2011 WATER AND WASTEWATER MASTER PLAN

PREPARED BY:

MARYLAND ENVIRONMENTAL SERVICE
259 Najoles Road
Millersville, Maryland 21108

DEPARTMENT OF TRANSPORTATION
VOLUME V OF X

DEPARTMENT OF PUBLIC SAFETY AND CORRECTIONAL SERVICES
VOLUME VI OF X

DEPARTMENT OF VETERANS AFFAIRS
VOLUME VII OF X

MILITARY DEPARTMENT
VOLUME VIII OF X

MARYLAND STATE POLICE
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UNIVERSITY SYSTEM OF MARYLAND
VOLUME X OF X

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Volume V of X - Maryland Department of Transportation

Executive Summary

MARYLAND ENVIRONMENTAL SERVICE

2011 WATER AND WASTEWATER MASTER PLAN

EXECUTIVE SUMMARY

I. INTRODUCTION

The Maryland Environmental Service (MES) was created by statute in 1970 (Chapter 240 of 1970) as an independent agency. Executive Order 01.01.1971.11 gave MES the responsibility for operation and maintenance of all State-owned water purification and solid waste disposal facilities. Two (2) years later, MES became incorporated into the Department of Natural Resources (DNR). While under DNR, all Capital Improvement Project (CIP) planning and annual funding requests for these facilities were prepared by MES and submitted to the State for approval. The first projects received funding in Fiscal Year 1984; however, the Department of General Services (DGS) had responsibility for managing the appropriations, procuring the consulting engineers, contractors, and other services, and providing project management and inspection for CIP with some input from MES staff.

The situation began to change in later years, with MES first receiving funding and procurement authorization for CIP in 1992 and becoming an instrumentality of the State and a public corporation independent of DNR in 1993. Chapter 4, First Special Session of 1992, said MES "*shall be responsible for and shall control the procurement of engineering and architectural services and all other related services and supplies for the projects for which State funds are appropriated under provisions of this act.*" Since 1992, MES has had full responsibility for the CIP program for State-owned water and wastewater treatment plants, and in some cases, the associated piping systems and water towers, when requested by a State Agency.

During this transition period, the Department of Budget and Management (DBM) asked MES to prepare a Master Plan for water and wastewater facilities operated by MES and owned by the State. There were numerous facilities needing capital improvements to accommodate expansions within the various institutions as well as changing state and federal regulations that required more advanced treatment processes. The initial appropriation to MES totaled over $14 million, which funded a backlog of 13 projects. As projected in the Master Plan, funding requirements decreased each year as the majority of the treatment facilities were upgraded. Eventually the requests were capped at $3.0 to $3.5 million per year, which was adequate for improvements to piping, pumping stations, and water towers.

In the early 2000's, Governor Parris Glendening issued an Executive Order requiring wastewater treatment plants to further reduce nutrient loadings to the State's waterways. The Maryland Department of the Environment (MDE) completed their Tributary Strategy plan, essentially capping nutrient loads at many wastewater treatment facilities. The EPA also issued new drinking water regulations with limits for new parameters such as arsenic, radon,

radionuclides, and disinfection by-products. As MES experienced a decade earlier, water and wastewater treatment facilities would need upgrades as new, more stringent permits were issued. Rapidly changing technology rendered controls and equipment obsolete at many sites and construction prices skyrocketed after September 11, 2001. It became apparent the $3.0 million cap would no longer be sufficient to make the necessary improvements.

During the 2008 session of the Maryland Legislature, the Governor's budget included a capital budget request from MES of $11.9 million for critical, compliance-related upgrades to four (4) treatment plants. The budget committees expressed concern there was no plan that adequately justified this increase. In the 2008 "*Joint Chairmen's Report on the State Operating Budget (SB 90) and the State Capital Budget (SB 150) and Related Recommendations*", MES was instructed to prepare an infrastructure improvement plan for the facilities managed by the agency by February 1, 2009. The 2008 Water and Wastewater Master Plan represents the response to this request.

II. OBJECTIVES AND METHODOLOGIES

A. OBJECTIVES

To fulfill the request of the Maryland Legislature as defined in the 2008 Joint Chairmen's report, the objectives of the water and wastewater master plan included reviewing operating and performance records, evaluating the existing water and wastewater facilities to determine what improvements may be needed, developing a concept plan and scope of the identified improvements, cost estimates, ranking the individual projects, and developing a comprehensive CIP funding schedule and projection for the next five years and to FY 2021.

The specific steps and methodology used to prepare the plan are as follows:

- Collect data from existing records and engineering drawings at office
- Develop custom "Infrastructure CIP Management" database
- Conduct site visits and inventory of all facilities
- Perform engineering evaluations at all facilities
- Review Master Plans and five-year plans of agencies served by MES
- Identify and determine future needs for all facilities
- Evaluate each facility compliance records and anticipate future regulatory constraints
- Review past capital improvement and critical maintenance expenditures
- Analyze future improvement alternatives for each facility
- Perform cost analysis of alternatives and prepare cost estimates for the identified CIPs for each facility
- Develop a methodology to allow ranking and prioritizing the CIPs

- Generate a schedule of implementation for the facility improvements
- Develop a financial plan for funding requests
- Generate final master plan report

B. REPORT STRUCTURE

The Master Plan consists of an Executive Summary along with separate volumes for each of the nine (9) State Agencies. This Executive Summary is also included in each of the individual agency volumes. Each of the agency volumes provides detailed infrastructure information for each of the facilities associated with that agency that includes:

- Background
- Water and wastewater facilities description
- Assessment of operations and performance data
- List of operational and infrastructure deficiencies
- Regulatory compliance history and future regulatory constraints
- Capital improvements and major maintenance funding history
- Cost analysis and recommended improvements
- Schedule of implementation
- Supplemental information

C. CIP RANKING SYSTEM

To allow ranking and prioritizing the CIP projects, MES developed a "Project Ranking Sheet". This consisted of the following six categories:

- Compliance & Permits (criteria uses number of permit violations)
- Health and Safety
- Structural issues
- Impact on operating and maintenance costs
- Operational deficiencies
- Energy and Environment (evaluates energy savings and environmental benefits)

Each of these categories had associated scoring criteria which allowed assigning points based on the listed criteria. The total score assigned each project was used to determine its ranking on the CIP list.

III. ANTICIPATED FUTURE REGULATORY REQUIREMENTS

In addition to water and wastewater systems that need improvements due to age, equipment obsolescence, and normal wear and tear, improvements are also needed to comply with more

stringent regulations and treatment requirements. The following section addresses current regulations and policies, and how they impact the need to make upgrades to water and wastewater facilities.

A. WASTEWATER TREATMENT PLANTS

1. Wastewater Treatment Plants Discharging to Streams

All wastewater plants with stream discharge are regulated by the National Pollutant Discharge Elimination System (NPDES). Dischargers are issued an NPDES permit that authorizes discharge to a water body and imposes limits that have to be met based primarily on the receiving stream's water quality standards. The permits typically require meeting both pollutant concentration limits as well as mass loading limits. The mass loading limits (lbs/day) are determined by taking the assigned maximum flow value (i.e., million gal/day) for the facility times the specified concentration limits (mg/l) times 8.34 (a conversion factor) .

The pollutants that are regulated on discharge permits usually consist of the conventional domestic wastewater pollutants:

- Biological Oxygen Demand (BOD_5) – This is a measure of the amount of organic compounds in water that can be assimilated by bacteria and other microorganisms.
- Total Suspended Solids (TSS) – This measures the amount of organic or inorganic particles that are suspended in the water.
- Ammonia – This is the dominant form of nitrogen in domestic wastewater. It is toxic to fish and other biota.
- Total Kjeldahl Nitrogen (TKN) – This is the amount of ammonia and organic nitrogen (i.e., the nitrogen bound up in organic compounds like proteins, etc.)
- Nitrate/Nitrite – This is the inorganic nitrogen fraction that has been converted from ammonia and organic nitrogen. Further biological assimilation of nitrate and nitrite converts it to nitrogen gas, which dissipates to the atmosphere.
- Total Nitrogen – Nitrogen is considered both a nutrient and a pollutant in that small amounts are beneficial to plants and animals, but in excess it promotes the proliferation of bacteria and algae and results in degraded water quality. Total nitrogen represents the sum of nitrate/nitrite and TKN.
- Total Phosphorus – Similar to nitrogen in that it is both a nutrient and a pollutant. Contrary to nitrogen, it can only be eliminated from wastewater by biological uptake or chemical precipitation.
- Bacteria – All wastewater must be properly disinfected prior to discharge and permits usually give limits for either Fecal Coliform or Total Coliform levels.

These are the dominant pollutants found in domestic sanitary wastewater. If there are other pollutants in the waste stream, then these pollutants may also be added to the discharge permit with appropriate limits.

Discharge permits can be amended at any time by MDE due to either new regulations or policies being adopted or based on new water quality information on the receiving stream that dictates more stringent limits. The permits are usually issued for a five-year period. Although, MDE can amend discharge permits at any time, the changes are usually made when the permit is renewed and reissued.

The U.S. EPA and State of Maryland regulations that govern the pollutant limits on discharge permits are as follows:

- Federal Clean Water Act – National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Load (TMDL) – Added to the CWA in 1992 (currently addressed via the Watershed Implementation Plans)
- Maryland Tributary Strategy and Point Source Strategy
- Other specific regulations that may govern specific watersheds or water bodies (e.g., Patuxent River Watershed – MD Code Section 4-302.1)

The discharge limits imposed on individual treatment plants are primarily determined by the water quality requirements of the receiving stream. Streams are classified by their designated use, (e.g., drinking water source, trout stream, general recreation, etc.) where each classification has associated discharge limits that have to be met to ensure protecting the water quality. The requirement to specify discharge limits was first established under the Federal Clean Water Act (CWA) under the NPDES program.

The second program that can determine the limits imposed on discharge permits is the Total Maximum Daily Load (TMDL) program. The TMDL program is a part of the Clean Water Act and it requires all states to evaluate and compile a list of water bodies that do not fully support beneficial uses such as aquatic life, fisheries, drinking water, recreation, etc. Each water body is evaluated and usually "modeled" to determine the maximum amount of pollutants that can be discharged to it with out impacting the water quality or beneficial use. After determining the maximum allowable quantities of the various pollutants that can be discharged to the body of water, each of the dischargers (i.e., WWTPs, non-point source discharges, etc.) is allocated portions of the TMDL amount. The allocated amount is then incorporated into the facility's discharge permit.

In the last few years, the EPA, in coordination with the states of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC) developed a nutrient and sediment pollution diet for the Bay known as the Chesapeake Bay Total Maximum Daily Load (TMDL). To fulfill the Bay TMDL requirements, MDE developed an allocation process that is contained in Maryland's Watershed Implementation Plan (WIP). The allocation process specifies loading caps for nutrients (N&P) and sediment to each of 58 "segment-sheds" to collectively meet the 2017 target (70% of the total nutrient and sediment reductions needed to meet EPA's final 2020 goals). Maryland's Phase I WIP was submitted to EPA on December 3, 2010. MDE is now working with other State agencies, county and local governments to develop Phase II Watershed Implementation Plans with more detailed reduction targets and strategies to ensure meeting the goals of the Bay TMDL.

Maryland's WIP is requiring that all major WWTPs (i.e., those with a design capacity greater than 500,000 gal/day) to upgrade to meet an Enhanced Nutrient Removal (ENR) level of treatment. There are some facilities that are already meeting ENR treatment requirements as part of the Tributary Strategy program that Maryland had in place for several years.

The Tributary Strategies are broad implementation plans for achieving and maintaining nutrient allocations for the ten major watersheds that drain into the Chesapeake Bay. These allocations were established through the year-2000 Chesapeake Bay Agreement process. Under this program, MDE developed the Enhanced Nutrient Removal (ENR) Load Allocations Table, which establishes nutrient loading caps for 66 major wastewater treatment plants.

The ENR Allocations Table allocated a fixed amount of nitrogen and phosphorus loadings (in lbs/year) to be discharged by each WWTP based on the facility's design capacity and assuming a total nitrogen and total phosphorus concentration of 4 mg/l and 0.3 mg/l, respectively. Therefore, if a WWTP needs to expand and accept additional flows (i.e., users), it has to meet lower concentration limits in order to compensate for the increase in flow.

The ENR Tributary Strategy also controls the nitrogen and phosphorus loadings from minor WWTPs (i.e., those with flow less than 500,000 gal/day). The minor WWTPs are allocated caps based on either their projected year 2020 flow or design capacity: whichever is lower and a nitrogen and phosphorus concentration of 18 mg/l and 3.0 mg/l, respectively. If minor WWTPs need to expand, their loading allocation is limited to a maximum amount of 6,100 lbs/year for nitrogen and 457 lbs/year for phosphorus.

The goal of the Tributary Strategy and now the Watershed Implementation Plans is to eventually have all the major WWTPs meeting ENR levels of treatment, which are 3.0 mg/l for nitrogen and 0.3 mg/l for phosphorus.

Maryland's Bay Restoration Fund (BRF) was also created to provide funding to WWTPs for upgrading to an ENR level of treatment. Priority for the funding is given to major WWTPs.

Either at the time of permit renewal, or due to other circumstances (e.g., WWTP expansion, etc.), any of the regulatory programs listed above could cause more stringent limits be imposed on the discharge permits. EPA and MDE are also including limits in discharge permits for other nonconventional pollutants (e.g., copper, zinc, etc.) along with stricter toxicity biomonitoring requirements and limits. The biomonitoring requires toxicity testing using live macroinvertebrates and fish. Any new limits or toxicity testing that are added to a facility's discharge permits may require an upgrade to the WWTP treatment processes if the facility was not designed to meet those requirements.

Although some of the State WWTPs have been upgraded in the past few years to meet low limits, many have not and . will require improvements to allow meeting more stringent limits. In order to properly plan future WWTP improvements, MES has adopted the following protocols for determining which type facilities may be issued more stringent limits and will need capital improvements to comply:

Major WWTPs (all treatment types):

A few facilities already have treatment systems that can meet an ENR level of treatment. For those that do not meet ENR, capital improvements will be specified to provide ENR level of treatment.

Minor WWTPs:

Lagoon Treatment Systems – Lagoons are an antiquated type of treatment system, which provide at best a secondary level of treatment. They do not remove nutrients to any appreciable extent and as a result discharge ammonia, which can be toxic to fish, and other aquatic life. MDE is moving to impose lower limits for ammonia and other parameters. Therefore, capital improvements will be specified for replacing the lagoon system with a more modern and sophisticated treatment system.

Other Secondary Type Treatment Systems – In addition to lagoons, there are other treatment systems in operation that are not designed to remove nutrients and therefore discharge ammonia and other harmful pollutants. Capital Improvements will be specified to replace or upgrade these systems.

Expanding Facilities – Any of the minor WWTPs that will have flow increases beyond their design capacity will have to meet more stringent limits. In some cases, if the flow increase is not too great, the WWTP may not be required to achieve full ENR level of treatment. Therefore, the nature of the

improvements specified would only be what is needed to meet the anticipated limits for the higher flow.

Note: Even though MES has adopted this protocol to program future CIP needs, these are based on regulations and/or policies that are in effect today. Therefore, this protocol is subject to change in response to new or amended regulations (State or Federal) or policies.

2. Wastewater Treatment Plant Solids Management

All WWTPs produce a solid material by-product as a result wastewater treatment. Regardless of the type of facility, these solids must be removed from the WWTP on a periodic basis in order for the treatment process to function properly. Basically, there are three options available for managing this solid material:

- Disposal into a landfill
- Incineration (burning)
- Recycling the material onto the land for beneficial uses, such as compost, fertilizer, etc.

The first two options, landfill disposal and incineration, while used by some WWTPs, are not without their problems. Dwindling landfill space and rising tipping fees have forced most facilities to explore other options. One advantage of incineration is that it can reduce the amount of material for ultimate disposal by as much as 75%. However stringent Federal air quality regulations (40 CFR 60, Subpart O), volatile energy costs, complexity of operation, and high capital expenditures have increasingly ruled out incineration as an option for most facilities, especially for smaller WWTPs with a capacity of less than 10 million gallons a day (MGD). There are also detrimental environmental impacts associated with incineration, such as excessive energy usage and concerns about greenhouse gas emissions. Finally, negative public perception surrounding incineration makes the execution of these projects almost impossible.

Nutrients in these solids, in the form of nitrogen and phosphorus (and a small amount of potassium) can be recycled onto farmland as a low-grade fertilizer, or used to reclaim land in dire need of revegetation (e.g., strip mined land). These solids also contain organic matter that is also beneficial for the soil. The beneficial reuse of this solid material is a cost-effective option for the recipient farmer as well as the WWTP. MES has already realized significant cost savings by implementing land application programs. Both the U.S. EPA and MDE promote the beneficial reuse of biosolids when done in accordance with the regulations.

Solid material from a WWTP that is treated to meet Federal and State standards for recycling onto land are called "biosolids". Material that is not treated, or does not meet these standards, is labeled "sludge", or "sewage sludge". The current Federal (40 CFR 503) and State of Maryland (COMAR 26.04.06) regulations

prescribe the treatment and management standards for recycling biosolids. These standards were established to protect public heath and the environment.

There are several core regulatory standards that WWTPs must follow before land applying biosolids:

- The concentration of chemical constituents, such as heavy metals, in the biosolids product must be under certain limits.
- Solids must be treated to significantly reduce pathogenic organisms. This treatment, called stabilization, is usually done at the WWTP prior to land application. Stabilization processes can be classified as:
    - Physical/chemical in nature, such as adding copious amounts of lime to kill pathogens (lime stabilization),
    - Biological treatment processes. Examples of biological treatment processes include anaerobic digestion, (subjecting the sludge solids to bacterial degradation for an extended period of time in a heated tank in the absence of oxygen), or aerobic digestion, which involves aerating the solids.
    - Time/temperature treatment, such as composting or heat drying the solids to produce a fertilizer pellet.
- The solids must be sufficiently treated so that the likelihood for disease transmitting organisms, called vectors, to be attracted to the biosolids is reduced. Vectors include flies, mice, mosquitoes, etc.
- Biosolids must be managed at the final reuse site in such a manner as to not cause a public health, nuisance, or environmental problem. These management practices can include procedures such as incorporating the biosolids into the soil at a farm site, or including directions to homeowners for use of a compost product.

Maryland is regarded as having an extensive biosolids regulatory program. One aspect of this program is that it requires mandatory, site-specific nutrient management plans be prepared for each farm site where biosolids is to be land applied. Nutrient management reduces the potential for nitrate-nitrogen contamination of groundwater, and phosphorus runoff into surface waters. MDE's regulations are more rigorous than the Federal rules, requiring more site practices to control nuisance factors (such as odors). Approximately 80% of the biosolids generated in Maryland are recycled in some manner, whether onto agricultural land, or through the sale and distribution of highly treated biosolids products such as compost or heat dried fertilizer pellets.

The nutrient management program is administered by the Maryland Department of Agriculture (MDA). In an effort to reduce nutrient pollution from non-point sources, MDA is in the process of revising its Nutrient Management Guidelines to

severely limit the practice of land applying biosolids and animal manures in the winter .Although currently all of MES' biosolids are land applied out-of-State where the restrictions are less stringent (i.e., Virginia) this change in the Nutrient Management Guidelines could affect the operation of our facilities if land application operations revert back to Maryland. This would necessitate either the construction of biosolids storage structures at of our State-owned Regional Sludge Management Facilities at considerable cost, or the installation of advanced sludge treatment processes to reduce the volume of solids being removed

MDE is also currently in the process of preparing comprehensive revisions to their biosolids regulations. It is envisioned that these new regulations will impose more stringent requirements, especially with respect to biosolids testing/monitoring, site controls, compliance inspections/permitting, and documentation of stabilization processes. Much of the revisions are in response to the public's demand for greater oversight of the land application program.
Future regulatory changes could also impose more stringent biosolids processing requirements on WWTPs, called "Class A" stabilization, such as composting and heat drying. These Class A processes reduce pathogens to near non-detectable levels. The general public's concern about pathogens is motivating the change to Class A stabilization processing; many WWTPs have already voluntarily implemented Class A stabilization to address these concerns. It is anticipated that MES will ultimately follow this industry trend, and eventually request funding for Class A processing.

In an effort to more efficiently manage biosolids from MES's facilities, the Agency currently utilizes a "regional" sludge management approach. Sewage sludge from most of MES' smaller facilities that do not meet the standards for recycling onto land is transported to larger WWTPs for further processing and stabilization. These stabilized, treated biosolids from the Regional Sludge Management Facilities are then land applied by a contractor. MES operates Regional Sludge Management Facilities at three State-owned WWTPs. One advantage of the regional approach is that economies of scale are achieved at the larger facilities, thus avoiding the need for constructing costly, separate stabilization processes at each of the smaller WWTPs. It also reduces staff time associated with regulatory monitoring at each of the smaller WWTPs.

A major disadvantage of the regional approach is that stabilization process reliability and equipment redundancy is critical. Sludge processing at the Regional Facilities must be more robust to avoid sludge disposal interruptions on the smaller, satellite State-owned WWTPs. Capital funding should be directed towards ensuring that biosolids processing equipment reliability at the regional facilities is maintained.

3. Wastewater Treatment Plants Using Land Disposal

Numerous WWTPs do not use stream discharge for the treated effluent and rely on spray irrigation to the land surface, underground discharge (i.e., drain field), or similar means. These type facilities are also facing more stringent discharge requirements. This is due to the recognition by MDE that ground disposal systems can contaminate groundwater supplies (i.e., drinking water wells) and migrates through the ground to discharge to streams and ultimately the Chesapeake Bay. To alleviate some of this pollution source, MDE included in the Tributary Strategies a provision that allows abandoning septic systems and connecting those users to sewers and treatment systems with a stream discharge. This provision is based on the assumption that septic systems provide only minimal nutrient removal and the untreated nutrients will eventually make their way to the Chesapeake Bay. The low level of treatment provided by septic systems is then off set by the high level of nutrient removal that is now possible with the newer ENR treatment technologies.

Just as with WWTPs that discharge to streams, MDE is also imposing lower limits on groundwater discharge permits to reduce the amount of nitrogen that is ultimately discharged to the Bay and to groundwater supplies. The limit for Total Nitrogen can be as low as 8 mg/l. These low limits are primarily imposed on the larger systems with flows over 5,000 gal/day. The Bay Restoration Fund also collects fees from users with On Site Sewage Disposal Systems (OSDS) (i.e., septic systems) and other ground disposal systems. MDE offers BRF grants for upgrading OSDS systems to provide increased nitrogen removal. Priority at this time is being given to those systems in the Critical Area or to those systems which are failing.

MES will either request BRF funding or Capital Improvement funds to upgrade any OSDS system that may be subject to more stringent discharge limits and/or would represent a good opportunity to upgrade to further reduce nitrogen being discharged to the Bay.

B. Water Treatment

The quality of drinking water that is produced is very strictly regulated under the EPA and Maryland's Safe Drinking Water Act. The water treatment plants that use surface water supplies (e.g., lakes, reservoirs, and streams) have much more stringent requirements that have to be met compared to those using groundwater (i.e., wells) as their source water. Two of the new regulations associated with surface water have decreased Maximum Contaminant Levels (MCLs) in drinking water and one new regulation requires higher removal of contaminants, which may require specific capital improvements at specific water treatment plants. These regulations are listed below:

- Stage I Disinfection By Product Rule - Total Trihalomethanes MCL of 80 ppb and Total Halocetic Acids MCL of 60 ppb
- Turbidity Maximum Contaminant Levels of 0.30NTU
- Enhanced Surface Water Treatment Rule – Requires 2 to 3-log removal of Cryptosporadium

Also, a Groundwater Rule requires 4-log virus removal, which may require installation of filtration in some of groundwater plants. Therefore, specific capital improvements that would be needed to meet new or more stringent regulations will be addressed at specific water treatment plants.

C. Water Reuse

The reuse of treated wastewater is becoming more and more popular in many parts of the country, resulting in a second "purple" water distribution system. The need for this is caused by the inability of the water sources to be able to meet the ever-increasing demand. Given the physical limitations (e.g., available land) and the regulatory requirements imposed on water and wastewater systems, water reuse and reclamation is not only good environmental stewardship, but is also now recognized as a way to save power and O&M costs, facilitating compliance with water or wastewater regulatory requirements. MES would recommend the implementation of any water reuse projects. Water reuse is already performed at the Eastern Correctional Institution (ECI) where the treated wastewater effluent is sent to the Cogeneration Plant for use in their cooling towers. This could be expanded to use for irrigation, toilet flushing, and other non-potable uses. Although no new projects have been identified, MES will continue to look for possible opportunities to reuse treated wastewater at State facilities.

IV. WATER/WASTEWATER INFRASTRUCTURE CIP SUMMARY

MES provides some level of operations and maintenance services to a total of 65 State facilities. The water and wastewater infrastructure utility systems at these facilities falls under one of the following categories:

- Water Source
- Water Treatment Plant
- Water Distribution
- Wastewater Treatment / Onsite Sewage Disposal System
- Wastewater Collection/Conveyance

MES does not provide operations and maintenance services for all these categories at all the facilities. There are many facilities where the State Agency operates one or more of the utility systems or it may receive service from a nearby municipality, county, or sanitation district.

The level of services that MES provides is described in each of the facility descriptions and is summarized in Table I. Table I lists all the facilities by Agency and gives the entity (e.g., MES, DNR, etc.) that is providing the services for that infrastructure category.

In preparing the 2008 Master Plan, only those systems that are operated by MES were evaluated for capital improvement needs and listed on the MES CIP Request. Out of the 65 total facilities, a total of 39 specific capital improvement projects have been identified and listed in the CIP funding schedule that extends to FY2021 (see Table II). The total CIP request for all 10 years is $64,643,000 with a total project costs estimated to be $98,898,000. The CIP request is less than the total project costs due to other funding sources that will pay their share of the costs (e.g., Freedom District WWTP) and due to CIP funding already received (e.g., ECI).

The MES project ranking system provided a consistent methodology to prioritize and rank the projects and spread the requested funding out over the next 10 years. Table II provides a list of all the projects, their ranking, the State agency, and the amount and year that the funding is requested.

TABLE I
State of Maryland Water and Wastewater Facilities
Distribution of Operational Functions

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
DNR					
Albert Powell Hatchery	DNR	DNR	DNR	MES	DNR
Big Run SP	MES	MES	MES	DNR	DNR
Calvert Cliffs SP	MES	MES	DNR	DNR	DNR
Camp Bay Breeze	MES	MES	DNR	DNR	DNR
Cunningham Falls SP	MES	MES	DNR	DNR	DNR
Dahlgreen Area - South Mt. SP	MES	MES	MES	DNR	DNR
Dan's Mountain SP	MES	MES	DNR	DNR	DNR
Deep Creek Lake SP	MES	MES	MES	Garrett Co	MES
Echo Lake Area - South Mt. SP	MES	MES	DNR	DNR	DNR
Elk Neck State Park	MES	MES	MES	MES	MES
Fair Hill NRMA	MES	MES	DNR	DNR	DNR
Fort Frederick SP	MES	MES	MES	MES	DNR
Gambrill SP	MES	MES	DNR	DNR	NR
Gathland SP	MES	MES	DNR	DNR	DNR
Greenbrier SP	MES	MES	DNR	MES	DNR
Greenwell SP	MES	MES	DNR	DNR	DNR
Herrington Manor SP	MES	MES	DNR	DNR	DNR
New Germany SP	MES	MES	DNR	MES	DNR
Pocomoke SP- Milburn & Shad Landing	MES	MES	DNR	DNR	DNR
Point Lookout SP	MES	MES	DNR	MES	DNR/MES
Rocks SP	MES	MES	DNR	DNR	DNR
Rocky Gap SP	MES	MES	MES	MES	MES
Sandy Point SP	MES	MES	DNR	DNR	DNR
St Mary's River State Park	MES	MES	DNR	DNR	DNR
Susquehanna State Park	MES	MES	DNR	DNR	DNR
Swallow Falls SP	MES	MES	DNR	MES	DNR
Washington Monument SP	MES	MES	DNR	DNR	DNR
MD Dept of Veterans Affairs					
Charlotte Hall Veterans Home	MES	MES	MDVA	MES	MDVA
MD Dept of the Military					
Brig. Gen. Thomas Baker Training Site	MES	MES	MES/MM	MM	MM
Camp Fretterd	MES	MES	MM	MES	MM
Frederick Armory	MES	MES	MM	MM	MM
Gunpowder Military Reservation	MM	MES	MM	MM	MM
MD State Police					
Barrack V - Berlin	MES	MES	MSP	MSP	MSP

TABLE I

State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Table I (cont.)

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
State Highway Adm.					
Bay Country Welcome Center	MES	MES	SHA	MES	SHA
Centreville Maintenance Shop	SHA	SHA	SHA	MES	SHA
Green Hill Cove				MES	SHA
I-68 Rest Stop	MES	MES	SHA	SHA	SHA
I-68 Visitor Center	MES	MES	SHA	SHA	SHA
I-70 Rest Stop	SHA	MES	SHA	MES	SHA
Leonardtown Maintenance Shop	SHA	MES	SHA	MES	SHA
Sideling Hill Visitors Center	MES	MES	SHA	MES	MES
University System of Maryland					
Ag. Exp. Sta. - University of MD	MES	MES	U of M	U of M	U of M
Horn Point Lab - University of MD	U of M	U of M	U of M	City of Cambr	MES
St Mary's College	MES	MES	MES	St. Mary's Col	MES
DHMH					
Crownsville Hospital Center	MES	MES	DHMH	MES	DHMH
Freedom District	Carroll Co	Carroll Co	Carroll Co	MES	Carroll Co
Rosewood State Hospital	Balto. Co.	Balto. Co.	DHMH/MES	Balto Co.	DHMH
Springfield Hospital Center	Carroll Co	Carroll Co	Carroll Co		DHMH
DJS					
Backbone Mountain Youth Center	MES	MES	MES	DJS	DJS
Chelteham Youth Facility	MES	MES	DJS	MES	DJS
Green Ridge Youth Center	MES	MES	MES	MES	MES
Meadow Mt. Youth Center	MES	MES	MES	DJS	DJS
Savage Mt. Youth Center	MES	MES	MES	DJS	DJS
Thomas O'Farrell / Henryton	Carroll Co.	Carroll Co.	Carroll Co.	Carroll Co.	MES*
Victor Cullen Center	Washington Co.	Washington Co.	DJS	MES	DJS
DPSCS					
Eastern Correct. Inst. - Cogen Plant	MES	MES	DPSCS	MES	DPSCS
Eastern Correctional Institution	MES	MES	DPSCS	MES	DPSCS
Eastern Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
Jessup Complex - Dorsey Run WWTP	AA Co	AA Co	DPSCS	MES	DPSCS
MCI - Hagerstown	Hagerstown	Hagerstown	DPSCS	MES	DPSCS
Poplar Hill Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
So. MD Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
WCI & NBCI	Cumberland	Cumberland	DPSCS	Cumberland	MES*

*Pumping stations only

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
HOLD	N/A	Eastern Correctional Institution - Cogen	Upgrade electrical control system.	Waiting for discussion/input from Environmental Ops before proceeding.	2017	2018	DPSCS	$3,500,000	$3,500,000									
1	73	Eastern Correctional Institution WWTP	New treatment plant; including the RO Reject system	Design expected to start in May 2011. FY11 REQUEST (12.126M - C)	2013	2015/2016	DPSCS	$26,730,000	$19,500,000	$1,950,000		$7,000,000	$10,550,000					
2	69	Freedom WWTP	Upgrade plant to 5 stage bardenpho process, and upgrade solids handling facilities.	Under Compliance Schedule. Negotiating a Consent Agreement w/MDE. FY12 REQUEST (1.4M - P)	2013	2014	DHMH	$18,000,000	$2,300,000	$1,566,000	$734,000							
3	65	Rocky Gap SP - WTP	Needs new plant.	Preliminary Design Report conducted; Needs new plant designed (have design funds). MES waiting on direction from DNR before moving forward w/final design. FY12 REQUEST (2.65M - C)	Design Funds Secured	2013	DNR	$3,729,000	$3,000,000	$3,000,000								
4	65	Rocky Gap SP - WWTP	Needs new plant.	Water usage unknown. Meeting permit requirements; monitoring for BOD, TSS, and Temperature (should not exceed 68 degrees). Water usage estimated to increase 140K gpd and wastewater 120K gpd. Current WWTP designed for 120K gpd. Existing plant cannot accommodate any further growth.	2013	2014	DNR	$3,000,000	$3,000,000	$300,000	$2,700,000							
5	62	Charlotte Hall VA Home - WW	**WWTP**: Repair or replace pond's liner system; replace floating boom; additional floating boom; install four (4) aerators/mixers; replace irrigation valves and nozzles; install sodium hypochlorite feed system; develop reserve RIB; construct equalization basin; construct perimeter fence; rehab effluent pump station pipe; and abandon monitoring well no. 5 located in RIB2. **WW COLLECTION**: for pump station no. 1 install grease trap, install influent channel w/bar screen, separate valve vaults and check & gate valves, alarm system, real time monitoring device; for pump station no relocate electrical box to above ground location, install real time monitoring device	Design 80% complete, RIBS may stay on Wish List. Nitrogen compliance issue. Plant capacity 60K pd; ADF 40-42K pd. Not meeting permit requirements; 3 violations in last year.	Design Funds Secured	2013	DVA	$3,667,000	$3,457,000	$3,457,000								
6	61	Cunningham Falls SP - WW Collection & Water Distribution Systems	WASTE WATER ($918K): Install HDPE Force Main thru existing gravity lines; grouting of annular space in sewer lines and MHs; and install 10 pump stations. WATER ($100K): Evaluate and replace leaking pipes in distribution system in Manor Area.	**WASTE WATER:** System consists mostly of terra cotta pipe and due to rocky soil and high groundwater table, it has severe I/I. The wastewater is conveyed over 3 miles to Thurmont for treatment. The Park pays for every gallon treated and as a results pays over $40K a year just to treat the extraneous I/I flows. **WATER:** Due to age of the distribution system, leaks becoming more frequent, requiring an operator to "camp out" at plant until leak is repaired to meet demand. Equipment - Filter media requires replacement, the piping in the clarifier is corroded and undersized, components of the clarifier have recently deteriorated and required re-fabrication. Tanks and piping were repainted several years back and starting to show corrosion again. Level control floats are extremely corroded and filter valves are leaking. Clearwell is undersized for peak demand.	2013	2013	DNR	$1,238,000	$1,238,000	$200,000	$1,038,000							
7	60	Victor Cullen -WWTP	Consider SBR or activated sludge. Rebuild bar screen. New 50K gpd plant; utilize existing buildings.	Occasional Ammonia limit (8) violations during winter. Currently a rock trickling filter w/fixed nozzles. Needs new bar screen. Plant rated/permitted at .05 MGD. Serves approximately 135 people.	2013	2014	DJS	$2,516,000	$2,516,000	$216,000	$2,300,000							

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
8		State Water Towers	Minor rehab & painting	Camp Fretterd (Witches Hat) (200K) ($448.2K); MCI-H (Standpipe) (300K) ($511.4K); Victor Cullen (300K) ($544.4K); . FY12 REQUEST (970K - P/C)	N/A	2013		$1,504,000	$1,504,000	$1,504,000								
9	62	Charlotte Hall VA Home - WTP	Construct a new, separate treatment building next to existing treatment to house softening units and store salt and other chemicals.		Design Funds Secured	2014	DVA	$210,000	$210,000		$210,000							
10	60	MCI -WWTP	Replace gas chlorine storage and feed system with UV disinfection units; cover the two (2) secondary clarifiers launders; install fermentation tank; install denitrification filters and associated carbon source feed system; install treated wastewater supply system for washing belt and polymer mixing during sludge dry; replace existing emergency 1200KVA generator; construct pole building for equipment and chemical storage; paint 300,000 gallon standpipe; design and construct new 500,000 gallon elevated storage tank.	No violations. Nitrogen & Phosphorus added 01/01/11. Waiting to learn of state's share (ENR grant - $$$ unknown); Possibly $3M each. MDE first wants feasibility study conducted - MES has funds for study (not going to BPW until June or July 2011). DNR Component: Automation, DO monitors, pumps, alkalinity addition. sulfur dioxide and 1 ton chlorine storage (safety issue). FY12 REQUEST (3.7M - P/C)	Design Funds Secured	2014	DPSCS	$6,000,000	$3,000,000		$3,000,000							
11	55	Southern MD Pre-Release -WWTP	New plant - MBR Plant	Design 80% complete; Existing plant is a buried steel tank. Holes visible above ground. No violations. Electrical system in a trailer (violated code). 20 year old plant. FY12 REQUEST (1.471M - P/C)	Design Funds Secured	2014	DPSCS	$3,000,000	$3,000,000		$3,000,000							
12		State Water Towers	Minor rehab & painting	Crownsville Hospital (Front) (250K) ($450,000); Victor Cullen (75K) ($300,000). MCI -H (500K Elevated) ($625,000) Does not required design.	N/A	2014		$1,375,000	$1,375,000			$1,375,000						
13	55	Cunningham Falls SP - WTP	New water treatment plant	Manual system; must have staff 8 hrs/day during summer season. While plant is currently operational, it was constructed in 1973 and is at the end of its useful life. Major deficiencies include: Total manual operation, very inefficient, operator must be onsite at all times when plant is running. Examples - Backwashing is problematic, no flexibility with backwashing due to requirement of operator onsite. Significant safety risk - operators must reach into the panel to pull relays to start and stop the plant. Relays must be pulled when plant is offline due to frequent lightning strikes which cause severe damage to controls.	2015	2015	DNR	$3,000,000	$3,000,000			$3,000,000						
14	55	WCI -WWPS (old)	Move controls above ground; need new pumps; inline grinder requested for bypass channel.	Steel wet well - rusting out. Confined space (safety concerns)	2015	2015	DPSCS	$750,000	$750,000			$750,000						

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
15	50	Camp Fretterd - WTP & WD	WATER: Relocate switches from main electrical panel to a separate, weatherproof enclosure; replace heaters in storage and treatment areas; replace roof; install mission control unit; construct new treatment facility for proposed new well; construct new well at higher elevation; construct new elevated tank; paint 100,000 gallon elevated water storage tank. WASTEWATER: replace two (2) submersible pumps in duplex pump station.	Design based on Watek's recommendations can begin on or after June 2011. WTP: only 1 well exists. DS: need booster station, close loops. FY11 REQUEST (236K - P) FY12 REQUEST (188K - P)	2015	2017	MM	$1,970,000	$1,970,000			$197,000		$1,773,000				
16		State Water Towers	Minor rehab & painting	ECI (Front) (500K) ($625,000); Sandy Point (100K) ($175,000)	2015	2015		$800,000	$800,000			$800,000						
17	49	Poplar Hill	Propose new mechanical plant.	Lagoon system; spray field.	2017	2018	DPSCS	$3,160,000	$3,160,000					$316,000	$2,844,000			
18	47	Swallow Falls SP - WWTP & WTP	New plant; maybe SBR.	Lagoon based system; Can not discharge in summer; from 7 days before Memorial Day through 7 days after Labor Day. 2/3 cost estimate for WW. 60K gpd.	2017	2019	DNR	$3,688,000	$3,688,000					$368,800		$3,319,200		
19	41	Fair Hill NRMA - WTP & WD	Propose new plant and tank	Lead paint & glass lined tank. WTP control center in metal shed.	2017	2018	DNR	$1,709,000	$1,709,000					$170,900	$1,538,100			
20	40	St. Mary's College	WDS: Replace 3-inch piping student residences; close loops at seven (7) locations; new service line to Admissions building and ww pumping station. WTP: Replace flow meter at well no. 1; install automated well controls.	Design underway. Construction ready drawings scheduled for completion in August 2011.	2017	2017	UNIVERS.	$636,000	$636,000					$636,000				
21	39	Cheltenham -WWTP	WASTEWATER - Install new headworks; upgrade electrical service; install new blowers; replace RBC's with SBR's; construct building for new treatment plant; replace valves; upgrade Dynasand filters; install continuous DO meter. WATER - Repair Well #2; relocate hypo and Day tanks to existing chlorine room; paint storage tank.	Digester needs work w/aeration system.	2017	2018	DJS	$7,050,000	$7,050,000					$705,000	$6,345,000			
22		State Water Towers	Minor rehab & painting	Crownsville Hosp (Back) (250K) ($375,000) (2017); Elk Neck S.P. (60K) ($150,000) (2017); Charlotte Hall (250K) ($375,000) (2018); Rocky Gap (500K) ($625,000) (2019); Camp Fretterd (300K) ($450,000) (2019)	2017	2017		$1,975,000	$1,975,000					$1,975,000				
23	35	Gunpowder (MNG)	Extra well needed. Update controls. Heating system in poor condition. Fence around small reservoir.	Operating on only 1 well.	2020	2021	MM	$116,000	$116,000								$11,600	$104,400
24	34	Eastern Pre-Release - WWTP	Propose new WWTP.	Lagoon system; discharge to stream. Lagoon dredging completed Spring 2011. Currently 20K gpd.	2020	2021	DPSCS	$3,160,000	$3,160,000								$316,000	$2,844,000

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
25	27	Meadow Mountain Youth Center -WS	Repair treatment building roof leaks. Construct new well.		2020	2020	DJS	$256,000	$256,000								$256,000	
26	20	U of M Agr Center -WTP&WD	New treatment control building for Well #1 to replace "shed" like structure. Add 500 gallon storage at treatment building in case line to tower is interrupted. Construct new water treatment facilities for Well #2. Backfill well vault and extend well above grade. Rehab Well #2.	Not a reimburseable project - but could become one.	2020	2020	UNIVERS.	$402,000	$402,000								$402,000	
27	17	O'Farrell Youth Center (Henryton) - WWPS	Replace building door, build curb around grinder channel, paint generator fuel tank.	NOT CIP; Maintenance item.	2020	2020	DJS	$20,000	$20,000								$20,000	
28	40 HOLD - push back as far as possible until clear scope of work defined.	Savage Mountain Youth Center - WS	Maintain with acid wash; scrap new well. Evaluate for water re-use.	First wanted replacement well - not feasible at this site - too difficult to find water. NOT CIP; Maintenance item.	2021	2021	DJS	$497,000	$497,000									$497,000
						GRAND TOTAL		$103,658,000	$76,789,000	$12,193,000	$12,982,000	$13,122,000	$10,550,000	$5,944,700	$10,727,100	$3,319,200	$1,005,600	$3,445,400

Agency Summary

DEPARTMENT OF TRANSPORTATION

INTRODUCTION

The Department of Transportation (DOT) consists of the State Highway Administration (SHA), the Transportation Authority, the Transit Administration, the Port Administration, the Motor Vehicle Administration, and the Aviation Administration. The Maryland State Highway Administration is the state agency responsible for maintaining Maryland numbered highways outside of Baltimore City. Formed in 1908, as the State Roads Commission (SRC), the administration is tasked with maintaining non-tolled bridges throughout the state, removing snow from the state's major thoroughfares, administering the state's "adopt-a-highway" program, and both developing and maintaining the state's freeway system. The Maryland Environmental Service (MES) provides water and wastewater services to following facilities:

FACILITY NAME	WATER SOURCE	WATER TREATMENT	WATER DISTRIBUTION	WASTEWATER TREATMENT	WASTEWATER COLLECTION
Bay Country Welcome Center	MES	MES	SHA	MES	SHA
Centreville Maintenance Shop	SHA	SHA	SHA	SHA	MES
I-68 Sideling Hill Rest Area	MES	MES	SHA	MES	SHA
I-68 Rest Stop	MES	MES	SHA	SHA	SHA
I-68 Visitor Center	MES	MES	SHA	SHA	SHA

AGENCY CAPITAL IMPROVEMENT PLANS

MES requested a copy of the DOT Capital Improvements Master Plan and were informed one did not exist. Therefore, the Agency's plans for expansion or proposed change in use are unknown at this time. The five-year plan submitted to the State projects no improvements for this planning period.[1]

CAPITAL IMPROVEMENT PLANS FOR MES OPERATED FACILITIES

MES provides both water and wastewater services to the facilities listed above. The following section provides summaries of the proposed capital improvement needs for each facility. More detailed descriptions of each facility are included in the each Facility Master Plan Report.

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[1] State of Maryland, Department of Budget and Management, FY 2009 – 2013 Capital Improvement Plan, http://dbm.maryland.gov/dbm_publishing/public_content/dbm_taxonomy/budget/capital_budget/capital_improvement_plans/toc_fy2009_2013capimprovplan.html

I. GREEN HILL COVE

- Install pond level transmitter and tie to alarm system

  Projected Cost: $8,000
  Planning and Design: N/A
  Construction: Fiscal Year 2009

II. LEONARDTOWN YARD

- Construct a new well

  Projected Cost: $119,830
  Planning and Design: Fiscal Year 2020
  Construction: Fiscal Year 2020

III. SIDELING HILL (SHA)

A. WASTEWATER TREATMENT PLANT
  - Replace grating as needed

B. WATER DISTRIBUTION SYSTEM
  - Replace water lines from well to treatment plant
  - Replace PVC distribution water lines as needed

  Projected Cost: $367,700
  Planning and Design: N/A
  Construction: Currently in progress

The Maryland Environmental Service Water and Wastewater Master Plan projects the cost for upgrades to DOT water and wastewater facilities through Fiscal Year 2021 to be **$530,263**. It is our understanding the SHA will request funding for these improvements.

FACILITIES NOT SERVED BY THE MARYLAND ENVIRONMENTAL SERVICE

There are several facilities falling under the jurisdiction of the Department of Transportation that are not served by the Maryland Environmental Service; local jurisdictions or sanitary authorities provide water and/or sewage collection and treatment services. A description of the facilities and water and wastewater service for each is not included within this document. Information on these systems may be included in future updates to this plan. MES recommends the existing infrastructure be evaluated at these facilities in order to avoid potential disruption to water and sewerage service in the future.

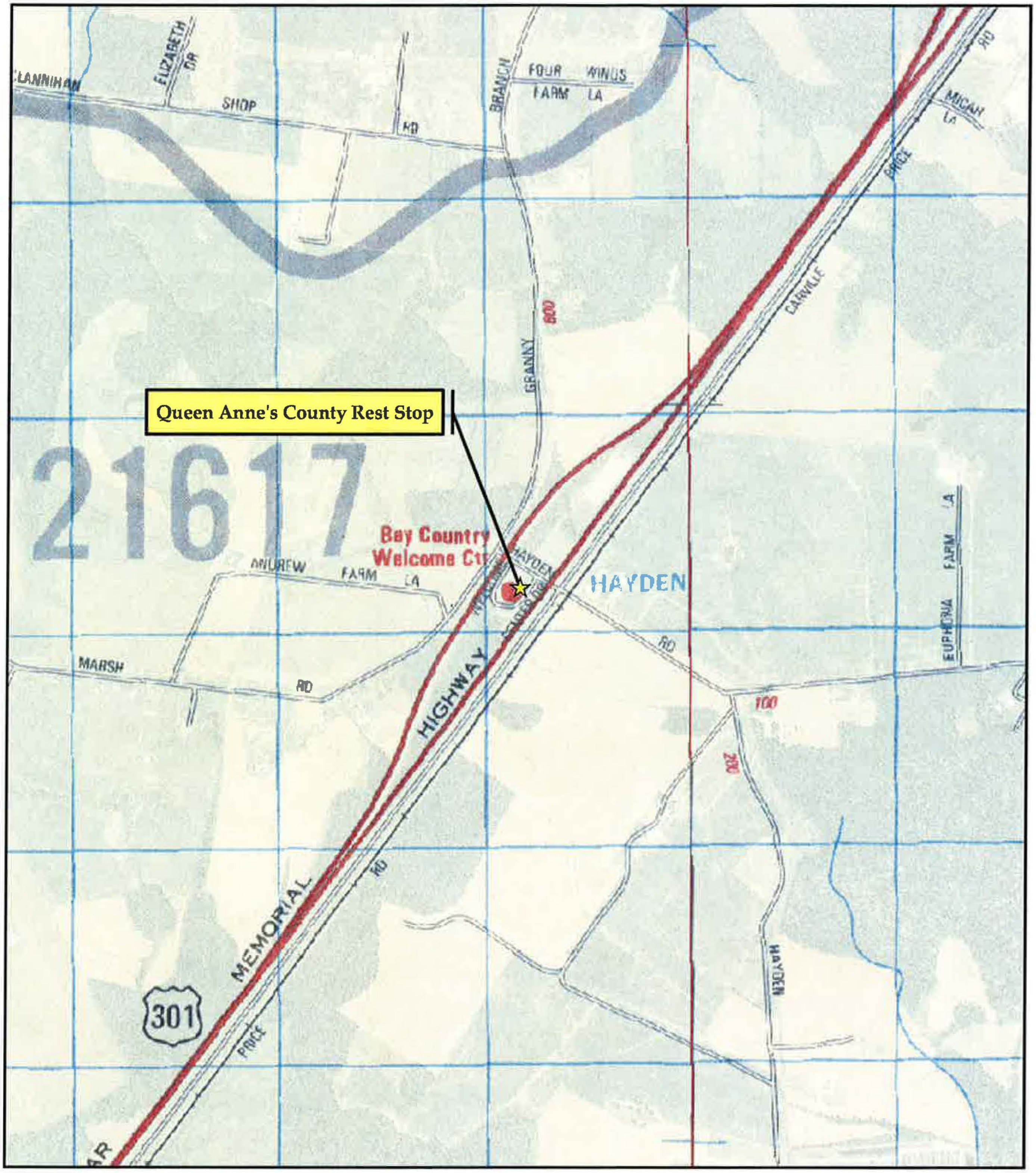
Summary

Detailed descriptions of the water and wastewater facilities operated by MES for the Department of Transportation are included in this volume, as well as the following information:

- Operations data
- Regulatory compliance history and future regulatory constraints
- A listing of operational and infrastructure deficiencies
- Capital improvements and major maintenance funding history
- Recommended improvements and estimated costs (in 2008 dollars)
- Proposed schedule of implementation
- Supplemental information

MES will continue to work closely with the DOT to keep abreast of their planning activities to ensure there will be an adequate water supply and sewerage service for proposed facility expansions or changes in use.

Bay Country Welcome Center



☆ Sites	Water and Wastewater Master Plan 2008	NAD 1983 StatePlane Maryland FIPS 1900 (feet) Projection: Lambert Conformal Conic GCS: North American 1983
Figure 1	MARYLAND ENVIRONMENTAL SERVICE 259 Najoles Road Millersville, MD 21108 (410) 729- 8200	0 500 1,000 1,500 2,000 Feet I:\GIS\Projects\MES\MES Sites\Sites.mxd

BAY COUNTRY WELCOME CENTER

BACKGROUND

The Bay Country Welcome Center, in Queen Anne's County, is a Department of Transportation (DOT) - State Highway Administration facility. This site is located on U.S. 301, in Queen Anne's County, Maryland, approximately 15 miles north of its junction with U.S. 50. The facility is located in the median of U.S. 301 and serves both northbound and southbound traffic.

The Bay Country Welcome Center has the following facilities:

- Restrooms
- Information Center
- Water Fountain
- Parking Area

The Rest Stop is open year-round, during daytime only, and was visited by approximately 68,000 persons in 2007. The center has approximately 8 staff members.

Maryland Environmental Service (MES) operates the following:

- Water Treatment Plant
- On-Site Disposal System

WATER AND ONSITE WASTEWATER DISPOSAL SYSTEM FACILITIES DESCRIPTION

A. WATER TREATMENT

The Bay Country Welcome Center water system consists of two (2) drilled wells, a treatment facility, and a distribution network. The treatment facility is rated at 40 gpm, or approximately 57,600 gpd. The treatment facility consists of two (2) arsenic removal units, a softening unit with its associated brine tank, chemical feed units for sodium hypochlorite, and two (2) 119-gallon bladder tanks. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION SYSTEM

The Bay Country Welcome Center has two (2) wells. Well No. 1 (currently in the process of being abandoned) is located in a grassy area near the picnic table area. Well No. 2 is located in a grassy area near the parking lot. The facility has approximately 500 feet of 2-inch water distribution main and service lines. Please refer to the Supplemental Information Section – Facility Description – WS&D.

C. ONSITE WASTEWATER DISPOSAL SYSTEM

The Center's wastewater is discharged into two (2) 10,000-gallon septic tanks in series and is then pumped into drain fields via two (2) 26 gpm pumps and 5,000-feet of force main. Please refer to Supplemental Information Section – Facility Description – OSDS.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2007 OPERATIONS INFORMATION

In 2007, average and peak water flows for the water treatment plant were 2,995 gallons per day and 40,000 gallons per day, respectively. Additional 2007 operations data for the water facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

The water source, water treatment, and onsite wastewater disposal systems are operating satisfactorily.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility did not have any violations in the past 15 years. Current water usage exceeds the amount of water allocated by the groundwater appropriation permit. Request for a revision of the groundwater appropriation permit will be required. No additional future regulations are expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

MES has made no capital improvement requests in the past.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

No improvements have been recommended for this facility for this planning period.

SUPPLEMENTAL INFORMATION

BAY COUNTRY WELCOME CENTER

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The water system consists of two (2) drilled wells, a treatment facility, and 125KW emergency generator, and distribution network.

Well No. 1 - This source is currently in process of being abandoned. The well is located in a grassy area, near the picnic table area. The well, drilled in 1973, is 6-inches in diameter and has a total depth of 60 feet. It is provided with 6-inch steel casing. The well has a presumed yield of 15 gpm. The well pump information is unknown. The static water level is at 6 feet. The pump is set at an unknown depth.

Well No. 2 - This well is located in a grassy area near the parking lot. The well, drilled in 1994, is 6-inches in diameter and has a total depth of 325 feet. It is provided with 6-inch casing. The well has a presumed yield of 50 gpm. Water is pumped from the well by a 5 hp submersible pump, which is capable of delivering 50 gpm. The static water level is 76ft below grade. The pump is set at 210 ft. and was installed in 1994.

The facility has approximately 500 ft. of 2-inch of water distribution main and service lines.

WATER TREATMENT

The waterworks consist of two (2) drilled wells, a treatment facility, and a distribution network.

The treatment facility consists of two (2) arsenic removal units, a softening unit with its associated brine tank, chemical feed units for sodium hypochlorite, and two (2) 119-gallon bladder tanks.

The treatment and control building is approximately 12 ft. long and 12 ft. wide. The treatment facility houses two (2) arsenic removal units. A separate room behind the restroom houses the softening units, sodium hypochlorite feed units and two (2) bladder tanks. The treatment and control building is equipped with two (2) heaters, one (1) exhaust fan, lighting, and other controls. The treatment facility is rated at 40 gpm, or approximately 57,600 gpd.

Raw well water enters the plant via a 2-inch water pipe and is first treated by two (2) arsenic removal units manufactured by Purolite. Each unit's vessel is 24-inches in diameter and is 60-inch high. Each unit is capable of treating 20 gpm. Each unit has 9.5 cubic feet of Arsenex NP resin. The backwash is accomplished at rate of 20 gpm.

Then, arsenic treated water is treated further by sodium hypochlorite. Sodium hypochlorite feed facilities includes chemical metering pumps rated at 12 gpd @ 110 psi and a 400-gallon day tank.

Next, arsenic and sodium hypochlorite-treated water is conveyed to two (2) 119-gallon bladder tanks and then to a softener unit. The softener unit is 5ft. high, 16-inches in diameter, and capable of treating 27 gpm with an exchange capacity of 28,000 grains of hardness per cubic feet. The softening unit is coupled with a brine tank, which is 2 ft. in diameter and 40-inches high. Bladder tanks provide storage and pressure to the distribution network.

ONSITE WASTEWATER DISPOSAL SYSTEM

The wastewater treatment facilities for the Center consist of two (2) septic tanks in series, a pump station, and drain fields. The size of the septic tanks are 10,000 gallons each. The effluent from these two (2) septic tanks is discharged into a wet well that is 5.5 ft. in diameter and approximately 15 ft. deep. Two submersible pumps in the wet well, with capacity of 700 gallons per hour and 900 gallons per hour, convey treated wastewater into drain fields.

The site has approximately 5,000 ft of force main.

Site Name: Bay Country Welcome Center

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates: *Latitude* 76° 4' 37.10" W *Longitude* 39° 1' 51.96" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Bay Country Welcome Center	Water System	SHA	Eastern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Bay Country Welcome Center

Address: 1000 Welcome Center, Centreville, MD 21617

Comments:

Agency: SHA

Region: Eastern

Average Daily Demand (ADD) (gal/day)	2,995
Peak Day Demand (gal/day)	40,000
WTP Design Capacity	57,600
Total No. of Wells	1
Average Daily Run Time of Wells (Hrs)	
Capacity w/ largest Well Offline	0
GW Appro. Permit Number (GAP)	QA1973G003(04) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	2,400
% of ADD to GAP	125%
General Discharge Permit Number	06HT5042

W/WW Engr. Project Mgt	MM
Location of Asbuilt Drawings or CDs	
WTP Process Description - List Unit Processes	Appendix C
Water source and Distribution System Description	Appendix D
Cost Analysis	Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Jason	Foreman	(410) 758-2998	(410) 490-8459
Kyle	Gulrich	(410) 758-2998	(410) 829-0861
Jay	Jarrell	(410) 758-2998	(443) 534-7242

Surface Water Appr. Permit Number	_______(_) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	
Days of Storage at ADD	
PDWIS WTP Number	117-1172
Appropriation Permit Exp. Date	7/1/2017 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Queenstown	BOD	4/22/1997	weekly	mg/L	70	45	Unknown	Construction of wetland treatment system.
Queenstown	BOD	4/22/1997	weekly	lbs/day	38	32	Unknown	Construction of wetland treatment system.
Queenstown	Fecal	7/31/1997	daily	MPN	18	14	Unknown	possiable dumping samples before and after were with in limits.
Queenstown	BOD	1/20/1999	weekly	mg/l	57	45	Unknown, probable lab error	ruts in road will be filled with stone, and grass seed will be sprayed in areas with little vegitation.
Queenstown	Fecal	5/31/1999	monthly	MPN	22	14	Unknown	Flow pace feed pump will be purchased and operators will chesk the rate once per day

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Bay Country Welcome Center

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
	Total:	**$0**		
	Total:	**$0**		

BAY COUNTRY WELCOME CENTER

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:
- The plant is operating satisfactorily

Proposed Improvements:
- None

ON-SITE WASTE DISPOSAL

Conditional Analysis:
- The system is operating satisfactorily

Proposed Improvements:
- None

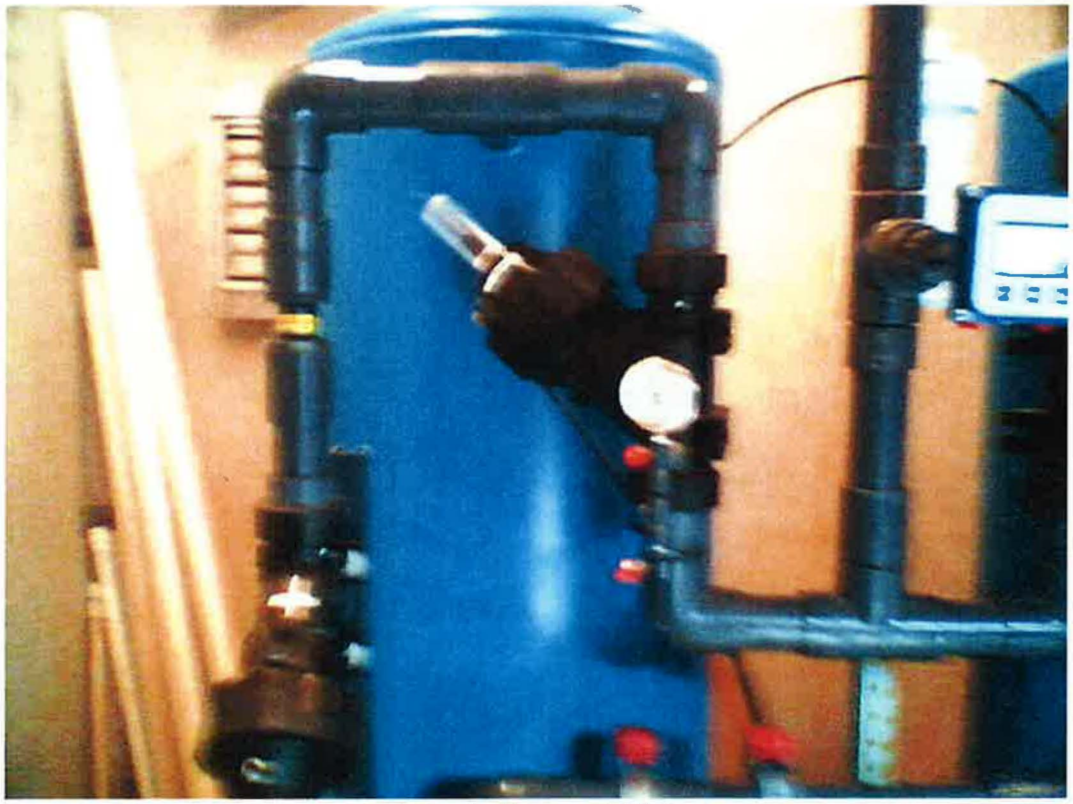
Bay Country Welcome Center

ONSITE WASTEWATER DISPOSAL SYSTEM

Septic Tanks- Overview

Wastewater Pump Station Overview

WTP



Arsenic Removal Unit

Bladder Tanks

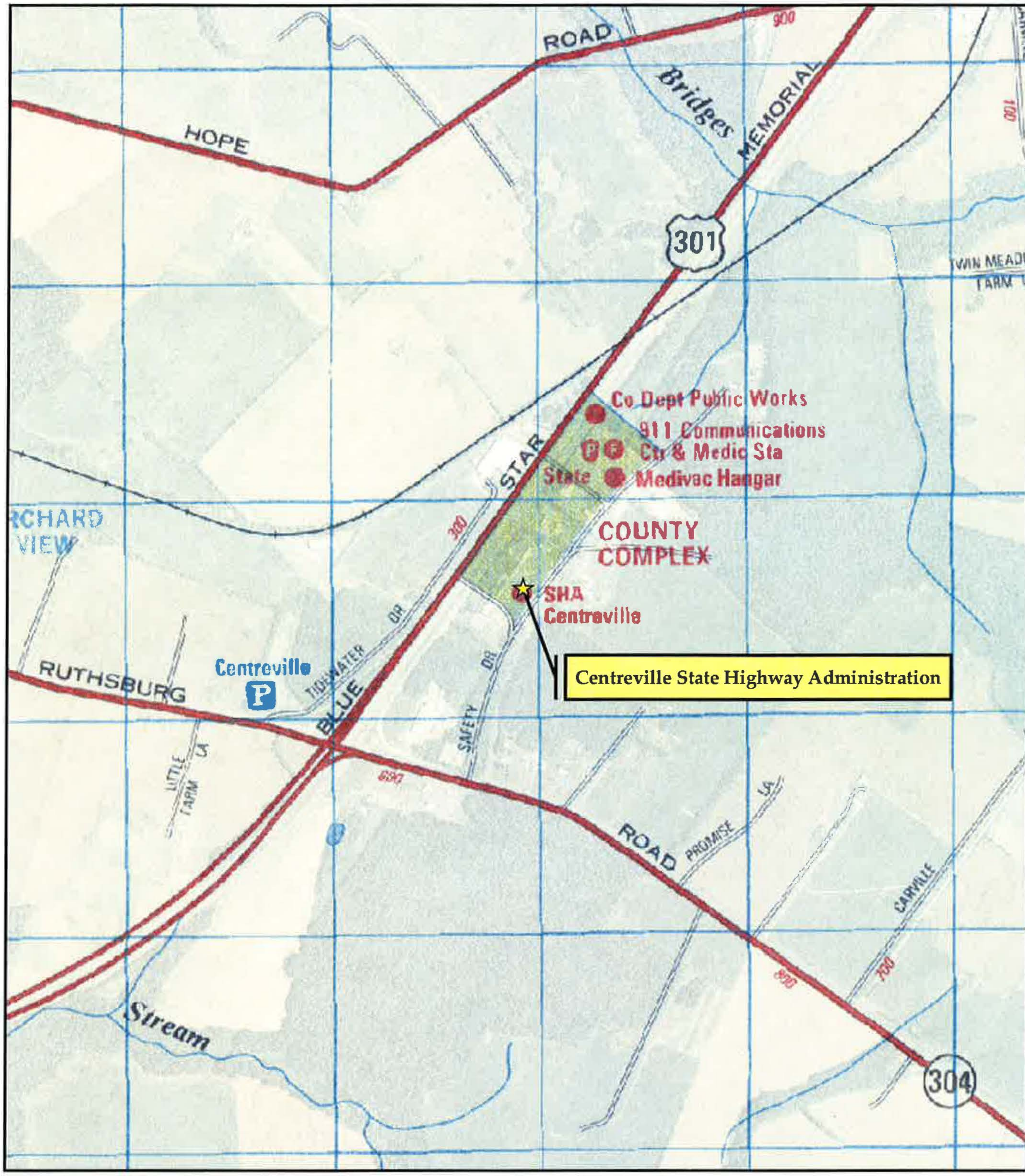
WTP

Well Number 1

Well Number 2

Centreville Maintenance Shop

State Highway Administration



☆ Sites

Water and Wastewater Master Plan 2008

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

Figure 1

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

0 500 1,000 1,500 2,000
Feet

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CENTREVILLE MAINTENANCE SHOP
(STATE HIGHWAY ADMINISTRATION)

BACKGROUND

The Centreville Maintenance Shop is a State Highway Administration (SHA) facility. The facility is located on Safety Road, near State Route 304, near County and State offices. The SHA operates the water distribution system. The onsite disposal system collects wastewater from two (2) buildings that house approximately 20 people.

Maryland Environmental Service (MES) operates the following:

- On-site Disposal system
- Oil water separator and the associated storm water facilities

ONSITE WASTEWATER DISPOSAL SYSTEM DESCRIPTION

ONSITE WASTEWATER DISPOSAL SYSTEM
Wastewater is collected by a gravity sewer from two (2) buildings and treated by mixing and mesh screen units. The treated water is discharged via pump station to a drain field. There are approximately 200 feet of gravity sewers and approximately 500 feet of force main to a drain field. Please refer to Supplemental Information Section – Facility Description - OSDS.

EXISTING CONDITIONS OF WATER FACILITIES

A. **2010 OPERATIONS INFORMATION**
2010 flow information is not available.

B. **OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES**
The onsite wastewater disposal system is operating satisfactorily.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility is not permitted. This facility did not have any violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

No capital improvement requests have been made in the past via Maryland Environmental Service.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

No improvements have been recommended for this facility for this planning period.

SUPPLEMENTAL INFORMATION

CENTREVILLE MAINTENANCE SHOP
(STATE HIGHWAY ADMINISTRATION)

FACILITY DESCRIPTIONS

ONSITE WASTEWATER DISPOSAL SYSTEM

Wastewater is collected by gravity sewers from two (2) buildings and is treated by mixing and mesh screen units then pumped by two (2) pumps to a drain field.

There are approximately 200 feet of gravity sewers and approximately 500 feet of force main to a drain field.

This facility is not permitted.

Site Name: Centreville Maintenance Shop

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd N/A

Amount of Previous CIP Funding $0.00

Amount of Current CIP funding $0.00

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
76° 5' 38.38" W	39° 0' 6.35" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Centreville Maintenance Shop	Wastewater System	SHA	Eastern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name:	Centreville Maintenance Shop		W/WW Engr. Project Mgt	MM
Address			Location of Asbuilt Drawings or CDs	
			WWTP Process Description - List Unit Processes	Appendix A ☐ N/A
			Sewer Collection Distribution	Appendix B
Agency:	SHA		Cost Analysis	Link
Region:	Eastern			

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber

Annual Average Daily Flow (gal/day)	204,852				
Peak Day Flow (gal/day)	1126000		Will future limits be more stringent?		
Ratio Peak Flow to ADD	5.5		GW Disposal Permit Exp. Date		☐ N/A
WWTP Design/Permit Capacity (gal/day)			Is more land needed for disposal?		
% of ADD to Design Capacity			No. of Sludge Disposal Options available	???	
NPDES Permit Number	MD0069043	☐ N/A	Are additional sludge disposal permits needed?	???	
State Permit Number	03-DP-3438	☐ N/A	Number of sludge permit violations	0	
NPDES Permit Exp. Date		☐ N/A	Number of permit violations		

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	1/1/2010	TN	monthly	mg/l	6.7	6
Details	1/31/2009	T-N	monthly	mg/l	7.9	6.0
Details	12/31/2008	T-N	monthly	mg/l	10.3	6

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Centreville	T-N	12/31/2008	monthly	mg/l	10.3	6	A 3" rain storm on the 10th and 11th thinned out the biomass in the SBR system and nitrification slowed down.	Solids wasting was decreased in order to increase the biomass and polymer was added to aid in settling.
Centreville	T-N	1/31/2009	monthly	mg/l	7.9	6.0	A 3" rain storm in December thinned out the biomass in the SBR system and nitrification slowed down.	Solids wasting was decreased in order to increase the biomass and polymer was added to aid in settling. Additional samples were collected once nitrification resumed.
Centreville	TN	1/1/2010	monthly	mg/l	6.7	6	The Town assumed WWTP operations on Jan 1 2010. At that time the SBR control panel was in a failure mode and required 24/7 manual operations. This caused the TN monthly limit to be exceeded by .7 mg/l.	The SBR computer failed in December 2009 and was a pre-existing condition at the time the Town assumed operation. The Town staff repaired the malfunctioning computer and restored all automatic presets and functions to the SBR process.

CENTREVILLE MAINTENANCE SHOP
(STATE HIGHWAY ADMINISTRATION)

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:
- N/A

Proposed Improvements:
- None

ON-SITE DISPOSAL SYSTEM

Conditional Analysis:
- Pump station to drain field is operating satisfactorily

Proposed Improvements:
- None

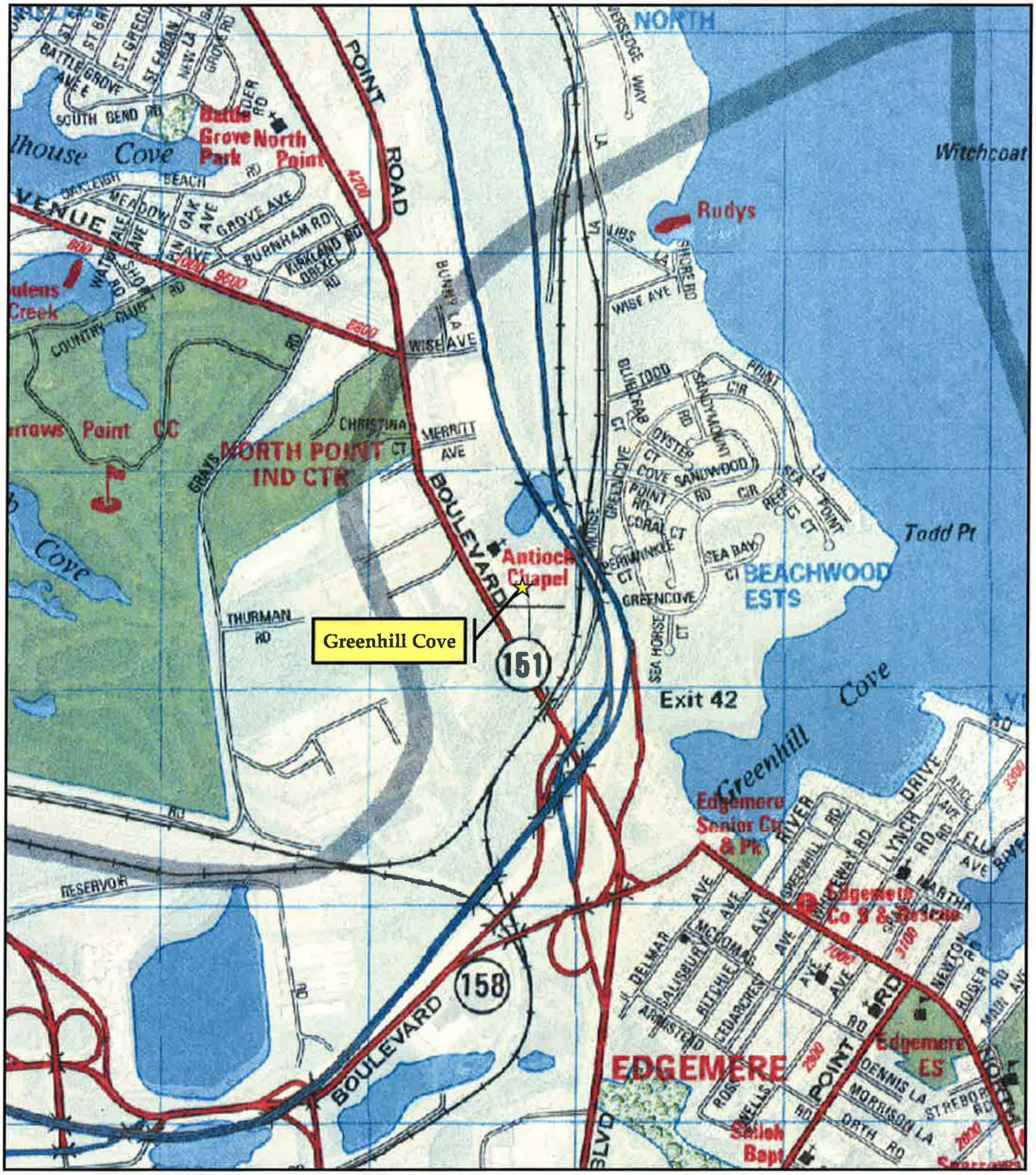
Centreville Maintenance Shop

ONSITE WASTEWATER DISPOSAL SYSTEM

Centerville SHA Pump Station

Green Hill Cove

Maryland State Highway Administration



☆ Sites	Water and Wastewater Master Plan 2008	NAD 1983 StatePlane Maryland FIPS 1900 (feet) Projection: Lambert Conformal Conic GCS: North American 1983
Figure 1	MARYLAND ENVIRONMENTAL SERVICE GIS SERVICES 259 Najoles Road Millersville, MD 21108 (410) 729- 8200	0 500 1,000 1,500 2,000 Feet I:\GIS\Projects\MES\MES Sites\Sites.mxd

GREEN HILL COVE
(MARYLAND STATE HIGHWAY ADMINISTRATION)

BACKGROUND

Green Hill Cove, in Baltimore County, is a State Highway Administration (SHA) facility. Green Hill Cove is located ¼ mile east of State Route 151 on a SHA service road off of Morse Lane in Sparrows Point.

The facility is a batch neutralization process designed to treat alkaline seepages (leachate) that weeps from the embankment of I-695. Storm water passes through a thick layer of slag producing a leachate high in calcium and hydroxyl ions that has a pH in excess of the facilities NPDES permit limit. The leachate is collected and treated at an industrial wastewater treatment facility before being discharged into Greenhill Cove.

Maryland Environmental Service (MES) operates this industrial wastewater treatment facility for the SHA.

WASTEWATER TREATMENT FACILITY DESCRIPTION

WASTEWATER TREATMENT

Leachate generated from the roadbed of I-695 during rainfall events is collected in a pond and chemically treated with acid or caustic soda to adjust the pH. After the pH has been corrected to within the range of 6.5 to 8.5, the treated effluent is discharged in batches into Green Hill Cove. Please refer to the Supplemental Information Section – Facility Description - WWTP.

EXISTING CONDITIONS OF WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average and peak wastewater flows were 1,221 gallons per day and 12,689 gallon per day, respectively. Additional 2010 operations data for the water facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment, the following deficiencies were identified:

- There are no means of operating in automatic mode; an operator needs to attend the plant
- The fill pump is in poor condition(replaced)
- The recirculation pump is in poor condition (replaced)
- There is no tank pressure transmitter to allow monitoring of batch neutralization tank (not needed for manual operation)
- There is no pond level transmitter to allow automatically activate pump

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility has had three (3) NPDES permit violations in the past 14 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

Maryland Environmental Service has made no past capital improvement requests.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment, the following recommended improvements were identified:

- Install pond level transmitter and tie to mission/alarm system

The above improvements will be part of the critical maintenance request, and will be funded by State Highway Administration. The projected total cost is **$7,500.00.**

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: N/A
- Installation: 2012

SUPPLEMENTAL INFORMATION

GREEN HILL COVE
(MARYLAND STATE HIGHWAY ADMINISTRATION)

FACILITY DESCRIPTIONS

WASTEWATER TREATMENT

Green Hill Cove is a leachate treatment facility. It is designed to treat alkaline seepages (leachate) that emanates from the embankment of I-695 in Sparrows Point, Baltimore County, Maryland. Runoff and leachate from the highway access ramp collects in a pond at the toe of the ramp bank. The leachate is treated with 93% sulfuric acid to lower the pH. The leachate collected in the pond is transferred to an 882-gallon fiberglass tank through a basket strainer. The transfer is a batch process attended by an operator. Sulfuric acid is injected into the influent piping of the fiberglass tank with a mixer that turns on automatically. The sulfuric acid feed system consists of a chemical metering pump rated at 4 gph, and a 55-gallon PVC tank with a mixer. The facility is equipped with a flow meter, a chart recorder and pH meters and controls.

Effluent limitations and monitoring requirements:

- pH: minimum is 6.5 and maximum is 8.5
- Monitoring Requirements:
  - Flow: monthly average and daily average
  - Total lead, total zinc and semi-volatile organics: monthly average and daily maximum

Site Name: Green Hill Cove - MD State Highway Administration

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Non

Indicate the Fiscal Year of Previous Funding Rec'd N/A

Amount of Previous CIP Funding **$0.00**

Amount of Current CIP funding **$0.00**

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates: *Latitude* 76° 30' 42.26" W *Longitude* 39° 15' 32.65" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Green Hill Cove - MD State ...	Wastewater System	SHA	Northern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Green Hill Cove - MD State Highway Admin.

Address: Morse Lane

Edgemere, MD 21219

Agency: SHA

Region: Northern

Annual Average Daily Flow (gal/day)	1,221
Peak Day Flow (gal/day)	12,689
Ratio Peak Flow to ADD	5%
WWTP Design/Permit Capacity (gal/day)	27,000
% of ADD to Design Capacity	5
NPDES Permit Number	MD0063916 ☐ N/A
State Permit Number	060P2633 ☐ N/A
NPDES Permit Exp. Date	4/30/2015 ☐ N/A

W/WW Engr. Project Mgt: SI

Location of Asbuilt Drawings or CDs

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Larry	Chambliss	(410) 285-0719	(410) 285-0719
Dave	Shaffer	(410) 285-0709	(410) 285-0709
Chris	Thompson	(410) 282-3076	(410) 897-7607

Will future limits be more stringent?	N/A
GW Disposal Permit Exp. Date	__/__/____ ☑ N/A
Is more land needed for disposal?	
No. of Sludge Disposal Options available	0
Are additional sludge disposal permits needed?	???
Number of sludge permit violations	0
Number of permit violations	3

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	12/23/2007	pH	daily	su max	12.1	8.5
Details	4/17/2007	pH	daily	su	12.38	8.5
Details	3/8/2007	pH	daily	su	4.6	6.5
Details	1/19/2001	pH	daily	SU	5.4	6
Details	5/24/2000	pH	daily	su	1.7	6.5
Details	6/4/1998	pH	daily	su	4.2	6.5
Details	6/2/1998	pH	daily	su	2.01	6.5

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Green Hill Cove	pH	4/17/2007	daily	su	12.38	8.5	Electronic effluent discharge valve failed to close all the way after discharging a batch. When the tank begain to fill again there was a discharge of none treated water.	A maintenance work order has been placed for the electronic discharge valve.
Green Hill Cove	pH	12/23/2007	daily	su max	12.1	8.5	Electronic effluent valve failed to close after discharging a batch. When the tank begin to fill again there was a discharge of approx. 150 gallons non-treated water.	A manually operated valve will be installed to control the discharge of effluent.
Green Hill Cove	pH	6/1/1998	daily	su	6.1	6.5	pH probe location problems	Consent order, plant upgrade pending
Green Hill Cove	pH	6/2/1998	daily	su	6.44	6.5	pH probe location problems	Consent order, plant upgrade pending
Green Hill Cove	pH	6/3/1998	daily	su	3.01	6.5	pH probe location problems	Consent order, plant upgrade pending
Green Hill Cove	pH	6/4/1998	daily	su	4.2	6.5	pH probe location problems	Try to increase mlss
Green Hill Cove	pH	5/24/2000	daily	su	1.7	6.5	Mixing pump turned off, causing check valve to malfunction	Try to increase mlss
Green Hill Cove	pH	1/19/2001	daily	SU	5.4	6		Operators counseled

GREEN HILL COVE
(MARYLAND STATE HIGHWAY ADMINISTRATION)

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT FACILITY

Conditional Analysis:

- There is no means of operating in automatic mode. The operator needs to attend the plant the entire time it is processing a batch
- There is no pond level transmitter to automatically activate the raw transfer pump

Proposed Improvements:

- Install a pond level transmitter

WASTEWATER COLLECTION SYSTEM:

Conditional Analysis:

- N/A

Proposed Improvements:

- N/A

Green Hill Cove
Maryland State Highway Administration

Sulfuric Acid Feed System

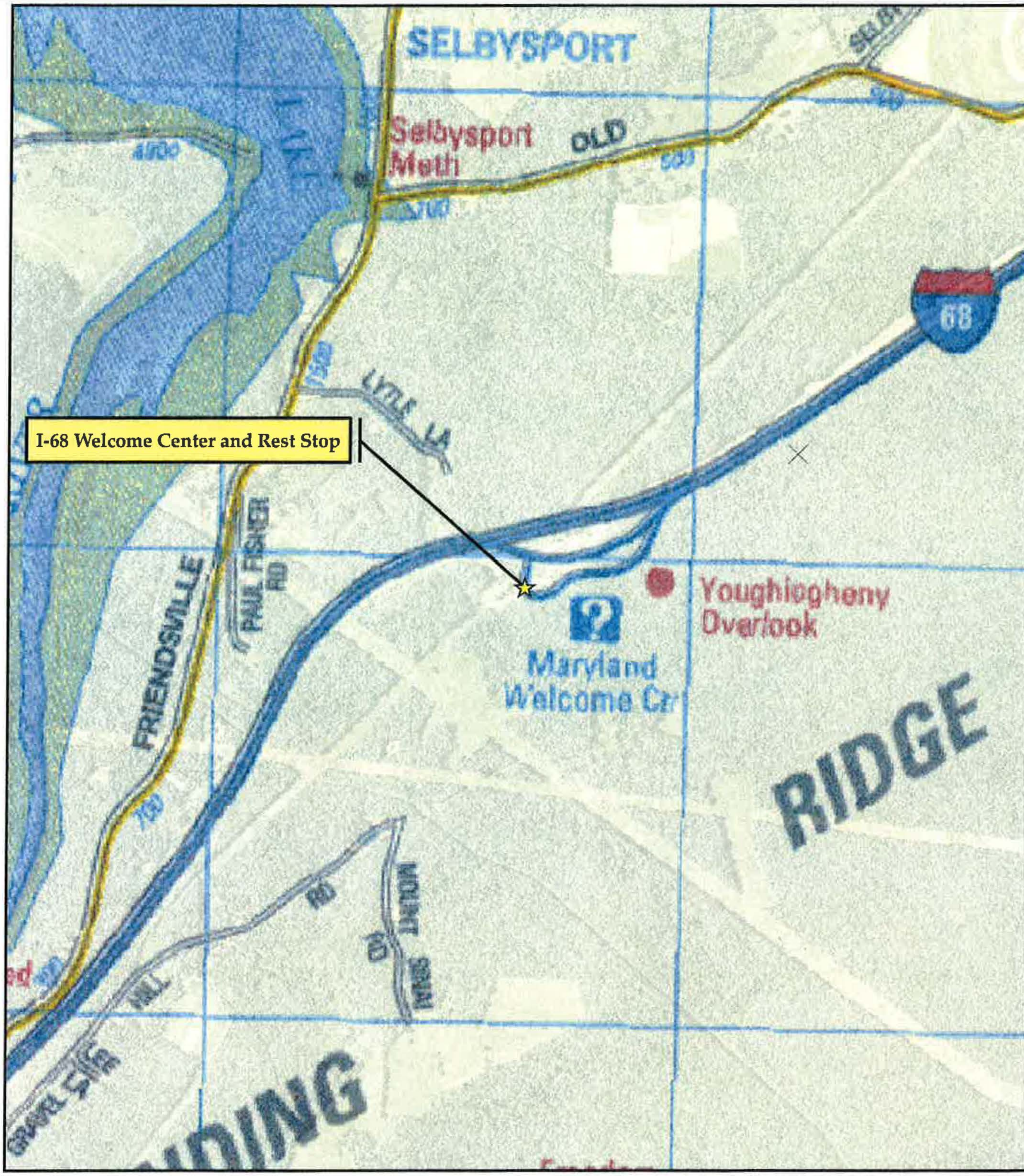
882-Gallon Leachate Tank


Leachate Collection Piping


Leachate Pond

I-68 Rest Stop

Youghiogheny Overlook in Friendsville



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729-8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

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I-68 REST STOP
YOUGHIOGHENY OVERLOOK IN FRIENDSVILLE

BACKGROUND

The I-68 Rest Stop that is located in Garrett County, also known as the Rest Stop at Youghiogheny Overlook in Friendsville, is a State Highway Administration (SHA) facility. The Rest Stop is located off state Route 68, west of the town of Frostburg.

The Rest Stop serves travelers by providing year-round access to water fountains and parking areas.

The Rest Stop is coupled with the Visitor Center that is located approximately 300 yards from the facility. The Rest Stop and the Visitor Center share the same parking area.

Maryland Environmental Service (MES) operates the water source and water treatment facilities for the I-68 Rest Stop.

WATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The water system for the I-68 Rest Stop consists of two (2) wells, a treatment facility, a 60 gallon bladder tank, a 60 gallon holding tank, and a distribution network. Treatment units are housed in a 6 feet long by 5 feet wide shed. The treatment plant consists of a softening unit and chemical feed facilities for soda ash and sodium hypochlorite. Please refer to the Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

The I-68 Rest Stop has two (2) wells. Well No. 1 is located 150 feet southeast of the facility and Well No. 2 is located 75 feet south of the restrooms. There is approximately 200 feet of 2-inch PVC water distribution pipes. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2010 OPERATIONS INFORMATION

The average daily flow for this facility is 532 gpd .

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

The water source and water treatment facilities are operating satisfactorily.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility did not have any violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

No capital improvement requests have been made in past by Maryland Environmental Service.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

There are no recommended improvements for this facility for this planning period.

SUPPLEMENTAL INFORMATION

I-68 REST STOP
YOUGHIOGHENY OVERLOOK IN FRIENDSVILLE

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION

Two (2) wells supply water to the I-68 Rest Stop.

Well No. 1- (ID# GA-88-0275) is located 150 ft. southeast of the facility. The well was drilled on March 17, 1996 to a depth of 490 ft. with a casing diameter of 6 inches. The current yield is 20 gpm with the static water level is 66 ft. The submersible pump is rated for 11 gpm and has a 1.5 hp motor set at a depth of 400 ft.

Well No. 2- (ID# GA-87-0999) is located 75 ft. south of the bathroom facility. The well was drilled in 1988 to a depth of 397 ft. with a casing diameter of 6 inches. The current yield is 15 gpm with a static water level of 85½ ft. The pump is a 1.5 hp submersible.

The water distribution system of approximately 200 feet of 2-inch PVC pipes supplies the bathroom facilities and drinking fountains.

WATER TREATMENT

The water system for the I-68 Rest Stop consists of (2) two wells, a treatment facility, a 60-gallon bladder tank, a 60-gallon holding tank, and a distribution network.

Treatment units are housed in a 6 ft. long by 5 ft. wide shed. The treatment plant consists of a softening unit, a sand filter, and chemical feed facilities for soda ash and sodium hypochlorite.

The chemical feed facilities for soda ash include a 15-gallon day tank and a chemical metering pump rated at 3 gpd at 100 psi. Chemical feed facilities for sodium hypochlorite includes a 35-gallon day tank, and a chemical metering pump rated at 7 gpd at 100 psi.

The softening unit, manufactured by Culligan, is rated for 5,800 gpd and consists of ion exchange vessels and a brine tank.

Site Name: I-68 Rest Stop

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates: *Latitude* *Longitude*

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	I-68 Rest Stop	Water System	SHA	Western

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: I-68 Rest Stop

Address

7 mile marker

Friendsville, MD 21531

Comments:

Agency: SHA

Region: Western

Average Daily Demand (ADD) (gal/day)

Peak Day Demand (gal/day)

WTP Design Capacity 5800 gpd

Total No. of Wells 2

Average Daily Run Time of Wells (Hrs)

Capacity w/ largest Well Offline

GW Appro. Permit Number (GAP) GA1987G001(__) N/A

Total GW. Appro. (GAP) (ave.day) (gal/day) 1000

% of ADD to GAP

General Discharge Permit Number

W/WW Engr. Project Mgt

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Randy	Lewis	(301) 387-4281	(301) 999-8619
Bob	Lancaster	(301) 387-4281	(301) 999-8610
Randy	Broadwater	(301) 387-4281	(301) 999-8600

Surface Water Appr. Permit Number (__) N/A

Surface Water Appr. Amount (SAP) (ave. day) (gal/day)

% of ADD to SAP

Amount of Water Storage (gallons) 60

Days of Storage at ADD

PDWIS WTP Number 111-1028

Appropriation Permit Exp. Date N/A

Est. Total length of Water Lines (feet)

Number of permit violations

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

I-68 REST STOP
YOUGHIOGHENY OVERLOOK IN FRIENDSVILLE

CONDITIONAL ANAYLYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:

- Facility is in overall good condition, no deficiencies reported

Proposed Improvements:

- SHA has possible proposed upgrades to infrastructure, possibly combining I-68 rest stop and I-68 Welcome Center into one (1) system

WATER SOURCE

Conditional Analysis:

- **No reported problems**

Proposed Improvements:

- **None**

WATER DISTRIBUTION SYSTEM

Conditional Analysis:

- No reported problems

Proposed Improvements:

- None

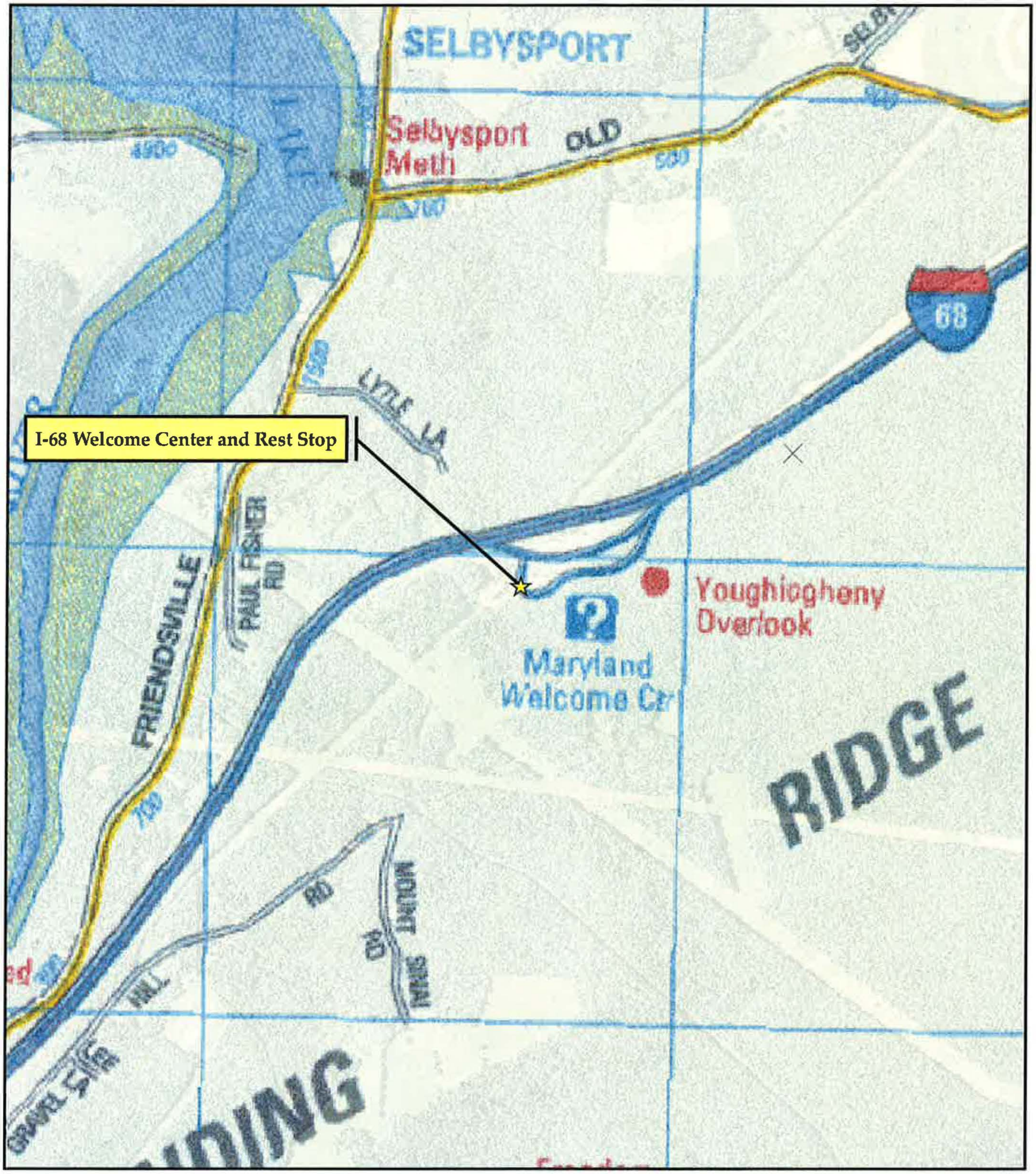
I-68 Rest Stop
Youghiogheny Overlook in Friendsville

Bladder Tank

Treatment Process Overview

I-68 Visitor Center

Youghiogheny Overlook in Friendsville



☆ Sites	Water and Wastewater Master Plan 2008	NAD 1983 StatePlane Maryland FIPS 1900 (feet) Projection: Lambert Conformal Conic GCS: North American 1983
Figure 1	MARYLAND ENVIRONMENTAL SERVICE GIS SERVICES 259 Najoles Road Millersville, MD 21108 (410) 729- 8200	0 500 1,000 1,500 2,000 Feet I:\GIS\Projects\MES\MES Sites\Sites.mxd

I-68 VISITOR CENTER
YOUGHIOGHENY OVERLOOK IN FRIENDSVILLE

BACKGROUND

The I-68 Youghiogheny Overlook in Friendsville (Visitor Center) that is located in Garrett County, also known as the Youghiogheny Welcome Center, is a State Highway Administration (SHA) facility. The Visitor Center is located off state Route 68, west of the town of Frostburg.

