

CITY OF ST. JOSEPH WATER FILTRATION PLANT
OPERATIONAL REPORT
NOVEMBER 2016



Mission Statement

WSJOB- The City and Authority working together to provide safe drinking water of the highest quality to all of our customers at the lowest possible price.

WATER PLANT REPORT-NOVEMBER 2016

Water demand in November was down by 6,187,089 gallons or 9.4% from last year. This year 78,455,541 gallons were delivered which compares to 84,642,630 gallons delivered in November of 2015. The November 2016 pumpage ranked 29th in the thirty year tabulation dating back to 1987.

GENERAL ACTIVITIES

Drinking Water Revolving Fund Project Plan Engineering (DWRF)

An RFP was developed and advertised for bid. Bids were opened on November 30, 2016. Staff will interview the finalists on 12/7/2016 and make a recommendation to the WSJOB and City of St. Joseph City Commission in December and early January. The DWRF application is due on May 1, 2017 for fiscal year 2018.

Michigan's Drinking Water Revolving Fund (DWRF) program is designed to assist water suppliers in satisfying the requirements of the Safe Drinking Water Act by offering low-interest loans of 2.5% (for 20 and 30-year loans) for fiscal year (FY) 2017 to eligible water suppliers.

Filtration Capacity Study/Phase 1 SCIP

Both phases of the Filtration Capacity Study are now complete. In October test filters in filter banks 5-8 and 9-12 were operated at 3.3 gpm/sq.ft. and 4.4 gpm/sq.ft respectively. These filters are currently rated at 2.0 gpm/sq.ft. Plant staff and CH2M Hill were very pleased with the extended filter runs that were achieved during this phase. Filter runs of 90 hours were obtained on filter #10 and 160 hours on filter #8 on two runs per filter. The filter runs were terminated based on the target head loss being reached while turbidity which is a measure of water quality remained excellent.

While the rate study was underway, CH2M engineers completed the on-site portion of the hydraulic assessment. As projected in the SCIP and confirmed in the assessment staff observed first hand the hydraulic limitations in the influent piping in filter gallery 5-8. During high water demand filter levels in the test filters dropped to very low levels when two or more filters were operating simultaneously. In fact, this condition produced excessive turbulence which presented a problem since it could have caused shearing of the floc particles. For purposes of the study filters in filter bank 9-12 were placed into service and test filters in 5-8 were reduced in number to a single filter during the tests. In terms of future planning we now know and have confirmed that the influent piping will have to be upsized.

The final report from CH2M Hill is expected in early December. Optimization Solutions will present their findings on December 15th.

Long Term 2 Enhanced Surface Water Rule

The purpose of Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) is to reduce illness linked with the contaminant Cryptosporidium and other pathogenic microorganisms in drinking water. The LT2ESWTR will supplement existing regulations by targeting additional Cryptosporidium treatment requirements to higher risk systems. Current regulations require filtered water systems to reduce source water Cryptosporidium levels by 2-log (99 percent).

Recent data on *Cryptosporidium* infectivity and occurrence indicate that this treatment requirement is sufficient for most systems, but additional treatment is necessary for certain higher risk systems. The City of St. Joseph is subject to this rule and tested for *Cryptosporidium* in 2009 and 2010 in its raw water. One count was found in 24 samples taken over a two year period which qualified as low risk. In October of this year the City began a second two year testing period. In spite of the low risk results obtained from the first round of testing and the expected similar results in this phase SJWTP capital improvements were programmed in the 2014 SCIP to further enhance treatment. Staff is awaiting the results from the October and November samples.

St. Joseph Township Interconnect Metering Project

The *cut and caps* at the Elmside and Elvern locations are complete as well as the installations of the meters at Colfax & Nickerson and Woodward & Empire.

MDEQ Certification Examinations

Mark took the MDEQ F-2 examination in November and Rory will be taking it in May.

Travel & Training

Staff attended CMMS training for the recently purchased *Cityworks* software.

West Michigan Homeland Security Consortium

Staff attended a meeting of the Homeland Security Consortium in Grand Rapids, MI

Water Plant Tour-Berrien Springs Parent Partnership

Home schooled children and their parents toured the plant. The group of 90 was divided into two smaller groups who were given tours over the course of one day.

Water Plant Tour-American Society for Quality

Staff gave a presentation on the history of the St. Joseph WTP at the Hilton Garden Inn in Benton Township. A tour of the water plant followed. The tour focused on process chemistry and quality control at the plant.

