

**CITY OF ST. JOSEPH WATER FILTRATION PLANT**  
**OPERATIONAL REPORT**  
**APRIL 2015**



**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-APRIL 2015

Water demand in April was down by 9,855,809 gallons or 10% from last year. This year 89,504,069 gallons were delivered which compares to 99,359,878 gallons delivered in April of 2014. Most of the disparity in the numbers is likely due to the fact that the April 2014 pumpage reflects the water lost from the main breaks last year. The April 2015 pumpage ranks 29<sup>th</sup> in the 30 year tabulation dating back to 1986.

### **GENERAL ACTIVITIES**

#### *Spring Intake Inspections*

Plant staff drafted and sent an RFP to qualified divers for inspections of the north and south intakes. Underwater Construction of Stevensville submitted the low bid. Inspections were performed in April.

South Intake: This intake which is rated at 16 MGD and was constructed in 1955 served as the water plant's sole water source until the completion of the North Intake in 2011. The 24" pipe extends 1500 ft. from shore. It was laid under the lake bottom and supplies a shorewell on the plant site. On the lake bottom the pipe terminates in an intake structure which consists of four vertical steel cylinders connected by a pipe manifold located in the center (two cylinders on a side). Divers found heavy zebra mussel growth on the cylinders and piping. Sand was found in all four of the cylinder influent pipes varying in depth from 70% to fully blocked. This intake was cleaned in 2013 and had been in service during the Fall of that year. Recently in January, plant staff reported a total blockage in this line when an attempt was made to utilize it during routine cleaning and maintenance of the North intake. At the time it was thought that frazil was the cause of the problem. On an emergency basis, Underwater Construction was directed to clean the intake structures and pipe manifold. Upon completion of this work, the station was placed back into service but only yielded 25% of its design capacity. On May 12<sup>th</sup>, this intake was successfully backflushed. At this time the intake is flowing 4 MGD and will be tested next week at higher flows. Given the minimal level of drawdown in the wetwell we are confident that the obstruction which was likely sand and sea grass has been successfully cleared. The South intake functions as an emergency backup, as an NPDES compliant backflush water source for the North and as a standby while maintenance is being performed on the North.

North Intake: The North intake which is rated at 32 MGD was completed in 2011 and serves as the primary intake for the water plant. Similar to the South intake it begins onshore with a low service pump station connected to a 48" pipe 4450 ft long which extends under the lake bottom. Near the end it splits into a 'Y' configuration and terminates at two large cylindrical steel cylinders which are eight feet in diameter. The legs of the Y are 70' long and as such the structures are just under 140' from each other on the lake bottom. The inspection revealed heavy sand deposition in the structures varying from two feet at the pipe entrance to eight feet. The divers were unable to enter the south leg which was 70% blocked and were only able to travel twenty feet in the north leg before being stopped by sand which was increasing in depth. The sand source appears to have been the result of the two major storms experienced last Fall. Guy Meadows of Michigan Technological University reminded us that these were 100 year storms and that sand deposition as a result of suspended material was likely a major factor. The divers did not find any evidence of shifting sand bars as was the cause of the 2005 blockage of the South intake. The sand level on the outside of all of the structures (North and South) was normal.

Video documentation of the inspections was done. Underwater Construction will return during the week of May 18<sup>th</sup> to clean the structures and remove the sand from the North intake. No further work is needed on the South which we believe at this time is clear.

### Intake Raw Water Sample Line

The raw water sample line in the North intake functions to provide water which is free of chlorine to enable the analysis for total organic carbon and coliform (bacteriological) enumeration. It consists of a ¾" HDPE line that terminates in an inlet screen assembly located on the roof of the North structure of the North Intake. A semicircular screen 2 feet in diameter at the base was installed in 2014 to provide additional screening capability when the sample line was reconfigured and check valves were installed to permit NPDES compliant backflushing capability for the sample line. Divers found that the semicircular screen was badly damaged and the sample line inside the structure was pulled apart and found to be lying in the sand. Repair of the line and screen will be attempted after the structure is cleaned.

### *Strategic Capital Improvement Plan*

The SCIP was presented to the St. Joseph City Commission on March 16<sup>th</sup> at their March study session by Mr. Tony Myers of CH2M Hill. A very good but curiously titled article followed the next day in the Herald Palladium-“*Water Plant Needs Major Repairs*’. Commissioners had also been invited to the water plant prior to the meeting and several tours were given during the week of March 9<sup>th</sup>. The next step in the process will be the development of a preliminary engineering report on Phase I of the plan.

### *Cross Connection Control Inspections*

Mark Kneibel of Hydro Corp performed the second round of inspections on commercial facilities in the City. He reported possible issues at two of the local marinas that are being followed up on by staff. This is Mark’s first visit and it may be that the site conditions are ok. In any event it is good practice to periodically bring in a fresh set of eyes. Hydro Corp is under contract to perform site inspections as part of the cross connection control program as required in Sections 30-66 and 30-67 of the City of St. Joseph Code of Ordinances. As stated in the ordinance, “The purpose of the cross-connection rules issued by the Michigan Department of Environmental Quality is to preserve the purity and quality of municipal water supplies through the prevention of backflow and the regulation of water line and system cross-connections.” In addition to commercial facilities, Hydro Corp inspects all City owned facilities including the Water Plant, City Hall, the marina, cemeteries, parks, public works, public safety buildings and even the flowered center tree lawn on Main Street.

### *Travel & Training*

Mark Thornton is enrolled in Water Chemistry which is being taught by our MDEQ District Engineer Gary Wozniak. Classes are being held at the Lake Township Water Plant in Bridgman. We are very pleased that this course is being held in Berrien County and that Gary is teaching it. All of us at one time or another have taken his courses locally and I believe they have provided a direct benefit to us and the water plant. The class will conclude in May.

Shawn Orlaske and Jeff Peden attended the Lab Practices seminar in Lansing. Topics covered were Algae and Cyanobacteria Toxins, Introduction to Asset Management, GHS, Cost of Service and Laboratory Techniques. Both Shawn and Jeff serve on the Lab Practices Committee for the Michigan Section AWWA.

Mark and I attended a Treatment Optimization seminar in Oak Creek, WI that was hosted by the Wisconsin Section AWWA. Tony Myers of CH2M Hill led a round table discussion on coagulation and surface water treatment chemistry. As you may recall Tony was the lead engineer on our SCIP. We also toured the Oak Creek WTP with Tony and had a chance to talk with plant staff. The Oak Creek plant is equipped with plate settlers similar to those proposed in the SCIP.

Shawn, Mark, Jeff Faultersack and I attended the Michigan Section AWWA Spring Regional in Kalamazoo. I gave a presentation at the meeting on the 2011 St. Joseph Intake/Shorewell project.

Shawn and I attended the West Michigan Superintendents luncheon in Saugatuck.