The Visitor Center is currently closed.

The Visitor Center is coupled with Rest Stop, which is located approximately 300 yards from the Visitor Center. The Visitor Center and the Rest Stop share the same parking area.

Maryland Environmental Service (MES) operates the water source and water treatment facilities for the I-68 Visitor Center.

WATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The water system for the I-68 Visitor Center consists of a single well, a treatment facility, a 35- gallon bladder tank, and a distribution network. The treatment facility consists of a softening unit, a filtration unit, and chemical feed facilities for soda ash and sodium hypochlorite. Please refer to the Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

The I-68 Visitor Center has a single well located approximately 250 feet south of facility. There is approximately 200 feet of 2-inch PVC water distribution pipes. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

EXISTING CONDITIONS OF WATER FACILITIES

A. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

The water source and water treatment facilities are operating satisfactorily, however are not currently in use.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility had no violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

No capital improvement requests have been made in the past via Maryland Environmental Service.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

No improvements are recommended for this facility for this planning period.

SUPPLEMENTAL INFORMATION

I-68 VISITOR CENTER
YOUGHIOGHENY OVERLOOK IN FRIENDSVILLE

FACILITY DESCRIPTIONS

WATER TREATMENT

The Visitor Center is currently closed and the water facilities are not in use.

The water system for the I-68 Visitor Center consists of a single well, a treatment facility, a 35- gallon bladder tank, and a distribution network.

The treatment facility consists of a softening unit, a filtration unit, and chemical feed facilities for soda ash and sodium hypochlorite.

The chemical feed facilities for sodium hypochlorite include a 15-gallon day tank and a chemical metering pump rated at 7 gpd at 100 psi.

The softening unit, manufactured by Culligan, is rated for 800 gpd and consists of ion exchange vessels and brine tank.

WATER SOURCE AND DISTRIBUTION

Water is supplied from one well (ID# GA-73-0417) is located 250 ft. south of the Visitor Center in the woods. The well was drilled in 1974 to a depth of 298 ft. and has a 6-inch casing. The static water level is at129 ft. and the well has a presumed yield of 10 gpm. The submersible well pump has a ¾ hp motor. The distribution system, installed in 1982, consists of approximately 200 feet of predominantly 1-1/2 inch in PVC and supplies a drinking water fountain and kitchen.

Site Name: I-68 Visitor Center

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates: *Latitude* *Longitude*

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	I-68 Visitor Center	Water System	SHA	Western

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: I-68 Visitor Center

Address

7 mile marker

Friendsville, MD 21531

Comments:

Agency: SHA

Region: Western

Average Daily Demand (ADD) (gal/day)

Peak Day Demand (gal/day)

WTP Design Capacity

Total No. of Wells 1

Average Daily Run Time of Wells (Hrs)

Capacity w/ largest Well Offline

GW Appro. Permit Number (GAP) ( ) N/A

Total GW. Appro. (GAP) (ave.day) (gal/day)

% of ADD to GAP

General Discharge Permit Number

W/WW Engr. Project Mgt

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes Appendix C

Water source and Distribution System Description Appendix D

Cost Analysis Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Randy	Lewis	(301) 387-4281	(301) 999-8619
Bob	Lancaster	(301) 387-4281	(301) 999-8610
Randy	Broadwater	(301) 387-4281	(301) 999-8600

Surface Water Appr. Permit Number ( ) N/A

Surface Water Appr. Amount (SAP) (ave. day) (gal/day)

% of ADD to SAP

Amount of Water Storage (gallons)

Days of Storage at ADD

PDWIS WTP Number 111-1145

Appropriation Permit Exp. Date N/A

Est. Total length of Water Lines (feet)

Number of permit violations

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

I-68 VISITOR CENTER
YOUGHIOGHENY OVERLOOK IN FRIENDSVILLE

CONDITIONAL ANAYLYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:
- Facility is in overall good condition, no deficiencies reported

Proposed Improvements:
- SHA has possible proposed upgrades to infrastructure, possibly combining I-68 rest stop and I-68 Welcome Center into 1 system.

WATER SOURCE

Conditional Analysis:
- No reported problems

Proposed Improvements:
- None

WATER DISTRIBUTION

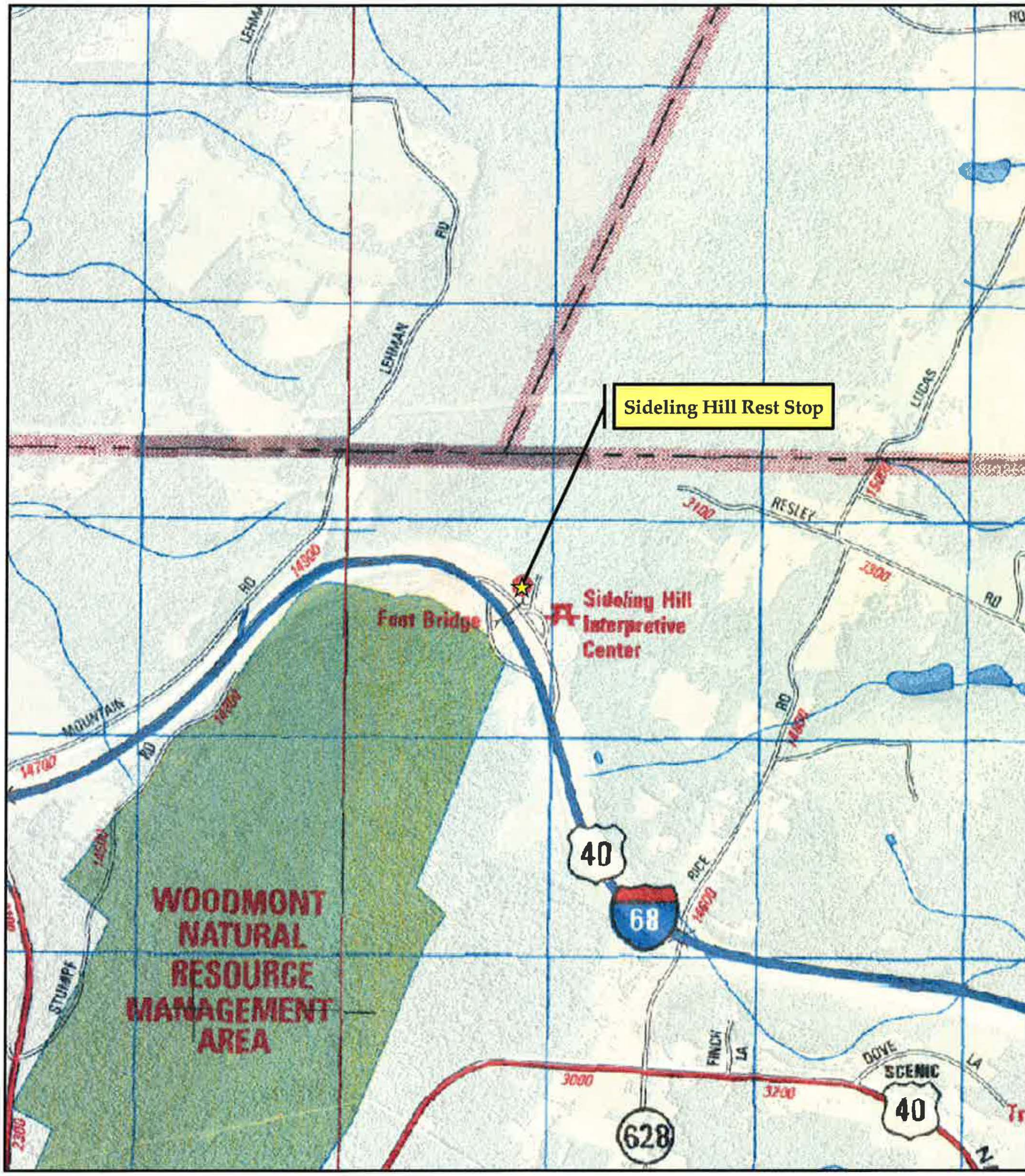
Conditional Analysis:
- No reported problems

Proposed Improvements:
- None

I-68 Visitor Center
Youghiogheny Overlook in Friendsville

Treatment Process Overview

I-68 Sideling Hill Rest Area



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE GIS SERVICES

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

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I-68 SIDELING HILL REST AREA

BACKGROUND

The I-68 Sideling Hill Rest Area is operated by the State Highway Administration (SHA). The rest area is located on I-68, approximately ten (10) miles west of Hancock in Washington County, Maryland. The site offers spectacular views and a geologic history of the Sideling Hill Cut. The rest area has an exhibit center, snack rooms, restrooms, a parking area on the westbound side and restrooms on the eastbound. A pedestrian bridge connects the eastbound and westbound sides. Approximately 1,408,944 persons visited the rest area in 2010

The SHA has no plans for expansion of this facility for this planning period.

Maryland Environmental Service (MES) operates the water source, water treatment plant, and wastewater treatment plant. The SHA operates the water distribution system and the wastewater collection system.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT

The Sideling Hill water system consists of two (2) drilled wells, two (2) individual sodium hypochlorite feed facilities, a treatment facility located within the restroom area, a 20,000-gallon below ground storage tank, two (2) pressure/bladder tanks, and a distribution network. The treatment plant is rated for 48,960 gallons per day and consists of two (2) green sand filters, chemical feed facilities for potassium permanganate, three (3) booster pumps, and two (2) bladder tanks in addition to sodium hypochlorite feed facilities at each of the individual wells. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION SYSTEM

Sideling Hill has two (2) wells. One (1) well is located at I-68 westbound, near the exhibit center, and the other well is located in a vault at I-68 eastbound. The rest area has approximately 2,300 ft. of 2-inch and 4-inch water mains and service lines. Please refer to Supplemental Information Section – Facility Description – WS&D.

C. WASTEWATER TREATMENT

The Sideling Hill wastewater treatment plant is rated at 25,000 gallons per day and consists of a manual bar screen; a flow equalization tank, and the associated pumping units; a surge tank and the associated pumping units; one (1) aeration tank; one (1) clarifier with the associated return sludge pumping units; one (1) aerobic digester; two (2) filters; Ultraviolet disinfection units; and a post aeration unit. Please refer to Supplemental Information Section – Facility Description – WWTP.

D. WASTEWATER COLLECTION SYSTEM

The Sideling Hill wastewater collection system consists of approximately 2,110 feet of gravity sewer pipes and approximately ten (10) manholes. Please refer to Supplemental Information Section – Facility Description – WWCS.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average and peak water flows were 5,116 gallons per day and 15,100 gallons per day, respectively. In 2010, average and peak wastewater flows were 3,279 gallons per day and 14,000 gallons per day, respectively. Additional 2010 operations data for the water and wastewater facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment, the following deficiencies were identified:

Wastewater Treatment Plant

- The grating for most of the plant is corroding

Water Distribution System

- The raw water pipes are deteriorating and frequent leaks have been reported
- The distribution piping often leaks due to poor joint material/installation

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility did not have any violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

MES has made no past capital improvement requests for this facility.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

Recommended improvements for this facility include the following:

Wastewater Treatment Plant

- Replace grating as needed

Water Distribution System

- Replace water lines from well to treatment plant
- Replace PVC distribution water lines as needed

The SHA will request funding for these improvements. The projected cost is approximately **$367,700**. Please refer to the Supplemental Information Section – Cost Analysis and Recommended Improvements

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements are currently in progress.

SUPPLEMENTAL INFORMATION

I-68 SIDELING HILL REST AREA

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The waterworks consist of two (2) drilled wells, two (2) individual sodium hypochlorite feed facilities, a treatment facility located within the restroom area, a 20,000-gallon below ground storage tank, two (2) pressure/bladder tanks, and a distribution network.

Well No. 1 - The source is a well located at I-68 westbound near the exhibit center. The year this well was drilled is unknown. The well is 6-inches in diameter and has a total depth of 371 feet. It is provided with 6-inch steel casing. The static level of well is 87 feet. The yield and drawdown test, conducted in the past, presumes a yield of 50 gpm. The well is equipped with a 7.5 hp submersible pump. The pump is set at 321 feet and was installed in 1995. This well water enters the treatment facility via a 4-inch line.

Well No. 2 - The source is a well located in a vault in I-68 eastbound. The year this well was drilled is unknown. The well is 6-inches in diameter and has a total depth of 272 feet. It is provided with 6-inch steel casing. The static level of the well is 130 feet. The yield and drawdown test, conducted in the past, presumes a yield of 9 gpm. The well is equipped with a 7.5 hp submersible pump rated at 20 gpm. The pump is set at 255 feet. This well water enters the treatment facility via a 4-inch line.

Treated water is stored in a 20,000-gallon, below grade reservoir. Three (3) booster pumps, rated at 80 gpm @ 196 ft. TDH, withdraw water from a 20,000 gallon below ground reservoir and supply water to the distribution network.

The Park has approximately 2,300 feet of 2-inch and 4 –inch water distribution main and service lines.

WATER TREATMENT PLANT

The waterworks consists of two (2) drilled wells, two (2) individual sodium hypochlorite feed facilities, a treatment facility located within the restroom area, a 20,000-gallon below ground storage tank, two (2) pressure/bladder tanks, and a distribution network.

Both wells enter the treatment facility via a 4-inch chlorinated water main. Prior to entering the treatment building, each well is disinfected with sodium hypochlorite. Sodium hypochlorite feed facilities for each well consists of a 10 gpd chemical metering pump, 55 gallon chemical day tank, and 5 gpm @ 40 psi chlorine booster pump with a ½ hp motor. Both of the well's chlorination facilities are housed in a square building that is 4.5 feet wide by 6 feet high. Well No. 1 also has a 220-gallon bladder tank, which is located in the Visitor Center. The treatment facility is rated at 48,960 gpd. The treatment facility, located in the back of the restroom facilities at I-68 eastbound, consists of green sand filters, chemical feed facilities for potassium permanganate, three (3) booster pumps and a bladder tank. There is also a below grade 20,000-gallon reservoir located near the Well No. 2 chlorine building.

Two (2), 25-inch diameter by 48-inch high green sand filters are provided. Each filter is designed to treat 17 gpm. The filtration rate is 3 gpm/sq. ft. The bed depth is 24 inches. The filtering material consists of: No. 1 anthracite, manganese zeolite (green sand), 1/8-inch by ¼-inch gravel, ¼-inch by ½-inch gravel, 1/8-inch by 1/16-inch gravel, and 20-inch freeboard.

Chemical feed facilities for potassium permanganate consist of a chemical metering pump rated at 10 gpd and a 35-gallon day tank.

Each booster pump is rated at 80 gpm @ 196 ft. TDH with 7 hp motor.

The bladder tank has a volume of 158 gallons.

WASTEWATER TREATMENT PLANT

The Sideling wastewater treatment plant is a packaged activated sludge plant. The plant is rated for a design flow of 25,000-gpd. The WWTP include the following:

- Preliminary Treatment:
    - Manual bar screen: 2.8 square feet, ½-inch opening
- Primary Treatment:
    - Flow Equalization Tank 1:
        - ✓ Volume: 9,000 gallons
        - ✓ Pumps: Two (2), grinder, 18 gpm, with 2 hp motors each
    - Surge Tank
        - ✓ Dimensions and Volume: 10 ft diameter and 14ft high, 10,000 gallons
        - ✓ Pumps: Two (2), grinder, 18 gpm, with 2 hp each
        - ✓ Blowers: 1 positive displacement type, rated at 125scfm@4.5psig with 5 hp motor
- Biological Treatment (Package Plant):
    - Aeration Tank:
        - ✓ Units and volume: One (1), 3,420 cubic feet
        - ✓ Detention time: 24 hrs
        - ✓ Coarse bubble diffusers: 12 each rated at 5.5 cfm, with a total capacity of 66 cubic feet per minute
        - ✓ Blowers: 2 positive displacement type, rated at 125scfm@4.5 psig with 5 hp each
    - Secondary Clarifier:
        - ✓ Units and Dimensions: One (1), 12 ft long, 7.5 ft wide and 11ft deep
        - ✓ Clarifier drive motor rated at 1/2hp
        - ✓ Two (2) 3-inch return lines
        - ✓ Detention time: 4 hrs
        - ✓ Return sludge pump: One (1), 26 gpm maximum
    - Aerobic digester
        - ✓ Units and dimensions: one (1), 12 ft long, 3 ft wide and 11ft deep
        - ✓ Volume: 3,000 gallons
        - ✓ Sludge Storage: 2,500 gallons, 15 days

        - ✓ Diffusers: coarse bubble, each rated at 5.5 cfm.

- Tertiary Treatment:
    - Sand filters:
        - ✓ Two (2) – filter cells each with an area of 22.3 sf and a filtration rate of <1gpm/sf. Each filter has 18-inches of media consisting of sand and pea gravel
        - ✓ Filter backwash pumps: One (1), 112 gpm
        - ✓ One (1) – filter backwash air scour blower rated at 150cfm@6psi, with 5 hp motor
        - ✓ Diffusers: 4
        - ✓ Clear well volume: 1,000 gallons
        - ✓ Mud well volume: 4,600 gallons
    - UV disinfection:
        - ✓ One (1) set of UV lamps
        - ✓ Capacity: 150 MPN/100 ml
        - ✓ UV transmission at 254 nm
        - ✓ Rated for a peak flow of 40 gpm
- Post Aeration:
    - Volume: 2,200 gallons
- Emergency Generator: Three (3) phase, 120/240V, 60KW
- Solids handling and disposal
    - Sludge hauled to Happy Hills WWTP

- Effluent for stream discharge: Munson Spring Branch
    - TSS: 30 mg/l (monthly average)
    - BOD: 5.0 mg/l (monthly average)
    - pH: between 6.5 and 8.5
    - Dissolved Oxygen: 5.0 mg/l minimum
    - Fecal Coliforms: 200 MPN/100 ml (monthly)
    - E-Coli: 126 MPN/100 ml (monthly)
    - Total Residual Chlorine: N/A
    - TKN: June 1 to September 30 - 2.0 mg/l monthly average
    - Ammonia: June 1 to September 30: 0.91 mg/l monthly average
      October 1 to May 31: 16 mg/l

WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of approximately 2,110 feet of gravity sewer pipes, and approximately 10 manholes. The SHA operates the Sideling Hill wastewater collection system.

Site Name: I-68 Sideling Hill Rest Stop

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd N/A

Amount of Previous CIP Funding **$0.00**

Amount of Current CIP funding **$0.00**

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
78° 18' 35.18" W	39° 40' 47.14" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	I-68 Sideling Hill Rest Area	Water System	SHA	Western
Details	I-68 Sideling Hill Rest Area	Wastewater System	SHA	Western

Select type of New Facility: | Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: I-68 Sideling Hill Rest Area

Address: On Route 68, West of Hancock in Washington County

Comments:

Agency: SHA

Region: Western

Average Daily Demand (ADD) (gal/day): 5,116

Peak Day Demand (gal/day): 15,100

WTP Design Capacity: 48,960

Total No. of Wells: 2

Average Daily Run Time of Wells (Hrs):

Capacity w/ largest Well Offline:

GW Appro. Permit Number (GAP): WA1988G001(04) ☐ N/A

Total GW. Appro. (GAP) (ave.day) (gal/day): 10,000

% of ADD to GAP: 51%

General Discharge Permit Number: 06HT5025

W/WW Engr. Project Mgt: MFr

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Don	Larke	(301) 777-2174	(301) 999-8611
Wayne	Boal	(301) 777-2174	(301) 999-1419
Roger	Knox	(301) 777-2174	(301) 999-8616

Surface Water Appr. Permit Number: ______(__) ☑ N/A

Surface Water Appr. Amount (SAP) (ave. day) (gal/day): N/A

% of ADD to SAP: N/A

Amount of Water Storage (gallons):

Days of Storage at ADD:

PDWIS WTP Number: 121-1128

Appropriation Permit Exp. Date: 2/1/2016 ☐ N/A

Est. Total length of Water Lines (feet):

Number of permit violations:

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

Facility Name: I-68 Sideling Hill Rest Area

Address: On Route 68, West of Hancock in
Washington County

Agency: SHA

Region: Western

Annual Average Daily Flow (gal/day): 3,279

Peak Day Flow (gal/day): 14,000

Ratio Peak Flow to ADD: 4.3

WWTP Design/Permit Capacity (gal/day): 25,000

% of ADD to Design Capacity: 13

NPDES Permit Number: MD0062821 ☐ N/A

State Permit Number: 05DP2434 ☐ N/A

NPDES Permit Exp. Date: 5/31/2011 ☐ N/A

W/WW Engr. Project Mgt: MFr

Location of Asbuilt Drawings or CDs: 32

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Don	Larke	(301) 777-2174	(301) 999-8611
Wayne	Boal	(301) 777-2174	(301) 999-1419
Roger	Knox	(301) 777-2174	(301) 999-8616

Will future limits be more stringent?

GW Disposal Permit Exp. Date ☐ N/A

Is more land needed for disposal?

No. of Sludge Disposal Options available: 1

Are additional sludge disposal permits needed? No

Number of sludge permit violations: 0

Number of permit violations

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	10/28/1998	BOD	weekly	mg/l	8.6	8

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Sideling Hill	BOD	10/28/1998	weekly	mg/l	8.6	8	Unknown	none

I-68 SIDLING HILL REST AREA

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:

- The plant is operating satisfactorily
- Grating for the plant is corroded and will require replacement in future

Proposed Improvements:

- Replace grating

WASTEWATER COLLECTION SYSTEM

Conditional Analysis:

- The collection system is operating satisfactorily

Proposed Improvements:

- None

WATER TREATMENT PLANT

Conditional Analysis:

- The plant is operating satisfactorily

Proposed Improvements:

- None

WATER SOURCE

Conditional Analysis:

- No issues reported

Proposed improvements:

- None

WATER DISTRIBUTION SYSTEM

Conditional Analysis:

- Raw water pipes are deteriorating and frequent leaks have been reported
- Distribution PVC piping is experiencing frequent leaks due to poor joint material/installation

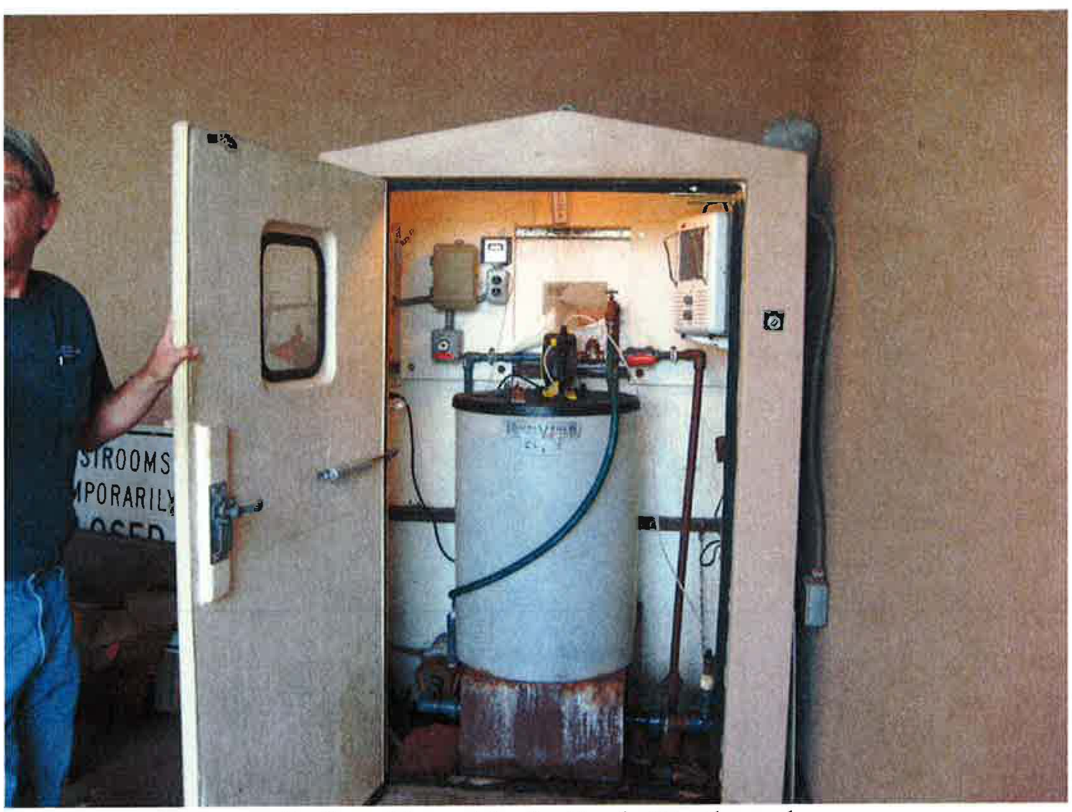
Proposed improvements:

- Replace raw water lines from well to the treatment plant
- Replace PVC distribution piping

I-68 Sideling Hill Rest Area

WS & D

200,000- Gallon Below Grade Reservoir



Sodium Hypochlorite Feed- Westbound

WS & D

Valves Eastbound

WTP

Bladder Tank and Controls- Eastbound

WTP

Greensand Filters and Process Piping-Eastbound

WWTP

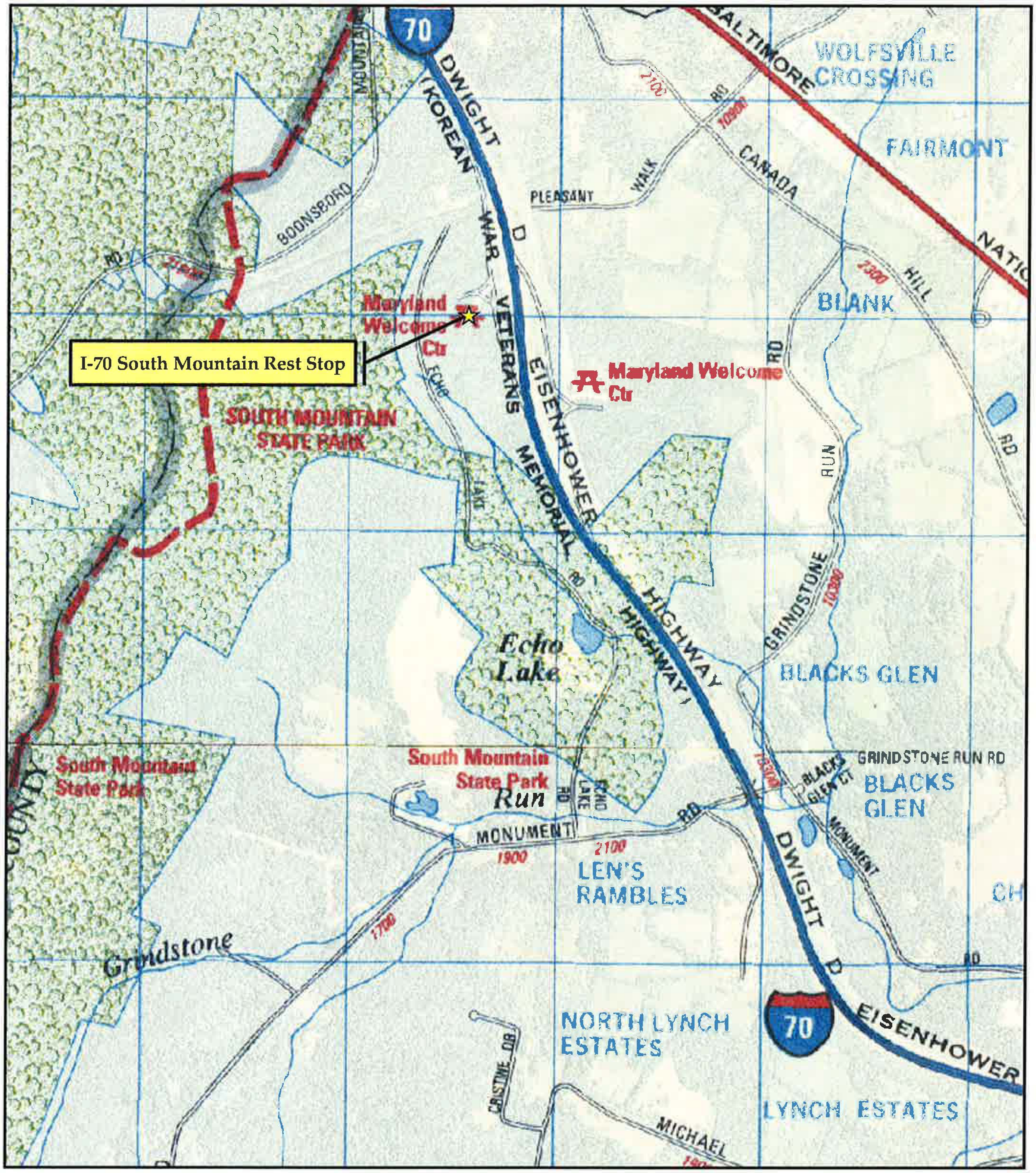

Greensand Surge Tank

WWTP

Aeration Tanks & Secondary Clarifier

UV Unit

I-70 Welcome Center



☆ Sites

Water and Wastewater Master Plan 2008

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

Figure 1

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729-8200

0 500 1,000 1,500 2,000
Feet

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I-70 WELCOME CENTER

BACKGROUND

The Interstate 70 (I-70) Welcome Center, Myersville, Maryland in Frederick County is a Maryland Department of Transportation [State Highway Administration (SHA)] Facility. The Welcome Center is located on either side of I-70, west of Frederick.

The Welcome Center provides the public with restroom facilities, water fountains, and parking facilities year-round. The Welcome Center receives approximately 55,000 visitors per week on average with peak usage occurring during weekends and holidays. The Welcome Center was shut down in April 2008 to facilitate upgrades to the water and wastewater treatment systems and reopened in June 2010.

Maryland Environmental Service (MES) operates the water and wastewater treatment facilities for the Welcome Center. SHA is responsible for the water distribution and collection system.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT

The I-70 Welcome Center water system consists of four (4) wells on the eastbound side, two (2) wells on the westbound side, an eastbound treatment facility, a westbound treatment facility, a 50,000-gallon ground storage tank, and a distribution network. All of the above facilities are in operation since June 2010. The eastbound treatment facility receives water from Well Nos. 1, 2, 3 and 4. The treatment plant consists of chemical feed facilities for soda ash and sodium hypochlorite, a 119-gallon water heater, an emergency eye wash station, a 3 KW unit heater, a magnetic flow meter, and an exhaust fan. The westbound treatment facility receives water from Well Nos. 5 and 6. The treatment plant consists of chemical feed facilities for sodium hypochlorite, a 119-gallon water heater, an emergency shower & eye wash station, a 3 KW unit heater, a magnetic flow meter, a dehumidifier and an exhaust fan. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION SYSTEM

The eastbound side of the I-70 Welcome Center has four (4) wells and the westbound side has two (2) wells. The water distribution system consists of a 50,000-gallon ground storage tank, approximately 4,747 feet of water mains and service lines ranging from 1-inch to 6-inches. Please refer to the Supplemental Information Section – Facility Description – WS&D.

C. WASTEWATER TREATMENT

The I-70 Welcome Center wastewater treatment plant is currently in operation and consists of a mechanical bar screen, screw conveyor, an off-line equalization basin, two (2) sequencing batch reactors, two (2) existing gravity filters, and UV units. Please refer to Supplemental Information Section – Facility Description – WWTP.

D. WASTEWATER COLLECTION SYSTEM

The I-70 Welcome Center wastewater collection system consists of approximately 1,557 feet of gravity sewer pipes, and approximately nine (9) manholes. Please refer to the Supplemental Information Section – Facility Description – WWCS.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, average and peak water flows were 11,825 gallons per day and 137,200 gallons per day, respectively. In 2010, average and peak wastewater flows were 10,312gallons per day and 104,000 gallons per day, respectively. Additional 2010 operations data for the water and wastewater facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

- The I-70 Welcome Center water and wastewater facility upgrades have been completed. Construction began in May 2008 and was completed in June 2010.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The I-70 Welcome Center wastewater treatment plant had two (2) violations in past year. One (1) pH violation and one (1) sample frequency violation occurred in the past year. The current permit is up for renewal in 2012 and it is anticipated that Total Nitrogen (TN) and Total Phosphorus (TP) goals would then become limits. The treatment facility has been designed to meet a TN limit of 7 mg/l and TP limit of 0.5 mg/l respectively. Effluent temperature could become an enforceable limit in the next permit cycle.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

MES has made no capital improvement requests for this facility in the past.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

The water treatment, wastewater treatment, and the water distribution, and wastewater collection systems have been upgraded by SHA and the Welcome Center has resumed normal operations. The facilities were formally opened in December 2010.

SUPPLEMENTAL INFORMATION

I-70 WELCOME CENTER

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION

The I-70 Welcome Center water system consists of four (4) wells on the eastbound side, two (2) wells on the westbound side, an eastbound treatment facility, a westbound treatment facility, a 50,000-gallon ground storage tank, and a distribution network.

Eastbound has four (4) wells and westbound has two (2) wells. Each well is equipped with a 4-inch submersible Gould's pump rated at 25 gpm @ 315 ft. TDH with a 3 hp motor. No additional information for the wells is available.

The water distribution system consists of a 50,000-gallon ground storage tank, approximately 4,747 feet of water mains, and service lines ranging from 1-inch to 6-inches.

The 50,000-gallon ground storage tank is 21 feet high and 28 feet in diameter.

WATER TREATMENT

The I-70 Welcome Center water system consists of four (4) wells on the eastbound side, two (2) wells on the westbound side, an eastbound treatment facility, a westbound treatment facility, a 50,000-gallon ground storage tank, and a distribution network.

The eastbound treatment units are housed in a 16 ft. long by 12 ft. wide by 8 ft. high concrete building. The eastbound treatment facility receives water from Well Nos. 1, 2, 3 and 4. The treatment plant consists of chemical feed facilities for soda ash and sodium hypochlorite, a 119-gallon water heater, an emergency eye wash station, a 3 KW unit heater, a magnetic flow meter, and an exhaust fan.

The chemical feed facilities for sodium hypochlorite include 3/8-inch chemical feed tubing, a 100-gallon day tank, and a chemical metering pump rated at 24 gpd at 100 psi. The chemical feed facilities for soda ash include a 100-gallon day tank and a chemical metering pump rated at 24 gpd @ 100 psi.

The westbound treatment units are housed in a 16 ft. long by 12 ft. wide by 8 ft. high wooden building. The westbound treatment facility receives water from Well Nos. 5 and 6. The treatment plant consists of chemical feed facilities for sodium hypochlorite, a 119-gallon water heater, an emergency shower & eye wash station, a 3 KW unit heater, a magnetic flow meter, a dehumidifier, and an exhaust fan.

The chemical feed facilities for sodium hypochlorite include 3/8-inch chemical feed tubing, a 100-gallon day tank, and a chemical metering pump rated at 24 gpd at 100 psi.

WASTEWATER TREATMENT SYSTEM

The I-70 wastewater treatment facility is rated for 50,000 gpd and consists of the following:

Existing Preliminary Treatment (Headworks)

- Raw sewage enters the plant through a mechanical screen

Solids Handling and Disposal

Preliminary and Primary Treatment

- Mechanical bar screen design rated for average flow of 50,000 gpd and peak flow of 100,000 gpd
  - Channel – 2 ft. wide, 10 ft. long, and 6 ft. deep
  - Opening - ¼ -inch
- Offline Equalization Basin - 100,000 gallons

Proposed Biological Treatment

- Package Sequencing Batch Reactors - Two(2) Fluidyne (make) steel tanks
  - Design rated for average design flow of 50,000 gpd and peak flow of 100,000 gpd
  - Batch flow equalization
  - Transfer pumps
- Decanting unit electric room (previously Blower Building):
  - Dimensions - 9.17 ft. wide by 9.83 ft. long

Tertiary Treatment

- Existing gravity filters:
  - Two (2) 3 ft. diameter by 10 ft. high, and rated for 21 gpm
  - Media - sand plus anthracite
- UV units:
  - Design rated for 40 gpm
  - 52-inches long, 6.5-inches wide, and 11.5" high
- Existing effluent tank: 7.5 ft. long, 3.5 ft. wide, and 6 ft. deep
- Auto pH monitoring system- ABB controller with feedback loop.

Effluent for stream discharge:

- TSS - mg/l (monthly average)
- BOD - 30 mg/l (monthly average)
- Ammonia - (May 1 to September 30) 4.3 mg/l (monthly average)
  (October 1 to April 30) 9.3 mg/l
- pH - between 6.8 and 7.3
- Dissolved Oxygen - 5.0 mg/l minimum, 6 mg/l daily average
- E.Coli – 126 MPN/100 ml (monthly)
- Total Residual Chlorine - Prohibited
- Total Phosphorous - No limit- Goal
- Total Nitrogen – No limit- Goal

WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of approximately 1,557 feet of gravity sewer pipes and approximately nine (9) manholes. The SHA operates the Sideling Hill wastewater collection system.

Site Name: I-70 Welcome Center

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
77° 25' 40.74" W	39° 41' 22.35" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	I-70 Welcome Center	Water System	SHA	Central
Details	I-70 Welcome Center	Wastewater System	SHA	Central

Select type of New Facility: | Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: I-70 Welcome Center

Address: S. Mountain Rest Area Eastbound
Myersville, MD 21701

Comments:

Agency: SHA

Region: Central

Average Daily Demand (ADD) (gal/day): 31,962

Peak Day Demand (gal/day): 129,300

WTP Design Capacity:

Total No. of Wells: 7

Average Daily Run Time of Wells (Hrs):

Capacity w/ largest Well Offline:

GW Appro. Permit Number (GAP): FR1966G013(06) ☐ N/A

Total GW. Appro. (GAP) (ave.day) (gal/day): 35,000

% of ADD to GAP: 91%

General Discharge Permit Number: 06HT5051

W/WW Engr. Project Mgt: PB

Location of Asbuilt Drawings or CDs:

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Allen	Becker	(301) 791-4759	(301) 487-5428
Chuck	Mills	(301) 791-4759	(410) 349-7006
Robert	Barnhart	(301) 791-4759	(443) 223-3416

Surface Water Appr. Permit Number: ( ) ☑ N/A

Surface Water Appr. Amount (SAP) (ave. day) (gal/day): N/A

% of ADD to SAP: N/A

Amount of Water Storage (gallons):

Days of Storage at ADD: 0.0

PDWIS WTP Number: 110-1162 110-1264

Appropriation Permit Exp. Date: 6/1/2012 ☐ N/A

Est. Total length of Water Lines (feet):

Number of permit violations

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	6/30/2000	BOD	monthly	lbs/day	0	7
Details	6/30/2000	TKN	monthly	lbs/day	6.3	4.7
Details	5/31/1998	TKN	monthly	lbs/day	5.2	4.7

Facility Name: I-70 Welcome Center

Address: S. Mountain Rest Area Eastbound
Myersville, MD 21701

Agency: SHA

Region: Central

Annual Average Daily Flow (gal/day): 11,170

Peak Day Flow (gal/day): 33000

Ratio Peak Flow to ADD: 3.0

WWTP Design/Permit Capacity (gal/day): 28,000

% of ADD to Design Capacity: 40

NPDES Permit Number: MD0023680 ☐ N/A

State Permit Number: 07-DP-0650 ☐ N/A

NPDES Permit Exp. Date: 6/30/2012 ☐ N/A

W/WW Engr. Project Mgt: PB

Location of Asbuilt Drawings or CDs

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Allen	Becker	(301) 791-4759	(301) 487-5428
Chuck	Mills	(301) 791-4759	(410) 349-7006
Robert	Barnhart	(301) 791-4759	(443) 223-3416

Will future limits be more stringent? Yes

GW Disposal Permit Exp. Date ☐ N/A

Is more land needed for disposal?

No. of Sludge Disposal Options available: 0

Are additional sludge disposal permits needed? Yes

Number of sludge permit violations: 0

Number of permit violations: 3

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	2/5/2011	pH	daily	mg/l	7.57	7.5
Details	4/30/2008	NH3	monthly	mg/l	33.9	17
Details	4/30/2008	NH3	monthly	lbs/day	4.2	4
Details	3/31/2008	NH3	monthly	mg/l	38.9	17
Details	3/31/2008	NH3	monthly	lbs/day	5.4	4
Details	1/31/2008	NH3	monthly	lbs/day	6.1	1.9

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
I-70	NH3	1/31/2008	monthly	lbs/day	6.1	1.9	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year. Adequate alkalinities are being maintained to assist in NH3 removal as well as maintaining maximum D.O.
I-70	NH3	1/31/2008	monthly	mg/l	45.1	8.3	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year. Adequate alkalinities are being maintained to assist in NH3 removal as well as maintaining maximum D.O.
I-70	NH3	3/31/2008	monthly	mg/l	38.9	17	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year. Adequate alkalinities are being maintained to assist in NH3 removal as well as maintaining maximum D.O.
I-70	NH3	3/31/2008	monthly	lbs/day	5.4	4	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year. Adequate alkalinities are being maintained to assist in NH3 removal as well as maintaining maximum D.O.
I-70	NH3	4/30/2008	monthly	mg/l	33.9	17	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year. Adequate alkalinities are being maintained to assist in NH3 removal as well as maintaining maximum D.O.
I-70	NH3	4/30/2008	monthly	lbs/day	4.2	4	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year. Adequate alkalinities are being maintained to assist in NH3 removal as well as maintaining maximum D.O.
I-70	NH3	4/30/2007	monthly	mg/l	39.3	17	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year.
I-70 Rest Stop	TKN	5/31/1998	monthly	lbs/day	5.2	4.7	Low air and water temps, and low alkalinity	New plant under construction
I-70 Rest Stop	BOD	6/30/2000	monthly	lbs/day	0	7	High flows due to I/I	New plant under construction
I-70 Rest Stop	TKN	6/30/2000	monthly	lbs/day	6.3	4.7	High flows due to I/I	New plant under construction
I-70 WWTP	NH3	10/31/2006	monthly	mg/l	3.3	18.1	Plant has aerated Lagoons and is unable to process NH3 with its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. A SBR plant is currently being designed.
I-70 WWTP	NH3	10/31/2006	monthly	lbs/day	0.77	3.05	Plant has aerated Lagoons and is unable to process NH3 with its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. A SBR plant is currently being designed.
I-70 WWTP	NH3	11/30/2006	monthly	mg/l	22.8	17	Plant has aerated Lagoons and is unable to process NH3 with its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year.
I-70 WWTP	NH3	12/31/2006	monthly	mg/l	36.6	17	Plant has aerated Lagoons and is unable to process NH3 with its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year.

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
I-70 WWTP	NH3	12/31/2006	monthly	lbs/day	7.4	4	Plant has aerated Lagoons and is unable to process NH3 with its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year.
I-70 WWTP	BOD	1/31/2007	monthly	mg/l	53.9	45	Plant has aerated Lagoons. During time of sampling high flows were recorded due to lowering of the lagoons. Lagoons are not capable of meeting winter NH3 limits.	The transfer pump between the lagoons was adjusted. The plant is currently being designed as an SBR plant to be built within the next year and lowering the lagoons to dredge is currently taking place- this was the reason for the high transfer pump flows.
I-70 WWTP	NH3	1/31/2007	monthly	mg/l	41	17	Plant has aerated Lagoons. During time of sampling high flows were recorded due to lowering of the lagoons. Lagoons are not capable of meeting winter NH3 limits.	The transfer pump between the lagoons was adjusted. The plant is currently being designed as an SBR plant to be built within the next year and lowering the lagoons to dredge is currently taking place- this was the reason for the high transfer pump flows.
I-70 WWTP	NH3	1/31/2007	monthly	lbs/day	71	4	Plant has aerated Lagoons. During time of sampling high flows were recorded due to lowering of the lagoons. Lagoons are not capable of meeting winter NH3 limits.	The transfer pump between the lagoons was adjusted. The plant is currently being designed as an SBR plant to be built within the next year and lowering the lagoons to dredge is currently taking place- this was the reason for the high transfer pump flows.
I-70 WWTP	NH3	3/31/2007	monthly	mg/l	40.4	17	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year.
I-70 WWTP	NH3	3/31/2007	monthly	lbs/day	4.1	4	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year.
I-70 WWTP	NH3	11/30/2007	monthly	mg/l	17.8	17	Plant has aerated Lagoons and is unable to process NH3 with its current design	The plant has aerated lagoons with filters and is unable to process high NH3 during cold weather with its current design. The plant is currently being designed as an SBR plant to be built within the next year.
I-70 WWTP	NH3	12/31/2007	monthly	mg/l	34.1	8.3	Plant has aerated Lagoons and is unable to process NH3 in its current design	The plant has aerated lagoons with filters and is unable to process high NH3 with its current design. The plant is currently being designed as an SBR plant to be built within the next year. Adequate alkalinities are being maintained to assist in NH3 removal as well as maintaining maximum D.O.
I-70 WWTP	pH	2/5/2011	daily	mg/l	7.57	7.5	The operator increased the acid feed rate to adjust pH back down to permit limits.	Since this incident, an automatic pH control system was installed (2/10/11). This automatically adjusts the pH to keep it within permit limits

I-70 WELCOME CENTER

CONDITIONAL ANAYLYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:
- The Welcome Center upgrade was completed in 2010.

Proposed Improvements:
- Construction of new eastbound and westbound water treatment facilities completed. See WTP description

WATER SOURCE

Conditional Analysis:
- No reported problems

Proposed Improvements:
- None

WATER DISTRIBUTION

Conditional Analysis:
- The Welcome Center upgrade was completed in 2010.

Proposed Improvements:
- None

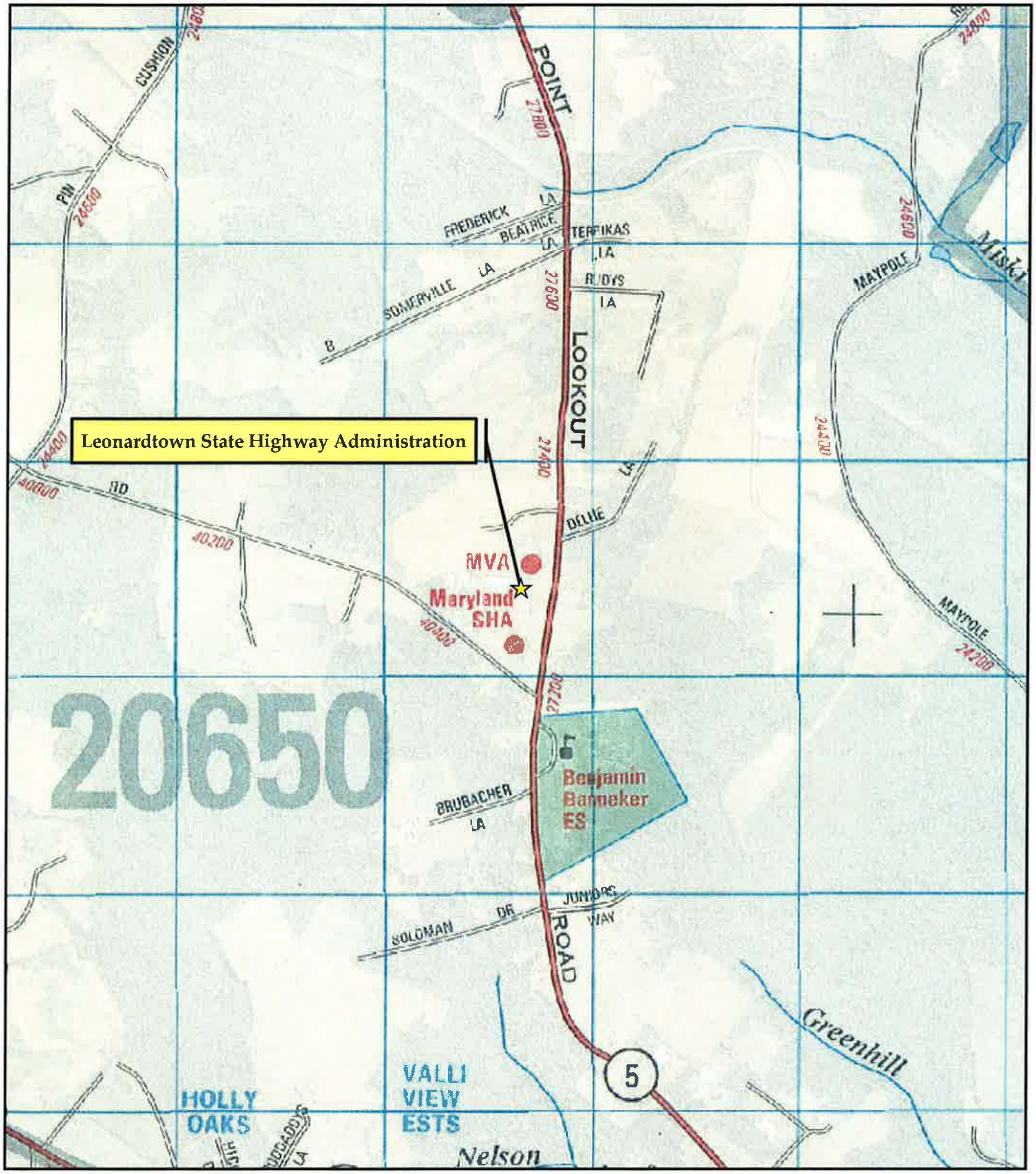
WASTEWATER TREATMENT

Conditional Analysis:
- The Welcome Center upgrade was completed in 2010.

Proposed Improvements:
- None

Leonardtown Maintenance Shop

State Highway Administration



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

LEONARDTOWN MAINTENANCE SHOP
STATE HIGHWAY ADMINISTRATION

BACKGROUND

Leonardtown Maintenance Shop [State Highway Administration (SHA)] is located in St. Mary's County, on the northern corner of the intersection of Route 5 and Sunnyside Road, north of Leonardtown. The facility is a regional shop with offices, maintenance, and storage.

Maryland Environmental Service (MES) operates the water source and water treatment plant. SHA maintenance operates the water distribution system and on-site wastewater disposal system and receives assistance from MES, as needed.

WATER FACILITIES DESCRIPTION

A. WATER TREATMENT

The waterworks consists of a single drilled well, a treatment facility, and a distribution network. The treatment facility consists of chemical feed facilities for sodium hypochlorite, a 10,000-gallon below grade reservoir, and a pump station. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION SYSTEM

The Leonardtown Maintenance Shop single well is located near the treatment building. There is approximately 500 ft. of 2-inch water mains in the complex. Please refer to Supplemental Information Section – Facility Description – WS&D.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average water flow for the water treatment plant was 2,697 gallons per day. Additional 2010 operations data for the water facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment, the following deficiencies were identified:

- There is no backup water source or backup well pump available on site in case of a breakdown

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility did not have any violations in the past 15 years. Due to the size of the water facility, MDE may grant an exemption from reporting requirements. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

No capital improvement requests have been made in the past via Maryland Environmental Service.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

Recommended improvements for this facility include the following:

- Construct a new well

The improvements will be part of the capital improvement request. The projected capital improvement request cost is approximately $50,000. Please refer to the Supplemental Information Section – Cost Analysis and Recommended Improvements

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2022
- Construction: Fiscal Year 2022

SUPPLEMENTAL INFORMATION

LEONARDTOWN MAINTENANCE SHOP
STATE HIGHWAY ADMINISTRATION

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION

The water system consists of one (1) drilled well, a treatment facility, and a distribution network.

The well (SM-81-4073) is located in a grassy area near the treatment building. The plastic cased well is 6-inches in diameter and has a total depth of 470 feet and is situated in the Aquia aquifer. A 20 ft. screen is installed at a depth of 450 ft. The yield and drawdown test estimated a yield of 30 gpm. There is approximately 500 ft. of 2-inch water mains in the complex.

WATER TREATMENT

The waterworks consists of a single drilled well, a treatment facility, and a distribution network

The treatment facility consists of chemical feed facilities for sodium hypochlorite, a 10,000-gallon below grade reservoir, and a pump station. Sodium hypochlorite feed facilities include a chemical metering pump rated at 12 gpd @ 100 psi and two (2) 50-gallon sodium hypochlorite day tanks. The treated water is discharged and stored in a 10,000 gallon below grade reservoir. The two (2) booster pumps, capable of 1,000 gpm, withdraw water from the 10,000 gallon below grade reservoir and supply the distribution network, which is comprised of offices and maintenance shops.

Site Name: Leonardtown Maintenance Shop

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
76° 33' 21.55" W	38° 18' 20.07" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Leonardtown Maintenance ...	Water System	SHA	Southern

Select type of New Facility: | Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Leonardtown Maintenance Shop

Address

26720 Point Lookout Road

Leonardtown, MD 20650

Comments:

Agency: SHA

Region: Southern

Average Daily Demand (ADD) (gal/day)	1,919
Peak Day Demand (gal/day)	No Rept
WTP Design Capacity	43,200
Total No. of Wells	1
Average Daily Run Time of Wells (Hrs)	
Capacity w/ largest Well Offline	0
GW Appro. Permit Number (GAP)	SM1988G112(02) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	700
% of ADD to GAP	
General Discharge Permit Number	06HT5028

W/WW Engr. Project Mgt: PT

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Sylvester	Ball	(301) 884-5593	(301) 536-5901
Ruby	Dean	(301) 884-5593	(301) 672-7406
Eric	Barnes	(301) 872-4401	(301) 980-2902

Surface Water Appr. Permit Number	___( ) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	10000
Days of Storage at ADD	5.2
PDWIS WTP Number	118-1326
Appropriation Permit Exp. Date	2/1/2013 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

LEONARDTOWN MAINTENANCE SHOP
STATE HIGHWAY ADMINISTRATION

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:
- Treatment facilities are in good condition

Proposed Improvements:
- None

WATER SOURCE

Conditional Analysis:
- No source backup
- No hour meter for well run time

Proposed improvements:
- Construct back-up well or have spare pump on hand
- Install hour meter

WATER DISTRIBUTION

Conditional Analysis:
- Operating satisfactorily

Proposed improvements:
- None

Leonardtown Maintenance Shop

Sodium Hypochlorite Feed System


Well


Pump Station


10,000-Gallon Below Grade Reservoir

2011 WATER AND WASTEWATER MASTER PLAN

DEPARTMENT OF PUBLIC SAFETY AND CORRECTIONAL SERVICES
VOLUME VI OF X

September 2011

Prepared By:

MARYLAND ENVIRONMENTAL SERVICE
259 Najoles Road
Millersville, Maryland 21108

2011 Water and Wastewater Master Plan

Volume VI of X - Maryland Department of Public Safety and Correctional Services

4. **Jessup Correctional Complex – Dorsey WWTP**
    A. Facility Overview
    B. Table 1- Wastewater flow estimates based on current population
    C. Supplemental Information
        a) Water & Wastewater Facility Descriptions
        b) Operations Data
        c) Regulatory Compliance History & Future Regulatory Constraints
        d) CIP & Major Maintenance Funding History
        e) Cost Analysis & Recommended Improvements
        f) Conditional Analysis & Proposed Improvements
        g) Photographs
5. **Maryland Correctional Institution - Hagerstown**
    A. Facility Overview
    B. Supplemental Information
        a) Wastewater Facility Descriptions
        b) Operations Data
        c) Regulatory Compliance History & Future Regulatory Constraints
        d) CIP & Major Maintenance Funding History
        e) Cost Analysis & Recommended Improvements
        f) Conditional Analysis & Proposed Improvements
        g) Photographs
6. **Poplar Hill Pre-Release Unit**
    A. Facility Overview
    B. Supplemental Information
        a) Water & Wastewater Facility Descriptions
        b) Operations Data
        c) CIP & Major Maintenance Funding History
        d) Cost Analysis & Recommended Improvements
        e) Conditional Analysis & Proposed Improvements
        f) Photographs
7. **Southern Maryland Pre-Release Unit**
    A. Facility Overview
    B. Supplemental Information
        a) Water & Wastewater Facility Descriptions
        b) Operations Data
        c) Regulatory Compliance History & Future Regulatory

Executive Summary

MARYLAND ENVIRONMENTAL SERVICE

2011 WATER AND WASTEWATER MASTER PLAN

EXECUTIVE SUMMARY

I. INTRODUCTION

The Maryland Environmental Service (MES) was created by statute in 1970 (Chapter 240 of 1970) as an independent agency. Executive Order 01.01.1971.11 gave MES the responsibility for operation and maintenance of all State-owned water purification and solid waste disposal facilities. Two (2) years later, MES became incorporated into the Department of Natural Resources (DNR). While under DNR, all Capital Improvement Project (CIP) planning and annual funding requests for these facilities were prepared by MES and submitted to the State for approval. The first projects received funding in Fiscal Year 1984; however, the Department of General Services (DGS) had responsibility for managing the appropriations, procuring the consulting engineers, contractors, and other services, and providing project management and inspection for CIP with some input from MES staff.

The situation began to change in later years, with MES first receiving funding and procurement authorization for CIP in 1992 and becoming an instrumentality of the State and a public corporation independent of DNR in 1993. Chapter 4, First Special Session of 1992, said MES "*shall be responsible for and shall control the procurement of engineering and architectural services and all other related services and supplies for the projects for which State funds are appropriated under provisions of this act.*" Since 1992, MES has had full responsibility for the CIP program for State-owned water and wastewater treatment plants, and in some cases, the associated piping systems and water towers, when requested by a State Agency.

During this transition period, the Department of Budget and Management (DBM) asked MES to prepare a Master Plan for water and wastewater facilities operated by MES and owned by the State. There were numerous facilities needing capital improvements to accommodate expansions within the various institutions as well as changing state and federal regulations that required more advanced treatment processes. The initial appropriation to MES totaled over $14 million, which funded a backlog of 13 projects. As projected in the Master Plan, funding requirements decreased each year as the majority of the treatment facilities were upgraded. Eventually the requests were capped at $3.0 to $3.5 million per year, which was adequate for improvements to piping, pumping stations, and water towers.

In the early 2000's, Governor Parris Glendening issued an Executive Order requiring wastewater treatment plants to further reduce nutrient loadings to the State's waterways. The Maryland Department of the Environment (MDE) completed their Tributary Strategy plan, essentially capping nutrient loads at many wastewater treatment facilities. The EPA also issued new drinking water regulations with limits for new parameters such as arsenic, radon,

radionuclides, and disinfection by-products. As MES experienced a decade earlier, water and wastewater treatment facilities would need upgrades as new, more stringent permits were issued. Rapidly changing technology rendered controls and equipment obsolete at many sites and construction prices skyrocketed after September 11, 2001. It became apparent the $3.0 million cap would no longer be sufficient to make the necessary improvements.

During the 2008 session of the Maryland Legislature, the Governor's budget included a capital budget request from MES of $11.9 million for critical, compliance-related upgrades to four (4) treatment plants. The budget committees expressed concern there was no plan that adequately justified this increase. In the 2008 "*Joint Chairmen's Report on the State Operating Budget (SB 90) and the State Capital Budget (SB 150) and Related Recommendations*", MES was instructed to prepare an infrastructure improvement plan for the facilities managed by the agency by February 1, 2009. The 2008 Water and Wastewater Master Plan represents the response to this request.

II. OBJECTIVES AND METHODOLOGIES

A. OBJECTIVES

To fulfill the request of the Maryland Legislature as defined in the 2008 Joint Chairmen's report, the objectives of the water and wastewater master plan included reviewing operating and performance records, evaluating the existing water and wastewater facilities to determine what improvements may be needed, developing a concept plan and scope of the identified improvements, cost estimates, ranking the individual projects, and developing a comprehensive CIP funding schedule and projection for the next five years and to FY 2021.

The specific steps and methodology used to prepare the plan are as follows:

- Collect data from existing records and engineering drawings at office
- Develop custom "Infrastructure CIP Management" database
- Conduct site visits and inventory of all facilities
- Perform engineering evaluations at all facilities
- Review Master Plans and five-year plans of agencies served by MES
- Identify and determine future needs for all facilities
- Evaluate each facility compliance records and anticipate future regulatory constraints
- Review past capital improvement and critical maintenance expenditures
- Analyze future improvement alternatives for each facility
- Perform cost analysis of alternatives and prepare cost estimates for the identified CIPs for each facility
- Develop a methodology to allow ranking and prioritizing the CIPs

- Generate a schedule of implementation for the facility improvements
- Develop a financial plan for funding requests
- Generate final master plan report

B. REPORT STRUCTURE

The Master Plan consists of an Executive Summary along with separate volumes for each of the nine (9) State Agencies. This Executive Summary is also included in each of the individual agency volumes. Each of the agency volumes provides detailed infrastructure information for each of the facilities associated with that agency that includes:

- Background
- Water and wastewater facilities description
- Assessment of operations and performance data
- List of operational and infrastructure deficiencies
- Regulatory compliance history and future regulatory constraints
- Capital improvements and major maintenance funding history
- Cost analysis and recommended improvements
- Schedule of implementation
- Supplemental information

C. CIP RANKING SYSTEM

To allow ranking and prioritizing the CIP projects, MES developed a "Project Ranking Sheet". This consisted of the following six categories:

- Compliance & Permits (criteria uses number of permit violations)
- Health and Safety
- Structural issues
- Impact on operating and maintenance costs
- Operational deficiencies
- Energy and Environment (evaluates energy savings and environmental benefits)

Each of these categories had associated scoring criteria which allowed assigning points based on the listed criteria. The total score assigned each project was used to determine its ranking on the CIP list.

III. ANTICIPATED FUTURE REGULATORY REQUIREMENTS

In addition to water and wastewater systems that need improvements due to age, equipment obsolescence, and normal wear and tear, improvements are also needed to comply with more

stringent regulations and treatment requirements. The following section addresses current regulations and policies, and how they impact the need to make upgrades to water and wastewater facilities.

A. WASTEWATER TREATMENT PLANTS

1. Wastewater Treatment Plants Discharging to Streams

All wastewater plants with stream discharge are regulated by the National Pollutant Discharge Elimination System (NPDES). Dischargers are issued an NPDES permit that authorizes discharge to a water body and imposes limits that have to be met based primarily on the receiving stream's water quality standards. The permits typically require meeting both pollutant concentration limits as well as mass loading limits. The mass loading limits (lbs/day) are determined by taking the assigned maximum flow value (i.e., million gal/day) for the facility times the specified concentration limits (mg/l) times 8.34 (a conversion factor) .

The pollutants that are regulated on discharge permits usually consist of the conventional domestic wastewater pollutants:

- Biological Oxygen Demand (BOD_5) – This is a measure of the amount of organic compounds in water that can be assimilated by bacteria and other microorganisms.
- Total Suspended Solids (TSS) – This measures the amount of organic or inorganic particles that are suspended in the water.
- Ammonia – This is the dominant form of nitrogen in domestic wastewater. It is toxic to fish and other biota.
- Total Kjeldahl Nitrogen (TKN) – This is the amount of ammonia and organic nitrogen (i.e., the nitrogen bound up in organic compounds like proteins, etc.)
- Nitrate/Nitrite – This is the inorganic nitrogen fraction that has been converted from ammonia and organic nitrogen. Further biological assimilation of nitrate and nitrite converts it to nitrogen gas, which dissipates to the atmosphere.
- Total Nitrogen – Nitrogen is considered both a nutrient and a pollutant in that small amounts are beneficial to plants and animals, but in excess it promotes the proliferation of bacteria and algae and results in degraded water quality. Total nitrogen represents the sum of nitrate/nitrite and TKN.
- Total Phosphorus – Similar to nitrogen in that it is both a nutrient and a pollutant. Contrary to nitrogen, it can only be eliminated from wastewater by biological uptake or chemical precipitation.
- Bacteria – All wastewater must be properly disinfected prior to discharge and permits usually give limits for either Fecal Coliform or Total Coliform levels.

These are the dominant pollutants found in domestic sanitary wastewater. If there are other pollutants in the waste stream, then these pollutants may also be added to the discharge permit with appropriate limits.

Discharge permits can be amended at any time by MDE due to either new regulations or policies being adopted or based on new water quality information on the receiving stream that dictates more stringent limits. The permits are usually issued for a five-year period. Although, MDE can amend discharge permits at any time, the changes are usually made when the permit is renewed and reissued.

The U.S. EPA and State of Maryland regulations that govern the pollutant limits on discharge permits are as follows:

- Federal Clean Water Act – National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Load (TMDL) – Added to the CWA in 1992 (currently addressed via the Watershed Implementation Plans)
- Maryland Tributary Strategy and Point Source Strategy
- Other specific regulations that may govern specific watersheds or water bodies (e.g., Patuxent River Watershed – MD Code Section 4-302.1)

The discharge limits imposed on individual treatment plants are primarily determined by the water quality requirements of the receiving stream. Streams are classified by their designated use, (e.g., drinking water source, trout stream, general recreation, etc.) where each classification has associated discharge limits that have to be met to ensure protecting the water quality. The requirement to specify discharge limits was first established under the Federal Clean Water Act (CWA) under the NPDES program.

The second program that can determine the limits imposed on discharge permits is the Total Maximum Daily Load (TMDL) program. The TMDL program is a part of the Clean Water Act and it requires all states to evaluate and compile a list of water bodies that do not fully support beneficial uses such as aquatic life, fisheries, drinking water, recreation, etc. Each water body is evaluated and usually "modeled" to determine the maximum amount of pollutants that can be discharged to it with out impacting the water quality or beneficial use. After determining the maximum allowable quantities of the various pollutants that can be discharged to the body of water, each of the dischargers (i.e., WWTPs, non-point source discharges, etc.) is allocated portions of the TMDL amount. The allocated amount is then incorporated into the facility's discharge permit.

In the last few years, the EPA, in coordination with the states of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC) developed a nutrient and sediment pollution diet for the Bay known as the Chesapeake Bay Total Maximum Daily Load (TMDL). To fulfill the Bay TMDL requirements, MDE developed an allocation process that is contained in Maryland's Watershed Implementation Plan (WIP). The allocation process specifies loading caps for nutrients (N&P) and sediment to each of 58 "segment-sheds" to collectively meet the 2017 target (70% of the total nutrient and sediment reductions needed to meet EPA's final 2020 goals). Maryland's Phase I WIP was submitted to EPA on December 3, 2010. MDE is now working with other State agencies, county and local governments to develop Phase II Watershed Implementation Plans with more detailed reduction targets and strategies to ensure meeting the goals of the Bay TMDL.

Maryland's WIP is requiring that all major WWTPs (i.e., those with a design capacity greater than 500,000 gal/day) to upgrade to meet an Enhanced Nutrient Removal (ENR) level of treatment. There are some facilities that are already meeting ENR treatment requirements as part of the Tributary Strategy program that Maryland had in place for several years.

The Tributary Strategies are broad implementation plans for achieving and maintaining nutrient allocations for the ten major watersheds that drain into the Chesapeake Bay. These allocations were established through the year-2000 Chesapeake Bay Agreement process. Under this program, MDE developed the Enhanced Nutrient Removal (ENR) Load Allocations Table, which establishes nutrient loading caps for 66 major wastewater treatment plants.

The ENR Allocations Table allocated a fixed amount of nitrogen and phosphorus loadings (in lbs/year) to be discharged by each WWTP based on the facility's design capacity and assuming a total nitrogen and total phosphorus concentration of 4 mg/l and 0.3 mg/l, respectively. Therefore, if a WWTP needs to expand and accept additional flows (i.e., users), it has to meet lower concentration limits in order to compensate for the increase in flow.

The ENR Tributary Strategy also controls the nitrogen and phosphorus loadings from minor WWTPs (i.e., those with flow less than 500,000 gal/day). The minor WWTPs are allocated caps based on either their projected year 2020 flow or design capacity: whichever is lower and a nitrogen and phosphorus concentration of 18 mg/l and 3.0 mg/l, respectively. If minor WWTPs need to expand, their loading allocation is limited to a maximum amount of 6,100 lbs/year for nitrogen and 457 lbs/year for phosphorus.

The goal of the Tributary Strategy and now the Watershed Implementation Plans is to eventually have all the major WWTPs meeting ENR levels of treatment, which are 3.0 mg/l for nitrogen and 0.3 mg/l for phosphorus.

Maryland's Bay Restoration Fund (BRF) was also created to provide funding to WWTPs for upgrading to an ENR level of treatment. Priority for the funding is given to major WWTPs.

Either at the time of permit renewal, or due to other circumstances (e.g., WWTP expansion, etc.), any of the regulatory programs listed above could cause more stringent limits be imposed on the discharge permits. EPA and MDE are also including limits in discharge permits for other nonconventional pollutants (e.g., copper, zinc, etc.) along with stricter toxicity biomonitoring requirements and limits. The biomonitoring requires toxicity testing using live macroinvertebrates and fish. Any new limits or toxicity testing that are added to a facility's discharge permits may require an upgrade to the WWTP treatment processes if the facility was not designed to meet those requirements.

Although some of the State WWTPs have been upgraded in the past few years to meet low limits, many have not and . will require improvements to allow meeting more stringent limits. In order to properly plan future WWTP improvements, MES has adopted the following protocols for determining which type facilities may be issued more stringent limits and will need capital improvements to comply:

Major WWTPs (all treatment types):

A few facilities already have treatment systems that can meet an ENR level of treatment. For those that do not meet ENR, capital improvements will be specified to provide ENR level of treatment.

Minor WWTPs:

Lagoon Treatment Systems – Lagoons are an antiquated type of treatment system, which provide at best a secondary level of treatment. They do not remove nutrients to any appreciable extent and as a result discharge ammonia, which can be toxic to fish, and other aquatic life. MDE is moving to impose lower limits for ammonia and other parameters. Therefore, capital improvements will be specified for replacing the lagoon system with a more modern and sophisticated treatment system.

Other Secondary Type Treatment Systems – In addition to lagoons, there are other treatment systems in operation that are not designed to remove nutrients and therefore discharge ammonia and other harmful pollutants. Capital Improvements will be specified to replace or upgrade these systems.

Expanding Facilities – Any of the minor WWTPs that will have flow increases beyond their design capacity will have to meet more stringent limits. In some cases, if the flow increase is not too great, the WWTP may not be required to achieve full ENR level of treatment. Therefore, the nature of the

improvements specified would only be what is needed to meet the anticipated limits for the higher flow.

Note: Even though MES has adopted this protocol to program future CIP needs, these are based on regulations and/or policies that are in effect today. Therefore, this protocol is subject to change in response to new or amended regulations (State or Federal) or policies.

2. Wastewater Treatment Plant Solids Management

All WWTPs produce a solid material by-product as a result wastewater treatment. Regardless of the type of facility, these solids must be removed from the WWTP on a periodic basis in order for the treatment process to function properly. Basically, there are three options available for managing this solid material:

- Disposal into a landfill
- Incineration (burning)
- Recycling the material onto the land for beneficial uses, such as compost, fertilizer, etc.

The first two options, landfill disposal and incineration, while used by some WWTPs, are not without their problems. Dwindling landfill space and rising tipping fees have forced most facilities to explore other options. One advantage of incineration is that it can reduce the amount of material for ultimate disposal by as much as 75%. However stringent Federal air quality regulations (40 CFR 60, Subpart O), volatile energy costs, complexity of operation, and high capital expenditures have increasingly ruled out incineration as an option for most facilities, especially for smaller WWTPs with a capacity of less than 10 million gallons a day (MGD). There are also detrimental environmental impacts associated with incineration, such as excessive energy usage and concerns about greenhouse gas emissions. Finally, negative public perception surrounding incineration makes the execution of these projects almost impossible.

Nutrients in these solids, in the form of nitrogen and phosphorus (and a small amount of potassium) can be recycled onto farmland as a low-grade fertilizer, or used to reclaim land in dire need of revegetation (e.g., strip mined land). These solids also contain organic matter that is also beneficial for the soil. The beneficial reuse of this solid material is a cost-effective option for the recipient farmer as well as the WWTP. MES has already realized significant cost savings by implementing land application programs. Both the U.S. EPA and MDE promote the beneficial reuse of biosolids when done in accordance with the regulations.

Solid material from a WWTP that is treated to meet Federal and State standards for recycling onto land are called "biosolids". Material that is not treated, or does not meet these standards, is labeled "sludge", or "sewage sludge". The current Federal (40 CFR 503) and State of Maryland (COMAR 26.04.06) regulations

prescribe the treatment and management standards for recycling biosolids. These standards were established to protect public heath and the environment.

There are several core regulatory standards that WWTPs must follow before land applying biosolids:

- The concentration of chemical constituents, such as heavy metals, in the biosolids product must be under certain limits.
- Solids must be treated to significantly reduce pathogenic organisms. This treatment, called stabilization, is usually done at the WWTP prior to land application. Stabilization processes can be classified as:
    - Physical/chemical in nature, such as adding copious amounts of lime to kill pathogens (lime stabilization),
    - Biological treatment processes. Examples of biological treatment processes include anaerobic digestion, (subjecting the sludge solids to bacterial degradation for an extended period of time in a heated tank in the absence of oxygen), or aerobic digestion, which involves aerating the solids.
    - Time/temperature treatment, such as composting or heat drying the solids to produce a fertilizer pellet.
- The solids must be sufficiently treated so that the likelihood for disease transmitting organisms, called vectors, to be attracted to the biosolids is reduced. Vectors include flies, mice, mosquitoes, etc.
- Biosolids must be managed at the final reuse site in such a manner as to not cause a public health, nuisance, or environmental problem. These management practices can include procedures such as incorporating the biosolids into the soil at a farm site, or including directions to homeowners for use of a compost product.

Maryland is regarded as having an extensive biosolids regulatory program. One aspect of this program is that it requires mandatory, site-specific nutrient management plans be prepared for each farm site where biosolids is to be land applied. Nutrient management reduces the potential for nitrate-nitrogen contamination of groundwater, and phosphorus runoff into surface waters. MDE's regulations are more rigorous than the Federal rules, requiring more site practices to control nuisance factors (such as odors). Approximately 80% of the biosolids generated in Maryland are recycled in some manner, whether onto agricultural land, or through the sale and distribution of highly treated biosolids products such as compost or heat dried fertilizer pellets.

The nutrient management program is administered by the Maryland Department of Agriculture (MDA). In an effort to reduce nutrient pollution from non-point sources, MDA is in the process of revising its Nutrient Management Guidelines to

severely limit the practice of land applying biosolids and animal manures in the winter .Although currently all of MES' biosolids are land applied out-of-State where the restrictions are less stringent (i.e., Virginia) this change in the Nutrient Management Guidelines could affect the operation of our facilities if land application operations revert back to Maryland. This would necessitate either the construction of biosolids storage structures at of our State-owned Regional Sludge Management Facilities at considerable cost, or the installation of advanced sludge treatment processes to reduce the volume of solids being removed

MDE is also currently in the process of preparing comprehensive revisions to their biosolids regulations. It is envisioned that these new regulations will impose more stringent requirements, especially with respect to biosolids testing/monitoring, site controls, compliance inspections/permitting, and documentation of stabilization processes. Much of the revisions are in response to the public's demand for greater oversight of the land application program.
Future regulatory changes could also impose more stringent biosolids processing requirements on WWTPs, called "Class A" stabilization, such as composting and heat drying. These Class A processes reduce pathogens to near non-detectable levels. The general public's concern about pathogens is motivating the change to Class A stabilization processing; many WWTPs have already voluntarily implemented Class A stabilization to address these concerns. It is anticipated that MES will ultimately follow this industry trend, and eventually request funding for Class A processing.

In an effort to more efficiently manage biosolids from MES's facilities, the Agency currently utilizes a "regional" sludge management approach. Sewage sludge from most of MES' smaller facilities that do not meet the standards for recycling onto land is transported to larger WWTPs for further processing and stabilization. These stabilized, treated biosolids from the Regional Sludge Management Facilities are then land applied by a contractor. MES operates Regional Sludge Management Facilities at three State-owned WWTPs. One advantage of the regional approach is that economies of scale are achieved at the larger facilities, thus avoiding the need for constructing costly, separate stabilization processes at each of the smaller WWTPs. It also reduces staff time associated with regulatory monitoring at each of the smaller WWTPs.

A major disadvantage of the regional approach is that stabilization process reliability and equipment redundancy is critical. Sludge processing at the Regional Facilities must be more robust to avoid sludge disposal interruptions on the smaller, satellite State-owned WWTPs. Capital funding should be directed towards ensuring that biosolids processing equipment reliability at the regional facilities is maintained.

3. Wastewater Treatment Plants Using Land Disposal

Numerous WWTPs do not use stream discharge for the treated effluent and rely on spray irrigation to the land surface, underground discharge (i.e., drain field), or similar means. These type facilities are also facing more stringent discharge requirements. This is due to the recognition by MDE that ground disposal systems can contaminate groundwater supplies (i.e., drinking water wells) and migrates through the ground to discharge to streams and ultimately the Chesapeake Bay. To alleviate some of this pollution source, MDE included in the Tributary Strategies a provision that allows abandoning septic systems and connecting those users to sewers and treatment systems with a stream discharge. This provision is based on the assumption that septic systems provide only minimal nutrient removal and the untreated nutrients will eventually make their way to the Chesapeake Bay. The low level of treatment provided by septic systems is then off set by the high level of nutrient removal that is now possible with the newer ENR treatment technologies.

Just as with WWTPs that discharge to streams, MDE is also imposing lower limits on groundwater discharge permits to reduce the amount of nitrogen that is ultimately discharged to the Bay and to groundwater supplies. The limit for Total Nitrogen can be as low as 8 mg/l. These low limits are primarily imposed on the larger systems with flows over 5,000 gal/day. The Bay Restoration Fund also collects fees from users with On Site Sewage Disposal Systems (OSDS) (i.e., septic systems) and other ground disposal systems. MDE offers BRF grants for upgrading OSDS systems to provide increased nitrogen removal. Priority at this time is being given to those systems in the Critical Area or to those systems which are failing.

MES will either request BRF funding or Capital Improvement funds to upgrade any OSDS system that may be subject to more stringent discharge limits and/or would represent a good opportunity to upgrade to further reduce nitrogen being discharged to the Bay.

B. Water Treatment

The quality of drinking water that is produced is very strictly regulated under the EPA and Maryland's Safe Drinking Water Act. The water treatment plants that use surface water supplies (e.g., lakes, reservoirs, and streams) have much more stringent requirements that have to be met compared to those using groundwater (i.e., wells) as their source water. Two of the new regulations associated with surface water have decreased Maximum Contaminant Levels (MCLs) in drinking water and one new regulation requires higher removal of contaminants, which may require specific capital improvements at specific water treatment plants. These regulations are listed below:

- Stage I Disinfection By Product Rule - Total Trihalomethanes MCL of 80 ppb and Total Halocetic Acids MCL of 60 ppb
- Turbidity Maximum Contaminant Levels of 0.30NTU
- Enhanced Surface Water Treatment Rule – Requires 2 to 3-log removal of Cryptosporadium

Also, a Groundwater Rule requires 4-log virus removal, which may require installation of filtration in some of groundwater plants. Therefore, specific capital improvements that would be needed to meet new or more stringent regulations will be addressed at specific water treatment plants.

C. Water Reuse

The reuse of treated wastewater is becoming more and more popular in many parts of the country, resulting in a second "purple" water distribution system. The need for this is caused by the inability of the water sources to be able to meet the ever-increasing demand. Given the physical limitations (e.g., available land) and the regulatory requirements imposed on water and wastewater systems, water reuse and reclamation is not only good environmental stewardship, but is also now recognized as a way to save power and O&M costs, facilitating compliance with water or wastewater regulatory requirements. MES would recommend the implementation of any water reuse projects. Water reuse is already performed at the Eastern Correctional Institution (ECI) where the treated wastewater effluent is sent to the Cogeneration Plant for use in their cooling towers. This could be expanded to use for irrigation, toilet flushing, and other non-potable uses. Although no new projects have been identified, MES will continue to look for possible opportunities to reuse treated wastewater at State facilities.

IV. WATER/WASTEWATER INFRASTRUCTURE CIP SUMMARY

MES provides some level of operations and maintenance services to a total of 65 State facilities. The water and wastewater infrastructure utility systems at these facilities falls under one of the following categories:

- Water Source
- Water Treatment Plant
- Water Distribution
- Wastewater Treatment / Onsite Sewage Disposal System
- Wastewater Collection/Conveyance

MES does not provide operations and maintenance services for all these categories at all the facilities. There are many facilities where the State Agency operates one or more of the utility systems or it may receive service from a nearby municipality, county, or sanitation district.

The level of services that MES provides is described in each of the facility descriptions and is summarized in Table I. Table I lists all the facilities by Agency and gives the entity (e.g., MES, DNR, etc.) that is providing the services for that infrastructure category.

In preparing the 2008 Master Plan, only those systems that are operated by MES were evaluated for capital improvement needs and listed on the MES CIP Request. Out of the 65 total facilities, a total of 39 specific capital improvement projects have been identified and listed in the CIP funding schedule that extends to FY2021 (see Table II). The total CIP request for all 10 years is $64,643,000 with a total project costs estimated to be $98,898,000. The CIP request is less than the total project costs due to other funding sources that will pay their share of the costs (e.g., Freedom District WWTP) and due to CIP funding already received (e.g., ECI).

The MES project ranking system provided a consistent methodology to prioritize and rank the projects and spread the requested funding out over the next 10 years. Table II provides a list of all the projects, their ranking, the State agency, and the amount and year that the funding is requested.

TABLE I

State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
DNR					
Albert Powell Hatchery	DNR	DNR	DNR	MES	DNR
Big Run SP	MES	MES	MES	DNR	DNR
Calvert Cliffs SP	MES	MES	DNR	DNR	DNR
Camp Bay Breeze	MES	MES	DNR	DNR	DNR
Cunningham Falls SP	MES	MES	DNR	DNR	DNR
Dahlgreen Area - South Mt. SP	MES	MES	MES	DNR	DNR
Dan's Mountain SP	MES	MES	DNR	DNR	DNR
Deep Creek Lake SP	MES	MES	MES	Garrett Co	MES
Echo Lake Area - South Mt. SP	MES	MES	DNR	DNR	DNR
Elk Neck State Park	MES	MES	MES	MES	MES
Fair Hill NRMA	MES	MES	DNR	DNR	DNR
Fort Frederick SP	MES	MES	MES	MES	DNR
Gambrill SP	MES	MES	DNR	DNR	NR
Gathland SP	MES	MES	DNR	DNR	DNR
Greenbrier SP	MES	MES	DNR	MES	DNR
Greenwell SP	MES	MES	DNR	DNR	DNR
Herrington Manor SP	MES	MES	DNR	DNR	DNR
New Germany SP	MES	MES	DNR	MES	DNR
Pocomoke SP- Milburn & Shad Landing	MES	MES	DNR	DNR	DNR
Point Lookout SP	MES	MES	DNR	MES	DNR/MES
Rocks SP	MES	MES	DNR	DNR	DNR
Rocky Gap SP	MES	MES	MES	MES	MES
Sandy Point SP	MES	MES	DNR	DNR	DNR
St Mary's River State Park	MES	MES	DNR	DNR	DNR
Susquehanna State Park	MES	MES	DNR	DNR	DNR
Swallow Falls SP	MES	MES	DNR	MES	DNR
Washington Monument SP	MES	MES	DNR	DNR	DNR

MD Dept of Veterans Affairs					
Charlotte Hall Veterans Home	MES	MES	MDVA	MES	MDVA

MD Dept of the Military					
Brig. Gen. Thomas Baker Training Site	MES	MES	MES/MM	MM	MM
Camp Fretterd	MES	MES	MM	MES	MM
Frederick Armory	MES	MES	MM	MM	MM
Gunpowder Military Reservation	MM	MES	MM	MM	MM

MD State Police					
Barrack V - Berlin	MES	MES	MSP	MSP	MSP

TABLE I
State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Table I (cont.)