University of South Carolina/Leco Corporation

The WTP hosted postdoctoral and doctoral students from the University of South Carolina Department of Chemistry and Biochemistry involved in research focusing on identifying new DBPs in drinking water, determining formation mechanisms, and integrating toxicological characterization with chemical characterization approaches met with plant staff and collected raw and finished water samples. The overall goal of this research is to solve human health issues surrounding drinking water DBPs. The students are working in collaboration with Leco Corporation of St. Joseph, MI.

Weather Report-November 2016

Rory Dickey who prepares our monthly weather report has brought to our attention the fact that record warm temperatures were observed on four days in November of this year. On November 1st a temperature of 71.3 exceeded the record of 69 degrees in 1970. After progressively greater ranges in temperature on the 6th and 7th between observed and past record temps a spread of nearly 18 degrees was recorded on November 18th when the temperature on that day of 70.7 degrees beat out the old record of 53 degrees in 1957.

Pack Ice Coverage in Lake Michigan at St. Joseph

One of the determining factors in the decision to relocate the St. Joseph WTP intake to deeper water in 2009 was the susceptibility of the 1955 intake to ice, both frazil and pack. In 2005, intake extension spools were in fact sheared off by natural forces and discovered later in the spring of that year some distance from the intake. Now a recently published article in the October edition of the Journal of Great Lakes Research sheds some light on the extent and physical characteristics of pack ice on Lake Superior. The abstract of that article is wherein subsurface pack ice is described as ‘ice keels’ is quoted below:

“During the 2013–2014 winter, the Lake Superior basin experienced record-low air temperatures and record-high ice cover. We present observations from three subsurface moorings which provided a novel view of the ice cover during this extreme winter. Each mooring carried a set of thermistors, and two sites had ADCPs, providing a rare glimpse into the subsurface characteristics and behavior of a large, partially ice-covered lake, including ice drift velocity, keel size and abundance, surface gravity wave suppression, and passive acoustics below the ice sheet. Ice drift velocities were well correlated with nearby wind velocities, with ice speeds approximately 4% of the wind speed and 20° to the right of the wind direction. Passing ice keels displaced the top subsurface float at the western mooring to depths of 6 m on a regular basis, and up to 11 m during one event. Anomalously large signal return strength at two ADCPs occurred sporadically at roughly the same time at two geographically separate locations, but only during periods of ice cover. The distribution of signal strength with depth suggests that these events are actually sounds from the ice cover itself, rather than reflectors in the water. Broadly speaking, ice cover on Lake Superior has more in common with oceanic ice cover than with ice cover on small lakes.”

Titze, Daniel and Jay Austin. Large Lakes Observatory, University of Minnesota-Duluth, Duluth, MN, USA.
Novel, direct observations of ice on Lake Superior during the high ice coverage of winter 2013-2014.

The old St. Joseph intake was located in 25 ft of water and extended 6 ft. off of the lake bottom and an additional four feet with the extensions. The 6 meter (19 ft) deep ice keels observed in Lake Superior would have easily scrapped the top of that intake and likely would have caused the loss of the extensions if such ice formations were possible on Lake Michigan. The 11 meter maximum ice keel reported in the article would just clear the top of the STWTP 2009 intake at low water datum.

ST. JOSEPH WATER FILTRATION PLANT
1701 LIONS PARK DRIVE
SAINT JOSEPH, MI. 49085

By: Greg Alimenti
 St. Joseph Water Plant
 700 Broad St.
 Saint Joseph, MI. 49085-1276
 (269) 983-1240

NOVEMBER 2016

DISTRIBUTION:	
Total Gallons	78,455,541
Average Day	2,615,185
Maximum Day	3,037,844
Minimum Day	1,996,884

TREATMENT:	
Total Low Service	81,115,708
Wash Water Gals.	802,608
Wash Water %	1.00%
Plant Use Gals.	1,710,677
Plant Use %	2.13%

FILTRATION:		
Ave. Filter Run	49.6	hours
Ave. Filter Rate	2.32	g/sqft/min
Filter Eff. Index	330.4	
Ave. Loss of Head	1.1	feet
Plant Sewer Usage	401	\$ 2,024.00

LABORATORY REPORT		
Average of	Raw	Tap
Chlorides mg/L	17.9	17.4
Fluoride mg/L	0.14	0.72
Alkalinity mg/L	122	109
Hardness mg/L	152	150
pH	8.1	7.5
Calcium mg/L	43	43
Magnesium mg/L	12	10
Turbidity NTU	0.56	0.06
Temperature °F	58	
Total Coliform		0.0
Chlorine Residual		mg/L Free
Mixing Basin		0.83
Applied		1.91
Tap		1.47
Distribution		0.76