#### *Water Tower Inspections*

Dixon Engineering completed ROV (Remotely Operated Vehicle) wet inspections of all three water towers. The impetus for this work was the recommendation from Corpro that cathodic protection would improve the longevity of the paint and surface metal inside the City water tower. Staff had planned for cathodic but did not install it based on Dixon's recommendation that it would not be needed until the paint coating on the interior of the tank began failing which is typically 10-15 years. In consultation with Dixon, staff learned that the unusually cold winters of late had brought about ice damage in several towers around the state. Given this information it was decided to inspect the Authority towers as well. The inspections were done while the towers were full and in service. Preliminary indications are that minor paint repair will be needed on a small section of the riser and ladder in the City tower and that no work will be needed in the Authority towers. Cathodic protection will be installed in the City tower while it is down for paint repair pending the recommendation from Dixon.

#### *SCADA/Instrumentation*

On March 13<sup>th</sup> the computer screens on filters 9-12 failed and resulted in a loss of control to those filters. West Michigan Instrumentation (Alpha Tran Engineering) and Advanced Boiler Control Systems were called in to assist plant staff to resolve the issue. The hard drives in both computers were replaced and were reprogrammed to enable local control of the filters from the process computer in the control room. In addition, WMI at our request created a backup screen whereby SDWA required filter water quality (turbidity) could be recorded and logged independently. By doing so, manual control of the filters in the event of local computer failure was enabled. In the event of such a failure in the future plant staff would be able to manually run the filter at constant rate while monitoring turbidity. This is important since filters 9-12 account for one half of the water plant's capacity.

WMI also programmed in ground level pressure readings at all three water towers. This capability restores what was lost with the decommissioning of the Stevensville pressure gauge. In addition, ground level pressure and elevation are important for instances when system pressure is dramatically reduced due to a large main break. In such cases water level in the towers which is currently measured from the bottom of the bowl becomes useless while ground level pressure yields vital information. These readings are also important in the event of an interconnection with the City of Benton Harbor which effectively operates at a hydraulic grade line that is 32 ft below that of St. Joseph. In such an instance ground level pressure would be the only means available to know system pressure since our towers would essentially be empty. Copies of the service reports from ABCS and Alpha-Tran Engineering are attached.

#### *Fairplain Interconnects*

The bids were opened at St. Joseph Charter Township Hall on April 30, 2015. Wightman & Associates recommended acceptance of the low bid submitted by John Boettcher Sewer & Excavating in the amount of \$76,124.00 for items 1,4,5, and 7. These items anticipated metering all locations (Woodward/Empire; Napier/Colfax; Nickerson/Colfax) and disconnecting the Elmside/Colfax interconnection. Memos of understanding are needed between the municipalities participating on the cost sharing of the improvements. The contractor's Notice to Proceed will likely be issued in July.

*Hazardous Response Training-Simulated Chemical Leak*

Plant staff met with Perry Godush from the Berrien County Sheriff Department to review a hazardous materials response practice exercise which will be held at the Water Plant on June 3<sup>rd</sup>. A simulated chlorine leak is planned. Berrien County Haz Mat and the St. Joseph Public Safety Department will participate. A post exercise session will be held as well on that date at the plant.

*MDEQ Laboratory Certification*

The St. Joseph Water Plant laboratory was inspected in April by the MDEQ. Four recommendations were made. The inspector was impressed and rated the laboratory among the top ten percent in the state which is to Shawn's credit.

*Structures Protection/Animal Control*

A licensed trapper was hired in April to remove groundhogs at the facility. The animals pose a threat to the underground finished water reservoirs, building foundations and shore protection.

*Excerpt from Diver Inspection Report-North Intake 48" Pipe Entrance-(South Structure)*



This photo shows sediment buildup inside the pipe entrance on the South Structure of the 48" North Intake. The sediment extends approximately 3 feet in the 4 foot pipe diameter.

## 4.0 FINDINGS – 24” Lake Intake Structure

Structure Coordinates: [REDACTED]

### Exterior of the Structure

The entire exterior of the four (4) Intakes are 100% covered with immature zebra mussels. The grating covers average 25% blockage due to the mussel growth on the grating steel. The grating is all in place and in satisfactory condition. All grating hatches were in satisfactory condition and accessible for the diver.

### PHOTO OF TOP GRATING



The exterior riprap is all in place with no signs of undermining or scouring. Like the actual structure, mussel growth covers the established rock. The top of the structures are two feet above the riprap. All four intakes are clear of the lake bottom.

# Monthly Maintenance Notes

April 2015

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. Mow and Grounds work at Plant, Booster Stations and Water Towers
04/01/15	Mead & White - Install power supply to Lathe in maintenance shop
04/06/15	Installed New Scraper Blade on moving wing for Clarifier # 3
04/07/15	West Michigan - Installed New Hard Drives on Computers for Filters 9-12, Added New North Raw Water Temp to quick view screen, Added pressure reads for Towers on Authority Screen
04/08/15	Filled Clarifier # 3, put into service
04/17/15	Repaired leak on 30" Chlorinator line, replaced 1" x 3/4" bushing that was cracked on ejector side
04/20/15	Yearly service on Toro Z Mower: changed oil, all filters and new plugs
04/20/15	Installed New Battery in UPS unit at Royalton Tower
04/21/15	Installed New Fan Motor on unit heater in Clarifier 2 & 3 room
04/27/15	Serviced City Tower Generator, Changed Oil, Oil Filter and Installed new Battery. (Air Filter Ok)
04/28/15	Underwater Construction - Inspection Dive on South Intake
04/29/15	Underwater Construction - Inspection Dive on North Intake
04/29/15	Serviced Lincoln Tower Generator, Changed Oil, Oil Filter, Air Filter and New Battery.

**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**

**APRIL 2015**

DISTRIBUTION:	
Total Gallons	89,504,069
Average Day	2,983,469
Maximum Day	3,422,810
Minimum Day	2,560,707

TREATMENT:	
Total Low Service	92,059,717
Wash Water Gals.	1,002,197
Wash Water %	1.10%
Plant Use Gals.	1,557,940
Plant Use %	1.70%

FILTRATION:		
Ave. Filter Run	67.9	hours
Ave. Filter Rate	1.94	g/sqft/min
Filter Eff. Index	821.7	
Ave. Loss of Head	0.6	feet
Plant Sewer Usage	722	\$ 1,595.45

LABRATORY REPORT		
Average of	Raw	Tap
Chlorides mg/L	18.5	19.4
Fluoride mg/L	0.13	0.98
Alkalinity mg/L	119	103
Hardness mg/L	147	142
pH	8.1	7.3
Calcium mg/L	38	38
Magnesium mg/L	12	12
Turbidity NTU	0.76	0.03
Temperature °F	43	
Total Coliform		0.0
Chlorine Residual		mg/L Free
Mixing Basin		0.93
Applied		1.69
Tap		1.68
Distribution		1.20

