



December 10, 2010

Hackettstown Municipal Utilities Authority
PO Box 450
Hackettstown, New Jersey 07840

Attention: Mr. Bruce D. Smith, Executive Director

Re: Annual Facilities Inspection 2010

Gentlemen:

Hatch Mott MacDonald (HMM) conducted the Annual Inspection of the operation and maintenance of the Hackettstown Municipal Utilities Authority's (HMUA) water and sanitary sewer utilities on October 21, 2010 as called for in Section 609 of the Bond Resolution, adopted October 3, 1967. The utilities remain in excellent overall operating condition. 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.

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 production capacities of Well Nos. 5 and 6 were increased by an aggregate amount of 750 GPM (1.1 MGD). Well No. 7 (Seber) with a capacity of 1,500 GPM (2.16 MGD) was constructed under Contract 33W during 2007 which further increased the capacity of the HMUA water supply system. The HMUA has been and continues to be proactive in its maintenance of their water system as demonstrated by the HMUA undertaking six (6) water distribution and transmission main replacement Contracts since 1993, including the installation of more than 35,000 linear feet (over 6.7 miles) of new replacement water mains. The investment in new infrastructure allows the HMUA to maintain a high quality of service to its patrons while keeping pace with a development that is occurring within the service area and the evolution of new regulations.

The water supply system is being competently operated under the direction of six (6) licensed operators. The average daily water production for the period between September 1, 2009 and August 31, 2010 was approximately 2.3997 MGD and the maximum monthly rate was 2.741 MGD (July 2010). These figures compare to 2.310 MGD and 2.627 MGD (June 2009), respectively, for the period between September 1, 2008 and August 31, 2009.

Water Distribution System

In recent years since 2000, the HMUA completed four (4) major water transmission main projects (Contract Nos. 24W, 26W, 31W and 33W) to improve the fire flow capacity in most of the deficient areas identified in the Insurance Service Organization (ISO) investigation in 1997. During 2010, the HMUA undertook the construction of a water main replacement project (Contract No. 33W) to replace undersized water mains located on Fifth Avenue, Reese Avenue, Liberty Street and Cook Street in the Town of Hackettstown and this project is substantially complete at this time with only restoration and punch list work remaining to be completed by the Contractor.

The water main projects also included the replacement of almost all of the old non-pumper fire hydrants. With the encouragement of the HMUA, the Town of Hackettstown requested an additional test by ISO. The ISO re-inspected the Town of Hackettstown in 2007 and the ISO upgraded the classification of the Town of Hackettstown from a Class 5 to a Class 4. The Town of Hackettstown's Public Fire Protection Classification is in the top 10% among all communities in the entire country.

Water Filtration Plant

The HMUA completed construction of a surface water treatment plant located at the Seber tract in the Town of Hackettstown in 1981. This facility provides treatment of the surface waters derived both from the Mine Hill Reservoir and Burd Reservoir. 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 a design capacity of 1.0 MGD.

The WFP was not in service at the time of HMM's field inspection on October 21, 2010 and the WFP has not been in service since August 8, 2008 (over 2 years ago). The HMUA has been able to meet the peak water demand period through the summers of 2009 and 2010 utilizing only groundwater supplies from the wells.

The WFP is an unattended facility and is automatic in its operation. This facility and the groundwater wells (discussed in the following section) are automatically controlled by the overall demand of the water supply system, as monitored at a Supervisory Control and Data Acquisition Main Control Panel (radio based computer controlled SCADA System).

The Water Filtration Plant was constructed over twenty-nine (29) years and the frequency of mechanical repairs has increased from that required during the initial years of operation. Routine maintenance is required to keep the equipment and controls in satisfactory operating condition. As noted previously, the WFP has not been in operation at all during the past twenty-seven (27) months; however, it is our understanding that the facility is in operational condition and ready to be placed into service, if there is a need to supplement the groundwater supplies from the wells with surface water sources treated by the WFP.

Well Stations

The HMUA potable water distribution system derives the majority of its supply from groundwater sources (wells). The HMUA water system operates under two (2) separate NJDEP Water Allocation Permits. The existing HMUA Allocation Permit (NJDEP Permit No. 5145) was issued for a ten-year term, effective in August 2005 with an expiration date of July 31, 2015. Water Allocation Permit No. 5145 is for the following water sources: Water Filtration Plant and Well Nos. 2, 4, 5, 6 & 7. The HMUA has a separate Water Allocation Permit (NJDEP Permit No. 5249) for the Claremont (Diamond Hill) Well No. 8.

The permitted pumping capacity from the six (6) operational wells is 3,800 GPM as shown in the table below.