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
State Highway Adm.					
Bay Country Welcome Center	MES	MES	SHA	MES	SHA
Centreville Maintenance Shop	SHA	SHA	SHA	MES	SHA
Green Hill Cove				MES	SHA
I-68 Rest Stop	MES	MES	SHA	SHA	SHA
I-68 Visitor Center	MES	MES	SHA	SHA	SHA
I-70 Rest Stop	SHA	MES	SHA	MES	SHA
Leonardtown Maintenance Shop	SHA	MES	SHA	MES	SHA
Sideling Hill Visitors Center	MES	MES	SHA	MES	MES
University System of Maryland					
Ag. Exp. Sta. - University of MD	MES	MES	U of M	U of M	U of M
Horn Point Lab - University of MD	U of M	U of M	U of M	City of Cambr	MES
St Mary's College	MES	MES	MES	St. Mary's Col	MES
DHMH					
Crownsville Hospital Center	MES	MES	DHMH	MES	DHMH
Freedom District	Carroll Co	Carroll Co	Carroll Co	MES	Carroll Co
Rosewood State Hospital	Balto. Co.	Balto. Co.	DHMH/MES	Balto Co.	DHMH
Springfield Hospital Center	Carroll Co	Carroll Co	Carroll Co		DHMH
DJS					
Backbone Mountain Youth Center	MES	MES	MES	DJS	DJS
Chelteham Youth Facility	MES	MES	DJS	MES	DJS
Green Ridge Youth Center	MES	MES	MES	MES	MES
Meadow Mt. Youth Center	MES	MES	MES	DJS	DJS
Savage Mt. Youth Center	MES	MES	MES	DJS	DJS
Thomas O'Farrell / Henryton	Carroll Co.	Carroll Co.	Carroll Co.	Carroll Co.	MES*
Victor Cullen Center	Washington Co.	Washington Co.	DJS	MES	DJS
DPSCS					
Eastern Correct. Inst. - Cogen Plant	MES	MES	DPSCS	MES	DPSCS
Eastern Correctional Institution	MES	MES	DPSCS	MES	DPSCS
Eastern Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
Jessup Complex - Dorsey Run WWTP	AA Co	AA Co	DPSCS	MES	DPSCS
MCI - Hagerstown	Hagerstown	Hagerstown	DPSCS	MES	DPSCS
Poplar Hill Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
So. MD Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
WCI & NBCI	Cumberland	Cumberland	DPSCS	Cumberland	MES*

*Pumping stations only

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
HOLD	N/A	Eastern Correctional Institution - Cogen	Upgrade electrical control system.	Waiting for discussion/input from Environmental Ops before proceeding.	2017	2018	DPSCS	$3,500,000	$3,500,000									
1	73	Eastern Correctional Institution WWTP	New treatment plant; including the RO Reject system	Design expected to start in May 2011. FY11 REQUEST (12.126M - C)	2013	2015/2016	DPSCS	$26,730,000	$19,500,000	$1,950,000		$7,000,000	$10,550,000					
2	69	Freedom WWTP	Upgrade plant to 5 stage bardenpho process, and upgrade solids handling facilities.	Under Compliance Schedule. Negotiating a Consent Agreement w/MDE. FY12 REQUEST (1.4M - P)	2013	2014	DHMH	$18,000,000	$2,300,000	$1,566,000	$734,000							
3	65	Rocky Gap SP - WTP	Needs new plant.	Preliminary Design Report conducted; Needs new plant designed (have design funds). MES waiting on direction from DNR before moving forward w/final design. FY12 REQUEST (2.65M - C)	Design Funds Secured	2013	DNR	$3,729,000	$3,000,000	$3,000,000								
4	65	Rocky Gap SP - WWTP	Needs new plant.	Water usage unknown. Meeting permit requirements; monitoring for BOD, TSS, and Temperature (should not exceed 68 degrees). Water usage estimated to increase 140K gpd and wastewater 120K gpd. Current WWTP designed for 120K gpd. Existing plant cannot accommodate any further growth.	2013	2014	DNR	$3,000,000	$3,000,000	$300,000	$2,700,000							
5	62	Charlotte Hall VA Home - WW	**WWTP**: Repair or replace pond's liner system; replace floating boom; additional floating boom; install four (4) aerators/mixers; replace irrigation valves and nozzles; install sodium hypochlorite feed system; develop reserve RIB; construct equalization basin; construct perimeter fence; rehab effluent pump station pipe; and abandon monitoring well no. 5 located in RIB2. **WW COLLECTION**: for pump station no. 1 install grease trap, Install influent channel w/bar screen, separate valve vaults and check & gate valves, alarm system, real time monitoring device; for pump station no. relocate electrical box to above ground location, install real time monitoring device.	Design 80% complete, RIBS may stay on **Wish List**. Nitrogen compliance issue. Plant capacity 60K pd; ADF 40-42K pd. Not meeting permit requirements; 3 violations in last year.	Design Funds Secured	2013	DVA	$3,667,000	$3,457,000	$3,457,000								
6	61	Cunningham Falls SP - WW Collection & Water Distribution Systems	WASTE WATER ($918K): Install HDPE Force Main thru existing gravity lines; grouting of annular space in sewer lines and MHs; and install 10 pump stations. WATER ($100K): Evaluate and replace leaking pipes in distribution system in Manor Area.	**WASTE WATER:** System consists mostly of terra cotta pipe and due to rocky soil and high groundwater table, it has severe I/I. The wastewater is conveyed over 3 miles to Thurmont for treatment. The Park pays for every gallon treated and as a results pays over $40K a year just to treat the extraneous I/I flows. **WATER:** Due to age of the distribution system, leaks becoming more frequent, requiring an operator to "camp out" at plant until leak is repaired to meet demand. Equipment - Filter media requires replacement, the piping in the clarifier is corroded and undersized, components of the clarifier have recently deteriorated and required re-fabrication. Tanks and piping were repainted several years back and starting to show corrosion again. Level control floats are extremely corroded and filter valves are leaking. Clearwell is undersized for peak demand.	2013	2013	DNR	$1,238,000	$1,238,000	$200,000	$1,038,000							
7	60	Victor Cullen -WWTP	Consider SBR or activated sludge. Rebuild bar screen. New 50K gpd plant; utilize existing buildings.	Occasional Ammonia limit (8) violations during winter. Currently a rock trickling filter w/fixed nozzles. Needs new bar screen. Plant rated/permitted at .05 MGD. Serves approximately 135 people.	2013	2014	DJS	$2,516,000	$2,516,000	$216,000	$2,300,000							

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
8		State Water Towers	Minor rehab & painting	Camp Fretterd (Witches Hat) (200K) ($448.2K); MCI-H (Standpipe) (300K) ($511.4K); Victor Cullen (300K) ($544.4K); FY12 REQUEST (970K - P/C)	N/A	2013		$1,504,000	$1,504,000	$1,504,000								
9	62	Charlotte Hall VA Home - WTP	Construct a new, separate treatment building next to existing treatment to house softening units and store salt and other chemicals.		Design Funds Secured	2014	DVA	$210,000	$210,000		$210,000							
10	60	MCI -WWTP	Replace gas chlorine storage and feed system with UV disinfection units; cover the two (2) secondary clarifiers launders; install fermentation tank; install denitrification filters and associated carbon source feed system; Install treated wastewater supply system for washing belt and polymer mixing during sludge dry; replace existing emergency 1200KVA generator; construct pole building for equipment and chemical storage; paint 300,000 gallon standpipe; design and construct new 500,000 gallon elevated storage tank.	No violations. Nitrogen & Phosphorus added 01/01/11. Waiting to learn of state's share (ENR grant - $$$ unknown); Possibly $3M each. MDE first wants feasibility study conducted - MES has funds for study (not going to BPW until June or July 2011). DNR Component: Automation, DO monitors, pumps, alkalinity addition, sulfur dioxide and 1 ton chlorine storage (safety issue). FY12 REQUEST (3.7M - P/C)	Design Funds Secured	2014	DPSCS	$6,000,000	$3,000,000		$3,000,000							
11	55	Southern MD Pre-Release -WWTP	New plant - MBR Plant	Design 80% complete; Existing plant is a buried steel tank. Holes visible above ground. No violations. Electrical system in a trailer (violated code). 20 year old plant. FY12 REQUEST (1.471M - P/C)	Design Funds Secured	2014	DPSCS	$3,000,000	$3,000,000		$3,000,000							
12		State Water Towers	Minor rehab & painting	Crownsville Hospital (Front) (250K) ($450,000); Victor Cullen (75K) ($300,000). MCI -H (500K Elevated) ($625,000) Does not required design.	N/A	2014		$1,375,000	$1,375,000			$1,375,000						
13	55	Cunningham Falls SP - WTP	New water treatment plant	Manual system; must have staff 8 hrs/day during summer season. While plant is currently operational, it was constructed in 1973 and is at the end of its useful life. Major deficiencies include: Total manual operation, very inefficient, operator must be onsite at all times when plant is running. Examples - Backwashing is problematic, no flexibility with backwashing due to requirement of operator onsite. Significant safety risk - operators must reach into the panel to pull relays to start and stop the plant. Relays must be pulled when plant is offline due to frequent lightning strikes which cause severe damage to controls.	2015	2015	DNR	$3,000,000	$3,000,000			$3,000,000						
14	55	WCI -WWPS (old)	Move controls above ground; need new pumps; inline grinder requested for bypass channel.	Steel wet well - rusting out. Confined space (safety concerns)	2015	2015	DPSCS	$750,000	$750,000			$750,000						

TABLE II
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CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
15	50	Camp Fretterd - WTP & WD	WATER: Relocate switches from main electrical panel to a separate, weatherproof enclosure; replace heaters in storage and treatment areas; replace roof; install mission control unit; construct new treatment facility for proposed new well; construct new well at higher elevation; construct new elevated tank; paint 100,000 gallon elevated water storage tank. WASTEWATER: replace two (2) submersible pumps in duplex pump station.	Design based on Watek's recommendations can begin on or after June 2011. WTP: only 1 well exists. DS: need booster station, close loops. FY11 REQUEST (236K - P) FY12 REQUEST (188K - P)	2015	2017	MM	$1,970,000	$1,970,000			$197,000		$1,773,000				
16		State Water Towers	Minor rehab & painting	ECI (Front) (500K) ($625,000); Sandy Point (100K) ($175,000)	2015	2015		$800,000	$800,000			$800,000						
17	49	Poplar Hill	Propose new mechanical plant.	Lagoon system; spray field.	2017	2018	DPSCS	$3,160,000	$3,160,000					$316,000	$2,844,000			
18	47	Swallow Falls SP - WWTP & WTP	New plant; maybe SBR.	Lagoon based system; Can not discharge in summer; from 7 days before Memorial Day through 7 days after Labor Day. 2/3 cost estimate for WW. 60K gpd.	2017	2019	DNR	$3,688,000	$3,688,000					$368,800		$3,319,200		
19	41	Fair Hill NRMA - WTP & WD	Propose new plant and tank	Lead paint & glass lined tank. WTP control center in metal shed.	2017	2018	DNR	$1,709,000	$1,709,000					$170,900	$1,538,100			
20	40	St. Mary's College	WDS: Replace 3-inch piping student residences; close loops at seven (7) locations; new service line to Admissions building and ww pumping station. WTP: Replace flow meter at well no. 1; install automated well controls.	Design underway. Construction ready drawings scheduled for completion in August 2011.	2017	2017	UNIVERS.	$636,000	$636,000					$636,000				
21	39	Cheltenham -WWTP	WASTEWATER - Install new headworks; upgrade electrical service; install new blowers; replace RBC's with SBR's; construct building for new treatment plant; replace valves; upgrade Dynasand filters; install continuous DO meter. WATER - Repair Well #2; relocate hypo and Day tanks to existing chlorine room; paint storage tank.	Digester needs work w/aeration system.	2017	2018	DJS	$7,050,000	$7,050,000					$705,000	$6,345,000			
22		State Water Towers	Minor rehab & painting	Crownsville Hosp (Back) (250K) ($375,000) (2017); Elk Neck S.P. (60K) ($150,000) (2017); Charlotte Hall (250K) ($375,000) (2018); Rocky Gap (500K) ($625,000) (2019); Camp Fretterd (300K) ($450,000) (2019)	2017	2017		$1,975,000	$1,975,000					$1,975,000				
23	35	Gunpowder (MNG)	Extra well needed. Update controls. Heating system in poor condition. Fence around small reservoir.	Operating on only 1 well.	2020	2021	MM	$116,000	$116,000								$11,600	$104,400
24	34	Eastern Pre-Release - WWTP	Propose new WWTP.	Lagoon system; discharge to stream. Lagoon dredging completed Spring 2011. Currently 20K gpd.	2020	2021	DPSCS	$3,160,000	$3,160,000								$316,000	$2,844,000

TABLE II
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CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
25	27	Meadow Mountain Youth Center -WS	Repair treatment building roof leaks. Construct new well.		2020	2020	DJS	$256,000	$256,000								$256,000	
26	20	U of M Agr Center -WTP&WD	New treatment control building for Well #1 to replace "shed" like structure. Add 500 gallon storage at treatment building in case line to tower is interrupted. Construct new water treatment facilities for Well #2. Backfill well vault and extend well above grade. Rehab Well #2.	Not a reimburseable project - but could become one.	2020	2020	UNIVERS.	$402,000	$402,000								$402,000	
27	17	O'Farrell Youth Center (Henryton) - WWPS	Replace building door, build curb around grinder channel, paint generator fuel tank.	NOT CIP; Maintenance item.	2020	2020	DJS	$20,000	$20,000								$20,000	
28	40 HOLD - push back as far as possible until clear scope of work defined	Savage Mountain Youth Center - WS	Maintain with acid wash; scrap new well. Evaluate for water re-use.	First wanted replacement well - not feasible at this site - too difficult to find water. NOT CIP; Maintenance item.	2021	2021	DJS	$497,000	$497,000									$497,000
						GRAND TOTAL		$103,658,000	$76,789,000	$12,193,000	$12,982,000	$13,122,000	$10,550,000	$5,944,700	$10,727,100	$3,319,200	$1,005,600	$3,445,400

Agency Summary

DEPARTMENT OF PUBLIC SAFETY AND CORRECTIONAL SERVICES

INTRODUCTION

Though the Department of Public Safety and Correctional Services (DPSCS) was created in 1970, the State assumed responsibilities for corrections in the early nineteenth century and began to take on public safety duties in the 1900's. Current DPSCS responsibilities include controlling and reducing crime, maintaining public order, and controlling and rehabilitating individuals who pose a threat to the public. DPSCS is comprised of the 19 divisions listed below:

- Commission on Correctional Standards
- Criminal Injuries Compensation Board
- Division of Capital Construction and Facilities Maintenance
- Division of Correction
- Division of Parole and Probation
- Division of Pre-Trial Detention and Services
- Police and Correctional Training Commissions
- Professional Development & Training Division
- Information Technology and Communication Division
- Inmate Grievance Office
- Internal Investigative Units
- Maryland Parole Commission
- Office of Property Management Services
- Office of Inspector General
- Office of Secretary
- Office of Treatment Services
- Emergency Number Systems Board
- Handgun Permit Review Board
- Sundry Claims Board

Maryland Environmental Service (MES) provides water and wastewater services to the following facilities:

FACILITY NAME	WATER SOURCE	WATER TREATMENT	WATER DISTRIBUTION	WASTEWATER TREATMENT	WASTEWATER COLLECTION
Eastern Correctional Institution – Cogeneration Facility	MES	MES	DPSCS	MES	DPSCS
Eastern Pre-Release Unit	MES	MES	DPSCS	MES	DPCS
Poplar Hill Pre Release Unit	MES	MES	DPSCS	MES	DPCS
Eastern Correctional Institution	MES	MES	DPSCS	MES	DPSCS

FACILITY NAME	WATER SOURCE	WATER TREATMENT	WATER DISTRIBUTION	WASTEWATER TREATMENT	WASTEWATER COLLECTION
Jessup Correctional Complex - Dorsey Run	Anne Arundel County	Anne Arundel County	DPSCS	MES	DPSCS
MCI – Hagerstown	Hagerstown	Hagerstown	DPSCS	MES	DPSCS
WCI WWPS	Cumberland	Cumberland	DPSCS	Cumberland	MES*

AGENCY CAPITAL IMPROVEMENT PLANS

MES' proposed improvements to the water and wastewater facilities are made based on information in the 2004 Capital Improvements Master Plan that was provided by DPSCS. MES also based recommended improvements and/or expansions to the water and wastewater systems at these sites on the Agency's five-year plan, which was submitted to the State Department of Budget and Management.[1]

FACILITY		PROJECT DESCRIPTION	PROJECT COST (DOLLARS)	PROJECT SCHEDULE	INCREASE W/WW FLOWS	IMPACT W/WW CAPACITY
WCI & NBCI COMPLEX	NBCI	Housing Units 3 & 4	59,000,000	2006	NO	NO
		Outdoor Rec Area	1,000,000	2007	NO	NO
		New SUI Shop	4,000,000	2010 Design/Constr.	NO	NO
	WCI	Central Warehouse Building	5,700,000	Canceled	NO	NO
		280 Bed Minimum Security	23,500,000	2010 Design	YES	NO
		Equipment Maintenance Building	6,700,000	2011 Design 2014 Constr	NO	NO
		SUI Shop Plant	2,000,000	2011	NO	NO
		Voc Education Building	12,800,000	2009 Design 2011 Constr	NO	NO
		Rubble Land Fill Cap	2,200,000	2010 Design/Constr	NO	NO

[1] State of Maryland, Department of Budget and Management, FY 2009 – 2013 Capital Improvement Plan, http://dbm.maryland.gov/dbm_publishing/public_content/dbm_taxonomy/budget/capital_budget/capital_improvement_plans/toc_fy2009_2013capimprovplan.html

Facility		Project Description	Project Cost (Dollars)	Project Schedule	Increase W/WW Flows	Impact W/WW Capacity
		Staff Training Facility	5,200,000	2010	NO	NO
MCI - Hagerstown	Roxbury	Gatehouse & Visitors Center	10,000,000	2012 Design 2014 Constr	NO	NO
		Dining Room Expansion, Relocate Medical	9,000,000	2014 Design	NO	NO
		Upgrade Perimeter Security	8,500,000	2012 Design 2014 Constr	NO	NO
		New Support Services Building	4,000,000	2010	NO	NO
		SUI Shop Plant	4,000,000	2011	NO	NO
	MCI	Upgrade Security	8,000,000	2008	NO	NO
		SUI Metal Plant	6,000,000	2012	NO	NO
		SUI Shop Plant	3,200,000	2006	NO	NO
		Renovations	5,000,000	2012	NO	NO
		Construct Two (2) 224 Bed Housing Units	18,000,000	2011	YES	NO
	MCTC	Design/Construct 192 Cell Housing Unit	25,800,000	Design 2010 2012 Constr	YES	NO
		Replace Windows & Heating System	22,000,000	2007	NO	NO
		Design/Construct New Bakery Dining Room Expansion	7,000,000	2010	NO	NO
		SUI Shop Plant Graphics	4,000,000	2013	NO	NO
		SUI Meat Plant	4,000,000	2010	NO	NO
		SUI Shop Plant	8,100,000	2009	NO	NO
ECI		Design, Construct and Equip Multi Purpose Bldg	2,200	2007	NO	NO
		SUI Shop Textile Plant	4,000,000	2013	NO	NO
		Parking & Road Resurfacing	1,200,000	2010	NO	NO

Facility		Project Description	Project Cost (Dollars)	Project Schedule	Increase W/WW Flows	Impact W/WW Capacity
		Renovate & Expand Central Whs Bldg	1,500,000	2010	NO	NO
		Replace cell door control system	1,000,000	2009	NO	NO
		Design, Construct and Equip support services Bldg	2,300,000	2011	NO	NO
		Renovation of Kitchen/Dining and Serving Area	1,200,000	2011	NO	NO
Poplar Hill Pre-Release		Fire Safety / Windows		2010 Construct	NO	NO
Jessup MHC Complex	Patux Inst (PATX)	Construct 300 bed Mental health Bldg	42,000,000	2006	YES	NO
		Install DC Fire Safety Project	7,428,000	2006	NO	NO
		Women's Support Bldg	4,000,000	2007	NO	NO
	Brockbridge (BCF)	Upgrade Kitchen / Dining	2,000,000	2009	NO	NO
		Construct Support Services Bldg	3,000,000	2009	NO	NO
	Jessup Pre Release (JPRU)	Two 560 Bed Min Security Compounds		2010 Design/Construct	YES	NO
		Construct Support Services Bldg	3,500,000	2010	NO	NO
	Jessup Regional Warehouse	Construct Warehouse	1,400,000	2010	NO	NO
	MCH-A	SUI Shop Mattress Uniform Replacement	4,000,000	2013	NO	NO
		SUI Shop Textiles Graphics	4,000,000	2008	NO	NO
EPRU		Upgrade Kitchen/Dining	2,000,000	2009	NO	NO

FACILITY	PROJECT DESCRIPTION	PROJECT COST (DOLLARS)	PROJECT SCHEDULE	INCREASE W/WW FLOWS	IMPACT W/WW CAPACITY
	Construct Support Services Building	3,000,000	2009	NO	NO
SMPRU	Upgrade Kitchen/Dining	2,500,000	2010	NO	NO

CAPITAL IMPROVEMENT PLANS FOR MES OPERATED FACILITIES

MES provides both water and wastewater services to the facilities listed above. The following section provides summaries of the proposed capital improvement needs for each facility. More detailed descriptions of each facility are included in the Facility Master Plan Report.

I. EASTERN CORRECTIONAL INSTITUTION

A. WATER SOURCE

- Construct a new backup well and abandon the existing Manokin wells

B. WATER TREATMENT PLANT

- Remove and replace instruments and controls with a common PLC/IO cabinet with digital microprocessor based PLC in the new electrical room. Run communication wires to existing plant control room HMI and install HMI software
- Install two (2) new RO skids with 450,000 GPD capacity with lower rejection utilizing 400 SF membranes
- Build a new chemical room with adequate ventilation and all new feed equipment
- Build a new electrical room with VFD for RO pumps, new MCCs, and a separate air conditioning unit
- Prepare and epoxy paint all remaining exposed piping
- Demolish existing green sand filters
- Demolish backwash pumps, blend pumps, booster pumps, transfer pumps and piping
- Remove and cap unused piping
- Install new cartridge filter housing
- Install new stationary cleaning system with permanent piping brought to within 24" of the RO skids
- Blend the concentrate from the RO units with the current WWTP effluent before discharge

C. WASTEWATER TREATMENT PLANT

- Replace the mechanical bar screen
- Install a washer and compactor (Muffin Monster)
- Construct an additional equalization tank
- New influent wet well at headworks
- New filters
- Construct additional process units to increase treatment capacity and

redundancy

Projected Cost: $23,528,000 ($11,402,000 have been received and additional funding of $12,126,000 expected in Fiscal Year 2012)
Planning and Design: Currently in progress
Construction: Fiscal Year 2012

II. Eastern Correctional Institution Cogeneration Facility

A. Bulk Fuel (Wood Chips) Handling System- $544,000.00

- Replace Truck scale and road approach to include drainage ditch restoration. - CIP
- Install electrical operators for the four bay doors in the wood receiving building
- Replace 8 hydraulic pistons underneath the walking floor
- Clean and replace as needed building down spouts
- Determine best management practices to better handle storm-water run-off to the inlet and separate it from woodchips.
- Install a fire suppression system for the wood chip building -CIP
- Replace the PLC for wood receiving, transfer and storage systems
- Improve drainage near silo and overall plant perimeter
- Install hoist, boom or elevator to transport spare parts and replace the exiting ladder with a stair system to access the top area of the silo- CIP
- The bulk handling fuel system equipment and support structure needs to be sand blasted, primed and painted. Some of the areas are suspected to have lead-based paint as part of the original construction.

B. Boiler Make Up Water System

- Water treatment corrective measures are currently in progress under capital improvement plan

C. Boiler Room - $771,000.00

- Insulate the high pressure steam lines
- Improve the lighting in the ceiling
- Improve ventilation in the ceiling
- Replace the four (4) main boiler feed pumps with American made units -CIP
- Upgrade the facility emergency lighting battery bank or change over to self-contained light fixtures that include battery back ups for emergency lighting.
- Boilers No. 1 & 2 refractory repairs
- Combustion control system optimization

D. Ash Collection System - $80,000.00

- Provide means of capturing quenching water from the ash systems.
- Install a video camera in each of the fly ash silos with a control room monitor

E. Condensate Return System - $203,000.00

- Replace condensate return tank – CIP

F. Effluent Water System - $18,000.00

- Replace the current wooden pump station building with metal construction

G. **SWITCHGEAR ROOM - $195,000.00**
- Repair the roof
- Repair the duct system to supply heat and circulating air
- Repair the wall areas to prevent water seepage between the foundation (floor) and the wall
- Replace the obsolete relays to include watt-hour meters on each generator breaker
- Update the Facility's Relay Coordination Study
- Facility short circuit analysis
- Arc flash coordination & implementation
- Replace obsolete current limiting devices in Sub. No.7

H. **DIESEL GENERATOR ROOM - $15,000.00**
- Install a canopy on intake of supply air fan

I. **UTILITY INTERFACE YARD - $120,000.00**
- Add an additional transformer with required switching to isolate and connect it into system. Currently in progress under Major Maintenance. Funding
- Upgrade the oil circuit breaker

J. **PRIMARY DUMP CONDENSER - $170,000.00**
- Re-tube the main steam dump condenser
- Re-Tube west Hi-Temp Converter

Projected Cost: $978,000 (CIP) and 1,250,000 (Maintenance)
Planning and Design: Fiscal year 2015
Construction: Fiscal year 2017

III. EASTERN PRE-RELEASE UNIT

- Dredge the lagoon as a short term solution
- Replace aerated pond with Sequencing Batch Reactors biological treatment units as long term solution
- Design and construct new 25,000 gallon ground storage tank and booster pump units

Projected Cost: $1,479,000
Planning and Design: Fiscal Year 2013
Construction: Fiscal Year 2015 and 2019

IV. JESSUP CORRECTIONAL COMPLEX

A. **WASTEWATER TREATMENT PLANT**
- Replace existing screen with two (2) new steeper pitch more suitable for removing large debris
- Replace existing grit removal system components such as the paddle drive assembly, drive tubes w/paddles, floor plate, inlet baffle, grit cyclone, and grit classifier
- Install manways to allow access to the flow equalization tank and install

liners to prevent corrosion. Also replace diffusers and mixing equipment

- Replace drive units, skimmers, scrappers, weir plate brackets, scum mixers and scum mixer supports
- Replace diffusers, clarifier skimmers, sludge scrapers, and scum pumps. Install chopper pumps with re-circulating feature
- Rebuild blower and install automated inlet valves, rate control valves, and DO probes
- Replace clarifier drives and add scum removal system in second stage tanks
- Replace RAS and WAS pumps. Modify piping to redirect flow from WAS to gravity sludge thickener rather than first stage reactor
- Replace existing filter media, under drain system, backwash pump seals and mud well pumps
- Install enclosure to prevent freezing of $Mg(OH)2$ and add a spare pump
- Upgrade existing alum feed system by adding a spare pump and allowing an additional feed point
- Install a standby pump for the polymer feed
- Replace methanol/supplemental carbon pumps and add on-line nitrate analyzers
- Replace blowers and diffusers for sludge holding tanks
- Install a new sludge screening system (holding tanks, pumps, screen and dumpster)
- Rebuild/rehab the existing belt filter presses. Upgrade HVAC system for the screen and grit building, and administration building
- Install an SCADA system

B. WASTEWATER TREATMENT PLANT

- Replace existing screen with less steep screens more suitable for removing large debris
- Replace existing grit removal system components such as the paddle drive assembly, drive tubes w/paddles, floor plate, inlet baffle, grit cyclone, and grit classifier
- Install manways to allow access to the flow equalization tank and install liners to prevent corrosion. Also replace diffusers and mixing equipment
- Replace drive units, skimmers, scrappers, weir plate brackets, scum mixers, and scum mixer supports.
- Replace diffusers, clarifier skimmers, sludge scrapers, and scum pumps
- Install chopper pumps with recirculating feature.
- Rebuild blower and install automated inlet valves, rate control valves, and DO probes
- Replace clarifier drives and add scum removal system in second stage tanks
- Replace RAS and WAS pumps. Replace existing filter media, under drain system, backwash pump seals, and mud well pumps
- Install enclosure to prevent freezing of $Mg(OH)2$ and add a spare pump
- Upgrade existing alum feed system by adding a spare pump and allowing an additional feed point

- Install a standby pump for the polymer feed
- Replace methanol/supplemental carbon pumps and add on-line nitrate analyzers
- Replace blowers and diffusers for sludge holding tanks
- Install a new sludge screening system (holding tanks, pumps, screen and dumpster)
- Rehab the existing belt filter presses
- Upgrade HVAC system for the screen and grit building, the blower building, and administration building
- Install an SCADA system

C. Wastewater Collection System

- Modify MHC pump station to allow installation of two (2) new mechanical bar screens to improve trash removal
- Provide enclosure with exhaust for MHC Pump Station
- Install a manual transfer switch to allow the operation of pump Nos. 1 and 2 from the generator
- Install automatic air release valves for pump Nos. 4 and 5

Projected Cost: $6,000,000 (All funds expected by fiscal year 2010)
Planning and Design: Complete
Construction: Fiscal Year 2012

V. Maryland Correctional Institution (Hagerstown Correctional Complex)

- Replace gas chlorine storage and feed system with UV disinfection units
- Install launder covers on two (2) secondary clarifiers
- Install a fermentation tank to enhance biological phosphorous removal and reduce the amount of sludge generated in the chemical phosphorous removal
- Install denitification filters and the associated addition carbon source feed system to reduce further total nitrogen levels discharged into stream
- Install treated wastewater supply system for washing belt and polymer mixing during sludge dewatering operations
- Replace the existing emergency 1200 KVA generator
- Construct a pole building for storing equipment and chemicals for use by maintenance
- Paint 300,000 gallon standpipe
- Design and construct new 500,000 gallon elevated storage tank in complex

Projected Cost: $6,000,000,000
Planning and Design: Fiscal Year 2013
Construction: Fiscal Year 2014

VI. Poplar Hill Pre-Release Unit

- Repair concrete roof, replace drywalls, and repair the joint between the concrete pad walls at the WWTP controls building

- Replace the hatch for the transfer pump station between the storage pond and spray field

  Projected Cost: $47,000
  Planning and Design: Fiscal Year 2020
  Construction: Fiscal Year 2020

VII. Southern Maryland Pre-Release Unit

A. Wastewater Treatment Plant

- Install oil and grease interceptor, new headworks including new screen, washer and compactor
- Install new influent pump station
- Replace existing below grade steel activated sludge plant with a new above ground SBR or membrane bioreactor treatment system in a building
- Construct new office building
- Install Mission type remote alarm and process monitoring system
- Retrofit existing hypochlorite based disinfection system and sodium thiosulfate dechlorination system. Existing tanks and accessories are grossly oversized
- Design and construct new liquid chlorine or on-site hypochlorite generation system to treat spray field discharges
- Clean vegetative growth in effluent holding pond, remove accumulated solids and repair liner as necessary
- Replace existing spray pumps, associated piping, check valves and gate valves
- Evaluate, replace and or repair existing above ground force main from spray pumps to the spray fields, transmission pipes, spray nozzles and valves in the spray fields

B. Wastewater Collection System

- Locate and remove sources of extraneous flow in collection system
- Install grease traps wherever appropriate

C. Water Treatment Plant

- Replace cleanout cap
- Install dehumidifier

  Projected Cost: $5,801,000
  Planning and Design: Fiscal Year 2012
  Construction: Fiscal Year 2013

VIII. Western Branch and Northern Branch Correctional Institution

- Replace the wet well. The existing wet well is deteriorating. It is constructed of steel
  and has corroded substantially over the years
- Replace the dry pit submersible vacuum pumps with submersible pumps. The dry pit
  submersible pumps require high maintenance

- Install an inline automated trash removal system in the bypass channel
- Install a vault with the necessary valves and connection fittings to provide the capability to hookup a bypass pump. In the event of emergency or pump maintenance,
  a bypass line would be useful
- Replace/Upgrade the controls. Relocate the controls above grade. They are currently
  housed in a dry well. The dry pit is subject to flooding
- Upgrade the headworks

  Projected Cost: $750,000
  Planning and Design: Fiscal Year 2015
  Construction: Fiscal Year 2015

The Maryland Environmental Service Water and Wastewater Master Plan projects the cost for upgrades to DPSCS water and wastewater facilities through fiscal year 2021 to be **$26,802,000.**

FACILITIES NOT SERVED BY THE MARYLAND ENVIRONMENTAL SERVICE

There are several facilities falling under the jurisdiction of the Department of Public Safety and Correctional Services that are not served by Maryland Environmental Service; local jurisdictions or sanitary authorities provide water and/or sewage collection and treatment services. A description of the facilities and water and wastewater service for each is not included within this document. Information on these systems may be included in future updates to this plan. MES recommends the existing infrastructure of these facilities be evaluated to avoid potential disruption to water and sewerage services in the future.

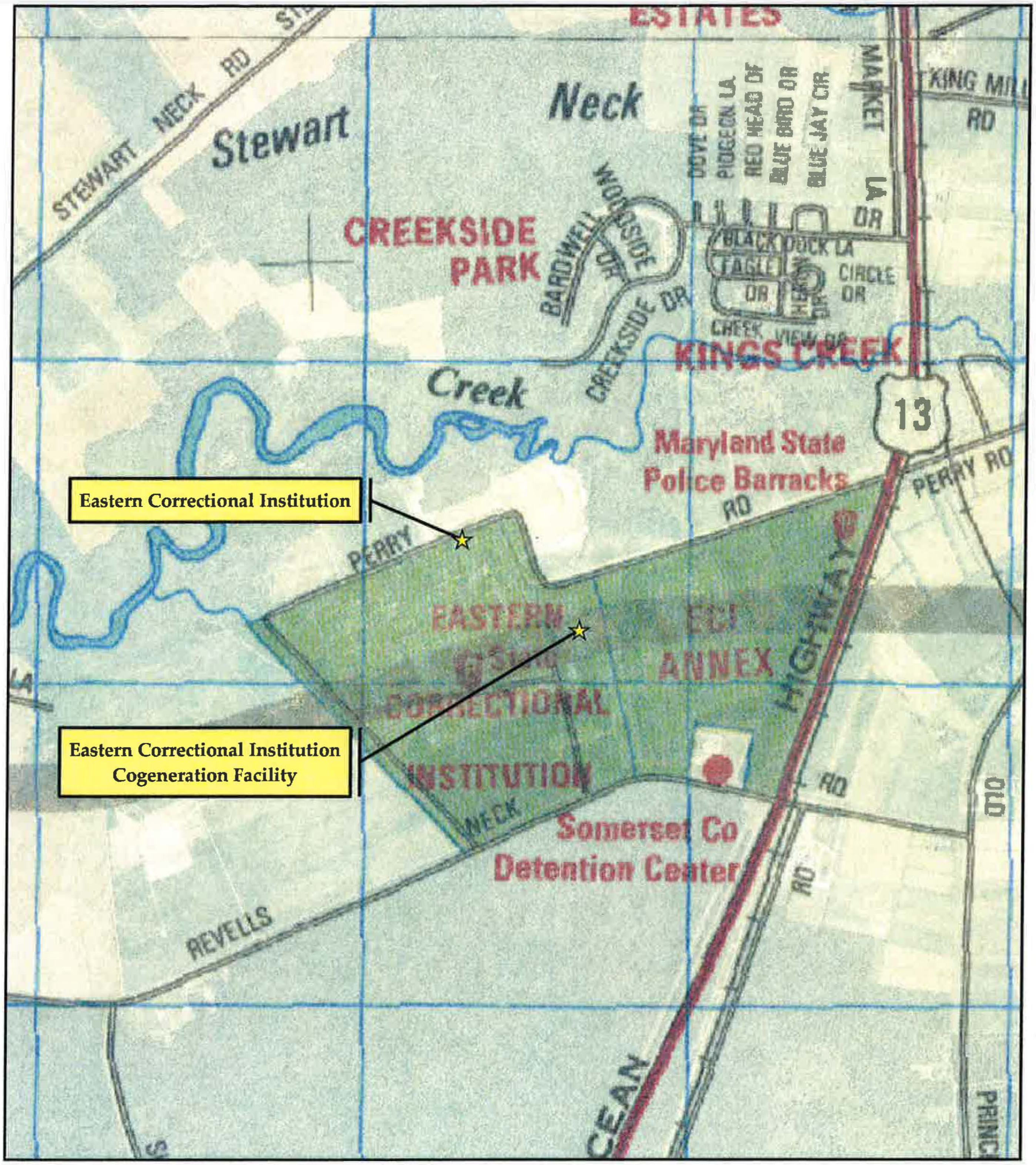
SUMMARY

Detailed descriptions of the water and wastewater facilities operated by MES for the Department of Public Safety and Correctional Services are included in this volume, as well as the following information:

- Operations data
- Regulatory compliance history and future regulatory constraints
- A listing of operational and infrastructure deficiencies
- Capital improvements and major maintenance funding history
- Recommended improvements and estimated costs (in 2008 dollars)
- Proposed schedule of implementation
- Supplemental information

MES will continue to work closely with DPSCS to keep abreast of their planning activities to ensure there will be an adequate water supply and sewerage service for proposed facility expansions or changes in use.

Eastern Correctional Institution



☆ Sites

Water and Wastewater Master Plan 2008

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

Figure 1

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

0 500 1,000 1,500 2,000
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

EASTERN CORRECTIONAL INSTITUTION

BACKGROUND

The Eastern Correctional Institution (ECI), in Westover, is a medium security Department of Public Safety and Correctional Services (DPSCS) prison facility. ECI is located in Somerset County and is approximately 3 miles southwest of Princess Anne, just off of Maryland Route 13. The current prison population consists of approximately 3,300 inmates and 800 prison staff. The facility is designed for a conventional inmate capacity of 3,420.

ECI has two (2) identical compounds (east and west wings) and is enclosed within a security fence. Each wing consists of four (4) housing units. Located within each of the compounds are a State Use Industries (SUI) shop and a support building. Each wing houses approximately 1,440 inmates. The remaining inmates are housed at ECI-A, a 420 bed Annex. ECI also provides water and sewer services to the Somerset County Detention Center.

The institution is served by a dedicated water source; a water treatment plant, and wastewater treatment plant; and a cogeneration power plant located on the premises, which is operated by Maryland Environmental Service (MES). Water distribution and wastewater collection system is operated by the Department of Corrections.

The 2004 DPSCS Master Plan projects the following upgrades and improvements at ECI.

- Design, construct replacement inmate cell door control systems
- Design, construct central warehouse renovation and expansion
- Design, renovate, and equip finishing & kitchens – east/west compounds
- Design, construct and equip multi-purpose building
- Design, construct equipment support services building
- Design, construct SUI Shop & Textile building
- Resurface roads & parking areas

The above improvements are not expected to increase the population at the facility. The water and wastewater flows may be increased. However, presently there is no expected impact to the capacity of water and wastewater facilities.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

A major capital improvement of the water treatment plant, which is now ongoing, is expected to be completed at the end of 2011. Under the CIP program, capacity of the water treatment plant is being expanded under partnership with the Somerset County Sanitary District. In addition, the shallow Manokin wells have been replaced with a deeper well. Upon completion, the ECI water treatment and supply facilities consist of three (3) wells (designated as wells no. 4, 5, & 6), a reverse osmosis treatment facility, two (2) 500,000 gallon elevated water storage tanks, and a water distribution system throughout the institution. Treatment system consists of three (3) RO skids with pre-treatment cartridge filters. The RO skids are each rated for 450,000 gallons per day. . Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

ECI has three (3) drilled wells. Two (2) Manokin wells have been abandoned and replaced by a deeper Patapsco well. All wells (4, 5, & 6) are located along Perry Road. Well 5 is located about 150 yards from the water and wastewater treatment plant. Well No.5 is located inside the wastewater treatment plant, and well 6 is located at the intersection of Perry Road and Route 13, near the Police Barracks. The water distribution system consists of two (2) 500,000-gallon elevated water storage tanks. No information is available for the water distribution piping. Please refer to Supplemental Information Section – Facility Description – WS&WD.

C. WASTEWATER TREATMENT PLANT

The ECI wastewater treatment plant is rated for a design flow of 0.48MGD, a BNR design flow of 0.68 MGD, and a peak flow of 1.02 MGD. The treatment plant consists of a grinder pump, a mechanical bar screen, a raw sewage pump station at the screen building, a rotary screen, a flow equalization tank, an influent pump station, a biological activated sludge process (5 stage process), chemical feed systems for alum, three (3) dynasand filters, ultraviolet disinfection units, effluent pumping units, power cogeneration water supply units, one (1) sludge storage tank, two (2) gravity thickeners, two (2) aerobic digesters, one (1) belt filter press, pumping units for sludge transfer and emergency power units. The Bardenpho process consists of two (2) anaerobic zones, one (1) anoxic zone, one (1) aeration zone, one (1) secondary anoxic zone, one (1) re-aeration zone, two (2) clarifiers and their associated recirculation and return pumping units. Please refer to Supplemental Information Section – Facility Description - WWTP.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

Average and peak water treatment plant flows in 2010 were 660,000 gallons per day and 740,000 gallons per day, respectively. In 2010, average and peak flows for the wastewater treatment plant were 550,000 gallons per day and 630,000 gallons per day, respectively. Additional water and wastewater facilities operations data is included in the Supplemental Information Section.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

Water Treatment Plant

- New reverse osmosis system has been installed to replace the old systems. The new system is capable of processing 1.3 MGD of water for the benefit of ECI and the Somerset County Sanitary District
- Untreated reject water is currently discharged into Kings Creek. Under a new revised draft permit from MDE, the reject water will be treated and discharged into the Manokin River with the wastewater effluent from ECI.

Wastewater Treatment Plant

- Mechanical bar screen is inadequate and does not function as intended

- Influent wet well at the screen building is undersized and cannot handle the influent volume
- Equalization tank is undersized. A new EQ Tank was constructed in 2010-11
- Piping in the filter room exhibits severe corrosion
- Flow to the secondary clarifiers is not balanced. Corrective measures have been completed
- Plant lacks redundancy. In the event that any of the biological units is out of service, there are no provisions to treat the daily flow from the complex

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The ECI wastewater treatment plant had four (4) violations between June 21, 1999 and July 6, 1999 for exceeding total nitrogen because the equalization tank and BNR pump stations were out of service. In 2000, the plant had a violation for exceeding total phosphorous because of an incorrect dosage of alum. In the period between May 14, 2001 and July 14, 2001, the plant experienced five (5) violations due to process errors and ammonia being returned from belt filter press. In December 2002 and February 2003, the plant exceeded total suspended solids because the dynasand filter was malfunctioning. In June 2003, the plant exceeded total phosphorous limits due to an unknown reason. In the period between January 14, 2004 and January 31, 2004, the plant exceeded total phosphorous and total suspended solids because the bar screen and roto-strainer were broken. In the period between January 21, 2006 and October 31, 2006, the plant exceeded TSS limits two (2) times, and total phosphorous limits three (3) times. All violations resulted from malfunctioning of dynasand filters. In the period between February 28, 2007 and August 31, 2007, the plant exceeded TSS seven (7) times, total nitrogen five (5) times, and fecal coliform one (1) time. Violations resulted from high flows and the carryover of solids. In 2006/2007, the Maryland Department of Natural Resources issued a consent order requiring corrective actions to the water source, water treatment, and wastewater treatment facilities. The corrective actions required under the consent order included water audits, ceasing use of the Manokin wells, and expanding the current wastewater treatment plant to handle increased wastewater flows.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In 1989, $9,025,000 in capital improvement requests was made for the design and construction of the water treatment plant, wastewater treatment plant, and elevated water storage tanks. In 2005, a capital improvement request for $300,000 was made to rehabilitate the elevated water storage tank. During the period between 2006 and 2008, $11,402,000 in capital improvement requests was made to design and construct water and wastewater treatment plants. Also, critical maintenance request for $11,079 were made for various improvements. Currently, a critical maintenance request to the Department of General Service (DGS) is being made for $56,261, to accomplish the following:

- Replace the double door at the control building
- Replace the crane at the control building
- Replace the crane at the influent pump station
- Install a wash down pad at the 420 bed pump station
- Replace the controls and alarms for remote wells

To date, no funds have been received for this critical maintenance request. Please refer to the Supplemental Information Section – CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

Wastewater Treatment Plant

- Replace the mechanical bar screen
- Install a washer and compactor (Muffin Monster)
- New influent wet well at headworks. Design of a new headworks facility has been completed and construction will start in 2011.
- New filters
- Construct additional process units to increase treatment capacity and redundancy and provide treatment of the reverse osmosis reject water

The above improvements are part a capital improvement request. The total projected cost is estimated $26.7 million.

The design of these improvements is currently in progress. As of December 2008, funding for $11,402,000 has been received, which includes funding for the water treatment plant. Additional funding for $19.95 million is expected in fiscal year 2015 & 2016.

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Currently in progress
- Construction: Fiscal Year 2015 & 2016

SUPPLEMENTAL INFORMATION

EASTERN CORRECTIONAL INSTITUTION

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION

The water treatment and supply facilities consists of four (4) wells, a treatment facility, two (2) 500,000 gallon elevated storage tanks, and a water distribution system throughout the correctional complex.

Well No. 4 (Patapsco Well): This well is located along Perry road and is about 150 yards from the water and wastewater treatment plants. This well, drilled in 1989, has a depth of 1,214 feet and an 8-inch well casing. The well is indicated to have a yield of 400 gallons per minute. The well is grouted to 1,070 ft. and the remainder (1,070 ft. - 1, 250 ft.) is gravel packed. It has a submersible pump rated at 400 gpm with a 20 hp motor, but currently pumps about 300 GPM. The screen interval in this well is 1,139 to 1,204 feet below the ground and the static water level is 49 feet below the top of the standpipe. The pump is set at an unknown depth.

Well No. 5 (Patapsco Well): This well is located inside the wastewater treatment plant. Drilled in 1991, the well has a depth of 1,251 feet and a 14-inch casing. The well has a presumed yield of 500 gallons per minute. The well is grouted to 900 ft. and the remainder (900 ft. – 1,265 ft.) is gravel packed. It has a submersible pump rated at 400 gpm with a 20 hp motor but currently, the pumps operate at 300 GPM. The screen interval in this well is 1,189 to 1,246 feet below ground and the static water level at 56.7 feet below the top of the standpipe. The pump is set at an unknown depth.

Well No. 6 (Patapsco Well): This well is located on the corner of Route 13 and Perry Road on the grounds of the State Police Barracks. It is used as a back-up source of water during periods of high water demand. These well is about 1,220 feet deep and it has a 12-inch stainless steel casing and 60 hp pump rated for 450 gpm. The screen interval in this well is 1,140 to 1205 feet below ground and the static water level at 53 feet below top of the standpipe. The pump is set at 220 feet depth.

ECI has two (2) 500,000-gallon elevated water storage tanks. The tanks have an overflow elevation of 169.5 feet. The finished water lead pump (stop) and lag pump (stop) are set at 168.55 and 167.40 feet, respectively. Finished water lead pump start and finished water lag pump start are set at 166.25 and 158.17 feet, respectively. The tanks have a low water alarm level set at 154.75 feet.

WATER TREATMENT PLANT

The water treatment and supply facilities consist of three (3) wells (designated as wells no. 4, 5 & 6), a treatment facility, two (2) 500,000 gallon elevated water storage tanks tank, and a water distribution system throughout the institution.

Raw water from Well No.4 enters the treatment building via a 6-inch pipe and enters from Well No. 5 via an 8-inch pipe. Both of the wells discharge piping is equipped with flow meters.

Prior to Reverse Osmosis (RO), acid/scale inhibitor is injected into an intermediate clear well discharge line. Acid/scale feed facilities include drums and chemical feeders. Acid treated water passes through two (2) 5-micron Cartridge filters and then to three (3) RO units.

Each RO unit consists of an RO supply pump rated at 450 gpm @ 225 psi and five (5) pressure vessels loaded with 8-inch by 40-inch elements. Each unit is rated for 80 gpm product flow, a 30 gpm reject flow, and a 73% recovery and membrane pressure of 225 psi. Three (3) vessels are in the first stage and two (2) vessels in are in the second stage. Each element has an active area of 365 square feet. The flux rate is 12.6 gallons per square per foot per day.

Permeate (product) from the RO units is collected in the finished water clear well rated for 58,000 gallons. Reject water is discharged to the storm drain.

Three (3) pumps transfer water from the intermediate clear well to the finished water well for 60/40% blending. Each pump is rated for 50 gpm @ 7 ft. TDH.

The three (3) finished water pumps are rated at 600 gpm @ 162 ft. TDH and withdraw water from the finished water clear well and convey to the elevated water tank and distribution network.

Gas chlorine is injected at the effluent of the finished water pumps. Gas chlorine feed facilities are rated at 20 ppd. Gas Chlorination facilities include 150 lb. cylinders, a 3.4 gpm @ 130 ft. TDH booster pump, a vacuum regulator, an automatic switchover, an ejector, a rotometer, a solenoid valve, a gate valve, a pressure gauge, a cylinder repair kit, panic hardware, a chlorine scale, a vent, a leak detection alarm and ammonia, an outside entrance/exit, and cylinder chains.

WASTEWATER TREATMENT PLANT

The wastewater treatment plant is rated for an average design flow of 0.48 MGD, a BNR design flow of 0.68 MGD, and a peak BNR design flow of 1.02 MGD. The plant was originally built in 1990 and then upgraded in 1996. The Plant includes the following:

I. Preliminary Treatment (Headworks)

- i. Channel: 36-inch wide, 19 feet deep, one (1) 10 hp grinder unit
- ii. Mechanical Bar Screen: One (1), Parkson Aquaguard Model AG-MN-A Spacing and angle: 6 mm and 75 degrees
- iii. Screened material removed is discharged via a 10-inch diameter pipe and a compactor rated at 12 cubic feet per hour with a 2 hp motor
- iv. Raw Sewage Pump Station at the Screen Building:
    - Two (2), rated at 1050 gpm @ 45 ft. TDH with 20 hp motors
    - Wet well: 5 ft. wide, 5 ft. long, and 19 ft. deep
- v. Flow Meter: Ultrasonic
- vi. Bypass channel/wet well
- vii. Rotary screen: one (1), rated for 1.7 MGD and 0.125 –inch opening and 1/3 hp motor.

II. Primary Treatment

i. Two (2) Flow Equalization Tanks

i. Dimensions: Outer diameter = 50 ft. and inner diameter = 30 ft.

ii. Working Volumes: 102,000 gallons and 152,000 gallons

iii. Mixing: 3 mixers rated at 2 hp each

ii. BNR Influent Pumps near Equalization Tank:

- Two (2), submersible, rated at 470 gpm @ 18.6 ft. TDH with 5 hp motor

iii. Flow Transmitter Vault

III. Biological Treatment Process - Bardenpho Process

i. Fermentation Zone (anaerobic):
- Two (2), total volume: 58,000 gallons
- Detention time: two (2) hours @ average flow
- Mixing: 5 hp surface mixers.

ii. Anoxic zone (First Stage)
- One (1), total volume: 42,000 gallons
- Detention time: 1.5 hours @ average flow
- Mixing: 5 hp submerged turbine mixers.

iii. Aeration Zone (Carrousel)
- One (1), volume: 326,000 Gallons
- Detention Time: 11.5 hours
- Mixing/Aeration: 50 hp surface aerator

iv. Second Anoxic Zone
- One (1), volume: 40,000 Gallons
- Detention Time: 1.4 Hours @ average flow
- Mixing: 5 hp submerged turbine mixers

v. Re-aeration Zone
- One (1), volume: 14,000 Gallons
- Detention Time: 0.5 hours @ average flow
- Mixing/Aeration: 5 hp surface aerator

A. Overall Performance
- Nitrification SRT: 12 days
- Process SRT: 15 days
- Minimum wastewater temperature: 17.5 deg. C
- Maximum wastewater temperature: 28 deg. C
- MLSS: 4,000 mg/l
- Return activated sludge: 100 % (max) to fermentation zone
- RAS solids concentration: 8,000 mg/l
- Sludge production: 1,040 lbs/day
- Oxygen coefficients: 1.25 lb. O2/lb BOD removed
  4.60 lb. O2/lb NH3-N removed
  2.86 lb. O2/lb NO3-N removed

B. Secondary Clarifiers
- Quantity and type: two (2) circular, center feed, with ¾ hp drive motor
- Dimensions: 35 feet diameter, 12 feet side water depth, 93,400 gallons each

- Surface Overflow Rate: Two (2) Units @ Avg. Flow: 350 GPM/Sq. ft
- Two (2) Units @ Peak Flow: 530 GPM/Sq. ft
- Detention Time: Two (2) Units @ Avg. Flow: 6.6 hours
- Two (2) Units @Peak Flow: 4.4 hours

C. Chemical Feed Systems:
- Alum Feed at Re-aeration Zone
- Storage Tanks: Three (3), 1,022 gal tanks and two (2) 1,500 gal tanks
- Chemical Metering Pumps: Three (3), rated at 8 gph @ 60 psi

D. Pumping Units
- Return Activated Sludge (RAS) Pumps at BNR Control Building
- Quantity and type: 3 (2+1 Standby), centrifugal
- Design Capacity: 240 gpm @ 17.5 feet TDH with 2 hp motor each
- Waste Activated Sludge ((WAS) Pumps at BNR Control Building
- Quantity and type: 2 (1+1 Standby), Positive Displacement
- Design Capacity: 80 gpm @ 25 feet TDH with 5 hp motor
- Scum Pump: One (1), rated at 120 gpm @ 12.4 ft. TDH with 2 hp motor

IV. Tertiary Treatment

A. Dynasand Effluent Filters
- Quantity and type: three (3), continuous backwash
- Filtration area and media depth: 114 square feet, 40 inch bed
- Filtration rates: Three (3) cells @ avg. flow: 2.9 gpm/sq.ft.
Three (3) cells @ peak flow: 4.4 gpm/sq.ft.
- Backwash rate: 5% of influent
- Filter Compressor: 7.5 hp

B. Ultraviolet Effluent Disinfection
- Channel size: 18-inches wide by 18-inches deep by 36-feet long
- Two (2) banks, 5 racks and 40 bulbs
- Maximum capacity: 1.02 MGD
- UV Transmission: 65 %

C. Post Aeration at Chemical Room
- Diffusers: Fine bubble
- Blowers: Two (2), rated at 120 cfm @ 10 psi with 7.5 hp motors

D. Effluent Pumps: Two (2), 2-Flyght pumps C3201-180 rated at 220 gpm @ 160 ft. TDH with 49 hp motors

E. Process Water Feed:
- One (1) pump, rated with 1 hp motor
- One (1) bladder tank rated at 60 gallons

F. Power Cogeneration Water Supply
- Dynasand Filter: surface area of 38 square feet and filtration rate of 3.6 gpm/square feet
- Two (2) finished water supply pumps rated at 210 gpm @ 18 ft. TDH

V. Solids Handling

- Sludge Storage Tank 1 (Currently being used as EQ tank)

- ◊ Total Volume: 66,000 Gallons
- ◊ Hydraulic Retention Time (HRT): 5 days @ 1%

- Gravity sludge thickeners (old clarifiers)
  - ◊ Quantity and dimensions: 2, 25 ft. diameter and 10 ft. deep
  - ◊ Total volume and HRT: 75,000 gallons, 16 days @ 2.5 %
- Aerobic Digesters (old aeration tanks)
  - ◊ Total volume and HRT: 179,000 Gallons, 39 days @ 2.5 %
  - ◊ Solids Retention Time: 60 Days
- Belt Filter Press
  - ◊ Quantity: One (1), Parkson P-32-S (FE 4470)
  - ◊ Belt width: 1.0 m
  - ◊ Spray water booster pump: 40 gpm @ 275 ft. TDH with 5 hp motor
  - ◊ Polymer Unit: One (1), Polyblend system rated at 8 gph @ 60 psi
  - ◊ Compressor: One (1), rated at 8.1 cfm @ 90 psi with 60 gallon air tank
  - ◊ Press wash water pump
- Pumping Units
  - ◊ <u>Gravity sludge thickeners to Aerobic digesters</u>:
    - Three (3), rated at 150 gpm @ 15 ft. TDH with 3 hp
  - ◊ <u>Aerobic digester to belt filter press:</u>
    - Two (2) rated at 205 gpm @ 25 ft. TDH with 10 hp motor each
- Dewatered Sludge Storage
  - ◊ Volume of Sludge Produced: 76 Cubic feet/day
  - ◊ Solids Concentration: 16%
  - ◊ Storage Building Dimensions: 30 ft. by 43.75 ft.
  - ◊ Depth of Sludge at capacity: 4.3 ft.
  - ◊ Sludge shipped to: Somerset Landfill

V. Emergency Power:

- Emergency Generator: Onan rated for 1 MW, 3 phase, 240/480 volts
- Fuel Tank: 6,000 gallon tank

VI. Effluent Discharge and Limits

- BOD: 15 mg/l MA
- TSS: 30 mg/l,
- Fecal Coliform: 14 MPN/100 ml MA,
- TRChlorine: 0.011 mg/l
- DO: 5.0 mg/l at any time
- pH: 6.5-8.5
- Ammonia (May 1 – Oct. 31) =0.50 mg/l MA
(Nov. 1 – Apr. 30) = 0.80 mg/l MA
- Total Phosphorous: 0.30 mg/l
- Total Nitrogen: 11,689 lbs/yr

Outfall: 4.7 miles to Kings Creek, which flows into the Manokin River.

Site Name: Eastern Correctional Institution

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

- Construct improvements to the water towers.
- Design and construct upgrades to the water treatment system including installation of a reverse osmosis water treatment system.

Indicate the Fiscal Year of Previous Funding Rec'd: 1989

Amount of Previous CIP Funding: $9,025,000.00

Amount of Current CIP funding: $11,702,000.00

Anticipated Date for current CIP funding: 2008

Estimated future CIP funds needed:

FY that CIP funding is needed:

Description of CIP Needs

Facility Location Coordinates: *Latitude* *Longitude*

Conditional Analysis | CIP Funding

Description | MM Funding

Amount of Current Major Maint. funding request: $11,079.00

Amount of future MM funding needed: $56,261.000

FY that MM funding is needed: 2009

Description of MM needs

-Install wash-down pad at 420 bed pump station.
-Replace crane at influent pump station.
-Replace crane at BNR.

Date of facility SWPPP expiration:

Date of facility SPCC expiration:

Are AST/USTs in compliance with testing reqmts.:

Are Security Measures Adequate?:

	FacilityName	FacilityType	Agency	Region
Details	ECI - WWTP	Wastewater System	DPSCS	Eastern
Details	ECI - WTP	Water System	DPSCS	Eastern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: ECI - WTP

Address

30209 Perry Road

Westover, MD 21871-3359

Comments:

Agency: DPSCS

Region: Eastern

Average Daily Demand (ADD) (gal/day)	709,858
Peak Day Demand (gal/day)	1,012,000
WTP Design Capacity	475200
Total No. of Wells	3
Average Daily Run Time of Wells (Hrs)	
Capacity w/ largest Well Offline	1,000,000
GW Appro. Permit Number (GAP)	SO1984G101(06) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	900,000
% of ADD to GAP	79%
General Discharge Permit Number	06HT9518

W/WW Engr. Project Mgt	MM
Location of Asbuilt Drawings or CDs	20(A,B)
WTP Process Description - List Unit Processes	Appendix C
Water source and Distribution System Description	Appendix D
Cost Analysis	Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Mike	Wreden	(410) 651-4659	(410) 651-4659
Rex	Powell	(410) 651-4659	(410) 507-8489
Don	Reed	(443) 223-0084	(443) 223-0084

Surface Water Appr. Permit Number	___( ) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	
Days of Storage at ADD	
PDWIS WTP Number	019-0013
Appropriation Permit Exp. Date	6/1/2018 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	12/19/2003	pH	daily	su	8.95	8.5
Details	12/31/1997	pH	daily	Units	8.6	8.5

Facility Name: ECI - WWTP

Address: 30209 Perry Road
Westover, MD 21871-3359

Agency: DPSCS

Region: Eastern

Annual Average Daily Flow (gal/day): 517,389

Peak Day Flow (gal/day): 727000

Ratio Peak Flow to ADD: 1.4

WWTP Design/Permit Capacity (gal/day):

% of ADD to Design Capacity:

NPDES Permit Number: MD0066613 ☐ N/A

State Permit Number: 05DP0356 ☐ N/A

NPDES Permit Exp. Date: 8/15/2010 ☐ N/A

W/WW Engr. Project Mgt: MM

Location of Asbuilt Drawings or CDs: 20(A,B)

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Mike	Wreden	(410) 651-4659	(410) 651-4659
Rex	Powell	(410) 651-4659	(410) 507-8489
Don	Reed	(443) 223-0084	(443) 223-0084

Will future limits be more stringent?

GW Disposal Permit Exp. Date: __/__/____ ☑ N/A

Is more land needed for disposal? N/A

No. of Sludge Disposal Options available: 2

Are additional sludge disposal permits needed? Yes

Number of sludge permit violations: 0

Number of permit violations: 21

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	10/8/2009	T-N	weekly	lbs/day	22.7	18
Details	10/7/2009	T-N	weekly	lbs/day	23	18
Details	10/6/2009	T-N	weekly	mg/l	6	4.5
Details	10/5/2009	T-N	weekly	mg/l	6.5	4.5
Details	10/4/2009	T-N	monthly	lbs/day	16	12
Details	10/3/2009	T-N	monthly	mg/l	4.4	3
Details	8/21/2007	TSS	monthly	mg/l	22.5	15

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
ECI	T-N	7/31/2007	monthly	lbs/day	14	12	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	8/7/2007	weekly	mg/l	30.5	23	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	8/7/2007	weekly	lbs/day	141	92	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	8/14/2007	weekly	mg/l	23.5	23	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	8/14/2007	weekly	lbs/day	104	92	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	8/31/2007	monthly	mg/l	23.5	15	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	8/31/2007	monthly	lbs/day	93.1	60	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	T-N	5/31/2007	monthly	mg/l	3.8	3	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	T-N	5/28/2007	weekly	mg/l	6.8	4.5	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	T-N	5/31/2007	monthly	lbs/day	17.4	12	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	T-N	5/21/2007	weekly	lbs/day	20	18	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	T-N	5/28/2007	weekly	lbs/day	33	18	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	5/31/2007	monthly	mg/l	17	15	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	5/21/2007	weekly	mg/l	24.5	23	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	5/28/2007	weekly	mg/l	36.5	23	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	5/31/2007	monthly	lbs/day	78	27	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	5/21/2007	weekly	lbs/day	124	42	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	TSS	5/28/2007	weekly	lbs/day	169	42	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI	Fecal	5/31/2007	monthly	MPN	22	14	Wastewater flows exceeded the plant design maximum flow causing solids carryover to the effluent stream.	The cause of the excessive wastewater flows has not been identified at this time.
ECI RO reject	pH	2/24/2004	daily	su	8.65	8.5		
ECI WTP	pH	12/31/1997	daily	Units	8.6	8.5	High pH in RO reject water	New plant planned
ECI WTP	pH	12/19/2003	daily	su	8.95	8.5	The well water Ph is always close to the daily maximum of 8.5.	Setting up a chemical feed system to add Hydrochloric acid to lower the Ph to within the permitted parameters
ECI WWTP	Total N	6/21/1999	weekly	mg/l	6	4.5	EQ basin and BNR pump station out of service	New plant planned
ECI WWTP	Total N	6/21/1999	weekly	lbs/day	25	18	EQ basin and BNR pump station out of service	Clean effluent pipe and contact chamber
ECI WWTP	Total N	6/28/1999	weekly	mg/l	8.3	4.5	EQ basin and BNR pump station out of service	Super chlorinated contact chamber
ECI WWTP	Total N	6/28/1999	weekly	lbs/day	29	18	EQ basin and BNR pump station out of service	Add Aquashade to the storage lagoon
ECI WWTP	Total N	6/30/1999	monthly	mg/l	5	3	EQ basin and BNR pump station out of service	New plant planned
ECI WWTP	Total N	6/30/1999	monthly	lbs/day	19	12	EQ basin and BNR pump station out of service	Adjusted sulfur rate

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
ECI WWTP	Total N	7/6/1999	weekly	mg/l	7.8	4.5	EQ basin and BNR pump station out of service	New plant planned
ECI WWTP	Total N	7/6/1999	weekly	lbs/day	33	18	EQ basin and BNR pump station out of service	New plant planned
ECI WWTP	Total P	6/30/2000	weekly	mg/l	0.58	0.45	Problems with correct alum	None
ECI WWTP	Total P	6/30/2000	weekly	lbs/day	1.9	0.18	Problems with correct alum	MES advised Town to put processes on line
ECI WWTP	Total N	5/14/2001	weekly	mg/l	5.26	4.5	Loss nitrification due to process errors.	Add Aquashade to the storage lagoon
ECI WWTP	Total N	5/21/2001	weekly	mg/l	7.55	4.5	Loss nitrification due to process errors.	Adjusted sulfur rate
ECI WWTP	Total N	5/21/2001	weekly	lbs/day	24.25	18	Loss nitrification due to process errors.	New plant planned
ECI WWTP	Total N	5/28/2001	weekly	mg/l	6.8	4.5	Loss nitrification due to process errors.	Cleaned chamber, plan UV installation
ECI WWTP	Total N	5/28/2001	weekly	lbs/day	25.86	18	Loss nitrification due to process errors.	Increased chlorine feed rate
ECI WWTP	Total N	5/31/2001	monthly	mg/l	4.95	3	Loss nitrification due to process errors.	Cleaned UV lights
ECI WWTP	Total N	5/31/2001	monthly	lbs/day	16.7	12	Loss nitrification due to process errors.	New plant planned
ECI WWTP	Total N	7/14/2001	weekly	mg/l	5.52	4.5	Ammonia returned to raw from belt press filter	New plant planned
ECI WWTP	Total N	7/14/2001	weekly	lbs/day	18.34	18	Ammonia returned to raw from belt press filter	New plant planned
ECI WWTP	TSS	12/7/2002		mg/l	40	23	Backwash filter clogged	Advised client to install aeration in lagoons
ECI WWTP	TSS	12/7/2002		lbs/day	160	92	Backwash filter clogged	MES advised Town to put processes on line
ECI WWTP	TSS	2/14/2003	weekly	mg/l	24	23	High flow filter backwash clogged	unclogged the filter backwash and reemphasis the need for this daily
ECI WWTP	Total-P	6/14/2003	weekly	mg/l	0.6	0.45	Unknown	The total-P result from June10, 2003 was a 1.1 mg/l. The laboratory performed a QA/QC check on the sample, but could find nothing wrong. The sample was analyses outside of the allowable hold time with a result of 0.11 mg/l. MES believes that the incorrect sample was run or another lab error occurred. But, the sample was clear, all other results were normal for that sample and the results before and after the sample did not indicate that there were any issues at the facility.
ECI WWTP	Total-P	6/14/2003	weekly	lbs/day	2.5	1.8	Unknown	The total-P result from June10, 2003 was a 1.1 mg/l. The laboratory performed a QA/QC check on the sample, but could find nothing wrong. The sample was analyses outside of the allowable hold time with a result of 0.11 mg/l. MES believes that the incorrect sample was run or another lab error occurred. But, the sample was clear, all other results were normal for that sample and the results before and after the sample did not indicate that there were any issues at the facility.
ECI WWTP	TSS	1/14/2004	weekly	mg/l	46.5	23	Broken equipment caused bypass of primary screening filling system with ground-up trash. Filters could not remove all floatables causing the violations.	On January 30th, the primary gear on the bar screen was replaced and the unit was returned to service. On February 5th, the roto-strainer float was replaced to stop it from by-passing indiscriminately.
ECI WWTP	TSS	1/31/2004	weekly	mg/l	23	15	Broken equipment caused bypass of primary screening filling system with ground-up trash. Filters could not remove all floatables causing the violations.	On January 30th, the primary gear on the bar screen was replaced and the unit was returned to service. On February 5th, the roto-strainer float was replaced to stop it from by-passing indiscriminately.
ECI WWTP	TSS	1/31/2004	monthly	lbs/day	80	60	Broken equipment caused bypass of primary screening filling system with ground-up trash. Filters could not remove all floatables causing the violations.	On January 30th, the primary gear on the bar screen was replaced and the unit was returned to service. On February 5th, the roto-strainer float was replaced to stop it from by-passing indiscriminately.
ECI WWTP	Total-P	1/14/2004	weekly	mg/l	0.71	0.45	Broken equipment caused bypass of primary screening filling system with ground-up trash. Filters could not remove all floatables causing the violations.	On January 30th, the primary gear on the bar screen was replaced and the unit was returned to service. On February 5th, the roto-strainer float was replaced to stop it from by-passing indiscriminately.

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
ECI WWTP	Total-P	1/14/2004	monthly	mg/l	0.4	0.3	Broken equipment caused bypass of primary screening filling system with ground-up trash. Filters could not remove all floatables causing the violations.	On January 30th, the primary gear on the bar screen was replaced and the unit was returned to service. On February 5th, the roto-strainer float was replaced to stop it from by-passing indiscriminately.
ECI WWTP	Total-P	1/31/2004	monthly	lbs/day	1.29	1.2	Broken equipment caused bypass of primary screening filling system with ground-up trash. Filters could not remove all floatables causing the violations.	On January 30th, the primary gear on the bar screen was replaced and the unit was returned to service. On February 5th, the roto-strainer float was replaced to stop it from by-passing indiscriminately.
ECI WWTP	pH	2/24/2004	daily	su	8.59	8.5	Operator error	trained operator in correct sampling and testing methods
ECI WWTP	TSS	1/21/2006	weekly	lbs/day	106	92		
ECI WWTP	TSS	1/21/2006	weekly	mg/l	26	23		
ECI WWTP	Total-P	6/28/2006	weekly	mg/l	0.57	0.45	Unknown	All plant records and log books were checked for variables which could cause the non-compliance. The cause could not be identified. Suspect laboratory testing error.
ECI WWTP	TSS	10/28/2006	weekly	mg/l	45.3	23	Dynasand Filter Sand Washers plugged with debris causing bypass of solids to filter effluent.	Operators cleaned Dynasand Sand Washers to improve sand filter performance preventing solids bypass to filter effluent.
ECI WWTP	TSS	10/28/2006	weekly	lbs/day	196	92	Dynasand Filter Sand Washers plugged with debris causing bypass of solids to filter effluent.	Operators cleaned Dynasand Sand Washers to improve sand filter performance preventing solids bypass to filter effluent.
ECI WWTP	Total-P	10/28/2006	weekly	mg/l	0.6	0.45	Dynasand filter sand washers plugged with debris causing bypass of solids containing phosphorus to filter effluent.	Operators cleaned Dynasand Sand Washers to improve sand filter performance preventing high phosphorus content solids bypass to filter effluent.
ECI WWTP	Total-P	10/28/2006	weekly	lbs/day	2.8	1.8	Dynasand filter sand washers plugged with debris causing bypass of solids containing phosphorus to filter effluent.	Operators cleaned Dynasand Sand Washers to improve sand filter performance preventing high phosphorus content solids bypass to filter effluent.
ECI WWTP	Total-P	10/31/2006	monthly	mg/l	1.3	1.2	Dynasand filter sand washers plugged with debris causing bypass of solids containing phosphorus to filter effluent.	Operators cleaned Dynasand Sand Washers to improve sand filter performance preventing high phosphorus content solids bypass to filter effluent.
ECI WWTP	TSS	2/28/2007	weekly	mg/l	35	23	Extremely high flows.	This Facility was not designed to accept and process extreme flows as this.
ECI WWTP	TSS	2/28/2007	weekly	lbs/day	132	92	Extremely high flows.	This Facility was not designed to accept and process extreme flows as this.
ECI WWTP	T-N	10/3/2009	monthly	mg/l	4.4	3	Excessive dissolved oxygen content within the plant process.	Inspection of the dissolved oxygen meter and probe indicated the meter to probe cable connection was loose causing
ECI WWTP	T-N	10/4/2009	monthly	lbs/day	16	12	Excessive dissolved oxygen content within the plant process.	Inspection of the dissolved oxygen meter and probe indicated the meter to probe cable connection was loose causing
ECI WWTP	T-N	10/5/2009	weekly	mg/l	6.5	4.5	Excessive dissolved oxygen content within the plant process.	Inspection of the dissolved oxygen meter and probe indicated the meter to probe cable connection was loose causing
ECI WWTP	T-N	10/6/2009	weekly	mg/l	6	4.5	Excessive dissolved oxygen content within the plant process.	Inspection of the dissolved oxygen meter and probe indicated the meter to probe cable connection was loose causing
ECI WWTP	T-N	10/7/2009	weekly	lbs/day	23	18	Excessive dissolved oxygen content within the plant process.	Inspection of the dissolved oxygen meter and probe indicated the meter to probe cable connection was loose causing
ECI WWTP	T-N	10/8/2009	weekly	lbs/day	22.7	18	Excessive dissolved oxygen content within the plant process.	Inspection of the dissolved oxygen meter and probe indicated the meter to probe cable connection was loose causing

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Eastern Correctional Instiution

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
DPSCS	1986	$1,960,000	Design, construct, and equip State Use Industries Building	
DPSCS	1986	$40,000	Design State Use Industries Building # 2	
DPSCS	1987	$704,000	Supplement 1986 appropriation to design, construct, and equip State Use Industries Building.	
DPSCS	1987	$2,708,000	Construct and equip State Use Industries Building # 2	
DPSCS	1987	$850,000	Purchase additional capital equipment for 1,500-cell medium security correctional facility.	
DPSCS	1991		Emergency inmate housing.	
DPSCS	1995	$1,559,000	Construct improvements to the central Kitchen	
DPSCS	1996	$1,597,000	Construct improvements to the central Kitchen	
DPSCS	2003	$3,422,000	Provide funds to design/build and equip a 140-bed minimum security housing unit.	
	Total:	**$12,840,000**		
MES	1987	$546,000	Design and prepare detailed plans and specifications for wastewater treatment plant.	
MES	1988	$3,881,000	Provide State's share of the cost of renovations to the wastewater treatment plant.	
MES	1989	$119,000	Provide a portion of the funds to design and construct an additional water tower.	
MES	1989	$750,000	Design and construct an expansion to the existing wastewater treatment facilities, including the provision of a sludge processing center.	
MES	1989	$556,000	Provide a portion of the funds to design and construct an additional water tower.	
MES	1989	$7,600,000	Construct water treatment and wastewater treatment facilities.	
MES	1991	$627,191	Design and construct capital improvements to water treatment plant.	
MES	2005	$300,000	Construct improvements to the water towers.	Project Completed

MES	2006	$563,000	Design and construct upgrades to the water treatment system including installation of a reverse osmosis water treatment system.	Project Completed
MES	2007	$269,000	Design improvements to the wastewater treatment plant.	Project Completed
MES	2008	$3,609,000	Design and construct imrovements to the water treatment plant.	Project Completed
MES	2008	$6,961,000	Design and construct improvements to the wastewater treatment plant.	Construction in progress
	Total:	**$25,781,191**		

ECI WWTP

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
	Total:	**$0**		
MES	1987	$546,000	Design and prepare detailed plans and specifications for wastewater treatment plant.	
MES	1988	$3,881,000	Provide State's share of the cost of renovations to the wastewater treatment plant.	
MES	1991	$627,191	Design and construct capital improvements to water treatment plant.	
	Total:	**$5,054,191**		

EASTERN CORRECTIONAL INSTITUTION

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:

- The mechanical bar screen is very steep and does not capture wastewater screenings as desired. It needs to be improved
- The influent wet well at the headworks is very shallow and small in volume
- The equalization tank is small. Facility is currently using rental temporary EQ tanks
- Pipes in the filter room exhibit severe corrosion
- Flow to the secondary clarifiers is not balanced
- The WWTP lucks redundancy

Proposed Improvements:

- Replace mechanical bar screen
- Install washer and compactor (Muffin Monster) for mechanical bar screen
- Provide a larger influent wet well
- Repaint pipes/filters in the filter room. Provide a dehumidifier
- Modify pipes to balance flows to clarifiers
- Expand WWTP to provide redundancy (New Bardenpho process)

WATER TREATMENT PLANT

Conditional Analysis:

- The WTP no longer uses Greensand filters for iron and manganese removal because of low iron and manganese level in raw water
- The upgrade of the WTP was completed in 2011. The Existing three (3) RO skids currently operate at their maximum out put capacity, and operate at 85% efficiency

Proposed Improvements:

- N/A

WATER SOURCE

Conditional Analysis:

- The WTP has three (3) deep (Patapsco) wells. Two (2) are operational and one (1) standby back-up well

Proposed Improvements:

- N/A

GREENWELL STATE PARK

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:

- All three (3) treatment facilities are in good condition

Proposed Improvements:

- None

WATER SOURCE

Conditional Analysis:

- The well for the Manor house water plant is broken
- The electrical feed pipe to the Knott House well is broken at the cap. Could cause insect infestation
- No source backup

Proposed improvements:

- Repair well
- Install bollards around both wells to protect from mowers
- All three systems should be connected for back-up purposes

WATER DISTRIBUTION

Conditional Analysis:

- Operating satisfactorily

Proposed improvements:

- None

FAIR HILL NATURAL RESOURCES MANAGEMENT AREA

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:

- The treatment plant operates predominantly in the summer season. Several of Fair Hill facilities are not operating year around
- The treatment building does not have heating or ventilation, which is subject to freezing of chemicals
- The chemical feed lines run outside of the building into a groundwater storage tank which makes them susceptible of freezing
- The plant does not have any alarm system
- The plant does not have any paved or concrete access to the building. Transporting heavy chemicals and other equipment could cause safety hazard
- There is no effluent meter after the 30,000-gallon ground storage tank

Proposed Improvements:

- Construct a new treatment building and operate year around
- Install appropriate additional treatment based on MDE recommendations after a determination has been made of whether or not the wells are under the influence of groundwater
- Abandon the existing booster pump station and associated complex piping and replace existing 30,000 gallon ground storage tank with elevated water tank
- Install influent and effluent flow meters at the new treatment plant
- Install new alarm system
- Install a cabinet for plant records
- Construct a sidewalk for safer access to the plant delivery

WATER SOURCE

Conditional Analysis:

- MDE is determining if well water is under groundwater influence
- Wells Nos. 4 and 5 do not receive any treatment
- None of the wells have run time meters, so the capacity of the pumps in the wells are not known

Proposed improvements:

- Install run time meters and flow meters on each well
- Install treatment units for Well Nos. 4 and 5

WATER DISTRIBUTION SYSTEM

Conditional Analysis:

- The 30,000-gallon ground storage tank is extensively corroded and the structural integrity is a concern
- Fair Hill facilities are now operating year-round and water supply needs are year-round

Proposed improvements:

- Site and construct a new elevated water tank
- Install flow meters for each of water systems

Eastern Correctional Institution

WTP

ECI Well Number 5

ECI WTP Reverse Osmosis Unit

WTP

ECI WTP Clearwell

ECI WTP Gas Chlorination

WTP

ECI WTP Greensand Filters

ECI WTP Overview

WWTP

Mechanical Bar Screen

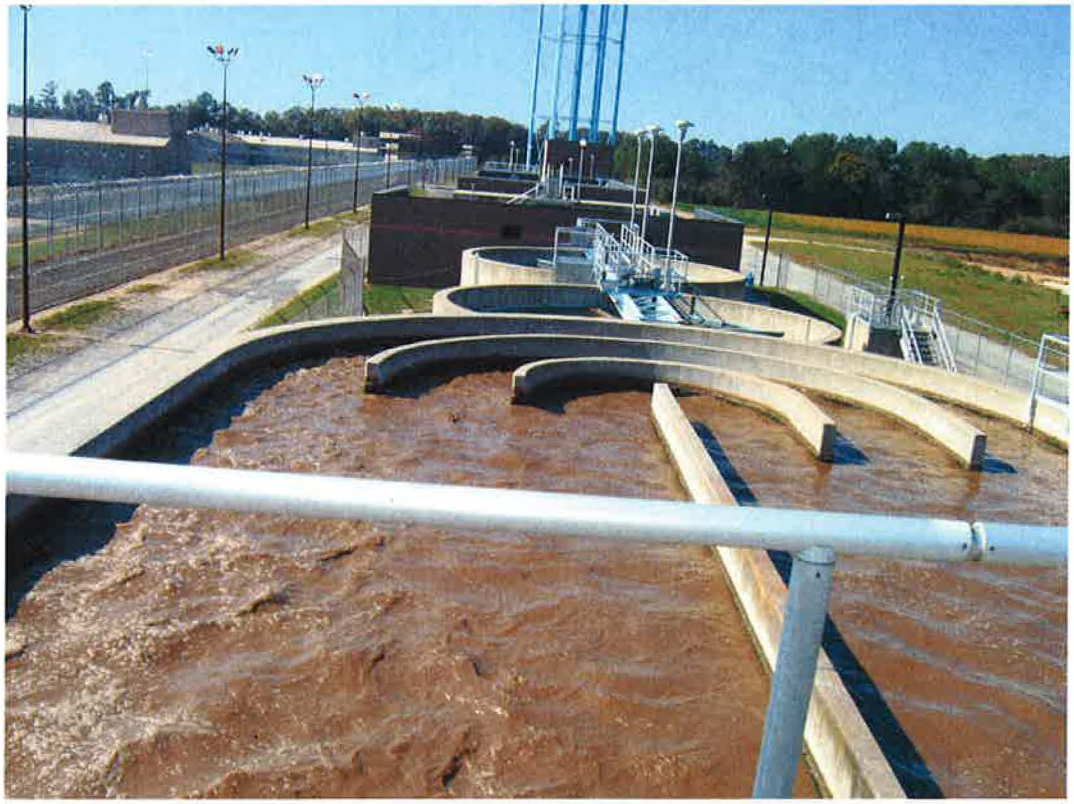
Influent PS and Wet Well

WWTP

Flow Equalization

Anoxic Zone

WWTP



BNR- Bardenpho Tankage

Clarifier

WWTP

Dynasand Filters

UV Units

WWTP

Aerobic Digester

Effluent Pumps

Eastern Correctional Institution

Cogeneration Plant

☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729-8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

EASTERN CORRECTIONAL INSTITUTION
COGENERATION PLANT

BACKGROUND

The Eastern Correctional Institution (ECI) Cogeneration Facility is located within the Eastern Correctional Institution (ECI) Complex. ECI is a medium security prison under the Department of Public Safety and Correctional Services (DPSCS). The Complex is located in Westover, Somerset County, and is approximately 3 miles southwest of Princess Anne, just off of Maryland Route 13. The current prison population consists of approximately 3,300 inmates and a prison staff of 800. It is designed for a conventional inmate capacity of 3,420.

ECI has two (2) identical compounds (east and west wings) and is enclosed by a security fence. Each wing consists of four (4) housing units. Located within each compound are a State Use Industries (SUI) shop and a support building. Each wing houses approximately 1,440 inmates. The remaining inmates are housed at ECI-A, a 560 bed annex.

ECI is served by a dedicated water source, a water treatment plant, a wastewater treatment plant, and a cogeneration power plant located on the premises, which is operated by Maryland Environmental Service (MES). The water distribution and wastewater collection system is operated by MES.

The 2004 DPSCS Master Plan projects the following upgrades and improvements at ECI.
- Design and construct replacements for the inmate cell door control systems
- Design and construct a central warehouse renovation and expansion
- Design, renovate, and equip finishing & kitchens – east/west compounds
- Design, construct, and equip a multi-purpose building
- Design, construct, and equipment a support services building
- Design and construct a SUI Shop & textile building
- Resurface roads and parking areas

POWER COGENERATION DESCRIPTION

The wood chip burning cogeneration plant provides electrical power, steam for cooking and laundry operations, and high temperature hot water for space heating, domestic hot water, and cleaning needs of the correctional complex. The plant is comprised of the following systems:
- Bulk fuel handling system that conveys wood chips from the wood chip building to the 900-ton storage capacity silo and provides automatic fuel feed to the boiler plant
- Two (2) wood chip fired boilers: rated to produce 25,000 lb/hr each at 600 psi operating with an exit steam temperature of 750° F
- Each boiler has a rated capacity to consume 85 tons of wood chips per day. The secondary fuel to start and support the boilers operation is No. 2 fuel oil
- The boiler plant operates two (2) of the four (4) main feed pumps that are each rated to deliver 90 gpm @ 800 psi. The main feed pumps are classified as multi-staged centrifugal pumps, two (2) motor driven and two (2) turbine driven units

- Ash Collection & Storage System that includes three (3) ash silos - one (1) of which is maintained with a continuous nitrogen blanket and a vacuum drag transport system
- Compressed control air system
- Compressed service air system
- Main condensate return system
- Boiler make-up water system
- Effluent water storage and supply system
- Two (2) condensing steam turbine generators each rated to produce 1.9 megawatts per hour of electricity
- Two (2) emergency diesel generators each rated to produce 1.0 megawatts per hour of electricity
- Electrical Switchgear room for utility interface, substation distribution, and control of four (4) facility generators
- High temperature hot water system
- Two (2) cooling towers each capable of cooling at rate of 4,200 gallons per minute

Please refer to Supplemental Information Section – Facility Description – Power Cogeneration Plant for additional information.

EXISTING CONDITIONS OF POWER COGENERATION FACILITIES

A. OPERATIONS DATA

Annually, the plant generates 340 million pounds of steam and consumes approximately 55,000 tons of wood chips. Annually, the plant generates approximately 17,755 MW of electricity and requires approximately 30 million gallons of cooling water.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

BULK FUEL (WOOD CHIPS) HANDLING SYSTEM

- The truck scale shows wear and tear
- The four (4) bay doors [two (2) 40 ft. & two (2) 20 ft.] in the wood receiving building are manually operated, original equipment that is unreliable when needed
- During rain events, runoff tends to carry piled wood chips into storm drains
- The PLC for the wood receiving, transfer, and storage systems is becoming outdated
- Improve drainage near silo and throughout the perimeter of the entire plant
- Spare parts are transported to upper areas of the silo in an unsafe manner. A safe and practical method is needed to permit access for maintenance and repairs
- Black top additional area to facilitate outside storage of wood chips

FACILITY STEAM GENERATING CAPACITY

- Insufficient steam generating capacity limits the two (2) turbine generators from producing all of the required Institutional electrical demand. A third steam generator is needed to realize the full functional value of the Co-Generation Facility

BOILER ROOM

- High-pressure steam lines insulation is showing sign of deterioration
- Poor lighting and ceiling ventilation in building

ASH COLLECTION SYSTEM

- There are no available means for capturing quenching water from the ash systems

CONDENSATE RETURN SYSTEM

- The condensate receiving tank is in poor condition. Re-evaluate, condition unconfirmed

EFFLUENT WATER SYSTEM

- The pump station building (wood construction) is deteriorating and needs to be replaced in its original form but of a metal construction

SWITCHGEAR ROOM

- The duct system is not operating as intended. Need a heating system installed to replace the hot heaters remove due to coil leakage
- Some of the wall and floor areas are in poor condition, which allows water infiltration into the electrical switchgear room

FACILITY GENERATION, CONTROL & DISTRIBUTION

- Evaluation of the complete electrical generation, control, distribution and utility interface is required to address equipment obsolescence, serviceability, reliability, and future demands of the ECI Complex
- Evaluation and feasibility study required to determine the location and functional need of a permanent bus entry to accept external temporary electrical generation

DIESEL GENERATOR ROOM

- The intake for the supply air fan is exposed to environmental elements and is not covered. The fan operation blows water or snow into the generator room

UTILITY INTERFACE YARD

- No additional transformer with dual connection within them is available on site
- Oil circuit breaker shows wear and tear

PRIMARY DUMP CONDENSER

- The primary steam dump condenser needs to be re-tubed

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The plant under Title V is permitted with the following:

Parameter	Permit Limits
Visible Emissions	Not to exceed 20% opacity for more than 6 minutes
Particulate matter	Not to exceed 0.34 lb. per million BTU input
Sulfur Oxides	Not to exceed 3.5 lb. per million BTU input

Future regulations are not expected to impact this facility. Therefore, upgrades to address regulations are not expected. Re-evaluate this position, it is reasonable to expect the Emission Regulations to be expanded and the facility to be impacted by compliance requirements. The facility should be pro-active and plan to meet PM .25 standards. Estimated Cost: TBD

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In the period between 1999 and 2003, capital improvement request totaling $4,331,000.00 were made for the design and construction of various improvements. In 2006, a capital improvement request was made for $538,000 for the design and construction of an electrical controls upgrade and to provide a reverse osmosis treatment system for the boiler make up water system.

SUPPLEMENTAL INFORMATION

EASTERN CORRECTIONAL INSTITUTION
COGENERATION PLANT

FACILITY DESCRIPTIONS

The ECI cogeneration Plant (ECI Co-Gen) is a green whole tree wood chip fired cogeneration plant serving the adjacent prison. The facility is comprised of the following systems:

- Bulk Fuel Handling/Storage System
- Boiler Fuel Feed System
- Boiler System
- Ash Collection/Storage System
- Compressed Air System
- Main Condensate System
- Condensate Return System
- Boiler Make-Up Water System
- Effluent Water System
- Turbine Generator System
- Diesel Generator System
- Switchgear Room
- High Temperature Hot Water System
- Cooling Towers
- High Pressure Main Steam Piping System
- Nitrogen Generation & Supply System

BULK FUEL HANDLING SYSTEM

The Bulk Handling Fuel System that conveys wood chips from the wood chip building to the boiler room is comprised of the following:

- The wood chip receiving building with a storage capacity of 400 tons that includes a hydraulic powered walking floor that measures 22 ft. long by 10 ft. wide and is used to convey wood chips to the transfer/ storage system. The fuel and scale operations office is also located in this building
- Truck scale
- Front end loader with 7 cubic yard bucket
- Hopper and drag chain conveyor assembly to transport the fuel to the conveyor
- A motor driven conveyor belt that transports the incoming wood fuel to the handling and storage system
- Two (2) magnetic units that are used to removed ferrous material and automatically shut down the system to protect and prevent damage to the equipment resulting from metallic materials in the feed system
- Disc screen and hammer assembly
- Wood chip hog assembly capable of reducing oversized wood chips to a nominal size
- Mechanical augers to transport wood chips
- Bucket elevator No. 1 is 118 ft. high and is used to load the wood fuel silo
- A concrete silo capable of holding 900 tons
- Silo infeed and outfeed screws to supply the wood fuel feed system
- Silo ring drive system

- Re-entry hopper
- Bucket Elevator No. 2
- A by-pass screw and trough assembly permit wood fuel to be supplied directly to Bucket Elevator No. 2 for continuous operation when the wood fuel silo is taken out of service

BOILER FUEL FEED SYSTEM

The Boiler fuel feed system consists of following units:

Wood Chip Feed System

- Two (2) wood feed chutes 40 feet in length each operated by electric reducing gear drive that supplies wood chips to two (2) wood feed metering bins, one 91) for each boiler
- Each metering feed bin includes a storage hopper above two (2) 16-inch diameter screws. The feeder is designed to provide a uniform volumetric discharge of wood to the two (2) pneumatic fuel distributors

Oil Feed Pump System

- 48,000 gallon oil storage tank
- Two (2) oil pumps rated at 1800 lb/hr with 1 hp motor

BOILER SYSTEM

The boiler plant is comprised of two (2) Cleaver-Brooks water tube D-type package boilers. The boilers can burn both wood chips and No. 2 oil. Each boiler operates at 610 psi, has an exit temperature of 750 degrees Fahrenheit, and has a steam generating capacity of 25,000 pounds per hour. If the No. 2 oil is used, approximately 212 gallons of No. 2 oil is consumed. Each unit consumes approximately 85 tons per day at rated steam generating capacity. The system includes the following equipment:

- Combustor - the Bigelow-Liptak refractory lined furnace chamber where all of the fuel is burned and all of the combustion air (under-grate and over-fire) is supplied
- Hydro-grate - located in the bottom of the combustor, it is used to dry, volatize and burn fixed carbon of the wood chip fuel
- □Boiler - the Cleaver-Brooks water tube package D-type boiler unit consisting of the refractory lined furnace, screen tubes, super heater and generating bank
- Tubular Air Heater (TAH) - the Eco, Inc. two (2) pass gas to air pre-heater located at the boiler outlet, which preheats the under-grate air supplied to the combustor
- Dust Collector - the Breslove regenerative multi-cyclone type dust collector located after the tubular air heater in the exhaust gas side duct works.
- Grate motion motor driving unit
- Fans for each boiler:
  - Fuel distribution air fan assembly
  - Primary combustion (Forced Draft) air fan assembly
  - Boiler induced draft air fan assembly

BOILER MAIN FEED PUMP SYSTEM

- Two (2) motor driven 10 stage centrifugal pumps rated at 90 gpm @ 800 psi with 75 hp motors
- Two (2) turbine driven 9 stage centrifugal pump rated at 90 gpm @ 800 psi with 70 hp motors

All feed pumps take suction from de-aerated feed tank at 50 psi and 297 degree Fahrenheit.

BOILER MAKEUP WATER FEED SYSTEM

- Three (3) charcoal filters
- Two (2) softeners and associated brine tank
- One (1) multimedia filter
- One (1) de-chlorination system
- One (1) polishing softener
- Reverse Osmosis system rated at 12 gpm that includes the following:
    - Influent Booster Pumps
    - Heater
    - Effluent Booster Pumps
    - Feed pump

ASH HANDLING SYSTEMS

- Fly Ash Removal System:
    - Five (5) mechanical auger assembly driven by motor and reducer to collect and convey fly ash from the boiler furnace
    - Six (6) hoppers each fitted with a rotary valve seal, motor driven and two (2) double dump valve assemblies on the primary hoppers collect and convey fly ash
- Fly and Bottom Ash Collection System
    - Fly and bottom ash is transported from each boiler's point of collection to the storage silo by a vacuum drag piping system located in sub floor foundation
    - The primary ash silo is located in the rear of the plant. The primary ash silo is blanketed with gaseous nitrogen to maintain an atmosphere below 16% oxygen content. The liquid nitrogen is supplied by a tanker truck. The storage tank capacity is 1,500 gal.
    - Secondary ash silo receives fly ash
    - Ash silo bag-house
    - Ash handling vacuum system
    - Ash handling vacuum system roots blower

COMPRESSED AIR SYSTEM

The compressed air system consists of one (1) rotary screw air compressor and six (6) reciprocating air compressors, which operates all pneumatically driven valves.