TREATMENT CHEMICAL SUMMARY:					
	Applied mg/L	Total Lbs.	Cost	Inventory lbs.	Days Supply
		CHEMICAL			
Alum (Al ⁺³)	1.96	1,317	\$4,337.99	143,004	3257
Chlorine (Cl ₂)	3.34	2,246	\$603.50	4,148	55
Fluoride (F ₂)	0.75	509	\$891.51	30,698	1810

		REMARKS:			
Total Cost all Chemicals	\$5,833.00				
Chemical Cost per Mil. Gallon Treated	\$71.91				
Chemical Cost per Mil. Gallon Delivered	\$74.35				
PLANT UTILITIES SUMMARY					
Electric:					
Total KWH	181,800	***includes measure of melted snow			
Total Power Cost	\$ 12,726.00	visit the City of Saint Joseph's Home page at www.sjcity.com			
Power Cost per Million Gallon Treated	\$ 156.89	e-mail comments to either: operator@sjcity.com or galiment@sjcity.com			
Power Cost per Million Gallon Delivered	\$ 176.41	WEATHER CONDITIONS AT THE PLANT		Air Temp. °F	
Gallons Pumped per KWH	374	SJWW Weather Computer		Avg.	49.4
		Rain Gauge, Inches	1.99	Max.	73.7
		days it rained***	7	Min.	31
Natural Gas:		Wind Speed, Avg	10.7	Lake Temp. °F	
Metered Cubic Feet	315	Wind Speed, Max	57	Avg.	57.8
Natural Gas Cost	\$218.62	Prevailing Wind Dir.	SSE	Max	61.8
Emergency Power Diesel Fuel Inv., Gals.	North 600	Lake Level (USACE)	579.17	Min	51.0
	South 2400				

