



# 2019 Annual Facilities Inspection Report

Hackettstown Municipal Utilities Authority

December 20, 2019

111 Wood Avenue South  
Iselin NJ 08830-4112  
United States of America

T +1 (800) 832 3272

mottmac.com

PO Box 450  
Hackettstown, NJ 07840

# **2019 Annual Facilities Inspection Report**

Hackettstown Municipal Utilities Authority

December 20, 2019

# Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
0	11/14/19	ES	KOB	DLK	Draft to HMUA
1	12/18/19	KOB	DLK	DLK	Addressing HMUA Review Comments
2	12/20/19	KOB	DLK	DLK	Issued to HMUA

**Information class: Standard**

---

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

---

# Contents

Executive Summary	1
<b>1 Water Supply</b>	<b>2</b>
1.1 Water Allocation Permit	2
1.2 Water Distribution System	2
1.3 Water Filtration Plant	4
1.4 Well Stations	4
1.5 Water Storage Tanks	6
1.5.1 2.4 MG Water Storage Tank	6
1.5.2 1.0 MG Water Storage Tank	6
1.5.3 Mount Olive Twp. and Independence Twp. Water Storage Tanks and Booster Stations	7
1.6 Development of Additional Water Supply	8
1.7 Water Quality	9
<b>2 Sewerage System</b>	<b>12</b>
2.1 Water Pollution Control Plant	12
2.1.1 Inlet Facilities & Raw Sewage Pumping	14
2.1.2 Primary & Secondary Treatment	15
2.1.3 Advanced Treatment	15
2.1.4 Post Aeration & Disinfection	17
2.1.5 Auxiliary Systems	17
2.1.6 Solids Handling Systems	18
2.1.7 Plant Laboratory	19
2.1.8 Buildings	19
2.1.9 Site	19
2.2 Sewage Collection System	19
2.2.1 Mt. Olive (formerly Oak Hill) Sewage Pumping Station	20
2.2.2 House of Good Shepard Sewage Pumping Station	20
2.2.3 Diamond Hill (Meadow Lane) Sewage Pumping Station	20
2.2.4 Water Filtration Plant (WFP) Sewage Pumping Station	21
2.3 Wastewater Service Area and Wastewater System Planning	21
<b>3 HMUA HEADQUARTERS COMPLEX &amp; OVERALL FACILITIES</b>	<b>23</b>
3.1 Facility Site Improvements	23
3.2 Energy Audit of HMUA Facilities	23
3.3 Air Permitting	23
3.4 Security Improvements	24
3.5 Electrical Testing Reports	24
<b>4 SUMMARY</b>	<b>25</b>

# Executive Summary

The HMUA was formed in 1965 and took over the operation of the Town of Hackettstown Water Supply System and a sewage treatment plant that served a small portion of the Town. Today, the HMUA provides service to portions of five municipalities in the Hackettstown Area. The five municipalities include the Town of Hackettstown, Independence Township and Mansfield Township in Warren County and Mt. Olive Township and Washington Township in Morris County.

Mott MacDonald conducted the Annual Inspection of the operation and maintenance of the Hackettstown Municipal Utilities Authority's (HMUA) water facilities and sanitary sewer facilities on October 24, 2019 covering the following:

## **Wastewater Facilities:**

- One (1) water pollution control plant; and
- Four (4) sewage pump stations in the collection and transmission system

## **Water Facilities:**

- Six (6) water supply wells;
- Two (2) booster pump stations; and
- Four (4) water storage tanks.

The utilities are well maintained and capably operated and remain in excellent overall operating condition.

# 1 Water Supply

The Hackettstown Municipal Utilities Authority completed an extensive potable water supply system improvement program between 1975 and 1981. This program included water transmission, water treatment, water supply and water storage projects and was necessary to meet State and Federal standards promulgated at that time and to keep pace with the growth in the Hackettstown area. Following completion of the aforementioned water system improvements, the HMUA undertook a series of individual projects designed to further increase the water supply capacity of the system and to replace the oldest, and in some cases undersized, water mains comprising the distribution system.

The HMUA has been and continues to be proactive in its maintenance of their water system as demonstrated by the HMUA undertaking eleven (11) water distribution and transmission main replacement Contracts since 1993, including the installation of more than 91,650 linear feet (over 17.5 miles) of new replacement water mains. This includes Contract 47W completed in 2018 with installation of 7,650 linear feet of replacement water mains. The investment in new infrastructure allows the HMUA to maintain a high quality of service to its patrons by reducing main breaks, service interruptions and O&M costs.

The water supply system is being competently operated under the direction of five (5) licensed operators. The average daily water production for the period between September 1, 2018 and August 31, 2019 was approximately 2.14 MGD and the maximum monthly rate was 2.45 MGD (July 2019). These figures compare to 2.21 MGD and 2.50 MGD (July 2018), respectively, for the period between September 1, 2017 and August 31, 2018.

The HMUA Water Filtration Plant had derived its water supply from the Mine Hill Upper and Lower Reservoirs and the Burd Reservoir. These properties have all been sold as the Authority now solely utilizes groundwater.

## 1.1 Water Allocation Permit

The HMUA received a modified NJDEP Water Allocation Permit (NJDEP Program Interest ID No. 5145 and Water Allocation Permit No. WAP110002) on June 20, 2012 with an effective date of July 1, 2012. The permit is a 10-year permit with an expiration date of June 30, 2022. The modified Water Allocation Permit combined the HMUA's two (2) Water Allocation Permits into one (1) combined Permit, eliminated surface water reservoirs and the water filtration plant, added Well No. 9 (Heath), increased pumping capacity of Well No. 8 (Claremont Well No. 1R) to 800 gpm and eliminated Well No. 2.

## 1.2 Water Distribution System

Since 2000, the HMUA has completed five (5) major water transmission main projects to improve the fire flow capacity in the distribution system. During 2010 and 2011, the HMUA undertook the construction of a water main replacement project (Contract No. 38W) to replace undersized water mains located on Fifth Avenue, Reese Avenue, Liberty Street and Cook Street in the Town of Hackettstown. The Claremont Water Transmission Main Project (Contract No. 40W) was completed in April 2013. The project followed the recommendations of a 2011 hydraulic model of the water system for the Diamond Hill area which evaluated the effect on the

water distribution system with an increase in capacity of the Diamond Hill Well No. 8 from 300 gpm to 1,050 gpm.

During 2014, HMUA undertook the construction of a water main replacement project (Contract No. 43W) to replace unlined cast iron water main with cement lined ductile iron pipe within the Arthur Terrace and College View areas of the Town of Hackettstown. Contract No. 43W included the construction of 17,000 LF of water main replacement which included a change order to construct approximately 6,000 LF of water main to replace the remainder of water main in the College View area due to concerns with water main breaks. During 2014, there were several sink holes in the College View area of Hackettstown on College View Drive and Ferris Place related to water main breaks. The HMUA repaired the water main breaks, and authorized Mott MacDonald to investigate the extent of sinkholes, provide recommendations, and remediated the affected areas.

During 2016, under Contract No. 45W HMUA replaced an additional 5,177 LF of water main within areas of Hackettstown and Mount Olive. Contract 47W, replaced 7,650 LF of water main within the Town of Hackettstown in 2018.

The water main projects also included the replacement of almost all of the old non-pumper fire hydrants. In 2007 the ISO upgraded the classification of the Town of Hackettstown from a Class 5 to a Class 4 Public Fire Protection Classification, which is in the top 10% among all communities in the entire country. HMUA has been painting hydrants on an ongoing basis, with roughly 65% completed to date.