TURBINE SYSTEM

There are two (2) steam condensing turbine generator sets that are each fitted with a condenser operating at 28.5 inches of mercury vacuum. Each turbine requires 22,500 lb.

of steam to generate 1.9 MW of electric power. The turbine generator set consists of a steam turbine, reducing gear, and an electric power generator. The steam turbine receives steam at 600 psi at 750° F and rotates at 4,940 rpm, which is converted by reducing gear into a 1,800 rpm in generator. Each turbine generator set is PLC controlled with integrated bearing temperature and lube oil system pressure monitoring. The 600 psi steam is exhausted from the turbine, condensed and returned as condensate. The system operates to recover 90% of the supplied steam. Each turbine has the ability to operate in the extraction mode to supply 50 psi auxiliary steam system or in the direct condensing mode. Each turbine system consists of the following additional units:

- Inner and after condenser air ejectors
- Gland exhaust condenser
- Auxiliary lube oil pump
- Air box cooler
- Lube oil cooler
- Gland seal/gland exhaust regulators
- Condenser atmospheric water sealed vent
- Automatic control condenser circulating water blow-down
- Condenser circulating water chemical treatment system

CIRCULATING COOLING SYSTEM FOR TURBINE GENERATOR SET

The circulating cooling system for each turbine generator set consists of the following:

- Cooling towers that use and receive effluent as the cooling water supply from the WWTP. Each cooling tower's circulation rate is 4,200 gpm and operates to cool the incoming water from 95° F to 85° F. The cooling supply of air is provided by sixteen (16) 5 hp fan and motor assemblies
- A 16-inch diameter pipeline from the cooling tower's water-box supplies cooled effluent to the 3,000 gallon cooling supply receiver tank
- Two (2) motor driven pumps rated at 4,200 gpm @ 40 ft. TDH with 60 hp motors circulate water from the cooling supply receiver tank through the condenser unit

DIESEL GENERATOR SYSTEM

The diesel generator room consists of the following:

- Two (2) 1 megawatt diesel generators
- Two (2) generator radiators
- Two (2) 25,000 cfm exhaust fans with 3 hp motors
- Three (3) 25,000 cfm air supply fans with 3 hp motors
- Two (2) diesel generator day tanks rated at 150 gallons
- One (1) 6,000 gallon diesel storage tank
- Two (2) trickle-charge battery systems to maintain starting power system

CONDENSATE RETURN FROM CONDENSATE RECEIVING TANK TO DE-AERATED TANK

- Condensate Receiving Tank with heat exchanger rated at 3,300 gallons
- Three (3) Condensate Return Pumps rated at 90 gpm @ 120 ft. TDH and 7.5 hp motor
- De-aerating Tank operates at 50 psi to supply boiler feed water at 297° F

TURBINE CONDENSER CONDENSATE RETURN SYSTEM

Each condenser's condensate return system consists of the following:

- Two (2) hot well pumps rated at 60 gpm @ 150 ft. TDH with 5 hp motor
- Inter condenser and after condenser units
- Plate heat exchanger rated at 120 gpm

EFFLUENT WATER SYSTEM FROM WASTEWATER PLANT

- Duplex strainers
- Self Cleaning Orival Strainer System
- Water storage tank rated for 28,000 gallons
- Two (2) effluent pumps
- De-chlorination system

HIGH TEMPERATURE HOT WATER SYSTEM

The high temperature hot water system consists of the following:

- Three (3) high temperature hot water pumps each rated at 645 gpm @ 195 ft. TDH with 60 hp motors
- Nitrogen expansion and pressurization tank rated at 500 cubic feet operating at 40 psi
- The hi-temp-hot water converters are rated for 36 MMBTU/hr with a circulation rate of 1,290 GPM [two (2) of three (3) pumps in operation] and an operating system temperature of 240° in and 280° out
- Steam supplied to the converter at 50 psi is condensed and returned to the condensate system at approximately 190°. Steam can also be supplied from the 600#/50# Reducing Station

HEAT RECOVERY SYSTEM

The heat recovery system consists of the following:

- Two (2) heat recovery pumps that are rated at 120 gpm @ 6 hp operating at 250° F
- Two (2) hot water heating pumps rated at 120 gpm @ 75 ft. TDH with 5 hp motors operating at 180 °F
- Heat Exchanger (Converter) capable of 120 gpm and heating water from 140° F to 180° F using 12.2 million BTUs

SWITCH GEAR

UTILITY INTERFACE YARD

The utility interface yard consists of the following:

- Primary step-down utility interface transformer from 25 KV to 4160
- Oil circuit breaker with by-pass switching
- Utility line termination box

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Eastern Correctional Institution Co-Generational Plant

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
	Total:	**$0**		
MES	1999	$240,000	Complete design and construct improvements to the Co-Generation Facility.	Project Completed
MES	2000	$2,925,000	Complete design and construct improvements to the Co-Generation Facility.	Project Completed
MES	2003	$1,148,000	Design and complete improvements to the facility (ECI Co-Generation Facility)	Project Completed
MES	2006	$538,000	Design and construct upgrades to the electrical control system and provide a reverse osmosis system (ECI Co-Generation Facility)	Project put on hold indefinitely
	Total:	**$4,851,000**		

EASTERN CORRECTIONAL INSTITUTION
COGENERATION PLANT

CONDITIONAL ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

BULK FUEL (WOOD CHIPS) HANDLING SYSTEM

- The truck scale shows wear and tear
- The four (4) bay doors [two (2) 40 ft. & two (2) 20 ft.] in the wood receiving building are manually operated, original equipment that is unreliable when needed
- During rain events, runoff tends to carry piled wood chips into storm drains
- The PLC for the wood receiving, transfer, and storage systems is becoming outdated
- Improve drainage near silo and throughout the perimeter of the entire plant
- Spare parts are transported to upper areas of the silo in an unsafe manner. A safe and practical method is needed to permit access for maintenance and repairs
- Black top additional area to facilitate outside storage of wood chips

FACILITY STEAM GENERATING CAPACITY

- Insufficient steam generating capacity limits the two (2) turbine generators from producing all of the required Institutional electrical demand. A third steam generator is needed to realize the full functional value of the Co-Generation Facility

BOILER ROOM

- High-pressure steam lines insulation is showing sign of deterioration
- Poor lighting and ceiling ventilation in building

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- There are no available means for capturing quenching water from the ash systems

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FACILITY GENERATION, CONTROL & DISTRIBUTION

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DIESEL GENERATOR ROOM

- The intake for the supply air fan is exposed to environmental elements and is not covered. The fan operation blows water or snow into the generator room

UTILITY INTERFACE YARD

- No additional transformer with dual connection within them is available on site
- Oil circuit breaker shows wear and tear

PRIMARY DUMP CONDENSER

- The primary steam dump condenser needs to be re-tubed

Eastern Correctional Institution
Co-Generation Plant

Wood Chip Pile Outside of Building

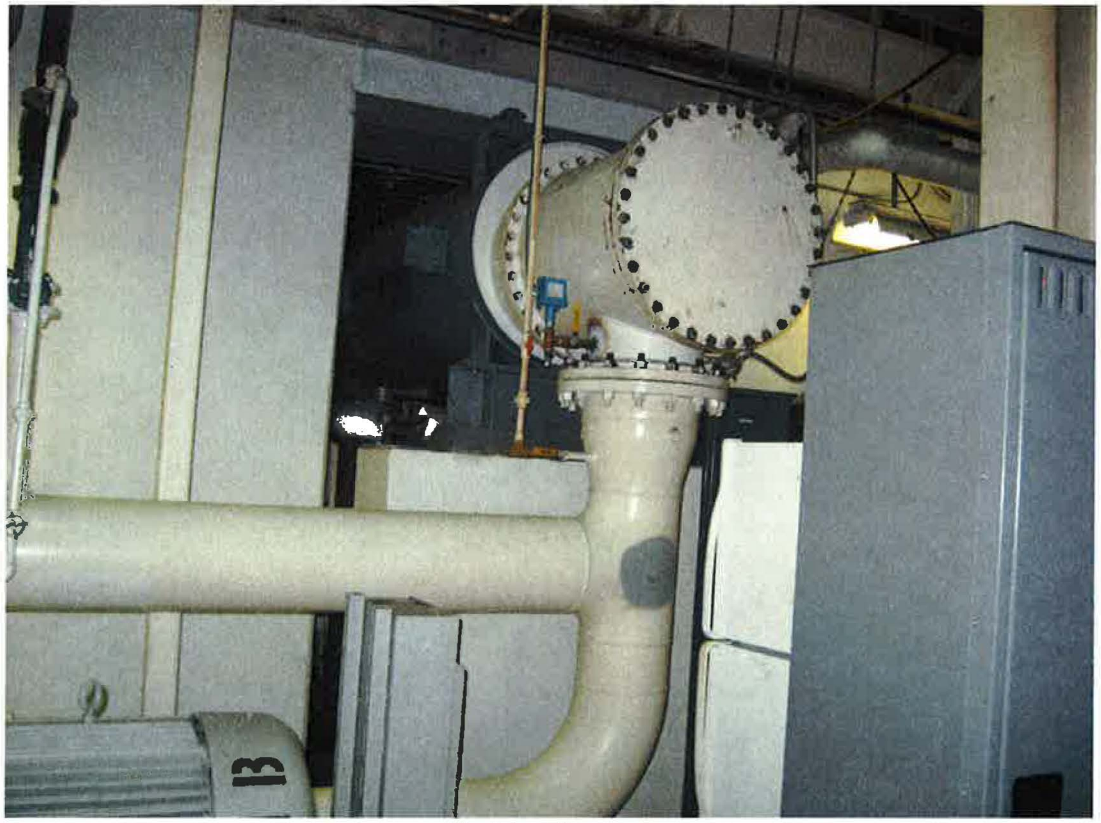
Wood Chip Walking Floor

Wood Chip Handling System

900-ton Wood Chip Storage Silo


Boiler System

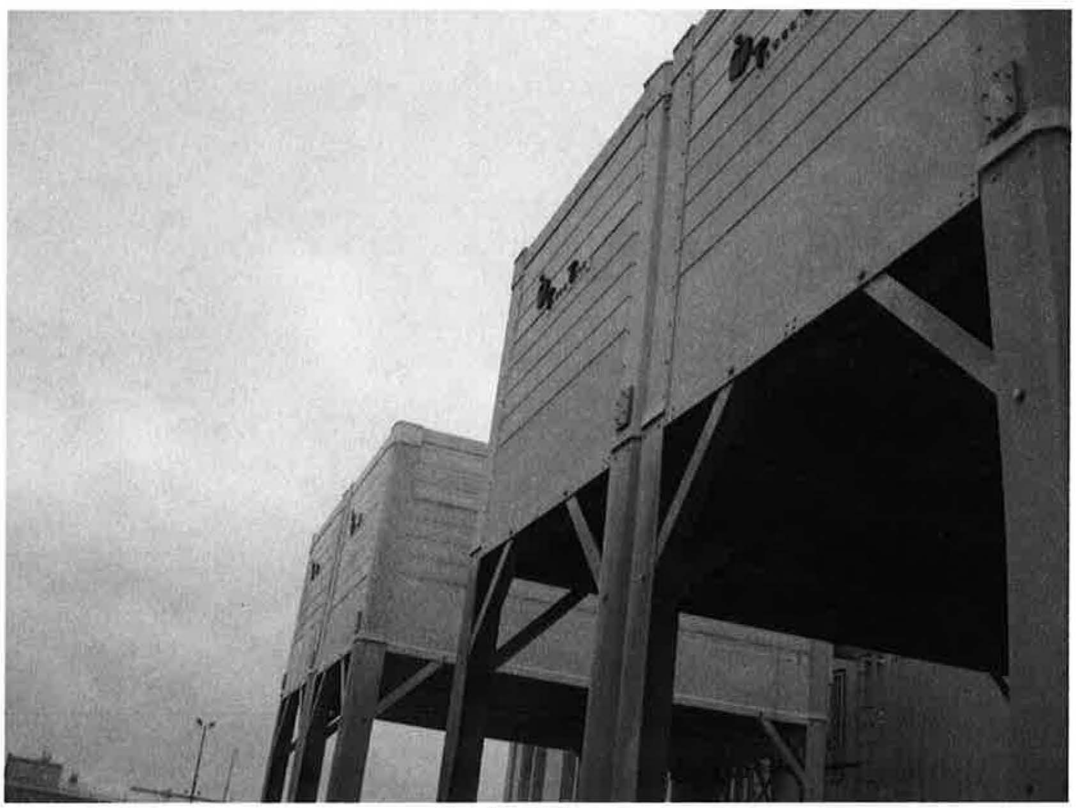

Boiler Make Up Water System



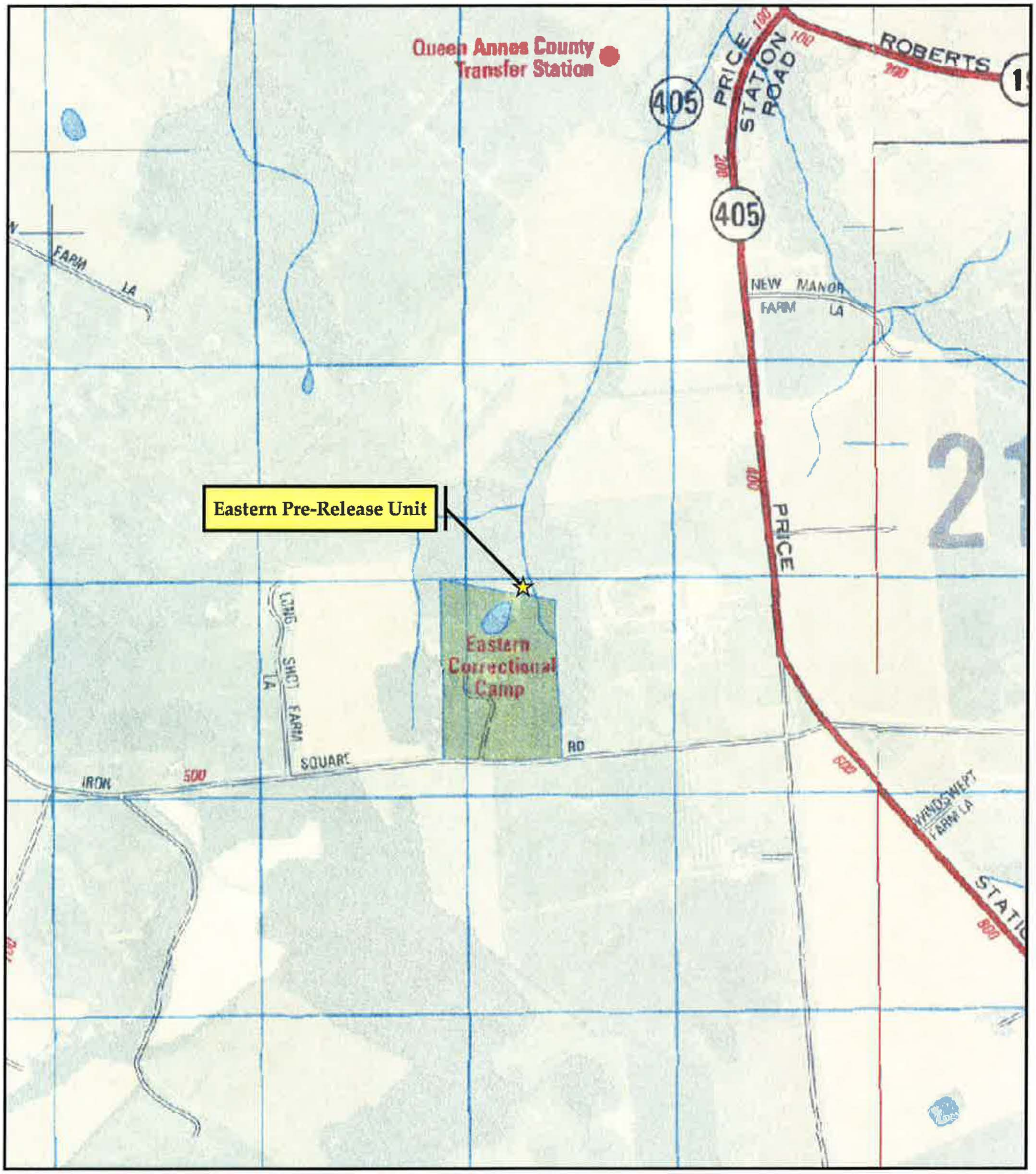
Turbine System

Diesel Generator


Utility Interface Yard


Cooling Towers

Eastern Pre-Release Unit



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729-8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

=EASTERN PRE-RELEASE UNIT

BACKGROUND

The Eastern Pre-Release Unit (EPRU) is a Department of Public Safety & Correctional Service (DPSCS) prison complex. The complex is located in Church Hill, Queen Anne's County, on Flat Iron Road, off of MD Route 213 approximately 3 miles north-west of Maryland Route 301.

This facility has a design capacity of 135 beds and a conventional operating capacity of 180 beds. The EPRU is open year-round and houses an average of 180 prisoners and 43 staff members. The facility consists of an administration building, a housing unit, and two (2) maintenance/storage shops. Staff at the facility includes guards, counselors, administrators, and food service personnel.

The 2004 DPSCS Master Plan projects the addition of a new support and service building and upgrade to the kitchen/dining area. This addition will have no impact on existing water and wastewater facilities.

Maryland Environmental Service (MES) operates the water and wastewater treatment plants.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The EPRU water treatment facility is rated at 115,000 gpd and consists of two (2) softening units, disinfection units, corrosion control facilities, and a 5,000-gallon hydropneumatic tank. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

EPRU has three (3) drilled wells. Two (2) of the wells are located approximately 150 ft. from the treatment building. One (1) well is used for watering the vegetable garden and serves as a backup source for the wastewater treatment plant. There is approximately 50 feet of water distribution pipes. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

C. WASTEWATER TREATMENT PLANT

The EPRU wastewater treatment plant is designed for an average flow of 20,000 gallons per day, and a peak flow of 80,000 gallons per day, and consists of a mechanical bar screen, an aerated lagoon, a dynasand filter, chemical feed facilities for alum, and a UV system. Please refer to Supplemental Information Section – Facility Description - WWTP.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2007, average and peak water flows for the water treatment plant were 34,000 gallons per day and 50,000 gallons per day, respectively. Average and peak flows for the wastewater treatment plant in 2010 were 22,000 gallons per day and 36,000 gallons per day, respectively. Additional operations data for the water and wastewater facilities is included in Supplemental Information Section.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

- The aerated pond has sludge accumulation up to 2.5 ft. The lagoon operating level is at 5.0 ft.
- The aerated pond treatment does not efficiently remove nitrogenous compounds
- EPRU's water distribution system relies only on a 5,000 gallon tank of storage in case of disruption of wells. This storage is not adequate to supply water to prison for a day.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The EPRU wastewater treatment plant experienced five (5) violations in the last 15 years. All violations were associated with exceeding total suspended solids. Nearly all violations resulted from algal blooms. The current treatment plant is less likely to handle algal blooms. Future regulatory requirements for ammonia, total nitrogen, and total phosphorous are likely to require alternative treatment units.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In the period between 1987 and 1988, $4,227,000 in capital improvement requests were made for the design and construction of the wastewater treatment plant. In 1991 a capital improvement request for $627,191 was made for the design and construction of the water treatment plant. Critical maintenance requests were made between 2002 and 2008 for $49,413 for various improvements. Currently, a critical maintenance request to the Department of General Services (DGS) is being made for $4,500. This request is waiting for approval. Please refer to Supplemental Information Section – CIP and Critical Maintenance Funding History.

Funding in the amount of $443,000 was provided in FY 2010 for dredging the wastewater lagoon and dredging. Dredging was completed in early 2011.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site visit to collect information for updating the Master Plan, dredging of the lagoon was in progress. In the long run, the following improvements were identified and recommended:

- Unless the facility permit limit changes, the dredged lagoon is expected to provide treatment at least for the next 10 years.

- Replace aerated pond with Sequencing Batch Reactors biological treatment units as long term solution within 10 to 15 years.
- Design and construct new 25,000 gallon ground storage tank and booster pump units

The above improvements will be part of a future Capital Improvement Request. The total projected cost shall be prepared at a future date.

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2020
- Construction: Fiscal Year 2021

The design and construction of a 25,000-gallon ground storage tank and booster pump units is projected for fiscal year 2021.

SUPPLEMENTAL INFORMATION

EASTERN PRE-RELEASE UNIT

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION

The water treatment and supply facilities consist of (3) three wells, the treatment facility, a 5,000-gallon hydropneumatic tank, and approximately 50 ft. of PVC water distribution.

Well No. 1 is used for watering a vegetable garden and as a backup well for the wastewater treatment plant.

Well No. 2 is located 150 ft. NE of the water treatment plant building. The well, drilled in 1992, is 250 ft. deep, and has 6-inch casing and 4-inch screen. The well is grouted to 150 ft. and from 150 to 250 ft., is gravel packed. The well has a yield of 96 gpm and has a submersible pump rated at 75 gpm with a 7.5 hp motor. The pump is set at 147 ft. The static water level is at 69 feet.

Well No. 3 is located 150 ft. NE of the water treatment plant building. The well, drilled in 1992, is 254 feet deep, and has 6-inch casing and 4-inch screen. The well is grouted to 148 ft. and from 148 to 254 ft., is gravel packed. The well has a yield of 95 gpm and has a submersible pump rated at 75 gpm with 7.5 hp motor. The pump is set at 147 ft. The static water level is at 70 feet.

Presence of arsenic has been detected in the EPRU well water over the last 6 years. Arsenic has been found in several community water systems in the vicinity of EPRU in Queen Anne's County, Maryland.

The hydropneumatic tank is rated at 5,000-gallons and provides both storage and pressure to the facility. The tank is equipped with 9.0 scfm @ 90 psi.

WATER TREATMENT SYSTEM

The water treatment facility is rated at 115,000 gpd and consists of two (2) softening units, disinfection units, corrosion control facilities, and a 5,000-gallon hydropneumatic tank.

The water treatment facilities are housed in a 24 ft. by 20 ft. concrete building. The building has a fan, two (2) humidifiers, a heater, and a vent.

Each softening unit has a vessel: 24-inches in diameter, 66-inches high and is rated for a flow of 80 gpm w/ 13 psi pressure drop. The vessel is loaded with 10 cubic feet of resin, and has a resin exchange capacity of 200,000 lb/cubic feet. Each unit has a brine tank 32-inches in diameter by 50-inches high. Resin is regenerated every 140 minutes.

The disinfection unit consists of a 165-gallon day tank and chemical metering pumps rated at 2.1 gph @ 150 psi to feed sodium hypochlorite.

Orthophosphate is added to effluent to promote corrosion control. Orthophosphate feed facilities include a metering pump rated at 1 gph and a day tank with volume of 30 gallons.

The plant has a single, three phase, a 40 KW diesel emergency generator, model number 120/208VAC, and a 500 gallon fuel tank.

WASTEWATER TREATMENT SYSTEM

The Eastern Pre-Release Unit wastewater treatment facility is rated at an average flow of 20,000 gpd and a maximum flow of 80,000 gpd. The plant has been operated by MES since 1990. The wastewater treatment plant consists of the following:

Preliminary Treatment (Headworks) and Primary Treatment
The headworks consist of a mechanical bar screen housed in an 18 ft. by 12 ft. wide building. The bar screen is the Parkson Aquaguard Model #AGMNF-75 with a 15mm opening. The effluent from the bar screen is discharged to an aerated lagoon.

Biological Treatment
Biological treatment occurs in a lagoon. The lagoon is divided in four (4) sections. Two (2) of the sections are aerated and the other two (2) are not aerated; this provides denitrification. Two (2) floating surface aerators are each equipped with 2 hp motors and 1 hp compressors. The lagoon is trapezoidal: 240 ft. by 360 ft. and 5 ft. deep. The approximate surface area is 105,000 sf. The lagoon has the volume to store thirty (30) days of wastewater flows at 20,000 gpd. Two (2) pumps rated at 45 gpm @ 20 ft. TDH with 3 hp motors pump wastewater from the lagoons to the Dynasand filters.

Tertiary Treatment
Lagoon effluent flows to a dynasand filter. Alum is added to the influent of the dynasand filter. Alum feed facilities include a 55-gallon day tank and a chemical metering pump rated at 30 gpd @ 150 psi. The dynasand filter is 5 ft. in diameter and 15.67 ft. high. The filter has 19 sq. ft. of area and an 80-inch sand bed. The airlift is rated at 3.7 scfm. The effective size and uniformity of sand is 0.8 and 1.5, respectively. Backwash waste from the dynasand filter is pumped by 18 gpm @ 10 ft. TDH with 2 hp motors to the lagoon.

Dynasand filter effluent is disinfected using a UV unit composed of four (4) racks with one (1) lamp each. The UV unit is designed to the exposure of 20,000 mW sec/sq cm and requires 200W of power. The UV light exposure is capable of inactivating 200 fecal coliforms per 100 ml.

Solids Handling and Disposal
N/A

Effluent for stream discharge:

- TSS of 30 mg/l (monthly average)
- BOD: (May 1 to October 31)= 20 mg/l (monthly average)
  (November 1 to April 30)= 30 mg/l (monthly average)
- Ammonia: (May 1 to October 31)=3.2 mg/l (monthly average)
  (November 1 to April 30)=6.8 mg/l
- pH between 6.5 and 8.5
- Dissolved Oxygen: 5.0 mg/l minimum, 6 mg/l daily average
- Fecal Coliforms: 200MPN/100 ml (monthly)
- Total Residual Chlorine

Site Name: Eastern Pre Release Unit

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd	1991
Amount of Previous CIP Funding	$5,054,191.00
Amount of Current CIP funding	$0.00
Anticipated Date for current CIP funding	N/A
Estimated future CIP funds needed	
FY that CIP funding is needed	

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
76° 0' 47.70" W	39° 11' 34.48" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request	$31,792.00
Amount of future MM funding needed	$4,500.00
FY that MM funding is needed	2009

Description of MM needs

-Purchase lagoon effluent pump.

Date of facility SWPPP expiration	
Date of facility SPCC expiration	
Are AST/USTs in compliance with testing reqmts.	
Are Security Measures Adequate?	

	FacilityName	Facility Type	Agency	Region
Details	Eastern Pre-Release Unit	Wastewater System	DPSCS	Eastern
Details	Eastern Pre Release Unit	Water System	DPSCS	Eastern

Select type of New Facility: | Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Eastern Pre Release Unit

Address

Comments:

Agency: DPSCS

Region: Eastern

Average Daily Demand (ADD) (gal/day)	37,647
Peak Day Demand (gal/day)	64,000
WTP Design Capacity	115,000
Total No. of Wells	2
Average Daily Run Time of Wells (Hrs)	8.7
Capacity w/ largest Well Offline	136,000
GW Appro. Permit Number (GAP)	GA1963G002(06) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	35,000
% of ADD to GAP	108%
General Discharge Permit Number	06HT9521

W/WW Engr. Project Mgt	MM
Location of Asbuilt Drawings or CDs	6
WTP Process Description - List Unit Processes	Appendix C
Water source and Distribution System Description	Appendix D
Cost Analysis	Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber

Surface Water Appr. Permit Number	________(__) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	5000
Days of Storage at ADD	0.1
PDWIS WTP Number	017-0006
Appropriation Permit Exp. Date	5/1/2016 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

Facility Name: Eastern Pre-Release Unit

Address: 700 Flat Iron Square Road
Church Hill, MD 21623

Agency: DPSCS

Region: Eastern

Annual Average Daily Flow (gal/day): 15,360

Peak Day Flow (gal/day): 38000

Ratio Peak Flow to ADD: 2.5

WWTP Design/Permit Capacity (gal/day): 20,000

% of ADD to Design Capacity: 77

NPDES Permit Number: MD0023876 ☐ N/A

State Permit Number: 05DP0764 ☐ N/A

NPDES Permit Exp. Date: Draft ☐ N/A

W/WW Engr. Project Mgt: MM

Location of Asbuilt Drawings or CDs: 6

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Jason	Foreman	(410) 758-2998	(410) 490-8459
Kyle	Gulrich	(410) 758-2998	(410) 829-0861
Jay	Jarrell	(410) 758-2998	(443) 534-7242

Will future limits be more stringent?

GW Disposal Permit Exp. Date: __/__/____ ☑ N/A

Is more land needed for disposal? N/A

No. of Sludge Disposal Options available: 0

Are additional sludge disposal permits needed? Yes

Number of sludge permit violations: 0

Number of permit violations

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	4/28/2011	BOD	weekly	mg/l	13	7.5
Details	4/19/2011	TSS	weekly	mg/l	37.9	7.5
Details	4/19/2011	TSS	daily	mg/l	37.9	5
Details	4/19/2011	NH3	daily	mg/l	4.27	1.1
Details	4/19/2011	BOD	weekly	mg/l	24.3	7.5
Details	3/15/2011	TSS	daily	lbs/day	6.5	5
Details	3/1/2011	TSS	monthly	mg/l	47	20

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
EPRU	TSS	1/31/2008	monthly	lbs/day	6.8	5	Algae bloom causing increased TSS, and an increased flow of .034 MGD	The effluent flow has been throttled back to increase detention times in the sand filter.
EPRU	NH3	8/31/2008	monthly	lbs/day	0.7	0.5	one of the aerators in the third quadrant failed.	Repaired aerator and put back on line.
EPRU	BOD	1/31/2009	monthly	lbs/day	5	7.5	Increasing and Decreasing temperatures occurred in January resulting in algae blooms in the pond. At intermittent times the pond would flip causing increased turbid pond effluent.	Decrease flow during months of January thru March.
EPRU	TSS	1/31/2009	monthly	lbs/day	5	14.2	Increasing and Decreasing temperatures occurred in January resulting in algae blooms in the pond. At intermittent times the pond would flip causing increased turbid pond effluent.	Decrease flow during months of January thru March.
EPRU	TSS	1/7/2009	weekly	lbs/day	7.5	14.2	Increasing and Decreasing temperatures occurred in January resulting in algae blooms in the pond. At intermittent times the pond would flip causing increased turbid pond effluent.	Decrease flow during months of January thru March.
EPRU	TSS	1/31/2009	monthly	mg/l	30	34	Increasing and Decreasing temperatures occurred in January resulting in algae blooms in the pond. At intermittent times the pond would flip causing increased turbid pond effluent.	Decrease flow during months of January thru March.
EPRU	NH3							
EPRU	NH3							
EPRU	TSS	2/29/2000	monthly	lbs/day	6.015	5	Problems with the chemical feed pumps and the lagoon flipped.	New plant planned
EPRU	TSS	8/4/2009	weekly	lbs/day	15	7.5	The filter was severly clogged causing the airlift not to continuously backwash	The filter was chlorinated and the airlift checked for leaks. There were areas on the airlift that showed wear and was
EPRU	TSS	8/5/2009	monthly	lbs/day	6.8	5	The filter was severly clogged causing the airlift not to continuously backwash	The filter was chlorinated and the airlift checked for leaks. There were areas on the airlift that showed wear and was
EPRU	BOD	2/18/2010	monthly	lbs/day	5.2	5	This was due to higher lagoon levels from the increased precipitation in February. The higher lagoon levels caused the lagoons to need to be discharged. Algal blooms also contributed to the pounds loading.	Aqua Shade has been added to the lagoon to try to slow the algal bloom. The lagoon levels are now down to a satisfactory level for facility discharge to be stopped.
EPRU	TSS	2/19/2010	monthly	lbs/day	5.2	5	This was due to higher lagoon levels from the increased precipitation in February. The higher lagoon levels caused the lagoons to need to be discharged. Algal blooms also contributed to the pounds loading.	Aqua Shade has been added to the lagoon to try to slow the algal bloom. The lagoon levels are now down to a satisfactory level for facility discharge to be stopped.
EPRU	TSS	2/1/2011	monthly	mg/l	47	30	Aqua Shade has been added to the lagoon to try to slow the algal bloom. A liquid aluminum sulfate feed system was installed to help lower TSS levels.	Aqua Shade has been added to the lagoon to try to slow the algal bloom. A liquid aluminum sulfate feed system was installed by the MES operations staff to replace the powered alum to help lower TSS levels. Liquid alum is stronger and will allow greater settling
EPRU WWTP	TSS	4/30/2005	monthly	lbs/day	6.8	5	The daily flow was at .028 MGD and there was an algal bloom in the lagoon.	The flow from the filter will be throttled back to maintain the flow at a lower rate leaving the filter.
EPRU WWTP	TSS	3/7/2006	weekly	mg/l	49	45	Plant upset due to algae bloom	Algal bloom in pond. All aerators were functioning, and aluminum sulfate dosage was increased prior to sampling to improve clarity and increase flocculation.
EPRU WWTP	TSS	3/7/2006	weekly	mg/l	31	30	Plant upset due to algae bloom	Algal bloom in pond. All aerators were functioning, and aluminum sulfate dosage was increased prior to sampling to improve clarity and increase flocculation.
EPRU WWTP	TSS	3/31/2006	monthly	lbs/day	8.6	7.5	Plant upset due to algae bloom	Algal bloom in pond. All aerators were functioning, and aluminum sulfate dosage was increased prior to sampling to improve clarity and increase flocculation.
EPRU WWTP	TSS	1/11/2011	weekly	mg/l	8.1	7.5	This is due to algal blooms in the influent treatment lagoon.	Aqua Shade was set up and fed to try and slow the algal bloom. The feed rate of aluminum sulfate was increased to help with the filtration process.

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
EPRU WWTP	TSS	3/15/2011	daily	lbs/day	6.5	5	The warm weather caused algal blooms in the influent storage lagoon.	Aqua Shade has been added to the lagoon to try to slow the algal bloom. A liquid aluminum sulfate feed system was installed to help lower TSS levels.
EPRU WWTP	BOD	4/19/2011	weekly	mg/l	24.3	7.5	Effluent flow rate	Effluent flow will be monitored to discharge at a lower rate.
EPRU WWTP	BOD	4/28/2011	weekly	mg/l	13	7.5	Effluent flow rate	Effluent flow will be monitored to discharge at a lower rate.
EPRU WWTP	TSS	4/19/2011	weekly	mg/l	37.9	7.5	Effluent flow rate	Effluent flow will be monitored to discharge at a lower rate.
EPRU WWTP	TSS	4/19/2011	daily	mg/l	37.9	5	Effluent flow rate	Effluent flow will be monitored to discharge at a lower rate.
EPRU WWTP	NH3	4/19/2011	daily	mg/l	4.27	1.1	Effluent flow rate	Effluent flow will be monitored to discharge at a lower rate.

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Eastern Pre-Release Unit

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
MES	1987	$546,000	Design and prepare detailed plans and specifications for wastewater treatment plant.	
MES	1988	$3,881,000	Provide State's share of the cost of renovations to the wastewater treatment plant.	
MES	1991	$627,191	Design and construct capital improvements to water treatment plant.	
MES	2010	$440,000	WWTP Lagoon Dredging	Project Completed
	Total:	**$5,494,191**		

EASTERN PRE-RELEASE UNIT

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:

- The plant is operating satisfactorily

Proposed Improvements:

- None

WASTEWATER TREATMENT PLANT

Conditional Analysis:

- Lagoon dredging was completed in 2010

Proposed Improvements:

- Future regulation may have stringent requirements for ammonia. In near future, replacing lagoon system with a conventional WWTP may be necessary

Eastern Pre-Release Unit

WTP

5,000-Gallon Hydropneumatic Tank

Ion Exchange Units

WTP

Eastern Pre-Release Unit Well

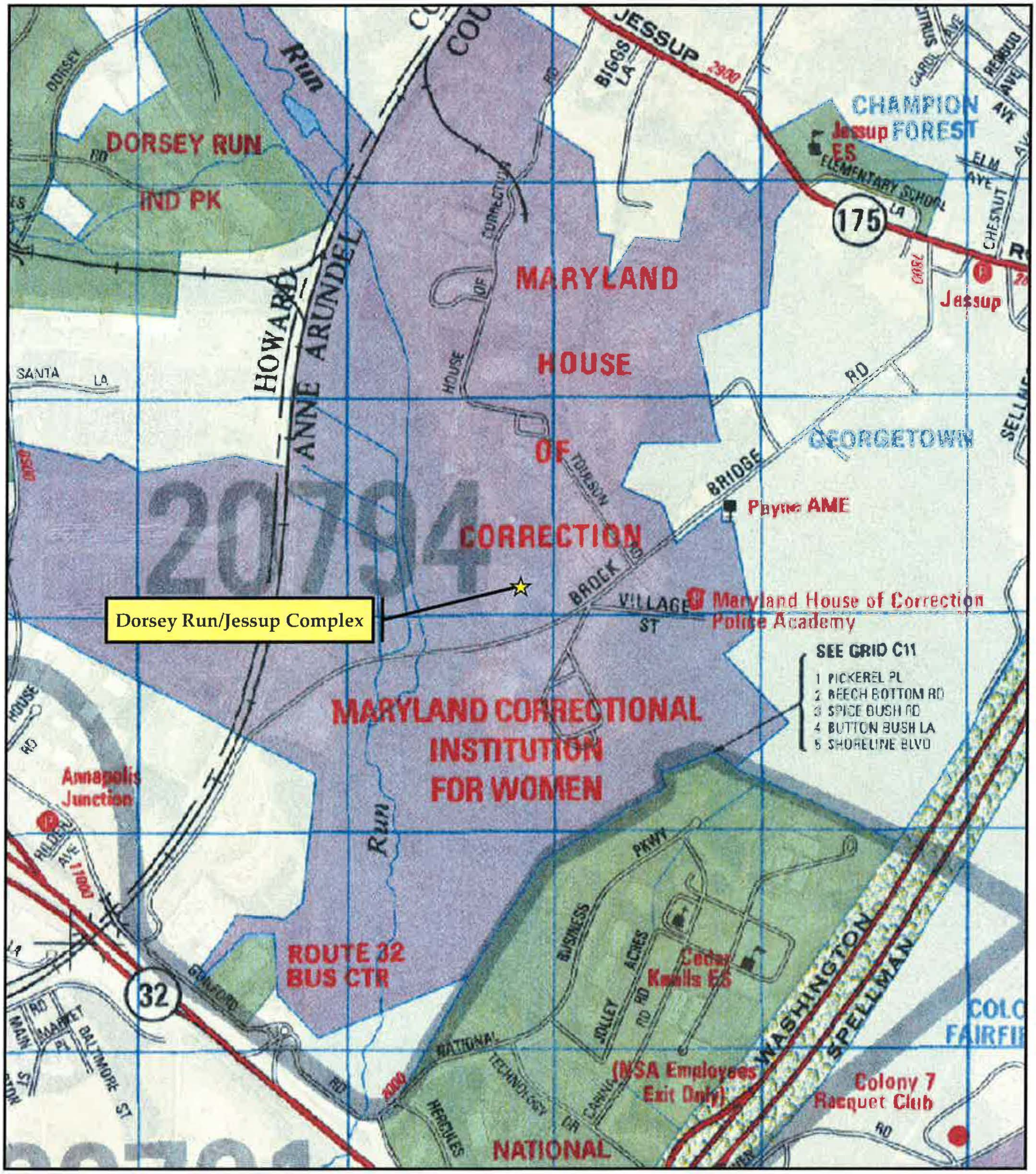
WWTP

Aerated Pond to Dynasand Filters Pumping Station

Dynasand Filters

Jessup Correctional Complex

Dorsey Advanced Wastewater Treatment Plant



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

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JESSUP CORRECTIONAL COMPLEX

DORSEY ADVANCED WASTEWATER TREATMENT PLANT

BACKGROUND

The Jessup Correctional Institution, in Anne Arundel and Howard Counties, is a Department of Public Safety and Correctional Services prison complex, which consists of six distinctly administered institutions. The Dorsey Run Advanced Wastewater Treatment Facility, located within the Jessup Complex, serves these six (6) institutions.

The Prison Complex is located in Jessup, Maryland, approximately 2 miles east of Interstate 95 on Brock Bridge Road, which includes the Maryland House of Correction – Annex, the Maryland Correctional Institution - Jessup (MCI-J), the Maryland Correctional Institution for Women (MCI-W), the Jessup Pre-Release Unit (JPRU), the Brockbridge Correctional Facility (BCF), the Patuxent Institution, the Herman L. Toulson Correctional Boot Camp Facility (HLTBC). The complex will also include two (2) new 560 bed facilities; one (1) to be built in FY 2012.and one (1) in FY2014. The new facilities will be called The Jessup Community Correctional Facility at first and then changed to the Dorsey Run Correctional Facility, if approved by the BPW.

Institution	Design Capacity	Conventional Capacity	Master Plan level Capacity
MCI-J	512 cells	870 beds	N/A
BCF	561 beds	611 beds	
JPRU	560 beds	596 beds	
HLTBC	384 beds	398 beds	
JCCF (name to change to Dorsey Run Correctional Facility)	1,120 beds	1,120 beds	Under Design
Perkins Hospital	240 beds	240 beds	NA
MHC –Annex	1,104 cells	1,200	1,456 beds
Patuxent Institution	576 beds	750 beds	1,050 beds

Approximately 1,000 prisoners have been transferred from the Maryland House of Correction (currently closed) to other correctional facilities throughout the state.

The 2004 DPSC Master Plan projects upgrades and new facilities at the Jessup Institution as follows:

1. MCI-J: Construct fence around Maintenance building
2. MHC-Annex:
    1. Design and construct two (2) new 128 cell medium security housing units
    2. Expand the support service building, recreation yard, visitor's building, gate house and administration building
    3. Construct SUI Shop for Textiles, Graphics, Mattress, Uniform replacement
3. MHC-JCCF
    1. Construct two (2) new 560 bed housing units. One (1) in FY 2012 and the other in FY 2014

4. Jessup Regional Warehouse: Design and construct a new warehouse building

5. Patuxent Institution:
   - Design and Construct a 300 bed mental health facility
   - Design and construct a support service building for female offenders
   - Modify the ventilation and install a sprinkler system and smoke evacuation system at the DC bldg-Fire Safety project

6. BCF: Upgrade Kitchen, Design & Construct Support Services Building

The net design capacity increase for the prison Institution is 1,120 beds.

The existing and planned populations for these facilities and the associated water and wastewater flows are listed in Table 1. Prison staff and inmates are reported together as total prison population.

The Clifton T. Perkins Hospital Center in Jessup is a Department of Health and Mental Hygiene (DHMH) Institution. Its sewage flows by gravity to a pump station near the plant from where it is pumped to the Dorsey Run Advanced Wastewater Treatment Plant. The Perkins Hospital Center is located about 1.5 miles east of I-95. The DHMH five-year plan projects upgrades and new facilities as follows:

- New 24,545 square feet 48-bed maximum-security facility to be added to the Stuart B Silver Wing building at Clifton T. Perkins Hospital.
- Renovate 80-beds at the north wing, the administration building, and the maximum security building

The Master Plan for DHMH was not available for review.

The existing and planned populations for the hospital and the associated water and wastewater flows are listed in Table 1 with patients and hospital staff reported as the total population.

The Dorsey Run Advanced Wastewater Treatment Plant also receives flow from the Jessup Elementary School and the Corman Construction Company, in Anne Arundel County. The existing and planned flows for these two (2) institutions and the associated water and sewage flows are also reported in Table 1.

In 1992, an Intergovernmental Agreement was executed with Howard County, whereby sewage flows from several Howard County parcels along Dorsey Run Road were allowed to convey waste to the Dorsey Run WWTP in exchange for an equal amount of flow from the Patuxent Institute and the Waterloo Police Barracks. The existing and planned water and sewer flows for this facility are also reported in Table 1

No impact on the wastewater facility is expected with the net increase in the Jessup Institution population. The current wastewater flow to the plant is approximately 1.05 MGD, and the plant is design rated for average annual flow of 2.0 MGD.

Maryland Environmental Services operates the following:

- Wastewater Treatment Plant
- Wastewater Collection System (MHC, Patuxent and Perkin Pump Stations only)

WASTEWATER FACILITIES DESCRIPTION

A. WASTEWATER TREATMENT PLANT

The wastewater treatment plant is rated for a design flow of two (2) million gallons per day and consists of two (2) mechanical bar screens; a screenings processing unit; a grit removal unit (currently abandoned; a pumping station; two (2) flow equalization tanks; two (2) primary clarifiers; a primary sludge pump station; a duel train activated sludge system with nitrification and de-nitrification reactor, associated return and recirculation pump stations; four (4) sand filters; a UV disinfection system; chemical feed systems for magnesium hydroxide, alum, polymer and supplemental carbon; two (2) sludge thickeners; two (2) sludge holding tanks; two (2) belt filter presses, and a sludge transfer pump station. Please refer to Supplemental Information Section – Facility Description - WWTP.

B. WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of three (3) sewage-pumping stations, approximately 2,100 feet of forced mains, 29,600 feet of gravity sewer pipes, and approximately 189 manholes. Please refer to Supplemental Information Section – Facility Description-WW Collection System

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

Average and peak sewage flows for the wastewater treatment in 2010 were 1,174,795 gallons per day and 1,555,600 gallons per day, respectively. Additional wastewater facilities 2010 operations data is included in Supplemental Information Section.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan and the facility evaluation conducted by an A/E firm, the following deficiencies were identified:

Wastewater Treatment Plant

- The existing screen in the MHC pump station cannot remove large debris
- The current grit removal system internals have been abandoned
- The diffusers and mixing equipment in the flow equalization tank are inefficient. The flow equalization tank cannot be accessed
- The components of the primary clarifiers show signs of age. These include drive units, a skimmer, a scrapper, weir plate brackets, scum mixers, and scum mixer supports
- The second stage tank clarifiers do not have a scum removal system
- The existing filter media and under drains are worn out and should be replaced
- The Mg(OH)2 solution is subject to freezing if it is not used on a regular basis

- The drive units of the gravity sludge thickener show signs of age
- The plant does not have a central process control system

Wastewater Collection System

- The MHC Pump Station has a roof but no walls and is accessible to unauthorized personnel
- The Perkins Pump Station controls are set up so that only certain pumps can be operated with the emergency generator. If these pumps are down, the emergency generator will not power any pumps
- Pumps Number 4 and 5 are frequently air bound

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The Dorsey Advance Wastewater Treatment Plant experienced three (3) violations in last 15 years. In 2005, the plant exceeded total nitrogen limits due to the methanol chemical feed system malfunctioning. In 2006 and 2007, pH levels were either below or above the NPDES permit limit due to interruptions in the caustic soda feed and a failure to calibrate the pH meter.

This plant is one (1) of the 66 major WWTP plants required by the Maryland Department of Environment to implement the Enhanced Nutrient Removal (ENR) Program. Currently, the National Pollution Discharge Elimination System (NPDES) Permit requires the effluent to meet total nitrogen levels of 3.0 mg/l and total phosphorous levels of 1.0 mg/l. Under the ENR program, this plant's effluent will be required to meet total nitrogen levels of 3.0 mg/l and total phosphorus levels of 0.3 mg/l. Design for a WWTP upgrade has been completed, which will upgrade the plants equipment to insure consistent compliance with future ENR limits.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In the period between 1992 and 1994, $4,022,000 in capital improvement requests were made for upgrades to the water distribution system and for design and construction of a regional sludge treatment facility. In the period between 1996 and 1998, capital improvement requests for $2,200,000 were made for design and construction of additional upgrades to the water distribution and wastewater collection system. In 2000 a capital improvement request for $550,000 was made for the design and construction of a central regional sludge facility. In the period between 2001 and 2003, capital improvement requests were made for $1,685,000 for wastewater collection improvements. In 2004, a capital improvement request for $425,000 was made to improve the elevated water storage tank. In the period between 2007 and 2008, capital improvement requests for $666,000 were made for improvements to the wastewater treatment plant. Currently, a capital improvement request for $4,382,000 for an upgrade of the wastewater treatment plant has been approved and funding was received in fiscal year 2010. The construction Notice to Proceed date was September 6, 2011 and a pre-construction meeting was held August 22, 2011. Critical maintenance requests were made between 2002 and 2008 for $474,344 for various improvements. In 2000, critical maintenance requests to the Department of General Services (DGS) were made for $145,700 to install covers for filters and construct a debris station. These requests are waiting for approval. In addition, a critical maintenance request to DGS was made in 1995, for $50,000, to demolish the old wastewater treatment plant. This request is also waiting for approval. This amount has been increased top $75,000. Please refer to Supplemental Information Section – CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

Wastewater Treatment Plant

- Replace existing screen with 2 screens with less of a pitch more suitable for removing large debris
- Replace existing grit removal system components such as the paddle drive assembly, drive tubes w/paddles, floor plate, inlet baffle, grit cyclone, and grit classifier
- Replace leaking portion of force main and install air release valve at high point - **Completed**
- Install man-ways to allow access to the flow equalization tank Also replace diffusers and mixing equipment
- Replace drive units, skimmers, scrappers, weir plate brackets, scum mixers, and scum mixer supports.
- Replace diffusers, clarifier skimmers, sludge scrapers, and scum pumps. Install chopper pumps with recirculating feature.
- Install automated inlet valves, rate control valves and DO probes
- Add scum removal system in second stage tanks
- Replace existing filter media, under drain system, backwash pump seals and mudwell pumps
- Upgrade existing alum feed system by adding a spare pump and automatic control system
- Install a standby pump for the polymer feed
- Replace methanol/supplemental carbon pumps and add on-line nitrate analyzers
- Replace blowers and diffusers for sludge holding tanks
- Install a new sludge screening system at sludge holding tank.
- Upgrade HVAC system in the Plant Administration Building and blower electrical room.
- Install SCADA system.

Wastewater Collection System

- Modify MHC pump station to allow installing two new mechanical bar screens to improve trash removal
- Install access stairs to MHC pump station drywell
- Replace roof structure over MHC pump station

The above improvements will be part of a capital improvement request that is currently funded. The total projected cost is approximately **$6,000,000.**

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Completed
- Construction: Start Fiscal Year 2012

SUPPLEMENTAL INFORMATION

JESSUP CORRECTIONAL COMPLEX

FACILITY DESCRIPTIONS

DORSEY ADVANCED WASTEWATER TREATMENT PLANT

The Dorsey advanced wastewater treatment plant (WWTP) is operated and maintained by Maryland Environmental Service (MES). The WWTP serves the Jessup Correctional Complex which includes:

- The Maryland House of Corrections;
- The Maryland Correctional Institute-Jessup;
- The Brockbridge Pre-Release Center;
- The Jessup Pre-Release Center;
- The Patuxent Institution;
- The Perkins Hospital;
- The Jessup Elementary School; and
- Other nearby state and local government owned facilities.
- Various private businesses in Howard and Anne Arundel Counties
- Jessup Community Correctional Facility (to be built in two (2) Phases FY 2012 and 2014)

The WWTP began operations in 1987 and has a design capacity of 2.0 million gallons per day (MGD). The treatment processes consists of the following:

I. Preliminary Treatment (Headworks)

Wastewater from the MHC and Perkins pump stations is conveyed to the screen and grit building. Debris from the screens is discharged to a compactor and subsequently to a dumpster.

1. Screening
    a. Hycor Monoscreen, Model MMS20-5-6: opening 3mm
    b. Mechanical bar screen (installed in bypass channel), Model AGMNSS: opening 15mm, 1 hp
2. Grit
    a. The grit system, originally a vortex grit removal system, is abandoned. A vacuum truck removes grit.
3. Pumping System (Screen & Grit Building to Flow Equalization Tank)
    a. Four (4) submerseable pumps each rated at 1.5 mgd with 50 hp motors
    b. A wet well with a volume of 15,000 gallons
    c. An emergency generator and fuel tank: 200 KW and 500 gallon
    d. One (1) suction lift dry prime diesel pump rated at 1500 gpm
    e. Force Main: 14" DIP, 625 ft., elevation difference flow equalization tank valve vault and wet well is 47.75 ft.

II. Primary Treatment

1. Flow Equalization Tank
    a. Dimensions: Two (2), 42 ft. diameter by 23 ft. high glass lined tanks
    b. Working Volume: 212,000 gallons each tank
    c. Mixing: Fine bubble diffusers
    d. Blowers: Two (2) 587scfm @ 10 psig with 40 hp motor
2. Circular Primary Clarifier
    a. Dimensions: Two (2) 45 ft. diameter by 10 ft. side water depth
    b. Surface Overflow Rate: 1200 gal/ft^2 @ 2.0 MGD
3. Primary Sludge Pumping Station
    a. Pumping Units: Two (2) rated at 85 gpm with 7.5 hp motors and VFD
    b. Scum Pumps: Two (2) rated at 40 gpm @ 100 psi with 5 hp motor
    c. Scum Mixers: Two (2) with ¾ hp motor
    d. Pinch Valve

III. Biological Treatment

1. Activated Sludge [Two (2) Stage]
    a. First Stage Nitrification Reactor and Clarifier :
        i. Two (2) tanks, each consisting of an outer ring aeration zone in the annular space surrounding the first stage clarifier. The outer tank walls are constructed of concrete and the inner walls are steel. Both tanks operate in parallel. The aeration zone is 16 ft. wide and has a 15 ft. SWD with a volume of 163,000 gallons
        ii. Type of diffusers – Fine bubble, 31 laterals each with 22 diffusers
        iii. Centrifugal Blowers – Three (3) 3200 scfm @7.5 psig, 150 hp each
        iv. Each first stage clarifier is 50 ft. in diameter and 12 ft. SWD with a volume of 176,000gallons.
    b. Second Stage De-Nitrification Reactor and Clarifier :
        i. Two (2) tanks - each tank consists of an outer ring aeration/anoxic zone in the annular space surrounding the second stage clarifier. The outer tank wall is constructed of concrete and the inner wall is steel. Both tanks operate in parallel. The anoxic zone is covered and is ¾ of the area and re-aeration zone is ¼ of area. The aeration zone is 7 ft. wide ring and has 15 ft. SWD with a volume of 16,500 gallons
        ii. The anoxic zone has a volume of 49,500 gallons and has four (4) mixers with 2 hp motors
        iii. The aeration zone has 90 fine bubble diffusers
        iv. Each second stage clarifier is 50 ft. in diameter with a 12 ft. SWD and a volume of 176,000 gallons
2. Return Activated Sludge, Waste Activated Sludge, and Internal Recirculation Pumping Units:
    a. RAS pumping units (first stage): two (2), each rated at 300 gpm @ 33 ft. TDH, with 10 hp motors. RAS return rate is 300 gpm
    b. RAS pumping units (second stage): two (2), each rated at 60 gpm @ 17 ft. TDH, with 2 hp motors. RAS return rate is 250 gpm
    c. WAS pumping units (first stage): two (2), each rated at 300 gpm @ 33 ft. TDH, with 7.5 hp motors. WAS return rate is 120 gpm

d. WAS pumping units (second stage): two (2), each rated at 60 gpm @ 17 ft. TDH, with 7.5 hp motor each. WAS return rate is 105g pm

IV. Tertiary Treatment

1. Filtration: Hydro-Clear by Siemens
   a. Filter Cells: Total 4 cells, 185 sq. ft. each cell
   b. Filter media: 0.45 mm sand, media depth=10 inch
   c. Design surface loading: 2 gpm/sf @ 2.0 MGD
   d. Backwash Pumps: Two (2), rated at 222 gpm with 7 hp motor each
2. Ultraviolet Disinfection
   a. UV unit is rated for a peak flow of 2.4 MGD with UV transmission of 65% and dosage of 30,000 microwatt-second per cm^2.
   b. One (1) channel: the channel has two (2) banks of nine (9) UV lamps each
3. Plant Water Pumping Units
   a. Three (3) pumping units rated at 100 gpm with 10 hp motor each
   b. Two (2) pumping units that convey water to the gravity thickener rated at 24 gpm with 5 hp motor each
4. Filter Backwash Mudwell Pumping Units

Two (2) pumping units that convey mudwell water to the first stage biological tanks rated at 175 gpm with 3 hp motors

V. Chemical Feed Systems

1. Magnesium Hydroxide (Alkalinity adjustment)
   a. Applied at primary clarifiers
   b. Storage: 5,500 gallons
   c. Pumping Unit: One (1), rated at 0.48 gpm @ 58 psi with ¾ hp motor
2. Alum (Phosphorous removal)
   a. Storage: 9,500 gallon fiberglass tank
   b. Metering Pumps: Positive displacement, rated at 7 gph @ 30 psi.

   Alum is injected at influent of secondary clarifiers for chemical phosphorous removal.
3. Polymer (Coagulation/flocculation)
   a. Applied at second stage aeration zone (1)
   b. Storage: 750 gallon bulk tank
   c. Day Tank: 35 gallon
   d. Transfer Pump: 7 gph @ 50 psi
   e. Chemical metering pumps: Two (2), rated at 147 gph @ 60 psi
4. Supplemental Carbon/Methanol
   a. Storage: 4,000 gallon steel tank
   b. Chemical metering pumps: Three (3), rated at 8 gph @ 60 psi

VI. Solids Handling

1. Gravity Sludge Thickeners
   a. Units and Dimensions: Two (2), 25 ft. diameter by 12 ft. SWD

b. Solids loading: 7000 lb/day/sf

One (1) of the gravity thickeners receives sludge from the primary clarifier and the other receives sludge from the first stage aeration WAS. Thickened sludge is conveyed to the sludge holding tank or the belt press filter.

2. Sludge Transfer Pumps (Gravity Thickener to Sludge Holding Tank and Belt Filter Press)
   a. Thickened Sludge Pumping units:
      - Two (2) double disc diaphragm pumps rated at 190 gpm @ 100 ft. TDH driven by a 7.5 hp motor transfer sludge from the gravity thickener to the belt filter press
      - One (1) double disc diaphragm pump rated at 190 gpm @ 100 ft. TDH driven by a 7.5 hp motor transfers sludge from the gravity thickener to the sludge holding tank
3. Aerobic Digesters/Sludge Holding Tanks
   a. Units and Dimensions: Two (2), 25 ft. diameter each, one (1) with 10 ft. SWD and one (1) with 14 ft. SWD
   b. Air diffusers: Coarse bubble
   c. Blowers: One (1), size unknown
4. Belt Filter Press
   a. Units and Dimensions: Two (2) 1 meter belt filter presses
   b. Hydraulic loading: 30 gpm @ 2% solids, 7 hours a day for 5 days a week
   c. Polymer storage tank: 1,300 gallons
   d. Potassium permanganate feed system for odor control
   e. Belt Press backwash water: Two (2), 10 hp pumps, a 5 hp pump and a bladder tank
5. Lime Sludge Blender: Design capacity: 5 ton/hr
6. Odor Control: Activated Carbon system [Single carbon vessel with two (2) fans]

VII. Emergency Power

1. Emergency Generator: 3 phase, 480 volt, 400 KVA

VIII. Effluent for stream discharge: South Branch of Patapsco River

1. BOD: (Apr 1 – Oct 31) =10 mg/l MA, (Nov 1 – Mar 31) = 30 mg/l MA
2. TSS: 30 mg/l MA, Fecal Coliform: 200 MPN/100 ml MA, E-Coli: 126 MPN/100 ml, DO: 5.0 mg/l minimum, pH: 6.5-8.5
3. Ammonia (Apr 1 – Oct 31) =1.4 mg/l MA,(11/1 – 3/31) = 3.0 mg/l MA
4. Total Nitrogen (Apr 1 – Oct 31): 3 mg/l & 24,400 lb/yr, Total Phosphorous: 1.0 mg/l MA & 1,830 lb/yr

WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of three (3) sewage-pumping stations, approximately 2,100 feet of forced mains, 29,600 feet of gravity sewer pipes, and approximately 189 manholes. Maryland Environmental Service operates the Jessup wastewater collection system (pump stations only). All of the sewage pumping stations discharge into the Dorsey Run Advanced Wastewater Treatment Plant.

MHC Pump Station
The pump station is located near the Rifle Range. The headworks for this pump station consists of a Parkson Aqua Guard mechanical bar screen, model AGMNARP; a Parkson Roto Press, model RP200CHDD; a Muffin Monster's auger grinder; and an Aerovent blower, model 500BIA-SWCB-1001-3/4. The pump station is a below grade structure. The station has four (4) submersible pumps rated at 1300 gpm @ 175 ft. TDH each with 40 hp motors. The wet well is 24 ft. long, 20 ft. wide and, 22 ft. deep. The station is equipped with a 200 KW emergency generator, a diesel pump rated at 1500 gpm, and a 500 gallon above ground diesel tank. This pump station discharges to the Screen and Grit pump station.

Perkins Pump Station
The pump station is located near the old trickling filter plant. The headworks for this pump station consist of manual bar screen, and a Muffin Monster communitor (model PC 2040). The pump station is a below grade structure. The station has six (6) submersible pumps rated 1300 gpm @ 150 ft. TDH with 15 hp motors each. The wet well is 24 ft. long, 8 ft. wide, and 18 ft. deep. The station is equipped with a 125 KW emergency generator and a 500 gallon above ground diesel tank. This pump station discharges to the screen and grit pump station.

Patuxent Institution Pump Station
The pump station is located near the Power Plant within the institutions compound. The headworks for this pump station consist of an Auger Monster model AGE 2400 (screen and grinder) with a capacity of 1.1 MGD. The pump station is a below grade structure. The station has two (2) pumps, each rated at 900 gpm with 20 hp motors. The wet well has an approximate capacity of 1,000. This pump station discharges to the MHC pump station.

Site Name: Jessup Correctional Complex - Dorsey WWTP

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

-Construct improvements to the water and wastewater system.
-Construct improvements to the water tower.
-Construct improvements to the Dorsey Wastewater Treatment Plant.

Indicate the Fiscal Year of Previous Funding Rec'd: 2001

Amount of Previous CIP Funding: $7,587,000.00

Amount of Current CIP funding: $1,911,000.00

Anticipated Date for current CIP funding: 2008

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
76° 46' 53.81" W	39° 9' 55.47" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request: $223,344.00

Amount of future MM funding needed: $195,207.00

FY that MM funding is needed: 1995

Description of MM needs

-Demolish old wastewater treatment plant.
-Design and construct debris station.
-Design and install filter covers.

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Jessup Correctional Comple...	Wastewater System	DPSCS	Northern

Select type of New Facility: | Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Jessup Correctional Complex - Dorsey Advance

Address: 7920 Brock Bridge Road
Jessup, MD 20794-9703

Agency: DPSCS

Region: Northern

Annual Average Daily Flow (gal/day): 1,172,603

Peak Day Flow (gal/day): 2,200,000

Ratio Peak Flow to ADD: 1.9

WWTP Design/Permit Capacity (gal/day): 2,000,000

% of ADD to Design Capacity: 59

NPDES Permit Number: MD0063207 ☐ N/A

State Permit Number: 07DP2488 ☐ N/A

NPDES Permit Exp. Date: 8/31/2010 ☐ N/A

W/WW Engr. Project Mgt: SI

Location of Asbuilt Drawings or CDs: 34(A,B,C)

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Herman	Thomas	(410) 799-7339	(410) 799-7339
Ronnie	Hunter	(410) 799-7339	(410) 799-7339
Chris	Thompson	(410) 282-3076	(410) 897-7607

Will future limits be more stringent?

GW Disposal Permit Exp. Date: __/__/____ ☑ N/A

Is more land needed for disposal? No

No. of Sludge Disposal Options available: 3

Are additional sludge disposal permits needed? No

Number of sludge permit violations: 0

Number of permit violations: 1

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	10/4/2010	TSS	monthly	mg/l	86	45
Details	9/1/2010	T-N	weekly	mg/l	5.4	4.5
Details	1/21/2009	TSS	weekly	mg/l	46	45
Details	10/28/2008	T-N	weekly	mg/l	4.6	4.5
Details	6/7/2008	T-N	weekly	mg/l	4.9	4.5
Details	5/31/2008	T-N	monthly	mg/l	5.1	3
Details	5/31/2008	T-N	monthly	lbs/day	60	50

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Dorsey Run	TN	5/14/2005	weekly	mg/l	5.82	4.5	Malfunctioning methanol chemical feed system .	We installed new chemical feed lines.
Dorsey Run	pH	11/28/2006	daily	su	5.3	6.5	The caustic soda feed pumps electrical breaker tripped out and the pumps stopped feeding.	The breaker was reset. The pumps outputs were increased to raise the pH to NPDES permit levels.
Dorsey Run	pH	2/27/2007	daily	su	8.9	8.5	Operator's error. The operator failed to properly calibrate the meter, and to retest the results.	We retrained all of the operators on the calibration of the pH meter . Along with the proper procedure when performing lab tests.
Dorsey Run	T-N	4/7/2008	weekly	mg/l	7.04	4.5	The east side 2nd stage clarifier was drained to inspect a problem with the collector drive unit and rake mechanism. The west side 2nd stage clarifier accepted all of the flow for approximately 1 week versus splitting it among two clarifiers and this hydraulically overloaded the clarifier limiting the effectiveness of the denitrifies.	We corrected the problem with the collector drive, refilled the train and balanced out the process. This allowed for effective treatability of the waste stream and brought the process within permit.
Dorsey Run	T-N	4/14/2008	weekly	mg/l	5.14	4.5	The east side 2nd stage clarifier was drained to inspect a problem with the collector drive unit and rake mechanism. The west side 2nd stage clarifier accepted all of the flow for approximately 1 week versus splitting it among two clarifiers and this hydraulically overloaded the clarifier limiting the effectiveness of the denitrifies.	We corrected the problem with the collector drive, refilled the train and balanced out the process. This allowed for effective treatability of the waste stream and brought the process within permit.
Dorsey Run	T-N	4/28/2008	weekly	mg/l	5.5	4.5	The east side 2nd stage clarifier was drained to inspect a problem with the collector drive unit and rake mechanism. The west side 2nd stage clarifier accepted all of the flow for approximately 1 week versus splitting it among two clarifiers and this hydraulically overloaded the clarifier limiting the effectiveness of the denitrifies.	We corrected the problem with the collector drive, refilled the train and balanced out the process. This allowed for effective treatability of the waste stream and brought the process within permit.
Dorsey Run	T-N	4/30/2008	monthly	mg/l	5.1	3	The east side 2nd stage clarifier was drained to inspect a problem with the collector drive unit and rake mechanism. The west side 2nd stage clarifier accepted all of the flow for approximately 1 week versus splitting it among two clarifiers and this hydraulically overloaded the clarifier limiting the effectiveness of the denitrifies.	We corrected the problem with the collector drive, refilled the train and balanced out the process. This allowed for effective treatability of the waste stream and brought the process within permit.
Dorsey Run	T-N	4/30/2008	monthly	lbs/day	57	50	The east side 2nd stage clarifier was drained to inspect a problem with the collector drive unit and rake mechanism. The west side 2nd stage clarifier accepted all of the flow for approximately 1 week versus splitting it among two clarifiers and this hydraulically overloaded the clarifier limiting the effectiveness of the denitrifies.	We corrected the problem with the collector drive, refilled the train and balanced out the process. This allowed for effective treatability of the waste stream and brought the process within permit.
Dorsey Run	T-N	5/14/2008	weekly	mg/l	6.56	4.5	The switching form Methanol (to reduce the amount of hazardous chemicals onsite)to an alternative carbon source. A trail was ran during the non nutrient season, and the product seemed to work, however after having problem denitrifying a QA QC was ran by the supplier on the product, and it was found to be out of specification.	We have increased our product feed to the two anoxic zones, and consulted with manufacture for a possible cause of our elevated NO3 numbers. We are also testing a new product to see if it will be more suitable for our denitrification process.
Dorsey Run	T-N	5/21/2008	weekly	mg/l	6.56	4.5	The switching form Methanol (to reduce the amount of hazardous chemicals onsite)to an alternative carbon source. A trail was ran during the non nutrient season, and the product seemed to work, however after having problem denitrifying a QA QC was ran by the supplier on the product, and it was found to be out of specification.	We have increased our product feed to the two anoxic zones, and consulted with manufacture for a possible cause of our elevated NO3 numbers. We are also testing a new product to see if it will be more suitable for our denitrification process.

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Dorsey Run	T-N	5/14/2008	weekly	lbs/day	77	75	The switching form Methanol (to reduce the amount of hazardous chemicals onsite)to an alternative carbon source. A trail was ran during the non nutrient season, and the product seemed to work, however after having problem denitrifying a QA QC was ran by the supplier on the product, and it was found to be out of specification.	We have increased our product feed to the two anoxic zones, and consulted with manufacture for a possible cause of our elevated NO3 numbers. We are also testing a new product to see if it will be more suitable for our denitrification process.
Dorsey Run	T-N	5/31/2008	monthly	mg/l	5.1	3	The switching form Methanol (to reduce the amount of hazardous chemicals onsite)to an alternative carbon source. A trail was ran during the non nutrient season, and the product seemed to work, however after having problem denitrifying a QA QC was ran by the supplier on the product, and it was found to be out of specification.	We have increased our product feed to the two anoxic zones, and consulted with manufacture for a possible cause of our elevated NO3 numbers. We are also testing a new product to see if it will be more suitable for our denitrification process.
Dorsey Run	T-N	5/31/2008	monthly	lbs/day	60	50	The switching form Methanol (to reduce the amount of hazardous chemicals onsite)to an alternative carbon source. A trail was ran during the non nutrient season, and the product seemed to work, however after having problem denitrifying a QA QC was ran by the supplier on the product, and it was found to be out of specification.	We have increased our product feed to the two anoxic zones, and consulted with manufacture for a possible cause of our elevated NO3 numbers. We are also testing a new product to see if it will be more suitable for our denitrification process.
Dorsey Run	T-N	6/7/2008	weekly	mg/l	4.9	4.5	This was a continuation of May's T-N problem that was caused by the carbon source that was being used. We converted to a different product at the beginning of the month and as the T-N numbers were going down, they were not low enough the first few days of July to meet discharge limits for the week. We were forced to find an alternative to methanol for carbon supplementation due to availability issues and price fluctuation.	The current carbon supplement we are using has proven itself to be effective in aiding the de-nitrification process.
Dorsey Run	T-N	10/28/2008	weekly	mg/l	4.6	4.5	While attempting to attain the optimum feed rate for the alternative carbon product to methanol we have been using, the feed rate of the carbon source was lowered to low. We recognized we were beginning to underfeed the carbon source immediately and increased the feed rate, but not in enough time to keep the Total Nitrogen from elevating slightly beyond our permit limit for our weekly average for Total Nitrogen.	The adjustment to the feed rate of the carbon supplement was made.
Dorsey Run	TSS	1/21/2009	weekly	mg/l	46	45	The cause of the non-compliance was the loss of the ability to waste the solids from the 2nd stage clarifier, do to the damage of the recycle/waste pump. Which caused bulking in the 2nd stage clarifier leading to carryover in the effluent.	We have installed a temporary rental pump in place of the damaged pump, and will operate it until the replacement of the recycle/waste pump is installed.
Dorsey Run	T-N	9/1/2010	weekly	mg/l	5.4	4.5	An un-clearable blockage in the return activated sludge line caused the draining of the 1st stage west clarifier on Sept. 20 2010, for the purpose of investigating the blockage. It was discovered that a section of 4" x 4" lumber was stuck in the line, blocking the flow. During the short time that the west train was out of service for the inspection, all of the plant's flow was diverted to the east train, temporarily causing an elevation of our nitrite/nitrates.	The 1st stage west clarifier has been inspected, the problem corrected and the train has been put back in service. This action has balanced out the flow through the plant, allowing the plant to recover it's denitrification process.

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Dorsey Run WWTP	TSS	10/4/2010	monthly	mg/l	86	45	The 1st stage west nitrification clarifier which had been drained during the latter part of September due to an un-clearable blockage in the return activated sludge line and refilling began on November 1st. The filling of that clarifier took about a day and a half and caused a temporary upset within the process causing some solids to carry over until the process stabilized.	The 1st stage west nitrification clarifier has been refilled and a balance has been achieved between the two trains. This balance will ensure a more complete removal of TSS from the process.

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Jessup Correctional Complex

Dorsey Adavanced Wastewater Treatment Plant

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
MES	1992	$2,510,000	Upgrade water service.	
MES	1993	$1,057,000	Upgrade water service.	
MES	1994	$455,000	Design and construct regional sludge treatment facility.	
MES	1996	$950,000	Design and construct improvements to the existing sewer system.	
MES	1997	$700,000	Construct improvements to the exisiting water distribution system.	
MES	1998	$550,000	Dsign and construct improvements to the existing water towers.	
MES	2000	$500,000	Design and construct the Central Regional Sludge Facility.	
MES	2001	$865,000	Design and construct improvements to the sewer system.	
MES	2003	$820,000	Construct improvements to the water and wastewater system.	
MES	2004	$425,000	Construct improvements to the water tower.	
MES	2007	$418,000	Design improvements to the Dorsey wastewater treatment plant.	
MES	2008	$248,000	Design improvements to the Dorsey wastewater treatment plant.	
MES	2010	$4,382,000	Wastewater Plant Upgrade	
	Total:	**$13,880,000**		

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Jessup Correctional Complex

Dorsey Advanced Wastewater Treatment Plant

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
MES/Dorsey Run	Aug-08	$5,000,000	Equipment	Bid Phase
MES/Freedom	Jan-12	$3,955,000	ENR	Pre-Design
MES/Springfield	Jan-06	$4,795,000	WW Collection & W Distribution	98% Complete
	Total:	**$13,750,000**		
	Total:	**$0**		

JESSUP CORRECTIONAL COMPLEX
DORSEY ADVANCED WASTEWATER TREATMENT PLANT

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:

- The existing mechanical bar screen at the MHC pump station cannot remove large debris
- The current grit removal system at the screen and grit pump station has been abandoned
- The diffusers and mixing equipment in the flow equalization tank are inefficient and the flow equalization tanks cannot be safely accessed
- The primary clarifier components are showing signs of age. These include the drive units, skimmer, scrapper, weir plate brackets, scum mixers, and scum mixer supports
- One (1) of existing three (3) blowers is out of service. The second stage tank clarifiers do not have a scum removal system
- The existing filter media and under drain is inefficient
- The drive units on the gravity sludge thickeners are showing signs of age
- The plant does not have a central process control system

Proposed Improvements:

- Replace the existing mechanical screen with 2 new ones that are installed with less of a pitch and are more suitable for removal of large debris
- Install man-ways to allow access to the flow equalization tanks and install liners to prevent corrosion. Also replace the diffusers and remove the mixing equipment
- On the primary clarifiers, replace the skimmers, scrappers, weir plate brackets, scum mixers, and scum mixer supports
- Rebuild the o/s main plant blower and install automated inlet valves, rate control valves, and DO probes
- Add a scum removal system in second stage tanks
- Replace the RAS and WAS pumps. Replace the existing filter media, under drain system on the effluent filters
- Upgrade the existing alum feed system to dose automatically
- Install a standby pump for polymer feed
- Tie the methanol/supplemental carbon pumps to an on-line nitrate analyzer
- Replace the blowers and diffusers in the sludge holding tanks
- Install a new sludge screening system for the sludge holding tank
- Upgrade the HVAC system for the plant Administration building and Blower Building electrical room.
- Install SCADA system

Approximate cost of upgrade: $6 million

WASTEWATER COLLECTION SYSTEM

Conditional Analysis:

- The Perkins Pump Station controls are set in manner that only certain pumps can be operated with emergency generator. If these pumps are down, the emergency generator will not power any pumps
- Pumps Nos.4 and 5 are frequently air bound

Proposed Improvements:

- Install manual transfer switch to allow operation of pump Nos. 1 and 2 from the generator
- Install automatic air release valves for Pump Nos. 4 and 5

Jessup Correctional Complex
Dorsey Advanced Wastewater Treatment Plant

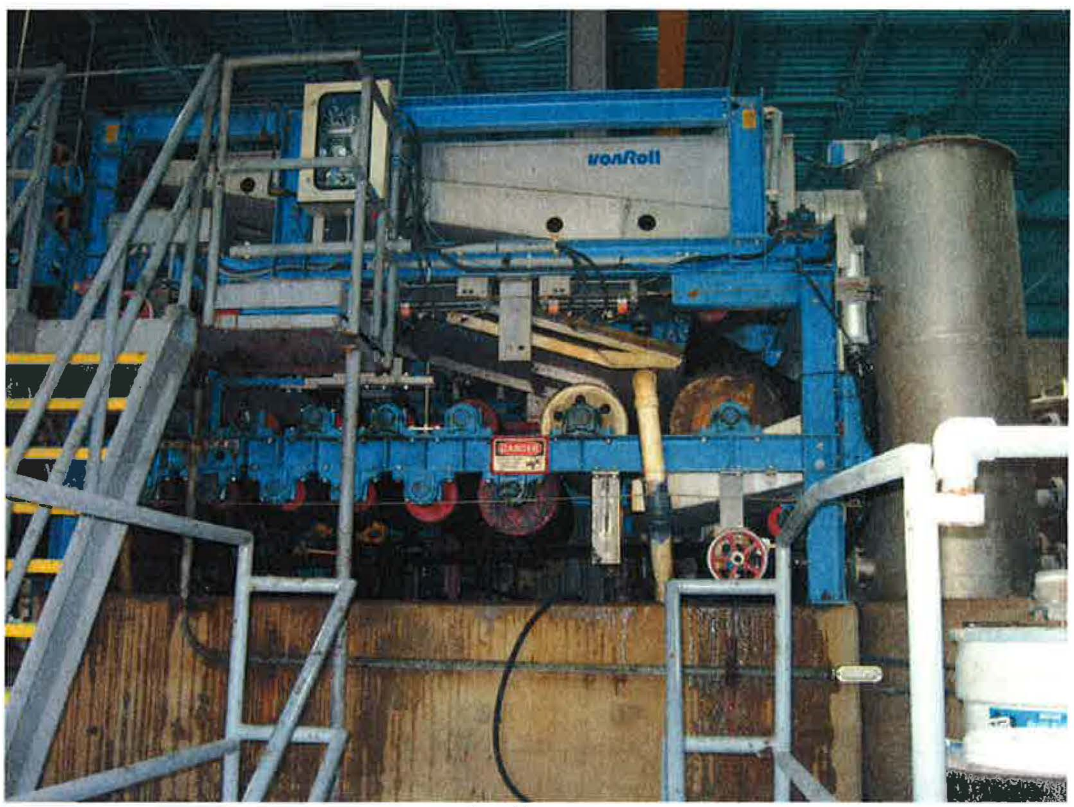
MHC Sewage Pump Station

Flow Equalization Tanks

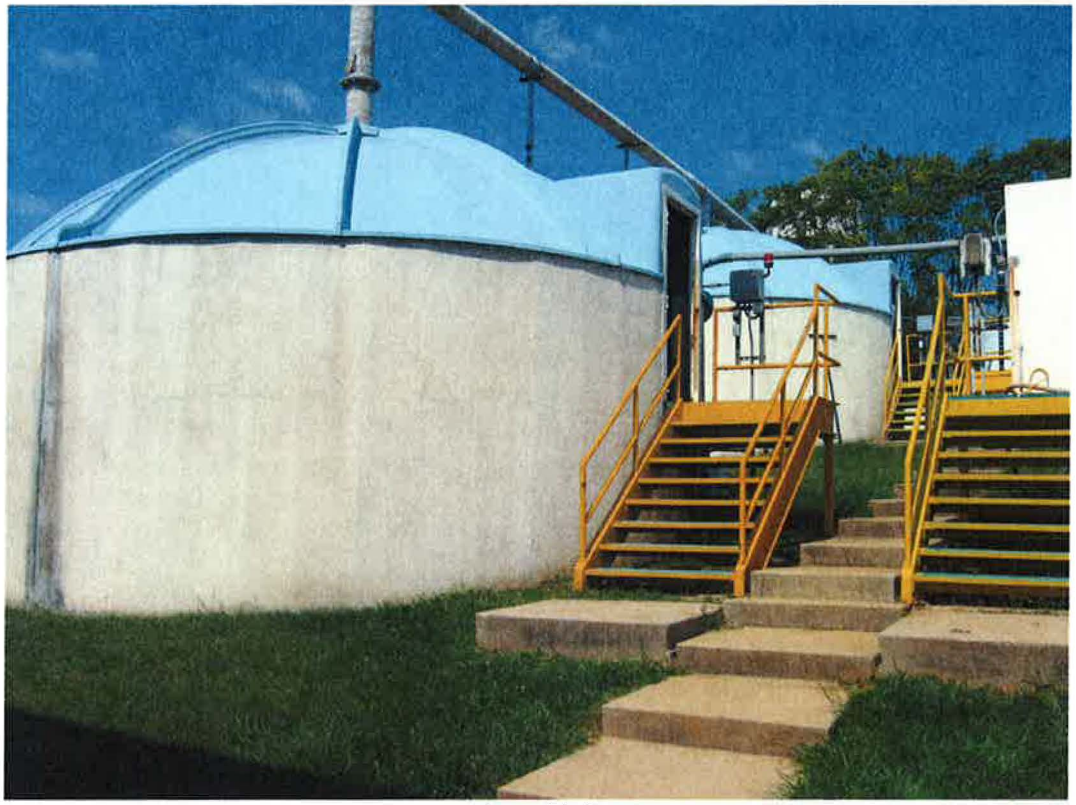

Clarification & Aeration


Filters

UV System

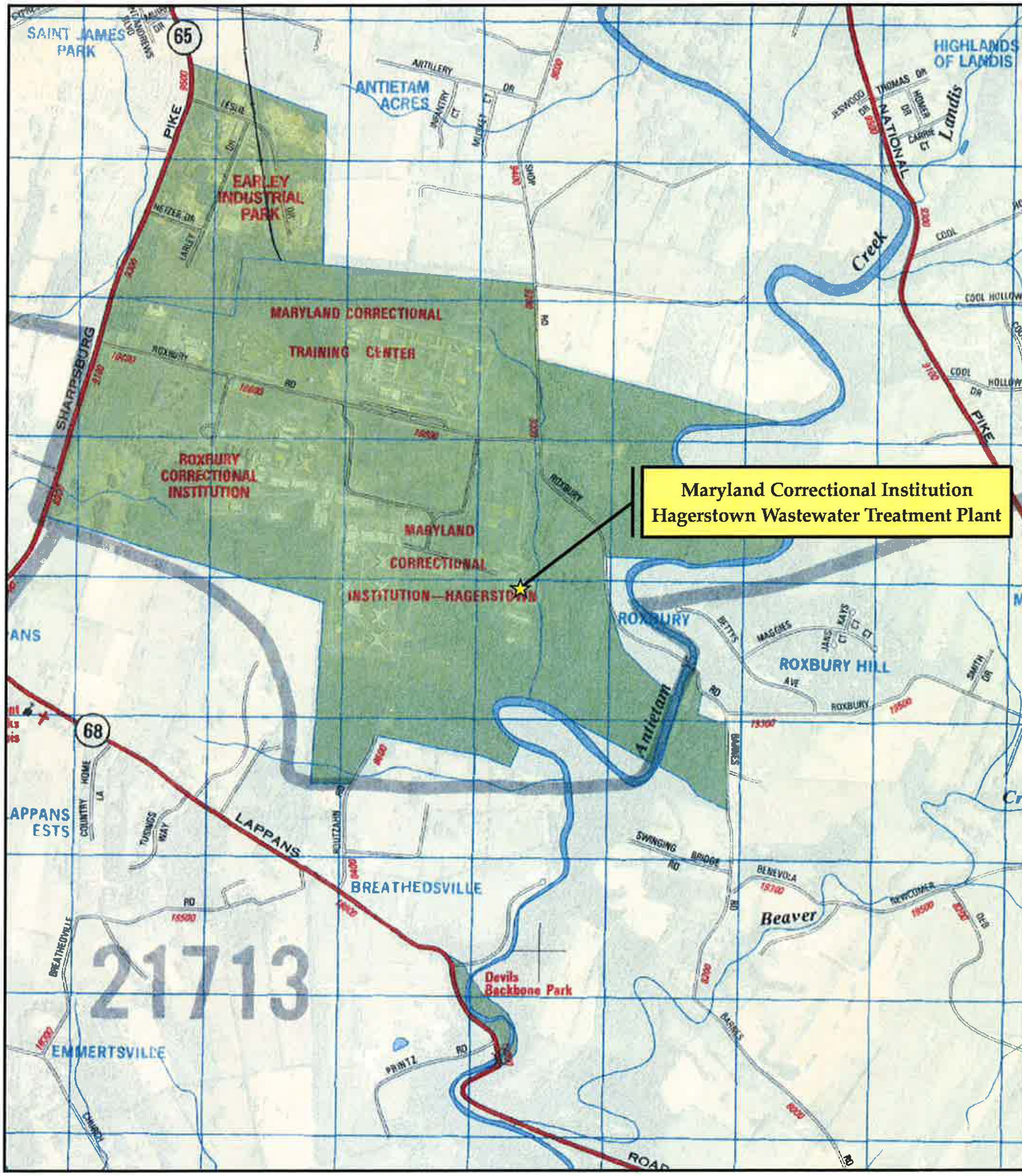


Belt Filter Press


Gravity Thickener


Outfall

Maryland Correctional Institution - Hagerstown



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000 2,500
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

MARYLAND CORRECTIONAL INSTITUTION – HAGERSTOWN

BACKGROUND

The Maryland Correctional Institution (MCI) is a Department of Public Safety and Correctional Services (DPSCS) facility. The complex is located in Washington County, approximately 2½ miles south of Hagerstown on Route 40. MCI is a facility comprised of four (4) penal institutions; the Maryland Correctional Institution-Hagerstown (MCI-H) built in 1941, which includes the Western Program Development Center and the Emergency Housing Unit; The Maryland Correctional Training Center (MCTC), which includes the Work Release Center (WRC) built in 1966; the Roxbury Correctional Institute (RCI) built in 1984; and the HED Donnel Pre-release Center (HED Donnel) built in 1959. Additional inmate housing cell dormitories also exist at the MCI-H, MCTC and RCI facilities. There are approximately 1,677 staff and 6,678 inmates in the complex. The total complex population is 8,355. The prison complex has 61 buildings for diverse uses.

Institution	Facility Design Capacity	Conventional Operating Capacity	Facilities Master Plan Capacity
RCI	912 cells	1,551 beds	N/A
MCI-W	736 beds	835 beds	1,083 beds
MCI -H	810 beds	1,618 beds	N/A
MCTC	1,471 beds	2,585 beds	2,969
WRC	N/A	N/A	N/A
HED Donnel	N/A	N/A	N/A

The 2004 DPSC Master Plan projects the following upgrades and new facilities at **RCI:**

- Design and construct a new Gatehouse, Visitors Registration, Administration, and upgrade perimeter security.
- Expansion of Dining Room and relocation of the medical/dental unit in a newly constructed 7,806 square foot building
- Design and construct new SUI shop

The 2004 DPSC Master Plan projects the following upgrades and new facilities at **MCI-H:**

- Upgrade security systems
- Design and construct new SUI shop and metal plant
- Construct two (2) 224 bed housing units
- Design and construct a new support service building to replace the 70 year old existing building

The 2004 DPSC Master Plan projects the following upgrades and new facilities at **MCTC**:

- Design and construct a new 47,000 square feet, 192 cell housing unit; plus 16,000 square feet of medical and commissary space
- Design and construct a new regional production bakery and renovate the inmate dining area (8,500 square feet)
- Design & construct new SUI shop, graphics shop, and meat plant.
- Replace windows, heating system, plumbing fixtures, and steam and condensate piping

These changes to the facility may increase wastewater flows, but is not expected to significantly impact the existing wastewater treatment plant that is currently rated at 1.6 MGD, which has a current average flows of 1.15 MGD.

The Maryland Environmental Service (MES) operates the wastewater treatment plant only. Water is supplied by the City of Hagerstown. The water distribution and wastewater collection system is operated and maintained by prison complex staff

WASTEWATER FACILITIES DESCRIPTION

WASTEWATER TREATMENT PLANT

The wastewater treatment plant is rated for a design flow of 1.6 million gallons per day and consists of a mechanical bar screen; a screening processing unit; a flow equalization tank; a four-stage bardenpho treatment system unit [two (2) first stage anoxic tanks, two (2) second stage anoxic tanks, four (4) aeration tanks, two (2) re-aeration tanks, four (4) secondary clarifiers, and the associated return and recirculation pumping units]; a gas chlorine disinfection system; chemical feed systems for lime and polyaluminum chloride (Delpak); one (1) sludge thickener; two (2) sludge holding tanks, one (1) aerobic digester; two (2) belt filter presses, and sludge transfer pump stations. Please refer to Supplemental Information Section – Facility Description - WWTP.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

Average and peak sewage flows for the wastewater treatment, in 2010 was 1,1072,224 gallons per day and 1,302,000 gallons per day, respectively. Additional wastewater facilities 2010 operations data is included in Supplemental Information Section.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan and the facility evaluation conducted by an A/E firm, the following deficiencies were identified:

- Disinfection is currently achieved by gas chlorine that is stored in 1-ton cylinders. Gas chlorine can compromise public safety
- Two (2) of the secondary clarifiers are subject to algae growth within their walls, which are often discharged to the effluent causing NPDES violations
- Stringent regulatory requirements to meet lower level of total nitrogen and total phosphorous will require additional treatment units, which are described in the proposed improvements
- The 1200 KVA generator is 26 years old and replacement parts are not available
- The 300,000 gallon standpipe paint is deteriorating
- Storage is not adequate to supply water for a one (1) day period in event of a disruption of water supply from the City of Hagerstown, or break of water main feeding the complex

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The MCI Wastewater Treatment Plant experienced eight (8) violations in the last 15 years. In 1997 and 2000, the plant pH levels were either below or above the permitted range due to operator errors. In 2005 and 2007 chlorine levels were exceeded at the outfall point due to insufficient sulfur dioxide feed, which is used for de-chlorination. In 2007, DO levels were below at the outfall point due to high air and water temperatures. In 2009, effluent chlorine levels were exceeded and the effluent flow meter failed to record total daily discharge flow.

This plant is one of the 66 major WWTP plants required by the Maryland Department of Environment to implement the Enhanced Nutrient Removal (ENR) Program. Under ENR's program, this plant's effluent will be required to meet total nitrogen levels of 3.0 mg/l and total phosphorus levels of 0.3 mg/l. Therefore, additional treatment units such as de-nitrification filters, fermentation tanks, and supplemental carbon feed facilities may be required.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

During 1987, 1988 and 1991, capital improvement requests were made for a total of $6,055,000 for the design and construction of a wastewater treatment. In the period between 1992 and 1994, $4,323,000 in capital improvement requests were made for upgrades to the water service and water distribution system. In the period between 2002 and 2003, capital improvement requests for $994,000 were made for the design and construction of wastewater improvements and an elevated water tank. Capital Improvement funds in the amount of $438,000 were made available in FY 2009 for the design of ENR upgrades. Critical maintenance requests were made between 2002 and 2008 for $32,258 for various improvements. In 1997, critical maintenance requests to the Department of General Services (DGS) were made for $20,000 to demolish the old aerobic digester. This request is waiting for approval. In addition, critical maintenance requests to the DGS were made for $65,360 in 2003, $18,509 in 2006, and $11,615 in 2007 to repair roofs on the maintenance building, the water lab and storage building, to cover effluent weirs for four (4) secondary clarifiers, to finish enclosing the front of sludge storage building and to paint the lime silo. These requests are also waiting for approval. Please refer to Supplemental Information Section – CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

- Replace gas chlorine storage and feed system with UV disinfection units
- Cover the two (2) secondary clarifiers launders
- Install a fermentation tank to enhance biological phosphorous removal and reduce the amount of sludge generated in the chemical phosphorous removal or upgrade chemical feed system for increased sludge removal
- Install de-nitification filters or conventional filters and the associated addition carbon source feed system to further reduce total nitrogen levels discharged into stream
- Install treated wastewater supply system for washing belt and polymer mixing during sludge drying operations
- Replace the existing emergency 1200 KVA generator
- Construct a pole building for storing equipment and chemicals for use by maintenance.
- Paint 300,000 gallon standpipe
- Design and construct new 500,000 gallon elevated storage tank within the complex
- Upgrade the headworks
- Isolate MCC by constructing a "Clean Room" to eliminate exposure to lime dust
- Install truck scale to weigh outgoing processed sludge

The above improvements will be part of a Capital Improvement Request. The total projected cost is **$6,000,000,** which includes design, inspection, testing and construction costs.