Monthly Maintenance Notes

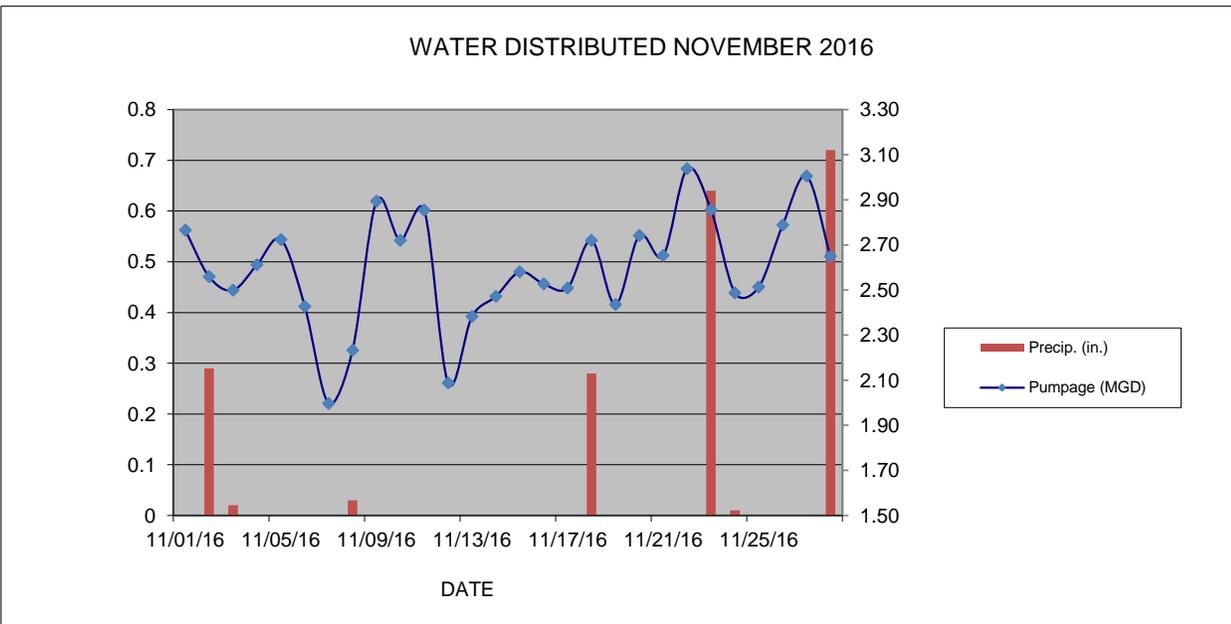
November 2016

Normal PM Maint. done Monthly	Check all High Service and Low Service Pumps, BPS pumps, Service BPS Chlorinators, Change out air filters on VFD Drives and Air Handlers. Grounds work at Plant, Booster Stations and Water Towers
11/04/16	Johnny on the Spot - cleaned the exterior of all plant windows.
11/08/16	Isolated and drained Royalton Tower to replace pipe nipples on stand pipe
11/09/16	Replaced (3) pipe nipples on stand pipe on Royalton Tower due to existing pipe nipples were leaking. New pipe nipples now Stainless Steel!
11/14/16	D.A.Dodd - Installed new unit heater in old lab room
11/16/16	Filled Royalton Tower to 10 ft and isolated it for bacti testing. Also exercised mud valve and inspected top of the tower, vent screen and paint condition.
11/17/16	Certified Crane - Annual inspection and service on all plant cranes and hoists
11/19/16	Drained Clarifier #1 for annual service and cleaning
11/21/16	Filled Royalton Tower, tower back in service
11/21 to 11/22/16	Cleaned and Serviced Clarifier # 1
11/23/16	Flushed sample supply lines for filters 5-8 and 9-12
11/28/16	Installed new blower motor for unit heater in chemical feed room
11/30/16	Filled Clarifier # 1 , Back in service

**ST JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED/RAINFALL
NOVEMBER 2016**

DATE	PUMPAGE (gallons)	PUMPAGE (MGD)	Rainfall (in)*	November 2015
11/01/16	2,765,122	2.77	0	2,980,524
11/02/16	2,558,695	2.56	0.29	2,981,085
11/03/16	2,499,277	2.50	0.02	2,953,535
11/04/16	2,611,595	2.61	0	2,969,534
11/05/16	2,723,593	2.72	0	3,498,430
11/06/16	2,427,253	2.43	0	3,500,571
11/07/16	1,996,884	2.00	0	2,648,312
11/08/16	2,233,353	2.23	0.03	3,183,803
11/09/16	2,893,292	2.89	0	2,395,440
11/10/16	2,719,617	2.72	0	2,973,366
11/11/16	2,854,067	2.85	0	2,899,416
11/12/16	2,087,813	2.09	0	2,924,997
11/13/16	2,382,567	2.38	0	2,601,714
11/14/16	2,471,657	2.47	0	2,667,642
11/15/16	2,580,606	2.58	0	2,814,953
11/16/16	2,526,847	2.53	0	2,848,653
11/17/16	2,509,321	2.51	0	3,037,389
11/18/16	2,720,027	2.72	0.28	2,657,327
11/19/16	2,435,643	2.44	0	2,170,166
11/20/16	2,742,023	2.74	0	2,878,322
11/21/16	2,652,145	2.65	0	2,501,313
11/22/16	3,037,844	3.04	0	2,641,243
11/23/16	2,855,355	2.86	0.64	3,068,880
11/24/16	2,487,308	2.49	0.01	2,771,416
11/25/16	2,513,121	2.51	0	2,816,318
11/26/16	2,787,900	2.79	0	2,670,786
11/27/16	3,004,863	3.00	0	2,387,339
11/28/16	2,649,554	2.65	0.72	2,789,323
11/29/16	2,754,291	2.75	0	2,673,719
11/30/16	2,973,907	2.97	0	2,737,115
TOTAL	78,455,541	78.46	1.99	84,642,630