In 2013, HMUA contracted with Mott MacDonald to prepare a hydraulic model of the entire water system. As part of this project the model was used to simulate the hydraulics associated with the replacement of the existing one million gallon (MG) ground storage level tank. The tank has a high water elevation of approximately 830 feet which is approximately 26 feet above the prevailing hydraulic grade line (HGL) of the Main Zone of the system. The HGL of the Main Zone is currently established by a 2.4 MG Tank in the southern portion of the distribution system, in Washington Township. Because of the tank's high elevation, it was unable to "float" on the existing system, and was instead filled via a small booster pumping station. Water within the tank had been stored for fire protection use by the Mars Company with a dedicated 10-inch diameter water main from the tank to the Mars Company (which is approximately 4,000 feet away). One of the main observations from the modeling was that a new tank located in the northern part of the system would have a significant impact on overall hydraulics, pressures, and fire protection in this area. The modeling effort also established a general prioritized ranking for potential tank sites. The 1 MG Tank which had been out of service since September 2015, was inspected by DN Tanks in August 2016 and underwent repairs which allowed it to be placed back into service to facilitate painting of the 2.4 MG Tank in 2017.

Also, in September 2013, Mott MacDonald modeled the hydraulics associated with the removal of an existing 12-inch transmission main located within the Harvestone easement.

During 2011, the HMUA undertook a project to install water pressure transmitters at up to seven (7) locations throughout the distribution system to continuously monitor the pressures at these locations within the water system, including any pressure spikes that may be present. Mott MacDonald completed preparation of plans and specifications for the project. The HMUA completed the installation of transmitters at Well 2, the Mount Olive Booster Station, and the Independence Booster Station .

In 2013, HMUA added confined space equipment (hoist mounts) at the Ketcham Road PRV vault, Route 57 vault, Vienna Hills PRV vault, Well 5 & 7 Chlorine vault, Well 7 vault, Mount Olive Tank vault, Independence Tank vault, and Vienna Hill Road PRV vault.

In 2016, Mott MacDonald completed an evaluation of 2,170 LF of 8" and 470 LF of 6" water main located on State Highway 46 between Willow Grove Avenue and Valentine Street. This evaluation provided options for the HMUA regarding this approximately 90-year old asset based on upcoming road improvements in the area. As the main appeared to be in good condition, a full replacement was not required at the time. HMUA is making repairs on an as-needed basis.

### 1.3 Water Filtration Plant

The HMUA surface water treatment plant was constructed at the Seber tract in the Town of Hackettstown in 1981 to treat surface waters derived both from the Mine Hill Reservoir and Burd Reservoir. With a design capacity of 1.0 MGD, the Water Filtration Plant (WFP) includes a raw water chamber, two solids contact clarifiers, two mixed media gravity filters, a chlorine contact chamber, two high lift pumps and necessary appurtenances, including a standby emergency generator.

The WFP has been permanently out of service since August 2008. HMUA continues to maintain the site and building on an as needed basis.

At the time of the 2019 inspection, the site continues to be used for stockpiling material from Contract 47W. The HMUA has begun the spoil disposal process as of October 2019 and the remainder will be completed under Contract 49W. Some fence repair will be included in the spoils disposal contract.

### 1.4 Well Stations

As of July 1, 2012, the HMUA potable water distribution system derives all supply from groundwater sources (wells). The HMUA water system now operates under a single NJDEP Water Allocation Permit. The HMUA Water Allocation Permit (NJDEP Program Interest ID No. 5145 and Water Allocation Permit No. WAP110002) was issued for a ten-year term, effective on July 1, 2012 with an expiration date of June 30, 2022.

Well No. 9 (Heath) was placed into operation in 2015, making the total permitted pumping capacity from the six (6) operational wells 5,100 GPM as shown in the table below.

#### HMUA Potable Water Wells

Well Designation	Current Production Rate	Permitted Pumping Rate *
Well No. 4 – Seber	0 GPM	300 GPM **
Well No. 5 – Seber	950 GPM	1,000 GPM **
Well No. 6 – Heath	670 GPM	700 GPM **
Well No. 7 – Seber	1,500 GPM	1,500 GPM **
Well No. 8 – Claremont 1R	540 GPM	800 GPM
Well No. 9 – Heath	550 GPM	800 GPM
<b>Totals</b>	<b>4,210 GPM</b>	<b>5,100 GPM</b>

\* Maximum Diversion Rate for all groundwater sources is 4,000 gpm.

\*\* Maximum Diversion Rate for Wells 4, 5, 6 & 7 is 3,200 gpm. Maximum Diversion for Well 4 is 200 GPM.

The maximum yearly water diversion allowed in the HMUA's current Water Allocation Permit is 1,165 MG (3.19 MGD) and the maximum monthly diversion is 123.7 MG (4.12 MGD). The actual water diversion for the 12-month period ending August 31, 2019 was 782.253 MG (2.14

MGD) and the maximum monthly diversion was 73.509 MG (2.45 MGD) (July 2019), both well within permit limits.

The active HMUA wells are in good operating condition. The static water levels at the well sites remain relatively constant from year to year indicating that these sources are not being overpumped. Well No. 9 became operational in 2015 and has been in continuous use since that time. Since being placed into service, HMUA added a radar sensor for monitoring the chemical tank level at Well No. 9 and installed a gate as required by Washington Township.

The HMUA received bids for Contract 35W in January 2008 to rehabilitate the well pumps for Well Nos. 5 and 6 to restore the pumping capacity of the wells to 1,000 GPM and 700 GPM, respectively. Corrosion on the existing doors and some concrete damage has been previously noted at the Well No. 6 facility. Minor masonry damage at Well No. 5 as noted during previous inspections was repaired in 2016. Well No. 4 has been out of service since November 2012 and the piping has been cut to prevent suspected leakage back into the well. Options are being reviewed to allow for the well to be used periodically, to avoid the risk of the well being removed from the Water Allocation Permit. Roof repairs were completed at the Well No. 4 building which houses the controls for Wells No. 5 & 7. The detention main butterfly valve for Well No. 7 remains out of service (in the open position). Well No. 6 is currently used infrequently, but options are being reviewed to allow back-up corrosion control chemical addition should Well No. 9 be out of service.

The HMUA acquired three (3) wells as part of the takeover of the Diamond Hill water system. However, the HMUA only operates the Claremont Avenue Diamond Hill Well No. 8 (also known as Claremont Well No. 1R). The Elmwood Drive Well (Diamond Hill Area) was abandoned and sealed by the HMUA. The Brookside Avenue Well (Diamond Hill Area) has been abandoned by the HMUA and will be sealed by the HMUA once it is no longer needed as a monitoring well. M-scope readings are taken monthly for HMUA tracking purposes.

In order to increase the capacity of Well No. 8 (Claremont Avenue – Diamond Hill), in 2013 a new well was drilled on the existing Well No. 8 site and the existing well was abandoned. The NJDEP approved and issued a Construction Permit in 2012, and authorized use of the 800 gpm permanent pump in 2013 by issuance of the NJDEP Permit to Operate. The permanent submersible well pump and VFD has a maximum pumping capacity of 800 gpm. Well No. 8 is permitted by the NJDEP for 800 gpm and is capable of operating at 800 gpm. However, when this well has been operated at 800 gpm this has resulted in impacts to one or more nearby wells. At the time of inspection, Well 8 was operating at 540 GPM. The HMUA has connected the one known property that was adversely affected by Well No. 8 to the HMUA water system. HMUA has continued to monitor impacts to nearby wells and has been able to increase the Well No. 8 pumping rates and operation times accordingly. Under Contract No. 42WS, an emergency generator was installed at Well No. 8. In 2017, HMUA staff added an enclosure above the well pump as a security improvement. A 4-inch diameter surge relief valve leak to the site drain was observed during the 2019 inspection.

