

**MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER FILTRATION PLANT**  
**SUPPLY NAME: CITY OF BENTON HARBOR | WSSN: 0600**

For the month/year of  
December-22

County:  
Berrien

Abul D. Ahmed  
 Certified Operator

F-1  
 Water Plant Classification

  
 Signature

Operator-in-Charge  
 Title

**Treatment Rate and Filter Data**

1. Maximum Treatment Rate	<u>7.140</u>	million gallons per day
2. Approved Rated Plant Capacity	<u>8</u>	million gallons per day
3. Average Filter Run	<u>77.0</u>	hours
4. Average Filtration Rate	<u>0.35</u>	gallons per square ft. per minute
5. Maximum Filtration Rate	<u>3.46</u>	gallons per square ft. per minute
6. Average Wash Water Use	<u>0.02</u>	percent of treated water

**Chemical Data**

7. Chlorine on hand	<u>31570</u>	lbs.	Est. Supply	<u>109</u>	days
8. Alum (Al <sup>3+</sup> ) on hand	<u>45529</u>	lbs.	Est. Supply	<u>192</u>	days
9. Cost of All Chemicals	<u>208.41</u>	dollars per million gallons			
10. Total Power Cost	<u>0.00</u>	dollars per million gallons			

**Remarks**

	North Filter	South Filter
Number of filter confluence samples >0.3 NTU	<u>1</u>	<u>0</u>
Number of filter confluence samples collected	<u>80</u>	<u>80</u>
Percent of filter confluence samples >0.3 NTU	<u>1%</u>	<u>0%</u>
Number of filter confluence samples >1 NTU	<u>0</u>	<u>0</u>

**Did any individual filter exceed:**

1.0 NTU in two consecutive measurements taken 15 minutes apart? <b>If yes, attach specific fi</b> 5.1    5.7	<u>No</u>
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? <b>If yes, attach specific filter(s) information and indicate required follow up status.</b>	<u>No</u>
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? <b>If yes, attach specific filter(s) information and indicate required follow up status.</b>	<u>No</u>
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? <b>If yes, attach specific filter(s) information and indicate required follow up status.</b>	<u>No</u>
Did plant tap disinfectant residual fall below 0.2 ppm during the month? <b>If yes, indicate date(s) and duration on a separate sheet</b>	<u>No</u>
Was minimum C*T credit achieved for the entire month? <b>If no, indicate on a separate sheet the date(s) not achieved</b>	<u>Yes</u>
Was continuous POE chlorine residual monitoring equipment off-line during the month? <b>If yes, indicate date(s) and duration on a separate sheet</b>	<u>No</u>
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? <b>If yes, indicate date(s) and duration on a separate sheet.</b>	<u>No</u>

**Distribution MGD**

**Total** 27.308      **Average** 0.881      **Max** 1.776      **Min** 0.572

**Comments**

Water Quality Sampling Site Station # 3 (Wolf's Marine) was closed for Holidays (week of 12/25/22). Low service and High service pump maintenance was performed by RW LaPine on 12/28/22 & 12/29/22 during plant operation which caused a temporary spike in turbidity. North plate settler was returned to service on 12/21/22 following cleaning and inspection.