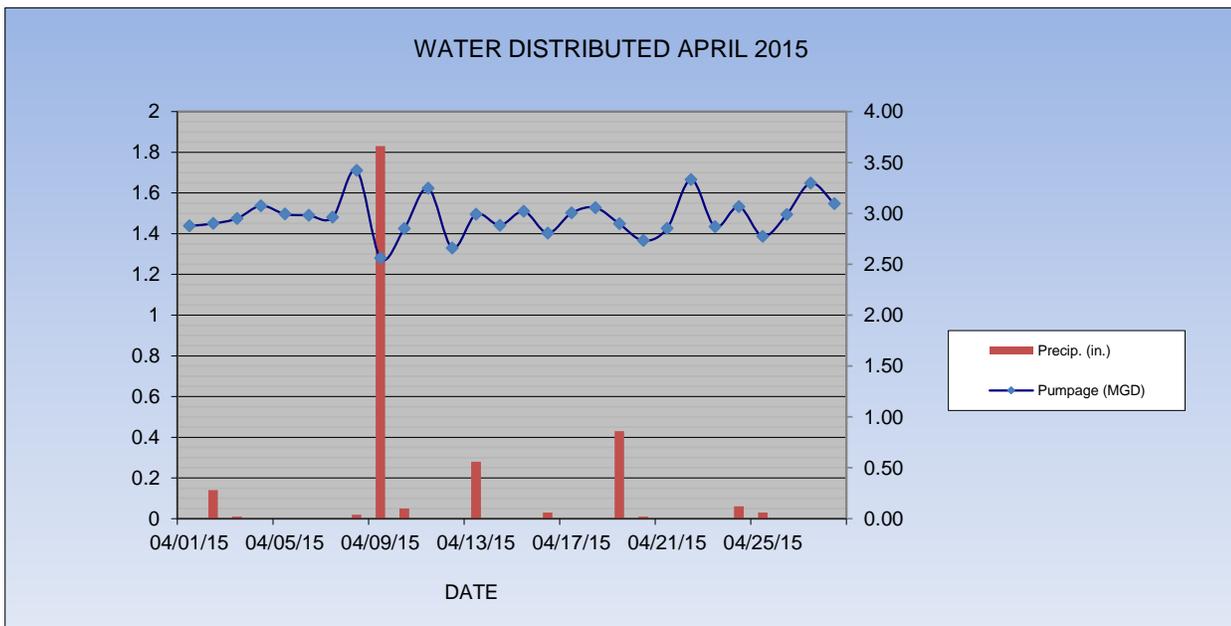
TREATMENT CHEMICAL SUMMARY:					
	Applied mg/L	Total Lbs.	Cost	Inventory lbs.	Days Supply
		CHEMICAL			
Alum (Al <sup>+3</sup> )	1.84	1,409	\$4,098.90	5,324	113
Chlorine (Cl <sub>2</sub> )	2.88	2,212	\$575.12	9,608	130
Fluoride (F <sub>2</sub> )	1.12	857	\$2,571.84	8,269	289

			REMARKS:		
Total Cost all Chemicals		\$7,245.86			
Chemical Cost per Mil. Gallon Treated		\$78.71			
Chemical Cost per Mil. Gallon Delivered		\$80.96			
PLANT UTILITIES SUMMARY					
Electric:					
Total KWH		5,440	***includes measure of melted snow		
Total Power Cost		\$426.06	visit the City of Saint Joseph's Home page at <a href="http://www.sjcity.com">www.sjcity.com</a>		
Power Cost per Million Gallon Treated		\$146.74	e-mail comments to either: <a href="mailto:operator@sjcity.com">operator@sjcity.com</a> or <a href="mailto:galimenti@sjcity.com">galimenti@sjcity.com</a>		
Power Cost per Million Gallon Delivered		\$165.62	<b>WEATHER CONDITIONS AT THE PLANT</b> Air Temp. °F		
Gallons Pumped per KWH		16453	SJWW Weather Computer	Avg.	48.5
			Rain Guage, Inches	2.89	Max. 68.9
			days it rained***	11	Min. 34.7
Natural Gas:			Wind Speed, Avg	7.5	Lake Temp. °F
Metered Cubic Feet		0	Wind Speed, Max	48	Avg. 42.8
Natural Gas Cost		-	Prevailing Wind Dir.	NNE	Max 47.4
	N 5/8	1500	Lake Level (USACE)	579.33	Min 35.4
Emergency Power Diesel Fuel Inv., Gals.	S 3/4	600			

**ST JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED/RAINFALL  
APRIL 2015**

DATE	PUMPAGE (gallons)	PUMPAGE (MGD)	Rainfall (in)	Day to Day Comparison 2015/2014	
				2015	2014
04/01/15	2,875,820	2.88	0	2,875,820	3,525,665
04/02/15	2,899,687	2.90	0.14	2,899,687	3,707,780
04/03/15	2,949,405	2.95	0.01	2,949,405	3,878,622
04/04/15	3,074,921	3.07	0	3,074,921	3,809,051
04/05/15	2,992,712	2.99	0	2,992,712	3,770,608
04/06/15	2,980,078	2.98	0	2,980,078	4,327,571
04/07/15	2,960,675	2.96	0	2,960,675	4,190,391
04/08/15	3,422,810	3.42	0.02	3,422,810	4,062,185
04/09/15	2,560,707	2.56	1.83	2,560,707	4,349,621
04/10/15	2,850,802	2.85	0.05	2,850,802	3,204,579
04/11/15	3,246,628	3.25	0	3,246,628	3,328,475
04/12/15	2,660,346	2.66	0	2,660,346	3,243,180
04/13/15	2,991,609	2.99	0.28	2,991,609	2,978,533
04/14/15	2,882,980	2.88	0	2,882,980	2,672,815
04/15/15	3,020,088	3.02	0	3,020,088	2,808,819
04/16/15	2,806,075	2.81	0.03	2,806,075	3,061,026
04/17/15	3,004,189	3.00	0	3,004,189	3,051,650
04/18/15	3,055,591	3.06	0	3,055,591	3,246,806
04/19/15	2,897,060	2.90	0.43	2,897,060	3,098,371
04/20/15	2,732,432	2.73	0.01	2,732,432	2,803,263
04/21/15	2,852,811	2.85	0	2,852,811	3,045,881
04/22/15	3,331,139	3.33	0	3,331,139	3,080,880
04/23/15	2,868,980	2.87	0	2,868,980	3,138,997
04/24/15	3,066,739	3.07	0.06	3,066,739	3,067,571
04/25/15	2,773,639	2.77	0.03	2,773,639	2,700,835
04/26/15	2,988,077	2.99	0	2,988,077	2,778,085
04/27/15	3,296,507	3.30	0	3,296,507	2,921,993
04/28/15	3,094,438	3.09	0	3,094,438	3,368,214
04/29/15	3,171,991	3.17	0	3,171,991	2,928,775
04/30/15	3,195,132	3.20	0	3,195,132	3,209,637
<b>TOTAL</b>	<b>89,504,069</b>	<b>89.50</b>	<b>2.89</b>	<b>89,504,069</b>	<b>99,359,878</b>

