	9.90	256	151	204	58	52	93	79.4	38.5	15.6	12.2	41	78
20	7.85	7.30	240	240	189	135	51	105	81.8	87.4	8.7	5.3	38	70
21	7.97	7.34	214	210	175	119	39	91	78.6	81.8	5.3	1.5	34	73
22	7.95	7.37	219	211	173	104	46	107	63.3	60.9	15.6	14.1	33	69
23	8.01	7.53	212	187	173	92	39	95	64.9	59.3	12.6	9.7	34	69
24	7.94	7.45	211	170	171	77	40	93	74.5	59.3	6.3	5.3	33	69
25	8.01	7.80	218	173	172	77	46	96	67.3	56.1	11.7	9.2	32	72
26	8.03	7.72	214	171	173	78	41	93	71.3	59.3	9.7	5.3	31	69
27	8.02	7.67	215	168	174	77	41	91	75.4	60.1	6.8	4.4	31	68
28	8.05	7.73	218	169	174	77	44	92	78.6	63.3	5.8	1.5	30	72
29	8.12	7.95	229	177	182	80	47	97	71.3	53.7	12.6	9.7	31	73
30	8.18	7.85	229	171	182	79	47	92	73.7	53.7	11.7	8.7	34	71
31	8.08	7.80	228	168	183	70	45	98	68.9	52.1	13.6	10.7	33	72
Avg.	7.98	7.89	290	208	233	104	57	104	97.0	68.7	12.4	8.8	45	81
Max.	8.27	9.90	366	243	297	135	76	132	133.1	89.8	20.4	18.5	64	98
Min.	7.55	7.30	211	151	171	58	39	91	63.3	38.5	5.3	1.5	30	68

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	155	12	0	1	0	120	< 2	0.60	2.2				
2	1	135	12	0	1	0	146	< 2	0.60	2.8				
3	1	214	12	0	1	0	83	< 2	0.58	1.0				
4	1	84	12	0	1	0	100	< 2	0.61	2.5				
5	1	118	12	0	1	0	120	< 2	0.64	1.2				
6	1	79	12	0	1	0	43	< 2	0.62	1.5				
7	1	162	12	0	1	0	51	< 2	0.60	1.7				
8	1	86	12	0	1	0	100	< 2	0.62	2.6				
9	1	225	12	0	1	0	189	< 2	0.64	2.0				
10	1	205	12	0	1	0	248	< 2	0.64	2.6				
11	1	387	12	0	1	0	339	< 2	0.61	3.2				
12	1	770	12	0	1	0	440	< 2	0.31	3.7				
13	1	442	12	0	1	0	340	< 2	0.43	4.7				
14	1	4196	12	0	1	0	1120	< 2	0.58	5.7				
15	1	48392	12	0	1	0	> 14760	< 2	0.56	5.7				
16	1	> 48392	12	0	1	0	> 14760	< 2	0.43	4.2				
17	1	39726	12	0	1	0	12460	< 2	0.45	2.8				
18	1	24066	12	0	1	0	> 14760	< 2	0.55	3.6				
19	1	> 48392	12	0	1	0	11100	< 2	0.38	6.5				
20	1	34658	12	0	1	0	7100	< 2	0.56	4.8				
21	1	12262	12	0	1	0	9400	< 2	0.49	6.3				
22	1	4764	12	0	1	0	2920	< 2	0.49	4.5				
23	1	1596	12	0	1	0	1940	< 2	0.45	4.1				
24	1	1182	12	0	1	0	960	< 2	0.41	4.0				
25	1	550	12	0	1	0	1060	< 2	0.41	4.5				
26	1	399	12	0	1	0	560	< 2	0.41	5.6				
27	1	195	12	0	1	0	450	< 2	0.40	6.0				
28	1	122	12	0	1	0	400	< 2	0.41	5.9				
29	1	98	12	0	1	0	480	< 2	0.42	4.9				
30	1	201	12	0	1	0	> 738	< 2	0.40	5.9				
31	1	187	12	0	1	0	507	< 2	0.42	5.2				
Avg.									0.51	3.9				
Max.		48392					12460	< 2	0.64	6.5				
Min.									0.31	1.0				

001641

Date	Free Chlorine Residual at Bacteriological Montioring Stations mg/l										Number of Samples
	1	2	3	4	5	6	7	8	CS	WS	
1											0
2											0
3	1.5	1.3	1.8	1.4	1.5	0.3	1.1	1.8		2.6	9
4	1.5	1.3	1.9	1.5	1.5	0.4	1.7	2.1		1.3	9
5	1.0	0.9	1.7	0.9	1.5	0.4	1.0	2.1		1.3	9
6											0
7											0
8											0
9											0
10	1.8	1.2	1.5	1.2	1.4	0.4	1.4	1.9		2.1	9
11	1.4	0.5	1.7	1.3	1.1	0.6	1.5	1.8	1.5	1.1	10
12	1.7	1.0	1.6	1.7	1.6	0.5	1.5	2.0		2.1	9
13											0
14											0
15											0
16											0
17	1.2	1.2	1.6	1.7	1.1	0.6	1.0	2.2	0.7	2.2	10
18	2.0	1.2	2.0	1.9	1.3	0.5	1.7	2.8		0.9	9
19	1.1	1.7	2.2	1.5	0.7	0.5	1.1	0.9		0.9	9
20											0
21											0
22											0
23											0
24	1.9	1.1	2.0	1.9	0.8	0.5	1.7	1.9		2.0	9
25	1.4	1.7	2.1	1.9	1.7	0.6	1.4	1.7		2.0	9
26	1.9	1.4	1.4	1.8	1.3	0.5	1.4	1.9		1.9	9
27											0
28											0
29											0
30											0
31	1.7	0.9	1.6	1.9	1.7	0.7	0.9	1.5		1.0	9

Distribution Sample Summary	
Total # of routine distribution samples analyzed	119
Total # of routine distribution samples required	100

Distribution Disinfectant Total Residual Summary	
Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.42

Distribution Bacteriological Summary	
Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

001642

Date	Total Chlorine Residual at Bacteriological Montioring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	1.7	1.6	2.2	1.6	1.6	0.4	1.5	2.0		2.8	9
4	1.8	1.6	2.2	1.7	1.8	0.6	2.0	2.3		1.6	9
5	1.7	1.3	2.2	1.2	1.8	0.5	1.7	2.5		1.6	9
6											0
7											0
8											0
9											0
10	2.1	1.5	1.7	1.5	1.6	0.5	1.7	2.2		2.4	9
11	1.7	0.7	2.0	1.6	1.5	0.7	1.7	2.4	1.7	1.4	10
12	2.0	1.2	1.9	2.0	1.9	0.6	1.7	2.3		2.3	9
13											0
14											0
15											0
16											0
17	1.7	1.5	2.0	1.9	1.4	0.7	1.5	2.7	0.9	2.6	10
18	2.3	1.4	2.3	2.2	1.5	0.6	1.9	3.0		1.1	9
19	1.4	1.9	2.7	1.8	1.0	0.7	1.4	1.5		1.1	9
20											0
21											0
22											0
23											0
24	2.4	1.4	2.3	2.3	1.1	0.7	2.0	2.4		2.5	9
25	1.6	2.3	2.7	2.5	1.9	0.8	1.7	1.9		2.5	9
26	2.4	1.8	1.9	2.1	1.6	0.7	1.8	2.2		2.3	9
27											0
28											0
29											0
30											0
31	2.2	1.2	1.9	2.6	1.9	0.9	1.3	1.8		1.3	9

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.7

Positive Distribution Samples

Date	Monitoring station	Date	Repeat Monitoring Stations	Residual (mg/L) Free / Total	Present or Absent

Rennaker, Joanne (DEQ)

From: Michael Glasgow <mglasgow@cityofflint.com>
Sent: Friday, April 10, 2015 4:42 PM
To: Prysby, Mike (DEQ)
Subject: City of Flint March MOR
Attachments: 3-15 State MOR.xls

Mike,

Here is a portion of our monthly MOR. The chemical feed rates are missing due to a computer glitch. I should have the completed copy of the report Monday, which I will email to you and also send a copy in the mail. I wanted to get the lab chemical analysis, bacteriological, and distribution sampling data to you today.

Mike Glasgow
City of Flint Water Plant

001645

WSSN: 2310

Date	Fluoriode Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1		0.24	0.60				0.0	0.6	0.7	2.4	2.7	1.9	2.1
2		0.25	0.62				0.0	0.4	0.6	2.5	2.8	2.0	2.4
3		0.23	0.57	0.55			0.0	0.6	0.7	2.5	2.9	2.0	2.5
4		0.24	0.59				0.0	0.5	0.7	2.3	2.9	2.1	2.3
5		0.22	0.57				0.0	0.5	0.7	2.7	3.1	2.3	2.8
6		0.25	0.58				0.0	0.4	0.6	2.5	3.0	1.9	2.5
7		0.23	0.56				0.0	0.4	0.7	2.3	2.7	1.8	2.3
8		0.23	0.61				0.0	0.6	0.8	2.5	2.8	2.5	2.8
9		0.26	0.64				0.0	0.5	0.7	2.5	2.8	2.5	2.8
10		0.23	0.56				0.0	0.4	0.6	2.6	3.2	2.2	2.7
11		0.23	0.52				0.0	0.6	0.8	2.4	2.7	2.2	2.6
12		0.23	0.53	0.50			0.0	0.4	0.6	2.8	3.1	2.3	2.7
13		0.24	0.54				0.0	0.4	0.7	2.6	3.3	2.0	2.5
14		0.24	0.52				0.0	0.6	0.8	3.2	3.5	2.0	2.4
15		0.21	0.49				0.0	1.0	1.4	1.7	2.0	1.8	2.0
16		0.19	0.52				0.0	1.6	1.9	2.0	2.3	2.0	2.2
17		0.21	0.54				0.0	0.6	1.0	2.8	3.1	2.5	3.1
18		0.21	0.51	0.52			0.0	0.3	0.5	3.0	3.5	3.0	3.5
19		0.20	0.52				0.0	0.6	1.1	3.0	3.3	2.5	2.8
20		0.17	0.55				0.0	0.3	1.0	2.9	3.3	1.3	1.6
21		0.17	0.48				0.0	0.6	1.3	2.6	3.3	1.7	2.3
22		0.14	0.51				0.0	0.5	1.4	2.6	2.9	2.5	2.8
23		0.16	0.55				0.0	0.5	1.3	2.6	3.0	2.6	2.9
24		0.16	0.58				0.0	0.3	0.8	2.7	3.2	2.5	2.9
25		0.17	0.62	0.53			0.0	0.3	0.7	2.5	2.9	2.3	3.0
26		0.15	0.56				0.0	0.3	0.5	2.8	3.3	2.4	2.8
27		0.19	0.64				0.0	0.3	0.5	2.5	3.1	2.0	2.6
28		0.16	0.66				0.0	0.6	0.8	3.0	3.5	2.3	3.0
29		0.14	0.59				0.0	0.5	0.7	2.7	3.1	2.5	3.0
30		0.18	0.66				0.0	0.8	1.0	2.6	3.0	2.6	3.0
31		0.17	0.65				0.0	0.5	0.7	2.4	2.7	2.0	2.3

Avg.	#DIV/0!	0.20	0.57	0.53	#DIV/0!	#DIV/0!	0.0	0.5	0.8	2.6	3.0	2.2	2.6
Max.	0.00	0.26	0.66	0.55	0.0	0.0	0.0	1.6	1.9	3.2	3.5	3.0	3.5
Min.	0.00	0.14	0.48	0.50	0.0	0.0	0.0	0.3	0.5	1.7	2.0	1.3	1.6

Date	pH (S.U.)		Total Hardness as CaCO3 (mg/L)		Total Alkalinity as CaCO3 (mg/L)		Non-Carbonate Hardness as CaCO3 (mg/L)		Calcium as Ca2+ (mg/L)		Magnesium as Mg2+ (mg/L)		Chloride as Cl- (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.27	8.09	366	229	297	122	69	107	113.0	72.1	20.4	11.2	51	89
2	7.95	8.06	358	243	295	111	63	132	110.6	68.9	20.4	18.5	52	88
3	7.95	7.74	360	234	297	122	63	112	116.2	71.3	16.5	14.1	52	87
4	7.81	7.82	354	243	285	129	69	114	129.1	89.8	8.3	4.4	54	85
5	7.97	7.77	360	235	290	126	70	109	117.0	71.3	16.5	13.6	54	95
6	7.55	7.69	362	239	288	124	74	115	133.1	89.0	7.3	2.9	55	89
7	7.90	7.94	351	234	288	124	63	110	126.7	87.4	18.0	13.6	54	87
8	7.93	8.26	363	235	288	123	75	112	120.2	74.5	15.6	11.7	48	87
9	7.96	7.84	357	237	286	125	71	112	116.2	74.5	16.5	12.2	57	95
10	8.01	8.08	349	233	273	129	76	104	122.6	81.0	10.7	7.3	64	98
11	7.92	8.29	347	233	281	117	66	116	115.4	72.1	13.6	11.2	61	95
12	8.00	7.94	345	233	279	127	66	106	125.0	84.2	8.7	5.3	54	91
13	8.07	7.92	348	235	282	127	66	108	126.7	84.2	7.8	5.3	54	88
14	7.99	8.11	343	226	273	112	70	114	123.4	81.8	8.7	3.9	54	85
15	8.00	8.15	309	210	236	99	73	111	97.0	65.7	17.5	12.6	51	87
16	8.00	7.97	251	176	198	78	53	98	79.4	50.5	15.1	12.2	42	76
17	7.99	7.66	305	191	242	92	63	99	97.8	55.3	14.1	11.7	46	76
18	8.00	7.95	270	203	223	104	47	99	89.0	72.1	12.6	4.4	46	84
19	7.90	9.90	256	151	204	58	52	93	79.4	38.5	15.6	12.2	41	78
20	7.85	7.30	240	240	189	135	51	105	81.8	87.4	8.7	5.3	38	70
21	7.97	7.34	214	210	175	119	39	91	78.6	81.8	5.3	1.5	34	73
22	7.95	7.37	219	211	173	104	46	107	63.3	60.9	15.6	14.1	33	69
23	8.01	7.53	212	187	173	92	39	95	64.9	59.3	12.6	9.7	34	69
24	7.94	7.45	211	170	171	77	40	93	74.5	59.3	6.3	5.3	33	69
25	8.01	7.80	218	173	172	77	46	96	67.3	56.1	11.7	9.2	32	72
26	8.03	7.72	214	171	173	78	41	93	71.3	59.3	9.7	5.3	31	69
27	8.02	7.67	215	168	174	77	41	91	75.4	60.1	6.8	4.4	31	68
28	8.05	7.73	218	169	174	77	44	92	78.6	63.3	5.8	1.5	30	72
29	8.12	7.95	229	177	182	80	47	97	71.3	53.7	12.6	9.7	31	73
30	8.18	7.85	229	171	182	79	47	92	73.7	53.7	11.7	8.7	34	71
31	8.08	7.80	228	168	183	70	45	98	68.9	52.1	13.6	10.7	33	72
Avg.	7.98	7.89	290	208	233	104	57	104	97.0	68.7	12.4	8.8	45	81
Max.	8.27	9.90	366	243	297	135	76	132	133.1	89.8	20.4	18.5	64	98
Min.	7.55	7.30	211	151	171	58	39	91	63.3	38.5	5.3	1.5	30	68

Date	Total Coliform						Standard Plate Count (Simplate MPN)		Conductivity (mS)	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap	Tap	Raw	Raw	Tap	Raw	Tap
1	1	155	12	0	1	0	120	< 2	0.60	2.2				
2	1	135	12	0	1	0	146	< 2	0.60	2.8				
3	1	214	12	0	1	0	83	< 2	0.58	1.0				
4	1	84	12	0	1	0	100	< 2	0.61	2.5				
5	1	118	12	0	1	0	120	< 2	0.64	1.2				
6	1	79	12	0	1	0	43	< 2	0.62	1.5				
7	1	162	12	0	1	0	51	< 2	0.60	1.7				
8	1	86	12	0	1	0	100	< 2	0.62	2.6				
9	1	225	12	0	1	0	189	< 2	0.64	2.0				
10	1	205	12	0	1	0	248	< 2	0.64	2.6				
11	1	387	12	0	1	0	339	< 2	0.61	3.2				
12	1	770	12	0	1	0	440	< 2	0.31	3.7				
13	1	442	12	0	1	0	340	< 2	0.43	4.7				
14	1	4196	12	0	1	0	1120	< 2	0.58	5.7				
15	1	48392	12	0	1	0	> 14760	< 2	0.56	5.7				
16	1	> 48392	12	0	1	0	> 14760	< 2	0.43	4.2				
17	1	39726	12	0	1	0	12460	< 2	0.45	2.8				
18	1	24066	12	0	1	0	> 14760	< 2	0.55	3.6				
19	1	> 48392	12	0	1	0	11100	< 2	0.38	6.5				
20	1	34658	12	0	1	0	7100	< 2	0.56	4.8				
21	1	12262	12	0	1	0	9400	< 2	0.49	6.3				
22	1	4764	12	0	1	0	2920	< 2	0.49	4.5				
23	1	1596	12	0	1	0	1940	< 2	0.45	4.1				
24	1	1182	12	0	1	0	960	< 2	0.41	4.0				
25	1	550	12	0	1	0	1060	< 2	0.41	4.5				
26	1	399	12	0	1	0	560	< 2	0.41	5.6				
27	1	195	12	0	1	0	450	< 2	0.40	6.0				
28	1	122	12	0	1	0	400	< 2	0.41	5.9				
29	1	98	12	0	1	0	480	< 2	0.42	4.9				
30	1	201	12	0	1	0	> 738	< 2	0.40	5.9				
31	1	187	12	0	1	0	507	< 2	0.42	5.2				

Avg.									0.51	3.9				
Max.		48392					12460	< 2	0.64	6.5				
Min.									0.31	1.0				

Rennaker, Joanne (DEQ)

From: Howard Croft <hcroft@cityofflint.com>
Sent: Thursday, April 09, 2015 10:04 AM
To: Brent Wright; Daugherty Johnson; Dayne Walling; donna. cole; Elizabeth Murphy; gdn2 @aol.com; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; rob.nicholas@veolia.com; Robert Bincsik; Robert Nicholas; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green
Subject: Tech Team_Water Quality Update_April
Attachments: Water Quality Implementation Plan.pdf; Flint Water Improvements 2015.pdf

Team,

I am forwarding everyone a copy of our Water Quality Implementation Plan along with the accompanying press release. We are aggressively moving forward with the installation of Granulated Activated Carbon and expect to have it installed and working by mid-July.

We are contemplating holding our next Technical Advisory Meeting in May just prior to our next TTHM test period which is the third week in May. I will ensure that everyone has sufficient notice prior to the meeting date and we will plan on having a conference call number available.

Please do not hesitate to email me if you have any questions.

Thank you,

--
Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

City of Flint
Water Quality Implementation Plan

Item	Cost	Owner & Support	April				May				June					July				August					September			
			6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28
Clean Plate Settlers	N/A	F-1 / DPW		Staff																								
Repair Clarifier	$10,000	F-1 / DPW			Contractor																							
Chemical Dosing & Levels	TBD	F-1 / DPW					Staff / LAN																					
GAC Purchase & Installation	$1,600,000	LAN / DPW	Design/DEQ Approval				Procurement			Mobilization			Installation															
Watermain Leak Detection	$900,000	S-1 / DPW	RFP / Response			Contract		Mobilization			Performance / Repairs																	
Hydraulic Model & Flushing Program	$173,700	LAN / DPW	Model being poulated with field data																									
2 Miles of Pipe Replacement	$2,163,000	S-1 / DPW	RFP / Response			Contract Signing			Mobilization			Construction																
Total	**$4,846,700**																											

Gerald Ambrose
Emergency Manager

CITY OF FLINT, MICHIGAN 1855

Dayne Walling
Mayor

Jason Lorenz
Public Information Officer
(810) 237-2039
jlorenz@cityofflint.com

For Immediate Release

City of Flint Announces Action Plan to Maintain Safety and Improve Quality of Flint Water

Flint, Michigan – April 8, 2015 – The City of Flint is proceeding with a series of actions to ensure the continued safety of Flint drinking water is maintained and that issues of discoloration and odor continue to be addressed. Most notably, the installation of a Granulated Active Charcoal filter (GAC) at the Water Treatment Plant is expected to be authorized this week by Emergency Manager Jerry Ambrose.