DATE	Million Gallons Treated	Alum Added lbs	Alum Applied as Product mg/L <i>NSF Max 400 mg/L</i>	Alum as Al <sup>+3</sup> mg/L	Turbidity Units														
					Raw			Applied	North Filter			South Filter			No. of 2 hr Compliance periods	No. of 4 hr Compliance periods >0.3 NTU	No. of samples >0.3 NTU	Plant Tap	
					Number of Samples	Avg.	Max.	Avg.	Number of Samples	Avg.	Max.	Number of Samples	Avg.	Max.				Avg.	Max.
1	0.781	223	34.2	1.50	3	3.80	6.20	0.35	3	0.10	0.11	3	0.10	0.12	6	0	0	0.10	0.11
2	0.780	217	33.3	1.46	3	4.10	5.90	0.45	3	0.09	0.09	3	0.10	0.11	6	0	0	0.10	0.10
3	0.652	186	34.2	1.50	3	2.90	3.90	0.45	3	0.09	0.11	3	0.10	0.12	6	0	0	0.11	0.12
4	0.810	229	33.9	1.49	3	4.60	5.80	0.41	3	0.10	0.10	3	0.09	0.10	6	0	0	0.11	0.12
5	0.757	208	32.9	1.45	3	5.40	9.30	0.55	3	0.09	0.10	3	0.10	0.12	6	0	0	0.11	0.11
6	0.741	237	38.3	1.68	3	4.20	8.00	0.69	3	0.09	0.10	3	0.12	0.14	6	0	0	0.12	0.13
7	0.566	230	48.7	2.14	3	2.90	3.10	0.68	3	0.11	0.12	3	0.10	0.11	6	0	0	0.10	0.11
8	0.612	192	37.6	1.65	2	4.20	6.00	0.56	2	0.11	0.12	2	0.12	0.12	4	0	0	0.12	0.13
9	0.900	258	34.4	1.51	3	3.50	6.90	0.57	3	0.11	0.12	3	0.10	0.10	6	0	0	0.10	0.11
10	0.713	205	34.5	1.51	2	2.00	2.40	0.59	2	0.10	0.11	2	0.10	0.11	4	0	0	0.10	0.10
11	0.815	222	32.6	1.43	3	1.60	1.90	0.63	3	0.10	0.12	3	0.10	0.10	6	0	0	0.09	0.10
12	0.746	193	31.0	1.36	3	2.40	3.80	0.63	3	0.09	0.09	3	0.11	0.11	6	0	0	0.12	0.12
13	0.905	249	33.0	1.45	3	2.60	4.90	0.70	3	0.14	0.16	3	0.13	0.16	6	0	0	0.12	0.16
14	1.020	147	17.3	0.76	2	3.80	4.70	2.02	2	0.10	0.10	2	0.14	0.15	4	0	0	0.13	0.14
15	0.960	678	84.6	3.72	3	4.50	5.30	0.57	3	0.09	0.10	3	0.11	0.14	6	0	0	0.13	0.14
16	0.813	256	37.7	1.66	2	4.00	4.60	0.89	2	0.10	0.11	2	0.11	0.12	4	0	0	0.12	0.12
17	0.750	38	6.1	0.27	2	5.20	7.90	2.40	2	0.15	0.18	2	0.16	0.19	4	0	0	0.11	0.11
18	0.772	182	28.2	1.24	2	4.00	5.80	1.20	2	0.13	0.14	2	0.14	0.15	4	0	0	0.14	0.15
19	1.038	261	30.1	1.32	3	2.20	3.40	0.78	3	0.15	0.16	3	0.14	0.14	6	0	0	0.13	0.14
20	0.725	176	29.1	1.28	2	4.30	6.80	0.88	2	0.19	0.24	2	0.20	0.21	4	0	0	0.14	0.14
21	0.712	245	41.2	1.81	3	2.00	2.80	1.10	3	0.11	0.12	3	0.12	0.13	6	0	0	0.13	0.14
22	0.795	149	22.5	0.99	2	1.40	1.60	0.50	2	0.10	0.10	2	0.13	0.13	4	0	0	0.11	0.11
23	0.673	154	27.4	1.20	2	4.10	4.30	0.57	2	0.10	0.10	2	0.11	0.12	4	0	0	0.12	0.13
24	0.889	171	23.1	1.01	2	14.30	14.50	0.84	2	0.10	0.10	2	0.11	0.13	4	0	0	0.12	0.12
25	1.928	397	24.7	1.08	4	18.60	20.80	2.55	4	0.12	0.13	4	0.11	0.11	8	0	0	0.11	0.12
26	0.837	206	29.5	1.30	2	14.90	19.90	3.00	2	0.12	0.15	2	0.11	0.11	4	0	0	0.14	0.16
27	1.785	689	46.3	2.03	3	33.10	58.00	2.57	3	0.15	0.18	3	0.14	0.18	6	0	0	0.10	0.16
28	1.119	148	15.9	0.70	3	15.10	19.50	2.75	3	0.23	0.34	3	0.19	0.26	6	0	1	0.18	0.21
29	1.050	203	23.2	1.02	2	5.10	5.70	1.75	2	0.15	0.16	2	0.17	0.17	4	0	0	0.17	0.19
30	1.060	211	23.9	1.05	2	3.80	4.60	1.30	2	0.12	0.12	2	0.13	0.15	4	0	0	0.13	0.13
31	1.049	193	22.1	0.97	2	1.80	1.80	0.83	2	0.10	0.10	2	0.10	0.11	4	0	0	0.16	0.17