<b>Average Day</b>	<b>2,969,177</b>
<b>Maximum Day</b>	<b>3,422,810</b>
<b>Minimum Day</b>	<b>2,560,707</b>

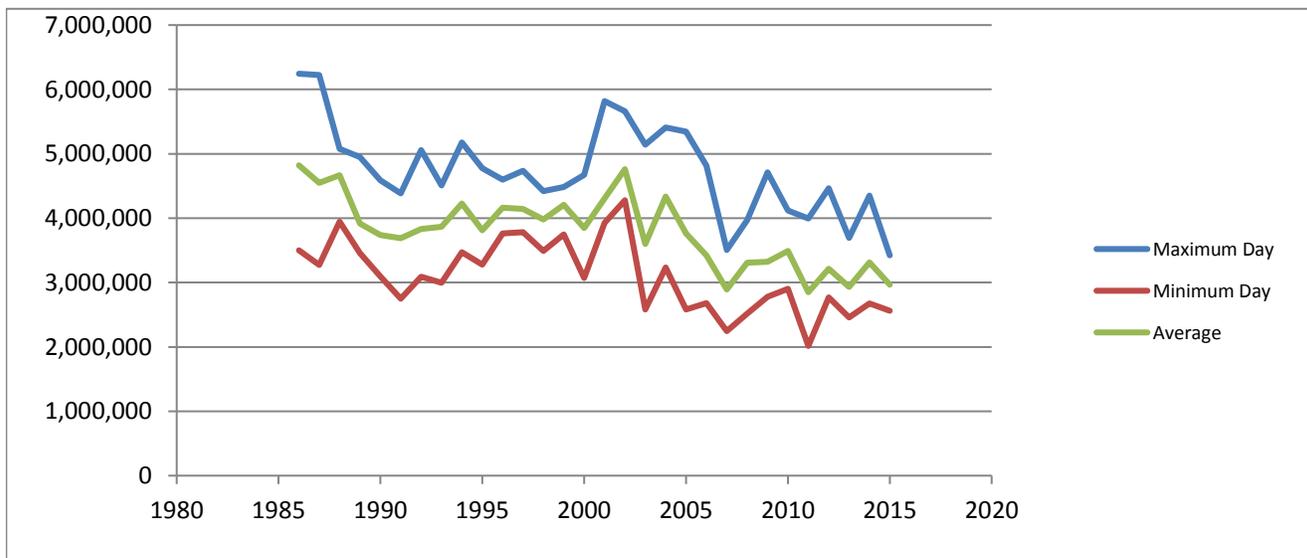


# ST JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED

APRIL 2015

Year	Average	Maximum Day	Minimum Day	Monthly Total
1986	4,820,910	6,244,100	3,499,400	144,627,300
1987	4,546,330	6,224,600	3,270,800	136,389,900
1988	4,668,567	5,078,400	3,946,400	140,057,000
1989	3,916,507	4,946,600	3,457,900	117,495,200
1990	3,736,903	4,586,800	3,093,000	112,107,100
1991	3,688,830	4,384,400	2,751,300	110,664,900
1992	3,830,540	5,058,100	3,092,500	114,916,200
1993	3,867,257	4,510,000	2,995,700	116,017,700
1994	4,226,717	5,175,600	3,468,700	126,801,500
1995	3,813,150	4,775,300	3,278,300	114,394,500
1996	4,160,767	4,600,100	3,760,250	124,823,000
1997	4,143,047	4,737,000	3,782,950	124,291,400
1998	3,982,177	4,422,050	3,492,300	119,465,300
1999	4,208,870	4,483,600	3,749,750	126,266,100
2000	3,846,682	4,673,250	3,070,300	115,400,450
2001	4,308,365	5,820,850	3,927,950	129,250,950
2002	4,760,498	5,661,000	4,278,600	142,814,950
2003	3,598,427	5,143,250	2,580,250	107,952,820
2004	4,336,191	5,410,250	3,232,750	130,085,740
2005	3,761,613	5,342,000	2,579,750	112,848,390
2006	3,421,883	4,813,020	2,680,500	102,656,500
2007	2,894,947	3,508,000	2,244,000	86,848,410
2008	3,306,528	3,968,250	2,514,750	99,195,850
2009	3,321,686	4,712,250	2,777,150	99,650,580
2010	3,490,279	4,120,407	2,901,472	104,708,365
2011	2,849,967	3,996,000	2,015,000	85,499,000
2012	3,212,837	4,463,210	2,767,357	96,385,121
2013	2,934,656	3,695,486	2,458,231	88,039,671
2014	3,311,996	4,349,621	2,672,815	99,359,878
2015	2,969,177	3,422,810	2,560,707	86,504,069

Rank	Year	Monthly Total
1	1986	144,627,300
2	2002	142,814,950
3	1988	140,057,000
4	1987	136,389,900
5	2004	130,085,740
6	2001	129,250,950
7	1994	126,801,500
8	1999	126,266,100
9	1996	124,823,000
10	1997	124,291,400
11	1998	119,465,300
12	1989	117,495,200
13	1993	116,017,700
14	2000	115,400,450
15	1992	114,916,200
16	1995	114,394,500
17	2005	112,848,390
18	1990	112,107,100
19	1991	110,664,900
20	2003	107,952,820
21	2010	104,708,365
22	2006	102,656,500
23	2009	99,650,580
24	2014	99,359,878
25	2008	99,195,850
26	2012	96,385,121
27	2013	88,039,671
28	2007	86,848,410
29	2015	86,504,069
30	2011	85,499,000