HMUA Potable Water Wells

<u>Well Designation</u>	<u>Current Production Rate</u>	<u>Permitted Pumping Rate</u>
Well No. 2- Snook	100 GPM	100 GPM *
Well No. 4- Seber	200 GPM	200 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 *
<u>Well No. 8- Claremont</u>	<u>0 GPM</u>	<u>300 GPM</u>
Totals	3,420 GPM	3,800 GPM

* Maximum Diversion Rate for groundwater sources from Well Nos. 2, 4, 5, 6 & 7 is 3,000 gpm.

The maximum yearly water diversion allowed in the HMUA's current Water Allocation Permits is 3.19 MGD (2,215 gpm) and the maximum monthly diversion is 4.12 MGD (2,860 gpm). The actual water diversion for the 12- month period ending August 31, 2010 was 2.3997 MGD and the maximum monthly diversion was 2.741 MGD (July 2010), both well within permit limits.

The original 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.

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. The Contractor completed the rehabilitation of the well pump for Well No. 6 and the pumping capacity has increased to approximately 670 gpm. The Contractor installed a new pump motor and rehabilitated well pump for Well No. 5 in March 2009. The pumping capacity of Well No. 5 was restored to

1,000 GPM. All Contract work for this project has been completed and Contract 35W was closed out in April 2009.

The HMUA acquired three (3) wells as part of the takeover of the Diamond Hill water system. However, the HMUA intends to only operate the Claremont Avenue Diamond Hill Well No. 8. The Elmwood Drive Well (Diamond Hill Area) has been 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 after receipt of NJDEP approval for an increase in capacity of the Claremont Avenue Diamond Hill Well No. 8.

The HMUA undertook a construction project to construct a new Well No. 7 located on the Seber Road site. This new well has a pumping capacity of 1,500 gpm. This project has been completed and was closed out in August 2008. Well No. 7 has been operating satisfactorily with a peak pumping rate of 1,500 GPM since the end of May 2007.

The HMUA is in the process of increasing the capacity of Well No. 8 (Claremont Avenue - Diamond Hill). Well No. 8 was not in service at the time of our field inspection. A new well was drilled on the existing Well No. 8 site and the existing well has been abandoned. The 300 gpm well pump has been installed and the pump test for the new Well No. 8 has been completed. The HMUA received approval from the NJDEP on November 16, 2010 to place the 300 gpm Well No. 8 back into service. It is our understanding that the HMUA has since placed Well No. 8 back into service, now that the necessary approvals have been obtained from the NJDEP.

The HMUA has prepared and submitted a Water Allocation Permit application to the NJDEP to increase the allowable pumping capacity of Well No. 8 to approximately 1,050 gpm and to add a new well, Heath Well No. 9, with a capacity of approximately 800 gpm to the HMUA's existing Diamond Hill Water Allocation Permit. The current permitted pumping capacity for Well No. 8 is 300 gpm and the total permitted capacity for the three (3) Diamond Hill areas wells is 415 gpm.

It is our understanding that Well No. 2 was taken out of service in early November 2010 due to failed water quality test (detection of E-Coli). The HMUA is currently investigating this situation and additional water quality tests will be undertaken prior to placing this well back into service.

Surface Water Impoundments

The HMUA Water Filtration Plant derives its water supply from the Mine Hill Upper and Lower Reservoirs and the Burd Reservoir. Safety inspections for the dams at each of these impoundments were initially conducted in October of 1981. Subsequent inspections of the Lower Mine Hill dam were completed in October 1987, January 1991, April 2001 and December 2004 and most recently, December of 2007. The inspections found the dams to be in fair overall condition. The structural integrity of the dams appeared to be sound. Stabilization of the embankment on the downstream side of the Lower Mine Hill Dam is required by NJDEP to protect it from erosion during storms which cause overtopping of the dam. A concept plan to

stabilize the area immediately downstream of the masonry dam and rehabilitate the area around the reservoir inlet raceway and former sand beds has been approved by the NJDEP Dam Safety Section.

Based on HMM's inspection of the Lower Mine Hill Dam on October 21, 2010, it is recommended that the following item be addressed:

- Remove vegetation growing in joints in face of dam.

During 2010, the HMUA removed trees from embankment adjacent to dam and also removed trees, branches and brush along toe of dam to facilitate observation of toe. It should be noted that the HMUA made concrete repairs to the crest of the Lower Mine Hill Dam in April 2008 and these repairs appear to be in satisfactory condition.

The New Jersey Dam Safety Compliance Schedule submitted as part of the December 2007 Lower Mine Hill Reservoir Dam Regular Inspection Report required that an investigation for repairs versus decommissioning of the dam be prepared and submitted to the NJDEP by July 31, 2008. The HMUA sent a letter to the NJDEP dated July 29, 2008 indicating that the HMUA is pursuing the sale of the dam to Green Acres and requested an extension for submission of the report on the investigation for repairs versus decommissioning of the dam. The NJDEP by letter dated August 13, 2008 granted the HMUA an extension of sixty (60) days beyond receipt of Draft Agreement from Green Acres. The HMUA sent another letter to the NJDEP dated December 12, 2008 requesting an additional time extension. By letter dated January 12, 2009, the NJDEP requested that the HMUA submit a status report which the HMUA has done. The HMUA has advised the NJDEP that the HMUA intends to breach the Lower Mine Hill Reservoir Dam.