Average Day	2,615,185
Maximum Day	3,037,844
Minimum Day	1,996,884

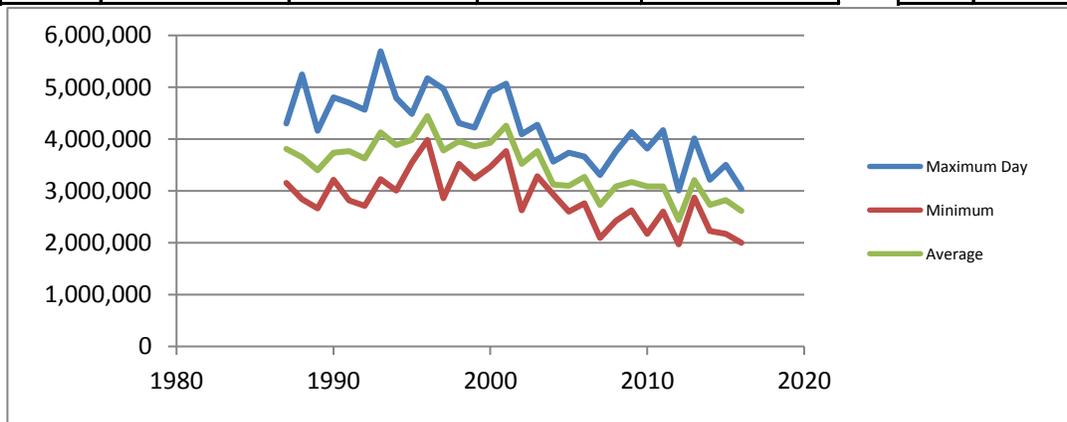


ST. JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED

NOVEMBER 2016

Year	Average	Maximum Day	Minimum	Monthly Total
1987	3,810,773	4,301,500	3,156,200	114,323,200
1988	3,647,963	5,249,400	2,837,900	109,438,900
1989	3,400,317	4,163,000	2,660,300	102,009,500
1990	3,736,293	4,806,000	3,215,400	112,088,800
1991	3,767,847	4,698,400	2,817,000	113,035,400
1992	3,627,230	4,566,400	2,713,900	108,816,900
1993	4,128,737	5,692,700	3,226,800	123,862,100
1994	3,884,147	4,791,400	3,009,000	116,524,400
1995	3,983,600	4,483,450	3,548,500	119,508,000
1996	4,444,210	5,170,950	3,983,750	133,326,300
1997	3,781,002	4,971,500	2,861,500	113,430,050
1998	3,956,542	4,309,600	3,519,500	118,696,520
1999	3,862,057	4,222,000	3,238,600	115,861,700
2000	3,925,378	4,906,750	3,458,750	117,761,350
2001	4,260,085	5,069,850	3,767,830	127,802,550
2002	3,523,023	4,091,750	2,626,010	105,690,700
2003	3,764,779	4,275,250	3,284,340	112,943,380
2004	3,121,532	3,563,000	2,932,000	93,645,960
2005	3,100,771	3,738,500	2,601,010	93,023,130
2006	3,272,130	3,661,750	2,762,000	98,163,900
2007	2,727,424	3,304,320	2,094,500	81,822,720
2008	3,083,225	3,763,500	2,424,250	92,496,750
2009	3,173,639	4,134,540	2,624,360	95,209,160
2010	3,086,018	3,816,617	2,170,172	92,580,535
2011	3,086,301	4,173,075	2,600,107	92,589,043
2012	2,440,805	3,008,047	1,969,902	73,224,159
2013	3,207,103	4,011,705	2,873,629	96,213,088
2014	2,731,690	3,218,063	2,225,326	81,950,687
2015	2,821,421	3,500,571	2,170,166	84,642,630
2016	2,615,185	3,037,844	1,996,884	78,455,541

Rank	Year	Monthly Total
1	1996	133,326,300
2	2001	127,802,550
3	1993	123,862,100
4	1995	119,508,000
5	1998	118,696,520
6	2000	117,761,350
7	1994	116,524,400
8	1999	115,861,700
9	1987	114,323,200
10	1997	113,430,050
11	1991	113,035,400
12	2003	112,943,380
13	1990	112,088,800
14	1988	109,438,900
15	1992	108,816,900
16	2002	105,690,700
17	1989	102,009,500
18	2006	98,163,900
19	2013	96,213,088
20	2009	95,209,160
21	2004	93,645,960
22	2005	93,023,130
23	2011	92,589,043
24	2010	92,580,535
25	2008	92,496,750
26	2015	84,642,630
27	2014	81,950,687
28	2007	81,822,720
29	2016	78,455,541
30	2012	73,224,159