CLEVELAND BOOSTER STATION

HILLTOP BOOSTER STATION

DATE	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl <sub>2</sub> PRE mg/l	Cl <sub>2</sub> POST mg/l	Cl <sub>2</sub> MON mg/l	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl <sub>2</sub> PRE mg/l	Cl <sub>2</sub> POST mg/l	Cl <sub>2</sub> MON mg/l	BOOSTER MGD
1-Apr	0.000	0	0.00	0.00	1.78	1.80	2.02	1.569	8	1.13	0.09	1.77	1.75	1.92	1.569
2-Apr	1.570	65	9.22	0.70	1.83	1.86	2.02	0.000	0	0.00	0.00	1.55	1.54	1.72	1.570
3-Apr	0.793	29	4.11	0.62				0.831	0	0.00	0.00				1.624
4-Apr	0.793	29	4.11	0.62				0.831	0	0.00	0.00				1.624
5-Apr	0.793	29	4.11	0.62				0.831	0	0.00	0.00				1.624
6-Apr	0.793	29	4.11	0.62	1.81	1.79	1.95	0.831	0	0.00	0.00	1.55	1.55	1.58	1.624
7-Apr	0.000	0	0.00	0.00	1.77	1.83	1.90	1.717	34	4.82	0.34	2.11	1.91	1.93	1.717
8-Apr	1.793	73	10.35	0.69	1.88	1.71	1.81	0.000	0	0.00	0.00	1.79	1.74	1.84	1.793
9-Apr	0.000	0	0.00	0.00	1.55	1.54	1.64	1.580	32	4.54	0.34	1.74	1.64	1.82	1.580
10-Apr	1.737	73	10.35	0.71	1.91	1.83	1.94	0.000	0	0.00	0.00	1.51	1.61	1.59	1.737
11-Apr	0.611	2	0.28	0.06				1.117	0	0.00	0.00				1.728
12-Apr	0.611	2	0.28	0.06				1.117	0	0.00	0.00				1.728
13-Apr	0.611	2	0.28	0.06	1.41	1.46	1.56	1.117	0	0.00	0.00	1.63	1.64	1.72	1.728
14-Apr	1.697	68	9.64	0.68	1.97	1.91	2.08	0.000	0	0.00	0.00	1.59	1.58	1.65	1.697
15-Apr	0.827	32	4.54	0.66				0.876	0	0.00	0.00				1.703
16-Apr	0.827	32	4.54	0.66	2.10	1.99	2.15	0.876	0	0.00	0.00	1.81	1.76	1.92	1.703
17-Apr	0.000	0	0.00	0.00	1.85	1.95	2.07	1.755	37	5.25	0.36	1.97	1.77	1.97	1.755
18-Apr	0.564	21	2.98	0.63				1.254	15	2.13	0.20				1.818
19-Apr	0.564	21	2.98	0.63				1.254	15	2.13	0.20				1.818
20-Apr	0.564	21	2.98	0.63	1.42	1.47	1.64	1.254	15	2.13	0.20	1.69	1.57	1.77	1.818
21-Apr	1.560	64	9.07	0.70	2.17	1.89	2.07	0.000	0	0.00	0.00	1.40	1.59	1.68	1.560
22-Apr	1.720	72	10.21	0.71	2.03	2.09	2.18	0.000	0	0.00	0.00	1.70	1.73	1.87	1.720
23-Apr	0.000	0	0.00	0.00	1.89	1.91	1.99	1.681	14	1.98	0.14	1.81	1.74	1.76	1.681
24-Apr	1.724	70	9.92	0.69	2.01	1.86	1.99	0.000	0	0.00	0.00	1.73	1.68	1.73	1.724
25-Apr	0.544	20	2.84	0.63				1.219	7	0.99	0.10				1.763
26-Apr	0.544	20	2.84	0.63				1.219	7	0.99	0.10				1.763
27-Apr	0.544	20	2.84	0.63	1.71	1.74	1.89	1.219	7	0.99	0.10	1.81	1.70	1.79	1.763
28-Apr	1.725	0	0.00	0.00	1.13	1.15	1.24	0.000	0	0.00	0.00	1.41	1.41	1.45	1.725
29-Apr	0.000	1	0.14	0.00	1.30	1.34	1.33	1.869	0	0.00	0.00	1.42	1.45	1.55	1.869
30-Apr	1.821	75	10.63	0.70	1.88	1.91	1.94	0.000	0	0.00	0.00	1.61	1.49	1.73	1.821
TOTAL	25.327	870	123.3					26.018	191	27.08					51.345
AVE DAY	0.844		4.1	0.44	1.8	1.8	1.9	0.8673		0.9	0.07	1.68	1.64	1.75	1.711
MAX	1.821		10.6	0.71	2.2	2.1	2.2	1.8692		5.2	0.36	2.11	1.91	1.97	1.869
MIN	0.000		0.0	0.00	1.1	1.2	1.2	0.0000		0.0	0.00	1.4	1.41	1.45	1.560
MONTHLY TOTALS:	Cleveland	Total MG Treated	25.327	SJCT EAST				Hilltop	Total MG Treated	26.018	Cleveland Pump Station:			25.327	
		Untreated	23.602	Average Day			0.162			15.722	Hilltop Pump Station:			15.722	
Total Authority Flow:	56.024		1.725	Month Total			4.856		Untreated	10.269	TOTAL AUTHORITY (Trted.)			41.049	

**DISTRIBUTION REPORT**

*For the Month of April 2015*

Activity		Number/Description	
Water Main Breaks		0	
MISS DIGS		512	
Delinquent Shut Off		13	Lincoln Township
Delinquent Shut Off (Broken Payment Plans)		0	
Hydrants (Repaired/Replaced)		2	Wayne St Near LMC Hit by truck. Replace Leroy & Kirth-Could not shut off. Replace
Valves		0	
Taps (1")		0	5293 Mandeberry Lane (RCT). New Construction 4938 Knollwood Drive (RCT). New Construction 1222 Forest Brook Drive (LCT). New Construction 1489 Fetke Drive (RCT). Well. Desire City water
Cross Connection Control (Hydro Designs)			
Service Work (System Valves)			
Repair of Curb box/Shut-Off Valves		2	914 Lane (City), 385 Parker (SJCTE)
Service Replacement		1	1200 State St. (City) Replace entire service: broken shut off.
Water Quality Complaint(s)		0	
Unidirectional Flushing Program (City)		NA	
Hydrant Flushing to maintain water quality		0	
Hydrant Flushing (Stage 2 Rule)			
Staff Education/Training		0	
Overtime-Total		101	(Including Sanitary and Storm)
Turn Off		8	(Note: This number does not include delinquent Shut off)
Turn On		25	
Finals		102	
<b>Meter Repair/Replacement</b>			
		Audit Meter	1
		Verify Read	1
Meter Repair		Move Mxu Box	
Per detail		New Installation	13
Meter leaking	6	New Installation-Benton Harbor	
Stopped Meter	9	Replaced/various reasons	3
Faulty Register		Rockwell Replacement	
Frozen Meter	4	Mxu Replaced	2
Move Meter Inside		Sprinkler meter removed/line capped	
Hard to read	4	Removals/demo	
Replace/Adding Sprinkler Meter		Curb box location	
Damage to Trt		Broken Remote	
New Plumbing		Noisy Meter	
New siding		Upgrade 5/8" to 3/4"	1
Meter sent out for testing		Meter Change/Benton Harbor	