The introduction of the GAC to the treatment process at Flint's plant will absorb or reduce the chemical precursors which will block or eliminate the formation of TTHM during the filtration process. Engineering and design are underway and installation of the GAC is targeted for completion by mid-July. Cost of this improvement is projected at $1.5 million and will be paid for by the proceeds from the state approved restructuring of the City's Drinking Water Revolving Fund loans.

In addition to the installation of the GAC, the City of Flint is undertaking a number of other improvements to the water system in the coming months, including a water leak detection monitoring, completion of the hydraulic model and subsequent targeted hydrant flushing program, and the replacement of two miles of water main pipe in a critical area of the city. All of these improvements scheduled to occur within the next six months.

"The replacement of this two mile section of pipe along Dupont Street has been identified by a water reliability study as a significant piece of infrastructure and will greatly improve

–CONTINUE–

Gerald Ambrose
Emergency Manager

CITY OF FLINT, MICHIGAN 1855

Dayne Walling
Mayor

the movement of water in that area of the city," said Dept. of Public Works Director Howard Croft. Increasing the circulation of the water in the system will immediately result in improvements in water aesthetics, such as discoloration and odor. The MDEQ has given its approval to the project and the process of bidding for construction will begin next week. Construction will take place during the summer of this year.

Ongoing repairs and maintenance also continue to improve the health of the system. To date, about 200 water main breaks have been repaired this year. Whenever major work that may disrupt service is scheduled, the City works to notify residents in the affected area with signage and with posts to cityofflint.com. Updates will include the area of work and the estimated time of completion.

Each main break repair stirs sediments in the line. "Residents should know that there is a chance of discoloration or odor any time work is being done on a main in their area," said Croft. "This is nothing to be alarmed about and it doesn't mean the water is unsafe." If discoloration of water or odor occurs due to repairs, residents are reminded that running the water for a few minutes should clear the line. Anyone with water questions should call 810-787-6537.

The City of Flint remains committed to addressing water related issues. Along with maintaining the safety of the water, addressing quality and affordability are top priorities. The steps outlined above are indicators of the City's progress in addressing the most pressing concerns surrounding water. Emergency Manager Ambrose reiterated that development of a contract with DWSD was not going to happen.

"Those advocating for a return to DWSD do not want to recognize the financial realities of such a move. Not only would such a move increase the City's costs by more than $1million per month, but the water from Detroit is no safer than Flint water, as both entities

–CONTINUE–

Gerald Ambrose
Emergency Manager

CITY OF FLINT, MICHIGAN
1855

Dayne Walling
Mayor

are measured by the same MDEQ standards that have been in place for years. Why anyone would want to send a million dollars a month to DWSD rather than make necessary repairs to the City's own system is beyond me."

Further updates on the progress being made to improve Flint's water system will released in regular updates to the media and in updates to the City's website, cityofflint.com. Anyone wishing to report an issue can do so under "Online Services". Anyone with questions about these or any other water issues should call the water treatment plant at 810-787-6537.

–END–

Rennaker, Joanne (DEQ)

From:	Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent:	Thursday, April 09, 2015 7:52 AM
To:	Prysby, Mike (DEQ)
Cc:	Busch, Stephen (DEQ)
Subject:	RE: Flint River Monitoring

Oh, that's good. Thank you! I put the letter in Tom P.'s box, but I'll revise it now before he gets in.
You both are terrific to work with; did I tell you that?
Jennifer

From: Prysby, Mike (DEQ) [mailto:PRYSBYM@michigan.gov]
Sent: Thursday, April 09, 2015 6:46 AM
To: Crooks, Jennifer
Cc: Busch, Stephen (DEQ)
Subject: RE: Flint River Monitoring

Jennifer,

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Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Wednesday, April 08, 2015 4:30 PM
To: Busch, Stephen (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: RE: Flint River Monitoring

How does this sound?

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Jen

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Wednesday, April 08, 2015 2:33 PM
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Cc: Prysby, Mike (DEQ)
Subject: RE: Flint River Monitoring

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Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
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MDEQ
517-643-2314

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, April 09, 2015 7:46 AM
To: Crooks, Jennifer
Cc: Busch, Stephen (DEQ)
Subject: RE: Flint River Monitoring

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MDEQ
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Rennaker, Joanne (DEQ)

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Also, not sure if the complainant read further into the Wikipedia reference....the reference provides discussion on the formation of TTHMs in drinking water through the reaction between chlorine and the TTHMs precursors present from the source water.

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Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

Rennaker, Joanne (DEQ)

From:	Busch, Stephen (DEQ)
Sent:	Wednesday, April 08, 2015 3:16 PM
To:	Doty, Susan (DEQ); Kammer, Stephanie (DEQ); Prysby, Mike (DEQ)
Cc:	Bennett, Charles (DEQ); Vanderlaan, Mary (DEQ); Bishop, Susan (DEQ); Keiper, William (DEQ)
Subject:	RE: Flint River Inquiry

Thanks. I think that probably is where the individual says the info is coming from.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Doty, Susan (DEQ)
Sent: Wednesday, April 08, 2015 3:06 PM
To: Kammer, Stephanie (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Cc: Bennett, Charles (DEQ); Vanderlaan, Mary (DEQ); Bishop, Susan (DEQ); Keiper, William (DEQ)
Subject: RE: Flint River Inquiry

I did a little internet searching and found this: In addition, Flint water contains elevated levels of trihalomethane (TTHM), a byproduct of the heavy chlorination of river water to combat bacteria. On January 2, notices were sent to water customers by the city warning that drinking water with excessive amounts of TTHM over "many years" could result in liver, kidney or central nervous system problems as well as an increased risk of cancer. (http://cityofflint.com/wp-content/uploads/City-of-Flint-Violation-Notice-MCL-TTHM-12_16_14.pdf)

If you google trihalomethane- Trihalomethanes are chemical compounds in which three of the four hydrogen atoms of methane are replaced by halogen atoms. Many trihalomethanes find uses in industry as solvents or refrigerants.

Maybe we need to talk with Drinking Water- Mike Prysby?
-Susan

Susan Doty
Environmental Quality Analyst
Michigan Department of Environmental Quality
Lansing District Office
525 W. Allegan Drive.
Lansing, MI 48909
Phone: 517-284-6664
www.michigan.gov/soilerosion
Subscribe to our Soil Erosion and Construction Storm Water Email List by clicking on the red envelope

From: Kammer, Stephanie (DEQ)
Sent: Wednesday, April 08, 2015 2:19 PM
To: Busch, Stephen (DEQ)
Cc: Bennett, Charles (DEQ); Vanderlaan, Mary (DEQ); Bishop, Susan (DEQ); Doty, Susan (DEQ); Keiper, William (DEQ)
Subject: RE: Flint River Inquiry

In addition, the City of Flint does some in-stream monitoring of the Flint and it's tributaries as part of their municipal storm water permit. I just looked at their most recent annual report and it does not appear that their monitoring includes solvents or refrigerants either.

Stephanie Kammer
DEQ-Water Resources Division
Lansing District Office
525 West Allegan Street
PO Box 30242
Lansing, Michigan 48909
517-897-1597
kammers@michigan.gov

From: Keiper, William (DEQ)
Sent: Wednesday, April 08, 2015 1:46 PM
To: Kammer, Stephanie (DEQ)
Cc: Alexander, Michael (DEQ)
Subject: RE: Flint River Inquiry

We do take water chemistry sample periodically in the flint (typically 4 times a year) however we do not monitor for solvents or refrigerants. Im not aware of monitoring for those parameters anywhere.

-Bill

William Keiper
Aquatic Biologist
Michigan Department of Environmental Quality
Water Resources Division

Office: 517-284-5553
Fax: 517-373-9958
Email: keiperw@michigan.gov

From: Kammer, Stephanie (DEQ)
Sent: Wednesday, April 08, 2015 12:58 PM
To: Alexander, Michael (DEQ); Goodwin, Kevin (DEQ); Keiper, William (DEQ)
Cc: Bennett, Charles (DEQ)
Subject: FW: Flint River Inquiry

See the question below regarding refrigerants and solvents in the Flint River. Is this anything your unit may be aware of?

From: Bennett, Charles (DEQ)
Sent: Wednesday, April 08, 2015 11:35 AM
To: Busch, Stephen (DEQ)
Cc: Vanderlaan, Mary (DEQ); Bishop, Susan (DEQ); Doty, Susan (DEQ); Kammer, Stephanie (DEQ)
Subject: RE: Flint River Inquiry

i'm NPDES compliance for genesee county and am neither aware of the monitoring or the letter

Charles Bennett, PE
DEQ Water Resources Division

Lansing District Office
BennettC4@michigan.gov
ph 517-284-6659; fax 517-241-3571

From: Bishop, Susan (DEQ)
Sent: Wednesday, April 08, 2015 11:16 AM
To: Bennett, Charles (DEQ); Doty, Susan (DEQ)
Subject: FW: Flint River Inquiry
Importance: High

FYI

From: Busch, Stephen (DEQ)
Sent: Wednesday, April 08, 2015 11:15 AM
To: Bartley, Cheryl (DEQ)
Cc: Bishop, Susan (DEQ)
Subject: Flint River Inquiry
Importance: High

Could you please have any of your staff that oversee Genesee County NPDES and Non-Point Source regarding the Flint River respond to me directly.

I am working with EPA Region 5 in response to a letter to the White House regarding Flint drinking water. The complainant indicates they received a "Letter of Alert" in January 2015 regarding the detection of refrigerant and solvent contaminants in the Flint River.

I just need to know if WRD staff are aware of any monitoring in the Flint River that could be associated with this, and if they might know where this "Letter of Alert" could be coming from.

Thanks.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

Rennaker, Joanne (DEQ)

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Rennaker, Joanne (DEQ)

From:	Busch, Stephen (DEQ)
Sent:	Wednesday, April 08, 2015 10:48 AM
To:	Crooks, Jennifer; Prysby, Mike (DEQ)
Subject:	RE: Flint to switch to chloramines?

Jennifer,

I was out yesterday and didn't have a chance to respond. There was some brief consideration early on about converting to a chloramination system. However, given the biofilm, TC, EC, and other aesthetic issues that had occurred in August and September of 2014, there was concern that use of chloramines in that distribution environment could easily lead to the presence and proliferation of nitrifying bacteria, causing more public health risk than it would be helping.

Given the reduction in DBP levels the City has been able to accomplish in the last 6-9 months there hasn't been a need to revisit the use of chloramines, but it's not completely off the table as an option if high DBP levels were to come back and remain prevalent.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Tuesday, April 07, 2015 11:32 AM
To: Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: RE: Flint to switch to chloramines?

I heard that it was discussed at a public meeting, so it's probably just an idea floating around. Thank you for checking into this, Mike.
Jen

From: Prysby, Mike (DEQ) [mailto:PRYSBYM@michigan.gov]
Sent: Tuesday, April 07, 2015 10:01 AM
To: Crooks, Jennifer; Busch, Stephen (DEQ)
Subject: RE: Flint to switch to chloramines?

Jennifer,
I do not recall chloramines being considered as a treatment alternative to reduce TTHMs; however, I will confirm this.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Tuesday, April 07, 2015 9:24 AM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Flint to switch to chloramines?

Hi, Mike and Steve. We've heard that Flint may be contemplating a switch to chloramines in the near future. We're concerned about possible effects related to what happened in DC. Is Flint planning on switching to chloramines; and if so, when?

Jen

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Tuesday, April 07, 2015 2:08 PM
To: Prysby, Mike (DEQ)
Subject: Another Citizen letter-question

Forwarded to me from the White House.

So, besides the usual questions/comments, this citizen mentions a recent letter (in January) sent to residents "regarding refrigerant and cleaning solvent being found in the River water".

Are you aware of the City sending out this letter? Are you aware if there was refrigerant and cleaning solvent being found in the River?

Jennifer

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Tuesday, April 07, 2015 2:05 PM
To:	Matta, Samir
Cc:	Busch, Stephen (DEQ)
Subject:	RE: City of Flint - WTP Conversion to GAC.

Samir,

We are not involved with the selection of a contractor for the upcoming work. The described approach is agreeable provided that the design, materials used, and method of installation is approved and permitted by our office in advance of the city making a financial commitment towards the system alteration. Please reference Sec. 325.1004 (6) of the Michigan Safe Drinking Water Act for further discussion of the permitting requirements for alteration of the water system. As we discussed, our office will review the design and, following our approval, issue a construction permit in a timely manner. If you have any further questions, feel free to contact me.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Matta, Samir [mailto:SFMatta@lan-inc.com]
Sent: Monday, April 06, 2015 11:14 AM
To: Prysby, Mike (DEQ)
Cc: hcroft@cityofflint.com; Busch, Stephen (DEQ)
Subject: City of Flint - WTP Conversion to GAC.

Hi Mike,

As per our phone conversation, LAN has been working with the City to implement the recommendation from Veolia with regard to the conversion of the 12 filters at the plant by replacing the 18" Anthracite with new GAC Media.

Due to the time frame limitation, We have discussed with the City that sole sourcing the GAC purchase and installation may be the only chance for us to accomplish the work on time as the system will need to be in place by early July in order to give the City 5-7 weeks of treatment time with the new media before the August sampling.

The City is looking for us to provide a turn-key delivery method in order to insure that we can acquire a vendor while performing the design and going thru your office for permitting.

Let us know if you agree with the approach or if you recommend a different method.

Your prompt response is greatly appreciated.

Samir F. Matta
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
1311 South Linden Road, Suite B • Flint, MI 48532
2121 University Park Dr, Suite 100 • Okemos, MI 48864-6901
D 517.819.2367 **C** 517.819.2367
www.lan-inc.com • sfmatta@lan-inc.com

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Subject: RE: Flint to switch to chloramines?

Jennifer,
I do not recall chloramines being considered as a treatment alternative to reduce TTHMs; however, I will confirm this.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Tuesday, April 07, 2015 9:24 AM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Flint to switch to chloramines?

Hi, Mike and Steve. We've heard that Flint may be contemplating a switch to chloramines in the near future. We're concerned about possible effects related to what happened in DC. Is Flint planning on switching to chloramines; and if so, when?

Jen

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Tuesday, April 07, 2015 9:24 AM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Flint to switch to chloramines?

Hi, Mike and Steve. We've heard that Flint may be contemplating a switch to chloramines in the near future. We're concerned about possible effects related to what happened in DC. Is Flint planning on switching to chloramines; and if so, when?

Jen

Rennaker, Joanne (DEQ)

From: Michael Glasgow <mglasgow@cityofflint.com>
Sent: Monday, April 06, 2015 5:37 PM
To: Prysby, Mike (DEQ)
Subject: Flint Oct 2014 Bromate Results
Attachments: October 2014 Bromate Results.pdf

Mike,

Here are the October 2014 Bromate results. I will put the Ozone dosage on the MOR immediately. We do have data from each month of operation. I will get to work on compiling that and updating the prior MOR's as soon as I finish verifying all the data from March MOR.

Mike Glasgow
City of Flint Water Plant

NSF International
789 N. Dixboro Rd. Ann Arbor, MI 48105, USA
1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org
Live Safer™

TEST REPORT

Send To: C0211289
Mr. Michael Glasgow
City of Flint, Municipality
1101 South Saginaw Street
Flint, MI 48502

Facility: C0211290
City of Flint Water Plant
4500 North Dort Highway
Flint MI 48505
United States

Result	**COMPLETE**	Report Date	06-NOV-2014
Customer Name	City of Flint, Municipality		
Tested To	USFDA CFR Title 21 Part 165.110		
Description	Municipal Water		
Test Type	Test only		
Job Number	J-00148749		
Project Number	9841598 (CL02)		
Project Manager	Anna Ciechanowski		

Thank you for having your product tested by NSF International.

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

Report Authorization Kerri L. Levanseler **Date** 06-NOV-2014

Kerri Levanseler - Director, Chemistry Laboratory

General Information

Standard: USFDA CFR Title 21 Part 165.110

Date and Time Sampled: 10/31/2014 08:34 EDT
Product Description: Municipal Water
Test Description: Bromate - October

Sample Id: **S-0001096447**
Description: Municipal Water - 10/31/2014 08:34 EDT
Sampled Date: 10/31/2014
Received Date: 11/05/2014

Testing Parameter	Reporting Limit	Result	FDA SOQ	Units	P / F
Disinfection Residuals/Disinfection By-Products					
Bromate	5	10	10	ug/L	Pass

<<Additional Information>>

Sample Id: S-0001096447

Test Parameter	Date Analyzed	Time Analyzed	Date Prepared/ Processed
Disinfection Residuals/Disinfection By-Products			
Bromate (Ref: EPA 300.1)	5-NOV-2014		

Testing Laboratories:

	Flag	Id	Address
All work performed at: (Unless otherwise specified)	→	NSF_AA	NSF International 789 N. Dixboro Road Ann Arbor MI 48105

References to Testing Procedures:

NSF Reference	Parameter / Test Description
C3015	Bromate (Ref: EPA 300.1)

Certifications:

Arizona (# AZ0655)	California (# 03214 CA)	Connecticut (# PH-0625)
Florida (# E-87752 FL)	Hawaii	Indiana
Maryland (# 201)	Michigan (# 0048)	North Carolina (# 26701)
New Jersey (# MI770)	Nevada (# MI000302010A)	New York (# 11206)
Pennslyvania (# 68-00312)	South Carolina (# 81005)	Virginia (# 00045)
Vermont (# VT 11206)		

Test descriptions preceded by an asterisk "*" indicate that testing has been performed per NSF International requirements but is not within its scope of accreditation.

The reported result for Odor, Phenolics, Potassium, Specific Conductance and Total Residual Chlorine cannot be used for compliance purposes within the State of Arizona.

Notes:

1) Bottled water sold in the United States shall not contain Fluoride in excess of the levels published by the USFDA in 21 CFR Part 165.110. These levels are based on the annual average of maximum daily air temperatures at the location where the bottled water is sold at retail. Please refer to the most current edition of the regulation to determine the Fluoride maximum level that pertains to your product.
2) A blank on the FDA SOQ column indicates that no maximum level has been established by the FDA for that contaminant.
3) An ND result means that the contaminant was not detected at or above the detection limit for the instrument.

For a list of NSF International Method Detection Limits refer to
http://www.nsf.org/media/enews/documents/minimum_detection_level_spreadsheet.pdf.

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Monday, April 06, 2015 9:48 AM
To: Benzie, Richard (DEQ)
Subject: RE: City of Flint Water

Richard,

I will summarize and respond....thanks for your input..

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Benzie, Richard (DEQ)
Sent: Monday, April 06, 2015 9:35 AM
To: Prysby, Mike (DEQ)
Cc: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Butler, Sonya (DEQ); Schneider, Robert (DEQ)
Subject: Re: City of Flint Water

I too know nothing about the city's rate setting methodology. You should confirm again that the public water supply program and Act 399 do not regulate water rates.

For questions about the DWRF, direct inquiries to the SRF Section.

You could also say that spills of this nature are reported to a separate division (Water Resources). The Office of Drinking Water and Municipal Assistance gets notified of such events if WRD or the person receiving the notification believes there may be a public water supply downstream that may be impacted. You should also let her know that surface water treatment plants like Flint are designed to handle microbial contamination including spikes caused by runoff and overflows. It is one of the primary reasons we require a certified operator be present during all periods of operation so they can react appropriately to changing raw water quality.

I would stay away from providing dollar amounts for the loans. Let SRF staff answer that question.

I'm home today with a doctor appointment shortly so I'm copying others that may be of assistance to you.

Sent using OWA for iPhone

From: Prysby, Mike (DEQ)
Sent: Monday, April 6, 2015 9:06:59 AM
To: Benzie, Richard (DEQ)
Subject: FW: City of Flint Water

Richard,

I am not in the position to offer much detail into Flint's water rates and how they are established. Those type of complaints or inquiries are best answered by the city. I can inform Sheila about the city's DWRF loan (early 2000s) used to renovate the WTP and I will suggest that Sheila ask the city how the DWRF debt balance is factored into the water rate structure. I recall the original DWRF loan amount (approx $35 million) for treatment plant upgrades and a current balance of approx $20 million. If I am off on these numbers...let me know. Thanks...