NOVEMBER 2016

SOUTHWEST MICHIGAN REGIONAL SANITARY SEWER & WATER AUTHORITY

WSSN 3726

CLEVELAND BOOSTER STATION

HILLTOP BOOSTER STATION

DATE	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl ₂ PRE mg/l	Cl ₂ POST mg/l	Cl ₂ MON mg/l	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl ₂ PRE mg/l	Cl ₂ POST mg/l	Cl ₂ MON mg/l	BOOSTER MGD
1-Nov	1.852	169	23.96	1.55	2.20	2.20	2.91	0.001	0	0.00	0.00	0.97	1.32	1.36	1.853
2-Nov	0.000	0	0.00	0.00	2.20	2.20	2.73	1.916	33	4.68	0.29	2.05	1.42	1.49	1.916
3-Nov	1.714	150	21.27	1.49	2.16	1.91	2.25	0.000	0	0.00	0.00	1.43	1.15	1.21	1.714
4-Nov	0.000	0	0.00	0.00	1.86	1.71	1.89	1.784	58	8.22	0.55	2.11	1.76	1.89	1.784
5-Nov	1.190	91	12.90	1.30				0.682	14	1.98	0.35				1.872
6-Nov	1.190	91	12.90	1.30				0.682	14	1.98	0.35				1.872
7-Nov	1.190	91	12.90	1.30	1.33	1.30	1.41	0.682	14	1.98	0.35	1.27	1.31	1.28	1.872
8-Nov	0.012	1	0.14	1.39	1.17	1.21	1.19	1.288	1	0.14	0.01	1.27	1.37	1.32	1.300
9-Nov	0.000	0	0.00	0.00	1.01	0.98	1.05	1.367	60	8.51	0.75	1.26	1.69	1.79	1.367
10-Nov	0.000	0	0.00	0.00	0.87	1.00	0.94	2.318	44	6.24	0.32	1.56	1.33	1.40	2.318
11-Nov	1.504	102	14.46	1.15	2.20	1.57	1.69	0.474	11	1.56	0.39	1.26	1.42	1.66	1.978
12-Nov	0.701	47	6.66	1.14				1.112	43	6.10	0.66				1.813
13-Nov	0.701	47	6.66	1.14				1.112	43	6.10	0.66				1.813
14-Nov	0.701	47	6.66	1.14	1.34	1.55	1.71	1.112	43	6.10	0.66	1.78	1.66	1.73	1.813
15-Nov	1.037	60	8.51	0.98				0.901	32	4.54	0.60				1.937
16-Nov	1.037	60	8.51	0.98	1.99	1.51	1.67	0.901	32	4.54	0.60	1.23	1.54	1.69	1.937
17-Nov	1.183	70	9.92	1.01	1.51	1.68	1.90	0.343	20	2.84	0.99	1.49	1.64	1.69	1.526
18-Nov	0.191	8	1.13	0.71	1.36	1.59	1.65	1.672	71	10.07	0.72	1.20	1.11	1.15	1.863
19-Nov	1.212	58	8.22	0.81				0.620	26	3.69	0.71				1.832
20-Nov	1.212	58	8.22	0.81				0.620	26	3.69	0.71				1.832
21-Nov	1.212	58	8.22	0.81	1.30	1.54	1.66	0.620	26	3.69	0.71	1.19	1.20	1.30	1.832
22-Nov	0.632	28	3.97	0.75	1.67	1.51	1.63	1.690	43	6.10	0.43	1.18	1.20	1.26	2.322
23-Nov	1.800	76	10.78	0.72	1.41	1.40	1.55	0.000	0	0.00	0.00	1.09	1.06	1.05	1.800
24-Nov	0.738	30	4.25	0.69				1.146	15	2.13	0.22				1.884
25-Nov	0.738	30	4.25	0.69				1.146	15	2.13	0.22				1.884
26-Nov	0.738	30	4.25	0.69				1.146	15	2.13	0.22				1.884
27-Nov	0.738	30	4.25	0.69				1.146	15	2.13	0.22				1.884
28-Nov	0.738	30	4.25	0.69	1.33	1.08	1.36	1.146	15	2.13	0.22	1.12	1.19	1.24	1.884
29-Nov	1.744	56	7.94	0.55	1.26	1.36	1.53	0.000	0	0.00	0.00	1.03	1.01	1.08	1.744
30-Nov	0.000	0	0.00	0.00	1.18	1.16	1.34	1.814	62	8.79	0.58	2.11	1.62	1.90	1.814
TOTAL	25.708	1,518	215.2					29.437	791	112.15					55.145
AVE DAY	0.857		7.2	0.82	1.54	1.50	1.69	0.9812		3.7	0.42	1.40	1.37	1.45	1.838
MAX	1.852		24.0	1.55	2.20	2.20	2.91	2.3179		10.1	0.99	2.11	1.76	1.9	2.322
MIN	0.000		0.0	0.00	0.87	0.98	0.94	0.0000		0.0	0.00	0.97	1.01	1.05	1.300
MONTHLY TOTALS:	Cleveland	Total MG Treated	25.708	SJCT EAST				Hilltop	Total MG Treated	29.437	Cleveland Pump Station:				25.708
		Untreated	0.000	Average Day	0.169				Treated	29.436	Hilltop Pump Station:				29.436
Total Authority Flow:	57.511			Month Total	5.072				Untreated	0.001	TOTAL AUTHORITY (Trted.)				55.144