The HMUA has prepared Contract Drawings that are substantially complete for the breaching of the Lower Mine Hill Reservoir Dam. The Dewatering Permit application to allow for the lowering of the water level in the reservoir and other applications necessary for the project have been submitted or will be submitted to the regulatory agencies shortly. The HMUA intends to bid and construct the breaching of the Lower Mine Hill Reservoir Dam project during 2011.

Deterioration of the concrete on the upstream face of the Upper Mine Hill Reservoir Dam has been noted in past facilities inspections as well as the inspection on October 21, 2010. The deterioration is occurring at the top of the dam which is alternately submerged and exposed to the weather during the normal fill and draw of the reservoir. The concrete deterioration appears to be confined to the western half of the upstream dam face. The HMUA has dropped the water level in the Upper Mine Hill Reservoir in the past to allow inspection of the extent of the concrete deterioration and also to prevent the freezing and thawing during the winter months from causing any additional spalling. If the HMUA decides to keep the reservoirs in service and/or to maintain ownership, it is recommended that the HMUA undertake a concrete repair project for the above section of the Upper Mine Hill Reservoir Dam while the extent of the required repairs is limited.



Upper Mine Hill Reservoir Dam



Upper Mine Hill Reservoir Dam -
Concrete Deterioration on the Upper
Portion of Upstream Face of Dam

In recognition of the costs associated with maintaining the dams in conformance with the New Jersey Dam Safety regulations as compared to the costs and successful results associated with completing additional groundwater wells, the HMUA has decided to proceed with the abandonment of its reservoirs. During the past two (2) years, the HMUA has had meetings with various representatives of the NJDEP to discuss the abandonment of the reservoirs. The HMUA has offered the reservoir properties with the existing dams to the State of New Jersey under the Green Acres Program. The viability of the reservoir abandonment concept is dependent upon the ability to develop the additional groundwater supplies necessary to replace the current water supply derived from the reservoirs and also satisfy the future water demands of the HMUA service area at build-out and is also dependent on the requirements of all agencies with jurisdiction related to the proposed abandonment of the surface reservoirs.



Lower Mine Hill Reservoir Dam



Lower Mine Hill Reservoir Dam -
Concrete Repairs to Top of Dam

Water Storage Tanks

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

1. 2.4 MG Water Storage Tank (Washington Township)
2. 1.0 MG Water Storage Tank (Independence Township)
3. Mount Olive Water Storage Tank (Mount Olive Township)
4. Independence Water Storage Tank (Asbury Road, Independence Township)

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 Washington Township off of Schooley's Mountain Road. The HMUA replaced the cathodic protection system and completed the repainting of the tank exterior during May of 1998 under Contract No. 22W.

Areas of corrosion, peeling paint and bubbling paint were noted on the tank exterior during the October 2010 inspection as well as during the October 2008 and October 2009 facilities inspections. It is recommended that the HMUA consider re-painting the exterior of the 2.4 MG Storage Tank in the near future. The piping in the valve vault of the tank requires repainting and the rectifier for the cathodic protection system, which was not replaced with the remainder of the system in 1998, should be considered for replacement.

During our October 2009 and October 2010 inspections, it was noted that there is a substantial amount of vegetation and small trees that are growing around the 2.4 MG Water Storage Tank. It is recommended that the vegetation and small trees around this Water Storage Tank be cleared and removed during the next year.

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. The tank serves 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.

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. Slight weepage has periodically been noted during prior inspections. No significant weepage was noted during our 2005, 2006 and 2007 inspections. Some slight weepage was observed in one area during the October 2007 inspection and slight weepage was observed in numerous areas during the October 2008 and October 2009

inspections. There was no weepage observed during the October 2010 inspection and the exterior of the tank appeared to be dry. It is suspected that thermal expansion and contraction of the tank may cause the weepage to alternately occur and then cease. The weepage should continue to be monitored on at least an annual basis.

During 2010, the HMUA removed the vegetation from around the perimeter of the tank as recommended in prior facility inspection reports. Vegetation and small trees were observed growing on the top of the storage tank by the access ladder during our October 2009 and October 2010 inspections. It is recommended that the vegetation and small trees on top of the storage tank be removed.

The 2.4 million gallon tank is located in the southeasterly section of the HMUA service area. It is recommended that the HMUA continue planning for a new storage tank in the vicinity of the existing 1.0 million gallon tank. The HMUA has identified two (2) potential sites to construct a new water storage tank. The tank should be constructed to operate directly on the Elevation 800 gradient, as a companion tank to the 2.4 MG tank. The additional storage will eventually be required for compliance with NJDEP regulations as system demands increase, and its construction in the northerly section of the service area will help balance the system pressures and improve fire flows in the northern section of the HMUA service area. Construction of a new tank in this area would also facilitate the proper repainting of the 2.4 MG tank as recommended above.