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Sheila Bailey-Waddell [mailto:sheila.bw@hotmail.com]
Sent: Friday, April 03, 2015 4:34 PM
To: Prysby, Mike (DEQ)
Subject: RE: City of Flint Water

Michael,

I refuse to believe that you were unaware of this incident. I have provided a link below for your reference and that you were informed. Although you have stated that you do not regulate the rates, there, perhaps, is an indirect relationship with Michigan DEQ components and rates charged (i.e revolving funds, loans, etc...). Somewhere in your agency's organization structure these two elements must cross.

http://www.mlive.com/news/flint/index.ssf/2015/04/flushing_discharges_nearly_100.html

Thank you,
Sheila

From: PRYSBYM@michigan.gov
To: sheila.bw@hotmail.com
Subject: City of Flint Water
Date: Fri, 3 Apr 2015 19:57:28 +0000

Sheila,

To better help address your first concern pertaining to the spill of sewage into the Flint, I will need to know the location of the spill and when it occurred. Your second concern, pertaining to the high cost of water cannot be answered by our department since we do not regulate how a water utility charges its customers. It is the city's obligation, as part of building good public relations and perception, to provide an informative response to customers concerned over high water rates.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
MDEQ

Rennaker, Joanne (DEQ)

From:	Benzie, Richard (DEQ)
Sent:	Monday, April 06, 2015 9:35 AM
To:	Prysby, Mike (DEQ)
Cc:	Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Butler, Sonya (DEQ); Schneider, Robert (DEQ)
Subject:	Re: City of Flint Water

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Subject: FW: City of Flint Water

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Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance

517 290-8817

From: Sheila Bailey-Waddell [mailto:sheila.bw@hotmail.com]
Sent: Friday, April 03, 2015 4:34 PM
To: Prysby, Mike (DEQ)
Subject: RE: City of Flint Water

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http://www.mlive.com/news/flint/index.ssf/2015/04/flushing_discharges_nearly_100.html

Thank you,
Sheila

From: PRYSBYM@michigan.gov
To: sheila.bw@hotmail.com
Subject: City of Flint Water
Date: Fri, 3 Apr 2015 19:57:28 +0000

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Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
MDEQ

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Monday, April 06, 2015 9:07 AM
To: Benzie, Richard (DEQ)
Subject: FW: City of Flint Water

Richard,

I am not in the position to offer much detail into Flint's water rates and how they are established. Those type of complaints or inquiries are best answered by the city. I can inform Sheila about the city's DWRF loan (early 2000s) used to renovate the WTP and I will suggest that Sheila ask the city how the DWRF debt balance is factored into the water rate structure. I recall the original DWRF loan amount (approx $35 million) for treatment plant upgrades and a current balance of approx $20 million. If I am off on these numbers...let me know. Thanks...

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Sheila Bailey-Waddell [mailto:sheila.bw@hotmail.com]
Sent: Friday, April 03, 2015 4:34 PM
To: Prysby, Mike (DEQ)
Subject: RE: City of Flint Water

Michael,

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Thank you,
Sheila

From: PRYSBYM@michigan.gov
To: sheila.bw@hotmail.com

Subject: City of Flint Water
Date: Fri, 3 Apr 2015 19:57:28 +0000

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Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
MDEQ

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Monday, April 06, 2015 9:00 AM
To: Michael Glasgow
Cc: Rosenthal, Adam (DEQ)
Subject: RE: City of Flint - March Bromate Results

Michael,

The March result is encouraging....we need a copy of the sample result from the sample collected in October of 2014...

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Monday, April 06, 2015 7:24 AM
To: Rosenthal, Adam (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: City of Flint - March Bromate Results

Adam,

Here are the results of our March bromate sampling.

Mike Glasgow
City of Flint Water Plant

Rennaker, Joanne (DEQ)

From:	Michael Glasgow <mglasgow@cityofflint.com>
Sent:	Monday, April 06, 2015 7:24 AM
To:	Rosenthal, Adam (DEQ)
Cc:	Prysby, Mike (DEQ)
Subject:	City of Flint - March Bromate Results
Attachments:	March 2015 Bromate Results.pdf

Adam,

Here are the results of our March bromate sampling.

Mike Glasgow
City of Flint Water Plant

NSF International
789 N. Dixboro Rd. Ann Arbor, MI 48105, USA
1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org

Live Safer™

TEST REPORT

Send To: C0211289
Mr. Michael Glasgow
City of Flint, Municipality
1101 South Saginaw Street
Flint, MI 48502

Facility: C0211290
City of Flint Water Plant
4500 North Dort Highway
Flint MI 48505
United States

Result	**COMPLETE**	Report Date	02-APR-2015
Customer Name	City of Flint, Municipality		
Tested To	USFDA CFR Title 21 Part 165.110		
Description	Municipal Water		
Test Type	Test Only		
Job Number	J-00157090		
Project Number	10005233 (CL03)		
Project Manager	Anna Ciechanowski		

Thank you for having your product tested by NSF International.

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

Report Authorization Kerri L. Levanseler **Date** 02-APR-2015

Kerri Levanseler - Director, Chemistry Laboratory

General Information

Standard: USFDA CFR Title 21 Part 165.110

Date and Time Sampled: 3/27/2015 08:00 EDT
Product Description: Municipal Water
Test Description: Bromate - March

Sample Id: **S-0001141163**
Description: Municipal Water - 3/27/2015 08:00 EDT
Sampled Date: 03/27/2015
Received Date: 03/31/2015

Testing Parameter	Reporting Limit	Result	FDA SOQ	Units	P / F
Disinfection Residuals/Disinfection By-Products					
Bromate	5	ND	10	ug/L	Pass

<<Additional Information>>

Sample Id: S-0001141163

Test Parameter	Date Analyzed	Time Analyzed	Date Prepared/ Processed
Disinfection Residuals/Disinfection By-Products			
Bromate (Ref: EPA 300.1)	31-MAR-2015		

Testing Laboratories:

	Flag	Id	Address
All work performed at: (Unless otherwise specified)	→	NSF_AA	NSF International 789 N. Dixboro Road Ann Arbor MI 48105

References to Testing Procedures:

NSF Reference	Parameter / Test Description
C3015	Bromate (Ref: EPA 300.1)

Certifications:

Arizona (# AZ0655)	California (# 03214 CA)	Connecticut (# PH-0625)
Florida (# E-87752 FL)	Hawaii	Indiana
Maryland (# 201)	Michigan (# 0048)	North Carolina (# 26701)
New Jersey (# MI770)	Nevada (# MI000302010A)	New York (# 11206)
Pennslyvania (# 68-00312)	South Carolina (# 81005)	Virginia (# 00045)
Vermont (# VT 11206)		

Test descriptions preceded by an asterisk "*" indicate that testing has been performed per NSF International requirements but is not within its scope of accreditation.

The reported result for Odor, Phenolics, Potassium, Specific Conductance and Total Residual Chlorine cannot be used for compliance purposes within the State of Arizona.

Notes:

1) Bottled water sold in the United States shall not contain Fluoride in excess of the levels published by the USFDA in 21 CFR Part 165.110. These levels are based on the annual average of maximum daily air temperatures at the location where the bottled water is sold at retail. Please refer to the most current edition of the regulation to determine the Fluoride maximum level that pertains to your product.
2) A blank on the FDA SOQ column indicates that no maximum level has been established by the FDA for that contaminant.
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For a list of NSF International Method Detection Limits refer to
http://www.nsf.org/media/enews/documents/minimum_detection_level_spreadsheet.pdf.

Rennaker, Joanne (DEQ)

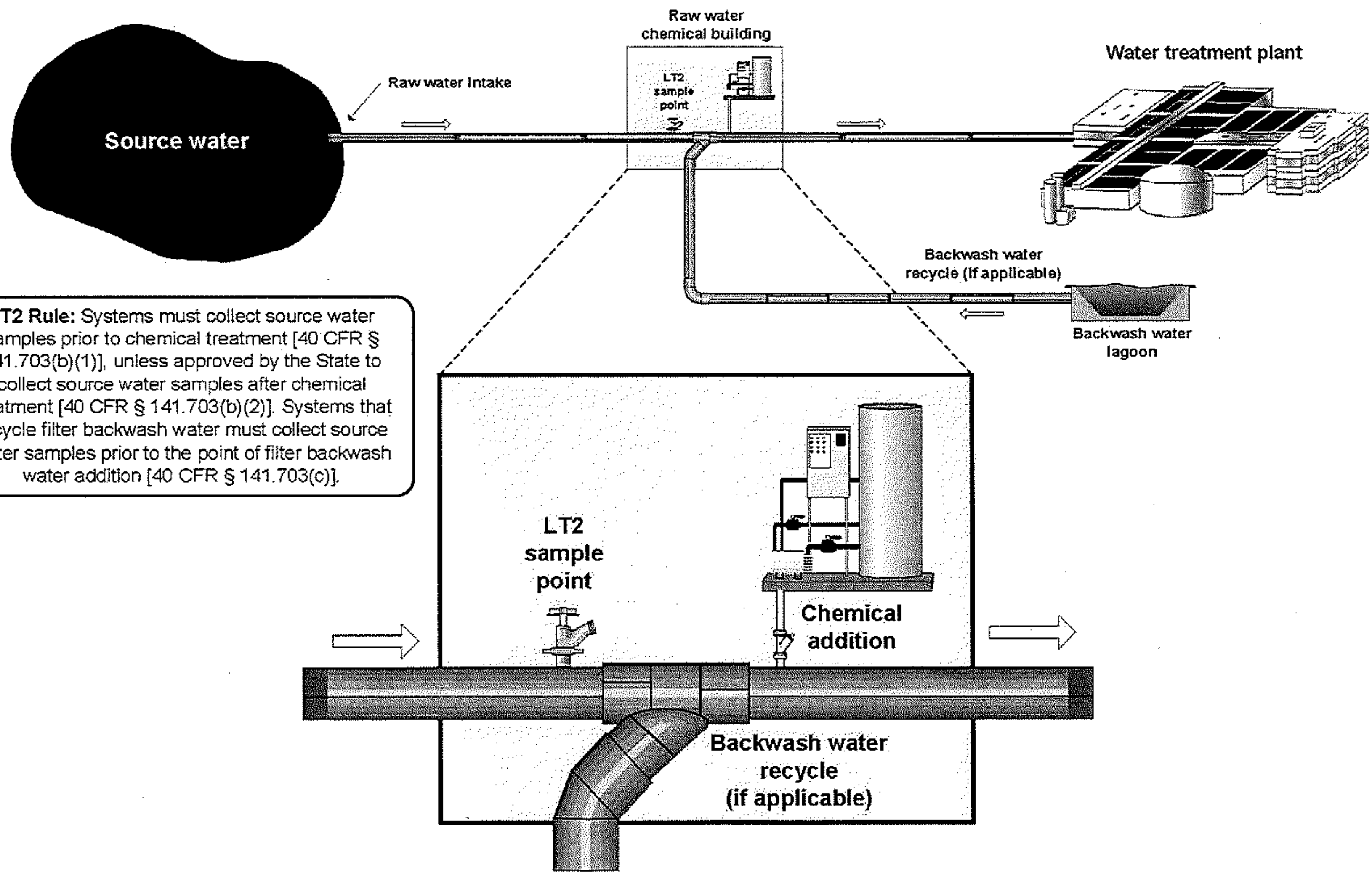
From: Prysby, Mike (DEQ)
Sent: Friday, April 03, 2015 2:47 PM
To: 'bwright@cityofflint.com'; Michael Glasgow
Subject: FW: Schematics for LT2 sampling plans
Attachments: Schematics_combined.pdf; SCHEMATIC_01.pdf; SCHEMATIC_02.pdf; SCHEMATIC_03.pdf; SCHEMATIC_04.pdf; SCHEMATIC_05.pdf; SCHEMATIC_06.pdf; SCHEMATIC_07.pdf; SCHEMATIC_08.pdf; SCHEMATIC_09.pdf; SCHEMATIC_10.pdf

Brent, Mike

Attached are the example schematics that the plants on Schedule 2 may use to indicate where the source water sampling location is in relation to the intake, chemical feed points, recycle streams (if any) and the plant. You can select the schematic that best fits your situation and mark the sampling location and other pertinent information on it. If you can't find a schematic that doesn't fit Flint's exact setup, you can use the generic/blank one (schematic 10). Your Schedule 2 Crypto. monitoring letter is being mailed to you today.

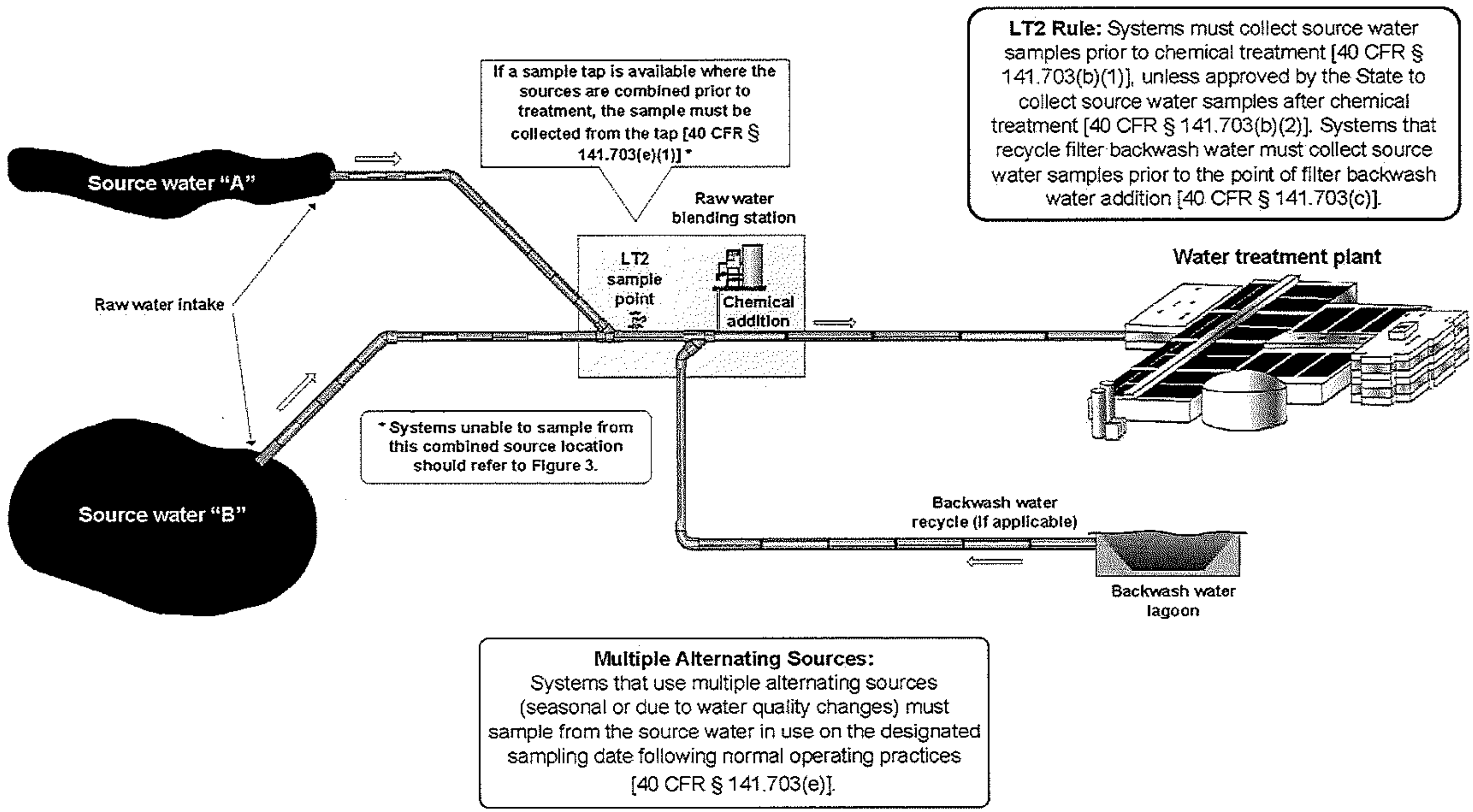
Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

Figure 1. Sample Tap before Chemical Treatment and Backwash Water Recycle (if applicable)



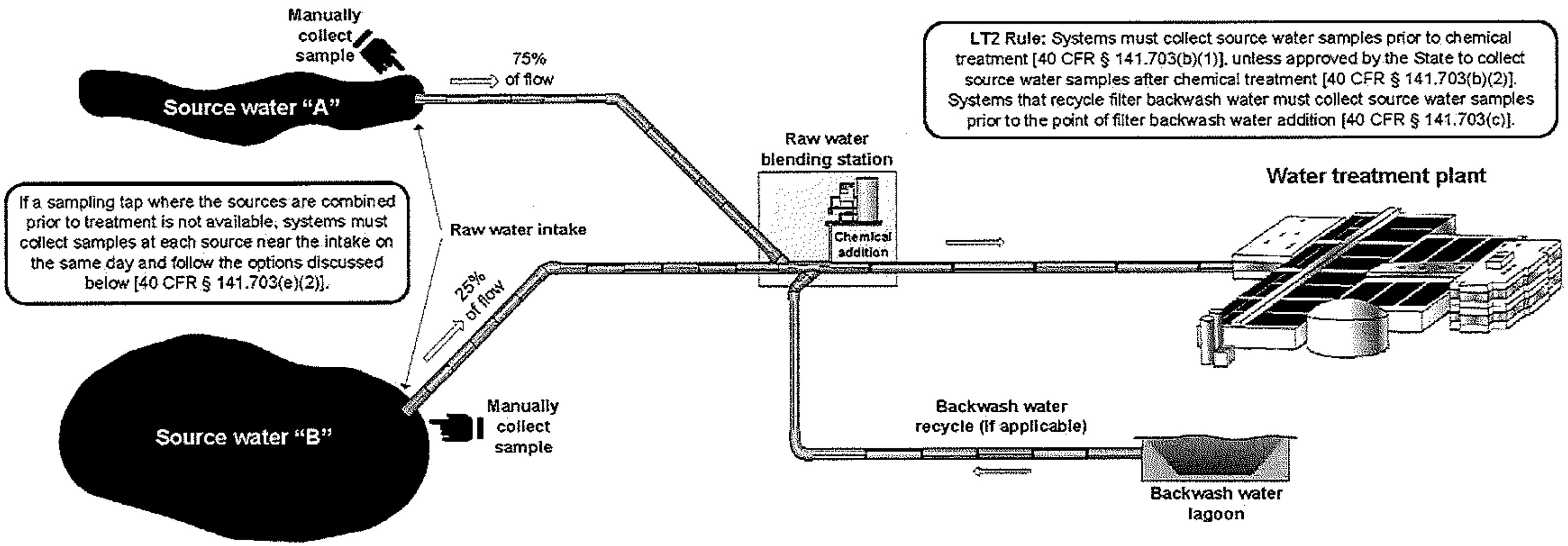
LT2 Rule: Systems must collect source water samples prior to chemical treatment [40 CFR § 141.703(b)(1)], unless approved by the State to collect source water samples after chemical treatment [40 CFR § 141.703(b)(2)]. Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition [40 CFR § 141.703(c)].

Figure 2. Multiple Sources: Sample Tap after Two Combined Sources



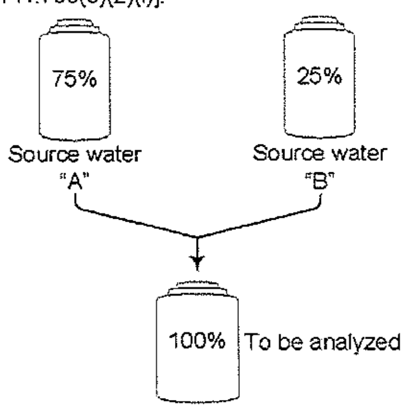
001698

Figure 3. Multiple Sources: Two (or More) Sources to be Composited



OPTION 1 (Recommended Option):

Collect samples manually at each source near the intake on the same day and composite them into one sample to be analyzed. The volume of sample from each source must reflect its proportion of the total plant flow at the time the samples were collected [40 CFR § 141.703(e)(2)(i)].