DISTRIBUTION REPORT

For the Month of November 2016

Activity	Number/Description
Water Main Breaks	1
MISS DIGS	304
Delinquent Shut Off	27 22 City 5 RCT
Delinquent Shut Off (Broken Payment Plans)	0
Hydrants (Repaired/Replaced)	1 (LCT). Free cap
Valve Turning	0
Valves	
Taps (1")	620 W. Napier (SJCT) Replace failed well.
	3842 Derry Dr. (RCT) New Construction
	5209 Washington Ave (LCT) New Construction
	1221 Forestbrook Dr. (LCT) New Construction
	4367 Tosi Circle (LCT) New Construction
Cross Connection Control (Hydro Designs)	
Repair of Curb box/Shut-Off Valves	1 487 Western (SJCTE), Replaced curbbox and shutoff valve
Service Repair	
Service Replacements	2 2603 Niles Ave (SJ) (replaced lead service)
	716 Main St. (SJ) Pit (replaced lead service), New construction
	2307 Morton (SJ) (replaced lead service)
	1003 Court (SJ) Pit (replaced lead service), galvanized repl
	1200 Colfax (SJTE) Terminated BH service on abandoned house.
Meter pit/service replacement	
Water Quality Complaint(s)	
Hydrant flushing to maintain water quality	
Hydrant Flushing (Stage 2 Rule)	
Service line complaints (customer side)	
Staff Education/Training	0
Overtime-Total	47.25 (Including Sanitary and Storm)
Turn Off	19 (Note: For delinquent Shut off see above)
Turn On	9
Finals	88
Meter Repair/Replacement	
	Audit Meter
	Verify Read
	1
Meter Repair	Move Mxu Box
Per detail	New Installation
	11
Meter leaking	2 New Installation-Benton Harbor
Stopped Meter	16 Replaced/various reasons (e.g.downsiz
	1
Faulty Register	1 Rockwell Replacement
Frozen Meter	2 Mxu Replaced
	8
Move Meter Inside	Sprinkler meter removed/line capped
Hard to read	14 Removals/demo
	2
Replace/Adding Sprinkler Meter	Curb box location
Damage to Meter	Broken Remote
New Plumbing	4 Noisy Meter
	1
New siding	Upgrade 5/8" to 3/4" (upgrade to 1")
Meter sent out for testing	Meter Change/Benton Harbor

CITY OF ST. JOSEPH WATER MAIN BREAK REPORT

For the Month/Year of: November 2016

#	Date	Location	Main Size	Gallons Lost	Break Type	Valves Turned	City Twp	Labor	Remarks
1	11/6/2016	Caugya & Pontiac	6	12000	Radial	5	SJCTE	30.0	Difficult to isolate/shut down, sand, 6 ft. cover, no cath.
2									
3									
4									
	TOTALS			12,000		5		30.0	