**MONTHLY CLIMATOLOGICAL SUMMARY**

**April**

**2015**

**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	48.5	43	63.1	7:00p	53	83	1986	38.6	8:00a	33	17	1984	14.2	0	0	4.5	20	12:00m	S
2	52	44	58.6	10:00a	53	79	1963	43.9	7:00p	33	20	1992	13.8	0	0.14	6.8	24	12:00p	S
3	43.2	44	51.5	3:00a	54	80	1956	35.3	12:00m	33	18	1954	21.6	0	0.01	9.4	36	7:00p	N
4	40.5	45	48.4	11:00p	54	75	1956	34.7	8:00a	34	15	1993	23.4	0	0	7.6	19	1:00a	SSW
5	48.4	45	56.7	6:00p	55	82	1988	41.7	3:00a	34	18	1982	15.8	0	0	7.3	25	4:00a	SSW
6	50	45	53.6	1:00a	55	82	1988	43.2	10:00p	34	14	1982	16.6	0	0	4.9	15	9:00a	NNE
7	49.2	46	52.8	6:00p	55	78	1991	43.9	1:00a	35	9	1982	16.6	0	0	5.2	25	6:00p	ENE
8	48	46	50.5	7:00p	56	77	1991	44.3	4:00p	35	15	1972	17.6	0	0.02	4.1	23	3:00a	E
9	57.1	46	68.9	12:00m	56	74	1967	48.9	2:00a	35	15	1985	6.1	0	1.83	6.5	39	5:00p	S
10	44.4	47	53.5	1:00a	57	80	1977	41.1	9:00a	36	15	1997	17.7	0	0.05	15	58	5:00p	WSW
11	46.9	47	54.2	6:00p	57	79	1977	41.5	8:00a	36	18	1952	17.1	0	0	5	18	8:00a	SW
12	57.1	47	64.9	4:00p	57	82	1971	48.6	7:00a	36	21	1982	8.3	0	0	4.6	21	12:00p	SSE
13	55.9	48	62.3	6:00a	58	77	1960	49.6	12:00p	36	18	1950	9.1	0	0.28	6.5	31	11:00a	SSW
14	51.3	48	53.3	12:00p	58	79	1976	49.7	3:00a	37	21	1982	13.5	0	0	2.5	13	1:00a	NNE
15	57.1	48	65.8	6:00p	59	83	1976	49	5:00a	37	16	1957	7.6	0	0	2.9	20	11:00p	E
16	50.1	49	57.6	1:00a	59	86	1976	46.4	12:00p	37	24	1990	13	0	0.03	3.3	16	1:00a	NNE
17	55.9	49	62.8	12:00m	59	84	1976	49.2	7:00a	38	25	1949	9	0	0	2.9	14	10:00a	SW
18	55.7	49	63.2	1:00a	60	86	2002	47.6	7:00p	38	19	1990	9.6	0	0	6.3	19	9:00p	N
19	59.6	50	68.2	2:00p	60	84	1985	55.9	7:00a	38	18	1988	3	0	0.43	4.4	21	12:00p	E
20	46.4	50	57.1	1:00a	60	84	1985	43.2	11:00p	39	22	1951	14.9	0	0.01	17.4	39	10:00a	WSW
21	43.6	50	46.5	5:00p	61	86	1985	42.2	8:00a	39	23	1953	20.6	0	0	19.3	40	10:00a	WSW
22	40.5	51	43.1	1:00a	61	86	1985	37.9	10:00a	39	21	1993	24.5	0	0	18.5	37	5:00a	WNW
23	41.4	51	44.5	8:00p	62	85	1980	39.4	8:00a	39	18	1986	23	0	0	6.3	26	2:00a	NW
24	44.7	51	49.8	5:00p	62	85	1990	39.1	6:00a	40	28	1999	20.6	0	0.06	4.6	17	7:00p	SSE
25	47.2	52	50.4	7:00p	62	86	1990	44.5	10:00p	40	25	1949	17.5	0	0.03	4.1	19	5:00p	ENE
26	43.9	52	46.4	1:00a	63	88	1986	41.6	7:00a	40	24	1997	21	0	0	8.6	24	5:00p	NNE
27	43.3	52	45.4	11:00p	63	87	1994	41.3	6:00a	41	27	1988	21.6	0	0	12.3	31	9:00a	N
28	44.4	53	46.7	5:00p	64	85	1990	42.4	8:00a	41	24	1992	20.4	0	0	4.8	13	8:00a	N
29	45.3	53	48.2	2:00p	64	82	1970	43.1	3:00a	41	27	1979	19.4	0	0	5.4	22	11:00p	N
30	43.1	53	45.6	1:00a	64	87	1962	40.9	11:00a	42	30	1971	21.8	0	0	12.7	29	7:00a	N
31																			
AVE	48.5	48.5											16.0	0.0	0.1	7.5	25.1		NNE
MAX	59.6	53	68.9			88		55.9		42	30		24.5	0	1.83	19.3	58.0		
MIN	40.5	43	43.1					34.7		33	9		3	0	0	2.5	13		
TOTAL															2.89				

Max Rain: 1.83 ON 04/09/15  
 Days of Rain: 9 (>.01 in)4(>.1 in) 1 (>1 in)



File: 031615-JG\_SR\_StJoe\_March Report  
Job# 70-150119-STJO

CITY OF ST. JOSEPH WATER PLANT SERVICE CONTRACT.  
Work report for the period starting 3/16/15.

- ❖ Reviewed last weekend's issues with Filters 9-12 PLC, Touchscreen computers etc.
- ❖ verified 4-20mA control loop for #11 filter: there should have been no problem controlling #11 (10 or 12) filter from the Backup Siemens 353 controller.
- ❖ discussed #9 Effluent valve malfunction with Rotork Tech.Support:
  - valve is tripping out on Overtorque "Closed" when it tries to close.
  - Low limit was reset about 6 weeks ago and appeared to resolve the issue
  - valve is back to tripping out on Overtorque.
  - Tech.Support indicated that whenever one limit is reset, the other needs to be reset as well otherwise the actuator will periodically act up again.
  - had to drain & isolate #9 filter to reset both limits. Now we'll have to see if the resolved the issue.
- ❖ Observed that #11 Flow & Loss-of-Head readings were not at Zero with the filter off:
  - checked and zeroed both transmitters
- ❖ Flushed flow sensing lines for filters 1-4 & 9-12:
  - rezero #4 Loss of Head transmitter
  - noted that PLC Flow loops for #9-12 filters still need to be reconfigured for Bumpless Transfer from Manual back to Auto.
- ❖ North Wetwell Temperature: wired up transmitter and made connections to PLC. Now waiting for 24vdc power supply
- ❖ South Wetwell Temperature: prepared PLC connections, now waiting for transmitter installation.
- ❖ #7 Filter:
  - investigated cycling controls.
  - Flushed flow sensing lines (even though it was done just a couple of weeks ago)
  - work on controller tuning to stabilize the loop.

This concludes our report for the March 2015 service call.



File: 041615-JG\_SR\_StJoe\_April Report  
Job# 70-150154-STJO

CITY OF ST. JOSEPH WATER PLANT SERVICE CONTRACT.

Work report for the period starting 4/16/15.