OPTION 2:

Collect samples manually at each source near the intake on the same day and analyze each independently, then calculate a weighted average of the analysis results. This is done by multiplying the result for each source by the percentage of its contribution to the total plant flow at the time the samples were collected, and then summing these values [40 CFR § 141.703(e)(2)(ii)].

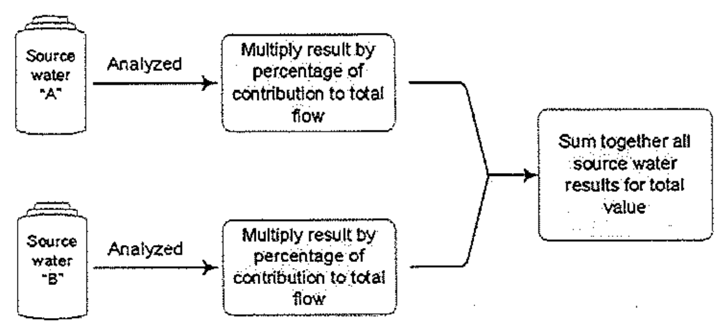


Figure 4. Multiple Plants with the Same Influent

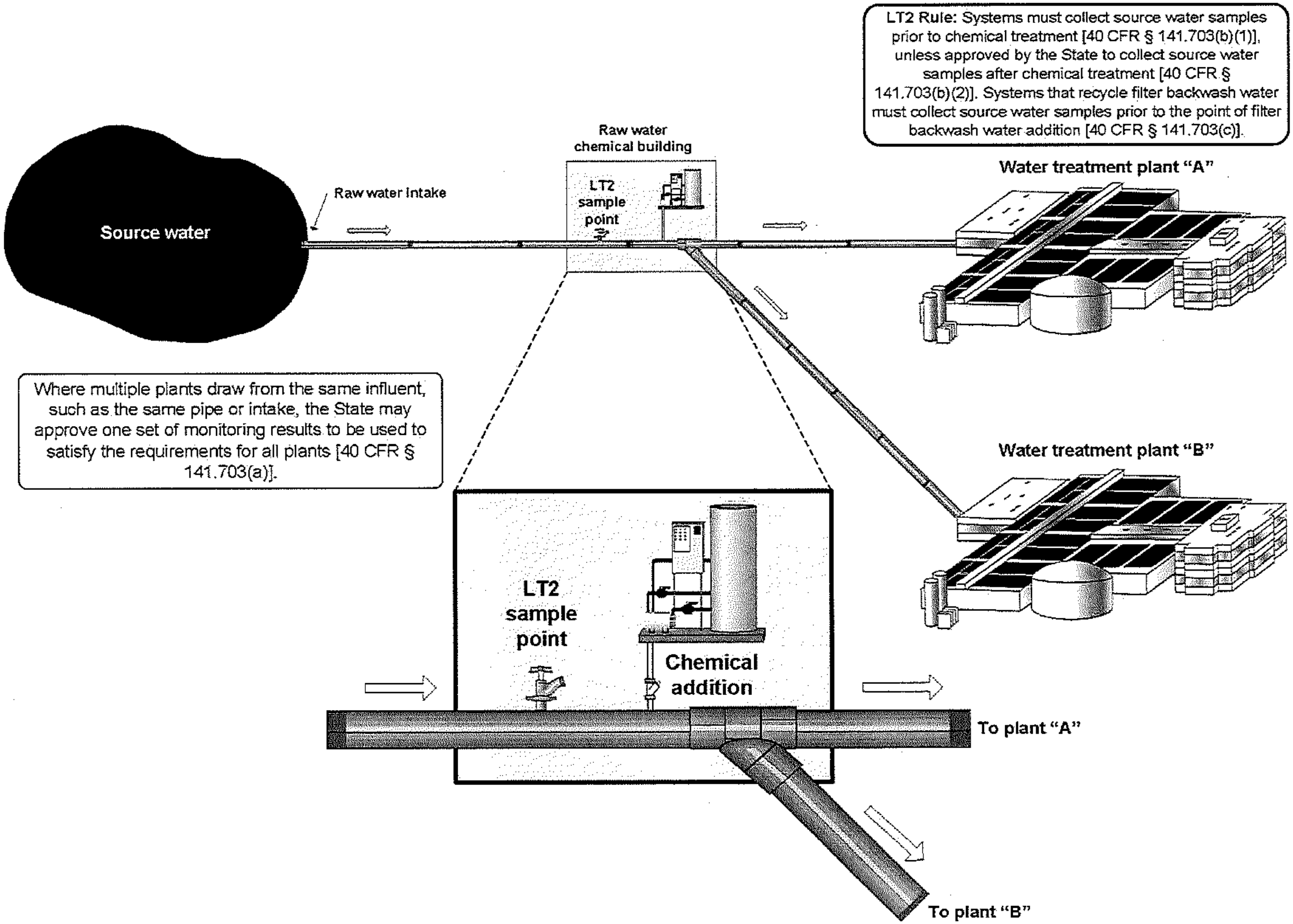
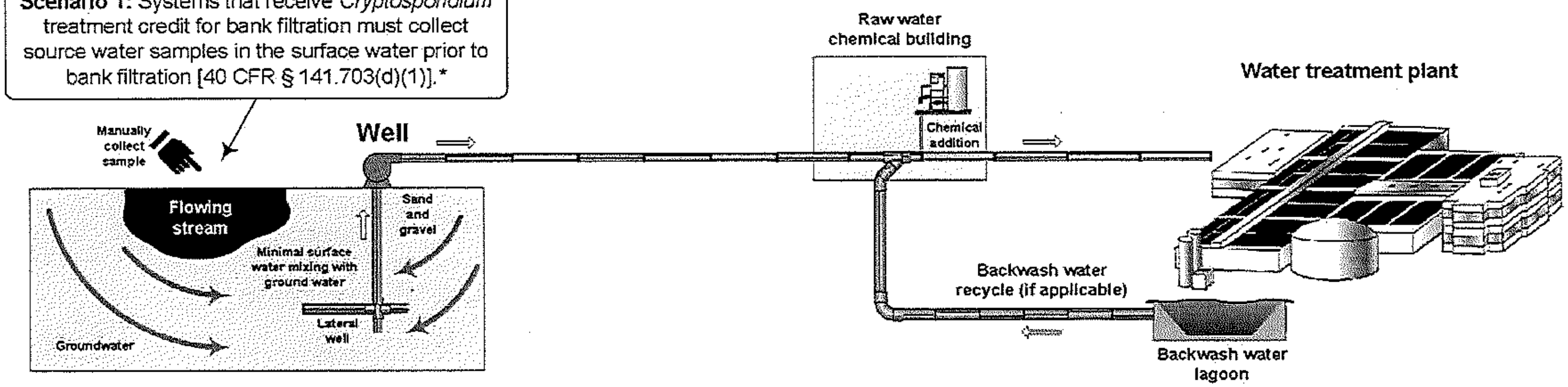


Figure 5. Bank Filtration

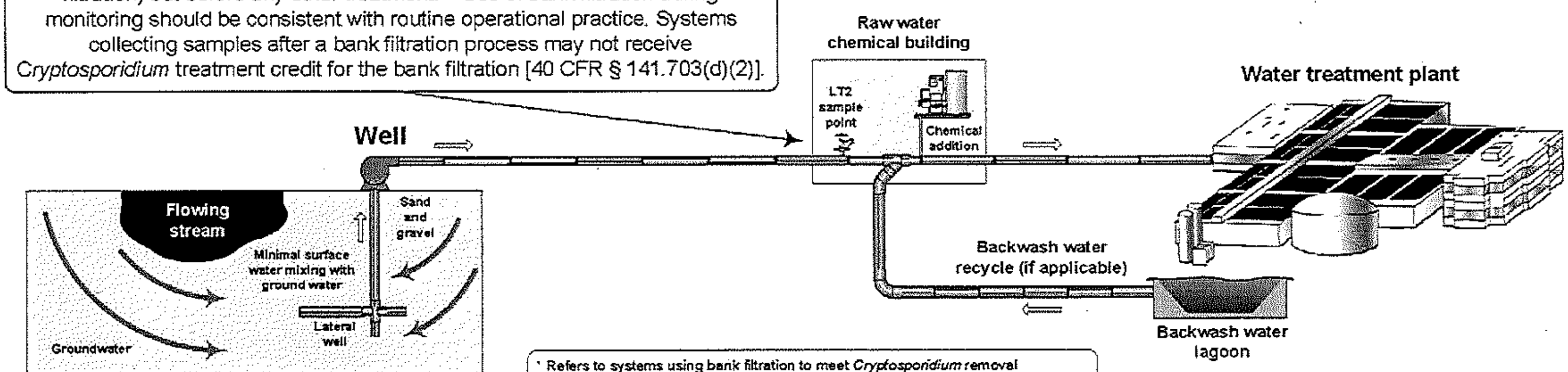
The correct sampling location for systems using bank filtration differs depending on whether the bank filtered water is treated by subsequent filtration:

Scenario 1: Systems that receive *Cryptosporidium* treatment credit for bank filtration must collect source water samples in the surface water prior to bank filtration [40 CFR § 141.703(d)(1)].*



Bank filtration cross section

Scenario 2: Systems using bank filtered water that is treated by subsequent filtration must collect source water samples from the well source (i.e., after bank filtration) but before any other treatment.** Use of bank filtration during monitoring should be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive *Cryptosporidium* treatment credit for the bank filtration [40 CFR § 141.703(d)(2)].



Bank filtration cross section

* Refers to systems using bank filtration to meet *Cryptosporidium* removal requirements of the Interim Enhanced Surface Water Treatment Rule (IESWTR) or Long Term 1 ESWTR under 40 CFR § 141.173(b) or 40 CFR § 141.522(a).
** Refers to systems where bank filtration serves as pretreatment to a filtration plant.

Figure 6. Ground Water Under the Direct Influence of Surface Water (GWUDI)

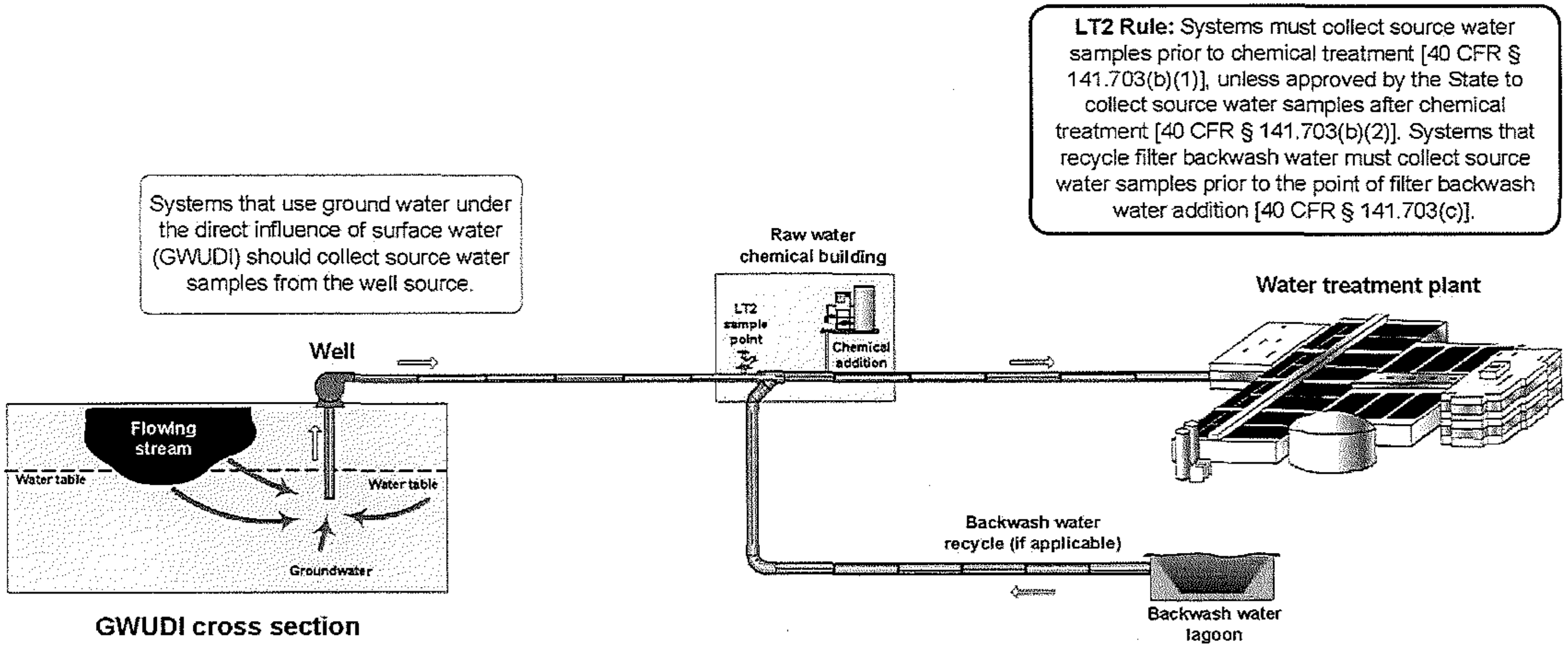
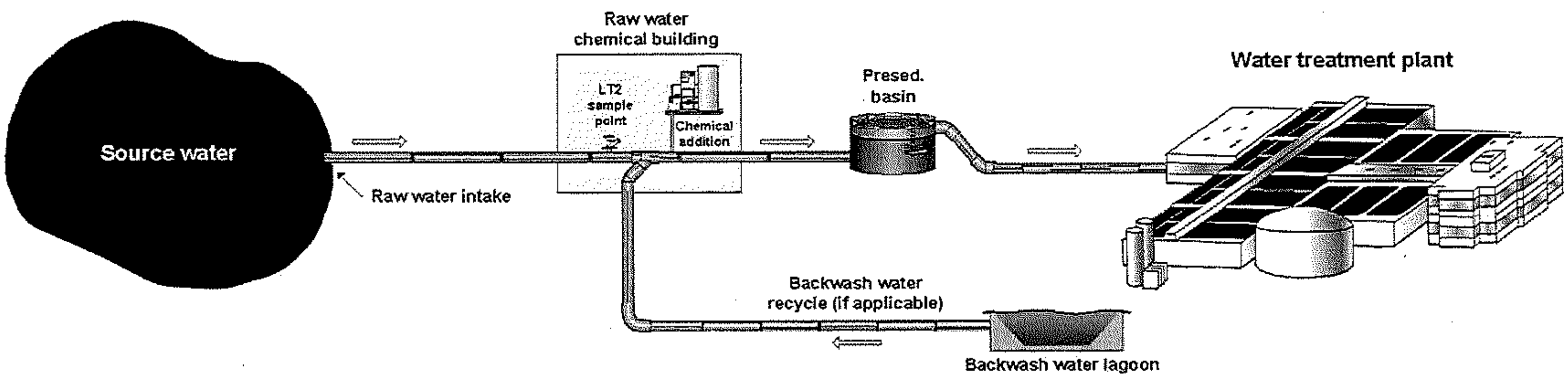


Figure 7. Presedimentation Basin

Scenario 1:
Systems using a presedimentation basin with chemical addition should collect source water samples prior to chemical treatment, unless approved by the State to collect source water samples after chemical treatment. Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition [40 CFR § 141.703(c)].



Scenario 2:
Systems without chemical addition prior to or in a presedimentation basin, or that have been approved by the State to collect source water samples after chemical treatment, may sample after the presedimentation basin but will not receive any treatment credit for presedimentation.