Note: The cost estimate is based on 2010 dollars and is subject to change based on implementation schedule, inflation rate, regulatory requirements and other factors that cannot be forecasted at the present time

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2014
- Construction: Fiscal Year 2015

SUPPLEMENTAL INFORMATION

MARYLAND CORRECTIONAL INSTITUTION - HAGERSTOWN

FACILITY DESCRIPTIONS

WASTEWATER TREATMENT PLANT

The Wastewater Treatment Plant is rated for an average design flow of 1.6 MGD. The plant was originally built in the 1970s and was upgraded in 1995. The plant includes the following:

Preliminary Treatment (Headworks)

- Screen:
  - Bar rack: Opening 1½-inch, 24-inch drain plate
  - Mechanical screen: Parkson Aqua Guard, model Aq-MN, opening ¼" inch
- Muffin Monster: Macho Monster- model 4000-
  - Screened material removed is discharged to the muffin monster unit. Effluent from the muffin monster is discharged offsite
- Influent Pump station: three (3), submersible pumps rated at 840 gpm, 3 hp each

Primary Treatment

- Flow Equalization Tank
  - Dimensions: 67.2 ft. in diameter and 7½ ft. deep
  - Working Volume: 0.795 MGD
  - Detention times: 11.9 hrs
  - Mixing: Four (4) 1.8 hp mixers

Biological Treatment

- BNR Process
  - Dimensions/Volume

    1st Stage Anoxic – Two (2) tanks: 29½ ft. long by 36 ft. wide by 12 ft. deep, Volume - 0.0953 MGD ea

    Aerobic – Four (4) tanks: 176 ft. long by 45 ft. wide by 9½ ft. deep, Volume - 0.51 MGD ea

    2nd Stage Anoxic - Two (2) tanks: 32 ft. long by 32 ft. wide by 9.74 ft. deep. Volume - 0.0746 MGD ea

    Re-aeration – Two 92) tanks: 32 ft. long, 8½ ft. wide by 9 ft. deep. Volume - 0.018 MGD
  - Hydraulic detention time

    Anoxic – 0.78 hrs 1st stage, 2.2 hrs 2nd stage

    Aerobic – 9.8 hrs

    Re-aeration – 0.55 hrs
  - Anoxic Tanks
    - Four (4) 5 hp mixers
  - Aeration

    Maximum available flow – 180 scfm

    Mixers: Two (2) 60 hp motors each

    Mixed Liquor Dissolved Oxygen Conc.: 1.0 mg/l

    Waste AS (WAS): 0.039 MGD @ 3% solids

    Return AS (RAS): 0.684 MGD

    Internal Recirculation: 3.456 MGD

- Secondary Clarification
  - No. of Units and Dimensions of Secondary Clarifiers:
    - Four 38 ft diameter with 10 ft SWD
    - Overflow rate at design flows: 353 gpd/ft2
    - Weir rate: 3539 gpd/ft
- Return Activated Sludge, Waste Activated Sludge and Internal Recirculation Pumping Units:
  - RAS pumping units:
    - 2, submersible pumps, each rated at 560 gpm, 7.5 hp
    - 2, submersible pumps, each rated at 560, 10 hp
  - WAS is accomplished by gravity
  - Internal Recycling: submersible. Non clog dry pit each rated at 2200 gpm, 15 hp
- Re-aeration:
  - Type of diffusers – Fine bubble
  - Two (2) 15 hp blowers

Tertiary Treatment

- Disinfection
  - Chlorination:
    - Type: Gas Chlorine
    - Feed rate: 100 lb/d
    - Storage: 1 ton containers
    - Chlorine Contact tank: 55 ft. long, 12 ft. wide, 8 ft. deep, vol = 0.039 MG
    - Detention time: 0.59 hrs
  - De-chlorination:
    - Type: Sulfur dioxide (SO2)
    - Feed rate: 100 lb/d
    - Storage: 1 ton containers

Chemical Feed Systems

- Lime
  - Storage: 2000 cubic feet
  - Lime conveying and feed system: 3000 lb/hr
  - Lime Bin and Hopper: 6000 lbs
  - Screw Feeders: 300 lb per hour
  - Mixers: 7.5 hp
- Lime is injected into biological process to provide alkalinity and pH control
- Polyaluminum chloride
  - Storage: 8000 gallons
  - Chemical metering pump: 30 gpd

Solids Handling

- Gravity Sludge Thickeners
  - Units and Dimensions: One, 20 ft. diameter by 10 ft. SWD
  - Solids loading: 4 lb/d/sf
- Gravity thickeners receive sludge from the secondary clarifiers (WAS). Thickened sludge is conveyed to the sludge holding tanks

- Sludge Holding Tanks
  - Dimensions/Volume: Two (2) , 17 ft. long, 26 ft. wide and 17 ft. deep
  - Centrifugal Blowers: One (1) rated at 25 psig with 40 hp motor
    One (1) rated at 20 psig, with 30 hp motor
- Sludge Transfer Pumps (Sludge Holding Tanks to Aerobic Digesters)
  - Thickened Sludge Pumping units: two (2) pumps rated at 90 gpm @ 48 ft. TDH driven by 5 hp motor
  - Scum Pumping units: Two (2) submersible pumps rated at 40 gpm @ 58 ft. TDH driven by 3 hp motor
- Aerobic Digesters
  - Units and Dimensions: One (1) 55 ft. diameter and 8 ft. deep
  - Volume: 0.142 MGD
  - Air diffusers: Coarse bubble
  - Blowers: Two (2) 25 hp each
- Sludge Transfer Pumps (Aerobic Digester to Belt Filter Press)
  - Pumping units: Three (3), 60 gpm @ 151 ft. TDH, 3 hp ea
- Belt Filter Press
  - Units and Dimensions: Two (2) - one (1) is 1m and other is 2m
  - Solids loading: 1.8% TS
  - Hydraulic loading: One (1) for 40 gpm/meter and other 60 gpm/meter

Emergency Power

- Emergency Generator: One (1), 3 phase, 480 volt, 400 KVA
  One (1), 3 phase, 480 volt, 1200 KVA
- Transfer switches: Two

Effluent for stream discharge: Antietam Creek (Trout Stream)

- BOD: 30 mg/l MA
- TSS: 30 mg/l MA
- Fecal Coliform: 200 MPN/100 ml MA, E-Coli: 126 MPN/100 ml
- TRChlorine: 0.093 mg/l
- DO: 5.0 mg/l minimum, pH: 6.5-8.5
- Ammonia ((May 1 – October 31) = 10.6 mg/l MA, (November 1 – April 30) = 17.0 mg/l MA
- Total Nitrogen: 19,492 lb/yr
- Total Phosphorous: 1,462 lb/yr

Site Name: Maryland Correctional Institution - Hagerstown

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

-Construct improvements to the water tower.

Indicate the Fiscal Year of Previous Funding Rec'd	2002
Amount of Previous CIP Funding	$10,979,000.00
Amount of Current CIP funding	$393,000.00
Anticipated Date for current CIP funding	2003
Estimated future CIP funds needed	
FY that CIP funding is needed	

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
77° 35' 10.77" W	39° 36' 11.77" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request	$32,258.00
Amount of future MM funding needed	$91,484.00
FY that MM funding is needed	1997

Description of MM needs

-Demolish old aerobic digester.
-Cover effluent wiers and launders on 4 second clar.
-Finish enclosing the front of the sludge storage building.

Date of facility SWPPP expiration	
Date of facility SPCC expiration	
Are AST/USTs in compliance with testing reqmts.	
Are Security Measures Adequate?	

	FacilityName	FacilityType	Agency	Region
Details	MCI - Hagerstown	Wastewater System	DPSCS	Western

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: MCI - Hagerstown

Address: 18901 Roxbury Road
Hagerstown, MD 21740

Agency: DPSCS

Region: Western

Annual Average Daily Flow (gal/day)	1,072,224
Peak Day Flow (gal/day)	1,302,000
Ratio Peak Flow to ADD	1.2
WWTP Design/Permit Capacity (gal/day)	1,600,000
% of ADD to Design Capacity	67
NPDES Permit Number	MD0023957 ☐ N/A
State Permit Number	04DP0759 ☐ N/A
NPDES Permit Exp. Date	12/13/2011 ☐ N/A

W/WW Engr. Project Mgt: MFr

Location of Asbuilt Drawings or CDs: 28(A,B,C),9

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Brad	Yeakle	(301) 791-4682	(301) 999-8613
Greg	Brown	(301) 791-4682	(301) 999-8608
Rex	Bowman		(410) 799-7339

Will future limits be more stringent?	
GW Disposal Permit Exp. Date	__/__/____ ☑ N/A
Is more land needed for disposal?	N/A
No. of Sludge Disposal Options available	6
Are additional sludge disposal permits needed?	No
Number of sludge permit violations	0
Number of permit violations	2

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	12/18/2009	cl2	daily	mg/l	0.22	0.1
Details	9/8/2008	CL2	daily	mg/l	2.5	<.10
Details	9/27/2007	cl2	daily	mg/l	0.87	0.093
Details	5/10/2007	DO	daily	mg/l	4.9	5
Details	7/14/2005	CL2	daily	mg/l	0.11	0.1
Details	12/2/2000	pH	daily	su	9	8.5
Details	2/18/1997	pH	daily	su	6.2	6

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
MCI	pH	3/18/1997	daily	su	6.3	6	Overfilled alum tank	None
MCI	pH	12/2/2000	daily	su	9	8.5	The EQ tank emptyed causing a no-flow situation in the mixing zone	SHA plans to review ops of o/w separator
MCI	DO	5/10/2007	daily	mg/l	4.9	5	Low Dissolved Oxygen due to weather related high temperatures and high water temperature	Was- Aeration pumps were installed into the cascade system to increase the D.O. by recuirculating water through the cascade. Is being- Aeration blower was added to the SO2 box in order to increase the D.O. before the cascade aeration.
MCI	cl2	9/27/2007	daily	mg/l	0.87	0.093	Insufficient feeding of sulphur dioxide to neutrilize the amount of chlorine used for disinfection.	WAS - Increase the amount of sulphur dioxide being fed to the system. Unusual amounts of chlorine were fed to the contact tanks durring a shut down of the flow going through the plant. This caused a high residual of chlorine to build up in the contact tanks. The sulphur dioxide feed rate was set to a 1:1 ratio but was not enought to neutralize the high chlorine residual being discharged from the contact tanks.
MCI	CL2	9/8/2008	daily	mg/l	2.5	<.10	Failure of Sulfer Dioxide deChlorination System. Automatic switching valve switched to head that wasn't hooked to a cylinder.	was- Automatic switchover valve was made to switch back to the container with SO2. Tape was also placed over the unhooked feed head so that atmospheric air could not be drawn into the system. This would cause the switchover valve to remain on the head hooked to the full tank.
MCI	cl2	12/18/2009	daily	mg/l	0.22	0.1	Undetermined - Investigation showed no apparent malfunction in equipment, it was possible an oxidative agent was present in the wastewater that caused an erroneous chlorine reading. No changes were made in the process and the second reading showed no chlorine present in the wastewater.	is being -We are monitoring the sulfer dioxide feed system for any malfunctions. We are also looking into purchasing an ORP or Chlorine analyzer upstream of outfall 001 to alert us of possible problems.
MCI WWTP	CL2	7/14/2005	daily	mg/l	0.11	0.1		

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Maryland Correctional Institution - Hagerstown

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
DPSCS	1986	$70,000	Supplement the appropriation "Reslate roof on the Main Building"	
DPSCS	1987	$670,000	Replace steam and condesate lines between Powerhouse and MCI-Hagerstown.	
DPSCS	1987	$95,000	Prepare detailed plans and specifications to expand and upgrade State Use Industries Metal Shop #1	
DPSCS	1987	$40,000	Prepare detailed plans and specifications to expand and upgrade State Use Industries Brush and Carton Shop.	
DPSCS	1987	$40,000	Prepare preliminary plans and specifications to renovate electrical system at main institution.	
DPSCS	1988	$230,000	Design and prepare detailed plans and specifications for renovation of electrical system at the main institution and construct cell door, fire safety and utility improvements.	
DPSCS	1988	$400,000	Convert cal fire boilers to natural gas fired boilers with the capability to burn oil.	
DPSCS	1990	$1,000,000	Electrical system	
DPSCS	1990	$175,000	Close fly ash disposal site	
DPSCS	1991	$3,436,000	Electrical and plumbing system upgrades and cell door replacemetn	
DPSCS	1992	$2,315,000	Electrical and plumbing systems upgrade and cell door replacement.	
DPSCS	1993	$2,020,000	Cell door, fire safety, and utility improvements.	
DPSCS	1994	$3,413,210	Construct cell door, fire safety, and utility improvements.	
DPSCS	1995	$1,654,000	Provide funds to design and construct cell door, fire safety and utility improvements.	
DPSCS	1996	$4,330,000	Provide funds to design and construct cell door, fire safety and utility improvements.	
DPSCS	1997	$95,000	Prepare detailed plans to construct and expansion of the State Use Industries upholstry shop.	

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
DPSCS	1998	$887,000	Construct and provide capital equipment for an expansion of the State Use Industries Upholstery Shop.	
DPSCS	2005	$1,754,000	Provide funds to design/build a State Use Industries Warehouse addition.	
	Total:	**$22,624,210**		
MES	1987	$100,000	Design and prepare detailed plans and specifications for improvements to wastewater treatment plant.	
MES	1988	$546,000	Construct improvements to wastewater treatment plant.	
MES	1992	$2,683,000	Upgrade water service and acquire any necessary easements.	
MES	1991	$5,409,000	Wastewater treatment plant.	
MES	1993	$985,000	Design and construct improvements to water distribution system.	
MES	1994	$655,000	Design and construct improvements to water distribution system.	
MES	2002	$601,000	Design and construct improvements to the wastewater treatment facility.	
MES	2003	$393,000	Construct improvements to the water tower.	
MES	2009	$438,000	Design ENR improvements to wastewater facility	
	Total:	**$11,810,000**		

MARYLAND CORRECTIONAL INSTITUTION - HAGERSTOWN

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:

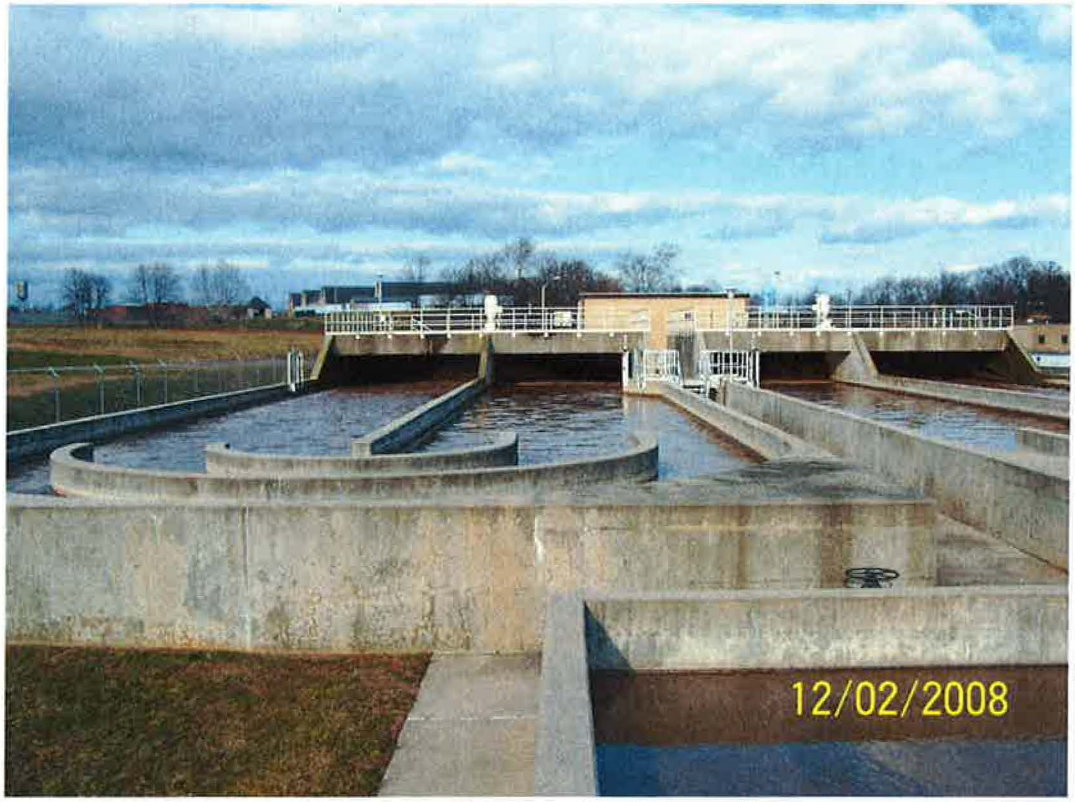
- Disinfection is currently achieved by gas chlorine that is stored in 1-ton cylinders. Gas chlorine can compromise public safety
- Two (2) secondary clarifiers are subject to algae growth within their walls, which are often discharged to the effluent causing NPDES violations
- Stringent regulatory requirements to meet lower levels of total nitrogen and total phosphorous will require additional treatment units described in proposed improvements
- The 1200 KVA generator is 26 years old and replacement parts are not available

Proposed Improvements:

- Replace gas chlorine storage and feed system with UV disinfection units
- Cover two (2) secondary clarifiers launders
- Install fermentation tank to enhance biological phosphorous removal and reduce sludge generated in chemical phosphorous removal
- Install de-nitification filters and associated carbon source feed system to reduce further total nitrogen levels discharged into stream
- Install treated wastewater supply system for washing belt and polymer mixing during sludge drying operations
- Replace existing emergency 1200 KVA generator
- Construct a new maintenance building
- Install a truck scale for weighing sludge that is being taken offsite

Maryland Correctional Institution - Hagerstown

WASTEWATER TREATMENT PLANT



BNR Aeration (Bardenpho) Tank

BNR Secondary Anoxic Tank

WASTEWATER TREATMENT PLANT

Chlorine and Sulfur Dioxide Treatment Units

Clarifiers # 3 and 4

WASTEWATER TREATMENT PLANT

Flow Equalization Tank

Headworks Muffin Monster and Bar Screen

WASTEWATER TREATMENT PLANT

New Belt Filter Press

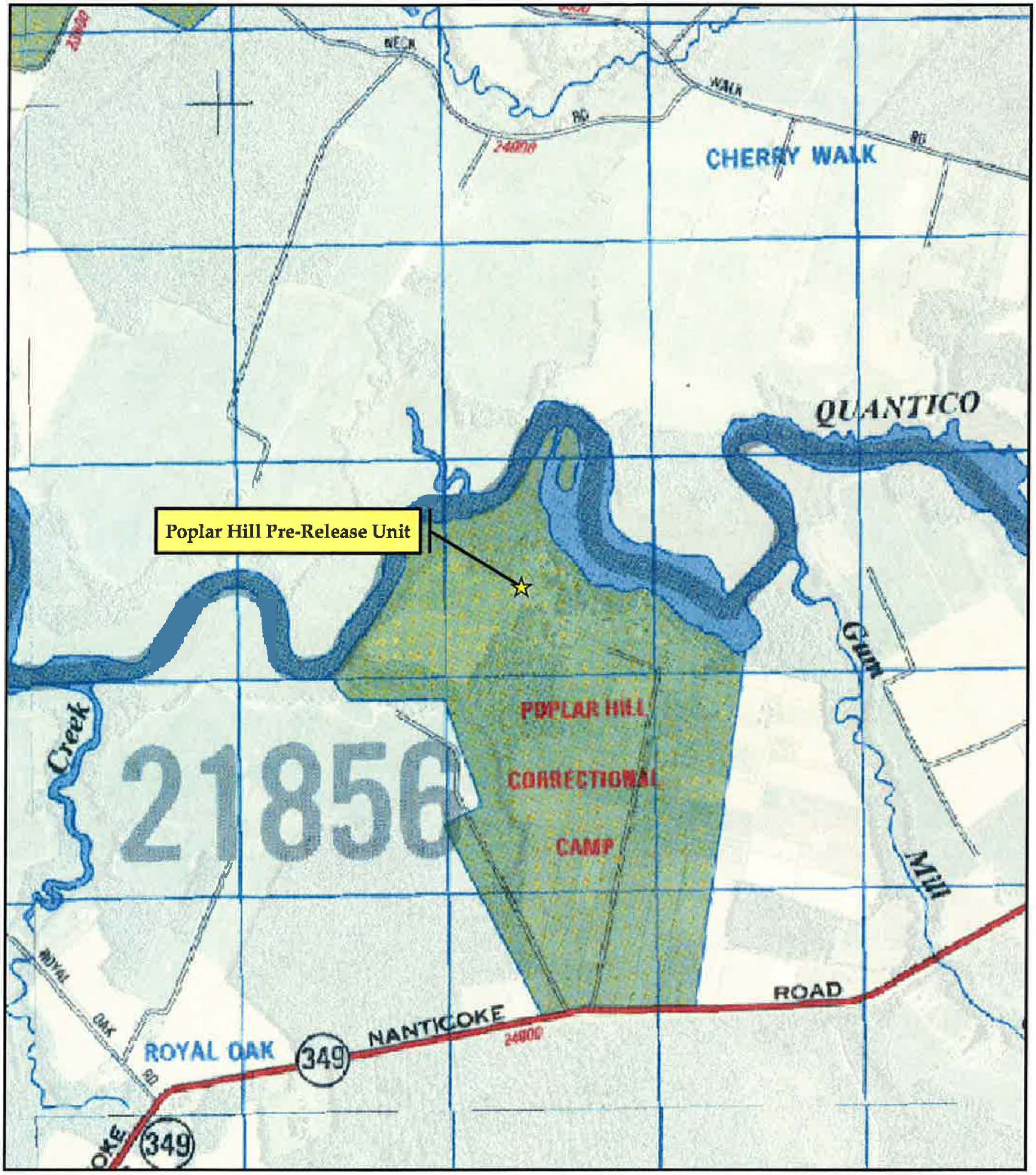
Processed Sludge Holding Building

WASTEWATER TREATMENT PLANT

WAS Thickener

WAS Sludge Holding Tank

Poplar Hill Pre-Release Unit



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

POPLAR HILL PRE-RELEASE UNIT

BACKGROUND

The Poplar Hill Pre-Release Unit (PHPRU), in Wicomico County, is a Department of Public Safety and Correctional Services (DPSCS), Division of Corrections prison complex. The complex is located approximately 11 miles west of Salisbury, off Maryland Route 349.

The PHPRU is open year-round and houses an average of 160 prisoners and a staff of 18. The staff at the facility includes guards, counselors, administrators, and food service personnel. The complex consists of a building with six (6) wings that includes administration offices. There is also a maintenance and training building on site.

The 2004 DPSCS Master Plan projects the replacement of windows and the installation of fire safety equipment. No impact to the water and wastewater facility capacity is expected.

Maryland Environmental Service operates the water treatment plant and the wastewater treatment plant.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The PHPRU water system consists of three (3) drilled wells, a treatment facility, a 15,000-gallon hydropneumatic tank, an 80 KW emergency generator, and a distribution network. The water treatment plant is design rated at 35,000 gpd. The treatment facilities consist of two (2) manganese zeolite (greensand) filters; chemical feed units for potassium permanganate, lime, polyorthophosphate and gas chlorination units housed in a 34 ft. long by 20 ft. wide concrete building. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

PHPRU has three (3) drilled wells. Two (2) of the wells are located adjacent to the prison parking lot. The third well is in the process of being abandoned. The water distribution system consists of a 15,000-gallon hydropneumatic tank and approximately 1,000 feet of water distribution mains and service lines. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

C. WASTEWATER TREATMENT PLANT

The PHPRU wastewater treatment plant is design rated for an average flow of 25,000 gallons per day and consists of a 2,500 gallon septic tank, a bar rack, an ultrasonic flow meter, a 1.44 million gallon facultative lagoon, a transfer pump station from the facultative lagoon to a storage pond, a 1.5 million gallon storage pond, a transfer pump station from the storage pond to spray fields, gas chlorination units, and 3.82 acres of spray fields. Please refer to Supplemental Information Section – Facility Description - WWTP.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average and peak water flows for the water treatment were 25,000 gallons per day and 55,000 gallons per day, respectively. For the wastewater treatment plant, 2010 average and peak flows were 37,000 gallons per day and 22,000 gallons per day, respectively. Additional water and wastewater facilities operations data is included in Supplemental Information Section.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

- The roof, drywalls, joint between the concrete pad and the walls of the wastewater treatment plant controls building are in poor condition
- The hatch for the transfer pump station, from the storage pond to the spray fields, is damaged
- The greensand filters at the water treatment plant are in poor condition and are inadequate. The greensand filters and the filter's influent and effluent piping are being replaced under current funding. In addition, a filter automated backwsh system is being installed

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

PHPRU water and wastewater treatment plants have not experienced any violations in last 15 years. However, in 2007, the water withdrawn from wells have exceeded groundwater appropriation permit. Request for increase in groundwater allocation will be required. No additional requirements are expected by future regulations.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In the period between 1989 and 1991, $868,000 in capital improvement requests were made for the design and construction of the water treatment plant. In the period between 1993 and 1994, capital improvement requests for $285,000 were made for the design and construction of wastewater treatment plant improvements. In 2005, a capital improvement request for $410,000 was made for improvements to the water distribution and wastewater collection system. In 2006 a critical maintenance request to Department of General Service (DGS) was made for $35,000 for a basket strainer and spare pumps for the lagoon and storage pond. No funds have been received for this critical maintenance request. Currently, critical maintenance requests to DGS are being made for $22,000. This request is waiting for approval. Please refer to Supplemental Information Section – CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

- Repair concrete roof, replace drywalls, and repair the joint between the concrete pad walls at the WWTP controls building
- Replace the hatch for the transfer pump station between the storage pond and spray field

The above improvements will be part of a Critical Maintenance Request. The total projected cost is **$47,000,** which includes design, inspection, testing and construction costs.

Note: The cost estimate is based on 2008 dollars and is subject to change based on implementation schedule, inflation rate, regulatory requirements and other factors that cannot be forecast at the present time

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2017
- Construction: Fiscal Year 2018

SUPPLEMENTAL INFORMATION

POPLAR HILL PRE-RELEASE UNIT

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The water system consists of three (3) drilled wells, a treatment facility, a 15,000-gallon hydropneumatic tank, an 80 KW emergency generator, and a distribution network.

Well No. 1 - The source is currently in the process of being abandoned. The well, drilled in 1984, is 8-inches in diameter and has a total depth of 45 feet. It is provided with 8-inch steel casing. The well has presumed yield of 100 gpm. The well pump information is unknown. The static water level is at 6 feet. The pump is set at an unknown depth

Well No. 2 - This well is located in a grassy area adjacent to the prison parking lot. The well, drilled in 1988, is 8-inches in diameter and has a total depth of 105 feet. It is provided with 8-inch casing. The well has a presumed yield of 65 gpm. Water is pumped from the well by a 5 hp submersible pump capable of delivering 100 gpm. The static water level is 9 ft. The pump is set at 63 ft. and was installed in 1988.

Well No. 3 - This well is located in a grassy area adjacent to the prison parking lot. The well was drilled in 1988. The well is 8-inch in diameter and has total depth of 105 feet. It is provided with 8-inch casing. The well has a presumed yield of 65 gpm. Water is pumped from the well by a 5 hp submersible pump capable of delivering 100 gpm. The static water level is 9 ft. The pump is set at 63 ft. and was installed in 1988.

Water from all the wells, after being treated, is discharged into a 15,000-gallon hydropneumatic tank, which provides storage and pressure to the distribution network.

The facility has approximately 1,000 feet of water distribution main and service lines.

WATER TREATMENT

The water system consists of three (3) drilled wells, a treatment facility, a 15,000-gallon hydropneumatic tank, an 80 KW emergency generator, and a distribution network.

The water treatment plant is design rated at 35,000 gpd. Treatment facilities consist of two (2) manganese zeolite (greensand) filters; chemical feed units for potassium permanganate, lime, polyorthophosphate; and gas chlorination units housed in 34 ft. long and 20 ft. wide concrete building.

Each greensand filter unit is 5 ft. in diameter and has an area of 20 square feet. Each unit is rated for a design flow of 70 gpm and a filtration rate of 3.5 gpm/ft^2.

The chemical feed facilities for potassium permanganate consist of a 55-gallon day tank and a chemical metering pump rated at 12 gpd @ 80 psi. Lime is stored in a 55-gallon day tank and is fed by a 12 gpd @ 80 psi metering pump. Polyorthophosphate is stored in a 50-gallon day tank and is fed by a 1.5 gpd @ 100 psi chemical metering pump. Gas Chlorination facilities are rated at 10 lb/d and include 150 lb. cylinders, a 5 gpm @ 230 ft. TDH booster pump, a vacuum regulator, an automatic switchover, an ejector, a rotameter, a solenoid valve, a gate valve, a pressure gauge, a cylinder repair kit, a panic hardware, a chlorine scale, vent, a leak detection alarm and ammonia, an outside entrance/exit, cylinder chains, and a gas-tight room.

The 15,000-gallon hydropneumatic tank is 8 ft. in diameter and 40 ft. long. It is equipped with a 15 hp compressor. The hydropneumatic tank provides storage and pressure to the distribution network.

The plant is equipped with an emergency generator rated for 80 KW and an associated 500-gallon fuel tank.

WASTEWATER TREATMENT

The Poplar Hill Pre-Release Unit wastewater treatment plant (WWTP) was constructed in 1989 and is rated for average design flow of 25,000 gpd. The plant consists of the following:

Preliminary Treatment
Preliminary treatment consists of a 2,500-gallon septic tank, which settles solids. The septic tank is designed for a 2 hr. detention time and a 300 gpd/ft^2 overflow rate. The pump-out frequency of the septic tank is approximately three (3) months. The effluent of the septic tank is conveyed to a channel that has a bar rack and an ultrasonic flow meter prior to entering the facultative lagoon. The controls building near flow meter is 20 ft. long and 12 ft. wide and is equipped with two (2) heaters rated at 1,875 watts, one (1) heater rated at 750 watts, and an exhaust fan.

Biological Treatment and Land Disposal
A facultative lagoon administers biological treatment. The facultative lagoon is rated for 1.44 million gallons, has an area of 1.1 acres and is approximately 4 ft. deep. The facultative lagoon has four (4) sections. Two (2) sections of the lagoon provide an aerobic environment. One (1) of these two (2) section has three (3) surface aerators rated for 2 hp each and the other has a single surface aerator rated at 2 hp. Combination of aerobic (upper layer), anaerobic (lower layer) and facultative (transitional layer) provides biological treatment. Effluent from the facultative lagoon passes over an adjustable weir at the outlet structure and is transported by gravity to pumping station No.1. The duplex submersible pump station No. 1 consists of an 8-foot diameter wet well, and two (2) 150 gpm @ 20 ft. TDH pumps with ½ hp motors that discharge to a 1.5 million gallon holding pond through a 4-inch PVC force main. The holding pond is 10 ft. deep and provides storage for 60 days. The effluent flows from the holding pond to Pump Station No.2, by gravity through an 8-inch gravity sewer. The duplex submersible pump station No. 2 consists of an 8-foot diameter wet well, and two (2) 230 gpm @ 70 ft. TDH pumps with 10 hp motors that discharge to a 3.82 acre spray irrigation field through a 6-inch PVC force main. The spray irrigation system consists of two (2) aerial spray pivots which discharge, on average, approximately 50,000 gpd in a 5-day period. The maximum hydraulic loading for the spray field is 2-inches per week in annual basis.

Tertiary Treatment
Gas chlorine is fed at the effluent of pump station No.1 at dosage of 6 mg/l and again at the effluent of pump station No.2 at dosage of 4 mg/l. Gas chlorine feed facilities consist of 150 lb. chlorine cylinders, a vacuum regulator with a gas flow meter rate valve vent, an ejector/diffuser, beam scales, a ¾ hp booster pump for pump station No. 1, 1-1/2 hp booster pump for pump station No. 2, and a solenoid valve and backflow preventers. Each chlorine feed facility is rated

for 100 pounds per day. Each of the chlorine buildings is equipped with 1500-watt electric heaters and 520 cfm exhaust fan.

The Groundwater Permit allows the following effluent parameters:

Monthly Averages:

- BOD: 70 mg/l
- Suspended Solids: 90 mg/l
- pH: 6.5 to 8.5
- Fecal Coliform: < 200 MPN/100 ml
- Flow: 30,000 gpd

Site Name: Poplar Hill Pre Release Unit

Background

File Link to Facility Photos

Open

Describe CIP of MM work currently in progress

-Design and construct improvements to the water distribution and wastewater collection systems.

Indicate the Fiscal Year of Previous Funding Rec'd: 1994

Amount of Previous CIP Funding: $1,153,000.00

Amount of Current CIP funding: $410,000

Anticipated Date for current CIP funding: 2005

Estimated future CIP funds needed:

FY that CIP funding is needed:

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
75° 44' 30.43" W	38° 18' 24.80" N

Conditional Analysis | CIP Funding

Description | MM Funding

Amount of Current Major Maint. funding request: N/A

Amount of future MM funding needed: $57,000.00

FY that MM funding is needed: 2006

Description of MM needs

-Basket strainer installation for spray fields.
-Spare pumps for process lagoon and spray lagoon.
-Replace floats on 5 surface aerators.

Date of facility SWPPP expiration:

Date of facility SPCC expiration:

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Poplar Hill Pre-Release Unit	Water System	DPSCS	Eastern
Details	Poplar Hill Pre-Release Unit	Wastewater System	DPSCS	Eastern
Details	Poplar Hill Pre Release Unit 2	Water System	DPSCS	Eastern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Poplar Hill Pre-Release Unit

Address
24094 Nanticoke Road
Quantico, MD 21856

Comments:

Agency: DPSCS

Region: Eastern

Average Daily Demand (ADD) (gal/day)	37,079
Peak Day Demand (gal/day)	65,000
WTP Design Capacity	35000
Total No. of Wells	2
Average Daily Run Time of Wells (Hrs)	7
Capacity w/ largest Well Offline	35,000
GW Appro. Permit Number (GAP)	WI1959G001(07) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	35,000
% of ADD to GAP	106%
General Discharge Permit Number	06HT9547

W/WW Engr. Project Mgt: MM

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Troy	Tilghman	(410) 651-4659	(410) 271-7460
Gregg	Kemp	(410) 651-4659	(410) 330-4598
Rex	Powell	(410) 651-4659	(410) 507-8489

Surface Water Appr. Permit Number	( ) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	
Days of Storage at ADD	
PDWIS WTP Number	022-0003
Appropriation Permit Exp. Date	6/1/2019 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

Facility Name: Poplar Hill Pre-Release Unit

Address: 24094 Nanticoke Road

Quantico, MD 21856

Agency: DPSCS

Region: Eastern

Annual Average Daily Flow (gal/day): 26,689

Peak Day Flow (gal/day): 222000

Ratio Peak Flow to ADD: 8.3

WWTP Design/Permit Capacity (gal/day):

% of ADD to Design Capacity:

NPDES Permit Number: ☐ N/A

State Permit Number: 07DP2250 ☐ N/A

NPDES Permit Exp. Date: ☐ N/A

W/WW Engr. Project Mgt: MM

Location of Asbuilt Drawings or CDs: 49

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Troy	Tilghman	(410) 651-4659	(410) 271-7460
Gregg	Kemp	(410) 651-4659	(410) 330-4598
Rex	Powell	(410) 651-4659	(410) 507-8489

Will future limits be more stringent?

GW Disposal Permit Exp. Date: Draft ☐ N/A

Is more land needed for disposal?

No. of Sludge Disposal Options available: 0

Are additional sludge disposal permits needed? Yes

Number of sludge permit violations: 0

Number of permit violations

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	1/30/2009	pH	daily	su max	8.7	8.5
Details	1/29/2009	pH	daily	su max	8.6	8.5
Details	1/25/2001	General	monthly			

Facility Name: Poplar Hill Pre Release 2

Address: 24094 Nanticoke Road, Quantico, MD 21856

Comments:

Agency: DPSCS

Region: Eastern

Average Daily Demand (ADD) (gal/day)	0
Peak Day Demand (gal/day)	0
WTP Design Capacity	35000
Total No. of Wells	2
Average Daily Run Time of Wells (Hrs)	
Capacity w/ largest Well Offline	
GW Appro. Permit Number (GAP)	WI1984G008(04) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	5,000
% of ADD to GAP	0%
General Discharge Permit Number	06HT9547

W/WW Engr. Project Mgt: MM

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Troy	Tilghman	(410) 651-4659	(410) 271-7460
Gregg	Kemp	(410) 651-4659	(410) 330-4598
Rex	Powell	(410) 651-4659	(410) 507-8489

Surface Water Appr. Permit Number	____(_) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	
Days of Storage at ADD	
PDWIS WTP Number	022-0003
Appropriation Permit Exp. Date	6/1/2019 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Poplar Hill	General	1/25/2001	monthly				Spraying on un-vegetative soil	Construction of wetland treatment system.
Poplar Hill	pH	1/29/2009	daily	su max	8.6	8.5	Chemical feed pump malfunction.	The Operator has rebuilt the chemical feed pump.
Poplar Hill	pH	1/30/2009	daily	su max	8.7	8.5	Chemical feed pump malfunction.	The Operator has rebuilt the chemical feed pump.

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Poplar Hill Pre-Release Unit

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
MES	1989	$80,000	Design and prepare detailed plans and specifications for improvements to the water treatment plant and raw source water supply.	
MES	1991	$788,000	Poplar hill water treatment plant.	
MES	1993	$52,000	Design improvements to wastewater treatment plant.	
MES	1994	$233,000	Construct improvements to wastewater treatment plant.	
MES	2005	$410,000	Design and construct improvements to the water distribution and wastewater collection systems.	Project Completed
	Total:	**$1,563,000**		

POPLAR HILL PRE-RELEASE UNIT

CONDITIONAL ANAYLYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:
- Concrete roof at Controls building is not structurally sound and is in poor condition
- Drywalls are in poor condition at Controls building
- Area between concrete pad and walls shows signs of leakage
- Lid for vault near pump station No. 2 is bent and not functioning as intended

Proposed Improvements:
- Repair concrete roof at controls building
- Replace drywalls at controls building
- Re-mortar joint between concrete pad and walls
- Replace lid for vault near pump station No. 2

WATER TREATMENT PLANT

Conditional Analysis:
- No issues reported

Proposed Improvements:
- None

WATER SOURCE

Conditional Analysis:
- No issues reported

Proposed Improvements:
- None

WATER DISTRIBUTION

Conditional Analysis:
- No issues reported

Proposed Improvements:

- None

Poplar Hill Pre-Release Unit

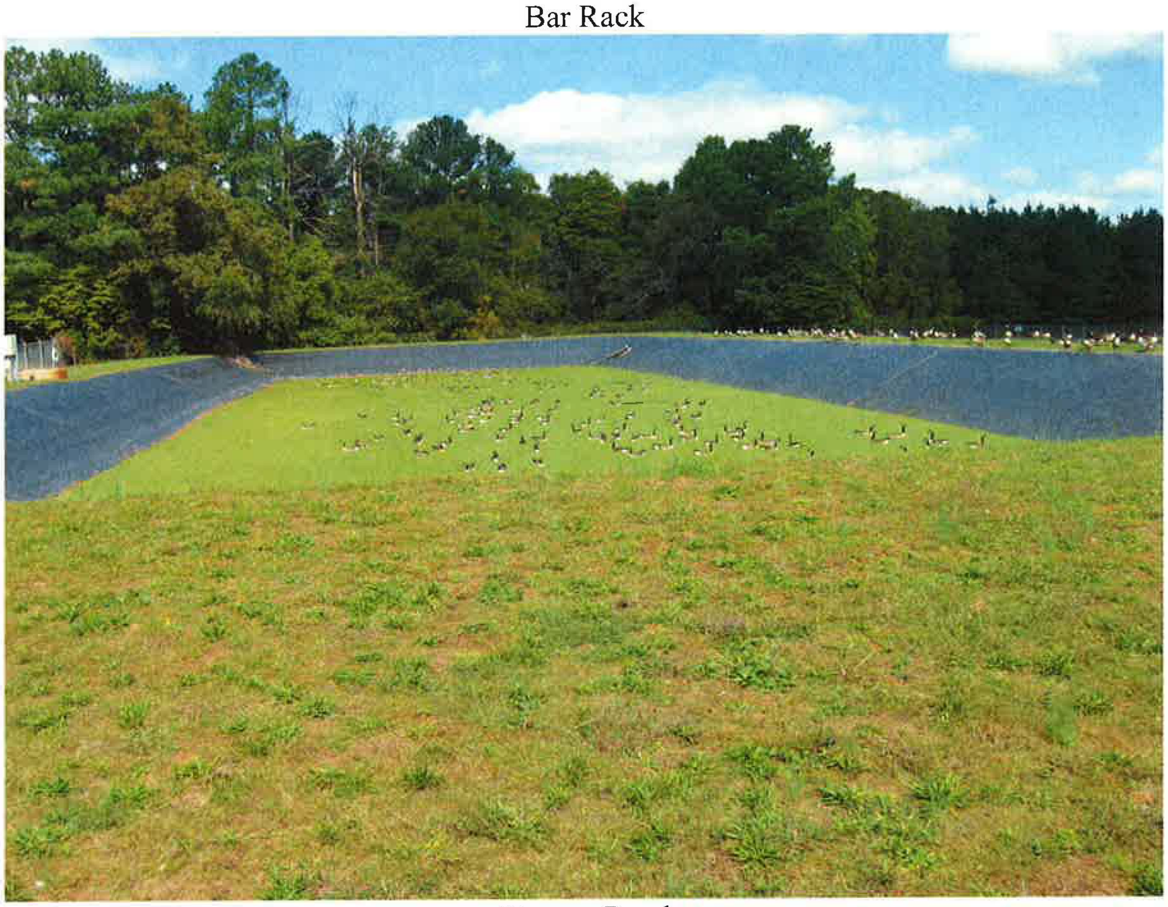
WWTP

Spray Fields

Facultative Lagoon

WWTP

Bar Rack



Storage Pond

WTP

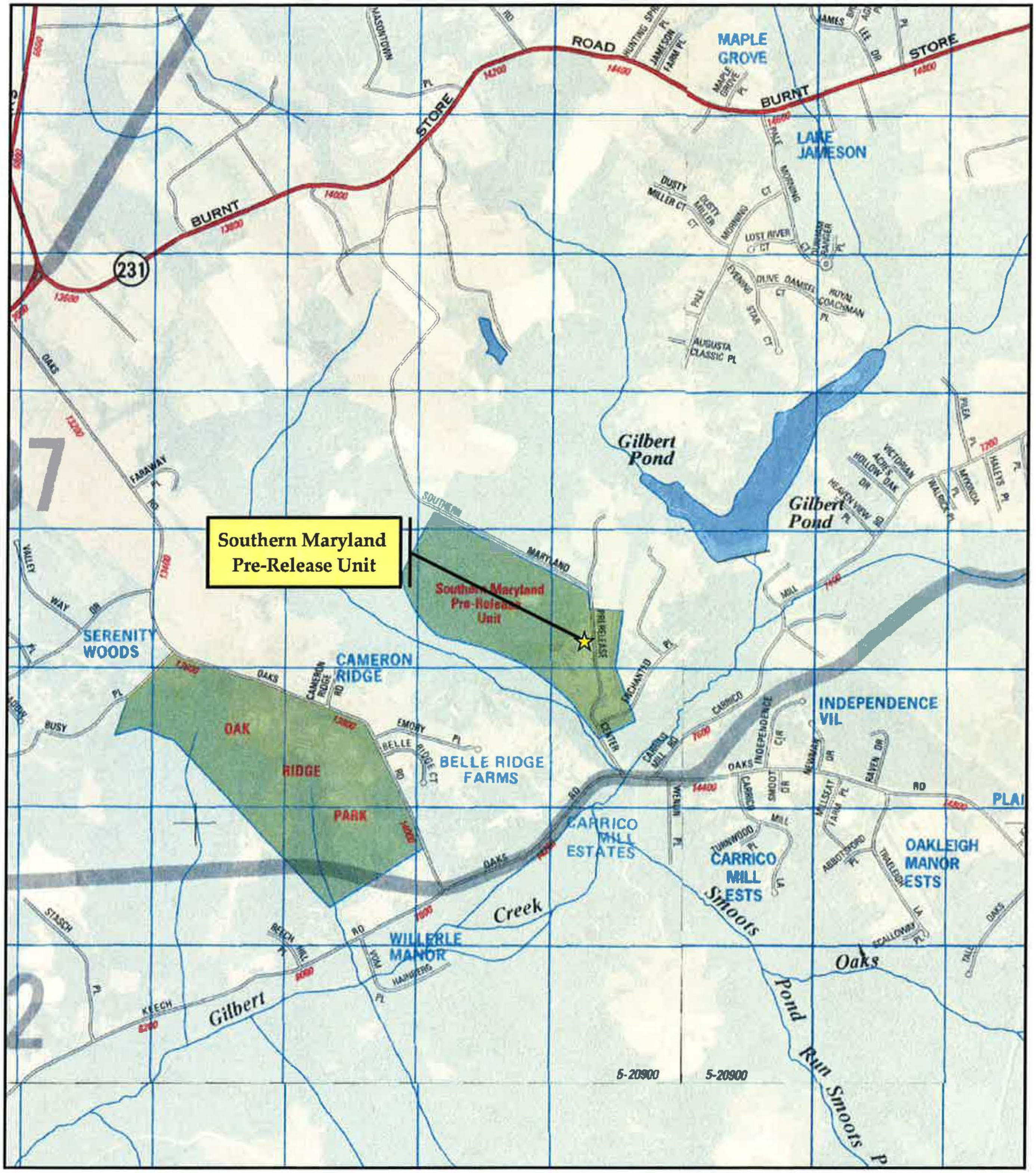
15,000-gallon Hydropneumatic Tank

Greensand Filters

WTP

Water Treatment Plant Overview

Southern Maryland Pre-Release Unit



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE GIS SERVICES

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000 2,500
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

SOUTHERN MARYLAND PRE-RELEASE UNIT

BACKGROUND

The Southern Maryland Pre-Release Unit (SMPRU) is a prison complex under the Department of Public Safety and Correctional Services (DPSCS). The complex is located in Charles County, between Hughesville and Charlotte Hall, near the intersection of Carrico Mill and Oaks Roads.

According to DPSCS, SMPRU has a design capacity of 120 beds and a conventional capacity of 180 beds. The complex is open year-round and houses an average of 176 prisoners and a staff of 10. The complex consists of an administration building and a prisoner's dormitory. Staff at the facility includes guards, counselors, administrators, and food service personnel.

The 2004 DPSCS Master Plan projected renovations to the kitchen dining area. The addition will not impact the current available capacity of water and wastewater treatment facilities.

Maryland Environmental Service (MES) operates the water treatment plant and the wastewater treatment plant.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The SMPRU water system consists of two (2) drilled wells, a treatment facility, a 10,000-gallon hydropneumatic tank, and a distribution network. The water treatment facilities, rated at 220 gpm, consist of two (2) softening units and gas chlorination units housed in a 30 ft. long by 15 ft. wide brick building. Please refer to the Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

SMPRU has two (2) drilled wells. Well No. 1 is located beside the administration building and Well No. 2 is located behind the administration building. The water distribution system consists of a 10,000-gallon hydropneumatic tank and approximately 500 feet of water distribution mains and service lines. Please refer to Supplemental Information Section – Facility Description – WS&WD.

C. WASTEWATER TREATMENT PLANT

The SMPRU wastewater treatment plant is rated for a design average flow of 20,000 gallons per day and a peak flow of 80,000 gallons per day. The plant consists of a manual bar screen, a flow meter, an extended aeration package unit (surge tank, aeration tank, aerobic digester, clarifier), chlorination/dechlorination units, a treated water storage pond, and 3-acres of spray irrigation fields. Please refer to Supplemental Information Section – Facility Description - WWTP.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, average and peak water flows for the water treatment plant were 22,961 gallons per day and 35,000 gallons per day, respectively. Average and peak flows for the wastewater treatment plant, in 2010, were 5,427 gallons per day and 34000 gallons per day via stream discharge and an average flow of 25,480 gallons per day and a peak flow rate of 96,000 gallons per day to the spray irrigation fields, respectively. Additional water and wastewater facilities 2010 operations data is included in the Supplemental Information Section.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

Wastewater Treatment Plant

- Grinder unit is old and is operating poorly
- The existing DAVCO extended aeration unit is in poor condition. Below are listed deficiencies:
    - Grates covering the unit are in need of re-coating to slow the effects of corrosion
    - Splitter box with V notch weir exterior is severely corroded. Return activated and waste activated sludge pipes are in very poor condition and have reached high degree of corrosion. These pipes are very important for efficient treatment process
    - The existing froth line shows high degree of rusting
    - Currently the plant has two (2) blowers in operation and no spares at the site for replacement should any one (1) blower break down. A spare blower stored at the site may avoid disruption of the treatment process
    - Several areas of the treatment plant exposed to the atmosphere are rusting
- Booster pumps for chlorination and de-chlorination and associated piping are also showing severe corrosion, primarily due to exposure to chlorine and weather
- Existing office trailer has leaking windows. Spare parts and other accessories are stored in front of main electrical panel
- Diesel generator base is corroded and appears to be unsafe
- Generator electrical panels are rusted
- Wind Rose tower uprooted from base. Presently leaning on the office trailer
- Treated wastewater is stored in a pond that is rated for 8 days of storage. Currently the pond has vegetation growing. This has caused the storage capacity of the pond to decrease significantly
- Currently only one (1) out of the two (2) spray field pumps is operational. The transmission piping to the spray field is laid above ground and has ruptured several times during cold weather
- Piping network (PVC) in spray irrigation fields damaged from falling trees and sunlight. Temporary repairs done in the past
- Transmission pipe/s (flexible hose) also damaged at several locations

Wastewater Collection System

- Some I/I reported by Operations Staff. Heavy grease in wastewater reaching treatment facility

Water Treatment Plant

- Cleanout (outside plant) cap broken
- High humidity inside treatment building

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The SMPRU wastewater treatment plant has experienced four (4) violations in the last 15 years. All of the violations resulted from the plant exceeding BOD and TSS due to operator error (over wasting of mixed liquor). A draft version of the stream discharge permit was received by MES in July 2011. The draft is essentially unchanged from the current permit which expired in 2009. The spray irrigation discharge permit is up for renewal in 2012.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In 1991, $684,000 in capital improvement requests was made for the design and construction of the water treatment plant. During the period between 2002 and 2008, critical maintenance requests were made for $39,143 to replace gas chlorination and gas dechlorination units with liquid chlorination and dechlorination. The work has been completed. In 2003, a critical maintenance request to the Department of General Service (DGS) was made for $10,500 to purchase an effluent spray pump. No funds have been received for this critical maintenance request. Please refer to Supplemental Information Section – CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

Wastewater Treatment Plant

- Install an oil and grease interceptor, new headworks; including new screen, washer and compactor
- Install new influent pump station
- Replace existing below grade steel activated sludge plant with a new above ground SBR or a membrane bioreactor treatment system in a building
- Construct new office building
- Install Mission type remote alarm and process monitoring system
- Retrofit existing hypochlorite based disinfection system and sodium thiosulfate dechlorination system. Existing tanks and accessories are grossly oversized
- Design and construct new liquid chlorine or on-site hypochlorite generation system to treat spray field discharges.
- Clean vegetative growth in effluent holding pond, remove accumulated solids and repair liner as necessary.
- Replace existing spray pumps, associated piping, check valves and gate valves.

- Evaluate, replace and or repair existing above ground force main from spray pumps to the spray fields, transmission pipes, spray nozzles and valves in the spray fields.

Wastewater Collection System

- Locate and remove sources of extraneous flow in collection system
- Install grease traps wherever appropriate

Water Treatment Plant

- Replace cleanout cap
- Install dehumidifier

The design of the wastewater facility improvements is currently underway and 80% complete. The above improvements will be part of a Capital Improvement Request. The total projected cost is **$5,801,000,** which includes design, inspection, testing and construction costs.

Note: The cost estimate is based on 2008 dollars and is subject to change based on implementation schedule, inflation rate, regulatory requirements and other factors that cannot be forecasted at the present time

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2010
- Construction: Fiscal Year 2014

SUPPLEMENTAL INFORMATION

SOUTHERN MARYLAND PRE-RELEASE UNIT

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The water system consists of two (2) drilled wells, a treatment facility, a 10,000-gallon hydropneumatic tank, and a distribution network.

Well No. 1 - The source is located in a pit in a grassy area to the left of the main administration building. The well is 6-inches in diameter and has a total depth of 570 feet. It is provided with 6-inch steel casing. The well has a specific yield of 0.62 gpm/ft and a drawdown of 268 ft. The well is equipped with a 7.5 hp submersible pump manufactured by Goulds, which is rated at 45 gpm @ 395 ft. TDH. The static water level is at 227 feet. The pump is set at 315 feet and was installed in 2003.

Well No. 2 - This well (CH-73-2278) is located behind the administration building, next to the water plant. The well, drilled in 1973, is 6-inches in diameter and has a total depth of 530 feet. It is provided with 6-inch casing. The well has a presumed yield of 56 gpm. Water is pumped from the well by a 10 hp submersible pump capable of delivering 60 gpm @ 365 ft. TDH. The static water level is 163ft. The pump is set at 300 ft. and was installed in 1973.

Water from both wells, after being treated, is discharged into a 10,000-gallon hydropneumatic tank, which provides storage and pressure to the distribution network.

The facility has approximately 500 ft. of PVC water distribution main and service lines.

WATER TREATMENT PLANT

The water system consists of two (2) drilled wells, a treatment facility, a 10,000-gallon hydropneumatic tank, and a distribution network.

The water treatment facilities are rated at 220 gpd; they consist of two (2) softening units and gas chlorination units housed in a 30 ft. long by 15 ft. wide brick building.

Each Kisco (DV-3660-2) softening unit consists of a vessel 36-inches in diameter, 72-inch high, and is rated for a flow of 110 gpm. The vessels are loaded with 20 cubic feet of resin, and have a resin exchange capacity of 15 lb/cubic feet. Both softening units are regenerated by salt stored in a 42-inch diameter by 48-inch high brine tank. Resin is regenerated every 26 minutes.

The gas chlorination facilities are rated at 10 lb/d and include 150 lb. cylinders, a 4.3 gpm @ 140 ft. TDH booster pump, a vacuum regulator, an automatic switchover, an ejector, a rotameter, a solenoid valve, a gate valve, a pressure gauge, a cylinder repair kit, panic hardware, a chlorine scale, a vent, a leak detection alarm and ammonia, an outside entrance/exit, cylinder chains, and a gas-tight room.

The 10,000-gallon hydropneumatic tank is 8 ft. in diameter and 28 ft. long. It is equipped with a 2 hp compressor. The hydropneumatic tank provides storage and pressure to the distribution network.

WASTEWATER SYSTEM

The wastewater facilities are rated for a design flow of 20,000-gpd and a peak flow of 80,000 gpd. They were built in 1979, upgraded in 1990, and include the following:

- Preliminary Treatment:
    - Mechanical bar screen (later replaced with Muffin Monster)
    - Parshall flume
    - Manual bar screen
- Biological Treatment (Extended Aeration Package Unit):
    - 5,000-gallon surge tank equipped with flow splitter box and V notch weir
    - 2,000-gallon aerobic digester with waste sludge line
    - 22,939-gallon aeration tank with coarse bubble diffusers with ball valve, return sludge line, and froth spray line
    - Two 110 cfm@5psi blowers
    - 7,578-gallon secondary clarifier
- Chlorination/Dechlorination Facilities:
    - 1,667-gallon capacity chlorine contact chamber
    - 5,560-gallon capacity dechlorination tank
- Treated wastewater storage pond rated for 8 days
- Land Treatment (Spray Irrigation):
    - Three (3) acres of spray irrigation area divided into five (5) parcels, 31,062 square feet each
    - Two (2) vertical turbine spray irrigation pumps rated at 117 gpm @ 165 ft. TDH
    - A spray irrigation distribution network consisting of two (2) 4-inch aluminum spray headers and six (6) spray nozzles for each parcel
    - Six monitoring wells
- Emergency Power:
    - 50 KW emergency generator
    - 480/240 Volts three phase power distribution network

In 1989, construction began on the existing wastewater treatment facility for the pre-release unit. The facility was completed and began operation in April of 1990. The effluent from the facility is discharged to the spray irrigation fields from March to November, or to a nearby stream from December to February. Sludge from this facility is periodically pumped out of the aeration tank and hauled to a site for land disposal. The plant is required to treat the wastewater and meet the following Permit conditions:

Effluent for Stream Discharge:

- TSS of 30 mg/l (monthly average)
- BOD of 30 mg/l (monthly average)

- Ammonia of 3.9 mg/l (monthly average)
- pH between 6.5 and 8.5
- Fecal Coliforms: 200 MPN/100 ml (monthly)
- Total Residual Chlorine: 0. 011 mg/l (maximum)
- Dissolved Oxygen: 5.0 mg/l minimum

Effluent for Groundwater discharge via spray fields:

- TSS of 90 mg/l (monthly average)
- BOD of 70 mg/l (monthly average)
- Flow of 20,000 gpd (yearly average)
- pH between 6.5 and 8.5
- Fecal coliforms: 200 MPN/100 ml (weekly)

Site Name: Southern Maryland Pre Release Unit

Background

File Link to Facility Photos

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd 1991

Amount of Previous CIP Funding $684,000.00

Amount of Current CIP funding $0.00

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
76° 58' 16.79" W	38° 25' 27.33" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request $20,000.00

Amount of future MM funding needed $10,500.00

FY that MM funding is needed 2003

Description of MM needs

-Purchase effluent spray pump.
-Rehabilitate chlorination and dechlorination system.

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Southern Maryland Pre-Rele...	Water System	DPSCS	Southern
Details	Southern Maryland Pre-Rele...	Wastewater System	DPSCS	Southern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Southern Maryland Pre-Release Unit

Address

14320 Oaks Road

Charlotte Hall, MD 20622

Comments:

Agency: DPSCS

Region: Southern

Average Daily Demand (ADD) (gal/day)	26,005
Peak Day Demand (gal/day)	39,000
WTP Design Capacity	64,800
Total No. of Wells	2
Average Daily Run Time of Wells (Hrs)	11.4
Capacity w/ largest Well Offline	51,840
GW Appro. Permit Number (GAP)	CH1955G006(04) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	28,000
% of ADD to GAP	93%
General Discharge Permit Number	06HT9523

W/WW Engr. Project Mgt: PT

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Sylvester	Ball	(301) 884-5593	(301) 536-5901
Eric	Barnes	(301) 872-4401	(301) 980-2902
Dorothy	Wise	(301) 872-4401	(443) 223-0063

Surface Water Appr. Permit Number	_____(_) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	
Days of Storage at ADD	
PDWIS WTP Number	008-0061
Appropriation Permit Exp. Date	4/1/2016 ☐ N/A
Est. Total length of Water Lines (feet)	500
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

Facility Name: Southern Maryland Pre-Release Unit

Address: 14320 Oaks Road

Charlotte Hall, MD 20622

Agency: DPSCS

Region: Southern

Annual Average Daily Flow (gal/day): 23,342

Peak Day Flow (gal/day): 73000

Ratio Peak Flow to ADD: 3.1

WWTP Design/Permit Capacity (gal/day): 20,000

% of ADD to Design Capacity: 117

NPDES Permit Number: MD0023914 N/A

State Permit Number: 04DP0750 N/A

NPDES Permit Exp. Date: 9/30/2009 N/A

W/WW Engr. Project Mgt: PT

Location of Asbuilt Drawings or CDs: 53

WWTP Process Description - List Unit Processes: Appendix A N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Sylvester	Ball	(301) 884-5593	(301) 536-5901
Eric	Barnes	(301) 872-4401	(301) 980-2902
Dorothy	Wise	(301) 872-4401	(443) 223-0063

Will future limits be more stringent?

GW Disposal Permit Exp. Date N/A

Is more land needed for disposal?

No. of Sludge Disposal Options available: 2

Are additional sludge disposal permits needed? No

Number of sludge permit violations: 0

Number of permit violations

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	2/28/2005	BOD	monthly	mg/l	33	30
Details	2/28/2005	BOD	monthly	lbs/day	6.2	5
Details	2/28/2005	TSS	monthly	mg/l	32	30
Details	2/28/2005	TSS	monthly	lbs/day	8.8	5
Details	2/7/2005	BOD	weekly	mg/l	86	45
Details	2/7/2005	BOD	weekly	lbs/day	11.5	7.5
Details	2/7/2005	TSS	weekly	mg/l	50	45

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
SMPRU WWTP	BOD	2/7/2005	weekly	mg/l	86	45	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.
SMPRU WWTP	BOD	2/7/2005	weekly	lbs/day	11.5	7.5	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.
SMPRU WWTP	BOD	2/28/2005	monthly	mg/l	33	30	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.
SMPRU WWTP	BOD	2/28/2005	monthly	lbs/day	6.2	5	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.
SMPRU WWTP	TSS	2/7/2005	weekly	mg/l	50	45	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.
SMPRU WWTP	TSS	2/7/2005	weekly	lbs/day	14.2	7.5	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.
SMPRU WWTP	TSS	2/28/2005	monthly	mg/l	32	30	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.
SMPRU WWTP	TSS	2/28/2005	monthly	lbs/day	8.8	5	Over wasting creating a young sluge resulting in a light floc which tends to decrease settling rate.	The operator was instructed to stop wasting for three to four days.

SOUTHERN MARYLAND PRE-RELEASE UNIT

CONDITION ASSESSMENT AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Condition Assessment:

- Grinder unit is old and is operating poorly
- The existing DAVCO extended aeration unit is in poor condition. Below are listed deficiencies:
    - Grates covering the unit are in need of re-coating to slow the effects of corrosion
    - Splitter box with V notch weir exterior is severely corroded. Return activated and waste activated sludge pipes are in very poor condition and have reached high degree of corrosion. These pipes are very important for efficient treatment process. See below photograph that illustrate these conditions
    - The existing froth line shows high degree of rusting
    - Currently the plant has two blowers in operation and none at site for replacement should any one blower break down. A spare blower stored at site may avoid disruption of the treatment process.
    - Several areas of the treatment plant exposed to the atmosphere are rusting. Attached photographs illustrate rusting in chlorination and de-chlorination zones adjacent to secondary clarifier.
- Booster Pumps for chlorination and de-chlorination and associated piping are also showing severe corrosion primarily due to exposure to chlorine and weather
- Existing office trailer has leaking windows. Spare parts and other accessories are stored in front of main electrical panel
- Diesel generator base is corroded and appears to be unsafe
- Associated electrical panels also rusted
- Wind Rose tower uprooted from base. Presently leaning on the office trailer
- Treated wastewater is stored in a pond that is rated for eight (8) days of storage. Currently the pond has vegetation growing. This has caused the storage capacity of the pond to decrease significantly
- Currently only one (1) out of the two (2) spray field pumps is operational. The transmission piping to the spray field is laid above ground and has ruptured several times during cold weather
- Piping network (PVC) in spray irrigation fields damaged from falling trees and sunlight. Temporary repairs done in the past
- Transmission pipe/s (flexible hose) also damaged at several locations

Proposed Improvements:

- Install oil and grease interceptor, new headworks including new screen, washer and compactor
- Install new influent pump station
- Replace existing below grade steel activated sludge plant with a new above ground SBR or membrane bioreactor treatment system in a building
- Construct new office building
- Install Mission type remote alarm and process monitoring system
- Retrofit existing Hypochlorite based disinfection system and Sodium thiosulfate dechlorination system. Existing tanks and accessories are grossly oversized
- Design and construct new liquid chlorine or on-site hypochlorite generation system to treat spray field discharges
- Clean vegetative growth in effluent holding pond, remove accumulated solids and repair liner as necessary
- Replace existing spray pumps, associated piping, check valves, and gate valves
- Evaluate, replace and or repair existing above ground force main from spray pumps to the spray fields, transmission pipes, spray nozzles, and valves in the spray fields

WASTEWATER COLLECTION SYSTEM

Condition Assessment:

- Generally operating satisfactorily
- Some I/I reported by Operations Staff
- Heavy grease in wastewater reaching treatment facility

Proposed Improvements:

- Locate and remove sources of extraneous flow in collection system
- Install grease traps wherever appropriate

WATER TREATMENT PLANT

Condition Assessment:

- Cleanout (outside plant) cap broken
- High humidity inside treatment building.

Proposed Improvements:

- Replace cleanout cap
- Install dehumidifier

WATER SOURCE

Condition Assessment:

- All sources are operating satisfactorily

Proposed improvements:

- Install bollards around wells

WATER DISTRIBUTION

Condition Assessment:

- Operating satisfactorily

Proposed improvements:

- None

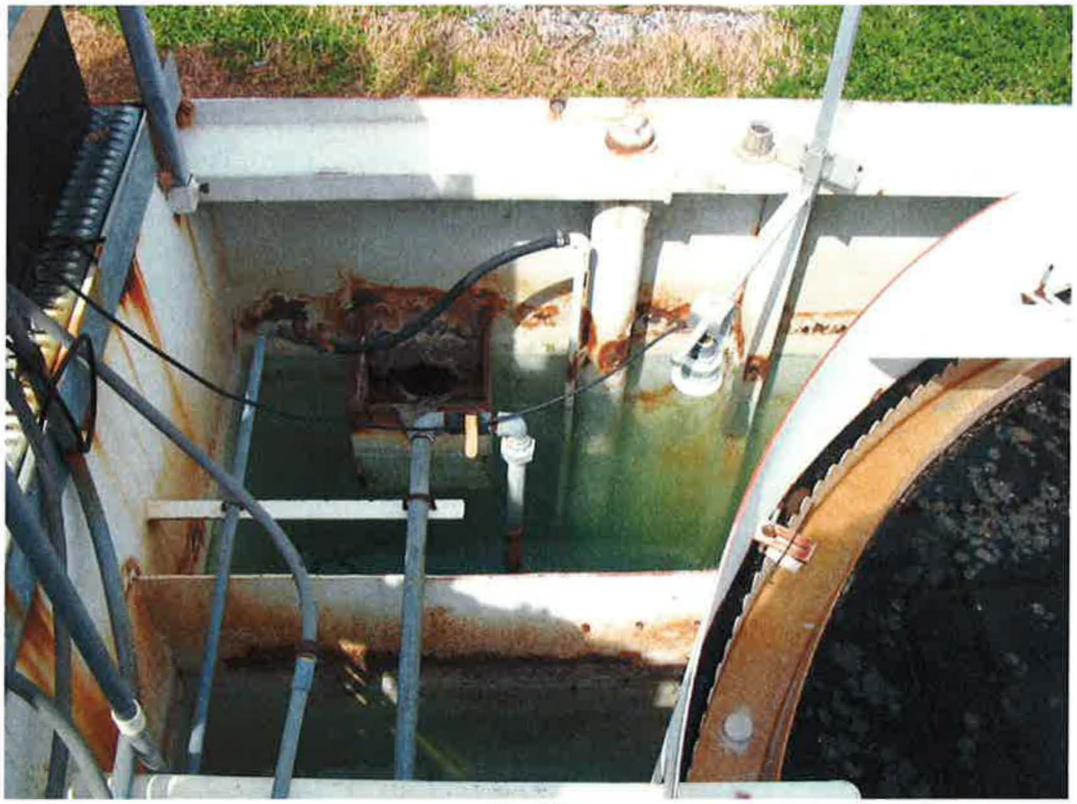
Southern Maryland Pre-Release Unit

WASTEWATER TREATMENT PLANT

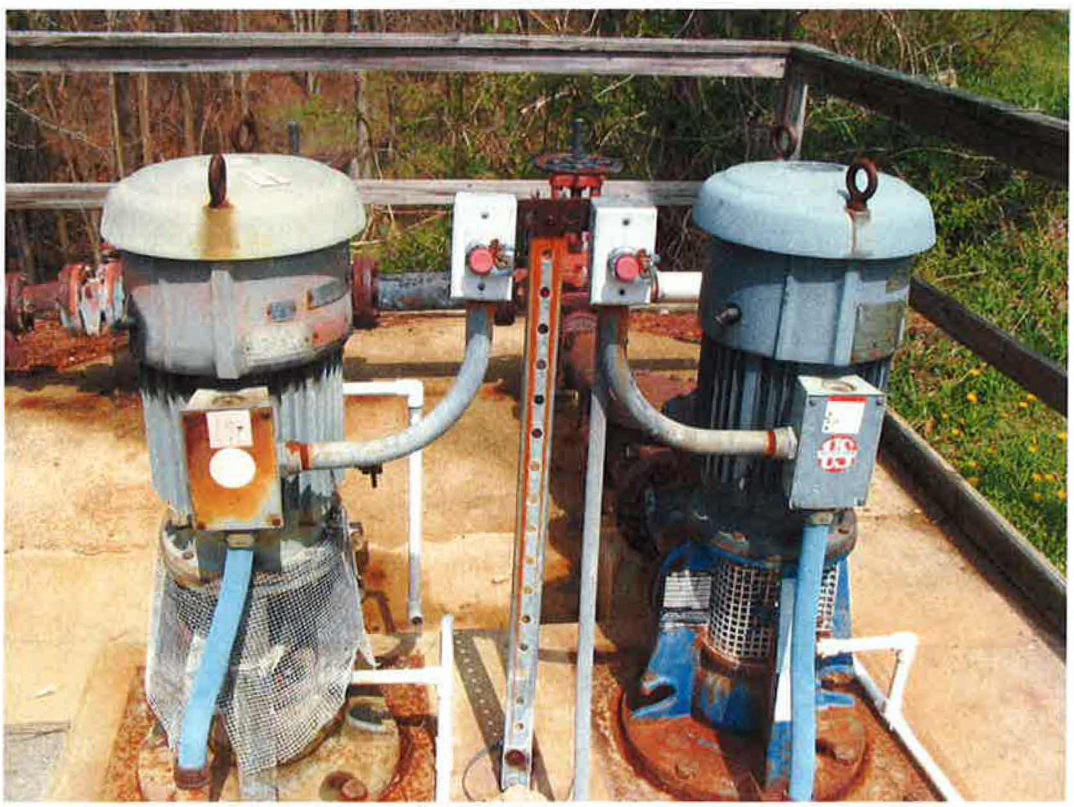
Storage Pond

Wastewater Treatment Piping Corrosion

WASTEWATER TREATMENT PLANT

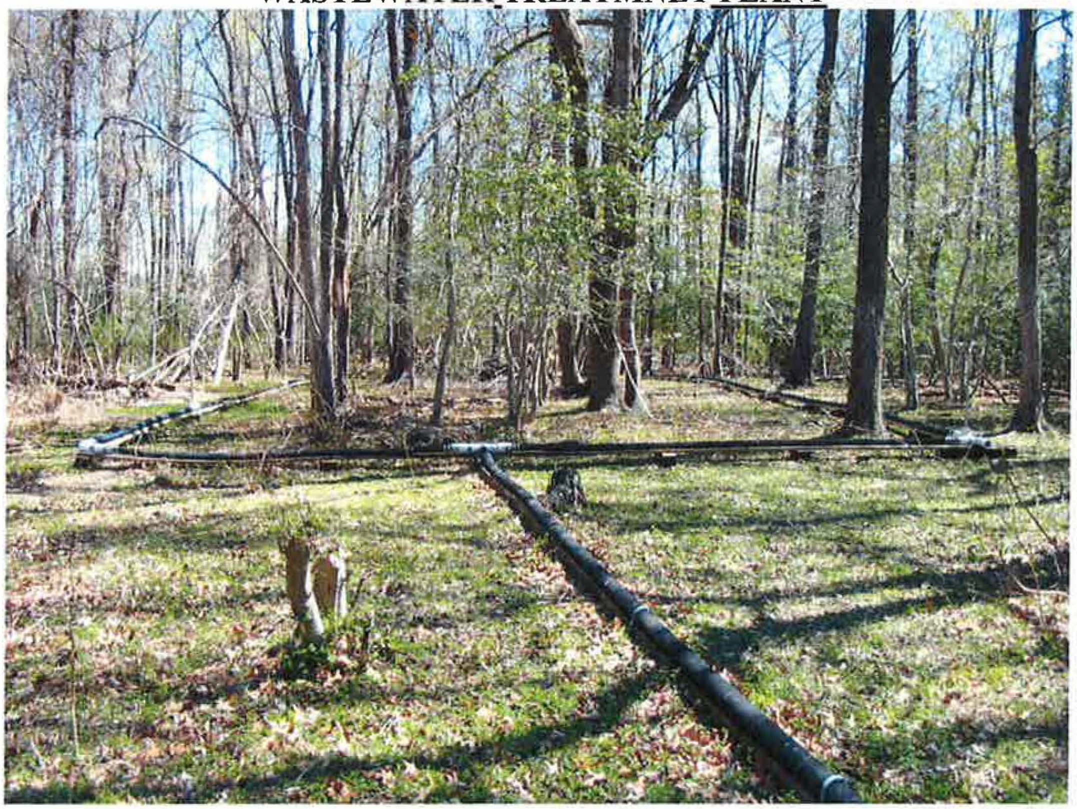


Clarifier



Spray Field Pumps

WASTEWATER TREATMNET PLANT



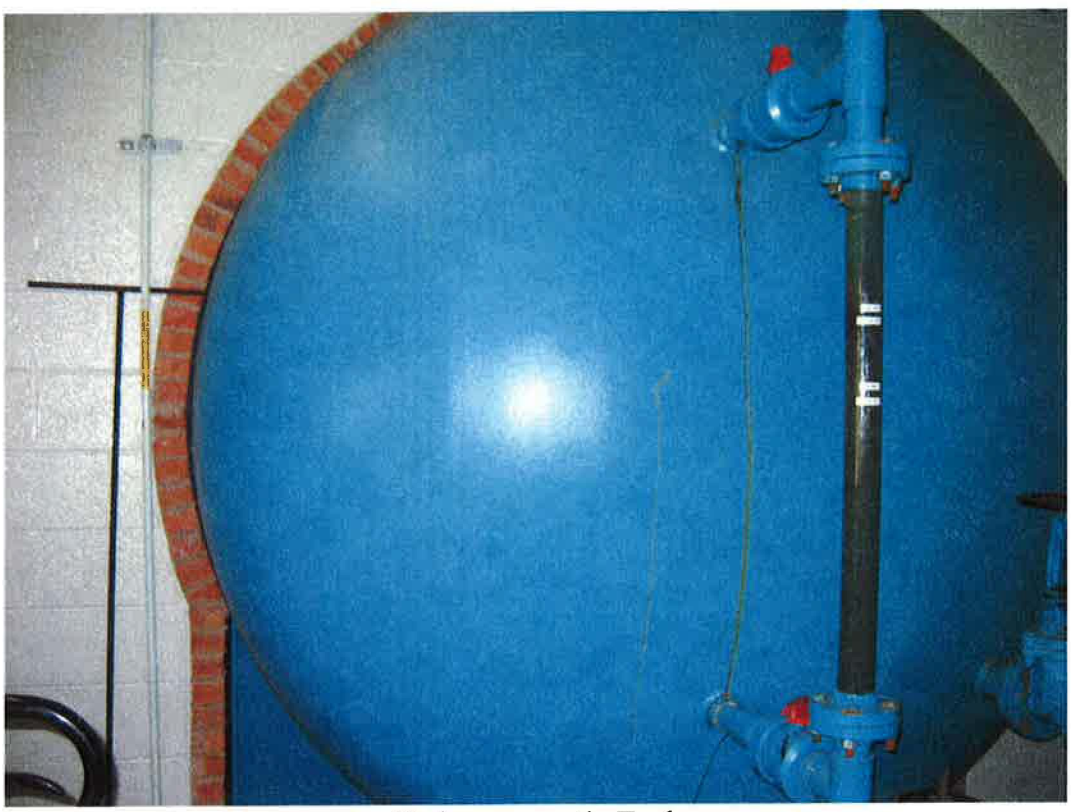
Spray Field Piping

WATER TREATMENT PLANT

Softening Units

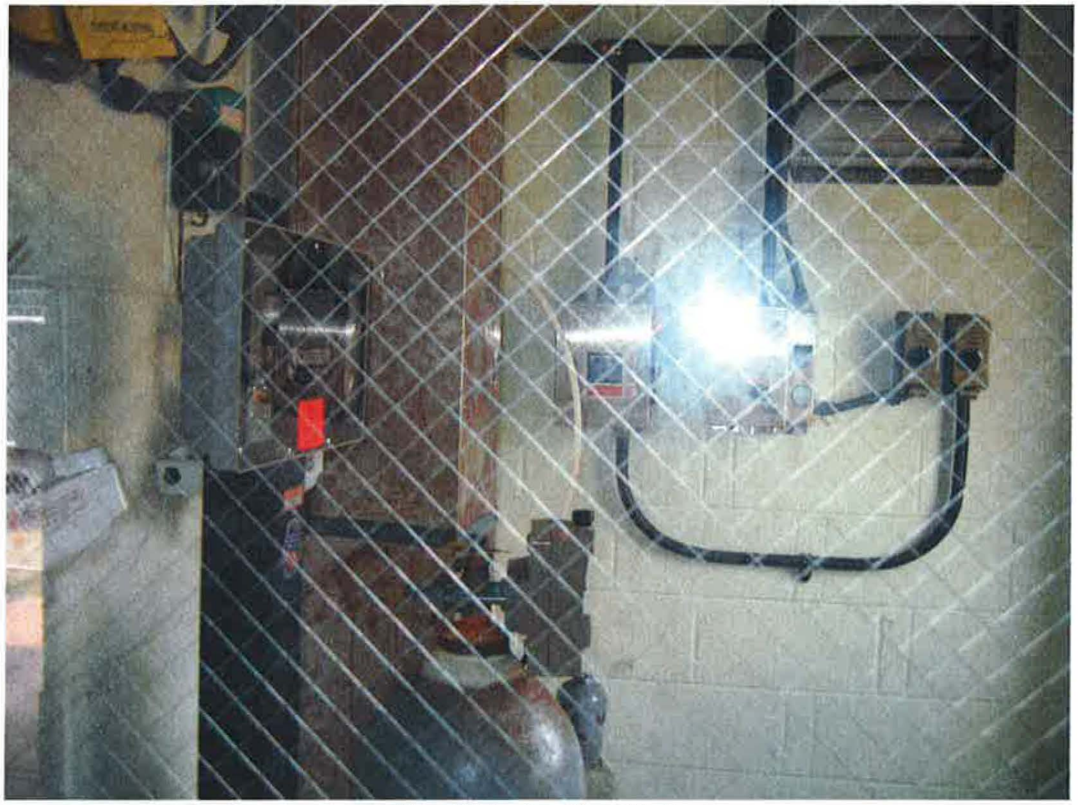
WATER TREATMENT PLANT

Well Number 2



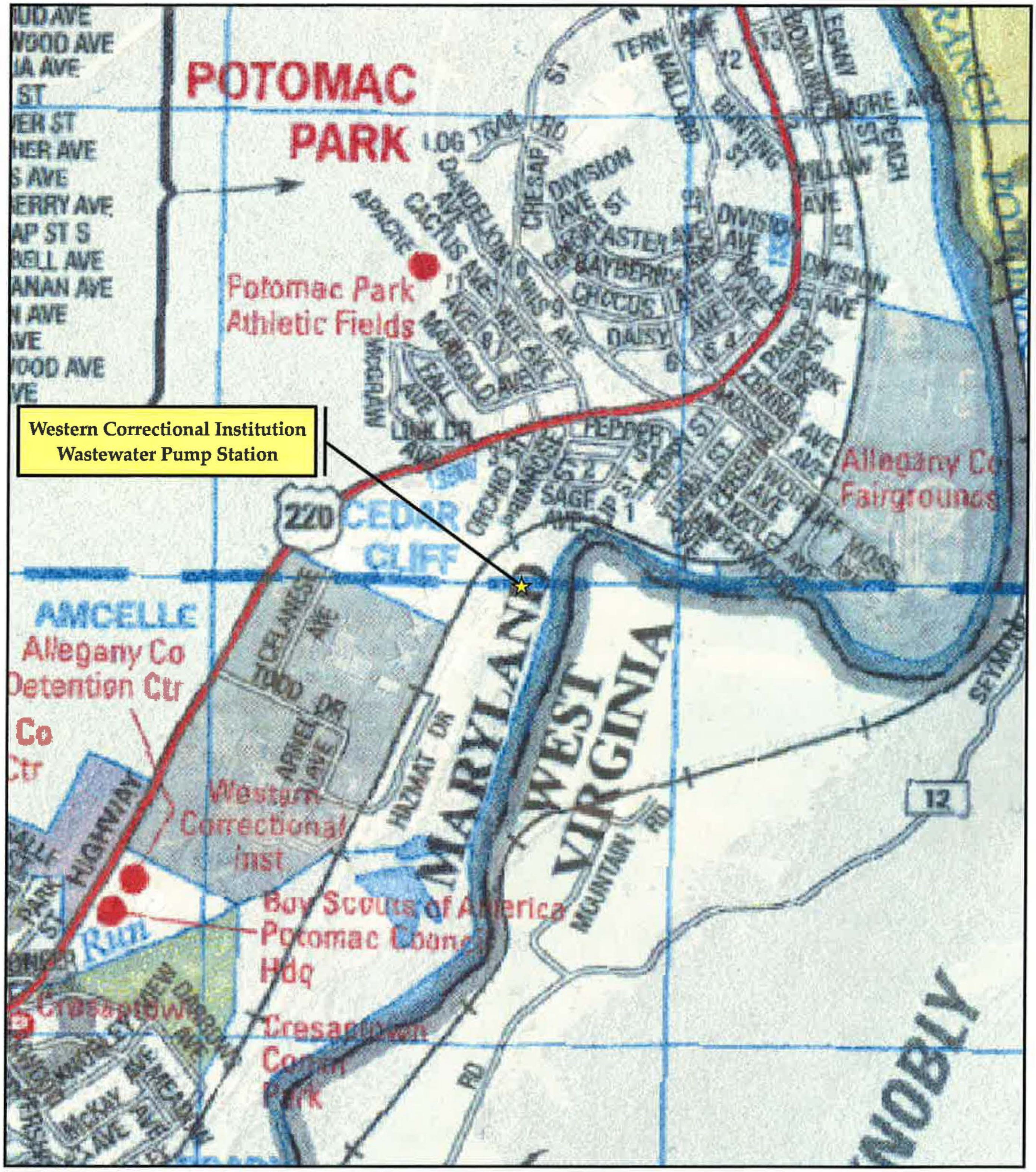
Hydropneumatic Tank

WATER TREATMENT PLANT



Gas Chlorination Unit

Western and North Branch Correctional Institutions



☆ Sites

Water and Wastewater Master Plan 2008

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000 2,500
Feet

Figure 1

MARYLAND ENVIRONMENTAL SERVICE
GIS SERVICES

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

I:\GIS\Projects\MES\MES Sites\Sites.mxd

WESTERN AND NORTH BRANCH CORRECTIONAL INSTITUTIONS

BACKGROUND

The Western and North Branch Correctional Institutions are Department of Public Safety and Correctional Services (DPSCS) facilities. Both facilities are located in Allegany County, six (6) miles southwest of Cumberland on Route 220, off of Interstate 68. A project location map is shown in Figure 1.

Western Correctional Institution (WCI) is a 912 cell, medium security facility located in Cresaptown, Allegany County. The facility contains five (5) housing units that house 1,680 beds.

Currently, the facility has 375 staff. The 2004 DPCS Master Plan projects the following upgrades:

- Construct a warehouse with two (2) loading docks
- Design and Construct a 280 bed minimum security facility by 2014
- Design and construct a Vocational Educational Building
- Design and Construct a SUI Shop Plant
- Design and Construct an Equipment Maintenance Building by 2013
- Design and a Construct Staff Training Facility
- Cap for Rubble Landfill

The projected Master Plan capacity will be 1,960 Beds

The 2004 DPCS Master Plan projects wastewater flows for the period, at WCI, to be approximately 233,500 gpd. The current wastewater pump station at WCI is adequate for this period.

The North Branch Correctional Institution (NBCI) is a 1,024 cell maximum security facility adjacent to WCI. The facility has single cells and can house approximately 1,024 beds. The 2004

DPCS Master Plan projects the following upgrades:

- Design and Construct MCE shop
- Design & Construct Housing Units 3 & 4
- Design & Construct New SUI Shop
- Design & Construct Outdoor Recreation Area

The 2004 DPCS Master Plan projected that NBCI wastewater flows for the period to be approximately 125,000 gpd. The current wastewater pump station at NBCI is adequate for this period.

Maryland Environmental Service (MES) operates and maintains the sewage pumping stations for each facility. The DPCSC operates and maintains the sewer collection pipes and manholes.

WASTEWATER COLLECTION SYSTEM

The wastewater collection system for WCI consists of a sewage pumping station, approximately 400 feet of gravity sewer pipes, approximately two (2) manholes and 240 ft. of force main. The sewage pumping station discharges into the Allegany County wastewater treatment facility. The wastewater collection system for NBCI consists of a sewage pumping station, approximately 400 feet of gravity sewer pipes, approximately two (2) manholes, and 1,500 ft. of force main. The sewage pumping station discharges into the Allegany County wastewater treatment facility.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010-11 OPERATIONS INFORMATION

From August 2010 through July 2011, the WCI Sewage Pump Station average and peak flows were 176,000 gallons per day and 264,000 gallons per day, respectively. Average and peak flows for NBCI, during the same period, were 174,000 gallons per day and 305,000 gallons per day, respectively.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

WCI Pump Station

- The pumps and electrical controls are subject to flooding due its location in a below grade vault
- Pumps frequently fail to operate due to the inadequate vacuum that is created
- The electrical sensors do not operate when the wet well is flooded
- There are safety hazards and confined space entry requirements

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility had no violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

Maryland Environmental Service has made no capital improvement requests since it began operating this facility. Currently, a critical maintenance request to the Department of General Services is being made for $31,500 to replace the macho cutter. This request is waiting for approval. Please refer to Supplemental Information Section - CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

- During the site assessment for the Master Plan, the following improvements were identified and recommended for:
- Replace the wet well. The existing wet well is deteriorating. It is constructed of steel and has corroded substantially over the years
- Replace the dry pit submersible vacuum pumps with submersible pumps. The dry pit submersible pumps require high maintenance
- Install an inline automated trash removal system in the bypass channel
- Install a vault with the necessary valves and connection fittings to provide the capability to hookup a bypass pump. In the event of emergency or pump maintenance, a bypass line would be useful
- Replace/Upgrade the controls. Relocate the controls above grade. They are currently housed in a dry well. The dry pit is subject to flooding

- Upgrade the headworks

The above improvements will be part of a Capital Improvement Request. The total projected cost is **$750,000,** which includes design, inspection, testing and construction costs.
Note: The cost estimate is based on 2008 dollars and is subject to change based on implementation schedule, inflation rate, regulatory requirements and other factors that cannot be forecasted at the present time

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2015
- Construction: Fiscal Year 2015

SUPPLEMENTAL INFORMATION

WESTERN AND NORTH BRANCH CORRECTIONAL INSTITUTES

FACILITY DESCRIPTIONS

WASTEWATER COLLECTION SYSTEM

The wastewater collection system for the Western Correctional Institution (WCI) consists of a sewage pumping station, approximately 400 feet of gravity sewer pipes, approximately two (2) manholes, and 240 ft. of force main. The sewage pumping station discharges into the Allegany County wastewater treatment facility.

The wastewater collection system for the North Branch Correctional Institution (NBCI) consists of a sewage pumping station, approximately 400 feet of gravity sewer pipes, approximately two (2) manholes, and 1,500 ft. of force main. The sewage pumping station discharges into the Allegany County wastewater treatment facility.

Maryland Environmental Service operates the WCI and NBCI collection systems.

WCI Pump Station
Wastewater that is conveyed by gravity sewer pipes enters the pump station via the headworks building that is 35 ft. long and 15 ft. wide. The headworks building consists of a mechanical bar screen located on the grade floor level. The screenings are discharged into the hopper and into the Muffin Monster unit for grinding. The effluent product from the Muffin Monster is conveyed to a dumpster for offsite disposal. The raw sewage flows towards the wet well, which is 10 ft. in diameter and 25 ft. deep. The wet well is capable of holding 5,000 gallons. The pumping station is equipped with three (3) vacuum pumps rated at 521 gpm @ 53 ft. TDH with 15 hp motors.

NBCI Pump Station
Wastewater that is conveyed by gravity sewer pipes enters the pump station via the headworks building that is 48 ft. long by 19 ft. wide and has two (2) floors. The headworks building consists of a mechanical bar screen located on the grade floor level. The screenings are discharged into the hopper and into the Muffin Monster unit for grinding. The effluent product from the Muffin Monster is conveyed to a dumpster for offsite disposal. The raw sewage flows towards two (2) in-line grinders and then into two (2) square wet wells that are each 12 ft. long, 12 ft. wide, and 14 ft. deep. The in-line grinders each have 5 hp motors. The wet wells are each capable of holding 15,000 gallons. The pumping station is equipped with three (3) submersible pumps each rated at 850 gpm @ 48.4 ft. TDH with 20 hp motors.

Site Name: Western & North Branch Correctional Institution

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd N/A

Amount of Previous CIP Funding $0.00

Amount of Current CIP funding $0.00

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
78° 48' 41.23" W	39° 42' 14.49" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request N/A

Amount of future MM funding needed $31,500.00

FY that MM funding is needed 2009

Description of MM needs

-Purchase replacement macho cutter cartage.

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Western CI - Wastewater P...	Wastewater System	DPSCS	Western
Details	North Brach CI - Wastewate...	Wastewater System	DPSCS	Western

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Western CI - Wastewater Pump Station

Address: 13800 McMullen Highway SW
Cumberland, MD 21502

Agency: DPSCS

Region: Western

Annual Average Daily Flow (gal/day): 203,262

Peak Day Flow (gal/day): 335,906

Ratio Peak Flow to ADD: 1.7

WWTP Design/Permit Capacity (gal/day): N/A

% of ADD to Design Capacity: N/A

NPDES Permit Number: ☑ N/A

State Permit Number: ☑ N/A

NPDES Permit Exp. Date: __/__/____ ☑ N/A

W/WW Engr. Project Mgt: MFr

Location of Asbuilt Drawings or CDs: 38

WWTP Process Description - List Unit Processes: Appendix A ☐ N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Wayne	Boal	(301) 777-2174	(301) 999-1419
Roger	Knox	(301) 777-2174	(301) 999-8616
Dick	Fair	(301) 777-2174	(301) 999-8607

Will future limits be more stringent?

GW Disposal Permit Exp. Date: __/__/____ ☑ N/A

Is more land needed for disposal? N/A

No. of Sludge Disposal Options available: N/A

Are additional sludge disposal permits needed? N/A

Number of sludge permit violations: 0

Number of permit violations

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

Facility Name: North Brach Cl - Wastewater Pump Station

Address

Agency: DPSCS

Region: Western

Annual Average Daily Flow (gal/day)	110,917
Peak Day Flow (gal/day)	157,505
Ratio Peak Flow to ADD	1.4
WWTP Design/Permit Capacity (gal/day)	N/A
% of ADD to Design Capacity	
NPDES Permit Number	☐ N/A
State Permit Number	☐ N/A
NPDES Permit Exp. Date	☐ N/A

W/WW Engr. Project Mgt

Location of Asbuilt Drawings or CDs

WWTP Process Description - List Unit Processes — Appendix A ☐ N/A

Sewer Collection Distribution — Appendix B

Cost Analysis — Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber

Will future limits be more stringent?	
GW Disposal Permit Exp. Date	☐ N/A
Is more land needed for disposal?	
No. of Sludge Disposal Options available	
Are additional sludge disposal permits needed?	
Number of sludge permit violations	
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

WESTERN AND NORTH BRANCH CORRECTIONAL INSTITUTIONS

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER COLLECTION SYSTEM

WCI PUMP STATION

Conditional Analysis:

- Pumps and electrical controls subject to flooding due it's location in a below grade vault
- Pumps frequently fail to operate due to inadequate vacuum created
- Electrical sensors do not operate when wet well is flooded
- Safety hazards and confined space entry requirements

Proposed Improvements:

- Replace the wet well. The existing wet well is deteriorating. It is constructed of steel and has corroded substantially over the years
- Replace the dry pit submersible vacuum pumps with submersible pumps. The dry pit submersible pumps require high maintenance
- Install an in-line automated trash removal system in the bypass channel
- Install a vault with the necessary valves and connection fittings to provide the capability to hookup a bypass pump. In the event of emergency or pump maintenance, a bypass line would be useful
- Replace/Upgrade the controls. Relocate the controls above grade. They are currently housed in a dry well. The dry pit is subject to flooding

NBCI UMP STATION

Conditional Analysis:

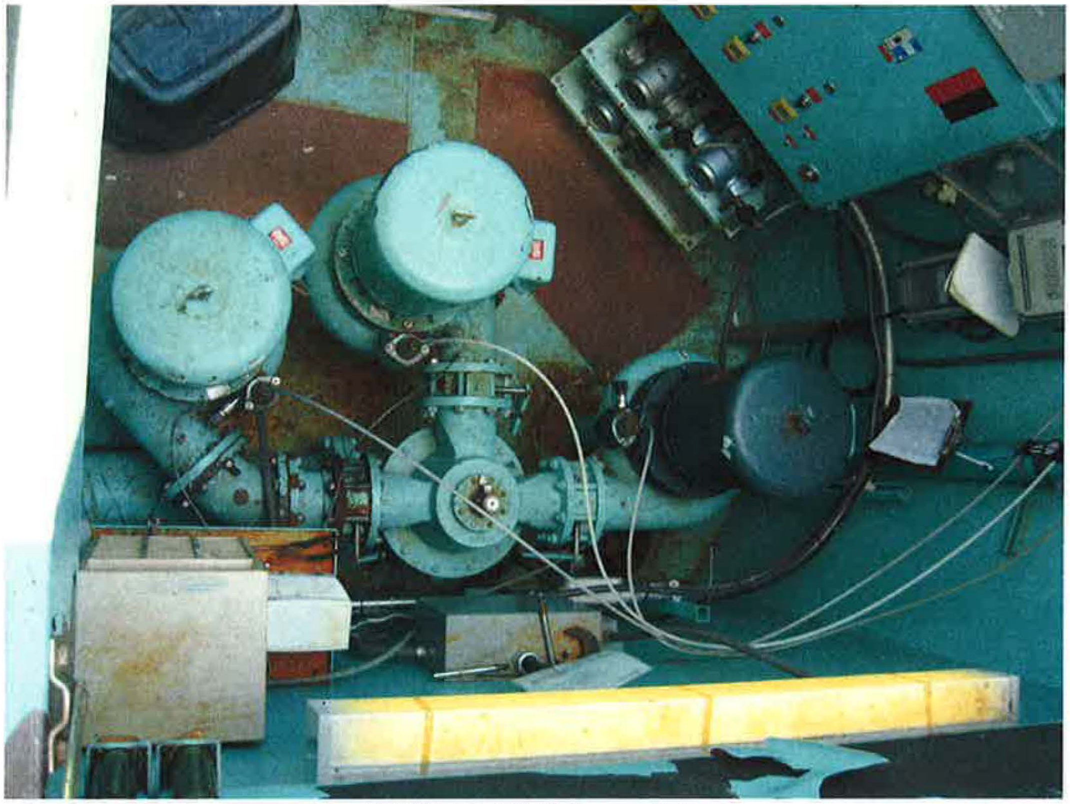
- The pump station built in 2005. Performance is excellent

Proposed Improvements:

- None

Western & North Branch Correctional Institutions

WCI



WCI Dry Pit Submersible

WCI Mechanical Bar Screen

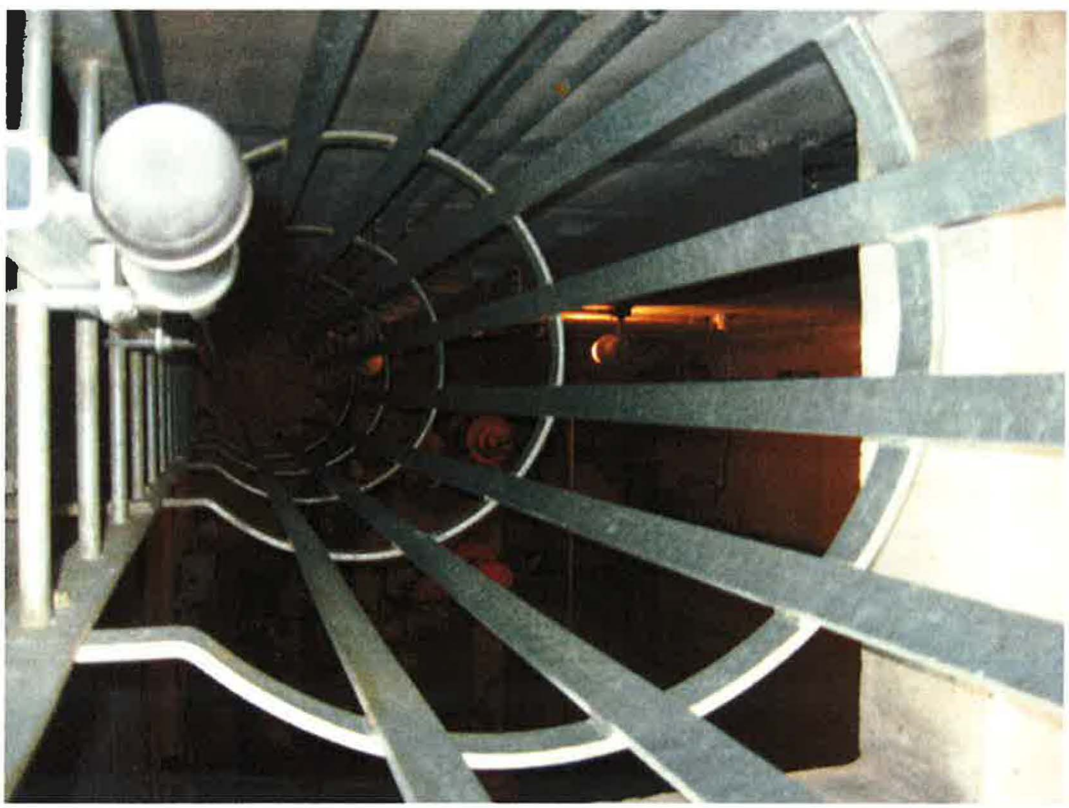
WCI

WCI PS Controls

WCI Screening Washer

NBCI

NBCI Screening Screw Compactor



NBCI Dry Well

NBCI

NBCI PS Grinder

NBCI

Screw Conveyor

2011 WATER AND WASTEWATER MASTER PLAN

DEPARTMENT OF VETERANS AFFAIRS

VOLUME VII OF X

September 2011

Prepared By:

MARYLAND
ENVIRONMENTAL
SERVICE

259 Najoles Road
Millersville, Maryland 21108

2011 Water and Wastewater Master Plan

Volume VII of X - Maryland Department of Veterans Affairs

Executive Summary

MARYLAND ENVIRONMENTAL SERVICE

2011 WATER AND WASTEWATER MASTER PLAN

EXECUTIVE SUMMARY

I. INTRODUCTION

The Maryland Environmental Service (MES) was created by statute in 1970 (Chapter 240 of 1970) as an independent agency. Executive Order 01.01.1971.11 gave MES the responsibility for operation and maintenance of all State-owned water purification and solid waste disposal facilities. Two (2) years later, MES became incorporated into the Department of Natural Resources (DNR). While under DNR, all Capital Improvement Project (CIP) planning and annual funding requests for these facilities were prepared by MES and submitted to the State for approval. The first projects received funding in Fiscal Year 1984; however, the Department of General Services (DGS) had responsibility for managing the appropriations, procuring the consulting engineers, contractors, and other services, and providing project management and inspection for CIP with some input from MES staff.