<b>AVG</b>	0.895			1.40	3	6.01		1.09		0.12			0.12					0.12	0.13
<b>MAX</b>	1.928			3.72	4	33.10	58.00	3.00		0.23	0.34		0.20	0.26				0.18	0.21
<b>MIN</b>	0.566			0.27	2	1.40		0.35		0.09			0.09					0.09	0.10
<b>TOTAL</b>	27.752	7353			80				80			80				0	1		

Date	pH		Total Hardness as CaCO <sub>3</sub> mg/L		Total Alkalinity as CaCO <sub>3</sub> mg/L		Non-Carb. Hardness as CaCO <sub>3</sub> mg/L		Calcium as Ca <sup>++</sup> mg/L		Magnesium as Mg <sup>++</sup> mg/L		Chloride as Cl <sup>-</sup> mg/L		Conductivity umhos	Sulfate mg/L	CSMR
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap	Tap
1	8.3	8.0	142	144	115	114	27	30	39	42	7	7	21	24	354	37	0.64
2	8.2	8.0	154	148	130	115	24	33	46	46	6	8		24	351	36	0.67
3	8.0	7.5	188	184	117	112	71	72	40	38	17	17		26	345	41	0.62
4	7.9	7.5	178	174	118	115	60	59	40	38	15	14		25	351	43	0.57
5	7.9	7.5	192	184	118	114	74	70	44	42	18	17		26	354	43	0.59
6	7.9	7.5	196	178	140	113	56	65	42	38	14	16		25	367	40	0.61
7	8.2	8.0	148	146	114	116	34	30	41	43	8	7		25	361	33	0.74
8	8.1	8.0	138	142	114	116	24	26	39	44	6	6		25	341	37	0.68
9	8.3	8.1	148	146	117	113	31	33	42	47	8	8		24	345	33	0.73
10	8.3	8.0	146	148	114	112	32	36	38	43	8	9		23	334	37	0.61
11	8.2	8.0	140	140	113	109	27	31	41	45	7	8		25	332	38	0.64
12	7.9	7.5	222	192	135	110	87	82	57	42	21	20		24	334	42	0.56
13	8.0	7.4	202	150	167	110	35	40	55	50	9	10		22	373	37	0.59
14	8.0	7.5	176	192	117	126	59	66	39	45	14	16		26	382	36	0.72
15	7.9	7.6	208	198	116	129	92	69	53	46	22	17		23	391	37	0.61
16	8.1	7.5	194	186	131	123	63	63	42	40	15	15		24	384	49	0.49
17	8.2	8.1	142	154	118	121	24	33	43	53	6	8		26	362	42	0.62
18	8.2	8.0	150	158	120	122	30	36	42	51	7	9		26	352	36	0.72
19	8.2	7.7	144	158	121	109	23	49	42	52	6	12	21	19	365	14	1.36
20	8.1	7.4	158	150	126	115	32	35	47	53	8	9		23	357	11	2.05
21	8.0	7.5	178	170	121	116	57	54	39	38	14	13		21	355	7	3.00
22	8.1	7.6	184	180	119	118	65	62	42	41	16	15		24	355	7	3.36
23	8.0	7.6	180	186	115	118	65	68	41	42	16	17		23	354	4	5.75
24	8.0	7.5	184	180	115	115	69	65	39	38	17	16		24	346	5	4.70
25	8.0	7.6	176	170	118	115	58	55	40	38	14	13		23	341	11	2.09
26	8.0	7.9	156	154	126	115	30	39	55	54	7	9	21	24	343	35	0.69
27	8.1	7.5	156	150	124	112	32	38	43	54	8	9		22	387	37	0.59
28	8.0	7.9	150	142	124	113	26	29	56	53	6	7		24	336	36	0.67
29	8.1	8.0	146	142	130	109	16	33	42	42	4	8		24	326	29	0.81
30	8.1	8.0	156	152	126	123	30	29	42	44	7	7		26	342	33	0.77
31	7.9	7.5	208	190	143	120	65	70	50	46	16	17		26	385	41	0.63