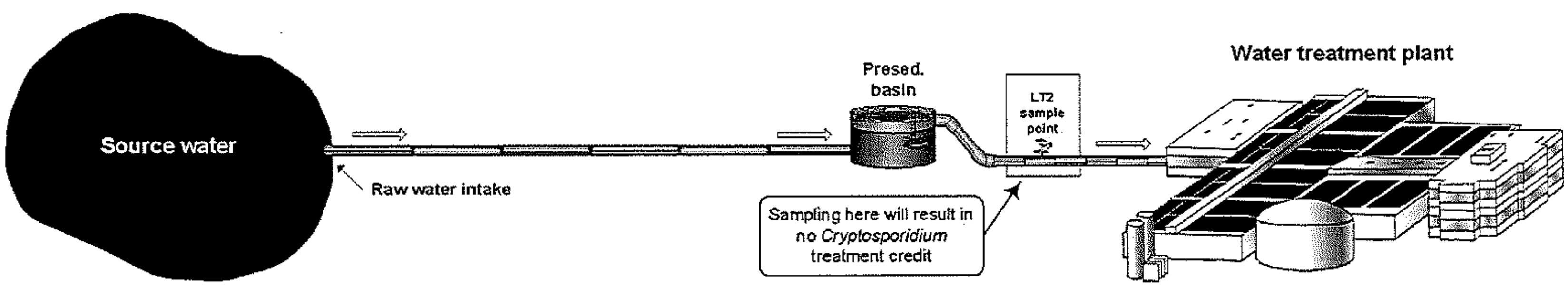


Figure 8. Raw Water Off-Stream Storage

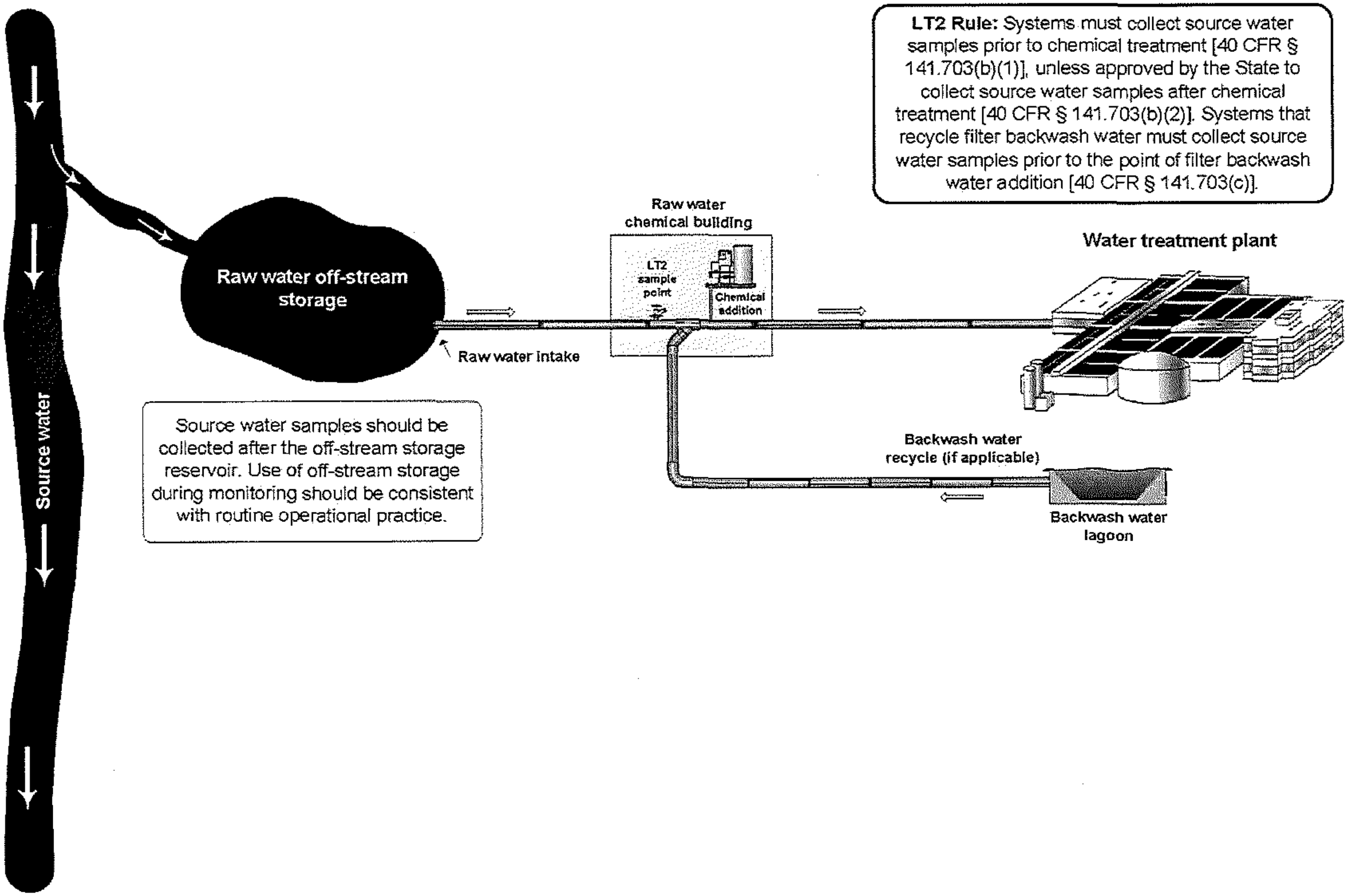


Figure 9. Mixed Source Water: Ground Water and Surface Water Sources

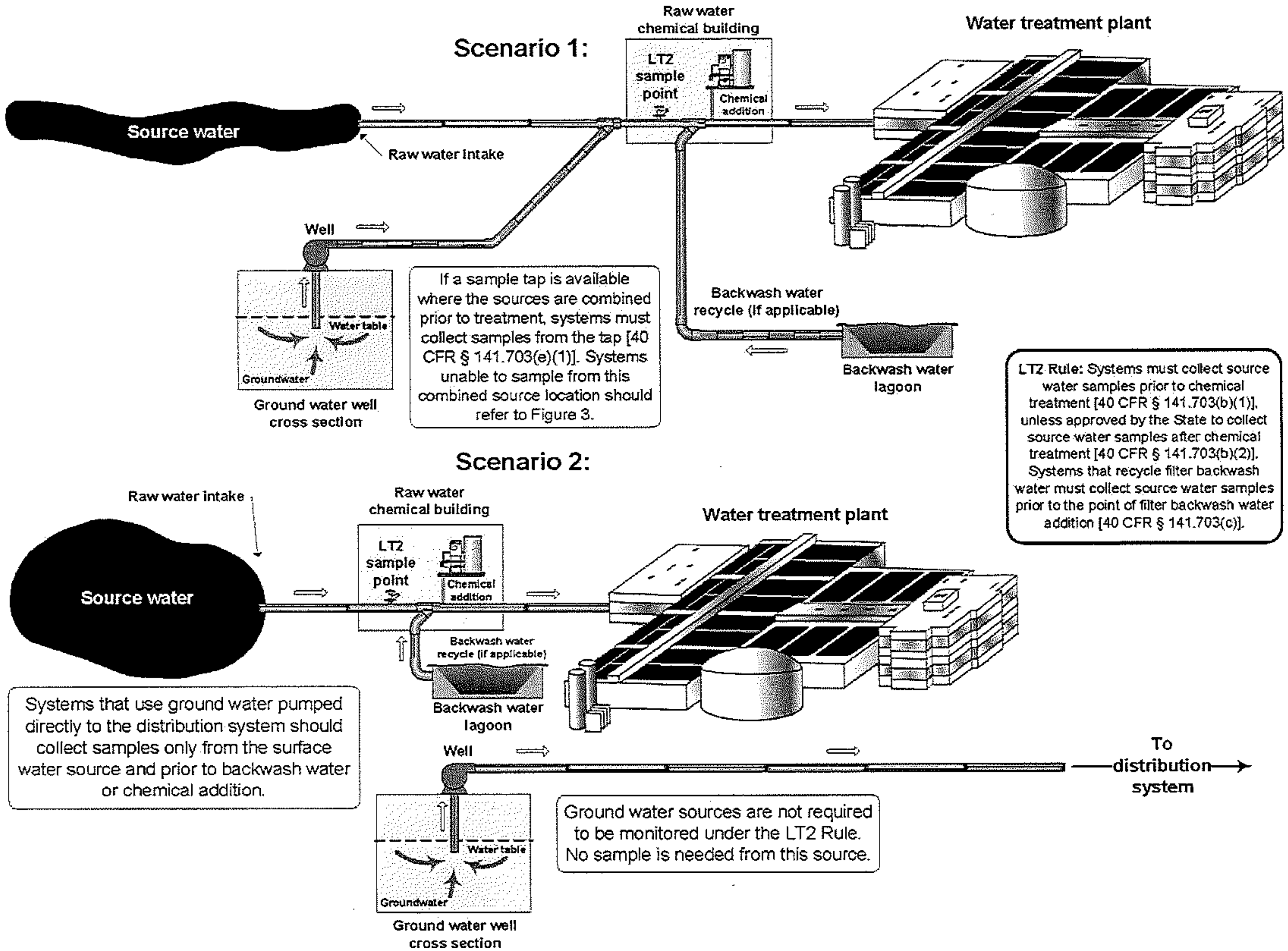


Figure 10. Blank Schematic for Submission to EPA

Public Water System (PWS) name: ______________________

PWS ID: ______________________

Water treatment plant name: ______________________

Water system facility ID: ______________________

Indicate the following on the diagram that best represents your facility type (if applicable):

1. LT2 sampling location
2. Points of chemical treatment prior to the treatment plant
3. Filter backwash water addition
4. Pretreatment processes (e.g., presedimentation basins, bank filtration)
5. Multiple source waters (show by adding additional sources)

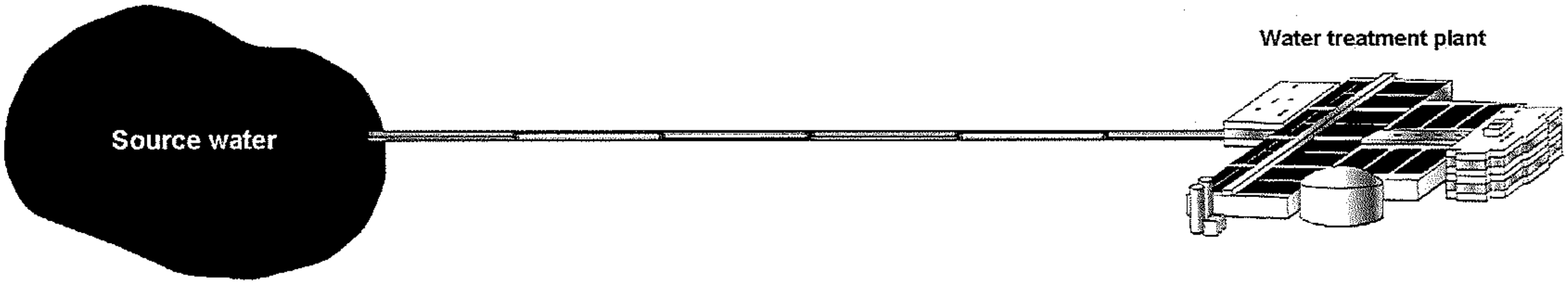
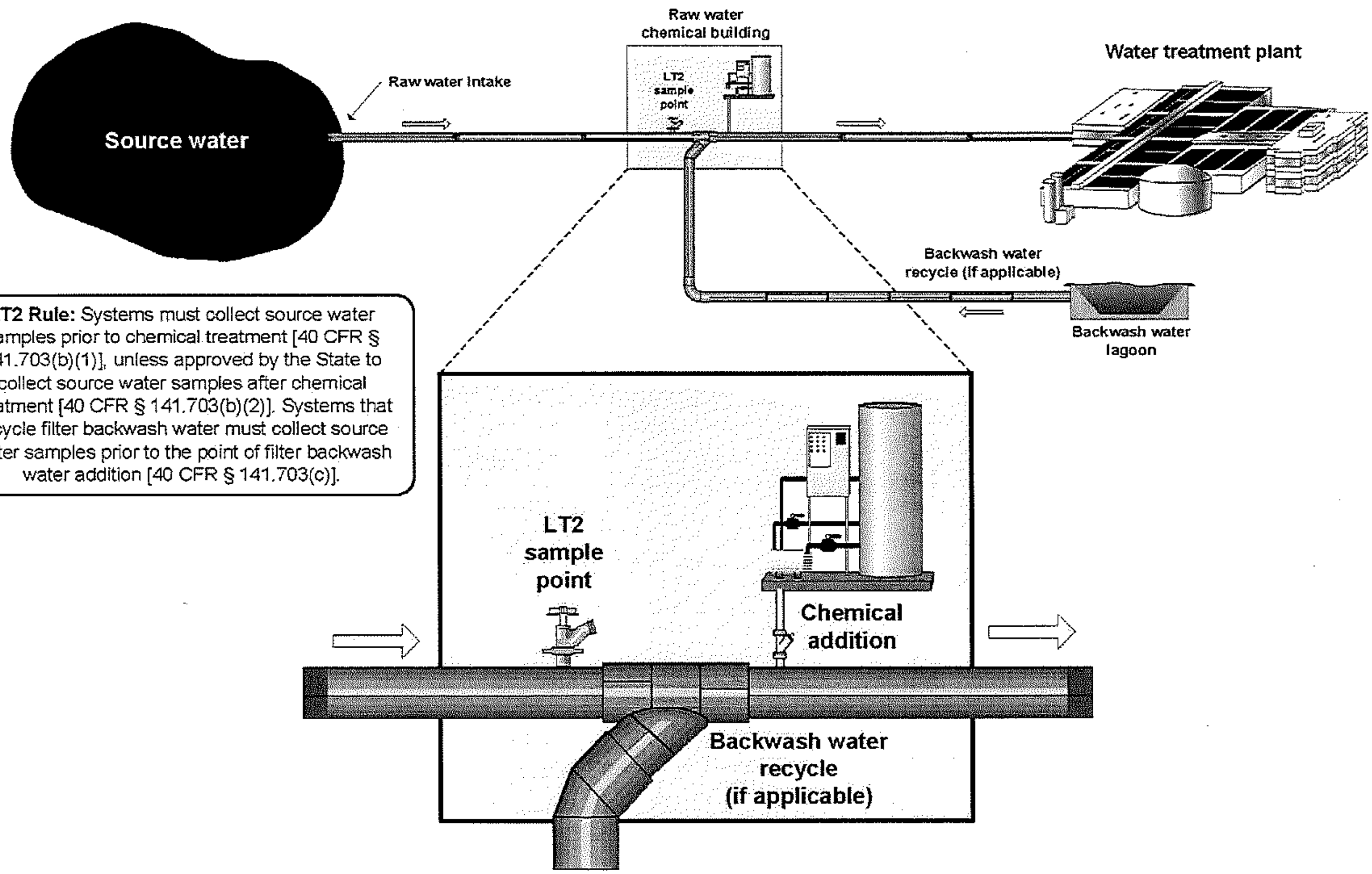


Figure 1. Sample Tap before Chemical Treatment and Backwash Water Recycle (if applicable)



LT2 Rule: Systems must collect source water samples prior to chemical treatment [40 CFR § 141.703(b)(1)], unless approved by the State to collect source water samples after chemical treatment [40 CFR § 141.703(b)(2)]. Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition [40 CFR § 141.703(c)].