Well No. 8 was temporarily taken out of service due to failed water quality tests (positive e-coli in raw water sample) in June 2012. Due to the failed water quality tests, the HMUA and Mott MacDonald prepared a Ground Water Rules/4-Log Virus Inactivation Certification Form, calculations and plans which were submitted to the NJDEP, and in 2012, a 4-log analyzer was installed at Well No. 8. The 2012 forms were resubmitted in December 2017 in response to an NJDEP letter dated October 25, 2017. NJDEP approval was received on March 12, 2018. Since this approval, one notification has been issued to NJDEP when the chlorine residual dropped below the required value of 0.88 ppm. HMUA is considering request to discontinue the certification.

## 1.5 Water Storage Tanks

The HMUA's Water System includes four (4) Water Storage Tanks as follows:

- 2.4 MG Water Storage Tank (Washington Township)
- 1.0 MG Water Storage Tank (Independence Township)
- 0.5 MG Mount Olive Water Storage Tank (Mount Olive Township)
- 0.42 MG Independence Water Storage Tank (Asbury Road, Independence Township)

### 1.5.1 2.4 MG Water Storage Tank

In 1979, the HMUA completed construction of a 2.4 million gallon (MG) water storage tank which maintains pressure in the distribution system and provides storage capacity for peak demand periods. The 2.4 MG Water Storage Tank is located in the southeasterly section of the HMUA service area in Washington Township off Schooleys Mountain Road. The HMUA replaced the cathodic protection system and completed the repainting of the tank exterior in 1998 under Contract No. 22W.

Areas of corrosion were noted on the tank exterior during the November 2014 inspection as well as during the 2012 and 2013 facilities inspections. During 2017, the tank was painted under Contract 46W. The tank was taken out of service in April 2017 and returned to service on July 20, 2017. The rectifier for the cathodic protection system, which was not replaced with the remainder of the system in 1998, was removed as part of Contract 46W. A 9' high security fence was also constructed around the tank during 2017. In 2018, an anniversary inspection was conducted by MBA prior to the end of the Contract 46W maintenance period. A few minor punch list items were noted by the inspection and subsequently addressed by the contractor. In 2019, some growth on the exterior of the tank was noted; however, the tank coating still appears to be in good condition.

### 1.5.2 1.0 MG Water Storage Tank

The HMUA also owns and operates a 1.0 million gallon water storage tank located on the western side of its service area in Independence Township. Prior to being taken out of service in September 2015, the tank served primarily as a storage reservoir for fire protection water for the M&M Mars factory located in the northwestern section of the Town of Hackettstown. Fire service for M&M Mars is now provided by the main system.

In September 2015, it was observed that the booster pump serving the tank was running continuously, indicating leakage at the tank. The tank was taken out of service, but the location of the leak was not identified. A condition assessment was carried out by DN Tanks in August 2016 and HMUA undertook repairs to allow the tank to be placed back into service while the 2.4 MG Tank was repainted. When the tank was first placed back into service, water main breaks were reported. Review of these breaks found that the tank level was higher than required resulting in increased system pressure. Replacement of the tank level sensor and booster pump pressure gauges addressed the issue. The tank is currently being maintained with 1.5' of water from the system.

The concrete tank sidewalls of the 1.0 MG Tank have shown minor signs of cracking during past site inspections. An inspection of the tank in July 1994 noted a small amount of weepage at the base of the tank sidewall near the valve vault. The HMUA caulked this crack and although the caulk has held up well for 10 years, the crack appeared to have opened slightly since our 2004 facilities inspection. Weepage along the tank wall was noted in varying degrees in the 2005-2014 inspections. The 2016 condition assessment notes a build-up of hard dry

efflorescence about 6 feet down from the roof slab. HMUA should monitor for vegetation on top of the tank.

As noted previously, the HMUA completed hydraulic modeling as part of continued planning for a new storage tank in the vicinity of the existing 1.0 million gallon tank. In 2017, Mott MacDonald prepared a conceptual site plan for tank replacement on a site northeast of the existing tank with a lower elevation. Discussions are ongoing with NJDEP, the Highlands Council and Warren County regarding siting. In 2018, a site survey was conducted to identify trees and to establish the corners of the new tank site. Survey updates in 2019 noted water main easements and access rights, and the property acquisition process with Warren County is ongoing.

### 1.5.3 Mount Olive Twp. and Independence Twp. Water Storage Tanks and Booster Stations

The two (2) newest water storage tanks were constructed in the HMUA service area in the 1998-1999 time frame to allow the water system to be extended to areas in Independence Township (0.5 MG) and Mt. Olive Township (0.42 MG) which are situated at elevations above the high water level of the 2.4 and 1.0 million gallon tanks. Both tanks are bolted, fused glass coated steel type construction. The HMUA approved this type of tank construction over conventional welded steel tanks in order to minimize the need for future painting.

The Mount Olive Township Water Storage Tank appeared to be in excellent physical condition during our October 2019 site inspection. Some minor growth near the tank base was noted. Following 2016 repairs to the altitude valve at the Booster station, HMUA is planning to replace the valve in 2020. Both booster station pumps have been retrofitted with stainless steel impellers following an investigation by Mott MacDonald which found that dezincification of the original Silicon Bronze impellers had occurred. In addition, HMUA has upsized 2" discharge piping to 4" on the pumps. During the October 2019 growth was noted on the Booster station roof and the floor coating has failed.

The Independence Township Water Storage Tank has been repaired for leaks in 2008, 2012, 2015, 2016 and again in August 2018. No weepage was observed during our October 2019 field inspection and the exterior of the tank appeared to be in satisfactory condition. At a four way joint connection of the plates, there was a small growth of moss, which should be monitored. No issues were noted at the booster station during the 2019 inspection.



Independence Water Storage Tank  
Growth observed at Joint



2.4 MG Tank  
Growth observed during 2019 Inspection

### 1.6 Development of Additional Water Supply

The New Jersey Department of Environmental Protection firm capacity regulations require water utilities to be able to meet their peak water demands with their largest water source out of service. The completion of Well No. 7 in 2007 on the Seber site provides additional firm capacity in the HMUA system and provides additional water quantity on a monthly and annual basis. Well No. 7 has been operating satisfactorily with a peak pumping rate of 1,500 GPM since the end of May 2007.

Aside from the amount of water which the HMUA is allowed to pump from its wells, the Bureau of Water Supply requires that adequate water source capacity be available to meet the peak system demands (as defined by the NJDEP) with the largest water source out of service. Currently, the HMUA water system meets the Bureau of Water Supply’s definition of adequate supply capacity with a firm capacity of 3,300 gpm (4.752 MGD) as indicated in the table below. As of 2012, the WFP and Well No. 2 have been removed from the Water Allocation Permit.

Source	Source Capacity	
	(MGD)	(GPM)
Well No. 4	(1)	(1)
Well No. 5	1.440	1,000
Well No. 6	1.008	700
Well No. 7	2.16	1,500
<b>Well No. 4 – Well No. 7 Total</b>	<b>4.608 MGD</b>	<b>3,200 GPM</b>
DH Well No. 8 (Claremont 1R)	1.152	800
Well No. 9	1.152	800
<b>Total Source Capacity</b>	<b>6.912 MGD</b>	<b>4,800 GPM</b>
Less Largest Source	2.16	1,500
<b>Firm Capacity</b>	<b>4.752</b>	<b>3,300</b>

(1) The NJDEP firm capacity calculation has removed Well No. 4, since it has been inactive since 2012.

The issue of firm capacity relates to a water system's source water reliability, and specifically to its ability to continue to meet peak system demands without the use of its largest water supply source. With Well No. 9 commencing operation in 2015, HMUA has added production capacity and its firm capacity.

In 2013, the HMUA has completed the process to increase the capacity of the Claremont (Diamond Hill) Well No. 8 located in Mansfield Township to 800 gpm (refer to previous comments on current operating level) and the construction of a new Heath Well No. 9 located in Washington Township on Schooleys Mountain Road, with a capacity of 800 gpm was completed in 2015.