- ❖ Raw Water Temperature: checked and adjusted the original RTD transducer. Its reading is still within 1°F of the new North Wetwell Temperature.
- ❖ #7 Filter: observed operation of flow loop and Effluent valve. It was cycling when I first checked, but later stabilized on its own with control signal moving around less than ¼ % and flow staying within +/- 15gpm of set point.
- ❖ Spare 353 controller: last month, contamination on the faceplate jack for #7 controller had blocked communication and I had to swap it out with one from used spare controller. After scraping jack tabs clean, functionality is now back to normal.
- ❖ #12 Filter:
  - Flow transmitter:
    - repaired loose local digital display board in flow transmitter
    - checked & adjusted zero.
  - Loss of Head transmitter:
    - checked & adjusted zero
- ❖ Loss-of-Head digital displays in 10-12 console are configured for 3 decimal display:
  - displays in 9-11 console are more appropriately configured for 2 decimals
  - changed 10-12 displays to 2 decimal display.
- ❖ Investigated feasibility of setting up the HACH 1950Plus TOC analyzer to provide Raw Water & Filtered Water TOC inputs to the SCADA system. Tentative answer is *Yes* but we're waiting for clarifications from HACH.

This concludes our report for the April Service Call.



# ALPHA-TRAN ENGINEERING CO.

12575 CLEVELAND ST. - NUNICA, MI 49448-9617 - PH. (616) 837-7341 - FAX (616) 837-8956

## FIELD SERVICE REPORT

Customer: St. Joseph Water Plant  
Address: 1701 Lions Park  
City, State ZIP: St. Joseph, MI 49085  
Contact: Greg Alimenti  
Phone Number: 269-983-1240  
Job Number: 3872

End User: St. Joseph Water Plant  
Address: 1701 Lions Park  
City, State ZIP: St. Joseph, MI 49085  
Contact: Greg Alimenti  
Phone Number: 269-983-1240

### TIME REPORT

DATE	START	STOP	HOURS	MILEAGE	COMMENTS
3/13/15	9:15 PM	11:15 PM	2:00		Home
3/16/15	8:45 AM	11:45 AM	3:00		Office
3/20/15	7:20 AM	8:25 AM	1:05	59	Travel
3/20/15	8:25 AM	11:55 AM	3:30		Onsite
3/20/15	12:15 PM	4:20 PM	4:05		Onsite
3/20/15	4:20 PM	5:25 PM	1:05	58	Travel
TOTAL			14:45	117	

### WORK REQUESTED:

1. Filter OITs F0911 & F1012 often reboot and have operational issues.
2. Filters 9-12 are not able to be controlled.

### WORK PERFORMED:

1. Worked with Mark & Greg on 3/13 to move WonderWare System Platform objects back to the GR/Authority PCs so that rebooting machines would not affect operation.
2. Changed access levels so that filters could be operated from any panel and not just the filter consoles.
3. Verified Filter OITs do not need to be operational for system to control and view Filters 9 – 12. (This was finalized 3/16.)
4. While onsite 3/20, reviewed OITs, blew out accumulated dust, and determined behavior was consistent with failed hard drives.
5. Investigated and advised best wiring practices for the new North Raw Temperature sensor to be added to the Shorewell Control panel.
6. Discussed desire to add tower pressures to each tank within the distribution system. Existing tower levels will be converted to respective PSI readings for trending and operations.
7. Changed turbidity display so that actual readings from instruments can be displayed on the WonderWare as desired in the event of a filter operating manually. This was verified to function and indication on the screens was provided to notify Operators that conditions are unusual.



**Benton Harbor Office:**  
2303 Pipestone Road  
Benton Harbor, MI 49022

*Telephone:*  
(269) 927-0100

*Toll Free:*  
(877) 927-0109

*Fax:*  
(269) 927-1300

*Website:*  
[www.wightman-assoc.com](http://www.wightman-assoc.com)

May 4, 2015

St. Joseph Charter Township  
3000 Washington Avenue  
P.O Box 147  
St. Joseph, MI 49085

Attention: Mr. Roger Seely, Supervisor

**RE: ST. JOSEPH CHARTER TOWNSHIP, SJCT INTERCONNECT METERING PROJECT,  
BID TABULATION AND RECOMMENDATION OF AWARD**

Dear Mr. Seely:

We have reviewed and tabulated the April 30, 2015 bids received for the above referenced project and have found John Boettcher Sewer & Excavating to be the low, responsive bidder in the amount of \$76,124.00 for items 1, 4, 5 and 7. The aforementioned amount and items anticipate metering all locations (Woodward/Empire; Napier/Colfax; Nickerson/Colfax) and disconnecting the Elmside/Colfax interconnection, with a portion of the costs to be offset by the City of St. Joseph, City of Benton Harbor, and/or Benton Charter Township. One copy of the bid tabulation is enclosed for your use, along with a copy of the preliminary engineer's estimate for the project.

We have successfully worked with the low bidder on previous projects and they are capable of performing the specified work. Therefore, we recommend St. Joseph Charter Township tentatively award the contract to John Boettcher Sewer & Excavating in said amount, subject to completion of necessary financial arrangements and execution of an acceptable memo of understanding between the municipalities participating with St. Joseph Charter Township on the cost sharing of the improvements. Please note the awarded Contract Amount is subject to change depending upon the selected alternative and which communities ultimately decide to participate in the project. Various alternatives are shown on the enclosed bid tabulation.

We are targeting participating municipalities to approve the memo of understanding at their May or June meetings, as well as the SMRSS&WA members approving a water service amendment in the same period. The contractor's Notice to Proceed will likely be issued in July.

We will keep the Township apprised of remaining actions to be taken on the project as things progress. If you have any comments or questions concerning this matter, please feel free to contact me at any time.

Very truly yours,

**WIGHTMAN & ASSOCIATES, INC.**

Alan C. Smaka, P.E.  
asmaka@wightman-assoc.com

cc w/encl.: Township Board  
Ms. Sara A. Senica, Township Attorney (via email)  
Mr. Tim Zebell, P.E., City of St. Joseph, City Engineer (via email)

PROJECT: **SJCT Interconnect Metering Project**  
 CLIENT: **St. Joseph Charter Township**  
 BID OPENING: April 30, 2015 @ 11:00 AM