The situation began to change in later years, with MES first receiving funding and procurement authorization for CIP in 1992 and becoming an instrumentality of the State and a public corporation independent of DNR in 1993. Chapter 4, First Special Session of 1992, said MES "*shall be responsible for and shall control the procurement of engineering and architectural services and all other related services and supplies for the projects for which State funds are appropriated under provisions of this act.*" Since 1992, MES has had full responsibility for the CIP program for State-owned water and wastewater treatment plants, and in some cases, the associated piping systems and water towers, when requested by a State Agency.

During this transition period, the Department of Budget and Management (DBM) asked MES to prepare a Master Plan for water and wastewater facilities operated by MES and owned by the State. There were numerous facilities needing capital improvements to accommodate expansions within the various institutions as well as changing state and federal regulations that required more advanced treatment processes. The initial appropriation to MES totaled over $14 million, which funded a backlog of 13 projects. As projected in the Master Plan, funding requirements decreased each year as the majority of the treatment facilities were upgraded. Eventually the requests were capped at $3.0 to $3.5 million per year, which was adequate for improvements to piping, pumping stations, and water towers.

In the early 2000's, Governor Parris Glendening issued an Executive Order requiring wastewater treatment plants to further reduce nutrient loadings to the State's waterways. The Maryland Department of the Environment (MDE) completed their Tributary Strategy plan, essentially capping nutrient loads at many wastewater treatment facilities. The EPA also issued new drinking water regulations with limits for new parameters such as arsenic, radon,

radionuclides, and disinfection by-products. As MES experienced a decade earlier, water and wastewater treatment facilities would need upgrades as new, more stringent permits were issued. Rapidly changing technology rendered controls and equipment obsolete at many sites and construction prices skyrocketed after September 11, 2001. It became apparent the $3.0 million cap would no longer be sufficient to make the necessary improvements.

During the 2008 session of the Maryland Legislature, the Governor's budget included a capital budget request from MES of $11.9 million for critical, compliance-related upgrades to four (4) treatment plants. The budget committees expressed concern there was no plan that adequately justified this increase. In the 2008 "*Joint Chairmen's Report on the State Operating Budget (SB 90) and the State Capital Budget (SB 150) and Related Recommendations*", MES was instructed to prepare an infrastructure improvement plan for the facilities managed by the agency by February 1, 2009. The 2008 Water and Wastewater Master Plan represents the response to this request.

II. OBJECTIVES AND METHODOLOGIES

A. OBJECTIVES

To fulfill the request of the Maryland Legislature as defined in the 2008 Joint Chairmen's report, the objectives of the water and wastewater master plan included reviewing operating and performance records, evaluating the existing water and wastewater facilities to determine what improvements may be needed, developing a concept plan and scope of the identified improvements, cost estimates, ranking the individual projects, and developing a comprehensive CIP funding schedule and projection for the next five years and to FY 2021.

The specific steps and methodology used to prepare the plan are as follows:

- Collect data from existing records and engineering drawings at office
- Develop custom "Infrastructure CIP Management" database
- Conduct site visits and inventory of all facilities
- Perform engineering evaluations at all facilities
- Review Master Plans and five-year plans of agencies served by MES
- Identify and determine future needs for all facilities
- Evaluate each facility compliance records and anticipate future regulatory constraints
- Review past capital improvement and critical maintenance expenditures
- Analyze future improvement alternatives for each facility
- Perform cost analysis of alternatives and prepare cost estimates for the identified CIPs for each facility
- Develop a methodology to allow ranking and prioritizing the CIPs

- Generate a schedule of implementation for the facility improvements
- Develop a financial plan for funding requests
- Generate final master plan report

B. REPORT STRUCTURE

The Master Plan consists of an Executive Summary along with separate volumes for each of the nine (9) State Agencies. This Executive Summary is also included in each of the individual agency volumes. Each of the agency volumes provides detailed infrastructure information for each of the facilities associated with that agency that includes:

- Background
- Water and wastewater facilities description
- Assessment of operations and performance data
- List of operational and infrastructure deficiencies
- Regulatory compliance history and future regulatory constraints
- Capital improvements and major maintenance funding history
- Cost analysis and recommended improvements
- Schedule of implementation
- Supplemental information

C. CIP RANKING SYSTEM

To allow ranking and prioritizing the CIP projects, MES developed a "Project Ranking Sheet". This consisted of the following six categories:

- Compliance & Permits (criteria uses number of permit violations)
- Health and Safety
- Structural issues
- Impact on operating and maintenance costs
- Operational deficiencies
- Energy and Environment (evaluates energy savings and environmental benefits)

Each of these categories had associated scoring criteria which allowed assigning points based on the listed criteria. The total score assigned each project was used to determine its ranking on the CIP list.

III. ANTICIPATED FUTURE REGULATORY REQUIREMENTS

In addition to water and wastewater systems that need improvements due to age, equipment obsolescence, and normal wear and tear, improvements are also needed to comply with more

stringent regulations and treatment requirements. The following section addresses current regulations and policies, and how they impact the need to make upgrades to water and wastewater facilities.

A. WASTEWATER TREATMENT PLANTS

1. Wastewater Treatment Plants Discharging to Streams

All wastewater plants with stream discharge are regulated by the National Pollutant Discharge Elimination System (NPDES). Dischargers are issued an NPDES permit that authorizes discharge to a water body and imposes limits that have to be met based primarily on the receiving stream's water quality standards. The permits typically require meeting both pollutant concentration limits as well as mass loading limits. The mass loading limits (lbs/day) are determined by taking the assigned maximum flow value (i.e., million gal/day) for the facility times the specified concentration limits (mg/l) times 8.34 (a conversion factor) .

The pollutants that are regulated on discharge permits usually consist of the conventional domestic wastewater pollutants:

- Biological Oxygen Demand (BOD_5) – This is a measure of the amount of organic compounds in water that can be assimilated by bacteria and other microorganisms.
- Total Suspended Solids (TSS) – This measures the amount of organic or inorganic particles that are suspended in the water.
- Ammonia – This is the dominant form of nitrogen in domestic wastewater. It is toxic to fish and other biota.
- Total Kjeldahl Nitrogen (TKN) – This is the amount of ammonia and organic nitrogen (i.e., the nitrogen bound up in organic compounds like proteins, etc.)
- Nitrate/Nitrite – This is the inorganic nitrogen fraction that has been converted from ammonia and organic nitrogen. Further biological assimilation of nitrate and nitrite converts it to nitrogen gas, which dissipates to the atmosphere.
- Total Nitrogen – Nitrogen is considered both a nutrient and a pollutant in that small amounts are beneficial to plants and animals, but in excess it promotes the proliferation of bacteria and algae and results in degraded water quality. Total nitrogen represents the sum of nitrate/nitrite and TKN.
- Total Phosphorus – Similar to nitrogen in that it is both a nutrient and a pollutant. Contrary to nitrogen, it can only be eliminated from wastewater by biological uptake or chemical precipitation.
- Bacteria – All wastewater must be properly disinfected prior to discharge and permits usually give limits for either Fecal Coliform or Total Coliform levels.

These are the dominant pollutants found in domestic sanitary wastewater. If there are other pollutants in the waste stream, then these pollutants may also be added to the discharge permit with appropriate limits.

Discharge permits can be amended at any time by MDE due to either new regulations or policies being adopted or based on new water quality information on the receiving stream that dictates more stringent limits. The permits are usually issued for a five-year period. Although, MDE can amend discharge permits at any time, the changes are usually made when the permit is renewed and reissued.

The U.S. EPA and State of Maryland regulations that govern the pollutant limits on discharge permits are as follows:

- Federal Clean Water Act – National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Load (TMDL) – Added to the CWA in 1992 (currently addressed via the Watershed Implementation Plans)
- Maryland Tributary Strategy and Point Source Strategy
- Other specific regulations that may govern specific watersheds or water bodies (e.g., Patuxent River Watershed – MD Code Section 4-302.1)

The discharge limits imposed on individual treatment plants are primarily determined by the water quality requirements of the receiving stream. Streams are classified by their designated use, (e.g., drinking water source, trout stream, general recreation, etc.) where each classification has associated discharge limits that have to be met to ensure protecting the water quality. The requirement to specify discharge limits was first established under the Federal Clean Water Act (CWA) under the NPDES program.

The second program that can determine the limits imposed on discharge permits is the Total Maximum Daily Load (TMDL) program. The TMDL program is a part of the Clean Water Act and it requires all states to evaluate and compile a list of water bodies that do not fully support beneficial uses such as aquatic life, fisheries, drinking water, recreation, etc. Each water body is evaluated and usually "modeled" to determine the maximum amount of pollutants that can be discharged to it with out impacting the water quality or beneficial use. After determining the maximum allowable quantities of the various pollutants that can be discharged to the body of water, each of the dischargers (i.e., WWTPs, non-point source discharges, etc.) is allocated portions of the TMDL amount. The allocated amount is then incorporated into the facility's discharge permit.

In the last few years, the EPA, in coordination with the states of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC) developed a nutrient and sediment pollution diet for the Bay known as the Chesapeake Bay Total Maximum Daily Load (TMDL). To fulfill the Bay TMDL requirements, MDE developed an allocation process that is contained in Maryland's Watershed Implementation Plan (WIP). The allocation process specifies loading caps for nutrients (N&P) and sediment to each of 58 "segment-sheds" to collectively meet the 2017 target (70% of the total nutrient and sediment reductions needed to meet EPA's final 2020 goals). Maryland's Phase I WIP was submitted to EPA on December 3, 2010. MDE is now working with other State agencies, county and local governments to develop Phase II Watershed Implementation Plans with more detailed reduction targets and strategies to ensure meeting the goals of the Bay TMDL.

Maryland's WIP is requiring that all major WWTPs (i.e., those with a design capacity greater than 500,000 gal/day) to upgrade to meet an Enhanced Nutrient Removal (ENR) level of treatment. There are some facilities that are already meeting ENR treatment requirements as part of the Tributary Strategy program that Maryland had in place for several years.

The Tributary Strategies are broad implementation plans for achieving and maintaining nutrient allocations for the ten major watersheds that drain into the Chesapeake Bay. These allocations were established through the year-2000 Chesapeake Bay Agreement process. Under this program, MDE developed the Enhanced Nutrient Removal (ENR) Load Allocations Table, which establishes nutrient loading caps for 66 major wastewater treatment plants.

The ENR Allocations Table allocated a fixed amount of nitrogen and phosphorus loadings (in lbs/year) to be discharged by each WWTP based on the facility's design capacity and assuming a total nitrogen and total phosphorus concentration of 4 mg/l and 0.3 mg/l, respectively. Therefore, if a WWTP needs to expand and accept additional flows (i.e., users), it has to meet lower concentration limits in order to compensate for the increase in flow.

The ENR Tributary Strategy also controls the nitrogen and phosphorus loadings from minor WWTPs (i.e., those with flow less than 500,000 gal/day). The minor WWTPs are allocated caps based on either their projected year 2020 flow or design capacity: whichever is lower and a nitrogen and phosphorus concentration of 18 mg/l and 3.0 mg/l, respectively. If minor WWTPs need to expand, their loading allocation is limited to a maximum amount of 6,100 lbs/year for nitrogen and 457 lbs/year for phosphorus.

The goal of the Tributary Strategy and now the Watershed Implementation Plans is to eventually have all the major WWTPs meeting ENR levels of treatment, which are 3.0 mg/l for nitrogen and 0.3 mg/l for phosphorus.

Maryland's Bay Restoration Fund (BRF) was also created to provide funding to WWTPs for upgrading to an ENR level of treatment. Priority for the funding is given to major WWTPs.

Either at the time of permit renewal, or due to other circumstances (e.g., WWTP expansion, etc.), any of the regulatory programs listed above could cause more stringent limits be imposed on the discharge permits. EPA and MDE are also including limits in discharge permits for other nonconventional pollutants (e.g., copper, zinc, etc.) along with stricter toxicity biomonitoring requirements and limits. The biomonitoring requires toxicity testing using live macroinvertebrates and fish. Any new limits or toxicity testing that are added to a facility's discharge permits may require an upgrade to the WWTP treatment processes if the facility was not designed to meet those requirements.

Although some of the State WWTPs have been upgraded in the past few years to meet low limits, many have not and . will require improvements to allow meeting more stringent limits. In order to properly plan future WWTP improvements, MES has adopted the following protocols for determining which type facilities may be issued more stringent limits and will need capital improvements to comply:

Major WWTPs (all treatment types):

A few facilities already have treatment systems that can meet an ENR level of treatment. For those that do not meet ENR, capital improvements will be specified to provide ENR level of treatment.

Minor WWTPs:

Lagoon Treatment Systems – Lagoons are an antiquated type of treatment system, which provide at best a secondary level of treatment. They do not remove nutrients to any appreciable extent and as a result discharge ammonia, which can be toxic to fish, and other aquatic life. MDE is moving to impose lower limits for ammonia and other parameters. Therefore, capital improvements will be specified for replacing the lagoon system with a more modern and sophisticated treatment system.

Other Secondary Type Treatment Systems – In addition to lagoons, there are other treatment systems in operation that are not designed to remove nutrients and therefore discharge ammonia and other harmful pollutants. Capital Improvements will be specified to replace or upgrade these systems.

Expanding Facilities – Any of the minor WWTPs that will have flow increases beyond their design capacity will have to meet more stringent limits. In some cases, if the flow increase is not too great, the WWTP may not be required to achieve full ENR level of treatment. Therefore, the nature of the

improvements specified would only be what is needed to meet the anticipated limits for the higher flow.

Note: Even though MES has adopted this protocol to program future CIP needs, these are based on regulations and/or policies that are in effect today. Therefore, this protocol is subject to change in response to new or amended regulations (State or Federal) or policies.

2. Wastewater Treatment Plant Solids Management

All WWTPs produce a solid material by-product as a result wastewater treatment. Regardless of the type of facility, these solids must be removed from the WWTP on a periodic basis in order for the treatment process to function properly. Basically, there are three options available for managing this solid material:

- Disposal into a landfill
- Incineration (burning)
- Recycling the material onto the land for beneficial uses, such as compost, fertilizer, etc.

The first two options, landfill disposal and incineration, while used by some WWTPs, are not without their problems. Dwindling landfill space and rising tipping fees have forced most facilities to explore other options. One advantage of incineration is that it can reduce the amount of material for ultimate disposal by as much as 75%. However stringent Federal air quality regulations (40 CFR 60, Subpart O), volatile energy costs, complexity of operation, and high capital expenditures have increasingly ruled out incineration as an option for most facilities, especially for smaller WWTPs with a capacity of less than 10 million gallons a day (MGD). There are also detrimental environmental impacts associated with incineration, such as excessive energy usage and concerns about greenhouse gas emissions. Finally, negative public perception surrounding incineration makes the execution of these projects almost impossible.

Nutrients in these solids, in the form of nitrogen and phosphorus (and a small amount of potassium) can be recycled onto farmland as a low-grade fertilizer, or used to reclaim land in dire need of revegetation (e.g., strip mined land). These solids also contain organic matter that is also beneficial for the soil. The beneficial reuse of this solid material is a cost-effective option for the recipient farmer as well as the WWTP. MES has already realized significant cost savings by implementing land application programs. Both the U.S. EPA and MDE promote the beneficial reuse of biosolids when done in accordance with the regulations.

Solid material from a WWTP that is treated to meet Federal and State standards for recycling onto land are called "biosolids". Material that is not treated, or does not meet these standards, is labeled "sludge", or "sewage sludge". The current Federal (40 CFR 503) and State of Maryland (COMAR 26.04.06) regulations

prescribe the treatment and management standards for recycling biosolids. These standards were established to protect public heath and the environment.

There are several core regulatory standards that WWTPs must follow before land applying biosolids:

- The concentration of chemical constituents, such as heavy metals, in the biosolids product must be under certain limits.
- Solids must be treated to significantly reduce pathogenic organisms. This treatment, called stabilization, is usually done at the WWTP prior to land application. Stabilization processes can be classified as:
    - Physical/chemical in nature, such as adding copious amounts of lime to kill pathogens (lime stabilization),
    - Biological treatment processes. Examples of biological treatment processes include anaerobic digestion, (subjecting the sludge solids to bacterial degradation for an extended period of time in a heated tank in the absence of oxygen), or aerobic digestion, which involves aerating the solids.
    - Time/temperature treatment, such as composting or heat drying the solids to produce a fertilizer pellet.
- The solids must be sufficiently treated so that the likelihood for disease transmitting organisms, called vectors, to be attracted to the biosolids is reduced. Vectors include flies, mice, mosquitoes, etc.
- Biosolids must be managed at the final reuse site in such a manner as to not cause a public health, nuisance, or environmental problem. These management practices can include procedures such as incorporating the biosolids into the soil at a farm site, or including directions to homeowners for use of a compost product.

Maryland is regarded as having an extensive biosolids regulatory program. One aspect of this program is that it requires mandatory, site-specific nutrient management plans be prepared for each farm site where biosolids is to be land applied. Nutrient management reduces the potential for nitrate-nitrogen contamination of groundwater, and phosphorus runoff into surface waters. MDE's regulations are more rigorous than the Federal rules, requiring more site practices to control nuisance factors (such as odors). Approximately 80% of the biosolids generated in Maryland are recycled in some manner, whether onto agricultural land, or through the sale and distribution of highly treated biosolids products such as compost or heat dried fertilizer pellets.

The nutrient management program is administered by the Maryland Department of Agriculture (MDA). In an effort to reduce nutrient pollution from non-point sources, MDA is in the process of revising its Nutrient Management Guidelines to

severely limit the practice of land applying biosolids and animal manures in the winter .Although currently all of MES' biosolids are land applied out-of-State where the restrictions are less stringent (i.e., Virginia) this change in the Nutrient Management Guidelines could affect the operation of our facilities if land application operations revert back to Maryland. This would necessitate either the construction of biosolids storage structures at of our State-owned Regional Sludge Management Facilities at considerable cost, or the installation of advanced sludge treatment processes to reduce the volume of solids being removed

MDE is also currently in the process of preparing comprehensive revisions to their biosolids regulations. It is envisioned that these new regulations will impose more stringent requirements, especially with respect to biosolids testing/monitoring, site controls, compliance inspections/permitting, and documentation of stabilization processes. Much of the revisions are in response to the public's demand for greater oversight of the land application program.
Future regulatory changes could also impose more stringent biosolids processing requirements on WWTPs, called "Class A" stabilization, such as composting and heat drying. These Class A processes reduce pathogens to near non-detectable levels. The general public's concern about pathogens is motivating the change to Class A stabilization processing; many WWTPs have already voluntarily implemented Class A stabilization to address these concerns. It is anticipated that MES will ultimately follow this industry trend, and eventually request funding for Class A processing.

In an effort to more efficiently manage biosolids from MES's facilities, the Agency currently utilizes a "regional" sludge management approach. Sewage sludge from most of MES' smaller facilities that do not meet the standards for recycling onto land is transported to larger WWTPs for further processing and stabilization. These stabilized, treated biosolids from the Regional Sludge Management Facilities are then land applied by a contractor. MES operates Regional Sludge Management Facilities at three State-owned WWTPs. One advantage of the regional approach is that economies of scale are achieved at the larger facilities, thus avoiding the need for constructing costly, separate stabilization processes at each of the smaller WWTPs. It also reduces staff time associated with regulatory monitoring at each of the smaller WWTPs.

A major disadvantage of the regional approach is that stabilization process reliability and equipment redundancy is critical. Sludge processing at the Regional Facilities must be more robust to avoid sludge disposal interruptions on the smaller, satellite State-owned WWTPs. Capital funding should be directed towards ensuring that biosolids processing equipment reliability at the regional facilities is maintained.

3. Wastewater Treatment Plants Using Land Disposal

Numerous WWTPs do not use stream discharge for the treated effluent and rely on spray irrigation to the land surface, underground discharge (i.e., drain field), or similar means. These type facilities are also facing more stringent discharge requirements. This is due to the recognition by MDE that ground disposal systems can contaminate groundwater supplies (i.e., drinking water wells) and migrates through the ground to discharge to streams and ultimately the Chesapeake Bay. To alleviate some of this pollution source, MDE included in the Tributary Strategies a provision that allows abandoning septic systems and connecting those users to sewers and treatment systems with a stream discharge. This provision is based on the assumption that septic systems provide only minimal nutrient removal and the untreated nutrients will eventually make their way to the Chesapeake Bay. The low level of treatment provided by septic systems is then off set by the high level of nutrient removal that is now possible with the newer ENR treatment technologies.

Just as with WWTPs that discharge to streams, MDE is also imposing lower limits on groundwater discharge permits to reduce the amount of nitrogen that is ultimately discharged to the Bay and to groundwater supplies. The limit for Total Nitrogen can be as low as 8 mg/l. These low limits are primarily imposed on the larger systems with flows over 5,000 gal/day. The Bay Restoration Fund also collects fees from users with On Site Sewage Disposal Systems (OSDS) (i.e., septic systems) and other ground disposal systems. MDE offers BRF grants for upgrading OSDS systems to provide increased nitrogen removal. Priority at this time is being given to those systems in the Critical Area or to those systems which are failing.

MES will either request BRF funding or Capital Improvement funds to upgrade any OSDS system that may be subject to more stringent discharge limits and/or would represent a good opportunity to upgrade to further reduce nitrogen being discharged to the Bay.

B. Water Treatment

The quality of drinking water that is produced is very strictly regulated under the EPA and Maryland's Safe Drinking Water Act. The water treatment plants that use surface water supplies (e.g., lakes, reservoirs, and streams) have much more stringent requirements that have to be met compared to those using groundwater (i.e., wells) as their source water. Two of the new regulations associated with surface water have decreased Maximum Contaminant Levels (MCLs) in drinking water and one new regulation requires higher removal of contaminants, which may require specific capital improvements at specific water treatment plants. These regulations are listed below:

- Stage I Disinfection By Product Rule - Total Trihalomethanes MCL of 80 ppb and Total Halocetic Acids MCL of 60 ppb
- Turbidity Maximum Contaminant Levels of 0.30NTU
- Enhanced Surface Water Treatment Rule – Requires 2 to 3-log removal of Cryptosporadium

Also, a Groundwater Rule requires 4-log virus removal, which may require installation of filtration in some of groundwater plants. Therefore, specific capital improvements that would be needed to meet new or more stringent regulations will be addressed at specific water treatment plants.

C. Water Reuse

The reuse of treated wastewater is becoming more and more popular in many parts of the country, resulting in a second "purple" water distribution system. The need for this is caused by the inability of the water sources to be able to meet the ever-increasing demand. Given the physical limitations (e.g., available land) and the regulatory requirements imposed on water and wastewater systems, water reuse and reclamation is not only good environmental stewardship, but is also now recognized as a way to save power and O&M costs, facilitating compliance with water or wastewater regulatory requirements. MES would recommend the implementation of any water reuse projects. Water reuse is already performed at the Eastern Correctional Institution (ECI) where the treated wastewater effluent is sent to the Cogeneration Plant for use in their cooling towers. This could be expanded to use for irrigation, toilet flushing, and other non-potable uses. Although no new projects have been identified, MES will continue to look for possible opportunities to reuse treated wastewater at State facilities.

IV. WATER/WASTEWATER INFRASTRUCTURE CIP SUMMARY

MES provides some level of operations and maintenance services to a total of 65 State facilities. The water and wastewater infrastructure utility systems at these facilities falls under one of the following categories:

- Water Source
- Water Treatment Plant
- Water Distribution
- Wastewater Treatment / Onsite Sewage Disposal System
- Wastewater Collection/Conveyance

MES does not provide operations and maintenance services for all these categories at all the facilities. There are many facilities where the State Agency operates one or more of the utility systems or it may receive service from a nearby municipality, county, or sanitation district.

The level of services that MES provides is described in each of the facility descriptions and is summarized in Table I. Table I lists all the facilities by Agency and gives the entity (e.g., MES, DNR, etc.) that is providing the services for that infrastructure category.

In preparing the 2008 Master Plan, only those systems that are operated by MES were evaluated for capital improvement needs and listed on the MES CIP Request. Out of the 65 total facilities, a total of 39 specific capital improvement projects have been identified and listed in the CIP funding schedule that extends to FY2021 (see Table II). The total CIP request for all 10 years is $64,643,000 with a total project costs estimated to be $98,898,000. The CIP request is less than the total project costs due to other funding sources that will pay their share of the costs (e.g., Freedom District WWTP) and due to CIP funding already received (e.g., ECI).

The MES project ranking system provided a consistent methodology to prioritize and rank the projects and spread the requested funding out over the next 10 years. Table II provides a list of all the projects, their ranking, the State agency, and the amount and year that the funding is requested.

TABLE I

State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
DNR					
Albert Powell Hatchery	DNR	DNR	DNR	MES	DNR
Big Run SP	MES	MES	MES	DNR	DNR
Calvert Cliffs SP	MES	MES	DNR	DNR	DNR
Camp Bay Breeze	MES	MES	DNR	DNR	DNR
Cunningham Falls SP	MES	MES	DNR	DNR	DNR
Dahlgreen Area - South Mt. SP	MES	MES	MES	DNR	DNR
Dan's Mountain SP	MES	MES	DNR	DNR	DNR
Deep Creek Lake SP	MES	MES	MES	Garrett Co	MES
Echo Lake Area - South Mt. SP	MES	MES	DNR	DNR	DNR
Elk Neck State Park	MES	MES	MES	MES	MES
Fair Hill NRMA	MES	MES	DNR	DNR	DNR
Fort Frederick SP	MES	MES	MES	MES	DNR
Gambrill SP	MES	MES	DNR	DNR	NR
Gathland SP	MES	MES	DNR	DNR	DNR
Greenbrier SP	MES	MES	DNR	MES	DNR
Greenwell SP	MES	MES	DNR	DNR	DNR
Herrington Manor SP	MES	MES	DNR	DNR	DNR
New Germany SP	MES	MES	DNR	MES	DNR
Pocomoke SP- Milburn & Shad Landing	MES	MES	DNR	DNR	DNR
Point Lookout SP	MES	MES	DNR	MES	DNR/MES
Rocks SP	MES	MES	DNR	DNR	DNR
Rocky Gap SP	MES	MES	MES	MES	MES
Sandy Point SP	MES	MES	DNR	DNR	DNR
St Mary's River State Park	MES	MES	DNR	DNR	DNR
Susquehanna State Park	MES	MES	DNR	DNR	DNR
Swallow Falls SP	MES	MES	DNR	MES	DNR
Washington Monument SP	MES	MES	DNR	DNR	DNR

MD Dept of Veterans Affairs					
Charlotte Hall Veterans Home	MES	MES	MDVA	MES	MDVA

MD Dept of the Military					
Brig. Gen. Thomas Baker Training Site	MES	MES	MES/MM	MM	MM
Camp Fretterd	MES	MES	MM	MES	MM
Frederick Armory	MES	MES	MM	MM	MM
Gunpowder Military Reservation	MM	MES	MM	MM	MM

MD State Police					
Barrack V - Berlin	MES	MES	MSP	MSP	MSP

TABLE I
State of Maryland Water and Wastewater Facilities
Distribution of Operational Functions
Table I (cont.)

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
State Highway Adm.					
Bay Country Welcome Center	MES	MES	SHA	MES	SHA
Centreville Maintenance Shop	SHA	SHA	SHA	MES	SHA
Green Hill Cove				MES	SHA
I-68 Rest Stop	MES	MES	SHA	SHA	SHA
I-68 Visitor Center	MES	MES	SHA	SHA	SHA
I-70 Rest Stop	SHA	MES	SHA	MES	SHA
Leonardtown Maintenance Shop	SHA	MES	SHA	MES	SHA
Sideling Hill Visitors Center	MES	MES	SHA	MES	MES
University System of Maryland					
Ag. Exp. Sta. - University of MD	MES	MES	U of M	U of M	U of M
Horn Point Lab - University of MD	U of M	U of M	U of M	City of Cambr	MES
St Mary's College	MES	MES	MES	St. Mary's Col	MES
DHMH					
Crownsville Hospital Center	MES	MES	DHMH	MES	DHMH
Freedom District	Carroll Co	Carroll Co	Carroll Co	MES	Carroll Co
Rosewood State Hospital	Balto. Co.	Balto. Co.	DHMH/MES	Balto Co.	DHMH
Springfield Hospital Center	Carroll Co	Carroll Co	Carroll Co		DHMH
DJS					
Backbone Mountain Youth Center	MES	MES	MES	DJS	DJS
Chelteham Youth Facility	MES	MES	DJS	MES	DJS
Green Ridge Youth Center	MES	MES	MES	MES	MES
Meadow Mt. Youth Center	MES	MES	MES	DJS	DJS
Savage Mt. Youth Center	MES	MES	MES	DJS	DJS
Thomas O'Farrell / Henryton	Carroll Co.	Carroll Co.	Carroll Co.	Carroll Co.	MES*
Victor Cullen Center	Washington Co.	Washington Co.	DJS	MES	DJS
DPSCS					
Eastern Correct. Inst. - Cogen Plant	MES	MES	DPSCS	MES	DPSCS
Eastern Correctional Institution	MES	MES	DPSCS	MES	DPSCS
Eastern Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
Jessup Complex - Dorsey Run WWTP	AA Co	AA Co	DPSCS	MES	DPSCS
MCI - Hagerstown	Hagerstown	Hagerstown	DPSCS	MES	DPSCS
Poplar Hill Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
So. MD Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
WCI & NBCI	Cumberland	Cumberland	DPSCS	Cumberland	MES*

*Pumping stations only

TABLE II

2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN

CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
HOLD	N/A	Eastern Correctional Institution - Cogen	Upgrade electrical control system.	Waiting for discussion/input from Environmental Ops before proceeding.	2017	2018	DPSCS	$3,500,000	$3,500,000									
1	73	Eastern Correctional Institution WWTP	New treatment plant; including the RO Reject system	Design expected to start in May 2011. FY11 REQUEST (12.126M - C)	2013	2015/2016	DPSCS	$26,730,000	$19,500,000	$1,950,000		$7,000,000	$10,550,000					
2	69	Freedom WWTP	Upgrade plant to 5 stage bardenpho process, and upgrade solids handling facilities.	Under Compliance Schedule. Negotiating a Consent Agreement w/MDE. FY12 REQUEST (1.4M - P)	2013	2014	DHMH	$18,000,000	$2,300,000	$1,566,000	$734,000							
3	65	Rocky Gap SP - WTP	Needs new plant.	Preliminary Design Report conducted; Needs new plant designed (have design funds). MES waiting on direction from DNR before moving forward w/final design. FY12 REQUEST (2.65M - C)	Design Funds Secured	2013	DNR	$3,729,000	$3,000,000	$3,000,000								
4	65	Rocky Gap SP - WWTP	Needs new plant.	Water usage unknown. Meeting permit requirements; monitoring for BOD, TSS, and Temperature (should not exceed 68 degrees). Water usage estimated to increase 140K gpd and wastewater 120K gpd. Current WWTP designed for 120K gpd. Existing plant cannot accommodate any further growth.	2013	2014	DNR	$3,000,000	$3,000,000	$300,000	$2,700,000							
5	62	Charlotte Hall VA Home - WW	WWTP: Repair or replace pond's liner system; replace floating boom; additional floating boom; install four (4) aerators/mixers; replace irrigation valves and nozzles; install sodium hypochlorite feed system; develop reserve RIB; construct equalization basin; construct perimeter fence; rehab effluent pump station pipe; and abandon monitoring well no. 5 located in RIB2. WW COLLECTION: for pump station no. 1 install grease trap, install influent channel w/bar screen, separate valve vaults and check & gate valves, alarm system, real time monitoring device; for pump station no relocate electrical box to above ground location, install real time monitoring device.	Design 80% complete, RIBS may stay on Wish List. Nitrogen compliance issue. Plant capacity 60K pd; ADF 40-42K pd. Not meeting permit requirements; 3 violations in last year.	Design Funds Secured	2013	DVA	$3,667,000	$3,457,000	$3,457,000								
6	61	Cunningham Falls SP - WW Collection & Water Distribution Systems	WASTE WATER ($918K): Install HDPE Force Main thru existing gravity lines; grouting of annular space in sewer lines and MHs; and install 10 pump stations. WATER ($100K): Evaluate and replace leaking pipes in distribution system in Manor Area.	WASTE WATER: System consists mostly of terra cotta pipe and due to rocky soil and high groundwater table, it has severe I/I. The wastewater is conveyed over 3 miles to Thurmont for treatment. The Park pays for every gallon treated and as a results pays over $40K a year just to treat the extraneous I/I flows. WATER: Due to age of the distribution system, leaks becoming more frequent, requiring an operator to "camp out" at plant until leak is repaired to meet demand. Equipment - Filter media requires replacement, the piping in the clarifier is corroded and undersized, components of the clarifier have recently deteriorated and required re-fabrication. Tanks and piping were repainted several years back and starting to show corrosion again. Level control floats are extremely corroded and filter valves are leaking. Clearwell is undersized for peak demand.	2013	2013	DNR	$1,238,000	$1,238,000	$200,000	$1,038,000							
7	60	Victor Cullen -WWTP	Consider SBR or activated sludge. Rebuild bar screen. New 50K gpd plant; utilize existing buildings.	Occasional Ammonia limit (8) violations during winter. Currently a rock trickling filter w/fixed nozzles. Needs new bar screen. Plant rated/permitted at .05 MGD. Serves approximately 135 people.	2013	2014	DJS	$2,516,000	$2,516,000	$216,000	$2,300,000							

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
8		State Water Towers	Minor rehab & painting	Camp Fretterd (Witches Hat) (200K) ($448.2K); MCI-H (Standpipe) (300K) ($511.4K); Victor Cullen (300K) ($544.4K); , FY12 REQUEST (970K - P/C)	N/A	2013		$1,504,000	$1,504,000	$1,504,000								
9	62	Charlotte Hall VA Home - WTP	Construct a new, separate treatment building next to existing treatment to house softening units and store salt and other chemicals.		Design Funds Secured	2014	DVA	$210,000	$210,000		$210,000							
10	60	MCI -WWTP	Replace gas chlorine storage and feed system with UV disinfection units; cover the two (2) secondary clarifiers launders; Install fermentation tank; install denitrification filters and associated carbon source feed system; install treated wastewater supply system for washing belt and polymer mixing during sludge dry; replace existing emergency 1200KVA generator; construct pole building for equipment and chemical storage; paint 300,000 gallon standpipe; design and construct new 500,000 gallon elevated storage tank.	No violations. Nitrogen & Phosphorus added 01/01/11. Waiting to learn of state's share (ENR grant - $$$ unknown); Possibly $3M each. MDE first wants feasibility study conducted - MES has funds for study (not going to BPW until June or July 2011). DNR Component: Automation, DO monitors, pumps, alkalinity addition. sulfur dioxide and 1 ton chlorine storage (safety issue). FY12 REQUEST (3.7M - P/C)	Design Funds Secured	2014	DPSCS	$6,000,000	$3,000,000		$3,000,000							
11	55	Southern MD Pre-Release -WWTP	New plant - MBR Plant	Design 80% complete; Existing plant is a buried steel tank. Holes visible above ground. No violations. Electrical system in a trailer (violated code). 20 year old plant. FY12 REQUEST (1.471M - P/C)	Design Funds Secured	2014	DPSCS	$3,000,000	$3,000,000		$3,000,000							
12		State Water Towers	Minor rehab & painting	Crownsville Hospital (Front) (250K) ($450,000); Victor Cullen (75K) ($300,000). MCI -H (500K Elevated) ($625,000) Does not required design.	N/A	2014		$1,375,000	$1,375,000			$1,375,000						
13	55	Cunningham Falls SP - WTP	New water treatment plant	Manual system; must have staff 8 hrs/day during summer season. While plant is currently operational, it was constructed in 1973 and is at the end of its useful life. Major deficiencies include: Total manual operation, very inefficient, operator must be onsite at all times when plant is running. Examples - Backwashing is problematic, no flexibility with backwashing due to requirement of operator onsite. Significant safety risk - operators must reach into the panel to pull relays to start and stop the plant. Relays must be pulled when plant is offline due to frequent lightning strikes which cause severe damage to controls.	2015	2015	DNR	$3,000,000	$3,000,000			$3,000,000						
14	55	WCI -WWPS (old)	Move controls above ground; need new pumps; inline grinder requested for bypass channel.	Steel wet well - rusting out. Confined space (safety concerns)	2015	2015	DPSCS	$750,000	$750,000			$750,000						

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
15	50	**Camp Fretterd - WTP & WD**	**WATER:** Relocate switches from main electrical panel to a separate, weatherproof enclosure; replace heaters in storage and treatment areas; replace roof; install mission control unit; construct new treatment facility for proposed new well; construct new well at higher elevation; construct new elevated tank; paint 100,000 gallon elevated water storage tank. **WASTEWATER:** replace two (2) submersible pumps in duplex pump station.	Design based on Watek's recommendations can begin on or after June 2011. WTP: only 1 well exists. DS: need booster station, close loops. FY11 REQUEST (236K - P) FY12 REQUEST (188K - P)	2015	2017	MM	$1,970,000	$1,970,000			$197,000		$1,773,000				
16		**State Water Towers**	Minor rehab & painting	ECI (Front) (500K) ($625,000); Sandy Point (100K) ($175,000)	2015	2015		$800,000	$800,000			$800,000						
17	49	**Poplar Hill**	Propose new mechanical plant.	Lagoon system; spray field.	2017	2018	DPSCS	$3,160,000	$3,160,000					$316,000	$2,844,000			
18	47	**Swallow Falls SP - WWTP & WTP**	New plant; maybe SBR.	Lagoon based system; Can not discharge in summer; from 7 days before Memorial Day through 7 days after Labor Day. 2/3 cost estimate for WW. 60K gpd.	2017	2019	DNR	$3,688,000	$3,688,000					$368,800		$3,319,200		
19	41	**Fair Hill NRMA - WTP & WD**	Propose new plant and tank	Lead paint & glass lined tank. WTP control center in metal shed.	2017	2018	DNR	$1,709,000	$1,709,000					$170,900	$1,538,100			
20	40	**St. Mary's College**	**WDS:** Replace 3-inch piping student residences; close loops at seven (7) locations; new service line to Admissions building and ww pumping station. **WTP:** Replace flow meter at well no. 1; install automated well controls.	Design underway. Construction ready drawings scheduled for completion in August 2011.	2017	2017	UNIVERS.	$636,000	$636,000					$636,000				
21	39	**Cheltenham -WWTP**	**WASTEWATER** - Install new headworks; upgrade electrical service; install new blowers; replace RBC's with SBR's; construct building for new treatment plant; replace valves; upgrade Dynasand filters; install continuous DO meter. **WATER** - Repair Well #2; relocate hypo and Day tanks to existing chlorine room; paint storage tank.	Digester needs work w/aeration system.	2017	2018	DJS	$7,050,000	$7,050,000					$705,000	$6,345,000			
22		**State Water Towers**	Minor rehab & painting	**Crownsville Hosp** (Back) (250K) ($375,000) (2017); **Elk Neck S.P.** (60K) ($150,000) (2017); **Charlotte Hall** (250K) ($375,000) (2018); **Rocky Gap** (500K) ($625,000) (2019); **Camp Fretterd** (300K) ($450,000) (2019)	2017	2017		$1,975,000	$1,975,000					$1,975,000				
23	35	**Gunpowder (MNG)**	Extra well needed. Update controls. Heating system in poor condition. Fence around small reservoir.	Operating on only 1 well.	2020	2021	MM	$116,000	$116,000								$11,600	$104,400
24	34	**Eastern Pre-Release - WWTP**	Propose new WWTP.	Lagoon system; discharge to stream. Lagoon dredging completed Spring 2011. Currently 20K gpd.	2020	2021	DPSCS	$3,160,000	$3,160,000								$316,000	$2,844,000

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
25	27	**Meadow Mountain Youth Center -WS**	Repair treatment building roof leaks. Construct new well.		2020	2020	DJS	$256,000	$256,000								$256,000	
26	20	**U of M Agr Center -WTP&WD**	New treatment control building for Well #1 to replace "shed" like structure. Add 500 gallon storage at treatment building in case line to tower is interrupted. Construct new water treatment facilities for Well #2. Backfill well vault and extend well above grade. Rehab Well #2.	Not a reimburseable project - but could become one.	2020	2020	UNIVERS.	$402,000	$402,000								$402,000	
27	17	**O'Farrell Youth Center (Henryton) - WWPS**	Replace building door, build curb around grinder channel, paint generator fuel tank.	NOT CIP; Maintenance item.	2020	2020	DJS	$20,000	$20,000								$20,000	
28	40 HOLD - push back as far as possible until clear scope of work defined	**Savage Mountain Youth Center - WS**	Maintain with acid wash; scrap new well. Evaluate for water re-use.	First wanted replacement well - not feasible at this site - too difficult to find water. NOT CIP; Maintenance item.	2021	2021	DJS	$497,000	$497,000									$497,000
						GRAND TOTAL		**$103,658,000**	**$76,789,000**	**$12,193,000**	**$12,982,000**	**$13,122,000**	**$10,550,000**	**$5,944,700**	**$10,727,100**	**$3,319,200**	**$1,005,600**	**$3,445,400**

Agency Summary

Department of Veterans Affairs

Introduction

The Maryland Department of Veterans Affairs (MDVA) is an Executive Department in the Maryland State Government and has a service mission to:

- Provide representation to the U.S. Department of Veterans Affairs. The Agency also provides referrals to other federal, state, and local government agencies for benefits that may be available to eligible individuals
- Manage and operate authorized Maryland State Veterans Cemeteries and a Civil War Cemetery
- Maintain and care for memorials for the Maryland Vietnam, Korean, and World War II Veterans.
- Manage Charlotte Hall Veterans Home
- Provide staff support and assistance to State Veterans Commissions

The Maryland Environmental Service (MES) provides water and wastewater services to following facility:

Facility Name	Water Source	Water Treatment	Water Distribution	Wastewater Treatment	Wastewater Collection
Charlotte Hall Veterans Home	MES	MES	MDVA	MES	MDVA

Agency Capital Improvement Plans

MES requested a copy of the MDVA Capital Improvements Master Plan and were informed one did not exist. Therefore the Agency's plans for expansion or proposed change in use are not known at this time. Agency's five-year plan submitted to the State does not project improvements for this planning period.[1]

Capital Improvement Plans for Facilities Served by the Maryland Environmental Service

MES provides both water and wastewater services to the facility listed above. The following section provides summaries of the proposed capital improvement needs. More detailed descriptions of this facility are included in the Water & Wastewater Facility Master Plan Report.

[1] State of Maryland, Department of Budget and Management, FY 2009 – 2013 Capital Improvement Plan, http://dbm.maryland.gov/dbm_publishing/public_content/dbm_taxonomy/budget/capital_budget/capital_improvement_plans/toc_fy2009_2013capimprovplan.html

Charlotte Hall Veterans Home

Wastewater Treatment Plant

- Evaluate and repair or replace the pond's liner system;
- Replace the existing floating boom and add an additional floating boom to create anoxic/aerobic zones in the pond to enhance nutrient removal;
- Install two new aerators/mixers: Out of four, two were replaced recently.
- Repair pond's concrete pier and replace outlet gates.
- Replace existing header and lateral pipes for spray irrigation fields
- Repair or replace valves for spray irrigation fields
- Install spray nozzles where needed
- Repair spray field pipe bedding conditions as needed
- Install sodium hypochlorite feed system as required under permit conditions.
- Develop reserve RIB if needed.
- Refurbish the basins with new distribution piping
- Repair the bed of each RIB to allow higher infiltration rates of wastewater into the ground.
- Construct an equalization basin to regulate flows to the new treatment system.
- Evaluate the current air supply to the Biolac System and add blowers to meet the air demand and provide redundancy.
- Construct a perimeter fence around the Biolac Treatment System to protect leaves from entering treatment tanks.
- Replace the soda ash feed system if necessary.
- Rehabilitate the piping associated with the effluent pump station.
- Abandon the monitoring well No. 5 located in RIB 2, and install a new monitoring well at an appropriate location.

MES has retained the services of an A/E firm to evaluate the existing wastewater treatment facility and design a new advanced treatment system to replace the existing facility. The design is 80% complete. MES is also planning to pilot a new advanced treatment system in the Fall of 2011.

Wastewater Collection System

- Replace existing Pump Station 1 with a concrete wet well and submersible pumps.
- Install a comminutor at Pump Station 1.
- Install a grease trap upstream of Pump Station No. 1
- Provide an influent channel with a bar screen for pump station No. 1
- Construct separate valve vaults and install check and gate valves for pump station No. 1
- Install an alarm system and a real time monitoring device for pump station No. 1
- Relocate the electrical box from inside the wet well to an above ground location in pump station No. 2

Water Treatment Plant

- Construct a new, separate treatment building next to the existing treatment building to house softening units and store salt and other necessary chemicals.

Projected Cost: $ 3,300,000
Planning and Design: 2013
Construction: Fiscal year 2014

The Maryland Environmental Service Water and Wastewater Master Plan projects the cost for upgrades to Department of Veterans Affairs water and wastewater facilities through Fiscal Year 2021 to be **$ 3,300,000**.

FACILITIES NOT SERVED BY THE MARYLAND ENVIRONMENTAL SERVICE

There are several facilities that fall under the jurisdiction of the Department of Veterans Affairs but are not served by Maryland Environmental Service; local jurisdictions or sanitary authorities provide water and/or sewage collection and treatment services. A description of the facilities and water and wastewater services for each is not included within this document. Information on these systems may be included in future updates to this plan. MES recommends the existing infrastructure be evaluated at these facilities to avoid potential disruption to future water and sewerage services.

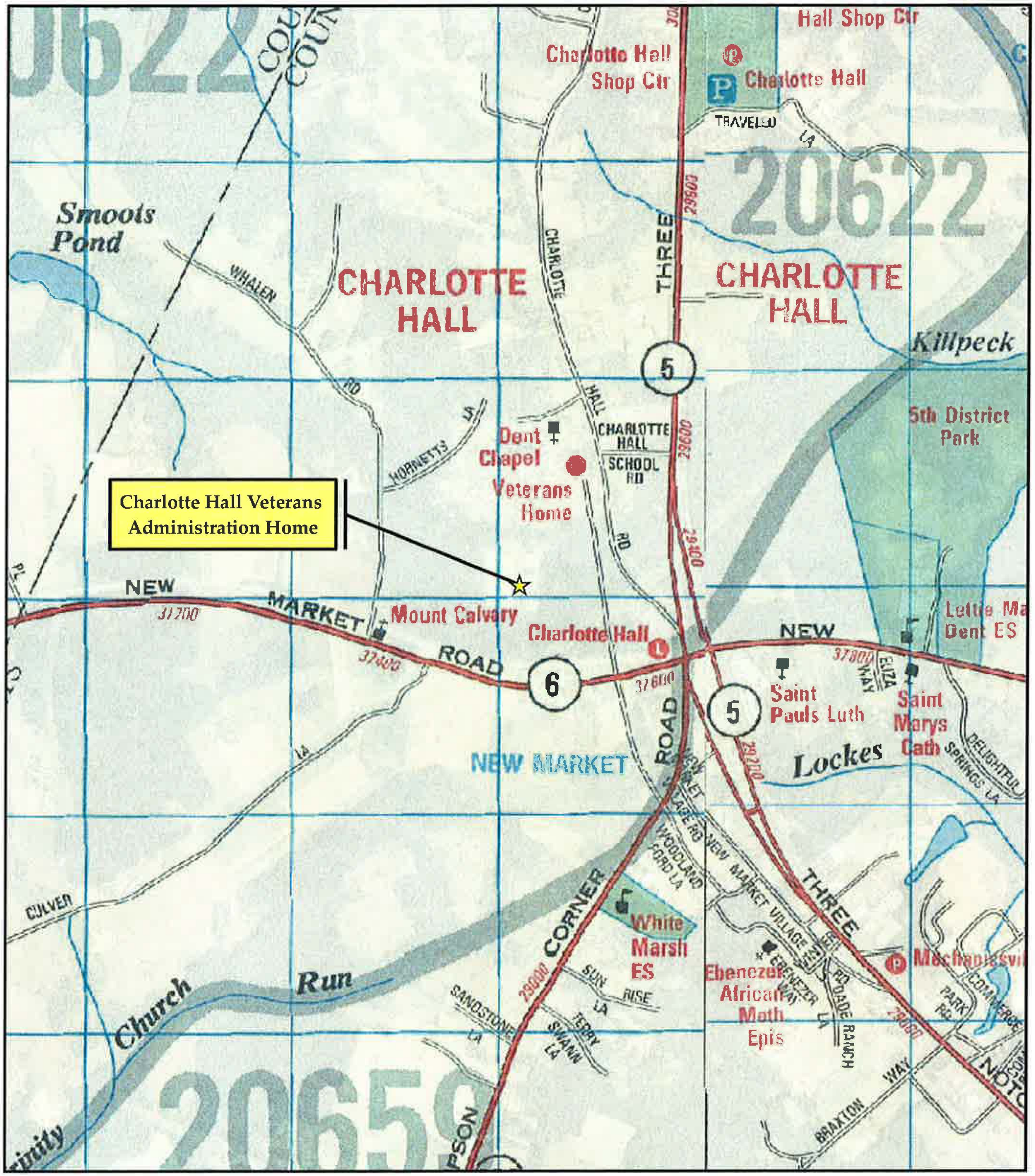
SUMMARY

Detailed descriptions of the water and wastewater facilities operated by MES for the Department of Veterans Affairs are included in this volume, as well as the following information:

- Operations data
- Regulatory compliance history and future regulatory constraints
- A listing of operational and infrastructure deficiencies
- Capital improvements and major maintenance funding history
- Recommended improvements and estimated costs (in 2008 dollars)
- Proposed schedule of implementation
- Supplemental information

MES will continue to work closely with the MDVA to keep abreast of their planning activities to ensure there will be an adequate water supply and sewerage service for proposed facility expansions or changes in use.

Charlotte Hall Veterans Home



☆ Sites

Water and Wastewater Master Plan 2008

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

Figure 1

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

0 500 1,000 1,500 2,000
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

CHARLOTTE HALL VETERANS HOME

BACKGROUND

Charlotte Hall Veterans Home is an assisted living and skilled nursing long-term facility for Maryland (MD) Veterans. The facility is a program of the MD Department of Veteran Affairs (DVA). The facility is located on 126 acres in Saint Mary's County, approximately 2 miles south of Charles County off of MD Route 5. The home was opened in 1985 and has 504 beds. The home currently has 384 residents and 320 staff.

The home consists of four (4) buildings. The main building consists of administrative offices and patient residences (Wings A and B). Two (2) other buildings consist of patient residences (Wings C, D and E). The fourth building is dedicated to the maintenance staff offices, equipment, and storage.

According to the five-year plan (2013-2017), there are no projected expansions for this facility. Therefore, there is no expected impact on water and wastewater demand. The Master Plan for this facility was not available for review.

The Home maintenance staff operates and maintains the water distribution system and the wastewater collection system. Maryland Environmental Service (MES) operates the water treatment plant and wastewater treatment plant.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The Charlotte Hall Veterans Home waterworks consists of two (2) wells, a sodium hypochlorite disinfection and treatment facility, a 250,000 gallon elevated water storage tank, and a distribution network. The groundwater water system is rated for 70,000 gallons per day. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER DISTRIBUTION

The Veterans home has two (2) wells. Well No. 1 is located in a grassy area, close to the treatment building. Well No. 2 is located outside the treatment plant fence. The water distribution system consists of a 250,000 gallon elevated water storage tank, and approximately 4,500 feet of 4-inch, 6-inch, and 8-inch water distribution mains and service lines. Please refer to Supplemental Information Section – Facility Description – WS & WD.

C. WASTEWATER TREATMENT PLANT

The Charlotte Hall Veterans Home wastewater treatment plant consists of a manual bar screen, a Biolac nutrient removal treatment system, a clarifier, a sludge storage tank, a 5.2 million-gallon lagoon, chemical feed facilities for soda ash, and chlorine, three rapid infiltration basins, and a six (6) acre spray irrigation field. Please refer to Supplemental Information Section – Facility Description - WWTP.

D. WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of two (2) pump stations, approximately 2,500 feet of gravity sewer pipes ranging from 6 to 8 inches, and approximately 23 manholes. There are also approximately 1,400 feet of 6-inch force main. Please refer to Supplemental Information Section – Facility Description - WWCS.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

The average and peak water flows for this facility in 2010 was 49,915 gallons per day and 115,000 gallons per day, respectively. The average and peak wastewater flows for this facility are 25,063 gallons per day and 45,000 gallons per day, respectively.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

Wastewater Treatment Plant

- The 5.2 MG pond is in various stages of deterioration. Several sections of the pond liner are torn, which could allow wastewater to infiltrate and contaminate the ground below.
- Two (2) of the four (4) existing aerators/mixers in the pond are inoperable and have been removed from the pond.
- The gates on the outlet structures of the pond are in a state of disrepair.
- The existing floating boom that serves as a baffle is inoperable
- The spray fields, which remained unused or the last six (6) years, have recently been activated after some temporary repairs. The above ground piping has corroded significantly.
- The rapid infiltration basins, which had lost full treatment capacity due to the accumulation of sediment and biosolids have been rehabilitated. Some of the distribution valves have been replaced as well.
- The Biolac diffuser assemblies were recently cleaned and restored to near normal operations. Treatment efficiencies have significantly increased. The Biolac system receives influent wastewater from Pump Stations 1 and 2.. Elevated wastewater temperatures from Pump Station 2 discharges have been a matter of concern. However, the issue has been resolved by the Home maintenance staff.. The Biolac system also lacks an enclosure/fence and is exposed to tree leaves that can disturb the normal operation of treatment units. The chemical feed pump for soda ash supplied to the Biolac system is not operating properly and needs to be replaced.
- The discharge piping for the effluent pumps shows signs of corrosion.
- The location of the monitoring well in the middle of RIB 2 makes this well susceptible to contamination. Several past results have indicated that fecal coliforms were detected in higher number than typically observed.

MES has retained the services of an A/E firm to evaluate the existing wastewater treatment facility, and design a new advanced treatment facility, which would enable the discharge of high quality wastewater for groundwater disposal via the RIBS. The design is 80% complete. MES is also planning to pilot a new and advanced wastewatwer treatment system at Charlotte Hall in September 2011.

Wastewater Collection System

- Several mechanical components of pump station No. 1 require constant refurbishing, such as resetting the guard rails, unclogging pump impellers, and

motor burnouts. This station experiences frequent clogging due to high grease content in the wastewater. Also the configuration of the pump station makes maintenance access difficult for valves and other equipment. The steel wet well has corroded significantly. An alarm system has recently been installed following two (2) incidents of basement flooding inside the Home.
- Pump station No. 2 lacks a basket/strainer prior to the pump suction line for trapping large debris. The existing inlet electrical box is set inside the wet well. This box must be relocated due to safety concerns. It is also recommended to install an alarm and communication-monitoring device.

Water Treatment Plant

- According to the Veterans Home Maintenance staff, water pumped from the wells is softened in ion exchange units located inside the Home to reduce hardness to minimize damage to the boilers and the laundry equipment located in the basement areas of the individual wings. It is unknown whether the entire supply of water consumed at the facility is processed in the softeners. Currently, the Veterans Home Maintenance staff operates 3 salt-based Culligan softening units at various locations. Salt (estimated use 4 tons per month) for water treatment is manually carried to the 3 locations as needed. This is labor intensive and poses a health and safety risk for residents and staff.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The Charlotte Hall Veterans Home wastewater treatment plant had four (4) violations in the past 15 years. In April 2007, pH was exceeded about four (4) times within a period of two (2) weeks due to the seasonal lagoon flip over. The groundwater discharge permit is set to expire in 2012. Maryland Department of Environment (MDE) may impose new limits at that time. The regulatory impact on the wastewater facilities cannot be projected at this time.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In the period between 1992 and 1997, a capital improvement request for $981,000 was made for the design and construction of various wastewater system improvements. In 2006, critical maintenance requests for $11,266 were made by the Department of General Services (DGS) for the rehabilitation of the chlorine system at the water treatment plant. Please refer to Supplemental Information Section – CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

Wastewater Treatment Plant

- Evaluate and repair or replace the pond's liner system.Replace the Biolac treatment system with an advanced treatment facility capable of reducing total nitrogen to less than 10 mg/l followed by membrane filtration.
- Install aerators in the pond if necessary.
- Repair pond's concrete pier and replace outlet gates
- Replace existing header and lateral pipes for spray irrigation fields
- Repair or replace valves for spray irrigation fields

- Install spray nozzles where needed
- Repair spray field pipe bedding as needed
- Install sodium hypochlorite feed system as required under permit conditions
- Develop reserve RIB if needed.
- Refurbish the basins with new distribution piping
- Repair the bed of each RIB to allow higher infiltration rates of wastewater into the ground
- Construct an equalization basin to regulate flows to the new treatment system
- Replace the soda ash feed system if necessary
- Rehabilitate the piping associated with the effluent pump station
- Abandon the monitoring well No. 5 located in RIB 2, and install a new monitoring well at an appropriate location

Wastewater Collection System

- Replace existing pump station no. 1 with a concrete wet well and submersible pumps.
- Install a grease trap upstream of pump station No. 1
- Install a communitor at pump station No. 1
- Provide an influent channel with a bar screen for pump station No. 1
- Construct separate valve vaults and install check and gate valves for pump station No. 1
- Relocate the electrical box from inside the wet well to an above ground location in pump station No. 2

Water Treatment Plant

- Construct a new, separate, treatment building next to the existing treatment building to house softening units and store salt and other necessary chemicals.

The above improvements will be part of a Capital Improvement Request. The total projected cost is **$3,667,000,** which includes design, inspection, testing, and construction costs for the wastewater system improvements only.

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2013
- Construction: Fiscal Year 2014

SUPPLEMENTAL INFORMATION

CHARLOTTE HALL VETERANS HOME

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The waterworks consist of a two (2) wells, sodium hypochlorite feed facilities, and a 250,000-gallon elevated water storage tank. The plant capacity is 0.94 MGD (based on well yield).

Well No. 1 - The source is located in a grassy area to the left of the treatment building. The well, drilled in 1983, is 10-inches in diameter and has a total depth of 559 feet. It is provided with 10-in steel casing. The well has a presumed yield of 240 gpm. The well is equipped with a 75 hp submersible pump manufactured by Goulds and rated at 400 gpm @ 442 feet TDH. The static water level is at 171 feet. The pump is set at 350 feet and was installed in 1983.

Well No. 2 - This well is located near the fence gate. The well, drilled in 1990, is 10-inches in diameter and has a total depth of 601 feet. It is provided with 10-inch casing. The well has a presumed yield of 520 gpm. A 75 hp submersible pump, manufactured by Goulds and capable of delivering 250 gpm @ 495 feet TDH, pumps water from the well. The static water level is 185 feet. The pump is set at 420 feet and was installed in 1990.

Water from all wells, after being treated, is discharged into a 250,000 gallon elevated water tank, which provides storage and pressure to the distribution network. The 250,000 gallon elevated water tank has an overflow elevation of 171 feet and has altitude valve. The inlet/outlet pipe is 8-inches and the overflow pipe is 8-inch.

The facility has approximately 4500 ft of 4-inch, 6-inch, and 8-inch water distribution main and service lines.

WATER TREATMENT

The waterworks consists of a two (2) wells, sodium hypochlorite feed facilities, a 250,000 gallon elevated water storage tank, and a distribution network.

Both wells discharge into the treatment facility. The treatment units are housed in a 20 foot x 12 foot brick building and are rated for 0.94 MGD (total well yield). Treatment consists of chemical feed facilities for sodium hypochlorite, which includes a chemical metering feed pump rated at 30 gpd @ 100 psi, a 150-gallon day tank, and a 150-gallon sodium hypochlorite storage tank. The treated water is stored in a 250,000-gallon elevated storage tank and then supplied to the distribution network by gravity.

The veteran's home maintenance staff operates six (6) softening units within their buildings.

WASTEWATER SYSTEM

The Charlotte Hall Veterans Home wastewater treatment plant (WWTP) was constructed in two (2) phases. The wastewater treatment facility was originally sized to handle flows from a 250-bed facility, and was rated at 55,000 gallons per day (GPD). Construction of the treatment plant was initiated in

1982 and completed in 1984. The original wastewater treatment facilities (Phase I) consisted of the following facilities:

- 5.2 MG treatment and storage lagoon
- Chlorine feed facilities and chlorine contact chamber
- A pump station to transfer 20,000 GPD from lagoon to the spray irrigation fields
- Six-acre spray irrigation fields rated for 21,000 gpd

Charlotte Hall Veterans Home initiated expansion of the sewer and water facilities (Phase II) in 1993, to accommodate an additional 254 beds. During 1993, the wastewater facilities were upgraded to handle additional flows. Currently, the home serves approximately 504 beds. These upgrades included:

- Influent pump station No. 2
- Manual bar screen
- Biolac oxidation treatment system rated at 50, 400 gpd
- Air feed (blower) facilities
- Clarifier
- Sludge storage tank
- Chemical feed facilities for methanol and soda ash addition
- Three rapid infiltration basins (RIBs) rated at 67,000 gpd
- Six monitoring wells

MDE issued a groundwater discharge permit which enables the discharge of treated wastewater to three (3) Rapid Infiltration Basins (RIBS) at 67,000 gallons per day, and also to a spray irrigation field at no more than 20,000 gallons per day for emergency use when the RIBS are out of service. The permit is due for renewal in January 2012.

The permit allows the following effluent parameters:

Monthly Averages for Spray Discharge

- BOD - 70 mg/l
- Suspended Solids - 90 mg/l
- pH - 6.5 to 8.5
- Fecal Coliform - <200 MPN/100 ml
- Flow - 20,000 gpd

Monthly averages for discharge to RIBS

- BOD - 30 mg/l
- Suspended Solids - 30 mg/l
- pH - 6.5 to 8.5
- Total Nitrogen- 13 mg/l
- Flow - 67,000 gpd

WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of two (2) pump stations, approximately 2,500 feet of gravity sewer pipes ranging from 6-inch to 8-inch, and approximately 23 manholes. There are also approximately 1,400 feet of 6-inch force main.

Pump Station No. 1 is located near Sycamore St. at the center of the Home. The pump station consists of two (2) submersible pumps of unknown size. This pump station pumps wastewater to the WWTP

Pump Station No. 2 is located approximately 400 ft north of the elevated water tank. The pump station consists of two (2) submersible pumps rated at 300 gpm @ 24 feet TDH with 4.5 hp motors. The pump station receives wastewater from the laundry facilities and discharges to the WWTP.

Site Name: Charolette Hall Veterans Home

Background

File Link to Facility Photos

K:\WWW\ENG\2008 Master Plan\Master Plan 2008-Working Copy\Phot ...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd 1997

Amount of Previous CIP Funding $981,000.00

Amount of Current CIP funding **$0.00**

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates: *Latitude* 76° 45' 38.21" W *Longitude* 38° 26' 43.22" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Charlotte Hall VA Home	Water System	DVA	Southern
Details	Charlotte Hall VA Home	Wastewater System	DVA	Southern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Charolette Hall Veterans Home

Address

29421 Charlotte Hall Road

Charlotte, MD 20622-8022

Comments:

Agency: DVA

Region: Southern

Average Daily Demand (ADD) (gal/day)	49,882
Peak Day Demand (gal/day)	123,000
WTP Design Capacity	288000
Total No. of Wells	2
Average Daily Run Time of Wells (Hrs)	3.4
Capacity w/ largest Well Offline	288,000
GW Appro. Permit Number (GAP)	SM1981G018(04) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	70,000
% of ADD to GAP	71%
General Discharge Permit Number	06HT9451

W/WW Engr. Project Mgt: PT

Location of Asbuilt Drawings or CDs: 60

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Sylvester	Ball	(301) 884-5593	(301) 536-5901
Eric	Barnes	(301) 872-4401	(301) 980-2902
Dorothy	Wise	(301) 872-4401	(443) 223-0063

Surface Water Appr. Permit Number	( ) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	250000
Days of Storage at ADD	5.0
PDWIS WTP Number	018-0217
Appropriation Permit Exp. Date	4/1/2009 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Charlotte Hall	pH	4/14/1997	daily	su	8.7	8.5	Seasonal lagoon flip	None
Charlotte Hall	pH	4/17/1997	daily	su	8.9	8.5	Seasonal lagoon flip	None
Charlotte Hall	pH	4/21/1997	daily	su	8.9	8.5	Seasonal lagoon flip	None
Charlotte Hall	pH	4/29/1997	daily	su	8.6	8.5	Seasonal lagoon flip	None
Charlotte Hall	flow	8/31/2005	monthly	mg/l	0.071	0.067	Exceeded flow allocation for BIP.	none
Charlotte Hall WWTP	T-N	8/1/2010	monthly	mg/l	21	13	An upset in the treatment plant developed as a result of a loss of dissolved oxygen in the aeration chamber due to a broken air diffuser.	The air line has been repaired.

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Charlotte Hall Veterans Home

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
DVA	1988	$30,000.00	Renovate the academic building.	
DVA	1990	$2,589,000.00	Design and construct and equip Phase III residentail housing unit .	
DVA	1990	$211,000.00	Provide a portion of the funds to renovate the academic building.	
DVA	1990	$300,000.00	Provide a portion of the funds to design and construct the Phase IV addition.	
DVA	1990	$5,140,000.00	Federal fund appropriation for the design and construction of Phase III residential housing unit.	
DVA	1992	$261,019.00	Provide a portion of the funds to renovate the academic building.	
DVA	1994	$169,000.00	Design the Phase IV addition.	
DVA	1994	$281,000.00	Federal fund appropriation for the design of the Phase IV addition.	
DVA	1995	$3,705,000.00	Phase IV addition- Provide a portion of the funds to design and construct the Phase IV addition.	
DVA	1995	$6,807,000.00	Federal funds appropriation for Phase IV	
DVA	1998	$134,000.00	Funds to purchase capital equipment for the Phase IV addition.	
DVA	1998	$223,000.00	Federal fund appropriation for the Phase IV addition to the Charlotte Hall Veterans Home to provide a portion of the funds to purchase capital equipment.	
DVA	1998	$134,000.00	Provide a portion of the funds to purchase capital equipment for the Phase IV addition to the Charlotte Hall Veterans Home.	
DVA	2001	$310,000.00	Provide funds to design the demolition of and demolish the Old Dormitory at the Charlotte Hall Veterans Home.	
	Total:	**$20,294,019.00**		
MES	1992	$741,000.00	Construct improvements to water and waste water systems.	
MES	1997	$91,000.00	Construct improvements to the existing wastewater facility.	
MES	1997	$149,000.00	Construct improvements to the existing wastewater facility.	
	Total:	**$981,000.00**		

CHARLOTTE HALL VETERANS HOME

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:

- The 5.2 MG pond is in various stages of deterioration. Several sections of the pond liner are torn, possibly allowing wastewater to infiltrate and contaminate the ground below
- Existing aerators/mixers in the pond are inoperable and have been removed from the pond
- Gates on the outlet structures of the pond are not operational
- The existing floating boom that serves as a baffle is in a state of disrepair
- The spray field has not been used for the last six (6) years due to deterioration of the spray irrigation equipment. Above ground piping is starting to show stains, which are indicators of corrosion. Due to weathering effects, spray irrigation header pipe bedding conditions were altered, limiting the supply of wastewater to the fields
- The rapid infiltration basins have lost full treatment capacity due to sedimentation and sludge cake accumulation in the basins, causing a decline in permeability of the basin with time. In addition, the network of distribution pipes in the infiltration basins have deteriorated due to corrosion, clogging and with inoperable isolation valves. The sand in the RIBS has been removed and replaced with fresh sand. One (1) valve was also replaced.
- No standby blower is available as a back up to the existing blower train. All three (3) blowers are currently operating continuously.. The Biolac system lacks an enclosure/fence, and is exposed to tree leaves, which can potentially disturb the normal operation of treatment units. The chemical feed pump for soda ash supplied to the Biolac system is not operating properly and requires replacement
- Discharge piping for the effluent pumps shows signs of corrosion
- Location of the monitoring well in the middle of RIB 2 makes this well susceptible to contamination. In the past, several results indicated that fecal coliforms were detected in higher number than typically observed

Proposed Improvements:

- Evaluate and repair or replace pond's liner system
- Replace existing floating boom and add additional floating boom to create noxic/aerobic/anoxic zones in the pond to enhance nutrient removal
- Install four aerators/mixers, two on each side of each floating boom of the pond
- Repair pond's concrete pier and replace outlet gates
- Replace existing header and lateral pipes for spray irrigation fields
- Repair or replace valves for spray irrigation fields
- Install spray nozzles where needed
- Repair spray field pipe bedding conditions as needed
- Install sodium hypochlorite feed system as required under permit conditions
- Develop reserve RIB

- Refurbish the basins with new distribution piping
- Repair the bed of each RIB to allow higher infiltration rates of wastewater into the ground
- Construct an equalization basin to regulate flows to zone prior to the Biolac Treatment System
- Evaluate current air supply to Biolac System and add blowers to meet the air demand and provide redundancy
- Construct a perimeter fence around Biolac Treatment System to protect from leaves entering treatment tanks
- Replace the soda ash feed system
- Rehabilitate piping associated with the effluent pump station
- Abandon the monitoring well No. 5 located in RIB 2 and install a new monitoring well at an appropriate location

WASTEWATER COLLECTION

Conditional Analysis:

- Several mechanical components of pump station No. 1 require refurbishing such as resetting of guard rails and repair of the lid. This station experiences frequent clogging due to high grease content in the wastewater. Also, the configuration of the station is such that access for maintenance of valves and other equipment is difficult
- Pump Station No. 2 lacks basket/strainer prior to the pump suction line for trapping large debris. The existing inlet electrical box is set inside the wet well. It is necessary to relocate this box because of safety concerns. Also, it is recommended that alarm and communication monitoring device be installed

Proposed Improvements:

- Construct new pump station with concrete wet well to replace existing station
- Install grease trap in pump station No. 1
- Provide an influent channel with a bar screen for the pump station No. 1
- Construct separate valve vaults and install check and gate valves for pump station No. 1
- Relocate the electrical box from inside wet well to above ground location in pump station No. 2

WATER TREATMENT PLANT

Conditional Analysis:

- According to the Veterans Home Maintenance staff, the water pumped from the wells is softened in ion exchange units located inside the Home to reduce the hardness, in an effort to minimize damage to the boilers and laundry equipment located in the basement areas of the individual wings. It is not known if the entire supply of water consumed at the facility is processed by the softeners. Currently, the Veterans Home Maintenance staff operates three (3) salt based Culligan softening units at various locations. Salt [estimated use four (4) tons per month] for water treatment is manually carried to the three (3) locations as needed. This is labor intensive and poses a health and safety risk to the residents and staff

Proposed Improvements:

- Construct a new separate treatment building next to existing treatment building to house softening units and store salt and other necessary chemicals

WATER SOURCE

Conditional Analysis:

- All sources are operating satisfactorily

Proposed improvements:

- None

WATER DISTRIBUTION

Conditional Analysis:

- Operating satisfactorily

Proposed improvements:

- None

Charlotte Hall Veterans Hall

WTP

Charlotte Hall Water Treatment Plant

Well Number 1

WTP

Well Number 2

Sodium Hypochlorite Feed System

WTP

250,000-Gallon Elevated Water Tank

WWTP

Biolac Treatment System

WWTP

5.2 MG Storage Lagoon

Spray Irrigation Fields

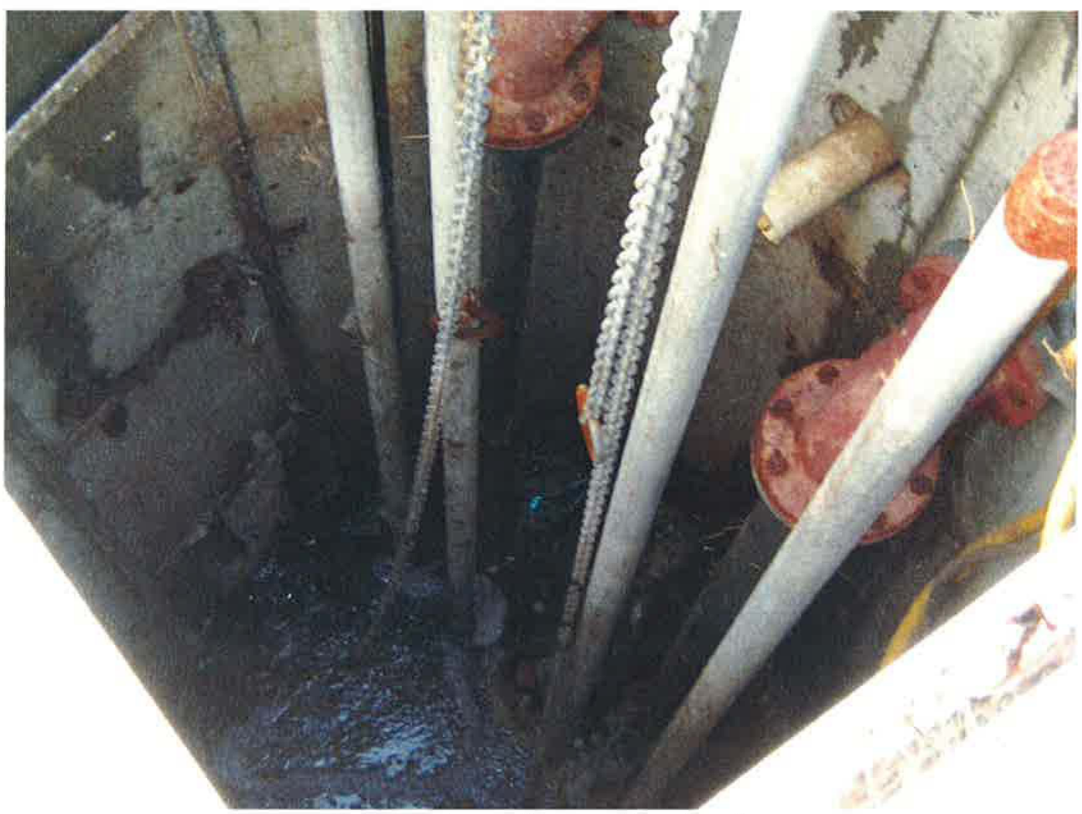
WWTP

Rapid Infiltration Basin

WWTP Control Building

WWCS


Sewage Pump Station Number 1


Sewage Pump Station Number 2

2011 WATER AND WASTEWATER MASTER PLAN

MILITARY DEPARTMENT

VOLUME VIII OF X

September 2011

Prepared By:

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108

2011 Water and Wastewater Master Plan

Volume VIII of X - Military Department of the State of Maryland

Executive Summary

MARYLAND ENVIRONMENTAL SERVICE

2011 WATER AND WASTEWATER MASTER PLAN

EXECUTIVE SUMMARY

I. INTRODUCTION

The Maryland Environmental Service (MES) was created by statute in 1970 (Chapter 240 of 1970) as an independent agency. Executive Order 01.01.1971.11 gave MES the responsibility for operation and maintenance of all State-owned water purification and solid waste disposal facilities. Two (2) years later, MES became incorporated into the Department of Natural Resources (DNR). While under DNR, all Capital Improvement Project (CIP) planning and annual funding requests for these facilities were prepared by MES and submitted to the State for approval. The first projects received funding in Fiscal Year 1984; however, the Department of General Services (DGS) had responsibility for managing the appropriations, procuring the consulting engineers, contractors, and other services, and providing project management and inspection for CIP with some input from MES staff.

The situation began to change in later years, with MES first receiving funding and procurement authorization for CIP in 1992 and becoming an instrumentality of the State and a public corporation independent of DNR in 1993. Chapter 4, First Special Session of 1992, said MES "*shall be responsible for and shall control the procurement of engineering and architectural services and all other related services and supplies for the projects for which State funds are appropriated under provisions of this act.*" Since 1992, MES has had full responsibility for the CIP program for State-owned water and wastewater treatment plants, and in some cases, the associated piping systems and water towers, when requested by a State Agency.

During this transition period, the Department of Budget and Management (DBM) asked MES to prepare a Master Plan for water and wastewater facilities operated by MES and owned by the State. There were numerous facilities needing capital improvements to accommodate expansions within the various institutions as well as changing state and federal regulations that required more advanced treatment processes. The initial appropriation to MES totaled over $14 million, which funded a backlog of 13 projects. As projected in the Master Plan, funding requirements decreased each year as the majority of the treatment facilities were upgraded. Eventually the requests were capped at $3.0 to $3.5 million per year, which was adequate for improvements to piping, pumping stations, and water towers.

In the early 2000's, Governor Parris Glendening issued an Executive Order requiring wastewater treatment plants to further reduce nutrient loadings to the State's waterways. The Maryland Department of the Environment (MDE) completed their Tributary Strategy plan, essentially capping nutrient loads at many wastewater treatment facilities. The EPA also issued new drinking water regulations with limits for new parameters such as arsenic, radon,

radionuclides, and disinfection by-products. As MES experienced a decade earlier, water and wastewater treatment facilities would need upgrades as new, more stringent permits were issued. Rapidly changing technology rendered controls and equipment obsolete at many sites and construction prices skyrocketed after September 11, 2001. It became apparent the $3.0 million cap would no longer be sufficient to make the necessary improvements.

During the 2008 session of the Maryland Legislature, the Governor's budget included a capital budget request from MES of $11.9 million for critical, compliance-related upgrades to four (4) treatment plants. The budget committees expressed concern there was no plan that adequately justified this increase. In the 2008 "*Joint Chairmen's Report on the State Operating Budget (SB 90) and the State Capital Budget (SB 150) and Related Recommendations*", MES was instructed to prepare an infrastructure improvement plan for the facilities managed by the agency by February 1, 2009. The 2008 Water and Wastewater Master Plan represents the response to this request.

II. OBJECTIVES AND METHODOLOGIES

A. OBJECTIVES

To fulfill the request of the Maryland Legislature as defined in the 2008 Joint Chairmen's report, the objectives of the water and wastewater master plan included reviewing operating and performance records, evaluating the existing water and wastewater facilities to determine what improvements may be needed, developing a concept plan and scope of the identified improvements, cost estimates, ranking the individual projects, and developing a comprehensive CIP funding schedule and projection for the next five years and to FY 2021.

The specific steps and methodology used to prepare the plan are as follows:

- Collect data from existing records and engineering drawings at office
- Develop custom "Infrastructure CIP Management" database
- Conduct site visits and inventory of all facilities
- Perform engineering evaluations at all facilities
- Review Master Plans and five-year plans of agencies served by MES
- Identify and determine future needs for all facilities
- Evaluate each facility compliance records and anticipate future regulatory constraints
- Review past capital improvement and critical maintenance expenditures
- Analyze future improvement alternatives for each facility
- Perform cost analysis of alternatives and prepare cost estimates for the identified CIPs for each facility
- Develop a methodology to allow ranking and prioritizing the CIPs

- Generate a schedule of implementation for the facility improvements
- Develop a financial plan for funding requests
- Generate final master plan report

B. REPORT STRUCTURE

The Master Plan consists of an Executive Summary along with separate volumes for each of the nine (9) State Agencies. This Executive Summary is also included in each of the individual agency volumes. Each of the agency volumes provides detailed infrastructure information for each of the facilities associated with that agency that includes:

- Background
- Water and wastewater facilities description
- Assessment of operations and performance data
- List of operational and infrastructure deficiencies
- Regulatory compliance history and future regulatory constraints
- Capital improvements and major maintenance funding history
- Cost analysis and recommended improvements
- Schedule of implementation
- Supplemental information

C. CIP RANKING SYSTEM

To allow ranking and prioritizing the CIP projects, MES developed a "Project Ranking Sheet". This consisted of the following six categories:

- Compliance & Permits (criteria uses number of permit violations)
- Health and Safety
- Structural issues
- Impact on operating and maintenance costs
- Operational deficiencies
- Energy and Environment (evaluates energy savings and environmental benefits)

Each of these categories had associated scoring criteria which allowed assigning points based on the listed criteria. The total score assigned each project was used to determine its ranking on the CIP list.

III. ANTICIPATED FUTURE REGULATORY REQUIREMENTS

In addition to water and wastewater systems that need improvements due to age, equipment obsolescence, and normal wear and tear, improvements are also needed to comply with more

stringent regulations and treatment requirements. The following section addresses current regulations and policies, and how they impact the need to make upgrades to water and wastewater facilities.

A. WASTEWATER TREATMENT PLANTS

1. Wastewater Treatment Plants Discharging to Streams

All wastewater plants with stream discharge are regulated by the National Pollutant Discharge Elimination System (NPDES). Dischargers are issued an NPDES permit that authorizes discharge to a water body and imposes limits that have to be met based primarily on the receiving stream's water quality standards. The permits typically require meeting both pollutant concentration limits as well as mass loading limits. The mass loading limits (lbs/day) are determined by taking the assigned maximum flow value (i.e., million gal/day) for the facility times the specified concentration limits (mg/l) times 8.34 (a conversion factor) .

The pollutants that are regulated on discharge permits usually consist of the conventional domestic wastewater pollutants:

- Biological Oxygen Demand (BOD_5) – This is a measure of the amount of organic compounds in water that can be assimilated by bacteria and other microorganisms.
- Total Suspended Solids (TSS) – This measures the amount of organic or inorganic particles that are suspended in the water.
- Ammonia – This is the dominant form of nitrogen in domestic wastewater. It is toxic to fish and other biota.
- Total Kjeldahl Nitrogen (TKN) – This is the amount of ammonia and organic nitrogen (i.e., the nitrogen bound up in organic compounds like proteins, etc.)
- Nitrate/Nitrite – This is the inorganic nitrogen fraction that has been converted from ammonia and organic nitrogen. Further biological assimilation of nitrate and nitrite converts it to nitrogen gas, which dissipates to the atmosphere.
- Total Nitrogen – Nitrogen is considered both a nutrient and a pollutant in that small amounts are beneficial to plants and animals, but in excess it promotes the proliferation of bacteria and algae and results in degraded water quality. Total nitrogen represents the sum of nitrate/nitrite and TKN.
- Total Phosphorus – Similar to nitrogen in that it is both a nutrient and a pollutant. Contrary to nitrogen, it can only be eliminated from wastewater by biological uptake or chemical precipitation.
- Bacteria – All wastewater must be properly disinfected prior to discharge and permits usually give limits for either Fecal Coliform or Total Coliform levels.

These are the dominant pollutants found in domestic sanitary wastewater. If there are other pollutants in the waste stream, then these pollutants may also be added to the discharge permit with appropriate limits.

Discharge permits can be amended at any time by MDE due to either new regulations or policies being adopted or based on new water quality information on the receiving stream that dictates more stringent limits. The permits are usually issued for a five-year period. Although, MDE can amend discharge permits at any time, the changes are usually made when the permit is renewed and reissued.

The U.S. EPA and State of Maryland regulations that govern the pollutant limits on discharge permits are as follows:

- Federal Clean Water Act – National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Load (TMDL) – Added to the CWA in 1992 (currently addressed via the Watershed Implementation Plans)
- Maryland Tributary Strategy and Point Source Strategy
- Other specific regulations that may govern specific watersheds or water bodies (e.g., Patuxent River Watershed – MD Code Section 4-302.1)

The discharge limits imposed on individual treatment plants are primarily determined by the water quality requirements of the receiving stream. Streams are classified by their designated use, (e.g., drinking water source, trout stream, general recreation, etc.) where each classification has associated discharge limits that have to be met to ensure protecting the water quality. The requirement to specify discharge limits was first established under the Federal Clean Water Act (CWA) under the NPDES program.

The second program that can determine the limits imposed on discharge permits is the Total Maximum Daily Load (TMDL) program. The TMDL program is a part of the Clean Water Act and it requires all states to evaluate and compile a list of water bodies that do not fully support beneficial uses such as aquatic life, fisheries, drinking water, recreation, etc. Each water body is evaluated and usually "modeled" to determine the maximum amount of pollutants that can be discharged to it with out impacting the water quality or beneficial use. After determining the maximum allowable quantities of the various pollutants that can be discharged to the body of water, each of the dischargers (i.e., WWTPs, non-point source discharges, etc.) is allocated portions of the TMDL amount. The allocated amount is then incorporated into the facility's discharge permit.

In the last few years, the EPA, in coordination with the states of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC) developed a nutrient and sediment pollution diet for the Bay known as the Chesapeake Bay Total Maximum Daily Load (TMDL). To fulfill the Bay TMDL requirements, MDE developed an allocation process that is contained in Maryland's Watershed Implementation Plan (WIP). The allocation process specifies loading caps for nutrients (N&P) and sediment to each of 58 "segment-sheds" to collectively meet the 2017 target (70% of the total nutrient and sediment reductions needed to meet EPA's final 2020 goals). Maryland's Phase I WIP was submitted to EPA on December 3, 2010. MDE is now working with other State agencies, county and local governments to develop Phase II Watershed Implementation Plans with more detailed reduction targets and strategies to ensure meeting the goals of the Bay TMDL.

Maryland's WIP is requiring that all major WWTPs (i.e., those with a design capacity greater than 500,000 gal/day) to upgrade to meet an Enhanced Nutrient Removal (ENR) level of treatment. There are some facilities that are already meeting ENR treatment requirements as part of the Tributary Strategy program that Maryland had in place for several years.

The Tributary Strategies are broad implementation plans for achieving and maintaining nutrient allocations for the ten major watersheds that drain into the Chesapeake Bay. These allocations were established through the year-2000 Chesapeake Bay Agreement process. Under this program, MDE developed the Enhanced Nutrient Removal (ENR) Load Allocations Table, which establishes nutrient loading caps for 66 major wastewater treatment plants.

The ENR Allocations Table allocated a fixed amount of nitrogen and phosphorus loadings (in lbs/year) to be discharged by each WWTP based on the facility's design capacity and assuming a total nitrogen and total phosphorus concentration of 4 mg/l and 0.3 mg/l, respectively. Therefore, if a WWTP needs to expand and accept additional flows (i.e., users), it has to meet lower concentration limits in order to compensate for the increase in flow.

The ENR Tributary Strategy. also controls the nitrogen and phosphorus loadings from minor WWTPs (i.e., those with flow less than 500,000 gal/day). The minor WWTPs are allocated caps based on either their projected year 2020 flow or design capacity: whichever is lower and a nitrogen and phosphorus concentration of 18 mg/l and 3.0 mg/l, respectively. If minor WWTPs need to expand, their loading allocation is limited to a maximum amount of 6,100 lbs/year for nitrogen and 457 lbs/year for phosphorus.

The goal of the Tributary Strategy and now the Watershed Implementation Plans is to eventually have all the major WWTPs meeting ENR levels of treatment, which are 3.0 mg/l for nitrogen and 0.3 mg/l for phosphorus.

Maryland's Bay Restoration Fund (BRF) was also created to provide funding to WWTPs for upgrading to an ENR level of treatment. Priority for the funding is given to major WWTPs.

Either at the time of permit renewal, or due to other circumstances (e.g., WWTP expansion, etc.), any of the regulatory programs listed above could cause more stringent limits be imposed on the discharge permits. EPA and MDE are also including limits in discharge permits for other nonconventional pollutants (e.g., copper, zinc, etc.) along with stricter toxicity biomonitoring requirements and limits. The biomonitoring requires toxicity testing using live macroinvertebrates and fish. Any new limits or toxicity testing that are added to a facility's discharge permits may require an upgrade to the WWTP treatment processes if the facility was not designed to meet those requirements.