The HMUA pursues an ongoing leak detection effort within its potable water distribution system. The leak detection program is a continuous long range maintenance program to ensure that unaccounted for water within the HMUA distribution system is minimized as required by the NJDEP. The HMUA purchased advanced leak detection equipment, ZCorr Correlating Loggers, in 2003 to improve its in-house leak detection efforts. The HMUA is currently exploring options to replace the ZCorr correlating loggers. The HMUA has also continued metering the injection water at the two booster stations. Unaccounted for water was reported to be approximately 22.9% during the 12-month period ending August 31, 2019, which is above the NJDEP goal of 15%. The HMUA is actively taking measures to reduce the amount of unaccounted water. The table below summarizes the reported approximate unaccounted water percentages since 2005.

Calendar Year	Unaccounted for Water (%)
2005	19.5
2006	14.1
2007	15.1
2008	12.7
2009	12.2
2010	13.5
2011	16.8
2012	21.7
2013	22.2
2014	15.6
2015	19.8
2016	18.1
2017	15.4
2018	23
2019	22.9*

\* For 12 months ending August 31, 2019

## 1.7 Water Quality

The HMUA has complied with the Federal and State regulations requiring analysis of water samples for organic and volatile chemicals, inorganic chemicals, trihalomethanes, disinfection byproducts and secondary drinking water constituents. The routine water analysis results indicate that the finished water is in compliance with the Safe Drinking Water Standards for these parameters.

The United States Environmental Protection Agency (USEPA) is enforcing more stringent standards for lead and copper concentrations in potable water with adoption of the Lead and

**Copper Rule.** Lead and copper in potable water typically originates as a result of corrosion occurring in plumbing systems within private homes rather than existing in the raw water the utility treats and pumps into the distribution system. The Lead and Copper Rule requires water utilities to optimize the treatment of potable water such that any corrosive tendency of the water is minimized.

Commencing in 2020, HMUA will sample for PFNA, 1,2,3-trichloropropane, ethylene dibromide, and 1,2-dibromo-3-chloropropane (DBCP) on a quarterly basis at all wells.

The HMUA applies a polyphosphate/orthophosphate blended corrosion inhibitor at its Well No. 9 to minimize corrosion within the plumbing systems of its customers. The bi-annual sampling of patron services conducted during 2002 achieved compliance with the EPA Lead Maximum Contaminant Level Goal (MCLG) of 0.015 M/L. It therefore appeared that optimal corrosion control had been achieved through the application of the polyphosphate/orthophosphate blend. However, the results of the first of the two annual sampling events from 2004 slightly exceeded the threshold for compliance with the Lead and Copper Rule. The HMUA met with the NJDEP to review the range of possible alternatives to ensure consistent compliance with the Lead and Copper Rule. The HMUA has replaced customer water meters with units which have almost no lead content, increased its effort in instructing customers on the proper water sampling techniques, and increased its frequency of corrosion inhibitor concentration monitoring within its water distribution system. The results from subsequent customer water sampling conducted in late 2004 and during the summers of 2005 through 2009, inclusive, have conformed to the Lead and Copper Rule. The results of the sampling in the summer of 2010 slightly exceeded the EPA's limits for the Lead and Copper Rule, but 2011, 2012 and 2013 samplings were in conformance. No sampling was required in 2014 and 2015, but standard sampling resumed in 2016. Sampling conducted in August 2017, April 2018 and August 2019 was in conformance. An extensive Public Education Program has been completed by the HMUA.

As of October 19, 2017, HMUA is subject to requirements under the New Jersey Water Quality Accountability Act (WQAA). This Act requires purveyors to demonstrate and report upon the planning, operation, maintenance and reinvestment of its water systems. HMUA contracted with Mott MacDonald to assist in developing the Asset Management Plan and the Cybersecurity assessment and is taking steps to achieve compliance and review required manpower associated with requirements for:

1. Water System Maintenance
2. Asset Management Plan
  - a. Initial Plan prepared as of April 12, 2019
  - b. 2019 Action Items
    - i. Valve Exercising – All valves larger than 12" have been exercised without any failure. GIS corrections have been done as part of the process.
    - ii. Leak Detection – Operation of six (6) potential replacement units were demonstrated for the HMUA. The evaluation of the replacement units is ongoing, with the selection and purchasing to be completed in 2020.
    - iii. SCADA Evaluation – An evaluation is underway to identify upgrades for inclusion in the AMP.
    - iv. Meters – 98% of meters have been replaced with the remainder being customers that have not been responsive. HMUA plans to maintain a 20-year replacement schedule.
    - v. Seber Road valve insertion was completed.
3. Mitigation Plans for Notice of Violations
4. Cybersecurity Program

- a. An updated form prepared by the NJ Dept. of Homeland Security & Preparedness' New Jersey Cybersecurity and Communications Integration Cell (NJCCIC) was submitted by the November 16, 2018 deadline.
- 5. Annual Certifications
  - a. October 19 – Annual Certification Form submitted

## 2 Sewerage System

The HMUA Water Pollution Control Plant is being operated by seven (7) personnel under the supervision of four (4) licensed operators. The collection systems is operated with five (5) licensed operators.

The Water Pollution Control Plant (WPCP) constructed in 1971 had an original permitted capacity of 1.65 MGD and was designed to provide advanced secondary treatment. Development which occurred within the HMUA service area in the 1970's and early 1980's required that the HMUA undertake a plant expansion. The enactment of more stringent effluent requirements by the U.S. Environmental Protection Agency and the New Jersey DEP also dictated that the treatment process be upgraded. The HMUA embarked upon the planning and design for the upgrade/expansion in 1984. The necessary construction permits and low interest rate financing received from the New Jersey Wastewater Treatment Trust were received in 1991. Construction of the WPCP upgrade/expansion to a capacity of 3.30 MGD was substantially completed in September 1993 and the construction contract was finalized in September 1995 at \$10,510,210.

### 2.1 Water Pollution Control Plant

The amount of treated effluent that can be discharged to the Musconetcong River from the Water Pollution Control Plant (WPCP) is limited by the NJPDES Permit (NJPDES Permit No. NJ0021369) issued to the HMUA for operation of the plant. Currently, the permitted capacity of the plant is rated at 3.30 MGD. The August 2008 NJPDES Permit with an expiration date of July 31, 2013 included provisions to formally increase the plant capacity rating from 3.30 MGD to 3.39 MGD due to additional flow from the Diamond Hill area of Mansfield Township. A renewal NJPDES permit was submitted to NJDEP in January 2013, and a draft permit was received and comments provided to NJDEP in August 2016. The draft permit included proposed arsenic and mercury limits. A final NJPDES permit dated September 18, 2017 was issued. Based on concerns with the mercury limit, a stay request was submitted on October 16, 2017. NJDEP issued the stay for mercury in a letter dated November 17, 2017 and the NJPDES Permit Modification dated December 6, 2017. The final permit also included a limit for arsenic. However, NJDEP simultaneously stayed the limit to allow time to study background arsenic levels and HMUA has been participating in an arsenic treatability study at the WPCP, conducted by NJDEP and Stevens Institute of Technology. A meeting of the Arsenic Study group was held on September 19, 2019 to discuss results of pilot testing to date, and it is anticipated that a waiver program will be developed to relieve utilities of the proposed limits.

As a result of requirements contained in the HMUA's NJPDES Permit, the amount of flow to the treatment plant could have a significant impact on whether the existing WPCP can meet the stringent load-based limitations. The HMUA already removes most of the phosphorus present in its effluent by application of alum. HMUA has determined, based upon findings from a Chemically Enhanced Primary Treatment (CEPT) study, that use of chemicals will be adequate to meet the permit limits.

The renewal of existing Wastewater Facility Discharge Permit (DRBC Docket No. D-091-30 CP-2) application was approved December 9, 2015 and will expire on December 20, 2020.