Figure 2. Multiple Sources: Sample Tap after Two Combined Sources

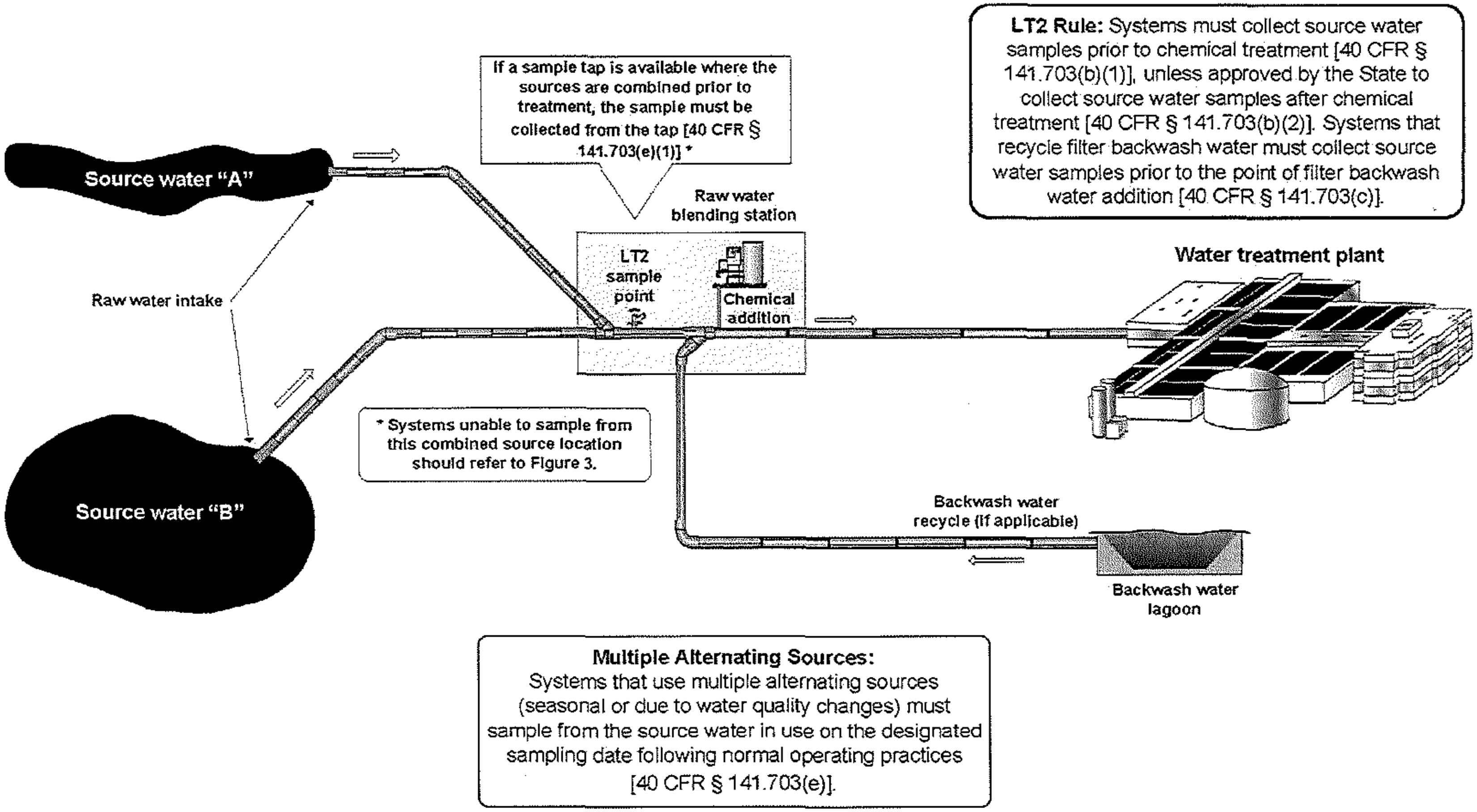


Figure 3. Multiple Sources: Two (or More) Sources to be Composited

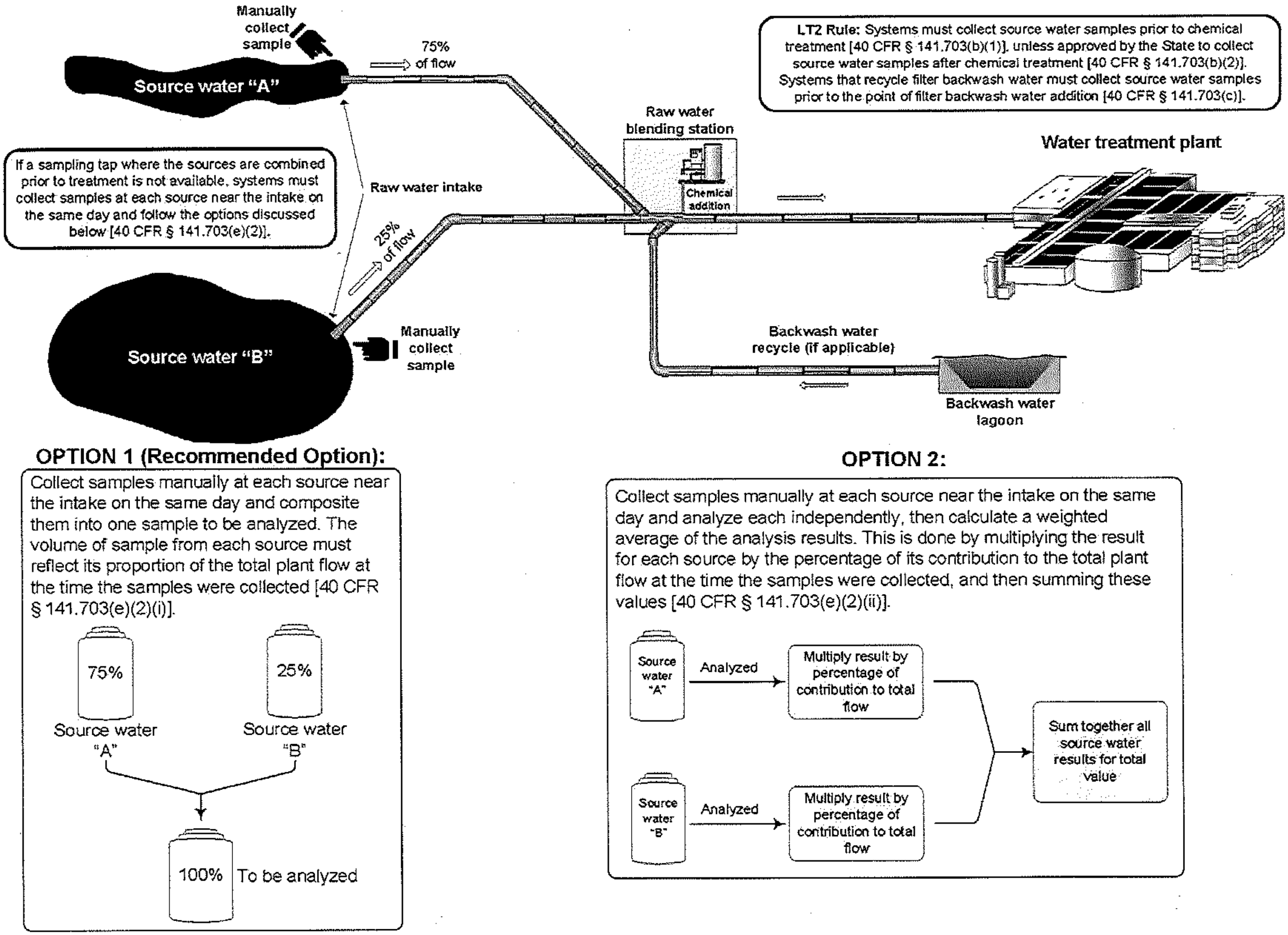


Figure 4. Multiple Plants with the Same Influent

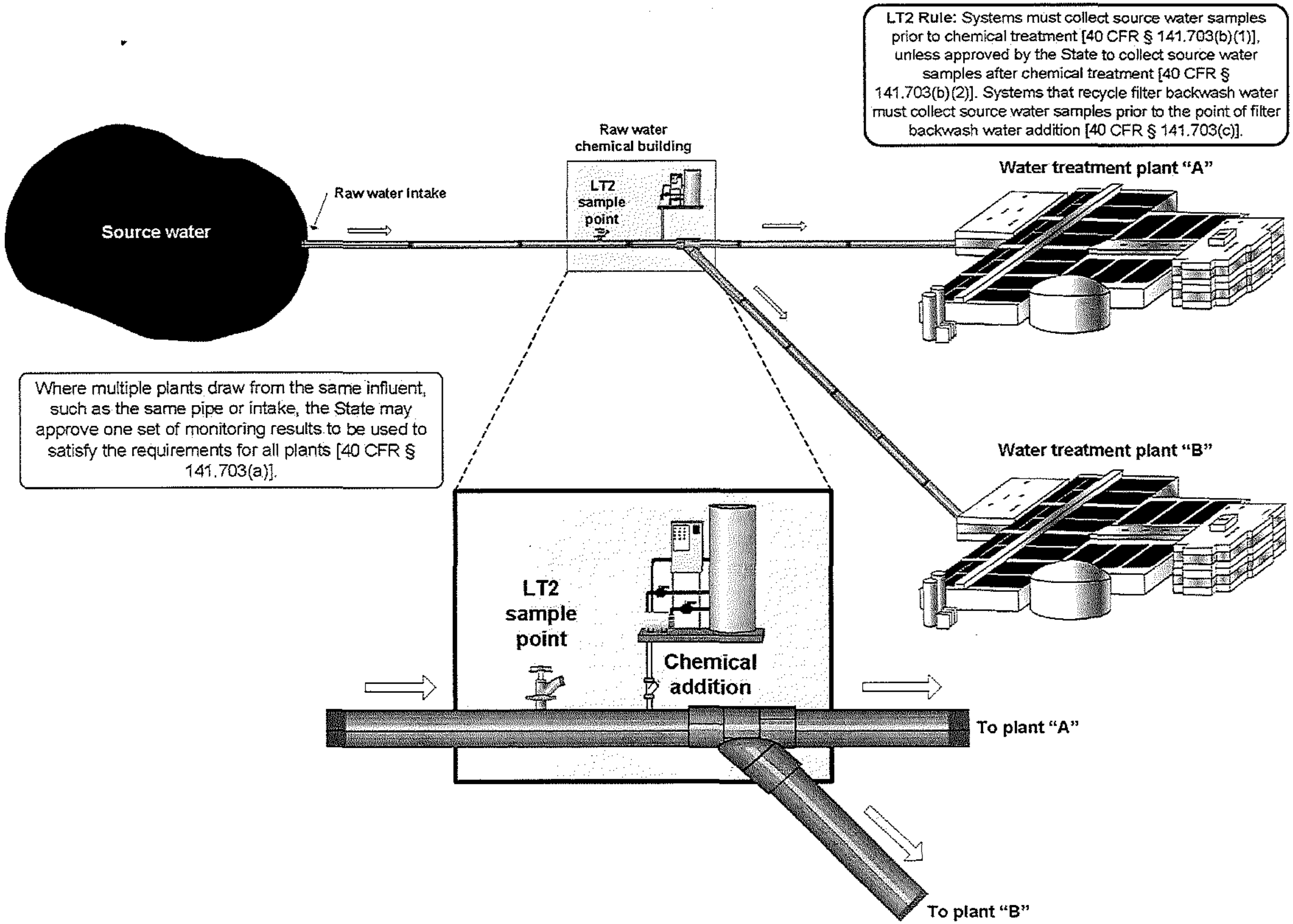
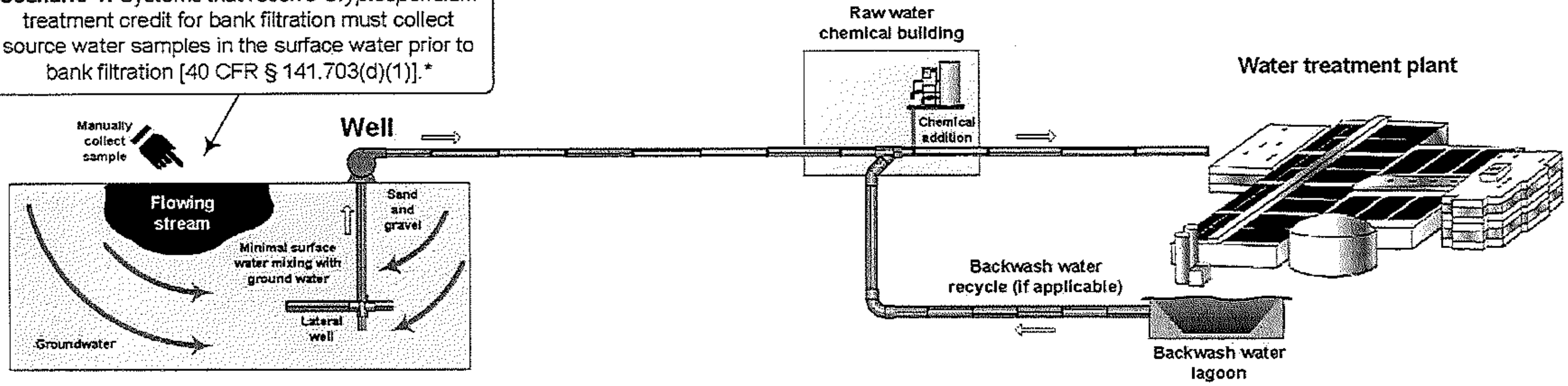


Figure 5. Bank Filtration

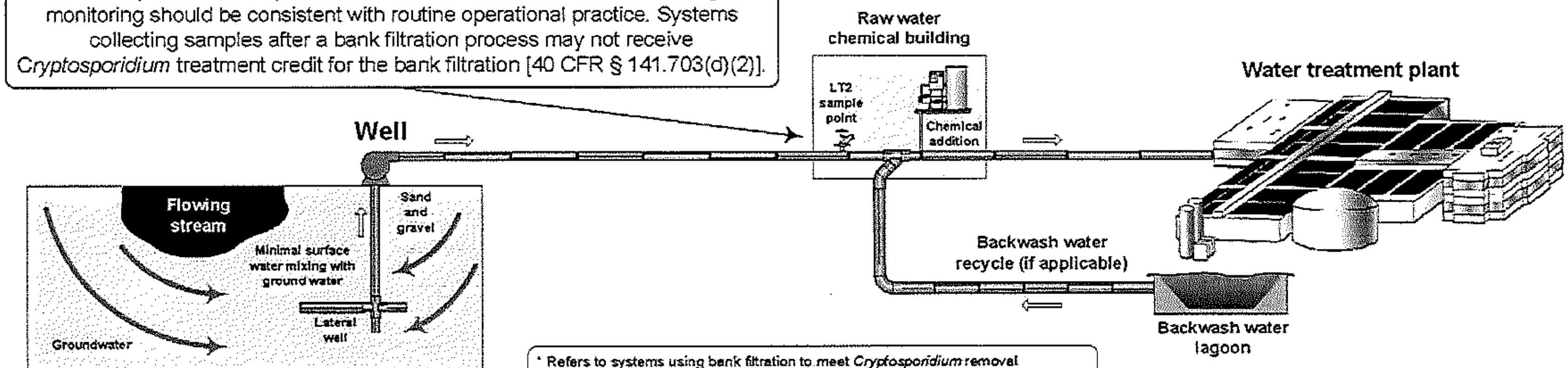
The correct sampling location for systems using bank filtration differs depending on whether the bank filtered water is treated by subsequent filtration:

Scenario 1: Systems that receive *Cryptosporidium* treatment credit for bank filtration must collect source water samples in the surface water prior to bank filtration [40 CFR § 141.703(d)(1)].*



Bank filtration cross section

Scenario 2: Systems using bank filtered water that is treated by subsequent filtration must collect source water samples from the well source (i.e., after bank filtration) but before any other treatment.** Use of bank filtration during monitoring should be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive *Cryptosporidium* treatment credit for the bank filtration [40 CFR § 141.703(d)(2)].



Bank filtration cross section

* Refers to systems using bank filtration to meet *Cryptosporidium* removal requirements of the Interim Enhanced Surface Water Treatment Rule (IESWTR) or Long Term 1 ESWTR under 40 CFR § 141.173(b) or 40 CFR § 141.522(a).
** Refers to systems where bank filtration serves as pretreatment to a filtration plant.

Figure 6. Ground Water Under the Direct Influence of Surface Water (GWUDI)

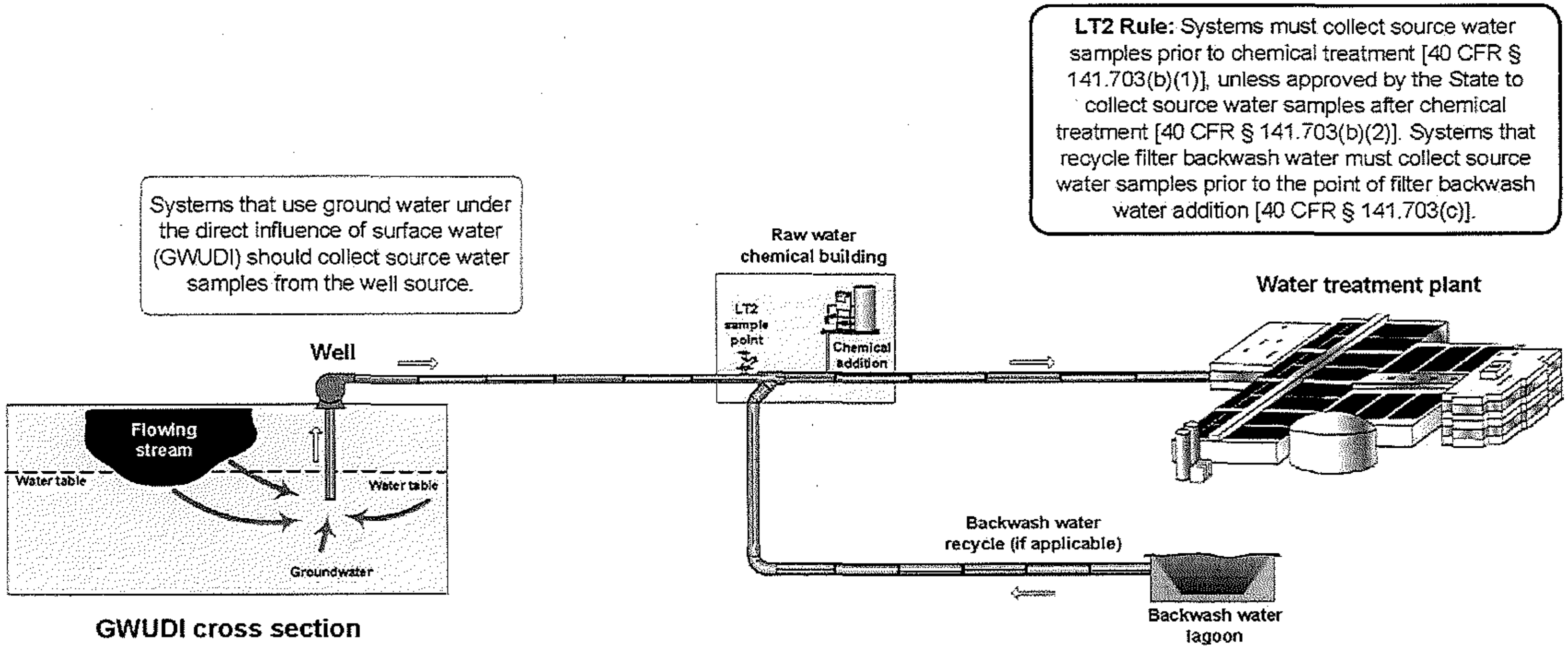
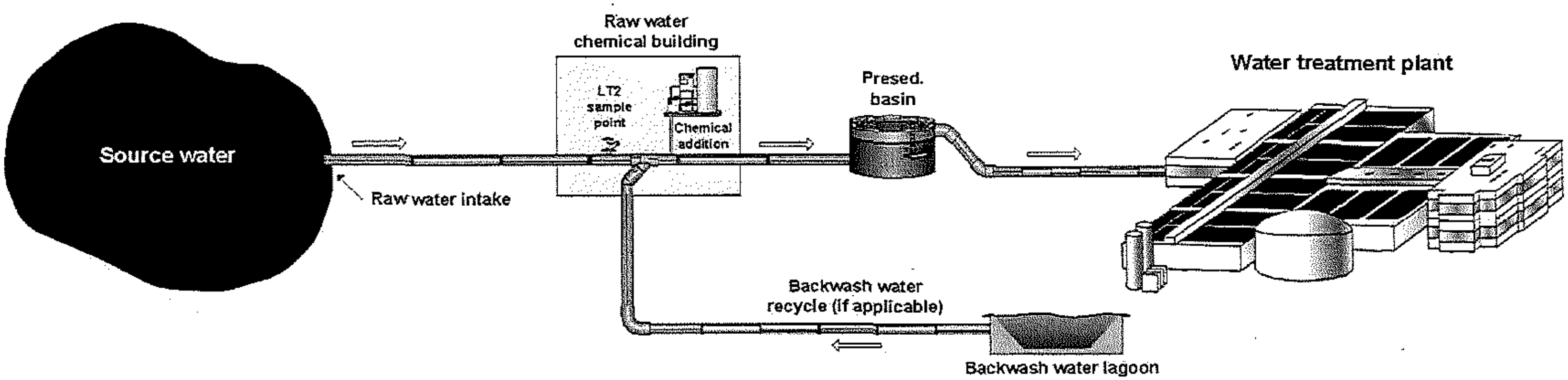


Figure 7. Presedimentation Basin

Scenario 1:
Systems using a presedimentation basin with chemical addition should collect source water samples prior to chemical treatment, unless approved by the State to collect source water samples after chemical treatment. Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition [40 CFR § 141.703(c)].



Scenario 2:
Systems without chemical addition prior to or in a presedimentation basin, or that have been approved by the State to collect source water samples after chemical treatment, may sample after the presedimentation basin but will not receive any treatment credit for presedimentation.