Although some of the State WWTPs have been upgraded in the past few years to meet low limits, many have not and . will require improvements to allow meeting more stringent limits. In order to properly plan future WWTP improvements, MES has adopted the following protocols for determining which type facilities may be issued more stringent limits and will need capital improvements to comply:

Major WWTPs (all treatment types):

A few facilities already have treatment systems that can meet an ENR level of treatment. For those that do not meet ENR, capital improvements will be specified to provide ENR level of treatment.

Minor WWTPs:

Lagoon Treatment Systems – Lagoons are an antiquated type of treatment system, which provide at best a secondary level of treatment. They do not remove nutrients to any appreciable extent and as a result discharge ammonia, which can be toxic to fish, and other aquatic life. MDE is moving to impose lower limits for ammonia and other parameters. Therefore, capital improvements will be specified for replacing the lagoon system with a more modern and sophisticated treatment system.

Other Secondary Type Treatment Systems – In addition to lagoons, there are other treatment systems in operation that are not designed to remove nutrients and therefore discharge ammonia and other harmful pollutants. Capital Improvements will be specified to replace or upgrade these systems.

Expanding Facilities – Any of the minor WWTPs that will have flow increases beyond their design capacity will have to meet more stringent limits. In some cases, if the flow increase is not too great, the WWTP may not be required to achieve full ENR level of treatment. Therefore, the nature of the

improvements specified would only be what is needed to meet the anticipated limits for the higher flow.

Note: Even though MES has adopted this protocol to program future CIP needs, these are based on regulations and/or policies that are in effect today. Therefore, this protocol is subject to change in response to new or amended regulations (State or Federal) or policies.

2. Wastewater Treatment Plant Solids Management

All WWTPs produce a solid material by-product as a result wastewater treatment. Regardless of the type of facility, these solids must be removed from the WWTP on a periodic basis in order for the treatment process to function properly. Basically, there are three options available for managing this solid material:

- Disposal into a landfill
- Incineration (burning)
- Recycling the material onto the land for beneficial uses, such as compost, fertilizer, etc.

The first two options, landfill disposal and incineration, while used by some WWTPs, are not without their problems. Dwindling landfill space and rising tipping fees have forced most facilities to explore other options. One advantage of incineration is that it can reduce the amount of material for ultimate disposal by as much as 75%. However stringent Federal air quality regulations (40 CFR 60, Subpart O), volatile energy costs, complexity of operation, and high capital expenditures have increasingly ruled out incineration as an option for most facilities, especially for smaller WWTPs with a capacity of less than 10 million gallons a day (MGD). There are also detrimental environmental impacts associated with incineration, such as excessive energy usage and concerns about greenhouse gas emissions. Finally, negative public perception surrounding incineration makes the execution of these projects almost impossible.

Nutrients in these solids, in the form of nitrogen and phosphorus (and a small amount of potassium) can be recycled onto farmland as a low-grade fertilizer, or used to reclaim land in dire need of revegetation (e.g., strip mined land). These solids also contain organic matter that is also beneficial for the soil. The beneficial reuse of this solid material is a cost-effective option for the recipient farmer as well as the WWTP. MES has already realized significant cost savings by implementing land application programs. Both the U.S. EPA and MDE promote the beneficial reuse of biosolids when done in accordance with the regulations.

Solid material from a WWTP that is treated to meet Federal and State standards for recycling onto land are called "biosolids". Material that is not treated, or does not meet these standards, is labeled "sludge", or "sewage sludge". The current Federal (40 CFR 503) and State of Maryland (COMAR 26.04.06) regulations

prescribe the treatment and management standards for recycling biosolids. These standards were established to protect public heath and the environment.

There are several core regulatory standards that WWTPs must follow before land applying biosolids:

- The concentration of chemical constituents, such as heavy metals, in the biosolids product must be under certain limits.
- Solids must be treated to significantly reduce pathogenic organisms. This treatment, called stabilization, is usually done at the WWTP prior to land application. Stabilization processes can be classified as:
    - Physical/chemical in nature, such as adding copious amounts of lime to kill pathogens (lime stabilization),
    - Biological treatment processes. Examples of biological treatment processes include anaerobic digestion, (subjecting the sludge solids to bacterial degradation for an extended period of time in a heated tank in the absence of oxygen), or aerobic digestion, which involves aerating the solids.
    - Time/temperature treatment, such as composting or heat drying the solids to produce a fertilizer pellet.
- The solids must be sufficiently treated so that the likelihood for disease transmitting organisms, called vectors, to be attracted to the biosolids is reduced. Vectors include flies, mice, mosquitoes, etc.
- Biosolids must be managed at the final reuse site in such a manner as to not cause a public health, nuisance, or environmental problem. These management practices can include procedures such as incorporating the biosolids into the soil at a farm site, or including directions to homeowners for use of a compost product.

Maryland is regarded as having an extensive biosolids regulatory program. One aspect of this program is that it requires mandatory, site-specific nutrient management plans be prepared for each farm site where biosolids is to be land applied. Nutrient management reduces the potential for nitrate-nitrogen contamination of groundwater, and phosphorus runoff into surface waters. MDE's regulations are more rigorous than the Federal rules, requiring more site practices to control nuisance factors (such as odors). Approximately 80% of the biosolids generated in Maryland are recycled in some manner, whether onto agricultural land, or through the sale and distribution of highly treated biosolids products such as compost or heat dried fertilizer pellets.

The nutrient management program is administered by the Maryland Department of Agriculture (MDA). In an effort to reduce nutrient pollution from non-point sources, MDA is in the process of revising its Nutrient Management Guidelines to

severely limit the practice of land applying biosolids and animal manures in the winter .Although currently all of MES' biosolids are land applied out-of-State where the restrictions are less stringent (i.e., Virginia) this change in the Nutrient Management Guidelines could affect the operation of our facilities if land application operations revert back to Maryland. This would necessitate either the construction of biosolids storage structures at of our State-owned Regional Sludge Management Facilities at considerable cost, or the installation of advanced sludge treatment processes to reduce the volume of solids being removed

MDE is also currently in the process of preparing comprehensive revisions to their biosolids regulations. It is envisioned that these new regulations will impose more stringent requirements, especially with respect to biosolids testing/monitoring, site controls, compliance inspections/permitting, and documentation of stabilization processes. Much of the revisions are in response to the public's demand for greater oversight of the land application program.
Future regulatory changes could also impose more stringent biosolids processing requirements on WWTPs, called "Class A" stabilization, such as composting and heat drying. These Class A processes reduce pathogens to near non-detectable levels. The general public's concern about pathogens is motivating the change to Class A stabilization processing; many WWTPs have already voluntarily implemented Class A stabilization to address these concerns. It is anticipated that MES will ultimately follow this industry trend, and eventually request funding for Class A processing.

In an effort to more efficiently manage biosolids from MES's facilities, the Agency currently utilizes a "regional" sludge management approach. Sewage sludge from most of MES' smaller facilities that do not meet the standards for recycling onto land is transported to larger WWTPs for further processing and stabilization. These stabilized, treated biosolids from the Regional Sludge Management Facilities are then land applied by a contractor. MES operates Regional Sludge Management Facilities at three State-owned WWTPs. One advantage of the regional approach is that economies of scale are achieved at the larger facilities, thus avoiding the need for constructing costly, separate stabilization processes at each of the smaller WWTPs. It also reduces staff time associated with regulatory monitoring at each of the smaller WWTPs.

A major disadvantage of the regional approach is that stabilization process reliability and equipment redundancy is critical. Sludge processing at the Regional Facilities must be more robust to avoid sludge disposal interruptions on the smaller, satellite State-owned WWTPs. Capital funding should be directed towards ensuring that biosolids processing equipment reliability at the regional facilities is maintained.

3. Wastewater Treatment Plants Using Land Disposal

Numerous WWTPs do not use stream discharge for the treated effluent and rely on spray irrigation to the land surface, underground discharge (i.e., drain field), or similar means. These type facilities are also facing more stringent discharge requirements. This is due to the recognition by MDE that ground disposal systems can contaminate groundwater supplies (i.e., drinking water wells) and migrates through the ground to discharge to streams and ultimately the Chesapeake Bay. To alleviate some of this pollution source, MDE included in the Tributary Strategies a provision that allows abandoning septic systems and connecting those users to sewers and treatment systems with a stream discharge. This provision is based on the assumption that septic systems provide only minimal nutrient removal and the untreated nutrients will eventually make their way to the Chesapeake Bay. The low level of treatment provided by septic systems is then off set by the high level of nutrient removal that is now possible with the newer ENR treatment technologies.

Just as with WWTPs that discharge to streams, MDE is also imposing lower limits on groundwater discharge permits to reduce the amount of nitrogen that is ultimately discharged to the Bay and to groundwater supplies. The limit for Total Nitrogen can be as low as 8 mg/l. These low limits are primarily imposed on the larger systems with flows over 5,000 gal/day. The Bay Restoration Fund also collects fees from users with On Site Sewage Disposal Systems (OSDS) (i.e., septic systems) and other ground disposal systems. MDE offers BRF grants for upgrading OSDS systems to provide increased nitrogen removal. Priority at this time is being given to those systems in the Critical Area or to those systems which are failing.

MES will either request BRF funding or Capital Improvement funds to upgrade any OSDS system that may be subject to more stringent discharge limits and/or would represent a good opportunity to upgrade to further reduce nitrogen being discharged to the Bay.

B. Water Treatment

The quality of drinking water that is produced is very strictly regulated under the EPA and Maryland's Safe Drinking Water Act. The water treatment plants that use surface water supplies (e.g., lakes, reservoirs, and streams) have much more stringent requirements that have to be met compared to those using groundwater (i.e., wells) as their source water. Two of the new regulations associated with surface water have decreased Maximum Contaminant Levels (MCLs) in drinking water and one new regulation requires higher removal of contaminants, which may require specific capital improvements at specific water treatment plants. These regulations are listed below:

- Stage I Disinfection By Product Rule - Total Trihalomethanes MCL of 80 ppb and Total Halocetic Acids MCL of 60 ppb
- Turbidity Maximum Contaminant Levels of 0.30NTU
- Enhanced Surface Water Treatment Rule – Requires 2 to 3-log removal of Cryptosporadium

Also, a Groundwater Rule requires 4-log virus removal, which may require installation of filtration in some of groundwater plants. Therefore, specific capital improvements that would be needed to meet new or more stringent regulations will be addressed at specific water treatment plants.

C. Water Reuse

The reuse of treated wastewater is becoming more and more popular in many parts of the country, resulting in a second "purple" water distribution system. The need for this is caused by the inability of the water sources to be able to meet the ever-increasing demand. Given the physical limitations (e.g., available land) and the regulatory requirements imposed on water and wastewater systems, water reuse and reclamation is not only good environmental stewardship, but is also now recognized as a way to save power and O&M costs, facilitating compliance with water or wastewater regulatory requirements. MES would recommend the implementation of any water reuse projects. Water reuse is already performed at the Eastern Correctional Institution (ECI) where the treated wastewater effluent is sent to the Cogeneration Plant for use in their cooling towers. This could be expanded to use for irrigation, toilet flushing, and other non-potable uses. Although no new projects have been identified, MES will continue to look for possible opportunities to reuse treated wastewater at State facilities.

IV. WATER/WASTEWATER INFRASTRUCTURE CIP SUMMARY

MES provides some level of operations and maintenance services to a total of 65 State facilities. The water and wastewater infrastructure utility systems at these facilities falls under one of the following categories:

- Water Source
- Water Treatment Plant
- Water Distribution
- Wastewater Treatment / Onsite Sewage Disposal System
- Wastewater Collection/Conveyance

MES does not provide operations and maintenance services for all these categories at all the facilities. There are many facilities where the State Agency operates one or more of the utility systems or it may receive service from a nearby municipality, county, or sanitation district.

The level of services that MES provides is described in each of the facility descriptions and is summarized in Table I. Table I lists all the facilities by Agency and gives the entity (e.g., MES, DNR, etc.) that is providing the services for that infrastructure category.

In preparing the 2008 Master Plan, only those systems that are operated by MES were evaluated for capital improvement needs and listed on the MES CIP Request. Out of the 65 total facilities, a total of 39 specific capital improvement projects have been identified and listed in the CIP funding schedule that extends to FY2021 (see Table II). The total CIP request for all 10 years is $64,643,000 with a total project costs estimated to be $98,898,000. The CIP request is less than the total project costs due to other funding sources that will pay their share of the costs (e.g., Freedom District WWTP) and due to CIP funding already received (e.g., ECI).

The MES project ranking system provided a consistent methodology to prioritize and rank the projects and spread the requested funding out over the next 10 years. Table II provides a list of all the projects, their ranking, the State agency, and the amount and year that the funding is requested.

TABLE I

State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
DNR					
Albert Powell Hatchery	DNR	DNR	DNR	MES	DNR
Big Run SP	MES	MES	MES	DNR	DNR
Calvert Cliffs SP	MES	MES	DNR	DNR	DNR
Camp Bay Breeze	MES	MES	DNR	DNR	DNR
Cunningham Falls SP	MES	MES	DNR	DNR	DNR
Dahlgreen Area - South Mt. SP	MES	MES	MES	DNR	DNR
Dan's Mountain SP	MES	MES	DNR	DNR	DNR
Deep Creek Lake SP	MES	MES	MES	Garrett Co	MES
Echo Lake Area - South Mt. SP	MES	MES	DNR	DNR	DNR
Elk Neck State Park	MES	MES	MES	MES	MES
Fair Hill NRMA	MES	MES	DNR	DNR	DNR
Fort Frederick SP	MES	MES	MES	MES	DNR
Gambrill SP	MES	MES	DNR	DNR	NR
Gathland SP	MES	MES	DNR	DNR	DNR
Greenbrier SP	MES	MES	DNR	MES	DNR
Greenwell SP	MES	MES	DNR	DNR	DNR
Herrington Manor SP	MES	MES	DNR	DNR	DNR
New Germany SP	MES	MES	DNR	MES	DNR
Pocomoke SP- Milburn & Shad Landing	MES	MES	DNR	DNR	DNR
Point Lookout SP	MES	MES	DNR	MES	DNR/MES
Rocks SP	MES	MES	DNR	DNR	DNR
Rocky Gap SP	MES	MES	MES	MES	MES
Sandy Point SP	MES	MES	DNR	DNR	DNR
St Mary's River State Park	MES	MES	DNR	DNR	DNR
Susquehanna State Park	MES	MES	DNR	DNR	DNR
Swallow Falls SP	MES	MES	DNR	MES	DNR
Washington Monument SP	MES	MES	DNR	DNR	DNR
MD Dept of Veterans Affairs					
Charlotte Hall Veterans Home	MES	MES	MDVA	MES	MDVA
MD Dept of the Military					
Brig. Gen. Thomas Baker Training Site	MES	MES	MES/MM	MM	MM
Camp Fretterd	MES	MES	MM	MES	MM
Frederick Armory	MES	MES	MM	MM	MM
Gunpowder Military Reservation	MM	MES	MM	MM	MM
MD State Police					
Barrack V - Berlin	MES	MES	MSP	MSP	MSP

TABLE I
State of Maryland Water and Wastewater Facilities
Distribution of Operational Functions
Table I (cont.)

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
State Highway Adm.					
Bay Country Welcome Center	MES	MES	SHA	MES	SHA
Centreville Maintenance Shop	SHA	SHA	SHA	MES	SHA
Green Hill Cove				MES	SHA
I-68 Rest Stop	MES	MES	SHA	SHA	SHA
I-68 Visitor Center	MES	MES	SHA	SHA	SHA
I-70 Rest Stop	SHA	MES	SHA	MES	SHA
Leonardtown Maintenance Shop	SHA	MES	SHA	MES	SHA
Sideling Hill Visitors Center	MES	MES	SHA	MES	MES
University System of Maryland					
Ag. Exp. Sta. - University of MD	MES	MES	U of M	U of M	U of M
Horn Point Lab - University of MD	U of M	U of M	U of M	City of Cambr	MES
St Mary's College	MES	MES	MES	St. Mary's Col	MES
DHMH					
Crownsville Hospital Center	MES	MES	DHMH	MES	DHMH
Freedom District	Carroll Co	Carroll Co	Carroll Co	MES	Carroll Co
Rosewood State Hospital	Balto. Co.	Balto. Co.	DHMH/MES	Balto Co.	DHMH
Springfield Hospital Center	Carroll Co	Carroll Co	Carroll Co		DHMH
DJS					
Backbone Mountain Youth Center	MES	MES	MES	DJS	DJS
Chelteham Youth Facility	MES	MES	DJS	MES	DJS
Green Ridge Youth Center	MES	MES	MES	MES	MES
Meadow Mt. Youth Center	MES	MES	MES	DJS	DJS
Savage Mt. Youth Center	MES	MES	MES	DJS	DJS
Thomas O'Farrell / Henryton	Carroll Co.	Carroll Co.	Carroll Co.	Carroll Co.	MES*
Victor Cullen Center	Washington Co.	Washington Co.	DJS	MES	DJS
DPSCS					
Eastern Correct. Inst. - Cogen Plant	MES	MES	DPSCS	MES	DPSCS
Eastern Correctional Institution	MES	MES	DPSCS	MES	DPSCS
Eastern Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
Jessup Complex - Dorsey Run WWTP	AA Co	AA Co	DPSCS	MES	DPSCS
MCI - Hagerstown	Hagerstown	Hagerstown	DPSCS	MES	DPSCS
Poplar Hill Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
So. MD Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
WCI & NBCI	Cumberland	Cumberland	DPSCS	Cumberland	MES*

*Pumping stations only

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
HOLD	N/A	Eastern Correctional Institution - Cogen	Upgrade electrical control system.	Waiting for discussion/input from Environmental Ops before proceeding.	2017	2018	DPSCS	$3,500,000	$3,500,000									
1	73	Eastern Correctional Institution WWTP	New treatment plant; including the RO Reject system	Design expected to start in May 2011. FY11 REQUEST (12.126M - C)	2013	2015/2016	DPSCS	$26,730,000	$19,500,000	$1,950,000		$7,000,000	$10,550,000					
2	69	Freedom WWTP	Upgrade plant to 5 stage bardenpho process, and upgrade solids handling facilities.	Under Compliance Schedule. Negotiating a Consent Agreement w/MDE. FY12 REQUEST (1.4M - P)	2013	2014	DHMH	$18,000,000	$2,300,000	$1,566,000	$734,000							
3	65	Rocky Gap SP - WTP	Needs new plant.	Preliminary Design Report conducted; Needs new plant designed (have design funds). MES waiting on direction from DNR before moving forward w/final design. FY12 REQUEST (2.65M - C)	Design Funds Secured	2013	DNR	$3,729,000	$3,000,000	$3,000,000								
4	65	Rocky Gap SP - WWTP	Needs new plant.	Water usage unknown. Meeting permit requirements; monitoring for BOD, TSS, and Temperature (should not exceed 68 degrees). Water usage estimated to increase 140K gpd and wastewater 120K gpd. Current WWTP designed for 120K gpd. Existing plant cannot accommodate any further growth.	2013	2014	DNR	$3,000,000	$3,000,000	$300,000	$2,700,000							
5	62	Charlotte Hall VA Home - WW	WWTP: Repair or replace pond's liner system; replace floating boom; additional floating boom; install four (4) aerators/mixers; replace irrigation valves and nozzles; install sodium hypochlorite feed system; develop reserve RIB; construct equalization basin, construct perimeter fence; rehab effluent pump station pipe; and abandon monitoring well no. 5 located in RIB2. WW COLLECTION: for pump station no. 1 install grease trap, install influent channel w/bar screen, separate valve vaults and check & gate valves, alarm system, real time monitoring device; for pump station no relocate electrical box to above ground location, install real time monitoring device.	Design 80% complete, RIBS may stay on **Wish List. Nitrogen compliance issue.** Plant capacity 60K pd; ADF 40-42K pd. Not meeting permit requirements; 3 violations in last year.	Design Funds Secured	2013	DVA	$3,667,000	$3,457,000	$3,457,000								
6	61	Cunningham Falls SP - WW Collection & Water Distribution Systems	WASTE WATER ($918K): Install HDPE Force Main thru existing gravity lines; grouting of annular space in sewer lines and MHs; and install 10 pump stations. WATER ($100K): Evaluate and replace leaking pipes in distribution system in Manor Area.	**WASTE WATER:** System consists mostly of terra cotta pipe and due to rocky soil and high groundwater table, it has severe I/I. The wastewater is conveyed over 3 miles to Thurmont for treatment. The Park pays for every gallon treated and as a results pays over $40K a year just to treat the extraneous I/I flows. **WATER:** Due to age of the distribution system, leaks becoming more frequent, requiring an operator to "camp out" at plant until leak is repaired to meet demand. Equipment - Filter media requires replacement, the piping in the clarifier is corroded and undersized, components of the clarifier have recently deteriorated and required re-fabrication. Tanks and piping were repainted several years back and starting to show corrosion again. Level control floats are extremely corroded and filter valves are leaking. Clearwell is undersized for peak demand.	2013	2013	DNR	$1,238,000	$1,238,000	$200,000	$1,038,000							
7	60	Victor Cullen -WWTP	Consider SBR or activated sludge. Rebuild bar screen. New 50K gpd plant; utilize existing buildings.	Occasional Ammonia limit (8) violations during winter. Currently a rock trickling filter w/fixed nozzles. Needs new bar screen. Plant rated/permitted at .05 MGD. Serves approximately 135 people.	2013	2014	DJS	$2,516,000	$2,516,000	$216,000	$2,300,000							

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CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
8		State Water Towers	Minor rehab & painting	Camp Fretterd (Witches Hat) (200K) ($448.2K); MCI-H (Standpipe) (300K) ($511.4K); Victor Cullen (300K) ($544.4K); . FY12 REQUEST (970K - P/C)	N/A	2013		$1,504,000	$1,504,000	$1,504,000								
9	62	Charlotte Hall VA Home - WTP	Construct a new, separate treatment building next to existing treatment to house softening units and store salt and other chemicals.		Design Funds Secured	2014	DVA	$210,000	$210,000		$210,000							
10	60	MCI -WWTP	Replace gas chlorine storage and feed system with UV disinfection units; cover the two (2) secondary clarifiers launders; install fermentation tank; install denitrification filters and associated carbon source feed system; install treated wastewater supply system for washing belt and polymer mixing during sludge dry; replace existing emergency 1200KVA generator; construct pole building for equipment and chemical storage; paint 300,000 gallon standpipe; design and construct new 500,000 gallon elevated storage tank.	No violations. Nitrogen & Phosphorus added 01/01/11. Waiting to learn of state's share (ENR grant - $$$ unknown); Possibly $3M each. MDE first wants feasibility study conducted - MES has funds for study (not going to BPW until June or July 2011). DNR Component: Automation, DO monitors, pumps, alkalinity addition. sulfur dioxide and 1 ton chlorine storage (safety issue). FY12 REQUEST (3.7M - P/C)	Design Funds Secured	2014	DPSCS	$6,000,000	$3,000,000		$3,000,000							
11	55	Southern MD Pre-Release -WWTP	New plant - MBR Plant	Design 80% complete; Existing plant is a buried steel tank. Holes visible above ground. No violations. Electrical system in a trailer (violated code). 20 year old plant. FY12 REQUEST (1.471M - P/C)	Design Funds Secured	2014	DPSCS	$3,000,000	$3,000,000		$3,000,000							
12		State Water Towers	Minor rehab & painting	Crownsville Hospital (Front) (250K) ($450,000); Victor Cullen (75K) ($300,000). MCI -H (500K Elevated) ($625,000) Does not required design.	N/A	2014		$1,375,000	$1,375,000			$1,375,000						
13	55	Cunningham Falls SP - WTP	New water treatment plant	Manual system; must have staff 8 hrs/day during summer season. While plant is currently operational, it was constructed in 1973 and is at the end of its useful life. Major deficiencies include: Total manual operation, very inefficient, operator must be onsite at all times when plant is running. Examples - Backwashing is problematic, no flexibility with backwashing due to requirement of operator onsite. Significant safety risk - operators must reach into the panel to pull relays to start and stop the plant. Relays must be pulled when plant is offline due to frequent lightning strikes which cause severe damage to controls.	2015	2015	DNR	$3,000,000	$3,000,000			$3,000,000						
14	55	WCI -WWPS (old)	Move controls above ground; need new pumps; inline grinder requested for bypass channel.	Steel wet well - rusting out. Confined space (safety concerns)	2015	2015	DPSCS	$750,000	$750,000			$750,000						

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
15	50	Camp Fretterd - WTP & WD	WATER: Relocate switches from main electrical panel to a separate, weatherproof enclosure; replace heaters in storage and treatment areas; replace roof; install mission control unit; construct new treatment facility for proposed new well; construct new well at higher elevation; construct new elevated tank; paint 100,000 gallon elevated water storage tank. WASTEWATER: replace two (2) submersible pumps in duplex pump station.	Design based on Watek's recommendations can begin on or after June 2011. WTP: only 1 well exists. DS: need booster station, close loops. FY11 REQUEST (236K - P) FY12 REQUEST (188K - P)	2015	2017	MM	$1,970,000	$1,970,000			$197,000		$1,773,000				
16		State Water Towers	Minor rehab & painting	ECI (Front) (500K) ($625,000); Sandy Point (100K) ($175,000)	2015	2015		$800,000	$800,000			$800,000						
17	49	Poplar Hill	Propose new mechanical plant.	Lagoon system; spray field.	2017	2018	DPSCS	$3,160,000	$3,160,000					$316,000	$2,844,000			
18	47	Swallow Falls SP - WWTP & WTP	New plant; maybe SBR.	Lagoon based system; Can not discharge in summer; from 7 days before Memorial Day through 7 days after Labor Day. 2/3 cost estimate for WW. 60K gpd.	2017	2019	DNR	$3,688,000	$3,688,000					$368,800		$3,319,200		
19	41	Fair Hill NRMA - WTP & WD	Propose new plant and tank	Lead paint & glass lined tank. WTP control center in metal shed.	2017	2018	DNR	$1,709,000	$1,709,000					$170,900	$1,538,100			
20	40	St. Mary's College	WDS: Replace 3-inch piping student residences; close loops at seven (7) locations; new service line to Admissions building and ww pumping station. WTP: Replace flow meter at well no. 1; install automated well controls.	Design underway. Construction ready drawings scheduled for completion in August 2011.	2017	2017	UNIVERS.	$636,000	$636,000					$636,000				
21	39	Cheltenham -WWTP	WASTEWATER - Install new headworks; upgrade electrical service; install new blowers; replace RBC's with SBR's; construct building for new treatment plant; replace valves; upgrade Dynasand filters; install continuous DO meter. WATER - Repair Well #2; relocate hypo and Day tanks to existing chlorine room; paint storage tank.	Digester needs work w/aeration system.	2017	2018	DJS	$7,050,000	$7,050,000					$705,000	$6,345,000			
22		State Water Towers	Minor rehab & painting	Crownsville Hosp (Back) (250K) ($375,000) (2017); Elk Neck S.P. (60K) ($150,000) (2017); Charlotte Hall (250K) ($375,000) (2018); Rocky Gap (500K) ($625,000) (2019); Camp Fretterd (300K) ($450,000) (2019)	2017	2017		$1,975,000	$1,975,000					$1,975,000				
23	35	Gunpowder (MNG)	Extra well needed. Update controls. Heating system in poor condition. Fence around small reservoir.	Operating on only 1 well.	2020	2021	MM	$116,000	$116,000								$11,600	$104,400
24	34	Eastern Pre-Release - WWTP	Propose new WWTP.	Lagoon system; discharge to stream. Lagoon dredging completed Spring 2011. Currently 20K gpd.	2020	2021	DPSCS	$3,160,000	$3,160,000								$316,000	$2,844,000

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CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
25	27	Meadow Mountain Youth Center -WS	Repair treatment building roof leaks. Construct new well.		2020	2020	DJS	$256,000	$256,000								$256,000	
26	20	U of M Agr Center -WTP&WD	New treatment control building for Well #1 to replace "shed" like structure. Add 500 gallon storage at treatment building in case line to tower is interrupted. Construct new water treatment facilities for Well #2. Backfill well vault and extend well above grade. Rehab Well #2.	Not a reimburseable project - but could become one.	2020	2020	UNIVERS.	$402,000	$402,000								$402,000	
27	17	O'Farrell Youth Center (Henryton) - WWPS	Replace building door, build curb around grinder channel, paint generator fuel tank.	NOT CIP; Maintenance item.	2020	2020	DJS	$20,000	$20,000								$20,000	
28	40 HOLD - push back as far as possible until clear scope of work defined.	Savage Mountain Youth Center - WS	Maintain with acid wash; scrap new well. Evaluate for water re-use.	First wanted replacement well - not feasible at this site - too difficult to find water. NOT CIP; Maintenance item.	2021	2021	DJS	$497,000	$497,000									$497,000
						GRAND TOTAL		$103,658,000	$76,789,000	$12,193,000	$12,982,000	$13,122,000	$10,550,000	$5,944,700	$10,727,100	$3,319,200	$1,005,600	$3,445,400

Agency Summary

MILITARY DEPARTMENT STATE OF MARYLAND

INTRODUCTION

The Military Department, State of Maryland (MM), provides highly trained personnel, equipment, and facilities capable of protecting life and property and preserving peace, order, and public safety with rapid response for the Governor and the citizen's of Maryland. The department works with local, state, and federal agencies to support rapid recovery efforts in the event of a natural or man-made disaster. The Military Department State of Maryland consists of the Maryland Army National Guard, Maryland Emergency Management, Honor Guard, and Maryland Defense Force. The Maryland Environmental Service (MES) provides water and wastewater services to following facilities:

FACILITY NAME	WATER SOURCE	WATER TREATMENT	WATER DISTRIBUTION	WASTEWATER TREATMENT	WASTEWATER COLLECTION
Camp Fretterd Military Reservation	MES	MES	MM	MES	MM
Gunpowder Military Reservation	MM	MES	MM	MM	MM
Frederick Armory	MES	MES	MM	MM	MM
Brig. Gen. Thomas B. Baker Training Site	MES	MES	MM	MES/MM	MM

AGENCY CAPITAL IMPROVEMENT PLANS

MES requested a copy of the Military Department's Capital Improvements Master Plan and were informed one did not exist. Therefore, the Agency's plans for expansion or proposed change in use are not known at this time. The five-year plan submitted by the Department to the Maryland Department of Budget and Management did not indicate any plans for Capital Improvement Projects for MM during this period.

CAPITAL IMPROVEMENT PLANS FOR MES-OPERATED FACILITIES

MES provides both water and wastewater services to the facilities listed above. The following section provides summaries of the proposed capital improvement needs for each facility. More detailed descriptions of each facility are included in the Water and Wastewater Master Plan Report.[1]

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[1] State of Maryland, Department of Budget and Management, FY 2009 – 2013 Capital Improvement Plan, http://dbm.maryland.gov/dbm_publishing/public_content/dbm_taxonomy/budget/capital_budget/capital_improvement_plans/toc_fy2009_2013capimprovplan.html

I. BAKER TRAINING FACILITY (MNG)

- No improvements needed at this time.

II. CAMP FRETTERD (MNG)

A. WATER TREATMENT PLANT FOR WELL NO. 1

- Relocate switches from main electrical panel to a separate, weatherproof enclosure
- Replace heaters in the storage and treatment areas
- Replace building door for Well No.1 treatment building
- Replace roof and fascia
- Install mission control unit

B. WATER TREATMENT PLANT FOR NEW WELL

- Construct a new treatment facility for the proposed new well

C. WATER SOURCE

- Construct a new well at a higher elevation, in the middle section of campus (in proximities of Armory Booster Pump Station), to provide redundancy to the campus-wide water supply.

D. WATER DISTRIBUTION

- Construct a new elevated tank in the middle section of campus (in proximities of Armory Booster Pump Station), to provide a consistent water supply and pressure campus-wide according to the 2005 water supply study conducted by Watek Engineering, or construct a new booster pump facility near the existing 300,000 gallon elevated water tank to provide adequate pressures at higher elevation areas.
- Paint 100,000 gallon elevated water storage tank

E. ONSITE WASTEWATER DISPOSAL

- Replace two submersible pumps in the duplex pump station located in Gill area

Projected Cost: $1,970,000
Planning and Design: Fiscal Year 2011
Construction: Fiscal Year 2012

III. GUNPOWDER MARYLAND NATIONAL GUARD RESERVATION

A. WATER TREATMENT PLANT

- Remove existing softeners and cap or modify piping as needed
- Install heating system for the building
- Install fence around the 5,000 gallon below grade reservoir
- Reconfigure space created by the removal of the softeners for use as a chemical (liquid and powder) storage area
- Well control building: repair roof/insulate

B. WATER SOURCE

- Construct a new well in an appropriate location to provide redundancy in supplying water to the facility.

Projected Cost: $116,000
Planning and Design: Fiscal Year 2020
Construction: Fiscal Year 2020

The Maryland Environmental Service Water and Wastewater Master Plan projects the cost for upgrades to the Military Department, State of Maryland, water and wastewater facilities through Fiscal Year 2021 to be $ **2,105,500.**

FACILITIES NOT SERVED BY THE MARYLAND ENVIRONMENTAL SERVICE

There are several facilities falling under the jurisdiction of the Military Department, State of Maryland, that are not served by Maryland Environmental Service; local jurisdictions or sanitary authorities provide water and/or sewage collection and treatment services. A description of the facilities and water and wastewater service for each facility is not included within this document. Information on these systems may be included in future updates to this plan. MES recommends the existing infrastructure be evaluated at these in order to avoid potential disruption to water and sewerage service in the future.

SUMMARY

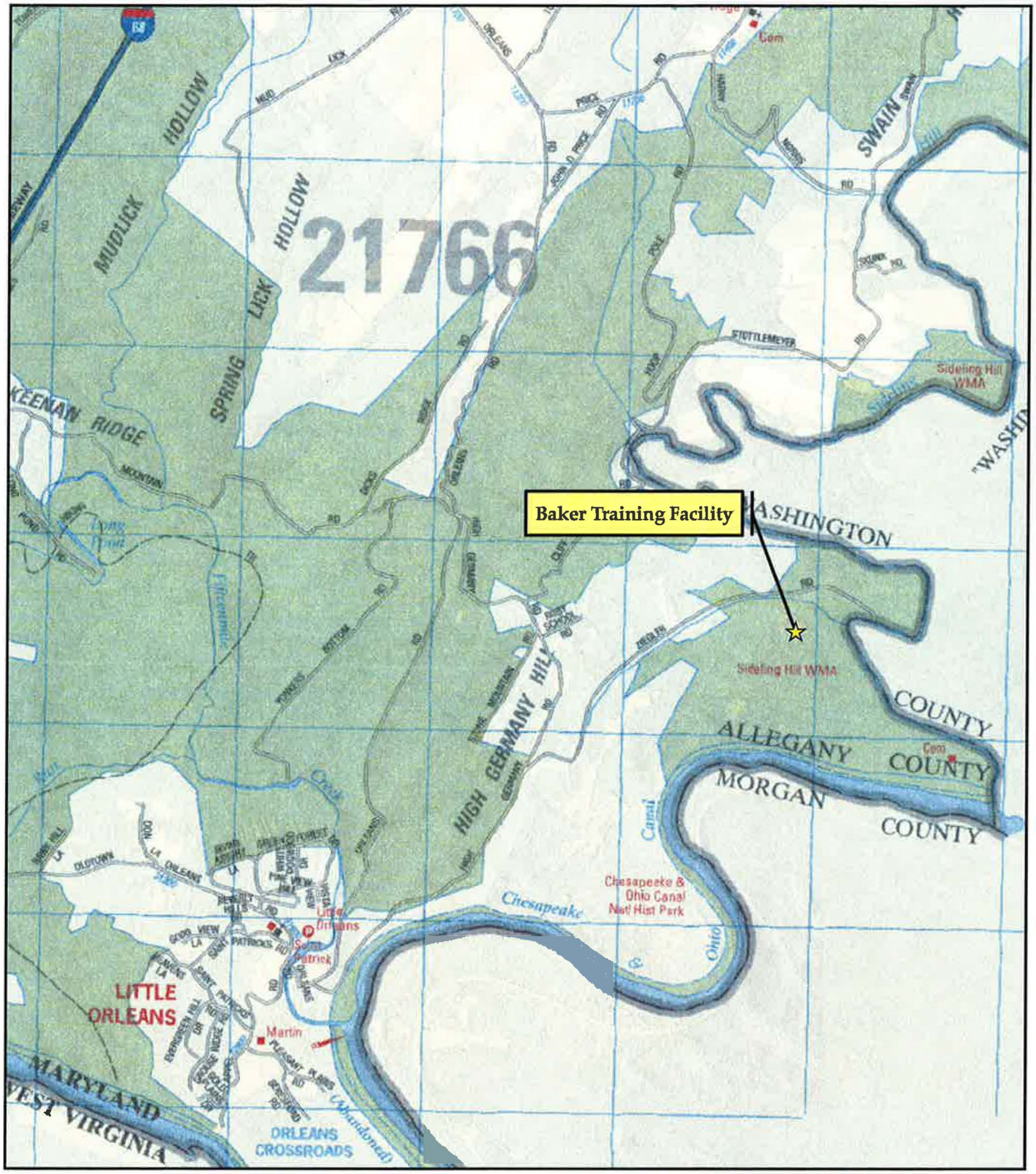
Detailed descriptions of the water and wastewater facilities operated by MES for the Military Department, State of Maryland, are included in this volume, as well as the following information:

- Operations data
- Regulatory compliance history and future regulatory constraints
- A listing of operational and infrastructure deficiencies
- Capital improvements and major maintenance funding history
- Recommended improvements and estimated costs (in 2008 dollars)
- Proposed schedule of implementation
- Supplemental information

MES will continue to work closely with the Military Department to keep abreast of their planning activities to ensure there will be an adequate water supply and sewerage service for proposed facility expansions or changes in use.

Brig. Gen. Thomas B. Baker Training Site

Maryland Army National Guard



☆ Sites	Water and Wastewater Master Plan 2008	NAD 1983 StatePlane Maryland FIPS 1900 (feet) Projection: Lambert Conformal Conic GCS: North American 1983
Figure 1	MARYLAND ENVIRONMENTAL SERVICE 259 Najoles Road Millersville, MD 21108 (410) 729- 8200	0 1,000 2,000 3,000 4,000 Feet I:\GIS\Projects\MES\MES Sites\Sites.mxd

BRIG. GEN. THOMAS B. BAKER TRAINING SITE
MARYLAND ARMY NATIONAL GUARD

BACKGROUND

The Baker Training facility is a Maryland Department of the Military (MDM) facility, which is located approximately 4 miles northeast of the Town of Little Orleans, Maryland. Baker Training facility is used primarily for military training and consists of the following:

- Ranger House
- Tablers Lodge
- Alleghany Site
- Straus Lodge
- Baker Lodge
- Maintenance Shop

This training facility opened in 1990. The facility is frequented by at least 20 people, and during special events the population can reach as high as 500 individuals. The population distribution by season is described in the table below:

Location	Population Summer/Mo.	Population Winter/Mo.	Population Yearly
Rangers House			6
Straus Lodge	200	40	
Tablers Lodge	100	20	
Baker Lodge	500	200	
Allegheny Site			20

Maryland Environmental Service (EMS) operates the water source and water treatment for the Maryland National Guard. The Maryland National Guard operates the onsite wastewater disposal system.

MDM has no plans to expand this facility. Therefore, there is no expected impact on water or wastewater.

WATER AND ONSITE WASTEWATER DISPOSAL SYSTEM FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The camp's waterworks consists of five (5) wells and a treatment facility for each well. The treatment facility for each well consists of an ion exchange unit, a bladder tank, and an ultraviolet disinfection unit. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

Groundwater is the water source for the Baker Training facility. There are five (5) wells located throughout the camp. Each well is near either a Lodge, a Ranger House, or the Allegheny Site. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

C. ONSITE WASTEWATER DISPOSAL SYSTEM

The Baker Training facility onsite wastewater disposal system consists of four (4) 2,500-gallon septic tanks and associated drain fields.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2007 OPERATIONS INFORMATION

In 2007, average water flows were 53,000 gallons per year. Additional 2007 operations data for the water facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment, the following deficiencies were identified:

- The hot water heaters are old and showing signs of wear.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility did not have any violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

MES has made no capital improvement requests for this facility.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment, the following recommended improvements were identified:

- Install four (4) hot water heaters

The above improvements will be part of the critical maintenance request for this facility: Projected Total Cost: **$19,500.**

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: N/A
- Installation: To Be Determined

SUPPLEMENTAL INFORMATION

BRIG. GEN. THOMAS B. BAKER TRAINING SITE
MARYLAND ARMY NATIONAL GUARD

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The waterworks consist of five (5) drilled wells, a treatment facility for each well, and a distinct distribution network for each well.

Ranger House Well
The well is located near the Ranger's residence. This well (AL-81-0227) was drilled before 1984. The well is 6-inches in diameter and has a total depth of 600 feet. The well is provided with 6-inch casing and 550 feet of 1-1/2 inch galvanized drop pipe. The well has a presumed yield of 9 gpm. The well is equipped with a Goulds pump of unknown size with a 3 hp motor, which was installed in 1991. The distribution network associated with this well consists of 1,585 ft. of PVC and cast-iron pipes ranging from 1-1/4 inch to 2-inch.

Straus Lodge Well
This well is located near Straus Lodge. This well (AL-94-0538), drilled in 1998, is 8-inches in diameter and has a total depth of 465 ft. The well is provided with 8-inch casing and 440 ft. of 1-1/2 inch galvanized drop pipe. The well has a presumed yield of 10 gpm and is equipped with a pump rated at 10 gpm with a 2 hp motor. The distribution network associated with this well consists of 100 ft. of 2-inch PVC pipe.

Tabler's Lodge Well
This well is located near Tabler's Lodge. This well (AL-94-0539), drilled in 1998, is 8-inches in diameter and has a total depth of 385 ft. The well is provided with 8-inch casing and 350 ft. of 1-1/2 inch galvanized drop pipe. The well has a presumed yield of 10 gpm and is equipped with a pump rated at 10 gpm with a 2 hp motor. The distribution network associated with this well consists of 111 ft. of 2-inch PVC pipe.

Baker's Lodge Well
This well is located near Baker's Lodge. The well (AL-94-0064), drilled in 1994, is 6-inch in diameter and has total depth of 298 ft. The well is provided with 6-inch casing and 73 feet of steel drop pipe. The well has a presumed yield of 6 gpm and is equipped with a pump rated at 20 gpm with a 5 hp motor. The distribution network associated with this well consists of 60 ft. of 2-inch PVC pipe.

Allegheny Well
This well was drilled in 1978. No additional information is available.

WATER TREATMENT

The waterworks consist of five (5) drilled wells and a treatment facility for each well. Each treatment facility consists of bladder/pressure tanks, ion exchange units, and ultraviolet disinfection units.

The Tabler's Lodge treatment facility consists of a 119 gallon bladder tank, an ion exchange unit with its associated brine tank rated at 10 gpm, and an ultraviolet disinfection unit rated at 12 gpm.

The Baker's Lodge treatment facility consists of a 62 gallon bladder tank, an ion exchange unit with its associated brine tank rated at 10 gpm, and an ultraviolet disinfection unit rated at 12 gpm.

The Straus's Lodge treatment facility consists of a 62 gallon bladder tank, an ion exchange unit with its associated brine tank rated at 10 gpm, and an ultraviolet disinfection unit rated at 12 gpm.

The Ranger's house treatment facility consists of a 62 gallon bladder tank, an ion exchange unit with its associated brine tank rated at 10 gpm, and an ultraviolet disinfection unit rated at 12 gpm.

The Allegheny treatment facility consists of a 30 gallon bladder tank, and an ultraviolet disinfection unit rated at 12 gpm.

Site Name: Brig. Gen. Thomas B. Baker Training Center

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd: N/A

Amount of Previous CIP Funding: $0.00

Amount of Current CIP funding: $0.00

Anticipated Date for current CIP funding: **N/A**

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates

Latitude	*Longitude*
78° 25' 1.27" W	39° 38' 14.20" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Brig. Gen. Thomas B. Baker...	Water System	MM	Western

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Brig. Gen. Thomas B. Baker Training Site

Address

Comments:

Agency: MM

Region: Western

Average Daily Demand (ADD) (gal/day): 22

Peak Day Demand (gal/day): N/A

WTP Design Capacity: 50,400 gpd

Total No. of Wells: 5 Not Conn

Average Daily Run Time of Wells (Hrs):

Capacity w/ largest Well Offline: 44,000

GW Appro. Permit Number (GAP): AL1958G001(05) ☐ N/A

Total GW. Appro. (GAP) (ave.day) (gal/day): 700

% of ADD to GAP: 3%

General Discharge Permit Number: 06HT5022

W/WW Engr. Project Mgt

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber

Surface Water Appr. Permit Number: ( ) ☑ N/A

Surface Water Appr. Amount (SAP) (ave. day) (gal/day): N/A

% of ADD to SAP: N/A

Amount of Water Storage (gallons):

Days of Storage at ADD:

PDWIS WTP Number: 101-1029 101-1112 101-1075 101-1076

Appropriation Permit Exp. Date: 5/1/2016 ☐ N/A

Est. Total length of Water Lines (feet): 1700

Number of permit violations:

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

BRIG. GEN. THOMAS B. BAKER TRAINING SITE
MARYLAND ARMY NATIONAL GUARD

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER COLLECTION

Conditional Analysis:
- There are four (4) existing 2,500 gal. septic tanks on-site. All are in good repair and are regularly maintained.

Proposed Improvements:
- None

WATER TREATMENT PLANT

Conditional Analysis:
- Hot water heaters are 30+ years old and require replacement

Proposed Improvements:
- Replacement of four (4) hot water heaters with tankless hot water heaters within five years

WATER SOURCE

Conditional Analysis:
- No issues reported

Proposed improvements:
- None

WATER DISTRIBUTION

Conditional Analysis:
- No issues reported

Proposed improvements:
- None

Brig. Gen. Thomas B. Baker Training Site
Maryland Army National Guard

WTP

Ion Exchange & Bladder Tank

WTP

Well

UV Unit

WTP

Treatment Facility Overview

Bay Country Welcome Center

ONSITE WASTEWATER DISPOSAL SYSTEM

Septic Tanks- Overview

Wastewater Pump Station Overview

WTP

Arsenic Removal Unit

Bladder Tanks

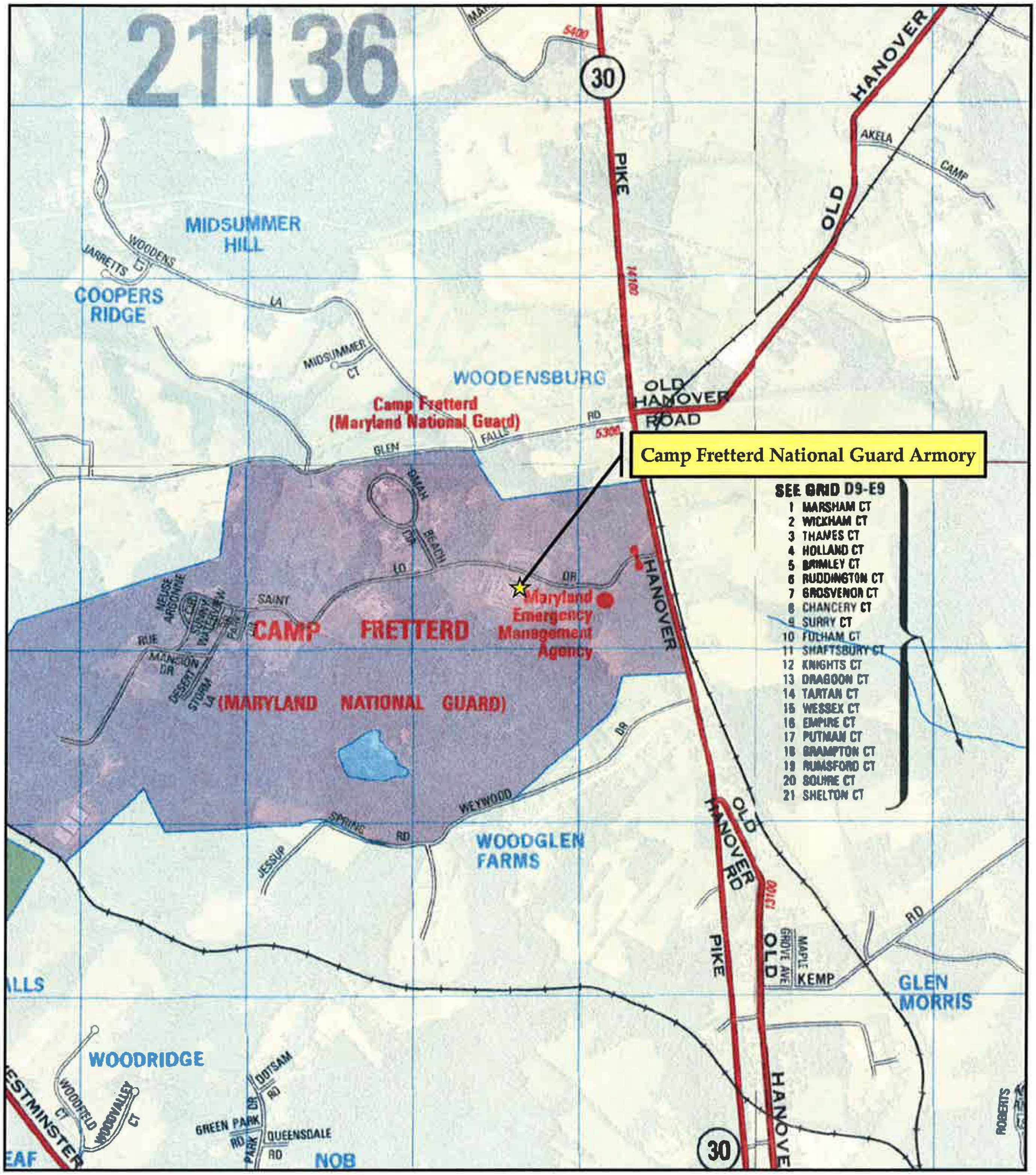
WTP

Well Number 1

Well Number 2

Camp Fretterd Military Reservation

Maryland Army National Guard



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000 2,500
Feet

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CAMP FRETTERD MILITARY RESERVATION
MARYLAND ARMY NATIONAL GUARD

BACKGROUND

Camp Fretterd is a Maryland Department of the Military (MDM) facility, and is home to several units of the Maryland Army and Air National Guard. The Camp Fretterd complex is located off State Route 30 north of Reisterstown in Western Baltimore County.

The facility has two (2) distinct areas: the Field Campus and the Gill Campus. The Field Campus contains the Armory and Maryland Emergency Management facilities. The Field Campus also includes several dormitories, classrooms, dining halls, aid stations, etc. The Gill Campus was constructed in the early 1960's and contains five (5) dormitories, a school building, gymnasium, dining facility, warehouse, and a small house. This area is used by the Maryland Military Academy as a resident training school for members of the Army National Guard.

The MDM has plans to expand the facilities. However, there is no specific information available at the present time as to when or to what degree.

Maryland Environmental Service operates the water facilities and two of the on-site wastewater disposal systems for the MDM.

WATER AND ONSITE WASTEWATER DISPOSAL SYSTEM FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

Camp Fretterd consists of two (2) drilled wells, a treatment facility, a 100,000 gallon elevated storage tank, a 300,000 gallon elevated storage tank, two (2) booster pump stations, and a distribution network. The treatment facility for Well No. 1 consists of a chemical feed facility for sodium hypochlorite, for water disinfection, and soda ash for pH adjustment. Well No. 2 does not receive any treatment and has been abandoned. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

Camp Fretterd has two (2) drilled wells. Well No. 1 is located inside the old water treatment building. Well No. 2 is located near two (2) elevated water storage tanks. This well has been abandoned due to low yield. The Camp Fretterd water distribution system consists of a 100,000 gallon elevated storage tank, a 300,000 gallon elevated storage tank, two (2) booster pump stations, and 18,950 feet of cast iron pipes ranging from 3-inch to 8-inch. There is also a 60,000-gallon ground storage tank at the MEMA complex, which is part of a distribution network, but is not operated by the Maryland National Guard. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

C. ONSITE WASTEWATER DISPOSAL SYSTEM

The on-site wastewater disposal system for Camp Fretterd is divided into four (4) distinct regions. The Gill Campus consists of a 22,000 gallon septic tank/wet well, a duplex submersible pump station, drain fields and 4,000 linear feet of sewer pipes. The MEMA system consist of four (4) septic tanks that are each rated for 2,500 gallon, three (3) drain fields, four observation wells for each drain field, and two (2) monitoring wells. The site manager's office, the Dooley Building, and the Weinberg Center systems each have 1,000-gallon septic tanks and drain fields. The Howard Hall system consists of two (2) 2,000-gallon septic tanks, a duplex submersible pump station, and associated drain fields.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average water demand was 10,500 gallons per day. Additional 2010 operations data for the water facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment, the following deficiencies were identified:

Water Treatment Plant

- All "on and off" switches (including lights) are located inside the main panel outside of the treatment building. This is highly unsafe for MES staff operating the system.
- The heaters, in both the storage and the treatment areas, are not working. This could allow the chemicals and the associated well discharge piping to freeze.
- The building door is damaged, which leads to the potential for vandalism
- The roof of the building is in poor condition
- There is no alarm system available

Water Source

The system is currently relying on a single source. No backup source is available.

Water Distribution

- The locations and hydraulic elevations of the existing water tanks and booster stations have a major impact on system pressure during periods of high demands when training events or conferences take place at the Camp.
- The existing 100,000 gallon tank paint is deteriorating.

Onsite Wastewater Disposal

The two (2) submersible pumps in the wastewater pump station in the Gill area are in need of repairs. The MEMA on-site septic system needs a major upgrade to comply with the new groundwater discharge permit issued in January 2010.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

The potable water system has had no compliance issues. Camp Fretterd has only one (1) functioning well. In the event this well breaks down, there is no alternate source to supply the campus. The emergency nature of some of the facilities on campus requires an additional source be made available. The now defunct well No. 2 will be abandoned according to MDE guidelines. A new replacement well will be constructed.

The MEMA on-site system will require a major upgrade to augment the septic tanks in order to comply with the groundwater discharge permit issued by MDE.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

Maryland Environmental Service has made no past capital improvement requests for this facility.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment, the following recommended improvements were identified:

Water Treatment Plant for Well No.1

- Relocate switches from main electrical panel to a separate, weatherproof enclosure
- Replace heaters in the storage and treatment areas
- Replace building door for Well No. 1 treatment building
- Replace roof and fascia
- Install mission control unit

Water Treatment Plant for New Well

- Construct a new treatment facility for the proposed new well

Water Source

- Construct a new well at a higher elevation, in the middle section of campus (in proximity of the Armory Booster Pump Station), to provide redundancy to the campus-wide water supply.

Water Distribution

- Construct a new elevated tank in the middle section of campus (in proximity of the Armory Booster Pump Station), to provide a consistent water supply and pressure campus-wide according to the 2005 water supply study conducted by Watek Engineering, or construct a new booster pump facility near the existing 300,000 gallon elevated water tank to provide adequate pressures at higher elevation areas.
- Paint 100,000 gallon elevated water storage tank

Onsite Wastewater Disposal

- Replace two (2) submersible pumps in the duplex pump station located in Gill area.
- Construct an advanced wastewater treatment facility for the MEMA on-site system.

The above improvements will be part of a future Capital Improvement Request. The total projected cost is **$1,970,000**, which includes design, inspection, testing and construction costs.

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2015
- Construction: Fiscal Year 2017

SUPPLEMENTAL INFORMATION

CAMP FRETTERD MILITARY RESERVATION
MARYLAND ARMY NATIONAL GUARD

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The waterworks consist of two (2) drilled wells, a treatment facility, a 100,000 gallon elevated storage tank, a 300,000 gallon elevated storage tank, two (2) booster pump stations and a distribution network. There is also a 60,000-gallon ground storage tank at the MEMA complex, which is part of distribution network that is not operated by Maryland National Guard.

Well No. 1 - The well is located in the old treatment and control building. The well, drilled in February 1987, is 6 inches in diameter and has a total depth of 305 feet. It is provided with 6-inch steel casing. A yield and drawdown test, conducted in June 1987, presumes a yield of 60 gpm. The well appurtenances consist of a sample tap, a flow meter, a pressure gauge, an airline for measuring water level, a check valve and a gate valve. The well is equipped with a 5 hp submersible pump rated at 75 gpm @ 380 feet TDH. The static water level is set at 24 feet. The pump is set at 280 feet and was installed in 1987. The pump discharges to the treatment facility via a 4-inch water line.

Well No. 2 - This well is located near the two (2) elevated storage tanks. The well, due to low yield, has been abandoned. No additional information is available.

The 100,000-gallon elevated storage tank was constructed in 1953. The tank is 15 feet tall, from the base of the tank. The overflow elevation is at 705 feet and grade elevation is 690 feet.

The 300,000-gallon elevated storage tank was constructed in 1962. The total height of the tank is 25 feet from the base of tank. The overflow elevation is 705 feet, and the grade elevation is 680 feet.

The 60,000-gallon ground storage tank, located in the MEMA building, has an overflow elevation of 746 feet and a base elevation of 730 feet.

Both the 300,000-gallon and the 100,000 gallon elevated storage tanks are located at the low point of the complex and provide water to the distribution network.

The Omaha Beach loop pump station is equipped with two (2) booster pumps rated at 110 gpm @ 120 ft. TDH that each have 7.5 hp motors, a 2,180 gallon hydropneumatic tank and fire pump rated at 750 gpm @ 92.5 ft. TDH with a 25 hp motor. This booster pump station primarily supplies water to the Omaha Beach loop. The booster pumps are on at 30 psi and off at 50psi.

The Armory pump station is equipped with two (2) booster pumps rated at 100 gpm @ 142 ft. TDH that have 7.5 hp motors. This booster pump station primarily provides water to MEMA complex via a 3-inch line.

The distribution system consists primarily of cast iron pipes ranging from 3-inch to 8-inch. The approximate length of distribution system is 18,950 feet.

WATER TREATMENT

The waterworks consist of two (2) drilled wells, a treatment facility, a 100,000 gallon elevated storage tank, a 300,000 gallon elevated storage tank, two (2) booster pump stations, and the distribution network.

The treatment facility for Well No. 1 consists of chemical feed facilities for sodium hypochlorite feed for water disinfection, and soda ash for pH adjustment. The chemical feed facilities for sodium hypochlorite include a 30-gallon day tank and a 17 gpd @ 100 psi chemical metering pump and the associated piping and fittings. Chemical feed facilities for soda ash include a 55 gallon day tank and a chemical metering pump rated at 50 gpd @ 25 psi.

Well No. 2 does not have any treatment facility

ONSITE WASTEWATER DISPOSAL SYSTEM

Wastewater is collected by gravity sewers and then discharged into several on-site disposal systems.

Gill Campus

The on-site disposal system for this campus consists of a 22,000-gallon septic tank/wet well, a duplex submersible pump station, a 20KW emergency generator, and 4,000 linear feet of sewer pipes. The submersible pump station consists of two (2) pumps with 5 hp motors.

Maryland Emergency Management Area (MEMA)

The onsite disposal system for this area consists of four (4) septic tanks rated for 2,500 gallon each, three (3) drain fields, four (4) observation wells for each drain field, and two (2) monitoring wells.

Site Manager, Dooley Bldg and Weinberg Center

Each of these facilities has a 1000-gallon septic tank and associated drain fields.

Howard Hall

The onsite disposal system for Howard Hall consists of two (2) 2,000-gallon septic tanks, a duplex submersible pump station, and associated drain fields. The submersible pump station consists of two (2) pumps with 2 hp motors.

Site Name: Camp Fretterd Military Reservation

Background

File Link to Facility Photos

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Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd N/A

Amount of Previous CIP Funding $0.00

Amount of Current CIP funding $0.00

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
76° 47' 19.53" W	39° 33' 4.97" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Camp Fretterd Military Reser...	Water System	MM	Central
Details	Camp Fretterd Military Reser...	OSDS	MM	Central

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Camp Fretterd Military Reservation

Address

5401 Rue Saint Lo Drive

Reisterstown, MD 21136

Comments:

Agency: MM

Region: Central

Average Daily Demand (ADD) (gal/day)	8,325
Peak Day Demand (gal/day)	70,700
WTP Design Capacity	86,400
Total No. of Wells	2
Average Daily Run Time of Wells (Hrs)	
Capacity w/ largest Well Offline	
GW Appro. Permit Number (GAP)	BA1988G043(04) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	10,000
% of ADD to GAP	83%
General Discharge Permit Number	06HT5043

W/WW Engr. Project Mgt: PB

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Earl	Villarreal	(410) 781-6463	(410) 781-6463
Dave	Coale	(410) 781-6463	(410) 781-6463
Doug	Myers	(410) 781-6463	(443) 223-0072

Surface Water Appr. Permit Number	______(_) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	
Days of Storage at ADD	
PDWIS WTP Number	103-0055
Appropriation Permit Exp. Date	3/1/2018 ☐ N/A
Est. Total length of Water Lines (feet)	18,950
Number of permit violations	

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	2/1/2011	TN	monthly	% mv	<1	50

Facility Name: Camp Fretterd Military Reservation

Address: 5401 Rue Saint Lo Drive
Reisterstown, MD 21136

Agency: MM

Region: Central

Average Daily Demand (ADD) (gal/day)

Peak Day Demand (gal/day)

Ratio Peak Flow to ADD

OSDS Design Capacity

% of ADD to Design Capacity

GW Disposal Permit Number: 01-DP-3183 ☐ N/A

Appropriation Permit Exp. Date: Draft ☐ N/A

Number of permit violations

Nature of Compliance Problem

W/WW Engr. Project Mgt

Location of Asbuilt Drawings or CDs

OSDS Description: Appendix E

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNum
Earl	Villarreal	(410) 781-6463	(410) 781-
Dave	Coale	(410) 781-6463	(410) 781-
Doug	Myers	(410) 781-6463	(443) 223-

Will Future Limits be more stringent?

No. of GW Monit. Wells

Is more land neeeded for disposal?

Frequency of tank cleanouts

Is more frequent pumping needed?

No. of Pump Stations

Est. Size of Septic Tank (gal)

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Camp Frettered	TN	2/1/2011	monthly	% rmv	<1	50	A septic hauler was called and the wastewater was pumped out of the septic tank to stop any discharge into any of the absorption trenches.	Discharge from the septic tanks to the absorption fields has been halted. Wastewater is being pumped and hauled.

CAMP FRETTERD MILITARY RESERVATION
MARYLAND ARMY NATIONAL GUARD

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:
- N/A

Proposed Improvements:
- N/A

WASTEWATER COLLECTION/ON-SITE DISPOSAL

Conditional Analysis:
- The two (2) submersible pumps in duplex station in Gill area are showing signs of wear and tear

Proposed Improvements:
- Replace two (2) submersible pumps in duplex pump station located in Gill area

WATER TREATMENT PLANT

Conditional Analysis:
- Well No. 1 Treatment building has THE following deficiencies:
    - All on and off switches (including lights) are located inside the main panel outside of treatment building therefore the main panel need to be accessed on a constant basis. The wiring arrangement inside the panel could be potential safety hazard
    - The heater is not operational in both the storage and treatment areas, which may freeze chemicals and associated well discharge piping
    - The building door is damaged and could be potential for vandalism
    - The roof of the building is in poor condition
    - No alarm system is available
- Well No. 2 water is currently abandoned and does mot receive any kind of treatment

Proposed Improvements:
- Proposed corrective measures for Well No. 1 treatment building
    - Relocate switches from main electrical panel to a separate weather-proof enclosure.
    - Replace heaters in storage and treatment areas
    - Replace building door for Well No. 1 treatment building
    - Replace roof and fascia
    - Install mission control unit
- Construct new treatment facility for proposed new well

WATER SOURCE

Conditional Analysis:

- The system is currently relying on single source. If problems arise for Well No. 1 no backup source is available

Proposed improvements:

- Construct a new well at higher elevation in middle section of campus (in proximity of the Armory Booster Pump Station) to provide redundancy in supplying water to whole campus.

WATER DISTRIBUTION

Conditional Analysis:

- The existing elevated water tanks and booster pumps are laid in such way that water pressures cannot be met during high demands resulting from events in campus.

Proposed improvements:

- Construct new elevated tank in middle section of campus (in proximity of the Armory Booster Pump Station) to provide consistent water supply and pressures to all campus according to a water supply study conducted by WATEK Engineering in 2005, or construct new booster pump facility near existing 300,000 gallon elevated water tank to provide adequate pressures at higher elevation areas.

Camp Fretterd Military Reservation

ONSITE DISPOSAL

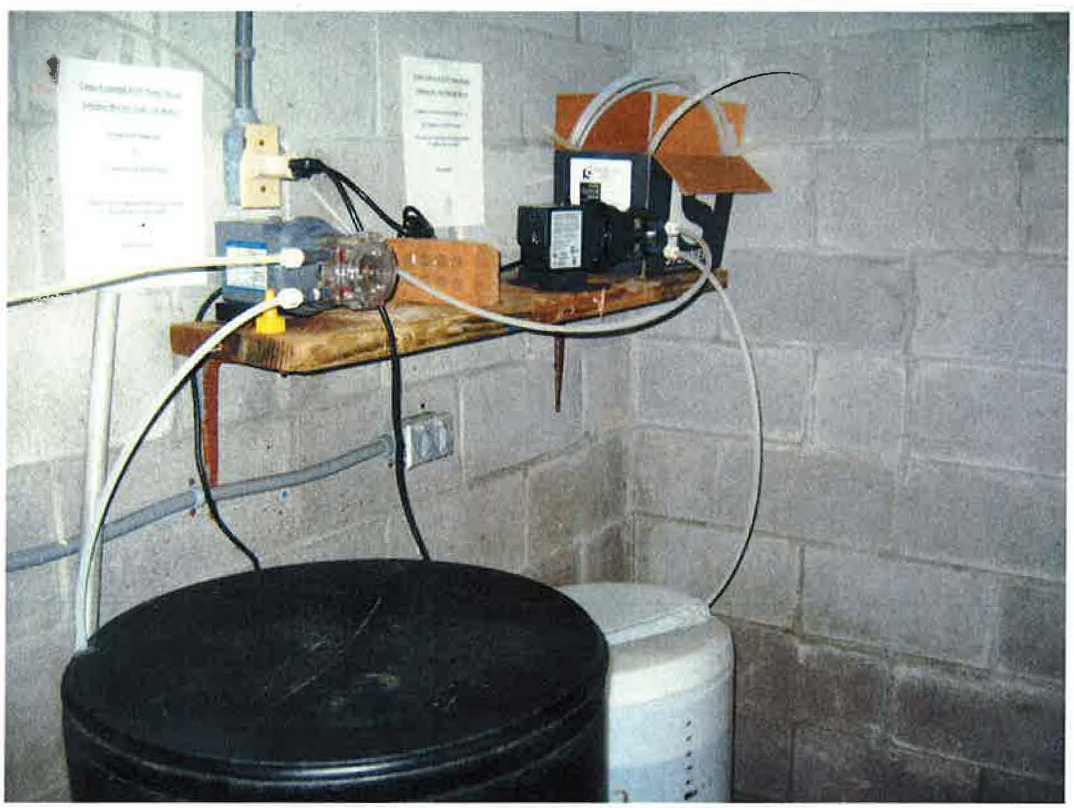
MEMA Onsite Wastewater Disposal

Gill Area Pump Station

ONSITE DISPOSAL

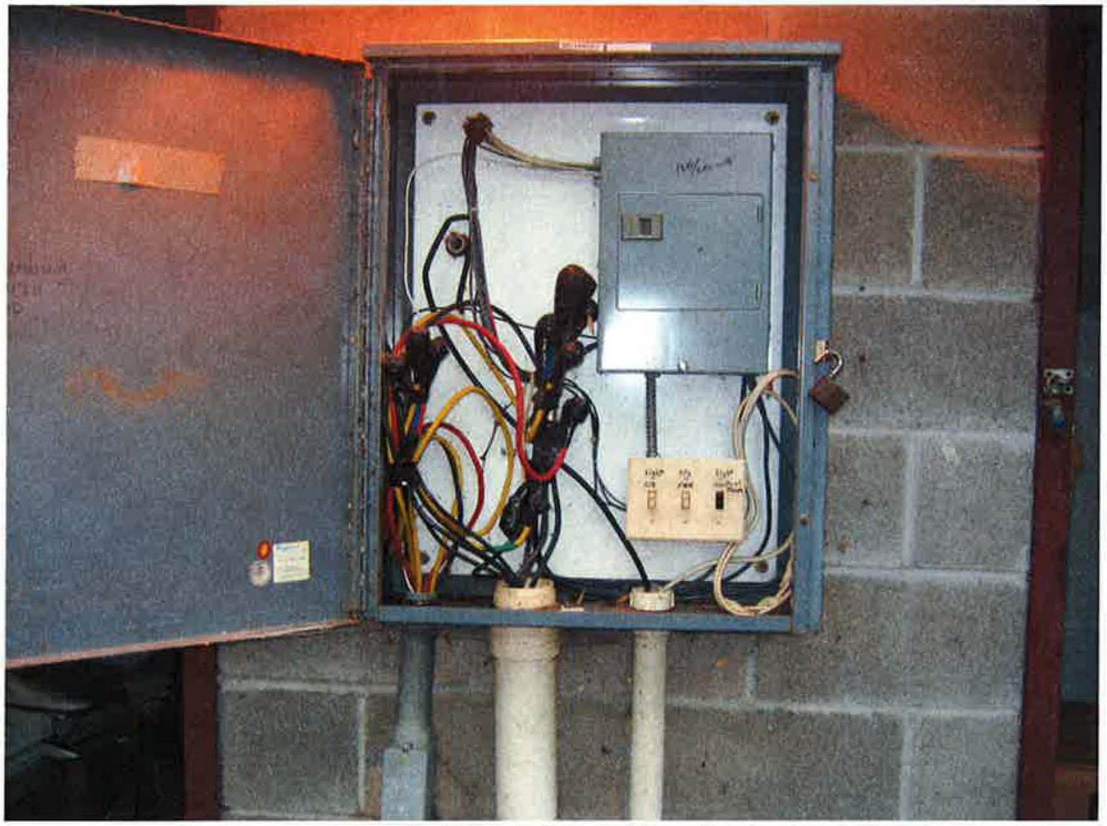
Howard Hall Pump Station/ Septic Tanks

WTP & WSD



Chemical Feed Facilities for Well No. 1

WTP & WSD



Well No.1 Control Panel

300,000 & 100,000 Gallon Storage

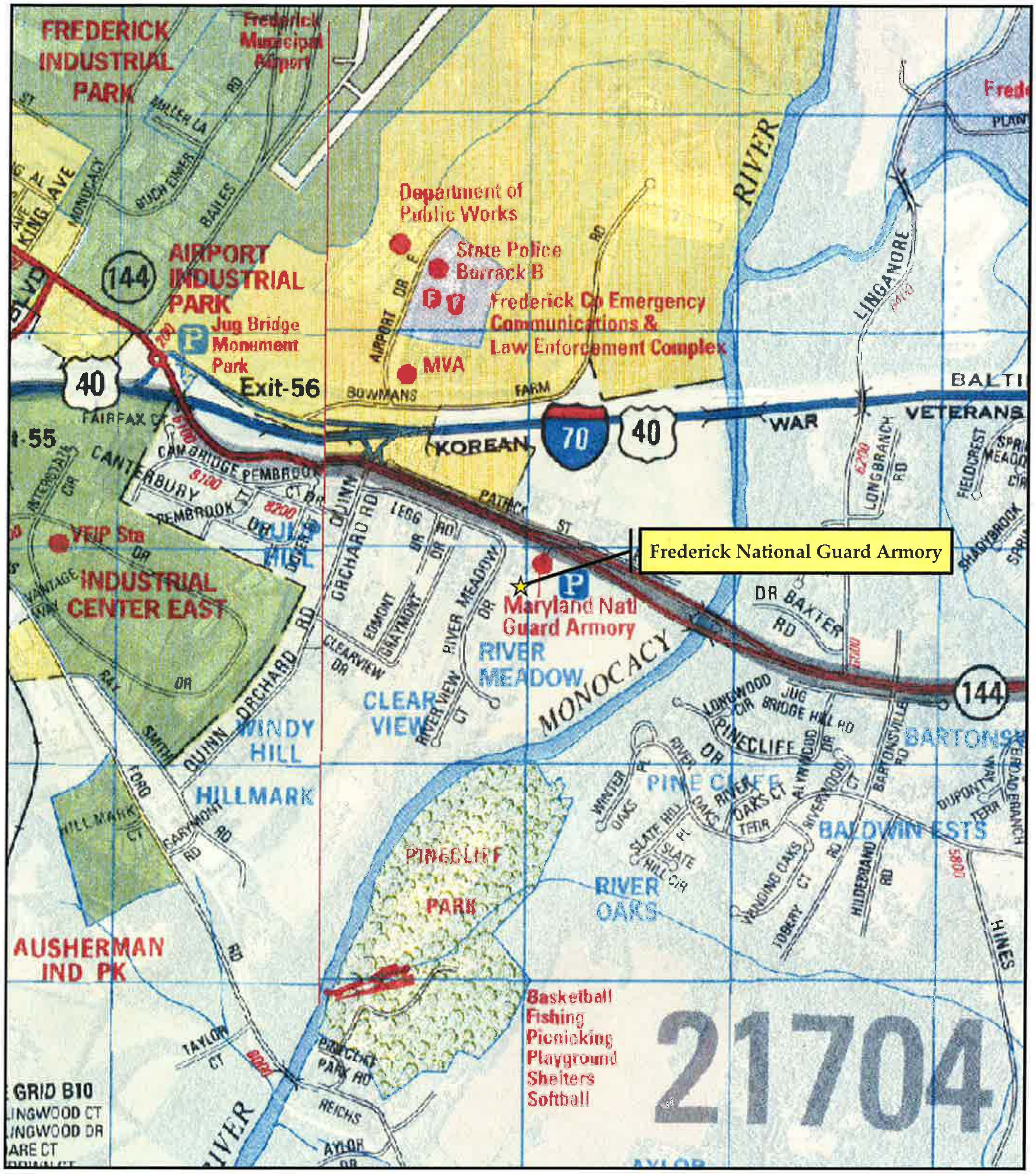
WTP & WSD

Omaha Beach Booster Pump Station

Armory Booster Pump Station

Frederick Armory

Maryland Army National Guard



☆ Sites	
Figure 1	

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

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FREDERICK ARMORY
MARYLAND NATIONAL GUARD

BACKGROUND

The Armory is a brick building operated by the Maryland Department of the Military (MDM). The facility sits on 2.5 acres, southeast of the City of Frederick, on the south side of U.S. Route 40. Weekday use of the facility is six (6) to eight (8) persons and approximately eighty (80) during weekend training drills.

The five-year plan from the Maryland Military Department projects no expansion of facilities at this location. The MDM Master Plan was not available for review.

Maryland Environmental Service (MES) operates the water source and water treatment facility.

WATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The Armory water system consists of one (1) drilled well and a treatment facility. The treatment facility is located within the furnace room and consists of chemical feed facilities for sodium hypochlorite, and a 1,000-gallon hydropneumatic tank. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

The Armory has a single well located approximately 100 feet from the treatment room. The well water is treated and supplies only the Armory. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average and peak water flows were 455 gallons per day and 15,100 gallons per day, respectively. Additional 2010 operations data for the water facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

The water source and water treatment facilities are operating satisfactorily.

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility did not have any violations in the past 15 years and is eligible for permit exemption. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

No capital improvement requests have been made in the past via Maryland Environmental Service.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

For this planning period, there are no recommended improvements for the facility.

SUPPLEMENTAL INFORMATION

FREDERICK ARMORY
MARYLAND NATIONAL GUARD

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION

The water system consists of one (1) drilled well and a treatment facility within the furnace room of the Armory.

The 8-inch well (FR73-7186), drilled in 1979, is 125 feet deep and located in a grassy area next to the parking lot approximately 100 feet from the treatment room. The well is equipped with 8-inch casing. The static level is at 18 feet. The presumed yield, based on a pumping test conducted in 1979, is 50 gpm. Well pump information is not available. A Water Appropriation Permit (FR1979G012) allows the withdrawal of 700 gpd. The treated water supplies the Armory's bathrooms and kitchen.

WATER TREATMENT

The waterworks consist of a single drilled well and a treatment facility

The treatment facility consists of chemical feed facilities for sodium hypochlorite and a 1,000-gallon hydro pneumatic tank. The sodium hypochlorite feed includes a chemical metering pump rated at 40 gpd at 100 psi and a 45-gallon day tank. The treated water is stored in a 1,000-gallon hydro pneumatic tank. The treatment plant serves a restroom and the kitchen in the Armory.

Site Name: Frederick Armory - MD Army National Guard

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
77° 26' 21.75" W	39° 33' 19.29" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Frederick Armory - MD Army...	Water System	MM	Central

Select type of New Facility: | Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Frederick Armory - MD Army National Guard

Address

Rt. 144 East

Frederick, MD

Comments:

Agency: MM

Region: Central

Average Daily Demand (ADD) (gal/day): 455

Peak Day Demand (gal/day): 15,100

WTP Design Capacity:

Total No. of Wells: 1

Average Daily Run Time of Wells (Hrs):

Capacity w/ largest Well Offline: 0

GW Appro. Permit Number (GAP): FR1979G012(03) ☐ N/A

Total GW. Appro. (GAP) (ave.day) (gal/day): 700

% of ADD to GAP: 65%

General Discharge Permit Number: 06HT5023

W/WW Engr. Project Mgt: PB

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
James	Campbell	(301) 791-4855	(301) 487-5481
Scott	Shaffer	(301) 791-4855	(301) 487-5471
Mike	Barkdoll	(301) 791-4855	(301) 487-5492

Surface Water Appr. Permit Number: ( ) ☑ N/A

Surface Water Appr. Amount (SAP) (ave. day) (gal/day): N/A

% of ADD to SAP: N/A

Amount of Water Storage (gallons):

Days of Storage at ADD:

PDWIS WTP Number: 110-1129

Appropriation Permit Exp. Date: 3/1/2013 ☐ N/A

Est. Total length of Water Lines (feet):

Number of permit violations:

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

FREDERICK ARMORY
MARYLAND NATIONAL GUARD

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:
- Good Condition

Proposed Improvements:
- None

WATER SOURCE

Conditional Analysis:
- No backup well is available

Proposed improvements:
- Eligible for an exemption for water appropriation

WATER DISTRIBUTION SYSTEM

Conditional Analysis:
- Operating satisfactorily

Proposed improvements:
- None

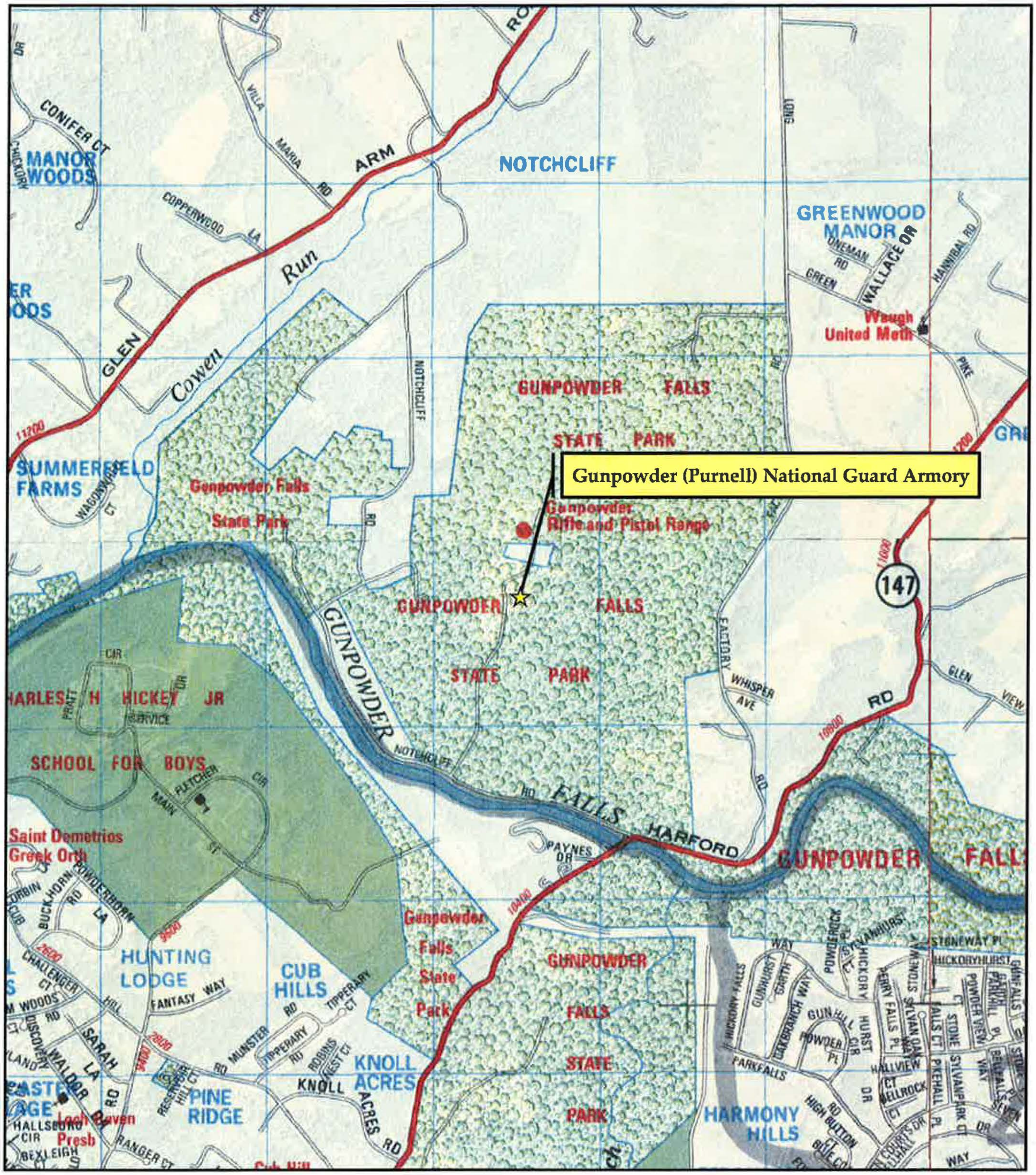
Frederick Armory
Maryland Army National Guard

Frederick NGA Treatment Room


Frederick NGA Well

Gunpowder Military Reservation

Maryland Army National Guard



☆ Sites	Water and Wastewater Master Plan 2008	NAD 1983 StatePlane Maryland FIPS 1900 (feet) Projection: Lambert Conformal Conic GCS: North American 1983
Figure 1	MARYLAND ENVIRONMENTAL SERVICE GIS SERVICES 259 Najoles Road Millersville, MD 21108 (410) 729-8200	0 500 1,000 1,500 2,000 2,500 Feet I:\GIS\Projects\MES\MES Sites\Sites.mxd

GUNPOWDER MILITARY RESERVATION
MARYLAND ARMY NATIONAL GUARD

BACKGROUND

Gunpowder Military Reservation of the Maryland Army National Guard is a Maryland Department of the Military (MDM) facility, and is home to several different units of the Maryland Army National Guard. The facility is located on Notchcliff Road, 4 miles north of Carney, in Baltimore County. The Gunpowder Military Reservation has approximately 25 people on a permanent basis and approximately 230 people a few days a week and at times on during weekend training events. The Gunpowder Military Reservation has the following facilities:

- Armory
- Ranger's House
- Police Barracks
- Two (2) Classrooms Barracks
- Dining Hall
- Three (3) Storage Buildings
- Women's Showers
- Leader Reaction Course
- Twelve (12) Tents
- Water Treatment Plant

The MDM five-year plan projects no expansion of the facilities at this location. The Maryland Military Master Plan was not available for review.

The Maryland Environmental Service (MES) operates the water treatment system for MDM, and the water source and wastewater collection system are operated by the MDM.

WATER FACILITIES DESCRIPTION

A. WATER TREATMENT PLANT

The waterworks consist of one (1) drilled well, a treatment facility, and a 5,000-gallon below grade raw water storage tank with two (2) submersible pumps that pump water to the treatment facility. The treatment plant consists of chemical feed equipment for soda ash, caustic soda, and sodium hypochlorite; plant controls; and a 3,000-gallon hydro pneumatic tank. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

The Gunpowder Reservation well and its control panel are approximately 500 feet from the raw water reservoir and treatment building. The distribution system consists primarily of cast iron pipes ranging from 1-inch to 3-inches. The approximate length of distribution system is 3,000 feet. Please refer to the Supplemental Information Section – Facility Description – WS&WD.

EXISTING CONDITIONS OF WATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, average water flows for the water treatment plant were 1,361 gallons per day. Additional 2010 operations data for the water facilities is included in the Supplemental Information Section – Operations Data - WTP.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment, the following deficiencies were identified:

Water Treatment Plant

- The existing softeners and associated piping have been abandoned. Softeners have been occupying space which could be used for the storage of bulk chemicals
- The building does not have any insulation or drop ceiling. Therefore, the chemicals are subject to freezing
- The below grade reservoir is not fenced and is subject to vandalism and accessible to potential contamination

Water Source

- The system is currently relying on a single source. If problems arise for the existing well there is no backup source available

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility did not have any violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

Maryland Environmental Service has made no past capital improvement requests for this facility.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment, the following recommended improvements were identified:

Water Treatment Plant

- Remove existing softeners and cap or modify piping as needed
- Install heating system for the building
- Install fence around the 5,000 gallon below grade reservoir
- Reconfigure space created by the removal of the softeners for use as a chemical (liquid and powder) storage area

Water Source

- Construct a new well in an appropriate location to provide redundancy in supplying water to the facility

The above improvements will be part of a Capital Improvement Request. The total projected cost is $116,000, which includes design, inspection, testing and construction costs.

Note: The cost estimate is based on 2008 dollars and is subject to change based on implementation schedule, inflation rate, regulatory requirements and other factors that cannot be forecast at the present time

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: Fiscal Year 2020
- Construction: Fiscal Year 2021

SUPPLEMENTAL INFORMATION

GUNPOWDER MILITARY RESERVATION
MARYLAND ARMY NATIONAL GUARD

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The waterworks consist of one (1) drilled well, a treatment facility, a 5,000-gallon below grade storage tank, and a raw water pumping facility.

Well - The well and well control panel are approximately 500 feet from the treatment building. The well, drilled in 1975, is 6-inches in diameter and has a total depth of 150 feet. It is provided with 6-inch steel casing. The presumed yield for this well is 30 gpm. The well is equipped with a submersible pump rated for an unknown capacity. The static water level is at 2 feet. The pump is set at an unknown depth. The well discharges to a 5,000-gallon below grade reservoir via a 2-inch water line. Two (2) submersible pumps in a reservoir, rated at 131 gpm @ 112 psi with 2 hp motors, transfers raw water from the below grade reservoir to the 2,000-gallon hydro-pneumatic tank located in the treatment building.

The distribution system consists primarily of cast iron pipes ranging from 1-inch to 3-inches. The approximate length of the distribution system is 3,000 feet.

WATER TREATMENT

The waterworks consists of one (1) drilled well, a treatment facility, a 5,000-gallon below grade storage tank, and a raw water pumping facility.

The well discharges to a 5,000-gallon below grade reservoir via a 2-inch water line. Two submersible pumps in the reservoir, rated at 131 gpm @ 112 psi with 2 hp motors, transfers raw water from the below grade reservoir to the 2,000-gallon hydro-pneumatic tank located in the treatment building.

The treatment building is 38 ft. long by 12 ft. wide. The treatment building houses chemical feed equipment for soda ash, caustic soda, and sodium hypochlorite; controls; and a 2,000-gallon hydro- pneumatic tank.

The chemical feed facilities for sodium hypochlorite consist of a 35-gallon day tank and a chemical metering pump rated at 1.25 gph @ 100 psi. Chemical feed facilities for soda ash consist of an 80-gallon day tank and a chemical metering pump rated at 120 gpd @ 100 psi. Chemical feed equipment for caustic soda consists of a 35-gallon day tank and a chemical metering pump rated at 44 gpd @ 100 psi.

The 2,000-gallon hydro-pneumatic tank is equipped with a ¼ hp compressor.

Site Name: Gunpowder Military Reservation - MD Army Nat. Grd.

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	*Longitude*
76° 31' 14.64" W	39° 28' 38.48" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Gunpowder Military Reserva...	Water System	MM	Northeast

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Gunpowder Military Reservation

Address: 1901 Notch Cliff Road, Glen Arm, MD 21057

Comments:

Agency: MM

Region: Northeast

Average Daily Demand (ADD) (gal/day)	1,216
Peak Day Demand (gal/day)	14,000
WTP Design Capacity	43,200
Total No. of Wells	1
Average Daily Run Time of Wells (Hrs)	
Capacity w/ largest Well Offline	0
GW Appro. Permit Number (GAP)	BA1975G003(03) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	3,700
% of ADD to GAP	33%
General Discharge Permit Number	06HT5021

W/WW Engr. Project Mgt	SI
Location of Asbuilt Drawings or CDs	44
WTP Process Description - List Unit Processes	Appendix C
Water source and Distribution System Description	Appendix D
Cost Analysis	Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Diane	Bauer	(443) 807-3196	

Surface Water Appr. Permit Number	________(__) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	5000
Days of Storage at ADD	4.1
PDWIS WTP Number	103-0077
Appropriation Permit Exp. Date	4/1/2013 ☐ N/A
Est. Total length of Water Lines (feet)	3000
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

GUNPOWDER MILITARY RESERVATION
MARYLAND ARMY NATIONAL GUARD

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:
- N/A

Proposed Improvements:
- N/A

WASTEWATER COLLECTION / ON-SITE DISPOSAL

Conditional Analysis:
- N/A

Proposed Improvements:
- N/A

WATER TREATMENT PLANT

Conditional Analysis:
- Existing softeners have been abandoned and piping associated with softeners is still connected
- Softeners has been occupying space which can be used for storage of bulk chemicals
- The building does not have any insulation or drop ceiling. Therefore, is subject to freezing of chemicals
- The below grade reservoir is not fenced and is subject to vandalism and accessible to potential contamination

Proposed Improvements:
- Install heating system for the building
- Install fence around the 5,000 gallon below grade reservoir
- Reconfigure space created by removal of softeners and use as chemical (liquid and powder)
- storage area
- Well control building: repair roof and insulate
- Upgrade control panel and clean up electrical wiring and receptacles within the plant

WATER SOURCE

Conditional Analysis:

- The system currently relies on single source. If problems arise for existing well, no backup source is available

Proposed improvements: Install back up well?