Mount Olive Twp. Water Storage Tank and Independence Twp. Water Storage Tank

Two (2) new 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 and Mt. Olive Township which are situated at elevations above the high water level of the 2.4 and 1.0 million gallon tanks. The capacity of each new tank is approximately 0.4 million gallons and they are both of the 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 2010 site inspection.



Mount Olive Township
Water Storage Tank



Independence Township
Water Storage Tank

It was reported by the HMUA that there was some areas of weepage at the Independence Township Water Storage Tank during 2008. These areas of weepage on the tank were repaired by an outside contractor during the fall of 2008 and these repairs appear to be holding up well. No weepage was observed during our October 2010 field inspection and the exterior of the tank appeared to be in satisfactory condition.

Development of Additional Water Supply

The HMUA has continued its program to develop additional sources of water to meet the projected water demands within its service area. 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 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 and divert from its surface water reservoirs, 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 3,000 gpm as indicated in the table below.

Source	Source Capacity	
	(MGD)	(GPM)
WFP	1.000	700
Well No. 2	0.144 ⁽¹⁾	100 ⁽¹⁾
Well No. 4	0.288 ⁽¹⁾	200 ⁽¹⁾
Well No. 5	1.440 ⁽¹⁾	1,000 ⁽¹⁾
Well No. 6	1.008 ⁽¹⁾	700 ⁽¹⁾
Well No. 7	2.16 ⁽¹⁾	1,500 ⁽¹⁾
DH Well No. 8	0.432 ⁽²⁾	300 ⁽²⁾
Total Source Capacity	6.472 MGD (5.752 MGD w/ Max. Diversion)	4,500 GPM (4,000 GPM w/ Max. Diversion)
Less Largest Source	2.16	1,500
Firm Capacity	4.312	3,000

- (1) The maximum diversion rate from groundwater sources (Wells 2, 4, 5, 6 & 7) is 3,000 GPM.
- (2) Diamond Hill Well No. 8 is operated under a separate Water Allocation Permit (Permit No. 5249).

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. The existing firm capacity of 4.312 MGD and based on flow projections will meet peak daily demands through 2015. Beyond 2015, additional capacity will be required.

The completion of Well No. 7 on the Seber site provides additional firm capacity in the HMUA system. Although the Highlands Preservation legislation, which took effect on August 10, 2004, removed a significant portion of the undeveloped land in Mt. Olive, Washington, and Independence Townships from the HMUA water service area, the extent of undeveloped land within the remainder of the HMUA potable water service area will likely require the construction of another permanent production well. The HMUA is proceeding with plans to replace the existing surface water supplies with additional groundwater wells.

The HMUA has undertaken a program to increase the capacity of the Claremont (Diamond Hill) Well No. 8 located in Mansfield Township and is working on the development of a new Heath Well No. 9 to be located in Washington Township on Schooleys Mountain Road. The hydrological testing has been completed for the proposed Heath Well No. 9. The HMUA has prepared and submitted a Water Allocation Permit application to the NJDEP for the proposed Well No. 9 with a capacity of approximately 800 gpm and to increase the pumping capacity of Well No. 8 to approximately 1,050 gpm.

It should be noted that there are new Radon Rules under consideration that may impact several of the HMUA's water supply wells, most likely Well No. 2 and Well No. 4 that are shallow wells. The HMUA is considering the possible abandonment of Well No. 2 at some point in the future.

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 in 2003 to improve its in-house leak detection efforts. Unaccounted for water was reported to be approximately 15.4% during the 12-month period ending August 31, 2010 which is just slightly above the NJDEP goal of 15%. Although higher than the last several years, this is still substantially lower than in 2005 when unaccounted for water was approximately 19.5%. The table below summarizes the reported approximate unaccounted water percentages since 2005.

Year	Unaccounted for Water (%)
2005	19.5
2006	14.2
2007	15.1
2008	13.4
2009	10.1
2010	15.4

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.

The HMUA applies a polyphosphate/orthophosphate blended corrosion inhibitor at its Well No. 6 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. However, the results of the sampling in the summer of 2010 slightly exceeded the EPA's limits for the Lead and Copper Rule. An extensive Public Education Program has completed by the HMUA. In addition, the HMUA is evaluating changes. It is possible that the problem may have been exacerbated by a change in the chemical company providing the chemical.