The WPCP operated at an average daily flow of 2.345 MGD between September 1, 2018 and August 31, 2019, compared to 2.096 MGD for the prior 12-month period. This equates to approximately 71 percent of the permitted plant capacity of 3.30 MGD. The maximum monthly flow during the period between September 1, 2018 and August 31, 2019 was 2.82 MGD (November 2018). The ratio of the maximum monthly flow to the 12-month average daily flow was 1.2 times. The plant performance results for the major effluent parameters of concern, Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Ammonia and Phosphorus, averaged 3.5, 5.7, 0.5 and 0.3 mg/l, respectively, over the past year, well within the NJDEP permit values of 20, 25, 1.0 and 0.49 mg/l assigned to the plant in the NJPDES Permit.

The upgraded and expanded WPCP has now been in service for twenty-seven (27) years. The major treatment reactors and equipment were found to be in good physical and mechanical condition during the October 2019 facilities inspection. Routine maintenance and occasional hardware replacement, particularly for equipment which has been installed since the original plant construction completed in 1971, will continue to be required on an as needed basis.

The HMUA has recently completed five (5) construction projects at the WPCP as follows:

**Contract No. 37S - 2010**

- Site Piping Improvements
- Inlet Facilities Improvements including new Screening/Washer/Compactor unit and “bus stop” Enclosure
- New Motors and variable frequency drives (VFDs) for the two (2) main Raw Sewage Pumps
- Improvements to the existing Anaerobic Digesters

**Contract No. 39S - 2012**

- Installation of two (2) new Nitrification Tank aeration blowers and associated controls

**Contract No. 42WS -2014**

- Installation of equipment to connect the two generators at the site
- Installation of a new power monitor allowing HMUA staff to operate additional equipment on the 660kW generator.

**Contract No. 44S - 2015**

- Building Architectural Improvements and Interior Painting
- Replacement of non-potable water pumps and site piping
- Elimination of Ponding Issue at lower level of Advanced Treatment Building
- Removal and decommissioning of Equalization Basin

**Contract No. 48S - 2019**

- Replacement of the Nitrification Tank diffusers
- Revision to Neuros Blower 10” Intake Piping
- Replacement of Anoxic Zone Mixers

The HMUA, under a separate procurement Contract No. 36S, purchased new Digester Mixing and Heating Equipment that was installed by the Contractor under Contract No. 37S in 2010.

A 31.7 kW solar array was installed at the WPCP Site under a Power Purchase Agreement. The installation of the solar array was completed in September 2011, with an official ribbon-

cutting ceremony on October 6, 2011. On November 13, the HMUA Board voted to accept ownership of the solar array and related appurtenances from SSE-NJ001, LLC at no cost as per a bill of sale dated November 16, 2018.

Since approximately 2006, the HMUA has been utilizing a maintenance management program software called "E-Maint" to keep track of the numerous routine maintenance tasks required to keep the equipment throughout the treatment plant operating efficiently and to increase the longevity of the equipment. The Sewer Utility's Chief Operator indicated that the "E-Maint" software has proven to be very helpful in keeping track and scheduling of the required maintenance tasks throughout the facility.

HMUA continues to accept wastewater from the M&M Mars pretreatment facilities which were constructed in 2015

### 2.1.1 Inlet Facilities & Raw Sewage Pumping

The influent flow meter was calibrated in 2016 (required every 5 years per NJDEP requirements). New Division Box No. 1 flow control cones were manufactured in 2013 to replace existing corroded units. Grit is removed at the Division Box using the HMUA Jet Truck.

Screening, Washing and Compacting Equipment was replaced in November 2010. The HMUA reported that equipment is working well. . One 3 CY dumpster of material is collected during a typical week. The compactor motor required replacement in 2013 and HMUA staff constructed a rain shield to protect the motor. The discharge chute insulation has some rodent damage for the past couple of years. HMUA is monitoring the insulation and will replace when necessary.

#### Recent Chronology for Raw Sewage Pumps

- HMUA personnel replaced the impeller and shaft sleeve for Raw Sewage Pump No. 3 in April 2011. The pump bearings and suction cover wear ring for this pump were also replaced by the HMUA in August 2011. . During 2011, the HMUA investigated pump noise and bearing temperature concerns for Raw Sewage Pump No. 3; however, a report by Rapid Pump and Meter in November 2011 found the pump to be operating within limits and the pump was returned to service.
- Raw Sewage Pump No. 1 was replaced in December 2012.
- In 2016, HMUA personnel replaced the rotating assembly for Pump No. 3.
- Raw Sewage Pump No. 2 was rebuilt in 2017
- Following a 2018 safety inspection, HMUA added shields below the motors where the pump shafts are exposed.

New motors and VFDs for Raw Sewage Pumps No. 1 and No. 2 were installed under Contract No. 37S, in 2010. During 2013, the HMUA completed the replacement of the existing Raw Sewage Pump Control Panel. HMUA staff also removed recirculation piping associated with future filters and repaired a damaged plug valve on the recirculation system during 2013. In 2019, HMUA reported that a sporadic issue with the use of Pump No. 3 VFD (original) while on generator power is still present.

The pump room floor, raw sewage piping, valves and pumps in the lower level of the WPCP Administration Building were coated under Contract No. 44S, in 2015.

The influent wet well is cleaned out by outside Contractors periodically as required. The refrigerant unit for the influent sampler was replaced in 2017.



Raw Sewage Pump Motor with shield

### 2.1.2 Primary & Secondary Treatment

During the October 2019 inspection of the site, both primary clarifiers were in service. Repainting of clarifier walkways was completed by HMUA to address peeling and minor surface rusting. Some minor concrete spalling was identified in the Primary Clarifier # 1 scum box during the 2018 inspection.

From February 2012 through April 2019, the plant had operated with a single trickling filter operation. The second filter was reactivated in April 2019 and HMUA plans to maintain this operation through November 2019. All three (3) of the trickling filter recirculation pumps were reported to be operating properly.

At the time of our site inspection, Intermediate Clarifier No. 1 and No. 2 were in service. Intermediate Clarifier No. 2 had been out of operation since February 2012 but was reactivated along with the second trickling filter. Some minor concrete damage was observed near the center column of Intermediate Clarifier No. 2 during the 2018 inspection. Intermediate Clarifier No. 1 was reported to have operated satisfactorily during the past year and appeared to be in sound operating condition.

The Intermediate Pumping Station was constructed during the WPCP Upgrade and Expansion in 1993. The Intermediate Pumping Station includes three (3) pumps with 25 HP motors equipped with VFDs. Prior to the April 2019 reactivation, the station had been off-line since February 2012 and was operated occasionally to test the equipment. During the November 2014 inspection, it was noted that the floor coating system has failed. The Pumping Station roof will require replacement at a future date.

The equalization basin was abandoned in 2015 as part of Contract No. 44S.

### 2.1.3 Advanced Treatment

During 2011 and 2012, the HMUA inspected and cleaned all diffusers in both Nitrification Tanks. The cleaning of the diffusers reduced the operating pressure for the aeration blowers. The effluent end diffusers have been removed from one tank as a trial operation. In 2017, Mott MacDonald carried out an evaluation of options for diffuser replacement as the existing swing-

arm mechanisms are no longer manufactured, and other diffuser designs offer higher efficiency. HMUA completed Contract 48S which included diffuser and mixer replacement in July 2019.

The three (3) Nitrification Tank internal recycle pumps were reported to be in satisfactory operating condition.