<b>AVG</b>	8.1	7.7	169	164	123	116	46	48	44	45	11	12	21	24	355	31	1.22
<b>MAX</b>	8.3	8.1	222	198	167	129	92	82	57	54	22	20	21	26	391	49	5.75
<b>MIN</b>	7.9	7.4	138	140	113	109	16	26	38	38	4	6	21	19	326	4	0.49



Date	Number of Samples	Colilert P/A	Heterotrophic Plate Count - CFU/mL		Temperature °C	
	Tap		Tap	Raw	Tap	Raw
1	1	A	11	0	8.0	9.0
2	1	A	10	0	8.0	9.0
3	1	A	24	0	7.8	9.5
4	1	A	20	0	7.7	9.0
5	1	A	22	0	7.2	9.0
6	1	A	24	0	7.3	8.5
7	1	A	18	0	7.0	8.0
8	1	A	23	0	8.0	9.0
9	1	A	14	0	7.0	8.0
10	1	A	8	0	7.0	8.5
11	1	A	22	0	7.0	9.0
12	1	A	15	0	6.8	8.0
13	1	A	27	2	7.0	9.0
14	1	A	18	0	6.8	7.5
15	1	A	14	0	6.7	7.5
16	1	A	25	0	6.0	7.5
17	1	A	2	0	6.0	8.0
18	1	A	3	0	6.0	7.0
19	1	A	14	0	7.0	8.0
20	1	A	17	3	7.0	7.0
21	1	A	6	0	5.3	6.5
22	1	A	16	0	5.3	6.5
23	1	A	7	0	5.3	6.5
24	1	A	55	0	3.8	6.5
25	1	A	38	0	2.6	6.0
26	1	A	14	0	2.0	5.0
27	1	A	32	0	6.0	6.0
28	1	A	78	0	3.0	4.0
29	1	A	50	0	3.0	4.0
30	1	A	77	0	4.0	5.1
31	1	A	121	0	3.8	3.5

AVG	1		27	0	6.0	7.3
MAX	1		121	3	8.0	9.5
MIN	1		2	0	2.0	3.5



Date	Free Chlorine Residual mg/L															
	City Hall	Wolf Marine	Bait Shed	Sunny Spot	B&Z											
1																
2																
3																
4																
5																
6																
7	1.66	1.58	1.86	1.55	1.04											
8																
9																
10																
11																
12																
13																
14																
15	1.61	1.55	1.44	1.63	1.02											
16																
17																
18																
19																
20																
21	1.72	1.71	1.37	1.72	0.72											
22																
23																
24																
25																
26																
27																
28	1.74		1.91	1.68	1.08											
29																
30																
31																

DISTRIBUTION SAMPLES BACTERIOLOGICAL SUMMARY	AVG	MAX	MIN
Chlorine Residuals, mg/L	1.50	1.91	0.72
Total Number of routine distribution samples analyzed	19		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	10		
Total number of check samples	0		
Total number of positive check samples			