The USEPA adopted the Surface Water Treatment Rule (SWTR) to minimize the risks of waterborne disease occurrences resulting from pathogenic organisms, which may not be sufficiently eliminated or de-activated, in the treatment process applied to surface water prior to delivery of the treated water to the first service connection. The SWTR is primarily geared to requiring increased treatment and monitoring of water derived from reservoirs and rivers. The HMUA increased the length of the chlorine detention main at the Water Filtration Plant (WFP) in 1995 to provide an increase in the disinfection time provided to the treated water. The HMUA installed individual turbidity monitoring equipment on each of the two (2) WFP filters to comply with the requirements of the SWTR.

SEWERAGE SYSTEM

The HMUA Water Pollution Control Plant is being operated under the supervision of six (6) 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 \$10,510,210.30.

Water Pollution Control Plant

The amount of treated effluent which 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 permit was renewed in June 2008, with an effective date of August 1, 2008 and an expiration date of July 31, 2013. The NJPDES Permit includes provisions to formally increase the plant capacity rating from 3.30 MGD to 3.39 MGD due to the additional flow from the Diamond Hill area of Mansfield Township.

The new NJPDES Permit imposed some new permit requirements which include the following:

- More stringent phosphorus concentration limits and new mass loading limits.
- New Total Dissolved Solids (TDS) limits.
- Arsenic and mercury discharge limits.

As a result of new NJPDES permit requirements contained in the HMUA's new 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. However, an increase in alum dose may not be adequate to achieve the more stringent phosphorus limits imposed by the new NJPDES Permit, especially at increased plant flows, which may necessitate the need for the HMUA to construct and operate costly phosphorus removal facilities.

The Water Pollution Control Plant operated at an average daily flow of 2.2868 MGD between September 1, 2009 and August 31, 2010, compared to 2.272 MGD for the prior 12-month period. This equates to approximately 69 percent of the permitted plant capacity of 3.30 MGD. The maximum monthly flow during the period between September 1, 2009 and August 31, 2010 was 2.835 MGD (March 2010). The ratio of the maximum monthly flow to the 12-month average daily flow was 1.24 times. The plant performance results for the major effluent parameters of concern, Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS) and Ammonia, averaged <3.09, <4.25 and <0.11 mg/l, respectively, over the past year, well within the NJDEP permit values of 20, 25, and 1.0 mg/l assigned to the plant in the Discharge to Surface Water Permit.

The upgraded and expanded Water Pollution Control Plant (WPCP) has now been in service for seventeen (17) years. The major treatment reactors and equipment were found to be in good physical and mechanical condition during the October 2010 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 is currently undertaking a construction project at the WPCP (Contract No. 37S) that includes the following:

- 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

The construction of Contract No. 37S commenced in late spring of 2010 and the Contract completion date is March 4, 2011. However, the actual Contract Completion date will be delayed to allow the painting of the Digester Covers in the spring of 2011.

The HMUA under a separate procurement Contract, purchased new Digester Mixing and Heating Equipment that will be installed by the Contractor for Contract No. 37S.



Water Pollution Control Plant Site

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 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.

The HMUA has been receiving delivery of landfill leachate from the Pollution Control Financing Authority of Warren County (PCFAWC) facility since 2004. However, with the startup of the new PCFAWC pretreatment facility in the Fall of 2009, the deliveries of landfill leachate have stopped with the last delivery made in January 2010.

During 2009 and 2010, the HMUA has been evaluating whether it may be possible to accept a higher strength of sewage from the M&M Mars facility to allow M&M Mars to reduce the level of pre-treatment required at their on-site treatment facility prior to discharge to the HMUA public sewer collection system. M&M has elected

not to make any changes to the level of pretreatment at their on site treatment facility and to keep things the same.

Inlet Facilities & Raw Sewage Pumping

In 2006, the HMUA completed a project to replace the wastewater grinding mechanism at the headworks to the treatment plant with a sewage grinder. The sewage grinder was re-built during 2009. The plant operator indicated that the re-built sewage grinder is operating satisfactorily. The influent flow meter is calibrated and certified annually.

The HMUA indicated that the plant has experienced problems with grit and rags traveling through the plant. The WPCP does not include grit or screening removal facilities. As mentioned in the 2008 Annual Inspection Report and as recommended in the Feasibility Report prepared by CH2M Hill, the HMUA has undertaken a project (currently in the construction phase) for the construction of screening and washing facilities for the removal of screenings at the head of the plant. The new Screening, Washing and Compacting Equipment were delivered to the site the week of October 15, 2010. It is our understanding that since the time of our site inspection, the new Screening, Washing and Compacting Equipment have been installed and that start-up and testing of this new equipment has been completed.

Raw Sewage Pumps No. 1 and No. 3 were re-built during 2006 including the replacement of bearings. Raw Sewage Pump No. 2 was re-built during May 2008 and the pump re-build included a new impeller, new upper and lower bearings, new snap ring and grease shield, new packing and shaft sleeve. The HMUA reported additional leaks in the area of the volute for Raw Sewage Pump No. 2 during the summer of 2008. It was determined that the leaks in the area of the volute could not be economically repaired; therefore, the HMUA purchased and installed a new suction cover, volute, bearings and housing as a complete unit for Raw Sewage Pump No. 2.