Nitrification Tanks with New Diffusers

The HMUA aerated both of the Nitrification Tanks with a single 125 hp constant speed blower for many years. The 1991 plant upgrade and expansion provided four (4) constant speed centrifugal blowers with 125 hp motors. As recommended by the Energy Audit prepared by CDM, the HMUA completed Contract No. 39S to replace two (2) of the four (4) existing 125 hp constant speed centrifugal blowers with more efficient variable speed turbo blowers and to reduce the air flow capacity of the blowers based on the actual plant operating conditions. Two (2) new 75 hp turbo blowers with VFDs and controls were installed and have been operational since early 2012, and a single turbo blower typically meets plant air demands for both Nitrification Tanks. The installation of the new turbo blowers has resulted in energy costs savings to the HMUA. As reported in the 2015 report, the turbo blowers were out of operation since August 2015 due to a VFD issue with one of the units. Though repairs occurred in 2016, VFD issues persisted and a constant speed blower had been in operation. In 2017, HMUA worked with Neuros to analyze the blower issues. Air sampling suggested that H<sub>2</sub>S from thickening operations was resulting in corrosion of the electronic components. Replacement of one VFD (with enhanced coatings) and the PLC was completed in 2017. A second replacement VFD was also installed. HMUA has also improved the seal on the door leading to the blower room, has maintained louvers in the open position and tested a new filter style as part of addressing the corrosion issue. With the diffuser replacement under Contract 48S, the turbo blowers have been operating at reduced speeds while meeting the plant air demands. One of the turbo blowers will periodically shutdown and throw an alarm – this is intermittent and the HMUA is working with Neuros to correct the issue.

Both Final Clarifiers were operating during our site inspection. During 2013, a Weir Wolf algae removal brush system was installed in Final Clarifier #2 and appears to be working satisfactorily. In June 2019, the same system was installed on Final Clarifier #1. In 2013,

HMUA installed new 8" WAS valves and replaced the WAS meter. In 2017, a new motor was installed on Final Clarifier #2.

#### 2.1.4 Post Aeration & Disinfection

Post aeration of Final Clarifier effluent is provided by a step cascade which is a concrete structure with no mechanical or electrical components. The unit is in sound condition. Effluent disinfection is provided in a two-channel UV disinfection system. The HMUA replaced the UV equipment and installed weather protection housing around the UV channels in 2002. The system has been having issues in automatic operation, and the HMUA staff completed a bulb change operation in 2017. However, as replacement parts are becoming difficult to obtain, HMUA is considering an upgrade of the UV system. In 2018, Mott MacDonald completed an evaluation comparing use of Peracetic Acid (PAA) in place of an upgrade to the UV system and has completed jar testing. A pilot study of PAA was conducted in 2019 and a report was prepared in November 2019.

Additional post aeration equipment is also installed in the UV tank, but is rarely, if ever needed at current flows due to the effectiveness of the step cascade. The blowers are used when the UV tanks are cleaned.

The HMUA installed bar screens just before the UV lamps to help prevent leaves and algae from affecting the performance of the UV disinfection system. The sluice gates located just prior to the UV lamps were replaced during 2012 with stainless steel versions. HMUA intends to change out the two (2) remaining aluminum gates this coming year.

During the 2018 Inspection, HMUA reported issues with the larger gates and mud valves in the UV tanks. During the 2019 Inspection, HMUA reported that three new mud valves and two new slide gates are ordered and to be installed by an outside contractor. HMUA noted that repairs have been necessary due to algae accumulation in the service water pumps.

HMUA has also been periodically running air into the effluent diffuser system.

#### 2.1.5 Auxiliary Systems

In 2007, the HMUA switched from the use of aluminum chloride to aluminum sulfate for phosphorus reduction. The HMUA continues to be very satisfied with the performance and use of the aluminum sulfate. The HMUA has two (2) Alum Storage Tanks and the Storage Tanks were reported and appeared to be in satisfactory condition. During our site inspection, both Alum Storage Tanks were in service. The seal water pumping systems at both the Administration and Advanced Treatment Buildings are in satisfactory operating condition and the service water pumping equipment in the Administration Building was replaced under Contract No. 44S. HMUA staff installed a stainless steel seal water filter in 2014. HMUA staff installed a new chemical feed pump and piping in 2011.

The WPCP has two (2) emergency generators. The original 300 Kw emergency generator was installed with the original plant construction in the 1970's. The other generator is a 660 Kw generator that was installed as part of the 1991 WPCP upgrade and expansion project. The emergency generators and automatic transfer switches (ATS) were reported to be in good working order at the time of our inspection. The emergency generators are exercised under load once per month. Maintenance and inspection of the emergency generator is performed quarterly by an outside contractor. With the completion of Contract No. 42WS, HMUA staff can use a new power monitor to operate additional equipment on the 660Kw generator. One of the main breakers was tested in November 2017, and a replacement was installed in April 2018.

During 2011, Mott MacDonald reviewed, investigated and evaluated the existing electrical distribution system at the WPCP to determine the feasibility of providing emergency back-up power to the Digester Building. The evaluation included preparation of Equipment List and Load Calculations for the existing 300 Kw generator. Based on the theoretical load analysis of the generator, the existing Digester Building feeder was connected to the existing 300 Kw generator to provide emergency power to the Digester Building.

The original boiler for the WPCP Administration Building, also constructed in the 1970's, was replaced in 2002 and is reported to be in satisfactory operating condition.

In 2019 Mott MacDonald carried out a review of the USTs and associated equipment. HMUA is planning a three-phase approach to remove the USTs and install one new AST to serve the 660 Kw generator. HMUA is also working with Elizabethtown Gas to extend natural gas service to the plant for use in heating and for the replacement of the existing 300 Kw standby generator.

### 2.1.6 Solids Handling Systems

Sludge collected in the primary and intermediate clarifiers is removed from the treatment process to the Anaerobic Digester system which was part of the original 1971 plant construction.

The HMUA undertook a Digester Repair Contract that included the construction of a new roof on the Digester Building, new waste gas burner, new gas piping and appurtenances. The Contract work for this project was completed during 2007.

As recommended by the WPCP Feasibility Study prepared by CH2M Hill and the Energy Audit prepared by CDM, the HMUA completed construction of Contract No. 37S to improve the gas production and performance of the anaerobic digestion system. The project included the installation of new sludge mixers. Air testing of the upgraded digesters occurred in late October 2011. HMUA staff added anti-slip pads to the digester covers to better facilitate flare maintenance. In 2014, the digester boiler was replaced and the existing oil tank was replaced with a propane tank. In 2015, boiler piping was replaced in stainless steel. In 2015, HMUA staff replaced an 8" digested sludge valve, which required draining the associated tank. The boiler receives quarterly maintenance. Since the 2018 inspection, HMUA has replaced the mixing valve and mixer compressor. HMUA is reviewing options for rebuilding the existing mixer compressor as a spare.

HMUA staff noted clarifier issues when the supernatant is recycled, so the flow is typically directed to the pre-thickened sludge wet well. It was noted that the exterior coating on the supernatant piping within the Digester building is failing. A struvite build-up has been identified in the digested sludge line – the pipe clogs over the course of a three-year period. HMUA staff cleaned sections of digester overflow piping in September 2019.

Sludge collected in the final clarifiers is wasted from the treatment system to a pre-thickened sludge holding tank at the Advanced Treatment Building. The waste sludge is thickened prior to being trucked off-site (PVSC) for ultimate disposal using gravity belt thickeners located in the Advanced Treatment Building. The two (2) gravity belt thickeners are now over twenty-five (25) years old, and in 2019, one of the two belts was out of service. In 2017, HMUA rebuilt steering mechanisms. A number of the rollers beneath the traveling belts are showing signs of wear and the HMUA has been periodically replacing these rollers as required. During the 2019 Inspection, it was noted that a full rebuild (including new controls) of one of the two units is planned. The gravity belt thickeners are typically operated three (3) days per week. The positive displacement pumps used in conjunction with the gravity belts are reported to have operated satisfactorily over the past year. In 2015, HMUA replaced one of the polymer control panels and two pumps.