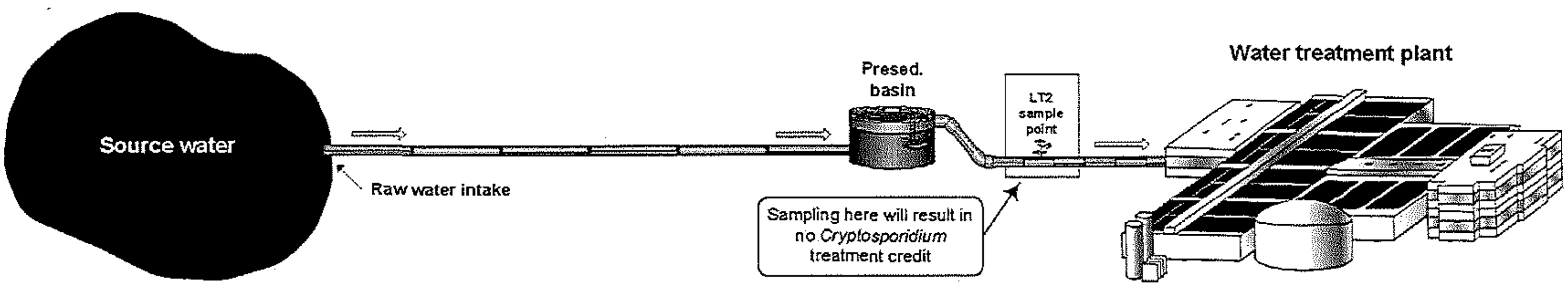


Figure 8. Raw Water Off-Stream Storage

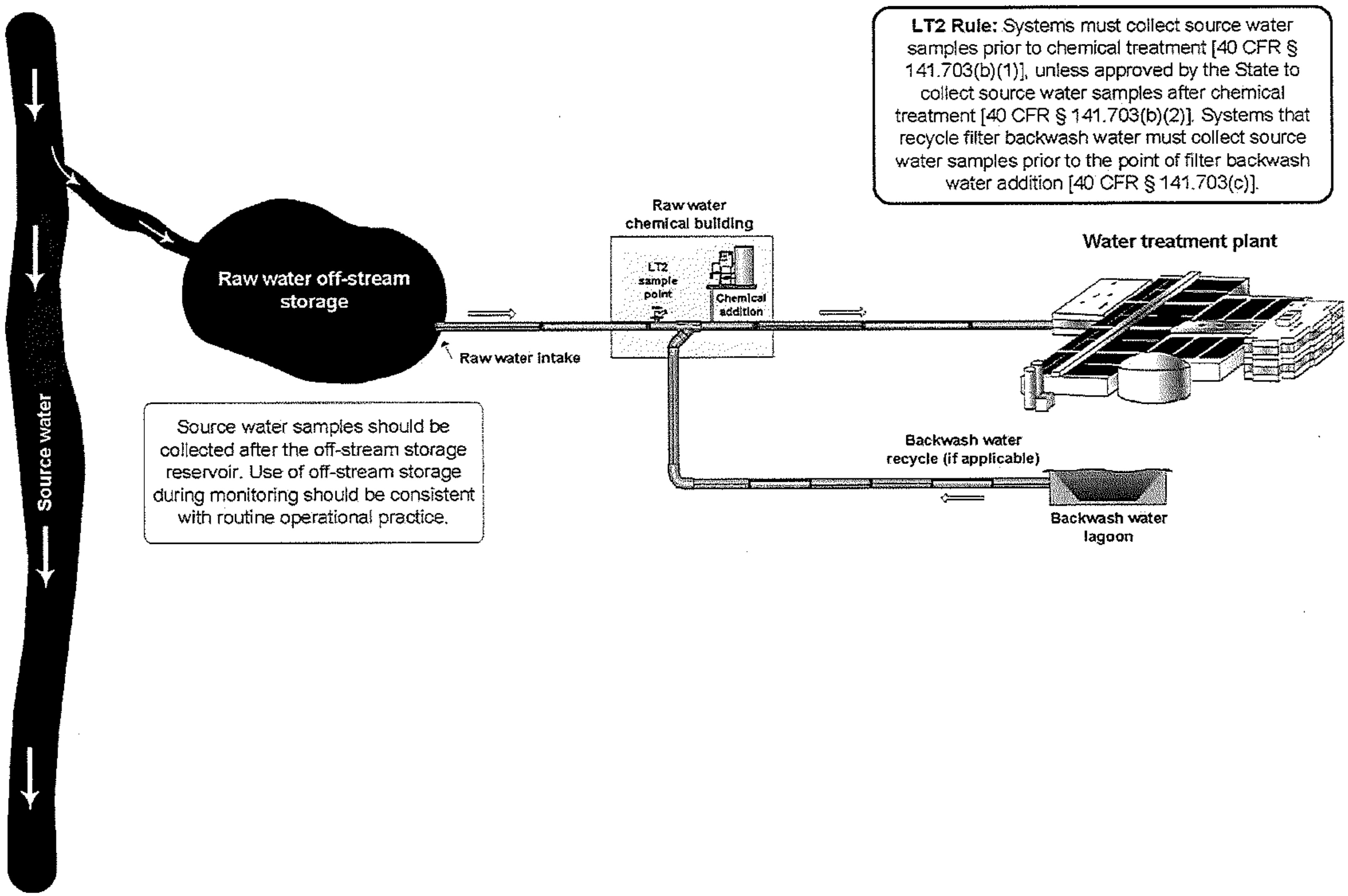


Figure 9. Mixed Source Water: Ground Water and Surface Water Sources

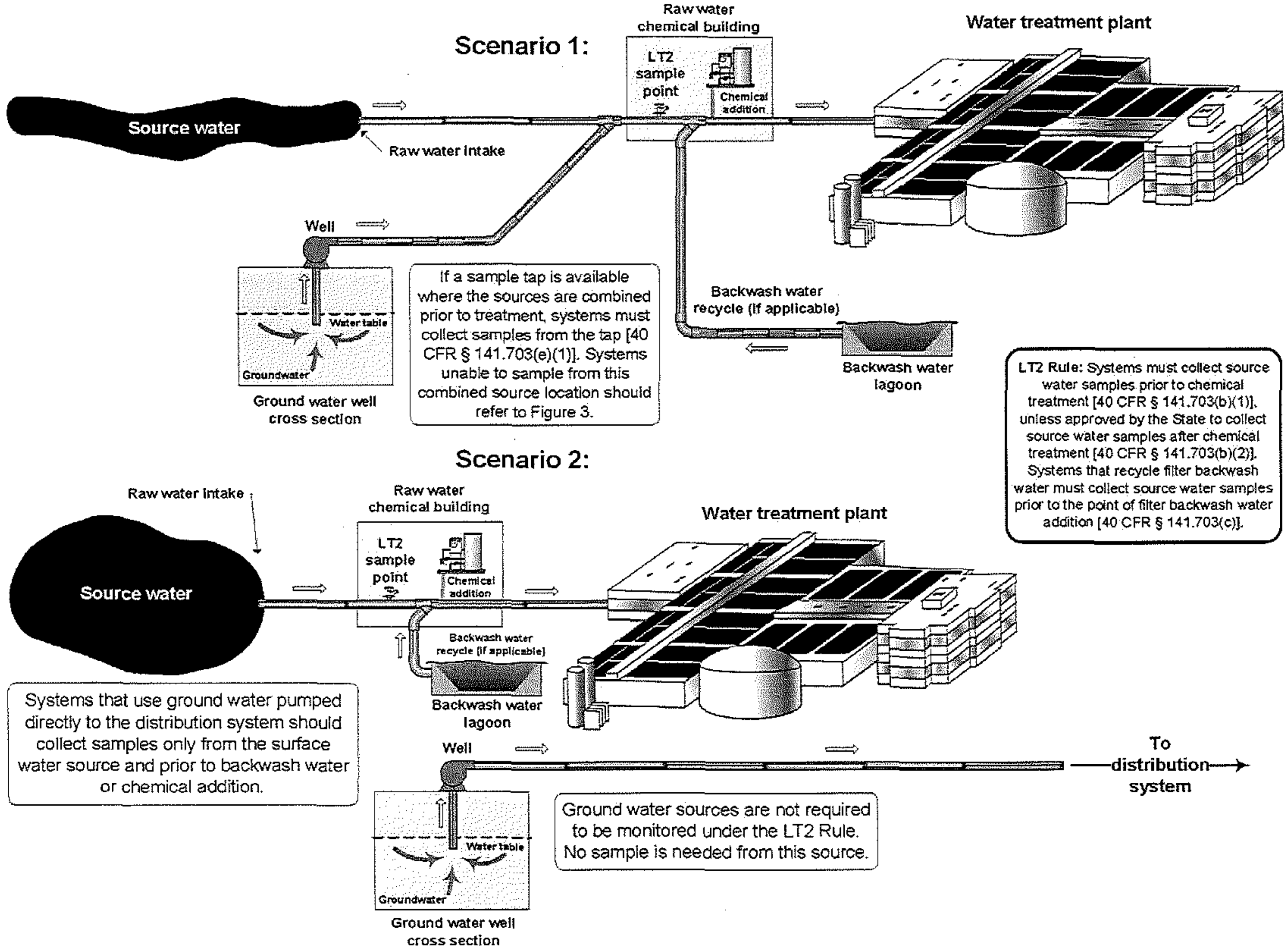


Figure 10. Blank Schematic for Submission to EPA

Public Water System (PWS) name: ______________________

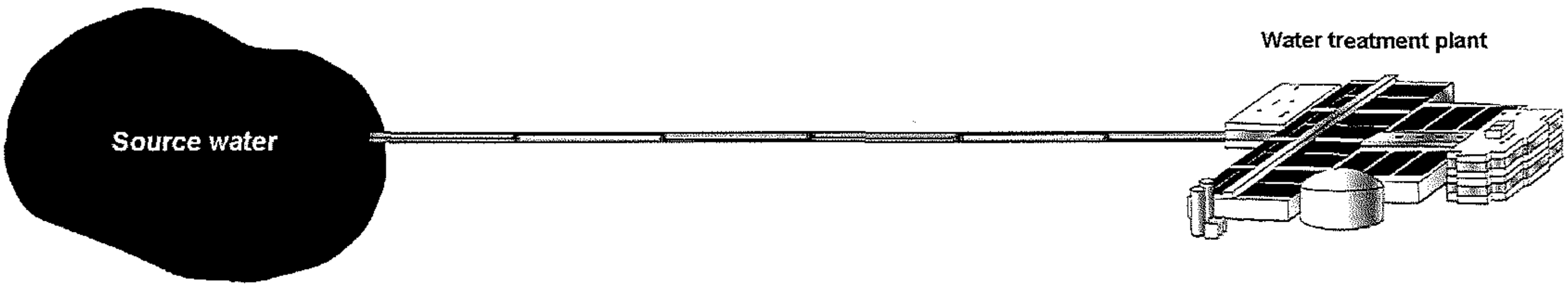
PWS ID: ______________________

Water treatment plant name: ______________________

Water system facility ID: ______________________

Indicate the following on the diagram that best represents your facility type (if applicable):

1. LT2 sampling location
2. Points of chemical treatment prior to the treatment plant
3. Filter backwash water addition
4. Pretreatment processes (e.g., presedimentation basins, bank filtration)
5. Multiple source waters (show by adding additional sources)



Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Friday, April 03, 2015 11:55 AM
To:	Michael Glasgow; 'bwright@cityofflint.com'
Subject:	Flint MORs

Mike, Brent

I was looking at Flint's MORs and I just noticed that ozone treatment parameters (ozone dosage and residuals) are not included. Ozone treatment parameters need to be included in the MOR. Please include this in future MORs. Also, if you can resurrect the ozone treatment parameters from previous months of operation (since going to the Flint River)......we would like that information to include in the previous MORs. Thanks.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, April 02, 2015 2:38 PM
To: Cook, Pat (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: RE: LT2 letter for Flint

Pat,
I will finalize the LT2 letter and send to WTP OIC by tomorrow. I will also email them the templates. Thanks.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Cook, Pat (DEQ)
Sent: Thursday, April 02, 2015 2:04 PM
To: Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: LT2 letter for Flint

Hi Mike,

Attached is the information that you will have to mail to the Flint WTP ASAP pertaining to the 2nd round of source water monitoring as required by the LT2 Rule. The first attachment is a letter that you will have to place on Lansing District letterhead with an appropriate signature block. The next 3 attachments are documents that you will need to print out and include with the letter.

You should also consider emailing the sampling plan template, calendar and example schematics to them so they can complete those forms electronically if they choose to do so. I'll email you the example schematics in a separate email.

If you have any questions, please give me a call.

Patrick Cook, P.E.
Community Drinking Water Unit
Office of Drinking Water & Municipal Assistance
Michigan Department of Environmental Quality
Phone: (517) 284-6514
cookp@michigan.gov

Rennaker, Joanne (DEQ)

From: Howard Croft <hcroft@cityofflint.com>
Sent: Wednesday, April 01, 2015 8:09 AM
To: Brent Wright; Daugherty Johnson; Dayne Walling; donna. cole; Elizabeth Murphy; gdn2 @aol.com; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; rob.nicholas@veolia.com; Robert Bincsik; Robert Nicholas; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green
Subject: Technical Advisory Notice
Attachments: Drinking water notice watermark.pdf; Flint Letter Color Header to Water Customers Final (1).pdf

Technical Team,

I am sending everyone a copy of the TTHM notice and the associated letter that we have mailed. We expect this to begin reaching customer mailboxes over the next few days.

We are still evaluating when to hold the next technical meeting and what the format will be.

We will be in touch soon,

--

Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (May 21, August 21, November 20 of 2014, and February 17, 2015). The average of the results at ANY of the eight locations must not exceed the maximum contaminant level (MCL) for TIHMs, otherwise our water system exceeds the MCL. The standard for TTHM is 80 micro grams per liter (ug/L). The location reporting the highest TTHM level was 105 ug/L; thus, our water system exceeds the TIHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem in 2015. Our most recent individual sample results were all less than half the 80 ug/L standard, however .since compliance is calculated using a locational running annual average (LRAA) of the most recent four quarters, we are still out of compliance with the MCL at two of eight locations.

For more information, please contact Mr. Brent Wright at 810-787-6537, or the Flint Water Plant at 4500 North Dart Highway, Flint, Michigan 48505.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Flint.

Water Quality Update

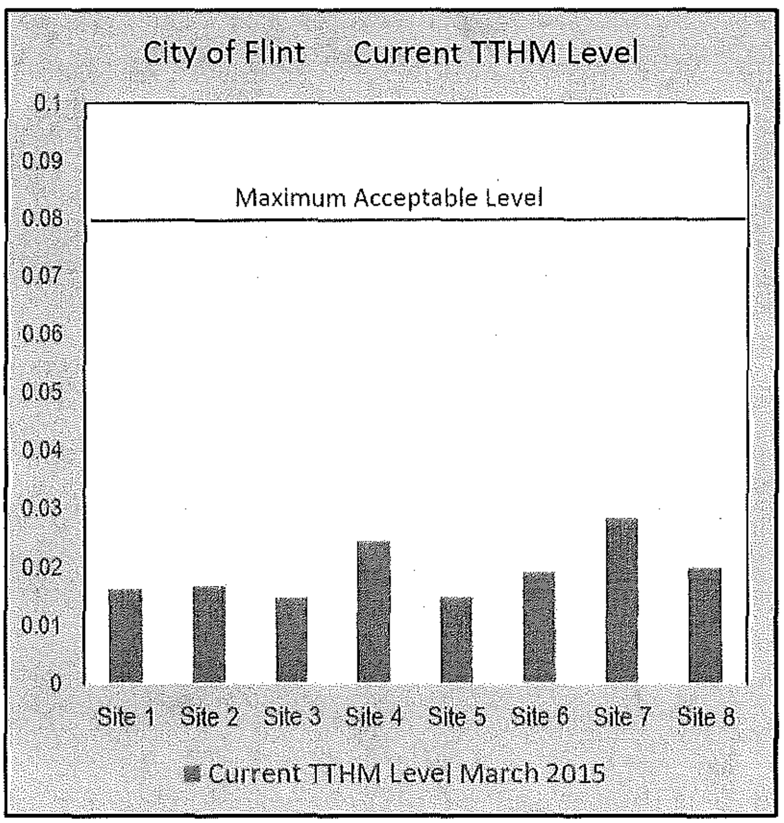
City of Flint Resident:

We are pleased to report that City of Flint water is safe and meets U.S. Environmental Protection Agency guidelines. While we continue to work on improving aesthetic qualities, such as discoloration or odor, you can be confident that the water provided to you today meets all safety standards. Maintaining safety and quality in our water is a top priority of the City.

We accomplished this by:

- Upgrading the ozone treatment process at the Water Treatment Plant
- Increasing water main/hydrant flushing to reduce stagnation
- Conducting additional testing of treatment to identify areas of improvement
- Improving water circulation by repairing valves and adjusting reservoir levels

Our most recent testing in February showed that every testing site was well below allowable levels, as shown below:



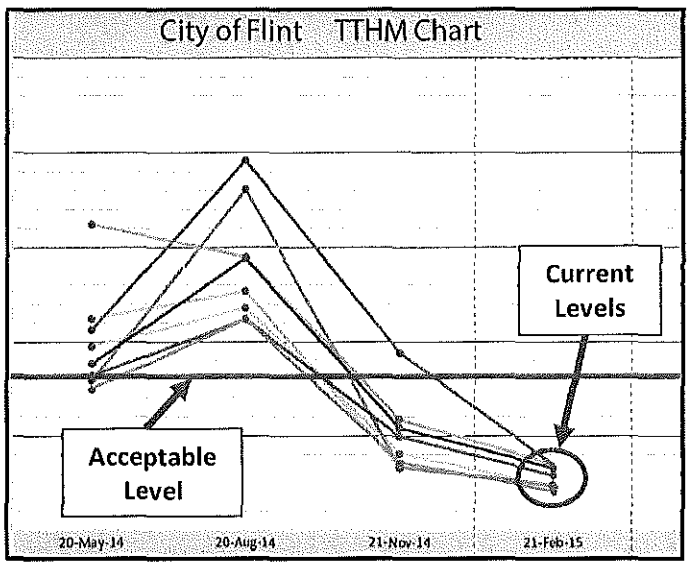
City of Flint

Water Quality Update

The Michigan Department of Environmental Quality (MDEQ) has acknowledged our progress:

"We are encouraged by the results from the most recent round of compliance samples collected on February 17, 2015, which now show individual TTHM levels at less than half of the 0.080 mg/L standard at all locations throughout the City's system. Operational Evaluation Reports from December 2014, and February 2015, have identified possible causes and corrective measures for the previous elevated TTHM levels, which we encourage the City to continue implementing." -MDEQ

Notification is based on four quarters of test results. Because of last year's test results, the City's *annual* quarterly testing average is not yet below the state's allowable average and the City is required to issue the attached notice ***("Important Information about Your Drinking Water")***.



If you have any questions about this report or would like a test done at your home, free of charge, please call us at 810-787-6537.

Maintaining safe water and improving its quality is a top priority for all of us at the City of Flint, and we apologize for the concerns these notices have raised. We have taken many steps to improve the safety and quality of our water supply and will be taking more. As you may know, we have recently received a series of recommendations from several sources, including a report from international urban water system consultant, Veolia North America. We will be taking further action steps to assure that water remains safe and that water quality is improved, and we will be working with our recently created Citizen Advisory Committee and our Technical Advisory Committee as we progress. Please track our progress on our website **cityofflint.com**.

City of Flint

Rennaker, Joanne (DEQ)

From: Mike Wright <jmikewright@yahoo.com>
Sent: Tuesday, March 24, 2015 2:06 PM
To: Howard Croft; Brent Wright; Daugherty Johnson; Dayne Walling; donna. cole; gdn2 @aol.com; James Henry; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Nicholas; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green; Elizabeth Murphy; Robert Bincsik; Robert Case; Jason Lorenz; Kelly Rossman-McKinney; Sharon Emery; Gerald Ambrose; Mike Wright
Subject: Re: HC Letter & FAQ's

Howard:
Thank you for sending these along, but I am just now seeing these documents (please add my work email to the list as well; wright.michael@epa.gov). I think they are largely fine, but do note some concerns below and additional suggestions.
Please also note that Susanne Cupal and colleagues were working on a TTHM Fact Sheet, that is much improved over the first iteration I saw.
Mike

FAQ Comments
Is it currently safe to drink City of Flint water?
I realize why this sentence was inserted ("The water today is comparable to Detroit's in safety and quality"), but am concerned that when THM levels exceed Detroit levels in the future, you'll be fielding questions as to why (even if THM levels are below the MCL).
Where is the City of Flint in addressing the water situation?
Similarly for this sentence ["The amount of TTHM in the water has decreased consistently in the last year and is currently at a safe level".], if you have a future exceedance of the MCL, you'll be faced with questions as to why are you distributing unsafe water (if you are basing this "safe" descriptor on the MCL level).
Will trihalomethanes make people sick?
Still unclear why the immunocompromised language is in here re: THMs, unless there are "residual" microbial risk issues/concerns?
I'd reword this ("Trihalomethanes are more likely to cause effects when inhaled") to this: People are more likely exposed to trihalomethanes when they are inhaled, compared to ingestion.
Discolored Water
Apart from main breaks, I assume the discoloration is primarily related to preventative measures/routine maintenance (flushing, flow changes, etc). Can't you elaborate on this to show you are being responsive to other needs?
Seems like more messaging may be needed on what is being released in discolored water incidents. Presumably it's mainly Iron for old cast iron pipes; so, seem likes you could alleviate safety concerns by noting this.
Why isn't there a question somewhere on "What should I do if I have discolored water?" along with recommendations provided (running water for a few minutes, etc)...
Edits:
Add the date of this FAQ sheet, since repeatedly says "currently" or drop currently altogether.
Reword: may periodically experience harmless...

Mayoral Letter
As noted in previous emails, above, and during the meeting, the immunocompromised warning is specific to microbial contamination risks, and has nothing to do with THMs (to my knowledge). If it's mandatory language because of the coliform hit, then it should be clearly stated that, these groups should contact physicians *if concerned about microbes in the water*. They can correct me if I am wrong, but I think part of the issue that clinicians (and health Dep't folks) are having is that this mixed messaging is confusing for clinicians and citizens. These documents discuss different contaminant groups (DBPs vs Microbes) which have different susceptible populations and exposure reduction recommendations.
Calling out chloride seems out of context, unusual and unclear. This might raise additional concerns without more informnation.
Edits:
I'd say annual running average (based on quarterly testing) vs annual quarterly...

Please let me know if any of this is unclear.
Thank you,
Mike Wright

On Thursday, March 19, 2015 9:08 AM, Howard Croft wrote:

Technical Team Members,

Attached please find the final copy of a letter to the health community along with a Frequently Asked Question list.

These documents are ready for distribution among your peers and others. We anticipate mailing out the actual violation notice at the beginning of next week.

I will email everyone on this list when we determine a date for the next Technical Committee Meeting.

Thank you,

--
Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Monday, March 23, 2015 5:06 PM
To: Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ); Poy, Thomas; Deltoral, Miguel; Shoven, Heather
Subject: FW: TTHM Health Effects
Attachments: TTHM PN template.pdf

Hi, Mike and Steve. Mike, as I recall from our phone call in February about the TTHM health effects with Tom Poy (see below), we talked about the State including the "pregnant" in your sample PN you send to the system with the TTHM violation letter. Rather than ask the City to re-issue the PN with the "pregnant", you said the next violation would include the "pregnant" in your sample PN. I see the PN in your March 5 violation letter to Flint; but I'm not seeing the word "pregnant" added to the PN. Can the City add "pregnant" to its PN now?
Jennifer

From: Crooks, Jennifer
Sent: Thursday, February 12, 2015 2:36 PM
To: Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ); Poy, Thomas; Deltoral, Miguel
Subject: TTHM Health Effects

Mike—Good talking with you this morning. I'm so glad I was able to snag Tom Poy to discuss the TTHM health effects issue with you.

Miguel said that TTHMs *MAY* cause miscarriages, which is more of an acute risk. Thus, the "pregnant" should be in the PN, so women know there could be risk, and can make their own decisions.

I included the link for PN Handbook, and a PDF of the PN template for TTHMs.
See page 104 of the PN Handbook (I also included as a PDF attached); here is the link:
http://water.epa.gov/lawsregs/rulesregs/sdwa/publicnotification/upload/PNrevisedPNHandbookMarch2010.pdf

Paul Joice, Paul.A.Joice@hud.gov
I don't have his phone number—perhaps you could call the Mayor's office to get Paul's phone number?

Eric Burneson, burneson.eric@epa.gov
202-564-5250

I think the Key Message here is that there are other studies out there that point to other Health Effects from TTHMs, but there's not enough information for EPA to say that these are definitely additional Health Effects to be concerned about, so EPA cannot put this in writing/in the PN.

Jennifer
312-886-0244

Stage 2 DBPR TTHM or HAA5 MCL Violation Notice – Template 2-19

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

[Contaminant, i.e., Total Trihalomethanes (TTHM) or Haloacetic Acid 5 (HAA5)] MCL Violation at [System]

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did (are doing) to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Testing results from [provide date range] show that our system exceeds the standard, or maximum contaminant level (MCL), for [TTHM/HAA5]. The standard for [TTHM/HAA5] is [MCL]. It is determined by averaging all the samples collected at each sampling location for the past 12 months. The level of [TTHM/HAA5] averaged at one of our system's locations for [provide date range] was [level].

What should I do?

- There is nothing you need to do. You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.
- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

[TTHM are four volatile organic chemicals] [HAA5 are five haloacetic acid compounds] which form when disinfectants react with natural organic matter in the water.

[**People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.**] **Or**

[**People who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.**]

What is being done?

[Describe corrective action.] We anticipate resolving the problem within [estimated time frame] (or the problem was resolved on [give date]).

For more information, please contact [name of contact] at [phone number] or [mailing address].

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]. State Water System ID#: ___________.
Date distributed: _______.

Rennaker, Joanne (DEQ)

From: Howard Croft <hcroft@cityofflint.com>
Sent: Saturday, March 21, 2015 11:02 AM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Cc: Natasha Henderson; Daugherty Johnson; Jason Lorenz; Brent Wright; Michael Glasgow
Subject: TTHM Violation
Attachments: Letter to Water Customers 3.20.15FINAL.docx

Mike,

I am sending you and Steve a copy of the letter that we plan to include with the violation notice. This is set to go out early next week and I wanted to get your opinion. We have considered some type of water summary to accompany this as well but I am not certain if I can pull that together in time unless you have a specific recommendation.

We continue to post the Monthly Operation Reports online within two weeks after the end of each month.