No.	Description	Qty.	Unit	John Boettcher		Pajay, Inc.		Balkema Excavating, Inc.	
				Unit Price	Total	Unit Price	Total	Unit Price	Total
<b>Base Bid</b>									
1	Alternate 1A - Meter Empire & Woodward	1	LS	\$20,416.25	\$20,416.25	\$29,175.00	\$29,175.00	\$48,000.00	\$48,000.00
2	Alternate 1B - Disconnect Empire & Woodward	1	LS	7,759.30	7,759.30	14,575.00	14,575.00	30,000.00	30,000.00
3	Alternate 1C - Meter Vault & Valve Only Empire & Woodward	1	LS	11,066.25	11,066.25	21,675.00	21,675.00	39,000.00	39,000.00
4	Disconnect at Elmside & Colfax	1	LS	6,811.70	6,811.70	13,575.00	13,575.00	31,000.00	31,000.00
5	Alternate 2A - Meter Napier & Colfax	1	LS	23,909.80	23,909.80	32,625.00	32,625.00	56,000.00	56,000.00
6	Alternate 2B - Disconnect Napier & Colfax	1	LS	7,281.10	7,281.10	18,275.00	18,275.00	35,000.00	35,000.00
7	Alternate 3A - Meter Nickerson & Colfax	1	LS	24,986.25	24,986.25	35,175.00	35,175.00	54,000.00	54,000.00
8	Alternate 3B - Additional Water Main Replacement	1	LS	4,088.00	4,088.00	7,575.00	7,575.00	26,000.00	26,000.00
<b>Base Bid Total - Items 1, 4, 5, &amp; 7 (Total Project with Three Meters)</b>						<b>\$76,124.00</b>		<b>\$110,550.00</b>	<b>\$189,000.00</b>
<b>Alternative Bid Total - Items 1, 4, 6, &amp; 7 (Total Project with Napier Disconnect)</b>						<b>\$59,495.30</b>		<b>\$96,200.00</b>	<b>\$168,000.00</b>
<b>Alternative Bid Total - Items 1, 6, &amp; 7 (Total Project with Napier Disconnect/BCT Performing Elmside)</b>						<b>\$52,683.60</b>		<b>\$82,625.00</b>	<b>\$137,000.00</b>
<b>Alternative Bid Total - Items 6 &amp; 7 (Only SJCT Items)</b>						<b>\$32,267.35</b>		<b>\$53,450.00</b>	<b>\$89,000.00</b>

**St. Joseph Charter Township**  
**Interconnect Metering and Disconnects**  
**Preliminary Engineer's Estimate**  
**Wednesday, December 17, 2014**

Item	Unit Price	Unit	Total		St. Joseph Charter Township		City of St. Joseph		City of Benton Harbor		Benton Charter Township	
			Qty	Total	Qty	Total	Qty	Total	Qty	Total	Qty	Total
<b>Empire &amp; Woodward Interconnect Meter</b>												
Mobilization	@ \$2,000.00	ls	1	\$2,000.00					1	\$2,000.00		
Meter Vault, Installed	@ 5,000.00	ea	1	5,000.00					1	5,000.00		
12" Sparling Bi-Directional Water Meter - 5 yr Battery	@ 4,500.00	ea	1	4,500.00					1	4,500.00		
12" Gate Valve	@ 2,800.00	ea	1	2,800.00					1	2,800.00		
12" Pressure Class 350 DIP Water Main	@ 50.80	lft	10	508.00					10	508.00		
Concrete Curb and Gutter Replacement	@ 20.00	lft	10	200.00					10	200.00		
HMA, 13A	@ 145.00	ton	2	290.00					2	290.00		
HMA, 36A	@ 160.00	ton	2.8	448.00					2.8	448.00		
										<u>15,746.00</u>		
<b>Elvern &amp; Colfax Interconnect Disconnect</b>												
Mobilization	@ \$2,000.00	ls	0	\$0.00	0	\$0.00						
Abandon Existing Water Main	@ 3,300.00	ea	0	0.00	0	0.00						
Concrete Curb and Gutter Replacement	@ 20.00	lft	0	0.00	0	0.00						
Restoration	@ 1,500.00	ls	0	0.00	0	0.00						
						<u>0.00</u>						
						<b>\$0.00</b>						
<b>Napier &amp; Colfax Interconnect Meter</b>												
Mobilization	@ \$2,000.00	ls	1	\$2,000.00							1	\$2,000.00
Meter Vault, Installed	@ 5,000.00	ea	1	5,000.00							1	5,000.00
8" Sparling Bi-Directional Water Meter - 5 yr Battery	@ 3,500.00	ea	1	3,500.00							1	3,500.00
8" Gate Valve	@ 900.00	ea	2	1,800.00							2	1,800.00
8" Pressure Class 350 DIP Water Main	@ 40.00	lft	10	400.00							10	400.00
HMA, 4E3	@ 360.00	ton	4	1,440.00							4	1,440.00
HMA, 3E3	@ 275.00	ton	5.5	1,512.50							5.5	1,512.50
HMA, 2E3	@ 230.00	ton	5.5	1,265.00							5.5	1,265.00
Minor Traffic Devices	@ 3,000.00	ea	1	3,000.00							1	3,000.00
												<u>19,917.50</u>
<b>Elmside &amp; Colfax Interconnect Disconnect</b>												
Mobilization	@ \$2,000.00	ls	1	\$2,000.00	1	\$2,000.00						
Abandon Existing Water Main	@ 3,300.00	ea	1	3,300.00	1	3,300.00						
HMA, 13A	@ 145.00	ton	4	580.00	4	580.00						
HMA, 36A	@ 160.00	ton	5.5	880.00	5.5	880.00						
Minor Traffic Devices	@ 3,000.00	ea	1	3,000.00	1	3,000.00						
						<u>9,760.00</u>						
<b>Nickerson &amp; Colfax Interconnect Meter</b>												
Mobilization	@ \$2,000.00	ls	1	\$2,000.00	0.5	\$1,000.00	0.5	\$1,000.00				
Meter Vault, Installed	@ 5,000.00	ea	1	5,000.00	0.5	2,500.00	0.5	2,500.00				
12" Sparling Bi-Directional Water Meter - 5 yr Battery	@ 4,500.00	ea	1	4,500.00	0.5	2,250.00	0.5	2,250.00				
12" Gate Valve	@ 2,800.00	ea	2	5,600.00	1	2,800.00	1	2,800.00				
12" Pressure Class 350 DIP Water Main	@ 50.80	lft	10	508.00	5	254.00	5	254.00				
HMA, 13A	@ 145.00	ton	4	580.00	2	290.00	2	290.00				
HMA, 36A	@ 160.00	ton	5.5	880.00	2.75	440.00	2.75	440.00				
						<u>9,534.00</u>		<u>9,534.00</u>				
<b>Subtotal Estimated Construction Cost</b>				<b>\$64,491.50</b>		<b>\$19,294.00</b>		<b>\$9,534.00</b>		<b>\$15,746.00</b>		<b>\$19,917.50</b>
<b>% of Subtotal</b>						30%		15%		24%		31%
Construction Contingency (8%)				5,159.32		1,543.52		762.72		1,259.68		1,593.40
Survey				3,600.00		1,077.02		532.20		878.96		1,111.82
Design Engineering				7,520.00		2,249.77		1,111.71		1,836.05		2,322.47
Construction Services				8,080.00		2,417.30		1,194.49		1,972.78		2,495.42
Administration (5%)				<u>3,224.58</u>		<u>964.70</u>		<u>476.70</u>		<u>787.30</u>		<u>995.88</u>
<b>Total Estimated Project Cost</b>				<b>\$88,850.82</b>		<b>\$26,581.61</b>		<b>\$13,135.12</b>		<b>\$21,693.48</b>		<b>\$27,440.61</b>