Raw Sewage Pump Nos. 1 and 2 and the auto con pump controls were installed with the original WPCP construction in 1971 and are over 35 years old. New motors and VFDs for Raw Sewage Pumps No. 1 and No. 2 will be installed shortly as part of the current construction project (Contract No. 37S).

The influent wet well was cleaned out by an outside Contractor during 2009. It is recommended that the piping, valves and pumps in the lower level of the Raw Sewage Pump Station Building be painted in the near future.

Primary & Secondary Treatment

Both primary clarifiers were in operation during our site inspection. The HMUA reported that both primary clarifiers are in satisfactory condition.

Both trickling filters were in operation during our site inspection and reported and appeared to be in satisfactory condition. All three (3) of the trickling filter recirculation pumps were reported to be operating properly.

Both intermediate clarifiers were in operation during our site inspection. Both Intermediate Clarifier No. 1 and Intermediate Clarifier No. 2 were reported to have operated satisfactorily during the past year and appeared to be in sound operating condition.



Trickling Filter



Intermediate Clarifier

The Intermediate Pumping Station was constructed during the WPCP Upgrade and Expansion in 1993. The facility appears to be in excellent condition. The Intermediate Pumping Station includes three (3) pumps with 25 HP motors equipped with VFDs. A new VFD was installed for Intermediate Pump No.3 during 2007. All three (3) intermediate pumps and two (2) of the VFDs were reported and appeared to be in satisfactory condition at the time of our field inspection. One (1) VFD for Intermediate Pump No. 1 was out of service at the time of our field inspection.

The WPCP Equalization Basin requires repair to the rubber liner which was installed on the floor and sidewalls of the lagoon during the original plant construction in the 1970's. It was hoped that the liner could be preserved rather than replaced during the plant upgrade/expansion project completed in the early 1990's. However, after the accumulated sludge was removed from the basin, it was determined that the liner is compromised in many places and should be replaced rather than repaired. The HMUA was considering undertaking a project for the replacement of the Equalization Basin liner. The HMUA met with the NJDEP on March 5, 2008 to determine the extent of the environmental and Highlands permits/exemptions that would be required to complete the Equalization Basin Liner Replacement project. In addition, the HMUA submitted a Delaware River Basin Commission (DRBC) Applicability Determination submittal package to the DRBC on May 13, 2008. The HMUA received a final review letter dated January 16, 2009 from the DRBC. The review letter from the DRBC stated that it is the "determination of the DRBC that the alterations are substantial and therefore require docket approval" from the DRBC. The HMUA has also reviewed the need for the Equalization Basin from a plant operational viewpoint. Based upon the review of the operational needs of the plant and the permits/approvals that would be required to replace the Equalization Basin liner and as recommended by the WPCP Feasibility Study prepared by CH2M Hill, the HMUA has decided to decommission the Equalization Basin. The HMUA plans

to include the abandonment of the Equalization Basin as part of a larger project at the WPCP during 2011.

Advanced Treatment

The diffusers were last inspected in 2005 and were found to be in good operating condition. It is recommended that the condition of the diffusers be inspected again in the near future. The three (3) Nitrification Tank internal recycle pumps were reported to be in satisfactory operating condition.



Nitrification Tanks



Aeration Blowers

The HMUA has aerated both of the Nitrification Tanks with a single blower for many years. The plant upgrade and expansion provided four blowers. The flows to the plant have not reached design values and sound design practice includes one spare blower. As recommended by the Energy Audit prepared by CDM, the HMUA plans to undertake a project to replace the existing blowers with more efficient blowers and to reduce the air flow capacity of the blowers based on the actual plant operating conditions. The design of this project will start after the HMUA has completed the Pilot Tests of the Chemically Enhanced Primary Treatment (CEPT) as recommended by the WPCP Feasibility Study prepared by CH2M Hill. The full scale CEPT Pilot Study was just started during the week of November 29, 2010 and is expected to be completed within the next 4 months.

Blower No. 4 was out of service during our October 2010 inspection. Since only one blower is required to meet peak air flow requirements and as mentioned above the HMUA plans to replace the existing blowers shortly, the HMUA does not plan to repair this blower at this time.

Both Final Clarifiers were operating during our site inspection and appeared to be in sound operating condition. The three (3) Return Activated Sludge (RAS) pumps have continued to operate well during the past year.

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 a weather protection housing around the UV channels in 2002. The system continues to operate well. 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 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 are in need of replacement and the HMUA intends to replace these gates themselves shortly.

Auxiliary Systems

During January 2007, the HMUA switched from the use of aluminum chloride to aluminum sulfate for phosphorus reduction. The HMUA reported 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 and the service water pumping equipment in the Administration Building are in satisfactory operating condition.