Thank you,

--
Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

Water Quality Update

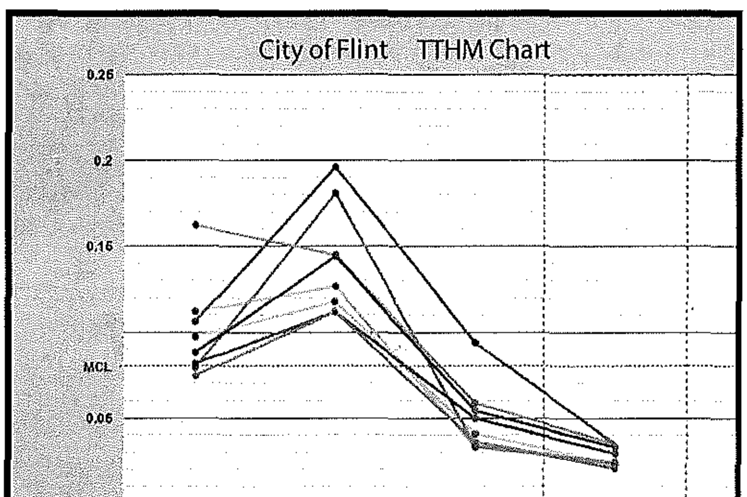
City of Flint Resident:

In January we alerted you to the presence at that time of excess TTHM (total trihalomethanes) in Flint's public water supply. TTHM – a byproduct of the water chlorination process – was found to be in excess of state guidelines (80 parts per billion) beginning in May 2014 and continuing into August. As soon as this excess concentration was discovered, we began taking steps to reduce it to within acceptable guidelines.

We are pleased to report that we have succeeded in bringing the water to within acceptable guidelines. While we continue to work on improving aesthetic qualities, such as discoloration or odor, you can be confident that the water provided to you today meets all state standards.

How did we did do this? With the help of LAN engineering, we upgraded the ozone treatment process at the Water Treatment Plant; increased water main/hydrant flushing to reduce stagnation; conducted small-scale testing of treatment to identify areas of improvement; improved overall plant operations; and enhanced the distribution system through water-circulation modeling.

By November, all but one testing site was below the allowable levels and **our most recent testing in February showed that every testing site was well below allowable levels, as shown below:**



	20-May-14	20-Aug-14	21-Nov-14	21-Feb-15
Series 1	0.162	0.145	0.059	0.035
Series 2	0.112	0.127	0.033	0.023
Series 3	0.097	0.118	0.041	0.023
Series 4	0.106	0.196	0.094	0.035
Series 5	0.079	0.181	0.034	0.024
Series 6	0.088	0.144	0.054	0.033
Series 7	0.082	0.112	0.05	0.029
Series 8	0.075	0.112	0.036	0.021
	Quarterly Result	Quarterly Result	Quarterly Result	Current Quarterly Result

City of Flint

Water Quality Update

The Michigan Department of Environmental Quality (MDEQ) has been monitoring our progress, as noted in its March 5, 2015 letter to the city:

"We are encouraged by the results from the most recent round of compliance samples collected on February 17, 2015, which now show individual TTHM levels at less than half of the 0.080 mg/L standard at all locations throughout the City's system. Operational Evaluation Reports from December 2014, and February 2015, have identified possible causes and corrective measures for the previous elevated TTHM levels, which we encourage the City to continue implementing. These modifications have likely contributed in part to the reduction in TTHM levels reported in the most recent quarter, and suggest the City may be able to achieve compliance with the TTHM standard at all sites by continuing these efforts." MDEQ

However, because MDEQ monitoring of excess concentrations is based on four quarters of test results, we are required to again notify you that based on the most recent four quarters of test results (which includes excess concentrations beginning in April), the City's *annual* quarterly testing average is not yet below the state's allowable average.

The attached notice ***("Important Information about Your Drinking Water")*** includes legally required language that summarizes the situation. Please review it and contact us with any questions.

In addition, included in this mailing is a list of Frequently Asked Questions. We also have created a place for regular updates on the city's website at **cityofflint.com**. We encourage residents who have concerns about the quality of their water to contact us immediately so on-site testing can be scheduled.

If you have questions about this report or would like a test done at your home, free of charge, please call us at 810-787-6537.

Maintaining safe water and improving its quality is a top priority, and we apologize for the concerns these notices have raised. We have taken many steps to improve the safety and quality of our water supply and will be taking more. As you may know, we have recently received a series of recommendations from several sources, including a report from international urban water system consultants, Veolia North America. We will be working with our recently created Citizen Advisory Committee and our Technical Advisory Committee to continue making improvements. Please track our progress on our website at cityofflint.com.

Sincerely,

??????

City of Flint

Rennaker, Joanne (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Thursday, March 19, 2015 11:07 AM
To:	Daugherty Johnson
Cc:	Busch, Stephen (DEQ)
Subject:	RE: RE: Flint Water Age map

Daugherty,

Based upon the most recent information provided to us from the city and your consultant, we are comfortable with either size transmission main (20-inch or 24-inch) for the transmission main project. An Act 399 permit (Permit No. W131020) issued March 18, 2013 (expired yesterday) inlcuded 23,550 LF of 24-inch WM, 1068 LF of 8-inch WM and 6800 LF of 8-inch WM. Given the reduced scope (lineal footage) of the project and expired permit...A new Act 399 permit seems more appropriate. Also, if the remaining work in the future (to complete the rest of the project) is completed under a separate contract, then, a separate Act 399 permits needs to be issued for that contract. A revised Act 399 permit application and set of plans (reduced scope) are needed. Assuming no changes in actual location of the proposed watermain and appurtenances, we should be able to expedite the review and issuance permit in a timely manner.

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Daugherty Johnson [mailto:djohnson@cityofflint.com]
Sent: Thursday, March 19, 2015 9:43 AM
To: Prysby, Mike (DEQ)
Subject: Fwd: RE: Flint Water Age map

Hello Mike. Here are the referenced exhibits in the 24 in. main reduction letter

Daugherty

---------- Forwarded message ----------
From: "Mack, Melissa" <MCMack@lan-inc.com>
Date: Mar 19, 2015 9:34 AM
Subject: RE: Flint Water Age map
To: "Daugherty Johnson" <djohnson@cityofflint.com>
Cc:

Hi Duffy,

Please see attached.

Melissa

Melissa C. (Henderson) Mack, PE

Associate, Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

2925 Briarpark Drive, Suite 400 • Houston, TX 77042-3720

T 713.266.6900 **x** 2436 **D** 713.821.0436

www.lan-inc.com • MCMack@lan-inc.com

From: Daugherty Johnson [mailto:djohnson@cityofflint.com]
Sent: Thursday, March 19, 2015 6:57 AM
To: Mack, Melissa
Subject: RE: Flint Water Age map

For clarification, I need the exhibits referenced in the letter you sent me discussing the downsizing of the 24 inch transmission main.

On Mar 19, 2015 7:55 AM, "Daugherty Johnson" <djohnson@cityofflint.com> wrote:

Hello Melissa. Could you send the exhibits referenced in the letter. DEQ wants to see them.

Thanks
Duffy

On Mar 15, 2015 5:26 PM, "Mack, Melissa" <MCMack@lan-inc.com> wrote:

You should be able to print to any size. Try 11x17 portrait. I'm attaching again in case the file got corrupt when it was sent last time.

Melissa C. (Henderson) Mack, PE

Associate, Project Manager

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& Newnam, Inc.
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From: Daugherty Johnson [mailto:djohnson@cityofflint.com]
Sent: Friday, March 13, 2015 1:46 PM
To: Mack, Melissa
Subject: RE: Flint Water Age map

I cannot print the map in its entirety. Do I need to scale a specific way?

On Mar 13, 2015 8:54 AM, "Mack, Melissa" <MCMack@lan-inc.com> wrote:

Duffy,

As discussed here is the water age map from January showing the water sample locations.

Thanks,

Melissa

Melissa C. (Henderson) Mack, PE

Associate, Project Manager

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& Newnam, Inc.
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From: Mack, Melissa
Sent: Thursday, March 12, 2015 1:12 PM
To: Daugherty Johnson; Green, Warren; Matta, Samir
Subject: Re: Flint Water Age map

Duffy,

We heard back from Innovyze. The model file got corrupted, but they are walking us through a fix. We are documenting the process so we'll know what do do if it happens in the future.

We expect to have fixed this afternoon and have the maps to you thereafter.

Thank you,

Melissa

Sent from my iPhone

On Mar 11, 2015, at 5:04 PM, Mack, Melissa <MCMack@lan-inc.com> wrote:

Duffy,

We ran into a technical issue with the model creating the water age maps without the 24-inch highlighted. We have to send the model to Innovyze. They weren't able to help us over the phone. We will get you the maps as soon as possible.

Thanks,

Melissa

Melissa C. (Henderson) Mack, PE

Associate, Project Manager

<image001.gif>

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www.lan-inc.com • MCMack@lan-inc.com

From: Daugherty Johnson [mailto:djohnson@cityofflint.com]
Sent: Wednesday, March 11, 2015 9:07 AM
To: Mack, Melissa; Green, Warren; Matta, Samir
Subject: Flint Water Age map

Hello Melissa. Would you please send me a copy of the latest Water Age map for Flint.

Thanks

Duffy

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, March 19, 2015 10:24 AM
To: Howard Croft
Cc: Busch, Stephen (DEQ); Rosenthal, Adam (DEQ)
Subject: RE: HC Letter & FAQ's

Howard,

It appears that my edits were not included in the final letter. The 6th paragraph down should be revised such that residents understand the difference between the Locational Running Annual Average (LRAA) and the results from the individual quarter (Feb 2015) ...to avoid possible confusion when they read the DEQ PN template which states that two of the eight sites are above the TTHM standard (this being based on the LRAA). Also, the words "annual average" needs to be replaced with Locational Running Annual Average (LRAA).

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 290-8817

From: Howard Croft [mailto:hcroft@cityofflint.com]
Sent: Thursday, March 19, 2015 9:09 AM
To: Brent Wright; Daugherty Johnson; Dayne Walling; donna. cole; gdn2@aol.com; Howard Croft; James Henry; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Nicholas; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green; Elizabeth Murphy; Robert Bincsik; Robert Case; Jason Lorenz; Kelly Rossman-McKinney; Sharon Emery; Gerald Ambrose
Subject: HC Letter & FAQ's

Technical Team Members,

Attached please find the final copy of a letter to the health community along with a Frequently Asked Question list.

These documents are ready for distribution among your peers and others. We anticipate mailing out the actual violation notice at the beginning of next week.

I will email everyone on this list when we determine a date for the next Technical Committee Meeting.

Thank you,

--

Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

Rennaker, Joanne (DEQ)

From: Howard Croft <hcroft@cityofflint.com>
Sent: Thursday, March 19, 2015 9:09 AM
To: Brent Wright; Daugherty Johnson; Dayne Walling; donna. cole; gdn2@aol.com; Howard Croft; James Henry; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Michael Glasgow; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Nicholas; rosejo@msu.edu; Russell Hudson; Samir Matta; Warren Green; Elizabeth Murphy; Robert Bincsik; Robert Case; Jason Lorenz; Kelly Rossman-McKinney; Sharon Emery; Gerald Ambrose
Subject: HC Letter & FAQ's
Attachments: Flint HC FAQ_Final.pdf; HC Letter Mayor.pdf

Technical Team Members,

Attached please find the final copy of a letter to the health community along with a Frequently Asked Question list.

These documents are ready for distribution among your peers and others. We anticipate mailing out the actual violation notice at the beginning of next week.

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--
Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

City of Flint Water FAQs

Is it currently safe to drink City of Flint water?

Yes. It's safe to drink, brush your teeth with, and bathe in the water. In the most recent water tests, in February 2015, all of the eight testing sites throughout the City were well below the maximum levels for total trihalomethanes (TTHM) recommended by the Environmental Protection Agency (EPA). You do not have to boil your water or take other corrective actions. The need to issue another violation notice is based entirely on high TTHM levels in the past. The water today is comparable to Detroit's in safety and quality.

Where is the City of Flint in addressing the water situation?

The City has made great strides in ensuring the safety of its water supply. The amount of TTHM in the water has decreased consistently in the last year and is currently at a safe level. While the water is safe to drink, some areas may experience harmless discoloration and possible odor. The City is continuing to address those aesthetic quality issues.

When was the last water test conducted?

The last water sampling test was conducted Feb. 21, 2015. The City of Flint received results from the state lab on Feb. 27, 2015. These results showed that February's quarterly results were well below the contaminant level (MCL). The City also monitors its water on a daily basis to ensure that water quality remains within the established guidelines.

What is considered to be a contaminant?

Contaminants in water may include microbial contaminants such as viruses and bacteria, and inorganic contaminants such as salts and metals, which can occur naturally. In this case it is trihalomethanes, which are a byproduct of disinfecting water. The disinfection process is regulated by the Safe Drinking Water Act and has played a crucial role in advancing public health. It's important to note that drinking water, including bottled water, is reasonably expected to contain slight amounts of some contaminants. But the presence of contaminants does not necessarily indicate that the water poses a health risk.

City of Flint Water FAQs

Will trihalomethanes make people sick?

For the majority of people, no. Individuals must consume excess amounts of contaminated water over many years to be susceptible to health risks, such as problems with the liver, kidneys, central nervous system, or increased risk of cancer. However, people with compromised immune systems – such as someone with HIV/AIDs, cancer, or other immune disorders – are more at risk and should speak to their health care provider. Trihalomethanes are more likely to cause effects when inhaled. To prevent this in situations such as showering (or other circumstances involving steam), simply open a door/window or turn on a fan. This is true with all public drinking water. It's not unique to water from the Flint River.

Is exposure to trihalomethanes bad for pregnant women?

While science has not established a causal relationship between trihalomethanes and adverse health effects among pregnant women, the City advises pregnant women to call the EPA's Safe Drinking Water Hotline at (800) 426-4791 about any concerns related to trihalomethanes.

Is it safer to drink bottled water?

Not necessarily. Although bottled water is regulated by the Food and Drug Administration (FDA), it undergoes much less rigorous testing than what the Environmental Protection Agency (EPA) requires for tap water. Also, the FDA does not regulate bottled water that is packaged and sold within a single state, even though 60-70% of bottled water falls into that category. The City of Flint's tap water is regulated by both the FDA and the EPA.

Where can I find official communications and updates on the Flint water issue?

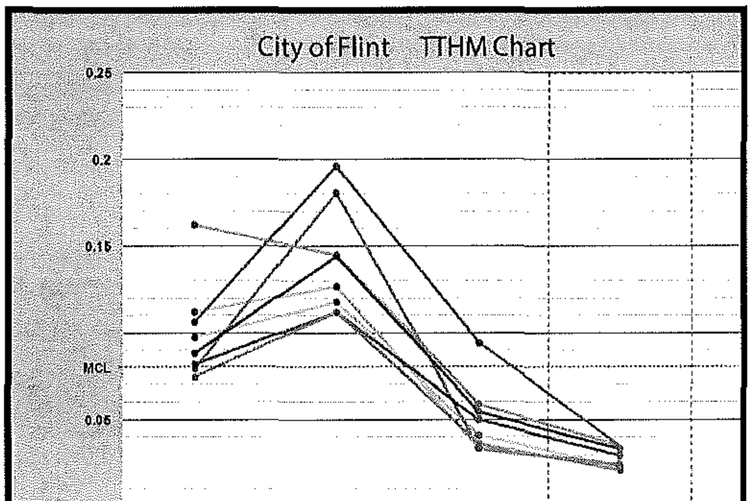
The City posts information on the City of Flint website at www.cityofflint.com. There is a special section dedicated to addressing Flint water concerns and providing the latest updates. In addition, citizens may also call the Flint Water Plant & Facilities at 810-787-6537.

Gerald Ambrose Emergency Manager | **Dayne Walling** Mayor | **Natasha Henderson** City Administrator

Members of the Flint Health Care Community,

The safety and quality of Flint's water has been in the news for months. We have worked hard to address these issues and have succeeded in bringing Flint's water to within the state's safety guidelines on all measures, including TTHM (total trihalomethanes). Excess TTHM triggered the initial letter to our customers earlier this year.

Even though Flint water now meets the standards and is testing at significantly below the state's allowable contamination levels, we are required to send out another letter to residents because the *annual* quarterly testing average is not yet below the state's allowable average.



	20-May-14	20-Aug-14	21-Nov-14	21-Feb-15
Series 1	0.162	0.145	0.059	0.035
Series 2	0.112	0.127	0.033	0.023
Series 3	0.097	0.118	0.041	0.023
Series 4	0.106	0.196	0.094	0.035
Series 5	0.079	0.181	0.034	0.024
Series 6	0.088	0.144	0.054	0.033
Series 7	0.082	0.112	0.05	0.029
Series 8	0.075	0.112	0.036	0.021
	Quarterly Result	Quarterly Result	Quarterly Result	Current Quarterly Result

The letter – a draft of which is enclosed for your information – includes legally required language recommending that residents who have severely compromised autoimmune systems, an infant in their household or who are elderly should contact their physician. This is standard language from the U.S. Environmental Protection Agency (EPA), which is included in every water quality or water related report the City publishes, regardless of whether there are specific health or quality concerns. It is used by other municipalities nationwide. We failed to alert you in advance of the first letter we were required to send out earlier this year, and we won't make that mistake again. We have also enclosed a fact sheet and Frequently Asked Questions to help you respond to any inquiries you may receive from patients.

Flint tests for TTHM – a byproduct of the water chlorination process – at eight different sites in the city. When we began using the Flint River as a source in April of 2014, our first round of quarterly testing for TTHM was conducted in May. At that time, only two testing sites were below the allowable maximum; in August, every site was above the allowable maximum.

Gerald Ambrose
Emergency Manager

Dayne Walling
Mayor

Natasha Henderson
City Administrator

The City, with the help of LAN engineering, developed an Operation Evaluation Report (OER), which contained an action plan to address the issue. That plan was implemented, including upgrading the ozone treatment process at the Water Treatment Plant (WTP), increasing water main/hydrant flushing to decrease stagnation, performing small-scale testing of treatment to identify areas of improvement, and applying overall improvements to the WTP through operational changes and to the distribution system through water-circulation modeling.

Because the public notice is based on an annual average of quarterly results, a notice was not required until November, at which time all but one testing site was below the allowable levels. Our most recent testing in February showed that every testing site was well below state allowable levels. (See the graph in this letter outlining our progress.)

We have taken many steps to continue to improve the safety and quality of Flint's water, including bringing in international urban water system consultants, Veolia North America, and establishing two advisory committees: a Citizens Advisory Committee and a Technical Advisory Committee made up of representatives from the University of Michigan, Michigan State University, Kettering University, Mott Community College, Michigan Department of Environmental Quality, U.S. Environmental Protection Agency, Genesys, Hurley and McLaren Hospitals and local health officials including the Genesee Medical Society, Greater Flint Health Coalition and the Genesee County Public Health Department.

We have also established a hotline 810-787-6537 and a place for continuing updates on the city's website **http://cityofflint.com/?p=6251**. In addition, we encourage residents who are concerned about their water to report it immediately so that we can arrange for on-site testing. We have offered this for more than a month, however, to date only a few residents have requested it. All residents wishing to have their water tested can call the hotline or send an email to **flintwater@cityofflint.com**.

While Flint's water system may still be challenged with aesthetic quality issues, such as discoloration or odor, we assure you the *safety* of the water meets all state standards. You should also know that the City publishes its monthly tests for a wide variety of water treatment components, including chloride levels, on its website at cityofflint.com/?page_id=5643.

We urge you to contact the City of Flint Water Treatment Plant with any specific questions or concerns. We will do our absolute best to get you the answers you need.

Sincerely,

Rennaker, Joanne (DEQ)

From: Busch, Stephen (DEQ)
Sent: Wednesday, March 18, 2015 11:54 AM
To: Howes, Sarah (DEQ); Shekter Smith, Liane (DEQ); Prysby, Mike (DEQ)
Cc: Tommasulo, Karen (DEQ)
Subject: RE: Flint Drinking Water Letter?

Importance: High

Never mind this was a private lab in Flint, not the Flint WTP.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Howes, Sarah (DEQ)
Sent: Tuesday, March 17, 2015 12:38 PM
To: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Cc: Tommasulo, Karen (DEQ)
Subject: Flint Drinking Water Letter?

Hi all---

I just got a call from Rep. Neeley's office and it's their understanding that DEQ will be issuing a letter on Flint Drinking Water tomorrow. Is this true? If so, could you please PDF me a copy and I'll distribute to the legislative offices that have asked for updates when appropriate.
Thanks,
Sarah

Sarah M. Howes | Legislative Liaison
Department of Environmental Quality
517.284.6707 O | C 517.282.9204