Spare parts are not readily available for the remaining existing polymer equipment. The thickened sludge mixer was replaced in 2016. A new hatch was installed between the belt thickeners. Commencing with the 2018 inspection, it was noted that some of the newer floor coatings in the Advanced Treatment Building installed in 2015 under Contract 44Ware already peeling, particularly in the stairwells. HMUA also completed cleaning the sump pumps and replacing a small section of fire system piping on the lower level. In 2019, Fischer Electric replaced the sump pumps' floats. HMUA is monitoring the operation of the sump pumps and may need to have one or two pumps rebuilt or replaced in the near future.

### 2.1.7 Plant Laboratory

The existing WPCP water quality analysis laboratory, located within the plant Administration Building was modified under Contract No. 44S. The laboratory has been certified by the NJDEP to conduct chemical analyses and had recently been audited by NJDEP at the time of the 2018 inspection. The laboratory is used to monitor select parameters used for routine process control of the treatment process and those for which the NJDEP requires monthly reporting from both the sewer utility and the water utility. Certain testing which is required on a monthly or less frequent basis does not justify the costs associated with purchasing additional laboratory equipment and maintaining a full-time lab technician on staff. These analyses continue to be performed by a private laboratory certified by the NJDEP.

### 2.1.8 Buildings

The buildings at the WPCP remain in good, well-maintained condition. A roofing repair project was undertaken in 2006. As the 2006 project didn't include the roofs for the Intermediate Pumping Station or the Advanced Treatment Building, the HMUA should plan for replacement. A new heating unit was installed in the Advanced Treatment Building during 2008 and stairwell radiators were replaced in 2016 due to corrosion. Building lighting improvements recommended by the Energy Audit were completed in August 2011. In 2015, building fire alarm systems were replaced and replacement emergency lighting was installed.

The HMUA received BPU approval on December 17, 2010 for an Energy Reduction Plan for the WPCP. The ERP provides for up to \$361,836 in rebates, including Lighting Retrofits that were completed in 2011. The ERP also includes many of the improvements constructed under Contract No. 37S such as piping upgrades and VFD's for the Raw Sewage Pumps as well as the Blower upgrades constructed under Contract No. 39S. , The HMUA received \$250,546 in rebates from the ERP. The final report certified a 33.4% reduction in electricity costs, providing an annual savings of approximately \$70,000.

### 2.1.9 Site

The HMUA installed new landscaping throughout most of the plant site during 2009. Since 2017, HMUA has been cutting brush along the existing fence line. Some of the site paving is reaching the end of its life, and the HMUA may consider milling and providing a new top coat.

During the 2019 inspection, a lawn hydrant near the UV disinfection system was in the process of being upgraded and replaced to match the others installed under Contract 44S in 2015.

## 2.2 Sewage Collection System

The HMUA continued to conduct internal television inspections of its sanitary sewer collection system during the past year in an effort to define areas where infiltration (groundwater leakage) may be entering the sewer system. Mott MacDonald completed a Phase I I/I investigation in the Spring of 2003 which identified which sections of the HMUA collection system warranted further

investigation to locate and repair specific leaks. The majority of the system was found to be in sound shape. However, there were a number of areas identified in the Phase I study where the collection system requires further investigation and repair of leakage sources. In 2018, grouting was done in the Kenwood area.

The HMUA purchased new TV Inspection equipment during 2008. TV Inspection equipment owned by the HMUA includes a sewer lateral camera to allow for the inspection of sewer service laterals within the collection system. The HMUA also owns a Jet/Vacuum Truck that is utilized to periodically clean the sanitary sewers within the HMUA's sanitary sewer collection system. Issues with the truck were noted during the 2019 inspection. The HMUA has established a Sewer System Cleaning Program as well as a TV Inspection Program. The HMUA performs TV Inspections of the sanitary sewers periodically as time permits. During the 2018 inspection, HMUA noted that they continue to monitor grease that collects in the 16" river crossing, which has minimal slope. The wet wells of the pump stations within the collection system are typically cleaned by the HMUA every two (2) months.

The HMUA owns and operates three (3) sewage pumping stations and operates one (1) sewage pumping station, the House of Good Shephard Pump Station, which is privately owned. The Hills of Independence sewage pumping station is privately owned and operated. The HMUA has one (1) spare pump available for each pumping station.

The HMUA has taken efforts to identify sump pump discharges to the collection system. When identified, homeowners are contacted and follow-up inspections are conducted to confirm that sump pumps were disconnected.

HMUA has installed new confined space signage for the stations since the 2017 inspection.

### **2.2.1 Mt. Olive (formerly Oak Hill) Sewage Pumping Station**

The HMUA owns and operates a small sewage pumping station serving a section of the Oak Hill at Mt. Olive subdivision along Stephens State Park Road. The sewage pumping station is located off Dorset Drive. The facility appeared to be in excellent physical condition and well maintained during our inspection. The discharge piping in the wet well is showing some signs of corrosion. In 2017, HMUA had installed new shock absorbers on the generator enclosure. The Oak Hill sewage pumping station includes two (2) submersible pumps, valve chamber, alarm dialer and emergency generator.

### **2.2.2 House of Good Shepard Sewage Pumping Station**

The House of Good Shepard sewage pumping station located in Hackettstown is privately owned, but is operated by the HMUA. This pumping station was constructed in approximately 1998. The pumping station was reported to be operating satisfactorily.

### **2.2.3 Diamond Hill (Meadow Lane) Sewage Pumping Station**

The Diamond Hill (Meadow Lane) sewage pumping station located in the Township of Mansfield is owned and operated by the HMUA. This pumping station was constructed in 2004. The pumping station includes two (2) submersible pumps and emergency natural gas generator. The Diamond Hill sewage pumping station appeared to be in good physical condition and well maintained. In 2017, a new pump plate, lead pump float and replacement of controls was required at the facility.

### 2.2.4 Water Filtration Plant (WFP) Sewage Pumping Station

The HMUA also owns and operates a small sewage pumping station located at the Water Filtration Plant in Hackettstown. In 2010, the existing grinder at the station was removed due to failure, and both pumps were replaced with non-clog pumps. In 2014, one of the two pumps was again replaced with a new version non-clog pump, and the second was replaced in 2018. The station was reported to be operating satisfactorily.

## 2.3 Wastewater Service Area and Wastewater System Planning

The HMUA's Future Sewer Service Area and water service areas were significantly reduced through implementation of the Highlands Preservation Act. The Highlands Regional Plan was approved by the Highlands Council on July 17, 2008 and was approved by the Governor. Amendments in the State's Water Quality Management Plan rules including the designation of the Musconetcong River as a "C-1" waterway has further limited the extent of the HMUA's sewer service area. Following a period with few requests, there has been an increase in requests received by the HMUA for centralized sanitary sewer and potable water service from undeveloped or underdeveloped properties situated within its service within the past two years.

The HMUA completed a project to update the November 2003 HMUA Wastewater and Water Flow Projections and the updated flow projections are included in a report entitled "Water and Wastewater Flow Projections dated September 2008". As detailed in the September 2008 Water and Wastewater Flow Projections Report, it was projected that the WPCP peak monthly flows would exceed the current permitted plant capacity rating of 3.30 MGD in 2017. However, the actual average plant flows had decreased at several points during the last 10 year period due to efforts by the HMUA to reduce inflow and infiltration (I/I) flows and slowed development within the HMUA Sewer Service Area. The current average flow does reflect an increase of approximately 12% from the previous 12-month period (average daily flow of 2.345 MGD from September 1, 2018 to August 31, 2019 compared to 2.096 MGD from September 1, 2017 to August 31, 2018). It should be noted that 2018 was the wettest year in the State since record keeping began in 1895. In 2012, HMUA staff made adjustments to the values in the Flow Projections Report (as suggested in previous Annual reports) to reflect properties removed from the sewer service area and connections which have occurred since 2008 and excess capacity was shown for the WPCP. At this time, it is recommended that the HMUA continue to monitor and evaluate the existing and projected flows.