The automatic transfer switch (ATS) for the emergency generator was replaced in approximately 2000. The emergency generator was installed with the original plant construction in the 1970's. The emergency generator and ATS are reported to be in good working order. The emergency generator is exercised under load once per month. Maintenance and inspection of the emergency generator is performed quarterly by an outside contractor. The original boiler for the WPCP Administration Building, also constructed in the 1970's, was replaced approximately ten (10) years ago and is reported to be in satisfactory operating condition.

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. Deteriorated portions of the original methane gas piping system and appurtenances, including the waste gas burner, in the digester complex have been replaced on an as needed basis since the original plant construction. The HMUA has also replaced both of the original primary clarifier sludge withdrawal pumps, repaired the boiler in the Digester Building, replaced the mechanical mixers in the Primary Digester with a submersible pump capable of macerating solids in the digester sludge and replaced the sludge recirculation pump used to keep the contents of the primary digester heated.

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 is currently undertaking a project (Contract No. 37S) to improve the gas production and performance of the anaerobic digestion system. The project will include the installation of new sludge mixers.

Sludge collected in the final clarifiers is wasted from the treatment system to a pre-thickened sludge holding tank at the Advanced Treatment system. The waste sludge is thickened prior to being trucked off-site for ultimate disposal using gravity belt thickeners located in the Advanced Treatment Building. The two (2) gravity belt thickeners are now seventeen (17) years old, but continue to operate very well, requiring only occasional miscellaneous repairs. 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. 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.



Gravity Belt Thickener



Gravity Belt Thickener

Plant Laboratory

The existing HMUA WPCP contains the HMUA water quality analysis laboratory, located within the plant Administration Building. The laboratory has been certified by the NJDEP to conduct chemical analyses. 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.

Buildings

The buildings at the WPCP remain in good, well-maintained condition. A roofing repair project was undertaken in 2006. A new heating unit was installed in the Advanced Treatment Building during 2008.

Site

The HMUA installed new landscaping throughout most of the plant site during 2009.

Sewage Collection System

The HMUA continues to conduct internal television inspections of its collection system during the past year in an effort to define areas where infiltration (groundwater leakage) may be entering the sewer system. Hatch 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 where the collection system requires further investigation and repair of leakage sources located in the Phase I study.

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. 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. 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 two (2) sewage pumping stations and operates one (1) sewage pumping station that is privately owned. The Private Hills of Independence sewage pumping station is privately owned and operated. The Private Hills of Independence sewage pumping station is no longer operated by the HMUA. The HMUA has one (1) spare pump available for each pumping station.

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 facility appeared to be in excellent physical condition and well maintained during our inspection. The Oak Hill sewage pumping station includes two (2) submersible pumps, valve chamber, alarm dialer and emergency generator. At the time of our inspection, one (1) of the submersible pumps was out of service with a "Seal Failure" alarm. The pump failure occurred on October 18, 2010 and the HMUA had called a Service Company to repair this pump.

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. During 2010, the HMUA repaired the insulation on the generator muffler that was noted in our previous inspection in October 2009.

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 excellent physical condition, well maintained and was reported and appeared to be operating satisfactorily. During 2010, the HMUA had one (1) of the ABS submersible pumps re-built.

Wastewater Service Area and Wastewater System Planning

During 2010, requests received by the HMUA for centralized sanitary sewer and potable water service from undeveloped or underdeveloped properties situated within its service area have remained slowed. Regulations governing development within New Jersey are changing and increasingly being influenced at the State level. The aim of the new regulations is to force new development and redevelopment within existing developed areas in order to preserve open space in the surrounding rural areas. 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 has been approved by the Governor. Recent amendments in the State's Water Quality Management Plan rules including the designation of the Musconetcong River as a "C-1" waterway may further limit the extent of the HMUA's sewer service area.

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 is projected that the WPCP peak monthly flows will exceed the current permitted plant capacity rating of 3.30 MGD in 2017. However, the actual plant flows during the last 12-month period remained essentially unchanged (less than 1.0% change) from the previous 12-month period (average daily flow of 2.29 MGD from September 1, 2009 to August 31, 2010 compared to 2.27 MGD from September 1, 2008 to August 31, 2009) due to efforts by the HMUA to reduce inflow and infiltration (I/I) flows and slowed development within the HMUA Sewer Service Area due to new regulations limiting development as well as the economy; therefore, at this time it is felt that the projected peak monthly flows estimated in the 2008 Flow Projections Report will not be reached in 2017. At this time, it is recommended that the HMUA monitor and evaluate the existing and projected flows to see the affect that the reduction in the HMUA Sewer Service Area caused by the Highlands Regulations

and new Wastewater Management Plan regulations have on the actual and projected flows.