CITY OF BENTON HARBOR WTP  
CT BENCHMARKING  
12-2022

Date	Peak	Segment 2 - Flocculation (2)				Segment 3 - Sedimentation (2)			
	Low Service Flow	In Use	Residual	pH	Temp.	In Use	Residual	pH	Temp.
	gpm	%	mg/L		C	%	mg/L		C
12/1/2022	2398	100	1.49	8.1	9.5	100	1.49	8.1	9.5
12/2/2022	2448	100	1.91	8.1	8.8	100	1.91	8.1	8.8
12/3/2022	2406	100	1.89	7.8	8.0	100	1.89	7.8	8.0
12/4/2022	2486	100	1.85	7.8	8.3	100	1.85	7.8	8.3
12/5/2022	2456	100	1.76	7.6	8.1	100	1.76	7.6	8.1
12/6/2022	2588	50	1.33	7.7	8.1	50	1.33	7.7	8.1
12/7/2022	1997	50	1.08	8.1	7.5	50	1.08	8.1	7.5
12/8/2022	2338	50	1.74	8.0	7.5	50	1.74	8.0	7.5
12/9/2022	1870	50	1.31	8.1	7.7	50	1.31	8.1	7.7
12/10/2022	1769	50	1.27	8.1	7.7	50	1.27	8.1	7.7
12/11/2022	1798	50	1.11	8.1	7.7	50	1.11	8.1	7.7
12/12/2022	1694	50	1.13	7.6	7.8	50	1.13	7.6	7.8
12/13/2022	4834	50	0.89	7.8	7.7	50	0.89	7.8	7.7
12/14/2022	3486	100	1.58	7.8	7.5	100	1.58	7.8	7.5
12/15/2022	4335	50	1.89	7.7	7.2	50	1.89	7.7	7.2
12/16/2022	3601	50	1.84	7.6	5.6	50	1.84	7.6	5.6
12/17/2022	3171	50	1.95	8.1	6.0	50	1.95	8.1	6.0
12/18/2022	3495	50	1.91	8.0	5.6	50	1.91	8.0	5.6
12/19/2022	3462	50	1.49	7.8	7.0	50	1.49	7.8	7.0
12/20/2022	3562	50	1.61	7.5	7.0	50	1.61	7.5	7.0
12/21/2022	3531	50	1.53	7.8	5.7	50	1.53	7.8	5.7
12/22/2022	4046	100	1.41	7.7	6.4	100	1.41	7.7	6.4
12/23/2022	4958	100	1.40	7.8	6.5	100	1.40	7.8	6.5
12/24/2022	3668	100	1.54	7.7	6.2	100	1.54	7.7	6.2
12/25/2022	3783	100	1.49	7.7	4.4	100	1.49	7.7	4.4
12/26/2022	3572	100	1.72	8.0	2.1	100	1.72	8.0	2.1
12/27/2022	5141	100	1.83	7.6	3.0	100	1.83	7.6	3.0
12/28/2022	3854	100	1.71	7.9	2.0	100	1.71	7.9	2.0
12/29/2022	3528	100	1.77	8.0	2.1	100	1.77	8.0	2.1
12/30/2022	3526	100	1.87	8.0	4.0	100	1.87	8.0	4.0
12/31/2022	3751	100	1.79	7.7	3.9	100	1.79	7.7	3.9



CITY OF BENTON HARBOR WTP  
CT BENCHMARKING  
12-2022

Date	Seg2 CT-M	Seg2 CT-R	Seg2 Ratio	Seg3 CT-M	Seg3 CT-R	Seg3 Ratio	Total Ratio	Total Inact.
	mg/L-min	mg/L-min	M/R	mg/L-min	mg/L-min	M/R	M/R	Log
12/1/2022	146	31	5	50	31	1.6	6.4	3.2
12/2/2022	184	33	6	63	33	1.9	7.4	3.7
12/3/2022	185	32	6	63	32	2.0	7.8	3.9
12/4/2022	175	31	6	60	31	1.9	7.6	3.8
12/5/2022	169	29	6	58	29	2.0	7.8	3.9
12/6/2022	61	29	2	21	29	0.7	2.8	1.4
12/7/2022	64	33	2	22	33	0.7	2.6	1.3
12/8/2022	88	35	3	30	35	0.9	3.4	1.7
12/9/2022	83	34	2	28	34	0.8	3.3	1.6
12/10/2022	85	34	3	29	34	0.9	3.4	1.7
12/11/2022	73	33	2	25	33	0.8	3.0	1.5
12/12/2022	79	28	3	27	28	1.0	3.8	1.9
12/13/2022	22	29	1	7	29	0.3	1.0	0.5
12/14/2022	107	32	3	37	32	1.1	4.5	2.2
12/15/2022	51	32	2	18	32	0.5	2.1	1.1
12/16/2022	60	35	2	21	35	0.6	2.3	1.2
12/17/2022	72	41	2	25	41	0.6	2.4	1.2
12/18/2022	64	40	2	22	40	0.5	2.2	1.1
12/19/2022	51	33	2	17	33	0.5	2.1	1.0
12/20/2022	53	30	2	18	30	0.6	2.4	1.2
12/21/2022	51	36	1	18	36	0.5	1.9	1.0
12/22/2022	82	33	3	28	33	0.9	3.4	1.7
12/23/2022	67	34	2	23	34	0.7	2.7	1.3
12/24/2022	99	34	3	34	34	1.0	3.9	2.0
12/25/2022	93	38	2	32	38	0.8	3.3	1.6
12/26/2022	113	50	2	39	50	0.8	3.0	1.5
12/27/2022	84	42	2	29	42	0.7	2.7	1.4
12/28/2022	105	49	2	36	49	0.7	2.9	1.4
12/29/2022	118	51	2	41	51	0.8	3.1	1.6
12/30/2022	125	45	3	43	45	1.0	3.8	1.9
12/31/2022	112	40	3	39	40	1.0	3.7	1.9