MONTHLY CLIMATOLOGICAL SUMMARY

November 2016

NAME: sjwwweather

St. Joseph Water Plant - 1701 Lions Park Drive - St. Joseph, MI

DAY	MEAN TEMP	NORM MEAN TEMP	HIGH TEMP	TIME	NORM HIGH TEMP	REC HIGH TEMP	YEAR	LOW TEMP	TIME	NORM LOW TEMP	REC LOW TEMP	YEAR	HEAT DEG DAYS	COOL DEG DAYS	RAIN	AVG WIND SPEED	HIGH	TIME	DOM DIR
1	64.4	35	71.9	6:30p	42	71.9	2016	55.3	12:30a	27	11	1964	1.9	1.3	0	6.4	24	12:30p	SSE
2	62.6	35	67.9	12:00p	42	69	1982	58.6	11:30p	27	1	1976	2.7	0.2	0.29	3	18	1:00p	SE
3	56.6	35	60	4:30p	41	67	1982	53.3	12:00m	27	-2	1976	8.4	0	0.02	7	24	9:30p	N
4	50	34	55.3	4:30p	41	64	1970	42.1	8:00a	26	10	1978	15	0	0	3.7	18	2:00a	ENE
5	55.2	34	62	5:30p	41	65	1982	45.4	5:00a	26	5	1991	9.8	0	0	8.6	22	9:30a	SW
6	55.9	33	64.2	5:00p	40	64.2	2016	47.2	7:30a	26	11	1954	9.1	0	0	4.3	13	12:30a	SE
7	57	33	68.3	4:30p	40	68.3	2016	48.5	7:30a	25	7	1950	8.2	0.2	0	3.5	16	12:00p	SE
8	55.3	33	58.9	5:00a	39	60	1991	51.2	10:00p	25	2	1977	9.7	0	0.03	18	41	10:30p	N
9	50.8	32	54.6	4:30p	39	62	1991	46.2	9:30p	24	3	1989	14.2	0	0	12.3	39	3:00a	N
10	55.3	32	59	4:30p	38	64	1971	51.3	12:30a	24	4	1978	9.7	0	0	21.6	35	1:30p	SW
11	50.7	31	58.1	1:00a	38	63	1949	39.5	12:00m	24	3	1978	14.3	0	0	16.3	35	11:00a	N
12	43.2	31	50.9	8:00p	37	62	1949	33	7:00a	23	-4	1958	21.8	0	0	8.7	28	11:00p	SW
13	50.3	30	56.6	5:00p	37	65	1975	45.3	1:00a	23	-4	1958	14.7	0	0	17.4	35	2:30a	SW
14	50.4	30	58.7	5:00p	37	65	1975	39.7	7:30a	23	3	1958	14.6	0	0	9.2	33	1:00a	SW
15	50	30	56.8	1:00p	36	62	1971	44.5	6:30a	22	-5	1989	15	0	0	4.7	16	3:30p	SE
16	50.7	29	58.5	2:30p	36	64	1984	44.9	2:30a	22	-6	1989	14.3	0	0	3.7	15	4:00a	N
17	60.4	29	73.7	3:00p	35	73.7	2016	45.7	12:30a	21	-8	1989	6.9	2.3	0	7.6	29	11:00p	SSE
18	61.7	28	70.7	2:00p	35	70.7	2016	45.4	12:00m	21	-2	1989	4.3	1	0.28	14.3	47	11:30p	SSE
19	40.1	28	45.6	12:30a	34	55	1957	36.5	12:00m	21	0	1983	24.9	0	0	33.3	57	11:30a	WNW
20	36.1	28	37.7	11:30p	34	58	1949	34.5	12:00m	20	-5	1983	28.9	0	0	19.5	38	3:00a	N
21	37.4	27	39.9	10:30p	33	60	1949	33.8	2:30a	20	-3	1989	27.6	0	0	9.8	28	10:30a	N
22	35.6	27	42	4:00p	33	58	1957	31	5:00a	19	-4	1989	29.4	0	0	1.8	14	12:00m	E
23	40	26	43.7	12:00m	33	57	1982	36.2	5:30a	19	-15	1989	25	0	0.64	3.7	19	10:30a	SE
24	43.4	26	47.1	1:30a	32	58	1982	39	12:00m	19	-7	1989	21.6	0	0.01	14.4	31	8:00a	W
25	41.9	26	44	7:00p	32	66	1982	39	12:30a	18	-5	1983	23.1	0	0	16.8	32	6:30p	W
26	42.1	25	45	4:30p	31	58	1982	38.7	11:00p	18	-2	1983	22.9	0	0	11.3	29	2:00a	WNW
27	39.4	25	44.7	11:00p	31	56	1959	35.2	7:30a	18	-2	1990	25.6	0	0	5.1	20	2:30p	SSE
28	47.2	24	53.6	11:00p	30	65	1984	41.9	5:30a	17	1	1950	17.8	0	0.72	8.3	43	12:00m	SSE
29	52.7	24	59.2	3:00p	30	64	1984	47	8:00a	17	-2	1961	12.3	0	0	11	34	4:30a	SSE
30	44.8	24	52.1	12:30a	29	58	1965	39.8	8:30p	16	-7	1983	20.2	0	0	17	40	11:30p	WSW
31																			
AVE	49.4	29.5											15.8	0.2	0.1	10.7	29.1		SSE
MAX	64.4	35	73.7			73.7		58.6		27	11		29.4	2.3	0.72	33.3	57.0		
MIN	35.6	24	37.7					31		16	-15		1.9	0	0	1.8	13		
TOTAL															1.99				

Max Rain: 0.72 ON 11/28/16
 Days of Rain: 6 (>.01 in) 4 (>.1 in) 0 (>1 in)