The HMUA and the Town of Hackettstown are currently preparing updates to the Hackettstown Wastewater Management Plan (WMP) to comply with the recent NJDEP Water Quality Management Plan (WQMP) requirements that became effective in July 2008. The HMUA and Town of Hackettstown sent initial draft NJDEP Sewer Service Area (SSA) maps to the NJDEP on October 1, 2009. Since the initial submission to the NJDEP, numerous revised SSA Maps, documentation and emails have been prepared and sent to the NJDEP based on comments received from the NJDEP on the SSA Maps. At this time, there are two (2) lots that the NJDEP is currently 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 would like to have included in the HMUA's Sewer Service Area. The properties owners of the two (2) lots in question have indicated that they plan to prepare and submit a Habitat Assessment to the NJDEP in an effort to have the NJDEP agree to include these lots within the HMUA's Sewer Service Area.

Following the completion and approval of the Hackettstown WMP by the NJDEP, the HMUA may want to consider the review and update of the flow projections from the 2008 Flow Projections Report. The final Sewer Service Area approved by the NJDEP as part of the Hackettstown WMP may result in a reduction of the projected flows that may further delay or eliminate the need to expand the capacity of the WPCP to meet the projected peak monthly flows as discussed above.

HMUA HEADQUARTERS COMPLEX & OVERALL FACILITIES

Facility Site Improvements Project

During 2009, the HMUA completed a project at the HMUA Headquarters Complex at 424 Hurley Drive which includes the Administration Building, Storage Building, Operations Building and Material Storage yard. The project included site improvements at the existing maintenance and operations yard to provide for the consolidation of the HMUA material and equipment storage areas. The project also included improvements to the existing Storage Building. All work associated with this Contract has been completed and the project was closed out during 2010.

This project allowed the HMUA to relocate the existing unimproved temporary disposal and material storage areas located at the Water Well No. 2 site to the project site at the HMUA's Headquarters Complex. The storage areas at the Well No. 2 site were removed and cleaned up during 2009.

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 is currently

undertaking several projects to implement some of the energy saving recommendations made in the Energy Audit report as discussed above. The HMUA plans to continue to implement additional recommendations included in the Energy Audit report during 2011.

Solar Energy Project

During 2010, the HMUA started implementation of a Solar Energy project that includes installation of solar panels and associated equipment at the Water Pollution Control Plant site. The project is being completed by a private Solar Energy company. This project would benefit the HMUA by providing electricity for some of the energy needs at the WPCP and lower electricity costs. Preparation of the various permit applications and approvals for this project including the Highlands Council and local Planning Board is in progress.

WPCP Feasibility Study

During 2009, the HMUA completed a Feasibility Study prepared by CH2M Hill for improvements to the WPCP. The HMUA has already undertaken several projects to improve the performance and operation of the WPCP as discussed above based on recommendations in the Feasibility Study and the HMUA plans to complete additional projects during 2011 based on recommendations in this report.

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 is being increased to meet growth occurring in the service area and to allow for the abandonment of the HMUA's surface water supplies as well as the Water Filtration Plant. The HMUA has completed construction of the pumping facilities for a new high capacity production well at the Seber site (Well No. 7). The HMUA has continued activities necessary for the replacement of its surface water reservoirs with groundwater; therefore, the process to construct Heath Well No. 9 to be located in Washington Township and increasing the capacity of Diamond Hill (Claremont) Well No. 8 should continue in order to allow for this concept to proceed. The HMUA should also commence planning for construction of a new water storage tank on the northerly side of its distribution system.

The WPCP upgrade/expansion was completed in 1993 and the plant is operating at approximately 69 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 is/will be proceeding with projects at the WPCP that include the following:

- Sludge Digester Mixer Project to improve gas production and performance of Anaerobic Digestion System (Contract No. 37S)
- New screening/washing equipment at headworks of plant (Contract No. 37S)

- Raw Sewage Pump (RSP) motors and VFDs for RSP No. 1 and No. 2 (Contract No. 37S)
- Site piping modifications (Contract No. 37S)
- Electrical co-generation project utilizing methane gas produced by digesters (this project to be initiated upon completion of digester mixing project) (future Contract scheduled for 2011)
- Blower Replacements (project to be initiated upon completion of Pilot Testing of Chemically Enhanced Primary Treatment (CEPT)) (future Contract scheduled for 2011)
- Abandonment of Equalization Basin (future Contract scheduled for 2011)

Construction of the projects included in Contract No. 37S is in progress and construction is scheduled to be completed in 2011. Designs for the remaining projects listed above are anticipated to start in 2011 with construction to follow.

As discussed above, at this time it is recommended that the HMUA monitor and evaluate the existing and projected flows at the Water Pollution Control Plant regarding whether it will be necessary to increase the capacity of the WPCP at some point to meet the future wastewater treatment capacity requirements.

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.

It is a pleasure to be associated with such a thorough and dedicated organization.

Very truly yours,

Hatch Mott MacDonald



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