To comply with the recent NJDEP Water Quality Management Plan (WQMP) requirements that became effective in July 2008 requiring updates to the Hackettstown Wastewater Management Plan (WMP), the HMUA and Town of Hackettstown sent initial draft NJDEP Sewer Service Area (SSA) maps to the NJDEP on October 1, 2009. Following the initial submission to the NJDEP, numerous revised SSA Maps, documentation and emails were sent to the NJDEP based on comments received from the NJDEP on the SSA Maps. Agreement was reached with NJDEP on two (2) lots that the NJDEP was excluding from the Sewer Service Area (due to lots being designated as Rank 4 Habitat in the State's database) that the Town of Hackettstown and the HMUA wanted included in the HMUA's Sewer Service Area. The Sewer Service Area, including these two lots, was the subject of an April 6, 2011 Public Hearing by NJDEP. In June 2011, information from the 2008 Flow Projections Report was provided to the Highlands Council, which had become responsible for completing the Hackettstown WMP. In June 2012, April 2013 & December 2013 formal comments were provided to the Highlands Council regarding future flow estimates developed by the Highlands Council. In November 2014, the Town of Hackettstown met with the Highlands Council and was assured that the WMP will be completed and submitted to NJDEP. The proposed amendment covering the Town was adopted on February 12, 2016.

In 2011 and 2012, Mott MacDonald reviewed and prepared comments on the Washington Township WMP Chapter prepared by the Highlands Council, which included future flow estimates for the five (5) contributing municipalities. The HMUA elected to submit no comments on the final document and the Washington Township WMP was adopted by NJDEP in July 2012. In February 2016, HMUA provided comments on a proposed Washington Township Zoning amendment (RO-03-16) impacting the Musconetcong Age-Restricted Housing Overlay zone. An Amendment related to the Heath Village West development was approved on March 20, 2018.

In 2012, Mott MacDonald reviewed WMP mapping for Mount Olive Township prepared by the Morris County Department of Planning. Comments were submitted on July 12, 2012 stating that only existing served/approved properties should be shown in the Future Sewer Service Area.

In 2016, Mott MacDonald updated the service area mapping from the 2008 Flow Projections Report reflecting the various updated municipal chapters.

## 3 HMUA HEADQUARTERS COMPLEX & OVERALL FACILITIES

### 3.1 Facility Site Improvements

In 2016, the HMUA undertook several minor building repair/update projects at the HMUA Headquarters Complex at 424 Hurley Drive which includes the Administration Building, Storage Building, Operations Building and Material Storage Yard.

In 2019, the HMUA Headquarters complex remained in good condition.

### 3.2 Energy Audit of HMUA Facilities

During 2009, the HMUA completed an Energy Audit of the HMUA's facilities that included the Water Pollution Control Plant, Water Filtration Plant, Administration Building, Operations Building, Storage Building and Well and Booster Stations. The Energy Audit prepared by CDM included recommendations with potential areas to reduce energy usage and to reduce energy costs. The HMUA has undertaken several projects to implement some of the energy saving recommendations made in the Energy Audit report as discussed above.

### 3.3 Air Permitting

The table below summarizes the air permits for HMUA facilities. In 2018, updates were made to permits at the Water Pollution Control Plant and Water Filtration Plant Site and preparation of a renewal permit for Claremont Well No. 8 was completed with permit issued in November 2018. Renewal permits for the WPCP Boiler and Well #9 will be completed in 2020.

**HMUA Air Permit Summary**

Facility Name and ID	Air Permit Number	Permit Type	Equipment	Effective Date	Expiration Date
<b>Water Pollution Control Plant</b> (25591)	GEN100001	GP-017	Boilers (3)	3/11/2015	3/11/2020
	GEN180001	GP-005A	Emergency Generators (2)	1/10/2018	1/10/2023
	PCP960002	PCP	Primary Digester	4/2/1998	4/2/2023
<b>Water Filtration Plant Site</b> (84575)	GEN180001	GP-005A	Emergency Generator	4/18/2018	4/18/2023
<b>Mount Olive Booster Pump Station</b> (85547)	GEN170001	GP-005A	Emergency Generator	12/8/2017	12/7/2022
<b>Independence Booster Pump Station</b> (85546)	GEN170001	GP-005A	Emergency Generator	12/8/2017	12/7/2022
<b>Claremont Well #8</b> (85654)	GEN180001	GP-005B	Emergency Generator	11/7/2018	11/7/2023
<b>Well #9</b> (26976)	GEN150001	GP-005B	Emergency Generator	5/20/2015	5/19/2020

### 3.4 Security Improvements

As mentioned previously, in 2017, HMUA added a security fence at the 2.4 MG tank and an enclosure around the Well No. 8 pump equipment. During the 2019 Inspection, all facilities appeared to have adequate security measures in place.

### 3.5 Electrical Testing Reports

In July 2017, three thermographic surveys were completed by CNA and a follow up survey was done in September 2019. The purpose of these reports was to generate an infrared thermographic scan of the building's electrical systems in order to identify points with elevated temperatures within the electrical systems. Points of elevated temperatures can indicate potential wear or deterioration.

If an issue was detected, it was rated on a scale of severity ranging from minor to intermediate to serious to critical. The severity of the issues was determined based on temperature.

In July 2017, the Office building was scanned. There were no issues identified.

In July 2017, the WPCP was scanned. There were seven (7) intermediate issues identified, five (5) serious issues identified, and one (1) critical issue identified. All but two of these identified issues were confirmed as resolved in the 2019 follow-up.

In July 2017, the WFP Building was scanned. There was one (1) serious issue identified. This issue was confirmed as resolved in the 2019 follow-up.

In September 2019, a follow up survey was completed. In this scan, there were two (2) intermediate issues identified at the WPCP. These issues are in the process of being corrected.

It is recommended that these surveys be conducted annually until all critical and serious faults are verified as corrected and thereafter every three (3) years.

## 4 SUMMARY

The HMUA potable water and sanitary sewer utility infrastructure is in sound condition and updated to comply with current environmental requirements. Potable water production capacity has been increased to meet growth occurring in the service area and this has allowed for the sale of the HMUA's surface water supply properties and the abandonment of the Water Filtration Plant. The HMUA has completed the replacement of its surface water reservoirs with groundwater with the completion of Well No. 9 located in Washington Township and the increased capacity of Diamond Hill (Claremont) Well No. 8. It is also recommended that the HMUA continue planning for construction of a new water storage tank on the northerly side of its distribution system. Additional capital projects have been identified in the Asset Management Plan and will be reviewed and prioritized on an annual basis.

The WPCP upgrade/expansion was completed in 1993 and the plant is operating at approximately 71 percent of its permitted capacity and complying with its NJDEP effluent limits. Capital expenditures for the next five years should include the miscellaneous replacement of mechanical and electrical equipment on an as needed basis which reaches the end of its useful life. As mentioned previously, the HMUA has completed the following projects at the WPCP:

- Sludge Digester Mixer Project to improve gas production and performance of Anaerobic Digestion System (Contract No. 37S, 2010)
- New screening/washing equipment at headworks of plant (Contract No. 37S, 2010)
- Raw Sewage Pump (RSP) motors and VFDs for RSP No. 1 and No. 2 (Contract No. 37S, 2010)
- Site piping modifications (Contract No. 37S, 2010)
- Blower Replacement (Contract No. 39S, 2012)
- Generator Interconnection (Contract No. 42WS, 2014)
- Removal of Equalization Basin and other improvements (Contract No. 44S, 2015)
- Replacement of Nitrification tank Diffuser System (Contract No. 48S, 2019)

The HMUA water and sewer facilities are well maintained and capably operated. In order to continue this level of performance and keep pace with technological advances in the water supply and wastewater treatment field, HMUA personnel are encouraged to continue attending training seminars.