Date	Filter Number											
	1	2	3	4	5	6	7	8	9	10	11	12
1					0.03	0.03	0.02	0.02				
2					0.02	0.03	0.02	0.02				
3					0.03	0.03	0.03	0.02				
4					0.03	0.03	0.02	0.02				
5					0.03	0.03	0.02	0.02				
6					0.03	0.03	0.03	0.02				
7					0.03	0.03	0.03	0.03				
8					0.03	0.03	0.03	0.02				
9					0.03	0.03	0.03	0.03				
10					0.03	0.03	0.02	0.02				
11					0.03	0.03	0.03	0.03				
12					0.03	0.03	0.03	0.03				
13					0.03	0.03	0.03	0.03				
14					0.03	0.03	0.04	0.03			0.13	0.12
15					0.03	0.03	0.03	0.03			0.07	0.07
16					0.02	0.03	0.07	0.06			0.03	0.03
17					0.03	0.04	0.09	0.09			0.06	0.06
18					0.03	0.04	0.06	0.07			0.06	0.05
19					0.02	0.03	0.02	0.02			0.03	0.04
20					0.03	0.04	0.03	0.02			0.03	0.03
21					0.02	0.03	0.03	0.03			0.03	0.04
22					0.02	0.03	0.03	0.04			0.03	0.03
23					0.02	0.03	0.03	0.02			0.03	0.07
24					0.03	0.04	0.02	0.02			0.03	0.03
25					0.09	0.11	0.03	0.03			0.03	0.03
26					0.04	0.04	0.03	0.03			0.05	0.03
27					0.04	0.05	0.04	0.03			0.04	0.08
28					0.16	0.20	0.13	0.16			0.13	0.14
29					0.12	0.13	0.08	0.13			0.13	0.21
30					0.06	5.10	5.70	0.06			0.04	0.03
31					0.06	0.05	0.03	0.06			0.06	0.04
<b>MAX</b>					0.16	5.10	5.7	0.16	0	0	0.13	0.21

**ENTRY POINT TO THE DISTRIBUTION SYSTEM WQP**

Daily Excursions	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
pH	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Ortho-phosphate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# Days with Excursions (9 days allowed per 6 months)	0	1	0	0	0	0	1	0	0	0	0	0	0	0

**EPTDS WQP Range**

pH minimum of 7.2 s.u.  
Ortho-phosphate minimum of 3.0 mg/L as PO<sub>4</sub>

**DISTRIBUTION WQP 10 Samples Quarterly**

Daily excursions	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
pH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ortho-phosphate	1	0	0	0	0	0	1	0	0	0	0	0	0	0
# Days with Excursions (9 days allowed per 6 months)	1	0	0	0	0	0	1	0	0	0	0	0	0	0

**Distribution WQP Range**

pH minimum of 7.2 s.u.  
Ortho-phosphate minimum of 3.0 mg/L as PO<sub>4</sub>