- Construct a new well at appropriate location to provide redundancy in supplying water to the facility

WATER DISTRIBUTION SYSTEM

Conditional Analysis:

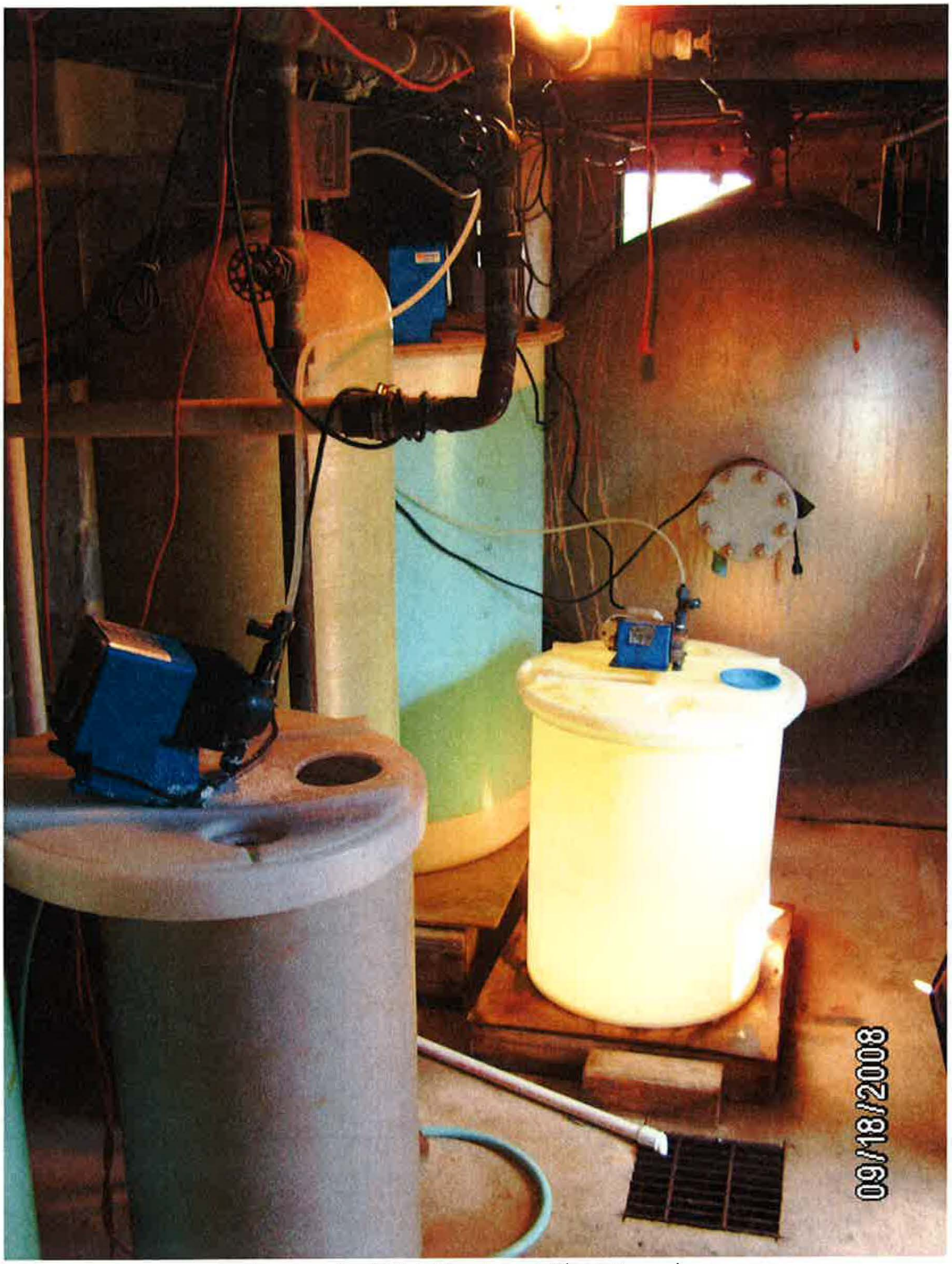
- Operating satisfactorily, but fails lead and copper annually

Proposed improvements:

- Re-pipe parts of the system with PVC to remedy pb and cu problem, or treat water with a polyphosphate to coat pipe and reduce corrosion

Gunpowder Military Reservation
Maryland Army National Guard

WTP & WS



Gunpowder NGA Treatment Plant Overview

WTP & WS

Gunpowder NGA Well

Control Building

WTP & WS

Raw Water Below Grade Reservoir and Pump Station

2011 WATER AND WASTEWATER MASTER PLAN

MARYLAND STATE POLICE
VOLUME IX OF X

September 2011

Prepared By:

MARYLAND ENVIRONMENTAL SERVICE
259 Najoles Road
Millersville, MD 21108

2011 Water and Wastewater Master Plan

Volume IX of X - Maryland State Police

Executive Summary

MARYLAND ENVIRONMENTAL SERVICE

2011 WATER AND WASTEWATER MASTER PLAN

EXECUTIVE SUMMARY

I. INTRODUCTION

The Maryland Environmental Service (MES) was created by statute in 1970 (Chapter 240 of 1970) as an independent agency. Executive Order 01.01.1971.11 gave MES the responsibility for operation and maintenance of all State-owned water purification and solid waste disposal facilities. Two (2) years later, MES became incorporated into the Department of Natural Resources (DNR). While under DNR, all Capital Improvement Project (CIP) planning and annual funding requests for these facilities were prepared by MES and submitted to the State for approval. The first projects received funding in Fiscal Year 1984; however, the Department of General Services (DGS) had responsibility for managing the appropriations, procuring the consulting engineers, contractors, and other services, and providing project management and inspection for CIP with some input from MES staff.

The situation began to change in later years, with MES first receiving funding and procurement authorization for CIP in 1992 and becoming an instrumentality of the State and a public corporation independent of DNR in 1993. Chapter 4, First Special Session of 1992, said MES "*shall be responsible for and shall control the procurement of engineering and architectural services and all other related services and supplies for the projects for which State funds are appropriated under provisions of this act.*" Since 1992, MES has had full responsibility for the CIP program for State-owned water and wastewater treatment plants, and in some cases, the associated piping systems and water towers, when requested by a State Agency.

During this transition period, the Department of Budget and Management (DBM) asked MES to prepare a Master Plan for water and wastewater facilities operated by MES and owned by the State. There were numerous facilities needing capital improvements to accommodate expansions within the various institutions as well as changing state and federal regulations that required more advanced treatment processes. The initial appropriation to MES totaled over $14 million, which funded a backlog of 13 projects. As projected in the Master Plan, funding requirements decreased each year as the majority of the treatment facilities were upgraded. Eventually the requests were capped at $3.0 to $3.5 million per year, which was adequate for improvements to piping, pumping stations, and water towers.

In the early 2000's, Governor Parris Glendening issued an Executive Order requiring wastewater treatment plants to further reduce nutrient loadings to the State's waterways. The Maryland Department of the Environment (MDE) completed their Tributary Strategy plan, essentially capping nutrient loads at many wastewater treatment facilities. The EPA also issued new drinking water regulations with limits for new parameters such as arsenic, radon,

radionuclides, and disinfection by-products. As MES experienced a decade earlier, water and wastewater treatment facilities would need upgrades as new, more stringent permits were issued. Rapidly changing technology rendered controls and equipment obsolete at many sites and construction prices skyrocketed after September 11, 2001. It became apparent the $3.0 million cap would no longer be sufficient to make the necessary improvements.

During the 2008 session of the Maryland Legislature, the Governor's budget included a capital budget request from MES of $11.9 million for critical, compliance-related upgrades to four (4) treatment plants. The budget committees expressed concern there was no plan that adequately justified this increase. In the 2008 "*Joint Chairmen's Report on the State Operating Budget (SB 90) and the State Capital Budget (SB 150) and Related Recommendations*", MES was instructed to prepare an infrastructure improvement plan for the facilities managed by the agency by February 1, 2009. The 2008 Water and Wastewater Master Plan represents the response to this request.

II. OBJECTIVES AND METHODOLOGIES

A. OBJECTIVES

To fulfill the request of the Maryland Legislature as defined in the 2008 Joint Chairmen's report, the objectives of the water and wastewater master plan included reviewing operating and performance records, evaluating the existing water and wastewater facilities to determine what improvements may be needed, developing a concept plan and scope of the identified improvements, cost estimates, ranking the individual projects, and developing a comprehensive CIP funding schedule and projection for the next five years and to FY 2021.

The specific steps and methodology used to prepare the plan are as follows:

- Collect data from existing records and engineering drawings at office
- Develop custom "Infrastructure CIP Management" database
- Conduct site visits and inventory of all facilities
- Perform engineering evaluations at all facilities
- Review Master Plans and five-year plans of agencies served by MES
- Identify and determine future needs for all facilities
- Evaluate each facility compliance records and anticipate future regulatory constraints
- Review past capital improvement and critical maintenance expenditures
- Analyze future improvement alternatives for each facility
- Perform cost analysis of alternatives and prepare cost estimates for the identified CIPs for each facility
- Develop a methodology to allow ranking and prioritizing the CIPs

- Generate a schedule of implementation for the facility improvements
- Develop a financial plan for funding requests
- Generate final master plan report

B. REPORT STRUCTURE

The Master Plan consists of an Executive Summary along with separate volumes for each of the nine (9) State Agencies. This Executive Summary is also included in each of the individual agency volumes. Each of the agency volumes provides detailed infrastructure information for each of the facilities associated with that agency that includes:

- Background
- Water and wastewater facilities description
- Assessment of operations and performance data
- List of operational and infrastructure deficiencies
- Regulatory compliance history and future regulatory constraints
- Capital improvements and major maintenance funding history
- Cost analysis and recommended improvements
- Schedule of implementation
- Supplemental information

C. CIP RANKING SYSTEM

To allow ranking and prioritizing the CIP projects, MES developed a "Project Ranking Sheet". This consisted of the following six categories:

- Compliance & Permits (criteria uses number of permit violations)
- Health and Safety
- Structural issues
- Impact on operating and maintenance costs
- Operational deficiencies
- Energy and Environment (evaluates energy savings and environmental benefits)

Each of these categories had associated scoring criteria which allowed assigning points based on the listed criteria. The total score assigned each project was used to determine its ranking on the CIP list.

III. ANTICIPATED FUTURE REGULATORY REQUIREMENTS

In addition to water and wastewater systems that need improvements due to age, equipment obsolescence, and normal wear and tear, improvements are also needed to comply with more

stringent regulations and treatment requirements. The following section addresses current regulations and policies, and how they impact the need to make upgrades to water and wastewater facilities.

A. WASTEWATER TREATMENT PLANTS

1. Wastewater Treatment Plants Discharging to Streams

All wastewater plants with stream discharge are regulated by the National Pollutant Discharge Elimination System (NPDES). Dischargers are issued an NPDES permit that authorizes discharge to a water body and imposes limits that have to be met based primarily on the receiving stream's water quality standards. The permits typically require meeting both pollutant concentration limits as well as mass loading limits. The mass loading limits (lbs/day) are determined by taking the assigned maximum flow value (i.e., million gal/day) for the facility times the specified concentration limits (mg/l) times 8.34 (a conversion factor) .

The pollutants that are regulated on discharge permits usually consist of the conventional domestic wastewater pollutants:

- Biological Oxygen Demand (BOD_5) – This is a measure of the amount of organic compounds in water that can be assimilated by bacteria and other microorganisms.
- Total Suspended Solids (TSS) – This measures the amount of organic or inorganic particles that are suspended in the water.
- Ammonia – This is the dominant form of nitrogen in domestic wastewater. It is toxic to fish and other biota.
- Total Kjeldahl Nitrogen (TKN) – This is the amount of ammonia and organic nitrogen (i.e., the nitrogen bound up in organic compounds like proteins, etc.)
- Nitrate/Nitrite – This is the inorganic nitrogen fraction that has been converted from ammonia and organic nitrogen. Further biological assimilation of nitrate and nitrite converts it to nitrogen gas, which dissipates to the atmosphere.
- Total Nitrogen – Nitrogen is considered both a nutrient and a pollutant in that small amounts are beneficial to plants and animals, but in excess it promotes the proliferation of bacteria and algae and results in degraded water quality. Total nitrogen represents the sum of nitrate/nitrite and TKN.
- Total Phosphorus – Similar to nitrogen in that it is both a nutrient and a pollutant. Contrary to nitrogen, it can only be eliminated from wastewater by biological uptake or chemical precipitation.
- Bacteria – All wastewater must be properly disinfected prior to discharge and permits usually give limits for either Fecal Coliform or Total Coliform levels.

These are the dominant pollutants found in domestic sanitary wastewater. If there are other pollutants in the waste stream, then these pollutants may also be added to the discharge permit with appropriate limits.

Discharge permits can be amended at any time by MDE due to either new regulations or policies being adopted or based on new water quality information on the receiving stream that dictates more stringent limits. The permits are usually issued for a five-year period. Although, MDE can amend discharge permits at any time, the changes are usually made when the permit is renewed and reissued.

The U.S. EPA and State of Maryland regulations that govern the pollutant limits on discharge permits are as follows:

- Federal Clean Water Act – National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Load (TMDL) – Added to the CWA in 1992 (currently addressed via the Watershed Implementation Plans)
- Maryland Tributary Strategy and Point Source Strategy
- Other specific regulations that may govern specific watersheds or water bodies (e.g., Patuxent River Watershed – MD Code Section 4-302.1)

The discharge limits imposed on individual treatment plants are primarily determined by the water quality requirements of the receiving stream. Streams are classified by their designated use, (e.g., drinking water source, trout stream, general recreation, etc.) where each classification has associated discharge limits that have to be met to ensure protecting the water quality. The requirement to specify discharge limits was first established under the Federal Clean Water Act (CWA) under the NPDES program.

The second program that can determine the limits imposed on discharge permits is the Total Maximum Daily Load (TMDL) program. The TMDL program is a part of the Clean Water Act and it requires all states to evaluate and compile a list of water bodies that do not fully support beneficial uses such as aquatic life, fisheries, drinking water, recreation, etc. Each water body is evaluated and usually "modeled" to determine the maximum amount of pollutants that can be discharged to it with out impacting the water quality or beneficial use. After determining the maximum allowable quantities of the various pollutants that can be discharged to the body of water, each of the dischargers (i.e., WWTPs, non-point source discharges, etc.) is allocated portions of the TMDL amount. The allocated amount is then incorporated into the facility's discharge permit.

In the last few years, the EPA, in coordination with the states of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC) developed a nutrient and sediment pollution diet for the Bay known as the Chesapeake Bay Total Maximum Daily Load (TMDL). To fulfill the Bay TMDL requirements, MDE developed an allocation process that is contained in Maryland's Watershed Implementation Plan (WIP). The allocation process specifies loading caps for nutrients (N&P) and sediment to each of 58 "segment-sheds" to collectively meet the 2017 target (70% of the total nutrient and sediment reductions needed to meet EPA's final 2020 goals). Maryland's Phase I WIP was submitted to EPA on December 3, 2010. MDE is now working with other State agencies, county and local governments to develop Phase II Watershed Implementation Plans with more detailed reduction targets and strategies to ensure meeting the goals of the Bay TMDL.

Maryland's WIP is requiring that all major WWTPs (i.e., those with a design capacity greater than 500,000 gal/day) to upgrade to meet an Enhanced Nutrient Removal (ENR) level of treatment. There are some facilities that are already meeting ENR treatment requirements as part of the Tributary Strategy program that Maryland had in place for several years.

The Tributary Strategies are broad implementation plans for achieving and maintaining nutrient allocations for the ten major watersheds that drain into the Chesapeake Bay. These allocations were established through the year-2000 Chesapeake Bay Agreement process. Under this program, MDE developed the Enhanced Nutrient Removal (ENR) Load Allocations Table, which establishes nutrient loading caps for 66 major wastewater treatment plants.

The ENR Allocations Table allocated a fixed amount of nitrogen and phosphorus loadings (in lbs/year) to be discharged by each WWTP based on the facility's design capacity and assuming a total nitrogen and total phosphorus concentration of 4 mg/l and 0.3 mg/l, respectively. Therefore, if a WWTP needs to expand and accept additional flows (i.e., users), it has to meet lower concentration limits in order to compensate for the increase in flow.

The ENR Tributary Strategy also controls the nitrogen and phosphorus loadings from minor WWTPs (i.e., those with flow less than 500,000 gal/day). The minor WWTPs are allocated caps based on either their projected year 2020 flow or design capacity: whichever is lower and a nitrogen and phosphorus concentration of 18 mg/l and 3.0 mg/l, respectively. If minor WWTPs need to expand, their loading allocation is limited to a maximum amount of 6,100 lbs/year for nitrogen and 457 lbs/year for phosphorus.

The goal of the Tributary Strategy and now the Watershed Implementation Plans is to eventually have all the major WWTPs meeting ENR levels of treatment, which are 3.0 mg/l for nitrogen and 0.3 mg/l for phosphorus.

Maryland's Bay Restoration Fund (BRF) was also created to provide funding to WWTPs for upgrading to an ENR level of treatment. Priority for the funding is given to major WWTPs.

Either at the time of permit renewal, or due to other circumstances (e.g., WWTP expansion, etc.), any of the regulatory programs listed above could cause more stringent limits be imposed on the discharge permits. EPA and MDE are also including limits in discharge permits for other nonconventional pollutants (e.g., copper, zinc, etc.) along with stricter toxicity biomonitoring requirements and limits. The biomonitoring requires toxicity testing using live macroinvertebrates and fish. Any new limits or toxicity testing that are added to a facility's discharge permits may require an upgrade to the WWTP treatment processes if the facility was not designed to meet those requirements.

Although some of the State WWTPs have been upgraded in the past few years to meet low limits, many have not and . will require improvements to allow meeting more stringent limits. In order to properly plan future WWTP improvements, MES has adopted the following protocols for determining which type facilities may be issued more stringent limits and will need capital improvements to comply:

Major WWTPs (all treatment types):

A few facilities already have treatment systems that can meet an ENR level of treatment. For those that do not meet ENR, capital improvements will be specified to provide ENR level of treatment.

Minor WWTPs:

Lagoon Treatment Systems – Lagoons are an antiquated type of treatment system, which provide at best a secondary level of treatment. They do not remove nutrients to any appreciable extent and as a result discharge ammonia, which can be toxic to fish, and other aquatic life. MDE is moving to impose lower limits for ammonia and other parameters. Therefore, capital improvements will be specified for replacing the lagoon system with a more modern and sophisticated treatment system.

Other Secondary Type Treatment Systems – In addition to lagoons, there are other treatment systems in operation that are not designed to remove nutrients and therefore discharge ammonia and other harmful pollutants. Capital Improvements will be specified to replace or upgrade these systems.

Expanding Facilities – Any of the minor WWTPs that will have flow increases beyond their design capacity will have to meet more stringent limits. In some cases, if the flow increase is not too great, the WWTP may not be required to achieve full ENR level of treatment. Therefore, the nature of the

improvements specified would only be what is needed to meet the anticipated limits for the higher flow.

Note: Even though MES has adopted this protocol to program future CIP needs, these are based on regulations and/or policies that are in effect today. Therefore, this protocol is subject to change in response to new or amended regulations (State or Federal) or policies.

2. Wastewater Treatment Plant Solids Management

All WWTPs produce a solid material by-product as a result wastewater treatment. Regardless of the type of facility, these solids must be removed from the WWTP on a periodic basis in order for the treatment process to function properly. Basically, there are three options available for managing this solid material:

- Disposal into a landfill
- Incineration (burning)
- Recycling the material onto the land for beneficial uses, such as compost, fertilizer, etc.

The first two options, landfill disposal and incineration, while used by some WWTPs, are not without their problems. Dwindling landfill space and rising tipping fees have forced most facilities to explore other options. One advantage of incineration is that it can reduce the amount of material for ultimate disposal by as much as 75%. However stringent Federal air quality regulations (40 CFR 60, Subpart O), volatile energy costs, complexity of operation, and high capital expenditures have increasingly ruled out incineration as an option for most facilities, especially for smaller WWTPs with a capacity of less than 10 million gallons a day (MGD). There are also detrimental environmental impacts associated with incineration, such as excessive energy usage and concerns about greenhouse gas emissions. Finally, negative public perception surrounding incineration makes the execution of these projects almost impossible.

Nutrients in these solids, in the form of nitrogen and phosphorus (and a small amount of potassium) can be recycled onto farmland as a low-grade fertilizer, or used to reclaim land in dire need of revegetation (e.g., strip mined land). These solids also contain organic matter that is also beneficial for the soil. The beneficial reuse of this solid material is a cost-effective option for the recipient farmer as well as the WWTP. MES has already realized significant cost savings by implementing land application programs. Both the U.S. EPA and MDE promote the beneficial reuse of biosolids when done in accordance with the regulations.

Solid material from a WWTP that is treated to meet Federal and State standards for recycling onto land are called "biosolids". Material that is not treated, or does not meet these standards, is labeled "sludge", or "sewage sludge". The current Federal (40 CFR 503) and State of Maryland (COMAR 26.04.06) regulations

prescribe the treatment and management standards for recycling biosolids. These standards were established to protect public heath and the environment.

There are several core regulatory standards that WWTPs must follow before land applying biosolids:

- The concentration of chemical constituents, such as heavy metals, in the biosolids product must be under certain limits.
- Solids must be treated to significantly reduce pathogenic organisms. This treatment, called stabilization, is usually done at the WWTP prior to land application. Stabilization processes can be classified as:
    - Physical/chemical in nature, such as adding copious amounts of lime to kill pathogens (lime stabilization),
    - Biological treatment processes. Examples of biological treatment processes include anaerobic digestion, (subjecting the sludge solids to bacterial degradation for an extended period of time in a heated tank in the absence of oxygen), or aerobic digestion, which involves aerating the solids.
    - Time/temperature treatment, such as composting or heat drying the solids to produce a fertilizer pellet.
- The solids must be sufficiently treated so that the likelihood for disease transmitting organisms, called vectors, to be attracted to the biosolids is reduced. Vectors include flies, mice, mosquitoes, etc.
- Biosolids must be managed at the final reuse site in such a manner as to not cause a public health, nuisance, or environmental problem. These management practices can include procedures such as incorporating the biosolids into the soil at a farm site, or including directions to homeowners for use of a compost product.

Maryland is regarded as having an extensive biosolids regulatory program. One aspect of this program is that it requires mandatory, site-specific nutrient management plans be prepared for each farm site where biosolids is to be land applied. Nutrient management reduces the potential for nitrate-nitrogen contamination of groundwater, and phosphorus runoff into surface waters. MDE's regulations are more rigorous than the Federal rules, requiring more site practices to control nuisance factors (such as odors). Approximately 80% of the biosolids generated in Maryland are recycled in some manner, whether onto agricultural land, or through the sale and distribution of highly treated biosolids products such as compost or heat dried fertilizer pellets.

The nutrient management program is administered by the Maryland Department of Agriculture (MDA). In an effort to reduce nutrient pollution from non-point sources, MDA is in the process of revising its Nutrient Management Guidelines to

severely limit the practice of land applying biosolids and animal manures in the winter .Although currently all of MES' biosolids are land applied out-of-State where the restrictions are less stringent (i.e., Virginia) this change in the Nutrient Management Guidelines could affect the operation of our facilities if land application operations revert back to Maryland. This would necessitate either the construction of biosolids storage structures at of our State-owned Regional Sludge Management Facilities at considerable cost, or the installation of advanced sludge treatment processes to reduce the volume of solids being removed

MDE is also currently in the process of preparing comprehensive revisions to their biosolids regulations. It is envisioned that these new regulations will impose more stringent requirements, especially with respect to biosolids testing/monitoring, site controls, compliance inspections/permitting, and documentation of stabilization processes. Much of the revisions are in response to the public's demand for greater oversight of the land application program.
Future regulatory changes could also impose more stringent biosolids processing requirements on WWTPs, called "Class A" stabilization, such as composting and heat drying. These Class A processes reduce pathogens to near non-detectable levels. The general public's concern about pathogens is motivating the change to Class A stabilization processing; many WWTPs have already voluntarily implemented Class A stabilization to address these concerns. It is anticipated that MES will ultimately follow this industry trend, and eventually request funding for Class A processing.

In an effort to more efficiently manage biosolids from MES's facilities, the Agency currently utilizes a "regional" sludge management approach. Sewage sludge from most of MES' smaller facilities that do not meet the standards for recycling onto land is transported to larger WWTPs for further processing and stabilization. These stabilized, treated biosolids from the Regional Sludge Management Facilities are then land applied by a contractor. MES operates Regional Sludge Management Facilities at three State-owned WWTPs. One advantage of the regional approach is that economies of scale are achieved at the larger facilities, thus avoiding the need for constructing costly, separate stabilization processes at each of the smaller WWTPs. It also reduces staff time associated with regulatory monitoring at each of the smaller WWTPs.

A major disadvantage of the regional approach is that stabilization process reliability and equipment redundancy is critical. Sludge processing at the Regional Facilities must be more robust to avoid sludge disposal interruptions on the smaller, satellite State-owned WWTPs. Capital funding should be directed towards ensuring that biosolids processing equipment reliability at the regional facilities is maintained.

3. Wastewater Treatment Plants Using Land Disposal

Numerous WWTPs do not use stream discharge for the treated effluent and rely on spray irrigation to the land surface, underground discharge (i.e., drain field), or similar means. These type facilities are also facing more stringent discharge requirements. This is due to the recognition by MDE that ground disposal systems can contaminate groundwater supplies (i.e., drinking water wells) and migrates through the ground to discharge to streams and ultimately the Chesapeake Bay. To alleviate some of this pollution source, MDE included in the Tributary Strategies a provision that allows abandoning septic systems and connecting those users to sewers and treatment systems with a stream discharge. This provision is based on the assumption that septic systems provide only minimal nutrient removal and the untreated nutrients will eventually make their way to the Chesapeake Bay. The low level of treatment provided by septic systems is then off set by the high level of nutrient removal that is now possible with the newer ENR treatment technologies.

Just as with WWTPs that discharge to streams, MDE is also imposing lower limits on groundwater discharge permits to reduce the amount of nitrogen that is ultimately discharged to the Bay and to groundwater supplies. The limit for Total Nitrogen can be as low as 8 mg/l. These low limits are primarily imposed on the larger systems with flows over 5,000 gal/day. The Bay Restoration Fund also collects fees from users with On Site Sewage Disposal Systems (OSDS) (i.e., septic systems) and other ground disposal systems. MDE offers BRF grants for upgrading OSDS systems to provide increased nitrogen removal. Priority at this time is being given to those systems in the Critical Area or to those systems which are failing.

MES will either request BRF funding or Capital Improvement funds to upgrade any OSDS system that may be subject to more stringent discharge limits and/or would represent a good opportunity to upgrade to further reduce nitrogen being discharged to the Bay.

B. Water Treatment

The quality of drinking water that is produced is very strictly regulated under the EPA and Maryland's Safe Drinking Water Act. The water treatment plants that use surface water supplies (e.g., lakes, reservoirs, and streams) have much more stringent requirements that have to be met compared to those using groundwater (i.e., wells) as their source water. Two of the new regulations associated with surface water have decreased Maximum Contaminant Levels (MCLs) in drinking water and one new regulation requires higher removal of contaminants, which may require specific capital improvements at specific water treatment plants. These regulations are listed below:

- Stage I Disinfection By Product Rule - Total Trihalomethanes MCL of 80 ppb and Total Halocetic Acids MCL of 60 ppb
- Turbidity Maximum Contaminant Levels of 0.30NTU
- Enhanced Surface Water Treatment Rule – Requires 2 to 3-log removal of Cryptosporadium

Also, a Groundwater Rule requires 4-log virus removal, which may require installation of filtration in some of groundwater plants. Therefore, specific capital improvements that would be needed to meet new or more stringent regulations will be addressed at specific water treatment plants.

C. Water Reuse

The reuse of treated wastewater is becoming more and more popular in many parts of the country, resulting in a second "purple" water distribution system. The need for this is caused by the inability of the water sources to be able to meet the ever-increasing demand. Given the physical limitations (e.g., available land) and the regulatory requirements imposed on water and wastewater systems, water reuse and reclamation is not only good environmental stewardship, but is also now recognized as a way to save power and O&M costs, facilitating compliance with water or wastewater regulatory requirements. MES would recommend the implementation of any water reuse projects. Water reuse is already performed at the Eastern Correctional Institution (ECI) where the treated wastewater effluent is sent to the Cogeneration Plant for use in their cooling towers. This could be expanded to use for irrigation, toilet flushing, and other non-potable uses. Although no new projects have been identified, MES will continue to look for possible opportunities to reuse treated wastewater at State facilities.

IV. WATER/WASTEWATER INFRASTRUCTURE CIP SUMMARY

MES provides some level of operations and maintenance services to a total of 65 State facilities. The water and wastewater infrastructure utility systems at these facilities falls under one of the following categories:

- Water Source
- Water Treatment Plant
- Water Distribution
- Wastewater Treatment / Onsite Sewage Disposal System
- Wastewater Collection/Conveyance

MES does not provide operations and maintenance services for all these categories at all the facilities. There are many facilities where the State Agency operates one or more of the utility systems or it may receive service from a nearby municipality, county, or sanitation district.

The level of services that MES provides is described in each of the facility descriptions and is summarized in Table I. Table I lists all the facilities by Agency and gives the entity (e.g., MES, DNR, etc.) that is providing the services for that infrastructure category.

In preparing the 2008 Master Plan, only those systems that are operated by MES were evaluated for capital improvement needs and listed on the MES CIP Request. Out of the 65 total facilities, a total of 39 specific capital improvement projects have been identified and listed in the CIP funding schedule that extends to FY2021 (see Table II). The total CIP request for all 10 years is $64,643,000 with a total project costs estimated to be $98,898,000. The CIP request is less than the total project costs due to other funding sources that will pay their share of the costs (e.g., Freedom District WWTP) and due to CIP funding already received (e.g., ECI).

The MES project ranking system provided a consistent methodology to prioritize and rank the projects and spread the requested funding out over the next 10 years. Table II provides a list of all the projects, their ranking, the State agency, and the amount and year that the funding is requested.

TABLE I
State of Maryland Water and Wastewater Facilities
Distribution of Operational Functions

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
DNR					
Albert Powell Hatchery	DNR	DNR	DNR	MES	DNR
Big Run SP	MES	MES	MES	DNR	DNR
Calvert Cliffs SP	MES	MES	DNR	DNR	DNR
Camp Bay Breeze	MES	MES	DNR	DNR	DNR
Cunningham Falls SP	MES	MES	DNR	DNR	DNR
Dahlgreen Area - South Mt. SP	MES	MES	MES	DNR	DNR
Dan's Mountain SP	MES	MES	DNR	DNR	DNR
Deep Creek Lake SP	MES	MES	MES	Garrett Co	MES
Echo Lake Area - South Mt. SP	MES	MES	DNR	DNR	DNR
Elk Neck State Park	MES	MES	MES	MES	MES
Fair Hill NRMA	MES	MES	DNR	DNR	DNR
Fort Frederick SP	MES	MES	MES	MES	DNR
Gambrill SP	MES	MES	DNR	DNR	NR
Gathland SP	MES	MES	DNR	DNR	DNR
Greenbrier SP	MES	MES	DNR	MES	DNR
Greenwell SP	MES	MES	DNR	DNR	DNR
Herrington Manor SP	MES	MES	DNR	DNR	DNR
New Germany SP	MES	MES	DNR	MES	DNR
Pocomoke SP- Milburn & Shad Landing	MES	MES	DNR	DNR	DNR
Point Lookout SP	MES	MES	DNR	MES	DNR/MES
Rocks SP	MES	MES	DNR	DNR	DNR
Rocky Gap SP	MES	MES	MES	MES	MES
Sandy Point SP	MES	MES	DNR	DNR	DNR
St Mary's River State Park	MES	MES	DNR	DNR	DNR
Susquehanna State Park	MES	MES	DNR	DNR	DNR
Swallow Falls SP	MES	MES	DNR	MES	DNR
Washington Monument SP	MES	MES	DNR	DNR	DNR
MD Dept of Veterans Affairs					
Charlotte Hall Veterans Home	MES	MES	MDVA	MES	MDVA
MD Dept of the Military					
Brig. Gen. Thomas Baker Training Site	MES	MES	MES/MM	MM	MM
Camp Fretterd	MES	MES	MM	MES	MM
Frederick Armory	MES	MES	MM	MM	MM
Gunpowder Military Reservation	MM	MES	MM	MM	MM
MD State Police					
Barrack V - Berlin	MES	MES	MSP	MSP	MSP

TABLE I

State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Table I (cont.)

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
State Highway Adm.					
Bay Country Welcome Center	MES	MES	SHA	MES	SHA
Centreville Maintenance Shop	SHA	SHA	SHA	MES	SHA
Green Hill Cove				MES	SHA
I-68 Rest Stop	MES	MES	SHA	SHA	SHA
I-68 Visitor Center	MES	MES	SHA	SHA	SHA
I-70 Rest Stop	SHA	MES	SHA	MES	SHA
Leonardtown Maintenance Shop	SHA	MES	SHA	MES	SHA
Sideling Hill Visitors Center	MES	MES	SHA	MES	MES
University System of Maryland					
Ag. Exp. Sta. - University of MD	MES	MES	U of M	U of M	U of M
Horn Point Lab - University of MD	U of M	U of M	U of M	City of Cambr	MES
St Mary's College	MES	MES	MES	St. Mary's Col	MES
DHMH					
Crownsville Hospital Center	MES	MES	DHMH	MES	DHMH
Freedom District	Carroll Co	Carroll Co	Carroll Co	MES	Carroll Co
Rosewood State Hospital	Balto. Co.	Balto. Co.	DHMH/MES	Balto Co.	DHMH
Springfield Hospital Center	Carroll Co	Carroll Co	Carroll Co		DHMH
DJS					
Backbone Mountain Youth Center	MES	MES	MES	DJS	DJS
Chelteham Youth Facility	MES	MES	DJS	MES	DJS
Green Ridge Youth Center	MES	MES	MES	MES	MES
Meadow Mt. Youth Center	MES	MES	MES	DJS	DJS
Savage Mt. Youth Center	MES	MES	MES	DJS	DJS
Thomas O'Farrell / Henryton	Carroll Co.	Carroll Co.	Carroll Co.	Carroll Co.	MES*
Victor Cullen Center	Washington Co.	Washington Co.	DJS	MES	DJS
DPSCS					
Eastern Correct. Inst. - Cogen Plant	MES	MES	DPSCS	MES	DPSCS
Eastern Correctional Institution	MES	MES	DPSCS	MES	DPSCS
Eastern Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
Jessup Complex - Dorsey Run WWTP	AA Co	AA Co	DPSCS	MES	DPSCS
MCI - Hagerstown	Hagerstown	Hagerstown	DPSCS	MES	DPSCS
Poplar Hill Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
So. MD Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
WCI & NBCI	Cumberland	Cumberland	DPSCS	Cumberland	MES*

*Pumping stations only

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
HOLD	N/A	Eastern Correctional Institution - Cogen	Upgrade electrical control system.	Waiting for discussion/input from Environmental Ops before proceeding.	2017	2018	DPSCS	$3,500,000	$3,500,000									
1	73	Eastern Correctional Institution WWTP	New treatment plant; including the RO Reject system	Design expected to start in May 2011. FY11 REQUEST (12.126M - C)	2013	2015/2016	DPSCS	$26,730,000	$19,500,000	$1,950,000		$7,000,000	$10,550,000					
2	69	Freedom WWTP	Upgrade plant to 5 stage bardenpho process, and upgrade solids handling facilities.	Under Compliance Schedule. Negotiating a Consent Agreement w/MDE. FY12 REQUEST (1.4M - P)	2013	2014	DHMH	$18,000,000	$2,300,000	$1,566,000	$734,000							
3	65	Rocky Gap SP - WTP	Needs new plant.	Preliminary Design Report conducted; Needs new plant designed (have design funds). MES waiting on direction from DNR before moving forward w/final design. FY12 REQUEST (2.65M - C)	Design Funds Secured	2013	DNR	$3,729,000	$3,000,000	$3,000,000								
4	65	Rocky Gap SP - WWTP	Needs new plant.	Water usage unknown. Meeting permit requirements; monitoring for BOD, TSS, and Temperature (should not exceed 68 degrees). Water usage estimated to increase 140K gpd and wastewater 120K gpd. Current WWTP designed for 120K gpd. Existing plant cannot accommodate any further growth.	2013	2014	DNR	$3,000,000	$3,000,000	$300,000	$2,700,000							
5	62	Charlotte Hall VA Home - WW	WWTP: Repair or replace pond's liner system; replace floating boom; additional floating boom; install four (4) aerators/mixers; replace irrigation valves and nozzles; install sodium hypochlorite feed system; develop reserve RIB; construct equalization basin; construct perimeter fence; rehab effluent pump station pipe; and abandon monitoring well no. 5 located in RIB2. WW COLLECTION: for pump station no. 1 install grease trap, install influent channel w/bar screen, separate valve vaults and check & gate valves, alarm system, real time monitoring device; for pump station no. relocate electrical box to above ground location, install real time monitoring device.	Design 80% complete, RIBS may stay on Wish List. Nitrogen compliance issue. Plant capacity 60K pd; ADF 40-42K pd. Not meeting permit requirements; 3 violations in last year.	Design Funds Secured	2013	DVA	$3,667,000	$3,457,000	$3,457,000								
6	61	Cunningham Falls SP - WW Collection & Water Distribution Systems	WASTE WATER ($918K): Install HDPE Force Main thru existing gravity lines; grouting of annular space in sewer lines and MHs; and install 10 pump stations. WATER ($100K): Evaluate and replace leaking pipes in distribution system in Manor Area.	WASTE WATER: System consists mostly of terra cotta pipe and due to rocky soil and high groundwater table, it has severe I/I. The wastewater is conveyed over 3 miles to Thurmont for treatment. The Park pays for every gallon treated and as a results pays over $40K a year just to treat the extraneous I/I flows. WATER: Due to age of the distribution system, leaks becoming more frequent, requiring an operator to "camp out" at plant until leak is repaired to meet demand. Equipment - Filter media requires replacement, the piping in the clarifier is corroded and undersized, components of the clarifier have recently deteriorated and required re-fabrication. Tanks and piping were repainted several years back and starting to show corrosion again. Level control floats are extremely corroded and filter valves are leaking. Clearwell is undersized for peak demand.	2013	2013	DNR	$1,238,000	$1,238,000	$200,000	$1,038,000							
7	60	Victor Cullen -WWTP	Consider SBR or activated sludge. Rebuild bar screen. New 50K gpd plant; utilize existing buildings.	Occasional Ammonia limit (8) violations during winter. Currently a rock trickling filter w/fixed nozzles. Needs new bar screen. Plant rated/permitted at .05 MGD. Serves approximately 135 people.	2013	2014	DJS	$2,516,000	$2,516,000	$216,000	$2,300,000							

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
8		**State Water Towers**	Minor rehab & painting	**Camp Fretterd** (Witches Hat) (200K) ($448.2K); **MCI-H** (Standpipe) (300K) ($511.4K); **Victor Cullen** (300K) ($544.4K); . FY12 REQUEST (970K - P/C)	N/A	2013		$1,504,000	$1,504,000	$1,504,000								
9	62	**Charlotte Hall VA Home - WTP**	Construct a new, separate treatment building next to existing treatment to house softening units and store salt and other chemicals.		Design Funds Secured	2014	DVA	$210,000	$210,000		$210,000							
10	60	**MCI -WWTP**	Replace gas chlorine storage and feed system with UV disinfection units; cover the two (2) secondary clarifiers launders; Install fermentation tank; install denitrification filters and associated carbon source feed system; install treated wastewater supply system for washing belt and polymer mixing during sludge dry; replace existing emergency 1200KVA generator; construct pole building for equipment and chemical storage; paint 300,000 gallon standpipe; design and construct new 500,000 gallon elevated storage tank.	No violations. Nitrogen & Phosphorus added 01/01/11. Waiting to learn of state's share (ENR grant - $$$ unknown); Possibly $3M each. MDE first wants feasibility study conducted - MES has funds for study (not going to BPW until June or July 2011). DNR Component: Automation, DO monitors, pumps, alkalinity addition. sulfur dioxide and 1 ton chlorine storage (safety issue). FY12 REQUEST (3.7M - P/C)	Design Funds Secured	2014	DPSCS	$6,000,000	$3,000,000		$3,000,000							
11	55	**Southern MD Pre-Release -WWTP**	New plant - MBR Plant	Design 80% complete; Existing plant is a buried steel tank. Holes visible above ground. No violations. Electrical system in a trailer (violated code). 20 year old plant. FY12 REQUEST (1.471M - P/C)	Design Funds Secured	2014	DPSCS	$3,000,000	$3,000,000		$3,000,000							
12		**State Water Towers**	Minor rehab & painting	**Crownsville Hospital** (Front) (250K) ($450,000); **Victor Cullen** (75K) ($300,000). **MCI -H** (500K Elevated) ($625,000) Does not required design.	N/A	2014		$1,375,000	$1,375,000			$1,375,000						
13	55	**Cunningham Falls SP - WTP**	New water treatment plant	Manual system; must have staff 8 hrs/day during summer season. While plant is currently operational, it was constructed in 1973 and is at the end of its useful life. Major deficiencies include: Total manual operation, very inefficient, operator must be onsite at all times when plant is running. Examples - Backwashing is problematic, no flexibility with backwashing due to requirement of operator onsite. Significant safety risk - operators must reach into the panel to pull relays to start and stop the plant. Relays must be pulled when plant is offline due to frequent lightning strikes which cause severe damage to controls.	2015	2015	DNR	$3,000,000	$3,000,000			$3,000,000						
14	55	**WCI -WWPS (old)**	Move controls above ground; need new pumps; inline grinder requested for bypass channel.	Steel wet well - rusting out. Confined space (safety concerns)	2015	2015	DPSCS	$750,000	$750,000			$750,000						

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
15	50	Camp Fretterd - WTP & WD	WATER: Relocate switches from main electrical panel to a separate, weatherproof enclosure; replace heaters in storage and treatment areas; replace roof; install mission control unit; construct new treatment facility for proposed new well; construct new well at higher elevation; construct new elevated tank; paint 100,000 gallon elevated water storage tank. WASTEWATER: replace two (2) submersible pumps in duplex pump station.	Design based on Watek's recommendations can begin on or after June 2011. WTP: only 1 well exists. DS: need booster station, close loops. FY11 REQUEST (236K - P) FY12 REQUEST (188K - P)	2015	2017	MM	$1,970,000	$1,970,000			$197,000		$1,773,000				
16		State Water Towers	Minor rehab & painting	ECI (Front) (500K) ($625,000); Sandy Point (100K) ($175,000)	2015	2015		$800,000	$800,000			$800,000						
17	49	Poplar Hill	Propose new mechanical plant.	Lagoon system; spray field.	2017	2018	DPSCS	$3,160,000	$3,160,000					$316,000	$2,844,000			
18	47	Swallow Falls SP - WWTP & WTP	New plant; maybe SBR.	Lagoon based system; Can not discharge in summer; from 7 days before Memorial Day through 7 days after Labor Day. 2/3 cost estimate for WW. 60K gpd.	2017	2019	DNR	$3,688,000	$3,688,000					$368,800		$3,319,200		
19	41	Fair Hill NRMA - WTP & WD	Propose new plant and tank	Lead paint & glass lined tank. WTP control center in metal shed.	2017	2018	DNR	$1,709,000	$1,709,000					$170,900	$1,538,100			
20	40	St. Mary's College	WDS: Replace 3-inch piping student residences; close loops at seven (7) locations; new service line to Admissions building and ww pumping station. WTP: Replace flow meter at well no. 1; install automated well controls.	Design underway. Construction ready drawings scheduled for completion in August 2011.	2017	2017	UNIVERS.	$636,000	$636,000					$636,000				
21	39	Cheltenham -WWTP	WASTEWATER - Install new headworks; upgrade electrical service; install new blowers; replace RBC's with SBR's; construct building for new treatment plant; replace valves; upgrade Dynasand filters; install continuous DO meter. WATER - Repair Well #2; relocate hypo and Day tanks to existing chlorine room; paint storage tank.	Digester needs work w/aeration system.	2017	2018	DJS	$7,050,000	$7,050,000					$705,000	$6,345,000			
22		State Water Towers	Minor rehab & painting	Crownsville Hosp (Back) (250K) ($375,000) (2017); Elk Neck S.P. (60K) ($150,000) (2017); Charlotte Hall (250K) ($375,000) (2018); Rocky Gap (500K) ($625,000) (2019); Camp Fretterd (300K) ($450,000) (2019)	2017	2017		$1,975,000	$1,975,000					$1,975,000				
23	35	Gunpowder (MNG)	Extra well needed. Update controls. Heating system in poor condition. Fence around small reservoir.	Operating on only 1 well.	2020	2021	MM	$116,000	$116,000								$11,600	$104,400
24	34	Eastern Pre-Release - WWTP	Propose new WWTP.	Lagoon system; discharge to stream. Lagoon dredging completed Spring 2011. Currently 20K gpd.	2020	2021	DPSCS	$3,160,000	$3,160,000								$316,000	$2,844,000

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
25	27	**Meadow Mountain Youth Center -WS**	Repair treatment building roof leaks. Construct new well.		2020	2020	DJS	$256,000	$256,000								$256,000	
26	20	**U of M Agr Center -WTP&WD**	New treatment control building for Well #1 to replace "shed" like structure. Add 500 gallon storage at treatment building in case line to tower is interrupted. Construct new water treatment facilities for Well #2. Backfill well vault and extend well above grade. Rehab Well #2.	Not a reimburseable project - but could become one.	2020	2020	UNIVERS.	$402,000	$402,000								$402,000	
27	17	**O'Farrell Youth Center (Henryton) - WWPS**	Replace building door, build curb around grinder channel, paint generator fuel tank.	NOT CIP; Maintenance item.	2020	2020	DJS	$20,000	$20,000								$20,000	
28	40 HOLD - push back as far as possible until clear scope of work defined	**Savage Mountain Youth Center - WS**	Maintain with acid wash; scrap new well. Evaluate for water re-use.	First wanted replacement well - not feasible at this site - too difficult to find water. NOT CIP; Maintenance item.	2021	2021	DJS	$497,000	$497,000									$497,000
						GRAND TOTAL		**$103,658,000**	**$76,789,000**	**$12,193,000**	**$12,982,000**	**$13,122,000**	**$10,550,000**	**$5,944,700**	**$10,727,100**	**$3,319,200**	**$1,005,600**	**$3,445,400**

Agency Summary

MARYLAND STATE POLICE

INTRODUCTION

The mission of the Maryland State Police (MSP) is to protect the citizens of the State of Maryland from foreign and domestic security threats, to fight crime, and to promote roadway safety by upholding the laws of the State of Maryland. This will be accomplished through aggressive patrol, investigation, intelligence gathering, interdiction efforts, and provide leadership and assistance to state and local agencies. The Maryland Environmental Service (MES) provides water and wastewater services to the following facility:

FACILITY NAME	WATER SOURCE	WATER TREATMENT	WATER DISTRIBUTION	WASTEWATER TREATMENT	WASTEWATER COLLECTION
Barrack V - Berlin	MES	MES	MSP	Unknown	MSP

AGENCY CAPITAL IMPROVEMENT PLANS

MES requested a copy of the MSP Capital Improvements Master Plan and were informed one did not exist. Therefore the Agency's plans for expansion or proposed change in use are unknown at this time. The agency's five-year plan submitted to the State does not project improvements for this planning period.[1]

CAPITAL IMPROVEMENT PLANS FOR FACILITIES SERVED BY THE MARYLAND ENVIRONMENTAL SERVICE

MES provides both water and wastewater services to the facility listed above. The following section provides summaries of the proposed capital improvement needs for each facility. More detailed descriptions of each facility are included in the Water and Wastewater Master Plan Report.

I. BERLIN STATE POLICE

- Install a dehumidifier
- Replace the main door of the treatment building
- Install alarms for pressure and power

Projected Cost: $40,400
Planning and Design: N/A
Construction: Fiscal Year 2011

The Maryland Environmental Service Water and Wastewater Master Plan projects the cost for upgrades to MSP water and wastewater facilities through fiscal year 2021 to be **$ 40,400**.

[1] State of Maryland, Department of Budget and Management, FY 2009 – 2013 Capital Improvement Plan, http://dbm.maryland.gov/dbm_publishing/public_content/dbm_taxonomy/budget/capital_budget/capital_improvement_plans/toc_fy2009_2013capimprovplan.html

FACILITIES NOT SERVED BY THE MARYLAND ENVIRONMENTAL SERVICE

There are several facilities falling under the jurisdiction of the Maryland State Police that are not served by Maryland Environmental Service; local jurisdictions or sanitary authorities provide water and/or sewage collection and treatment services. A description of the facilities and water and wastewater service for each is not included within this document. Information on these systems may be included in future updates to this plan. MES recommends the existing infrastructure be evaluated at these facilities in order to avoid potential disruption to water and sewerage service in the future.

SUMMARY

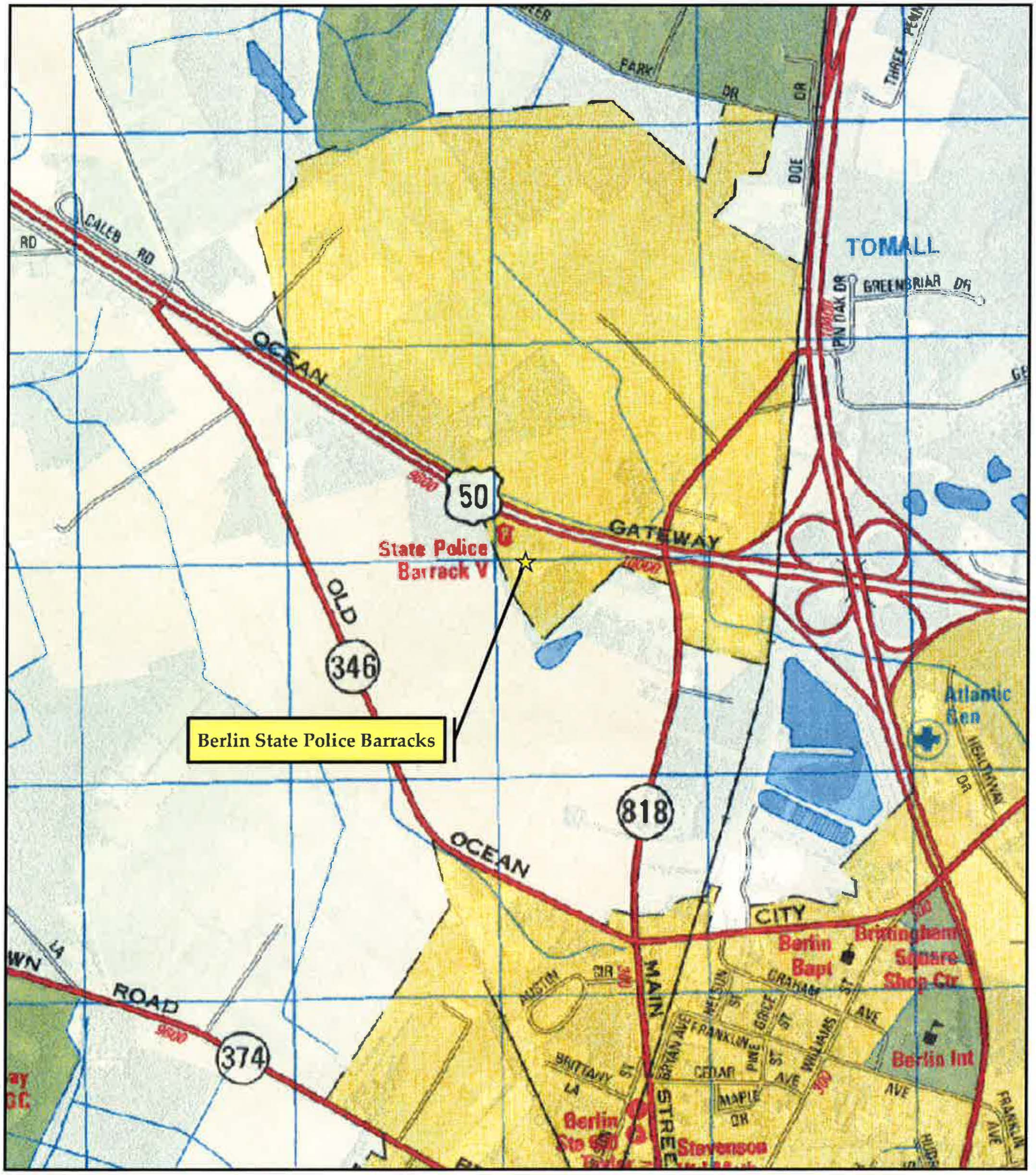
Detailed descriptions of the water and wastewater facilities operated by MES for the Maryland State Police are included in this volume, as well as the following information:

- Operations data
- Regulatory compliance history and future regulatory constraints
- A listing of operational and infrastructure deficiencies
- Capital improvements and major maintenance funding history
- Recommended improvements and estimated costs (in 2008 dollars)
- Proposed schedule of implementation
- Supplemental information

MES will continue to work closely with the MSP to keep abreast of their planning activities to ensure there will be an adequate water supply and sewerage service for proposed facility expansions or changes in use.

Barracks V - Berlin

Maryland State Police



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000
Feet

I:\GIS\Projects\MES\MES Sites\Sites.mxd

BARRACKS V – BERLIN
MARYLAND STATE POLICE

BACKGROUND

The State Trooper Barracks V Berlin facility, located in Worcester County, is a Department of Public Safety and Correctional Services (DPSCS) complex. The Barracks V Facility is located off of U.S. Highway Route 50 in Berlin, Maryland.

The Barracks has two (2) buildings: a main building and a support building. There are approximately 15 officers and staff on a permanent basis and during special events, the number can reach as high as 200.

According to the five-year plan (2013-2017), there are no projected expansions for this facility. Therefore, no impact on water and wastewater demand is expected. The master plan for this facility was not available for review.

Maryland Environmental Service (MES) operates the water source and the water treatment plant.

WATER FACILITIES DESCRIPTION

A. WATER TREATMENT

The State Police Barracks V water system consists of a single well, a treatment facility and a distribution network. The treatment facility consists of two (2) softening units, two (2) 40 gallon retention tanks, chemical feed units for combined sodium hypochlorite + soda ash + orthophosphate, and two (2) 81 gallon bladder tanks. The facility is rated to treat a maximum of 80 gpm or 115,000 gpd based on ion exchange units. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

The water source for Barracks V is a drilled well located 5 feet from the treatment building. The distribution system consists primarily of 100 feet of service cast iron pipes, which are 2 inches in diameter. Please refer to Supplemental Information Section – Facility Description – WS&D.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average and peak water flows were 1,130 gallons per day and 13,333 gallons per day, respectively. Additional 2010 operations data is included in Supplemental Information Section – Operation Data

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the master plan, the following deficiencies were identified:

- The main door does not close properly
- There are no mechanisms (alarms) to alarm during times of inadequate pressure or power loss

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility had no violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

MES has made no past capital improvement or critical maintenance requests for this facility.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the master plan, the following improvements were identified and recommended:

- A dehumidifier was installed in 2010.
- Replace the main door of the treatment building
- Install alarms for pressure and power

The above improvements will be part of a critical maintenance request. The total projected cost is **$40,400**

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: N/A
- Construction: Fiscal Year 2011

SUPPLEMENTAL INFORMATION

BARRACKS V – BERLIN
MARYLAND STATE POLICE

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The waterworks consists of one (1) drilled well, a treatment facility, and a distribution network

The well, drilled in 1988, is approximately 5 ft. from treatment building. The well is 4 inches in diameter and has a total depth of 65 feet. It is provided with 4-inch steel casing. The presumed yield for this well is 60 gpm. The well is equipped with a 1.5 hp submersible pump rated at 30 gpm. The static water level is at 1.5 feet. The pump is set at 42 feet and was installed in 1988. The well discharges to a treatment facility and then to the distribution network.

The distribution system consists primarily of service cast iron pipes 2-inch in diameter. The approximate length of the distribution system is 100 feet.

WATER TREATMENT

The waterworks consist of a single well, a treatment facility, and a distribution network.

The treatment and control building is approximately 24 feet long by 13 feet wide. The treatment facility consists of two (2) softening units, two 40 gallon retention tanks, chemical feed units for combined sodium hypochlorite + soda ash + orthophosphate and two (2) 81 gallon bladder tanks. The facility is rated to treat a maximum of 80 gpm or 115,000 gpd based on ion exchange units.

Raw well water enters the plant via a 2-inch water pipe and is then conveyed to two (2) 81-gallon bladder tanks. Raw effluent from the two (2) bladder tanks flows to two softening systems. The softening system consist of two (2) mineral tanks by Ecowater with 4 cubic feet of cation resin with capacity to exchange 132,000 grains each, a 700 pound brine tank and two (2) 400-gallon retention tanks. A combination of soda ash plus sodium hypochlorite and orthophosphate is mixed and stored in a 55-gallon day tank. A 17 gpd @ 100 psi chemical metering pump injects Neutra 7 compound into ion exchange effluent piping. The treated water is distributed to the main building and support building via 1-inch service lines.

Site Name: Barracks V - Berlin State Police

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd N/A

Amount of Previous CIP Funding $0.00

Amount of Current CIP funding $0.00

Anticipated Date for current CIP funding N/A

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
75° 16' 3.35" W	38° 19' 17.61" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Barracks V - Berlin : Marylan...	Water System	MSP	Eastern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Barracks V - Berlin : Maryland State Police

Address: 9758 Ocean Gateway
Berlin, MD 21811

Comments:

Agency: MSP

Region: Eastern

Average Daily Demand (ADD) (gal/day)	170
Peak Day Demand (gal/day)	7,934
WTP Design Capacity	43200
Total No. of Wells	1
Average Daily Run Time of Wells (Hrs)	
Capacity w/ largest Well Offline	0
GW Appro. Permit Number (GAP)	WO1976G010(04) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	1,000
% of ADD to GAP	17%
General Discharge Permit Number	06HT5057

W/WW Engr. Project Mgt: MM

Location of Asbuilt Drawings or CDs

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Troy	Tilghman	(410) 651-4659	(410) 271-7460
Gregg	Kemp	(410) 651-4659	(410) 330-4598
Rex	Powell	(410) 651-4659	(410) 507-8489

Surface Water Appr. Permit Number	____( ) ☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	162
Days of Storage at ADD	1.0
PDWIS WTP Number	123-0062
Appropriation Permit Exp. Date	6/1/2010 ☐ N/A
Est. Total length of Water Lines (feet)	100
Number of permit violations	

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

CIP AND MAJOR MAINTENANCE FUNDING HISTORY

Barracks V - Berlin

Maryland State Police

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade	Status
MSP	1990	$405,000	Replace radio tower at the Berlin Barracks and construct a new tower at a central location (Worcester Co.)	
	Total:	**$405,000**		

BARRACKS V – BERLIN
MARYLAND STATE POLICE

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:
- The plant is vulnerable to humidity
- The door is not operating properly.
- No alarms for pressure and power are available

Proposed Improvements:
- Install dehumidifier
- Replace main door for the treatment building
- Install alarms for pressure and power

WASTEWATER TREATMENT PLANT

Conditional Analysis:
- N/A

Proposed Improvements:
- N/A

Barracks V – Berlin
Maryland State Police

Well

Treatment Plant Overview

2011 WATER AND WASTEWATER MASTER PLAN

UNIVERSITY SYSTEM OF MARYLAND
VOLUME X OF X

September 2011

Prepared By:

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108

2011 Water and Wastewater Master Plan

Volume X of X – University System of Maryland

Executive Summary

MARYLAND ENVIRONMENTAL SERVICE

2011 WATER AND WASTEWATER MASTER PLAN

EXECUTIVE SUMMARY

I. INTRODUCTION

The Maryland Environmental Service (MES) was created by statute in 1970 (Chapter 240 of 1970) as an independent agency. Executive Order 01.01.1971.11 gave MES the responsibility for operation and maintenance of all State-owned water purification and solid waste disposal facilities. Two (2) years later, MES became incorporated into the Department of Natural Resources (DNR). While under DNR, all Capital Improvement Project (CIP) planning and annual funding requests for these facilities were prepared by MES and submitted to the State for approval. The first projects received funding in Fiscal Year 1984; however, the Department of General Services (DGS) had responsibility for managing the appropriations, procuring the consulting engineers, contractors, and other services, and providing project management and inspection for CIP with some input from MES staff.

The situation began to change in later years, with MES first receiving funding and procurement authorization for CIP in 1992 and becoming an instrumentality of the State and a public corporation independent of DNR in 1993. Chapter 4, First Special Session of 1992, said MES "*shall be responsible for and shall control the procurement of engineering and architectural services and all other related services and supplies for the projects for which State funds are appropriated under provisions of this act.*" Since 1992, MES has had full responsibility for the CIP program for State-owned water and wastewater treatment plants, and in some cases, the associated piping systems and water towers, when requested by a State Agency.

During this transition period, the Department of Budget and Management (DBM) asked MES to prepare a Master Plan for water and wastewater facilities operated by MES and owned by the State. There were numerous facilities needing capital improvements to accommodate expansions within the various institutions as well as changing state and federal regulations that required more advanced treatment processes. The initial appropriation to MES totaled over $14 million, which funded a backlog of 13 projects. As projected in the Master Plan, funding requirements decreased each year as the majority of the treatment facilities were upgraded. Eventually the requests were capped at $3.0 to $3.5 million per year, which was adequate for improvements to piping, pumping stations, and water towers.

In the early 2000's, Governor Parris Glendening issued an Executive Order requiring wastewater treatment plants to further reduce nutrient loadings to the State's waterways. The Maryland Department of the Environment (MDE) completed their Tributary Strategy plan, essentially capping nutrient loads at many wastewater treatment facilities. The EPA also issued new drinking water regulations with limits for new parameters such as arsenic, radon,

radionuclides, and disinfection by-products. As MES experienced a decade earlier, water and wastewater treatment facilities would need upgrades as new, more stringent permits were issued. Rapidly changing technology rendered controls and equipment obsolete at many sites and construction prices skyrocketed after September 11, 2001. It became apparent the $3.0 million cap would no longer be sufficient to make the necessary improvements.

During the 2008 session of the Maryland Legislature, the Governor's budget included a capital budget request from MES of $11.9 million for critical, compliance-related upgrades to four (4) treatment plants. The budget committees expressed concern there was no plan that adequately justified this increase. In the 2008 "*Joint Chairmen's Report on the State Operating Budget (SB 90) and the State Capital Budget (SB 150) and Related Recommendations*", MES was instructed to prepare an infrastructure improvement plan for the facilities managed by the agency by February 1, 2009. The 2008 Water and Wastewater Master Plan represents the response to this request.

II. OBJECTIVES AND METHODOLOGIES

A. OBJECTIVES

To fulfill the request of the Maryland Legislature as defined in the 2008 Joint Chairmen's report, the objectives of the water and wastewater master plan included reviewing operating and performance records, evaluating the existing water and wastewater facilities to determine what improvements may be needed, developing a concept plan and scope of the identified improvements, cost estimates, ranking the individual projects, and developing a comprehensive CIP funding schedule and projection for the next five years and to FY 2021.

The specific steps and methodology used to prepare the plan are as follows:

- Collect data from existing records and engineering drawings at office
- Develop custom "Infrastructure CIP Management" database
- Conduct site visits and inventory of all facilities
- Perform engineering evaluations at all facilities
- Review Master Plans and five-year plans of agencies served by MES
- Identify and determine future needs for all facilities
- Evaluate each facility compliance records and anticipate future regulatory constraints
- Review past capital improvement and critical maintenance expenditures
- Analyze future improvement alternatives for each facility
- Perform cost analysis of alternatives and prepare cost estimates for the identified CIPs for each facility
- Develop a methodology to allow ranking and prioritizing the CIPs

- Generate a schedule of implementation for the facility improvements
- Develop a financial plan for funding requests
- Generate final master plan report

B. REPORT STRUCTURE

The Master Plan consists of an Executive Summary along with separate volumes for each of the nine (9) State Agencies. This Executive Summary is also included in each of the individual agency volumes. Each of the agency volumes provides detailed infrastructure information for each of the facilities associated with that agency that includes:

- Background
- Water and wastewater facilities description
- Assessment of operations and performance data
- List of operational and infrastructure deficiencies
- Regulatory compliance history and future regulatory constraints
- Capital improvements and major maintenance funding history
- Cost analysis and recommended improvements
- Schedule of implementation
- Supplemental information

C. CIP RANKING SYSTEM

To allow ranking and prioritizing the CIP projects, MES developed a "Project Ranking Sheet". This consisted of the following six categories:

- Compliance & Permits (criteria uses number of permit violations)
- Health and Safety
- Structural issues
- Impact on operating and maintenance costs
- Operational deficiencies
- Energy and Environment (evaluates energy savings and environmental benefits)

Each of these categories had associated scoring criteria which allowed assigning points based on the listed criteria. The total score assigned each project was used to determine its ranking on the CIP list.

III. ANTICIPATED FUTURE REGULATORY REQUIREMENTS

In addition to water and wastewater systems that need improvements due to age, equipment obsolescence, and normal wear and tear, improvements are also needed to comply with more

stringent regulations and treatment requirements. The following section addresses current regulations and policies, and how they impact the need to make upgrades to water and wastewater facilities.

A. WASTEWATER TREATMENT PLANTS

1. Wastewater Treatment Plants Discharging to Streams

All wastewater plants with stream discharge are regulated by the National Pollutant Discharge Elimination System (NPDES). Dischargers are issued an NPDES permit that authorizes discharge to a water body and imposes limits that have to be met based primarily on the receiving stream's water quality standards. The permits typically require meeting both pollutant concentration limits as well as mass loading limits. The mass loading limits (lbs/day) are determined by taking the assigned maximum flow value (i.e., million gal/day) for the facility times the specified concentration limits (mg/l) times 8.34 (a conversion factor) .

The pollutants that are regulated on discharge permits usually consist of the conventional domestic wastewater pollutants:

- Biological Oxygen Demand (BOD_5) – This is a measure of the amount of organic compounds in water that can be assimilated by bacteria and other microorganisms.
- Total Suspended Solids (TSS) – This measures the amount of organic or inorganic particles that are suspended in the water.
- Ammonia – This is the dominant form of nitrogen in domestic wastewater. It is toxic to fish and other biota.
- Total Kjeldahl Nitrogen (TKN) – This is the amount of ammonia and organic nitrogen (i.e., the nitrogen bound up in organic compounds like proteins, etc.)
- Nitrate/Nitrite – This is the inorganic nitrogen fraction that has been converted from ammonia and organic nitrogen. Further biological assimilation of nitrate and nitrite converts it to nitrogen gas, which dissipates to the atmosphere.
- Total Nitrogen – Nitrogen is considered both a nutrient and a pollutant in that small amounts are beneficial to plants and animals, but in excess it promotes the proliferation of bacteria and algae and results in degraded water quality. Total nitrogen represents the sum of nitrate/nitrite and TKN.
- Total Phosphorus – Similar to nitrogen in that it is both a nutrient and a pollutant. Contrary to nitrogen, it can only be eliminated from wastewater by biological uptake or chemical precipitation.
- Bacteria – All wastewater must be properly disinfected prior to discharge and permits usually give limits for either Fecal Coliform or Total Coliform levels.

These are the dominant pollutants found in domestic sanitary wastewater. If there are other pollutants in the waste stream, then these pollutants may also be added to the discharge permit with appropriate limits.

Discharge permits can be amended at any time by MDE due to either new regulations or policies being adopted or based on new water quality information on the receiving stream that dictates more stringent limits. The permits are usually issued for a five-year period. Although, MDE can amend discharge permits at any time, the changes are usually made when the permit is renewed and reissued.

The U.S. EPA and State of Maryland regulations that govern the pollutant limits on discharge permits are as follows:

- Federal Clean Water Act – National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Load (TMDL) – Added to the CWA in 1992 (currently addressed via the Watershed Implementation Plans)
- Maryland Tributary Strategy and Point Source Strategy
- Other specific regulations that may govern specific watersheds or water bodies (e.g., Patuxent River Watershed – MD Code Section 4-302.1)

The discharge limits imposed on individual treatment plants are primarily determined by the water quality requirements of the receiving stream. Streams are classified by their designated use, (e.g., drinking water source, trout stream, general recreation, etc.) where each classification has associated discharge limits that have to be met to ensure protecting the water quality. The requirement to specify discharge limits was first established under the Federal Clean Water Act (CWA) under the NPDES program.

The second program that can determine the limits imposed on discharge permits is the Total Maximum Daily Load (TMDL) program. The TMDL program is a part of the Clean Water Act and it requires all states to evaluate and compile a list of water bodies that do not fully support beneficial uses such as aquatic life, fisheries, drinking water, recreation, etc. Each water body is evaluated and usually "modeled" to determine the maximum amount of pollutants that can be discharged to it with out impacting the water quality or beneficial use. After determining the maximum allowable quantities of the various pollutants that can be discharged to the body of water, each of the dischargers (i.e., WWTPs, non-point source discharges, etc.) is allocated portions of the TMDL amount. The allocated amount is then incorporated into the facility's discharge permit.

In the last few years, the EPA, in coordination with the states of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC) developed a nutrient and sediment pollution diet for the Bay known as the Chesapeake Bay Total Maximum Daily Load (TMDL). To fulfill the Bay TMDL requirements, MDE developed an allocation process that is contained in Maryland's Watershed Implementation Plan (WIP). The allocation process specifies loading caps for nutrients (N&P) and sediment to each of 58 "segment-sheds" to collectively meet the 2017 target (70% of the total nutrient and sediment reductions needed to meet EPA's final 2020 goals). Maryland's Phase I WIP was submitted to EPA on December 3, 2010. MDE is now working with other State agencies, county and local governments to develop Phase II Watershed Implementation Plans with more detailed reduction targets and strategies to ensure meeting the goals of the Bay TMDL.

Maryland's WIP is requiring that all major WWTPs (i.e., those with a design capacity greater than 500,000 gal/day) to upgrade to meet an Enhanced Nutrient Removal (ENR) level of treatment. There are some facilities that are already meeting ENR treatment requirements as part of the Tributary Strategy program that Maryland had in place for several years.

The Tributary Strategies are broad implementation plans for achieving and maintaining nutrient allocations for the ten major watersheds that drain into the Chesapeake Bay. These allocations were established through the year-2000 Chesapeake Bay Agreement process. Under this program, MDE developed the Enhanced Nutrient Removal (ENR) Load Allocations Table, which establishes nutrient loading caps for 66 major wastewater treatment plants.

The ENR Allocations Table allocated a fixed amount of nitrogen and phosphorus loadings (in lbs/year) to be discharged by each WWTP based on the facility's design capacity and assuming a total nitrogen and total phosphorus concentration of 4 mg/l and 0.3 mg/l, respectively. Therefore, if a WWTP needs to expand and accept additional flows (i.e., users), it has to meet lower concentration limits in order to compensate for the increase in flow.

The ENR Tributary Strategy also controls the nitrogen and phosphorus loadings from minor WWTPs (i.e., those with flow less than 500,000 gal/day). The minor WWTPs are allocated caps based on either their projected year 2020 flow or design capacity: whichever is lower and a nitrogen and phosphorus concentration of 18 mg/l and 3.0 mg/l, respectively. If minor WWTPs need to expand, their loading allocation is limited to a maximum amount of 6,100 lbs/year for nitrogen and 457 lbs/year for phosphorus.

The goal of the Tributary Strategy and now the Watershed Implementation Plans is to eventually have all the major WWTPs meeting ENR levels of treatment, which are 3.0 mg/l for nitrogen and 0.3 mg/l for phosphorus.

Maryland's Bay Restoration Fund (BRF) was also created to provide funding to WWTPs for upgrading to an ENR level of treatment. Priority for the funding is given to major WWTPs.

Either at the time of permit renewal, or due to other circumstances (e.g., WWTP expansion, etc.), any of the regulatory programs listed above could cause more stringent limits be imposed on the discharge permits. EPA and MDE are also including limits in discharge permits for other nonconventional pollutants (e.g., copper, zinc, etc.) along with stricter toxicity biomonitoring requirements and limits. The biomonitoring requires toxicity testing using live macroinvertebrates and fish. Any new limits or toxicity testing that are added to a facility's discharge permits may require an upgrade to the WWTP treatment processes if the facility was not designed to meet those requirements.

Although some of the State WWTPs have been upgraded in the past few years to meet low limits, many have not and . will require improvements to allow meeting more stringent limits. In order to properly plan future WWTP improvements, MES has adopted the following protocols for determining which type facilities may be issued more stringent limits and will need capital improvements to comply:

Major WWTPs (all treatment types):

A few facilities already have treatment systems that can meet an ENR level of treatment. For those that do not meet ENR, capital improvements will be specified to provide ENR level of treatment.

Minor WWTPs:

Lagoon Treatment Systems – Lagoons are an antiquated type of treatment system, which provide at best a secondary level of treatment. They do not remove nutrients to any appreciable extent and as a result discharge ammonia, which can be toxic to fish, and other aquatic life. MDE is moving to impose lower limits for ammonia and other parameters. Therefore, capital improvements will be specified for replacing the lagoon system with a more modern and sophisticated treatment system.

Other Secondary Type Treatment Systems – In addition to lagoons, there are other treatment systems in operation that are not designed to remove nutrients and therefore discharge ammonia and other harmful pollutants. Capital Improvements will be specified to replace or upgrade these systems.

Expanding Facilities – Any of the minor WWTPs that will have flow increases beyond their design capacity will have to meet more stringent limits. In some cases, if the flow increase is not too great, the WWTP may not be required to achieve full ENR level of treatment. Therefore, the nature of the

improvements specified would only be what is needed to meet the anticipated limits for the higher flow.

Note: Even though MES has adopted this protocol to program future CIP needs, these are based on regulations and/or policies that are in effect today. Therefore, this protocol is subject to change in response to new or amended regulations (State or Federal) or policies.

2. Wastewater Treatment Plant Solids Management

All WWTPs produce a solid material by-product as a result wastewater treatment. Regardless of the type of facility, these solids must be removed from the WWTP on a periodic basis in order for the treatment process to function properly. Basically, there are three options available for managing this solid material:

- Disposal into a landfill
- Incineration (burning)
- Recycling the material onto the land for beneficial uses, such as compost, fertilizer, etc.

The first two options, landfill disposal and incineration, while used by some WWTPs, are not without their problems. Dwindling landfill space and rising tipping fees have forced most facilities to explore other options. One advantage of incineration is that it can reduce the amount of material for ultimate disposal by as much as 75%. However stringent Federal air quality regulations (40 CFR 60, Subpart O), volatile energy costs, complexity of operation, and high capital expenditures have increasingly ruled out incineration as an option for most facilities, especially for smaller WWTPs with a capacity of less than 10 million gallons a day (MGD). There are also detrimental environmental impacts associated with incineration, such as excessive energy usage and concerns about greenhouse gas emissions. Finally, negative public perception surrounding incineration makes the execution of these projects almost impossible.

Nutrients in these solids, in the form of nitrogen and phosphorus (and a small amount of potassium) can be recycled onto farmland as a low-grade fertilizer, or used to reclaim land in dire need of revegetation (e.g., strip mined land). These solids also contain organic matter that is also beneficial for the soil. The beneficial reuse of this solid material is a cost-effective option for the recipient farmer as well as the WWTP. MES has already realized significant cost savings by implementing land application programs. Both the U.S. EPA and MDE promote the beneficial reuse of biosolids when done in accordance with the regulations.

Solid material from a WWTP that is treated to meet Federal and State standards for recycling onto land are called "biosolids". Material that is not treated, or does not meet these standards, is labeled "sludge", or "sewage sludge". The current Federal (40 CFR 503) and State of Maryland (COMAR 26.04.06) regulations

prescribe the treatment and management standards for recycling biosolids. These standards were established to protect public heath and the environment.

There are several core regulatory standards that WWTPs must follow before land applying biosolids:

- The concentration of chemical constituents, such as heavy metals, in the biosolids product must be under certain limits.
- Solids must be treated to significantly reduce pathogenic organisms. This treatment, called stabilization, is usually done at the WWTP prior to land application. Stabilization processes can be classified as:
    - Physical/chemical in nature, such as adding copious amounts of lime to kill pathogens (lime stabilization),
    - Biological treatment processes. Examples of biological treatment processes include anaerobic digestion, (subjecting the sludge solids to bacterial degradation for an extended period of time in a heated tank in the absence of oxygen), or aerobic digestion, which involves aerating the solids.
    - Time/temperature treatment, such as composting or heat drying the solids to produce a fertilizer pellet.
- The solids must be sufficiently treated so that the likelihood for disease transmitting organisms, called vectors, to be attracted to the biosolids is reduced. Vectors include flies, mice, mosquitoes, etc.
- Biosolids must be managed at the final reuse site in such a manner as to not cause a public health, nuisance, or environmental problem. These management practices can include procedures such as incorporating the biosolids into the soil at a farm site, or including directions to homeowners for use of a compost product.

Maryland is regarded as having an extensive biosolids regulatory program. One aspect of this program is that it requires mandatory, site-specific nutrient management plans be prepared for each farm site where biosolids is to be land applied. Nutrient management reduces the potential for nitrate-nitrogen contamination of groundwater, and phosphorus runoff into surface waters. MDE's regulations are more rigorous than the Federal rules, requiring more site practices to control nuisance factors (such as odors). Approximately 80% of the biosolids generated in Maryland are recycled in some manner, whether onto agricultural land, or through the sale and distribution of highly treated biosolids products such as compost or heat dried fertilizer pellets.

The nutrient management program is administered by the Maryland Department of Agriculture (MDA). In an effort to reduce nutrient pollution from non-point sources, MDA is in the process of revising its Nutrient Management Guidelines to

severely limit the practice of land applying biosolids and animal manures in the winter .Although currently all of MES' biosolids are land applied out-of-State where the restrictions are less stringent (i.e., Virginia) this change in the Nutrient Management Guidelines could affect the operation of our facilities if land application operations revert back to Maryland. This would necessitate either the construction of biosolids storage structures at of our State-owned Regional Sludge Management Facilities at considerable cost, or the installation of advanced sludge treatment processes to reduce the volume of solids being removed

MDE is also currently in the process of preparing comprehensive revisions to their biosolids regulations. It is envisioned that these new regulations will impose more stringent requirements, especially with respect to biosolids testing/monitoring, site controls, compliance inspections/permitting, and documentation of stabilization processes. Much of the revisions are in response to the public's demand for greater oversight of the land application program.
Future regulatory changes could also impose more stringent biosolids processing requirements on WWTPs, called "Class A" stabilization, such as composting and heat drying. These Class A processes reduce pathogens to near non-detectable levels. The general public's concern about pathogens is motivating the change to Class A stabilization processing; many WWTPs have already voluntarily implemented Class A stabilization to address these concerns. It is anticipated that MES will ultimately follow this industry trend, and eventually request funding for Class A processing.

In an effort to more efficiently manage biosolids from MES's facilities, the Agency currently utilizes a "regional" sludge management approach. Sewage sludge from most of MES' smaller facilities that do not meet the standards for recycling onto land is transported to larger WWTPs for further processing and stabilization. These stabilized, treated biosolids from the Regional Sludge Management Facilities are then land applied by a contractor. MES operates Regional Sludge Management Facilities at three State-owned WWTPs. One advantage of the regional approach is that economies of scale are achieved at the larger facilities, thus avoiding the need for constructing costly, separate stabilization processes at each of the smaller WWTPs. It also reduces staff time associated with regulatory monitoring at each of the smaller WWTPs.

A major disadvantage of the regional approach is that stabilization process reliability and equipment redundancy is critical. Sludge processing at the Regional Facilities must be more robust to avoid sludge disposal interruptions on the smaller, satellite State-owned WWTPs. Capital funding should be directed towards ensuring that biosolids processing equipment reliability at the regional facilities is maintained.

3. Wastewater Treatment Plants Using Land Disposal

Numerous WWTPs do not use stream discharge for the treated effluent and rely on spray irrigation to the land surface, underground discharge (i.e., drain field), or similar means. These type facilities are also facing more stringent discharge requirements. This is due to the recognition by MDE that ground disposal systems can contaminate groundwater supplies (i.e., drinking water wells) and migrates through the ground to discharge to streams and ultimately the Chesapeake Bay. To alleviate some of this pollution source, MDE included in the Tributary Strategies a provision that allows abandoning septic systems and connecting those users to sewers and treatment systems with a stream discharge. This provision is based on the assumption that septic systems provide only minimal nutrient removal and the untreated nutrients will eventually make their way to the Chesapeake Bay. The low level of treatment provided by septic systems is then off set by the high level of nutrient removal that is now possible with the newer ENR treatment technologies.

Just as with WWTPs that discharge to streams, MDE is also imposing lower limits on groundwater discharge permits to reduce the amount of nitrogen that is ultimately discharged to the Bay and to groundwater supplies. The limit for Total Nitrogen can be as low as 8 mg/l. These low limits are primarily imposed on the larger systems with flows over 5,000 gal/day. The Bay Restoration Fund also collects fees from users with On Site Sewage Disposal Systems (OSDS) (i.e., septic systems) and other ground disposal systems. MDE offers BRF grants for upgrading OSDS systems to provide increased nitrogen removal. Priority at this time is being given to those systems in the Critical Area or to those systems which are failing.

MES will either request BRF funding or Capital Improvement funds to upgrade any OSDS system that may be subject to more stringent discharge limits and/or would represent a good opportunity to upgrade to further reduce nitrogen being discharged to the Bay.

B. Water Treatment

The quality of drinking water that is produced is very strictly regulated under the EPA and Maryland's Safe Drinking Water Act. The water treatment plants that use surface water supplies (e.g., lakes, reservoirs, and streams) have much more stringent requirements that have to be met compared to those using groundwater (i.e., wells) as their source water. Two of the new regulations associated with surface water have decreased Maximum Contaminant Levels (MCLs) in drinking water and one new regulation requires higher removal of contaminants, which may require specific capital improvements at specific water treatment plants. These regulations are listed below:

- Stage I Disinfection By Product Rule - Total Trihalomethanes MCL of 80 ppb and Total Halocetic Acids MCL of 60 ppb
- Turbidity Maximum Contaminant Levels of 0.30NTU
- Enhanced Surface Water Treatment Rule – Requires 2 to 3-log removal of Cryptosporadium

Also, a Groundwater Rule requires 4-log virus removal, which may require installation of filtration in some of groundwater plants. Therefore, specific capital improvements that would be needed to meet new or more stringent regulations will be addressed at specific water treatment plants.

C. Water Reuse

The reuse of treated wastewater is becoming more and more popular in many parts of the country, resulting in a second "purple" water distribution system. The need for this is caused by the inability of the water sources to be able to meet the ever-increasing demand. Given the physical limitations (e.g., available land) and the regulatory requirements imposed on water and wastewater systems, water reuse and reclamation is not only good environmental stewardship, but is also now recognized as a way to save power and O&M costs, facilitating compliance with water or wastewater regulatory requirements. MES would recommend the implementation of any water reuse projects. Water reuse is already performed at the Eastern Correctional Institution (ECI) where the treated wastewater effluent is sent to the Cogeneration Plant for use in their cooling towers. This could be expanded to use for irrigation, toilet flushing, and other non-potable uses. Although no new projects have been identified, MES will continue to look for possible opportunities to reuse treated wastewater at State facilities.

IV. WATER/WASTEWATER INFRASTRUCTURE CIP SUMMARY

MES provides some level of operations and maintenance services to a total of 65 State facilities. The water and wastewater infrastructure utility systems at these facilities falls under one of the following categories:

- Water Source
- Water Treatment Plant
- Water Distribution
- Wastewater Treatment / Onsite Sewage Disposal System
- Wastewater Collection/Conveyance

MES does not provide operations and maintenance services for all these categories at all the facilities. There are many facilities where the State Agency operates one or more of the utility systems or it may receive service from a nearby municipality, county, or sanitation district.

The level of services that MES provides is described in each of the facility descriptions and is summarized in Table I. Table I lists all the facilities by Agency and gives the entity (e.g., MES, DNR, etc.) that is providing the services for that infrastructure category.

In preparing the 2008 Master Plan, only those systems that are operated by MES were evaluated for capital improvement needs and listed on the MES CIP Request. Out of the 65 total facilities, a total of 39 specific capital improvement projects have been identified and listed in the CIP funding schedule that extends to FY2021 (see Table II). The total CIP request for all 10 years is $64,643,000 with a total project costs estimated to be $98,898,000. The CIP request is less than the total project costs due to other funding sources that will pay their share of the costs (e.g., Freedom District WWTP) and due to CIP funding already received (e.g., ECI).

The MES project ranking system provided a consistent methodology to prioritize and rank the projects and spread the requested funding out over the next 10 years. Table II provides a list of all the projects, their ranking, the State agency, and the amount and year that the funding is requested.

TABLE I

State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
DNR					
Albert Powell Hatchery	DNR	DNR	DNR	MES	DNR
Big Run SP	MES	MES	MES	DNR	DNR
Calvert Cliffs SP	MES	MES	DNR	DNR	DNR
Camp Bay Breeze	MES	MES	DNR	DNR	DNR
Cunningham Falls SP	MES	MES	DNR	DNR	DNR
Dahlgreen Area - South Mt. SP	MES	MES	MES	DNR	DNR
Dan's Mountain SP	MES	MES	DNR	DNR	DNR
Deep Creek Lake SP	MES	MES	MES	Garrett Co	MES
Echo Lake Area - South Mt. SP	MES	MES	DNR	DNR	DNR
Elk Neck State Park	MES	MES	MES	MES	MES
Fair Hill NRMA	MES	MES	DNR	DNR	DNR
Fort Frederick SP	MES	MES	MES	MES	DNR
Gambrill SP	MES	MES	DNR	DNR	NR
Gathland SP	MES	MES	DNR	DNR	DNR
Greenbrier SP	MES	MES	DNR	MES	DNR
Greenwell SP	MES	MES	DNR	DNR	DNR
Herrington Manor SP	MES	MES	DNR	DNR	DNR
New Germany SP	MES	MES	DNR	MES	DNR
Pocomoke SP- Milburn & Shad Landing	MES	MES	DNR	DNR	DNR
Point Lookout SP	MES	MES	DNR	MES	DNR/MES
Rocks SP	MES	MES	DNR	DNR	DNR
Rocky Gap SP	MES	MES	MES	MES	MES
Sandy Point SP	MES	MES	DNR	DNR	DNR
St Mary's River State Park	MES	MES	DNR	DNR	DNR
Susquehanna State Park	MES	MES	DNR	DNR	DNR
Swallow Falls SP	MES	MES	DNR	MES	DNR
Washington Monument SP	MES	MES	DNR	DNR	DNR
MD Dept of Veterans Affairs					
Charlotte Hall Veterans Home	MES	MES	MDVA	MES	MDVA
MD Dept of the Military					
Brig. Gen. Thomas Baker Training Site	MES	MES	MES/MM	MM	MM
Camp Fretterd	MES	MES	MM	MES	MM
Frederick Armory	MES	MES	MM	MM	MM
Gunpowder Military Reservation	MM	MES	MM	MM	MM
MD State Police					
Barrack V - Berlin	MES	MES	MSP	MSP	MSP

TABLE I

State of Maryland Water and Wastewater Facilities

Distribution of Operational Functions

Table I (cont.)

Location	Water Source	Water Treatment Plant	Water Distribution	Wastewater Treatment Plant / Onsite Disposal System	Wastewater Collection
State Highway Adm.					
Bay Country Welcome Center	MES	MES	SHA	MES	SHA
Centreville Maintenance Shop	SHA	SHA	SHA	MES	SHA
Green Hill Cove				MES	SHA
I-68 Rest Stop	MES	MES	SHA	SHA	SHA
I-68 Visitor Center	MES	MES	SHA	SHA	SHA
I-70 Rest Stop	SHA	MES	SHA	MES	SHA
Leonardtown Maintenance Shop	SHA	MES	SHA	MES	SHA
Sideling Hill Visitors Center	MES	MES	SHA	MES	MES
University System of Maryland					
Ag. Exp. Sta. - University of MD	MES	MES	U of M	U of M	U of M
Horn Point Lab - University of MD	U of M	U of M	U of M	City of Cambr	MES
St Mary's College	MES	MES	MES	St. Mary's Col	MES
DHMH					
Crownsville Hospital Center	MES	MES	DHMH	MES	DHMH
Freedom District	Carroll Co	Carroll Co	Carroll Co	MES	Carroll Co
Rosewood State Hospital	Balto. Co.	Balto. Co.	DHMH/MES	Balto Co.	DHMH
Springfield Hospital Center	Carroll Co	Carroll Co	Carroll Co		DHMH
DJS					
Backbone Mountain Youth Center	MES	MES	MES	DJS	DJS
Chelteham Youth Facility	MES	MES	DJS	MES	DJS
Green Ridge Youth Center	MES	MES	MES	MES	MES
Meadow Mt. Youth Center	MES	MES	MES	DJS	DJS
Savage Mt. Youth Center	MES	MES	MES	DJS	DJS
Thomas O'Farrell / Henryton	Carroll Co.	Carroll Co.	Carroll Co.	Carroll Co.	MES*
Victor Cullen Center	Washington Co.	Washington Co.	DJS	MES	DJS
DPSCS					
Eastern Correct. Inst. - Cogen Plant	MES	MES	DPSCS	MES	DPSCS
Eastern Correctional Institution	MES	MES	DPSCS	MES	DPSCS
Eastern Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
Jessup Complex - Dorsey Run WWTP	AA Co	AA Co	DPSCS	MES	DPSCS
MCI - Hagerstown	Hagerstown	Hagerstown	DPSCS	MES	DPSCS
Poplar Hill Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
So. MD Pre-Release Unit	MES	MES	DPSCS	MES	DPSCS
WCI & NBCI	Cumberland	Cumberland	DPSCS	Cumberland	MES*

*Pumping stations only

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
HOLD	N/A	Eastern Correctional Institution - Cogen	Upgrade electrical control system.	Waiting for discussion/input from Environmental Ops before proceeding.	2017	2018	DPSCS	$3,500,000	$3,500,000									
1	73	Eastern Correctional Institution WWTP	New treatment plant; including the RO Reject system	Design expected to start in May 2011. FY11 REQUEST (12.126M - C)	2013	2015/2016	DPSCS	$26,730,000	$19,500,000	$1,950,000		$7,000,000	$10,550,000					
2	69	Freedom WWTP	Upgrade plant to 5 stage bardenpho process, and upgrade solids handling facilities.	Under Compliance Schedule. Negotiating a Consent Agreement w/MDE. FY12 REQUEST (1.4M - P)	2013	2014	DHMH	$18,000,000	$2,300,000	$1,566,000	$734,000							
3	65	Rocky Gap SP - WTP	Needs new plant.	Preliminary Design Report conducted; Needs new plant designed (have design funds). MES waiting on direction from DNR before moving forward w/final design. FY12 REQUEST (2.65M - C)	Design Funds Secured	2013	DNR	$3,729,000	$3,000,000	$3,000,000								
4	65	Rocky Gap SP - WWTP	Needs new plant.	Water usage unknown. Meeting permit requirements; monitoring for BOD, TSS, and Temperature (should not exceed 68 degrees). Water usage estimated to increase 140K gpd and wastewater 120K gpd. Current WWTP designed for 120K gpd. Existing plant cannot accommodate any further growth.	2013	2014	DNR	$3,000,000	$3,000,000	$300,000	$2,700,000							
5	62	Charlotte Hall VA Home - WW	WWTP: Repair or replace pond's liner system; replace floating boom; additional floating boom; install four (4) aerators/mixers; replace irrigation valves and nozzles; install sodium hypochlorite feed system; develop reserve RIB; construct equalization basin; construct perimeter fence; rehab effluent pump station pipe; and abandon monitoring well no. 5 located in RIB2 WW COLLECTION: for pump station no. 1 install grease trap, install influent channel w/bar screen, separate valve vaults and check & gate valves, alarm system, real time monitoring device; for pump station no. relocate electrical box to above ground location, install real time monitoring device.	Design 80% complete, RIBS may stay on Wish List. Nitrogen compliance issue. Plant capacity 60K pd; ADF 40-42K pd. Not meeting permit requirements; 3 violations in last year.	Design Funds Secured	2013	DVA	$3,667,000	$3,457,000	$3,457,000								
6	61	Cunningham Falls SP - WW Collection & Water Distribution Systems	WASTE WATER ($918K): Install HDPE Force Main thru existing gravity lines; grouting of annular space in sewer lines and MHs; and install 10 pump stations. WATER ($100K): Evaluate and replace leaking pipes in distribution system in Manor Area.	WASTE WATER: System consists mostly of terra cotta pipe and due to rocky soil and high groundwater table, it has severe I/I. The wastewater is conveyed over 3 miles to Thurmont for treatment. The Park pays for every gallon treated and as a results pays over $40K a year just to treat the extraneous I/I flows. WATER: Due to age of the distribution system, leaks becoming more frequent, requiring an operator to "camp out" at plant until leak is repaired to meet demand. Equipment - Filter media requires replacement, the piping in the clarifier is corroded and undersized, components of the clarifier have recently deteriorated and required re-fabrication. Tanks and piping were repainted several years back and starting to show corrosion again. Level control floats are extremely corroded and filter valves are leaking. Clearwell is undersized for peak demand.	2013	2013	DNR	$1,238,000	$1,238,000	$200,000	$1,038,000							
7	60	Victor Cullen -WWTP	Consider SBR or activated sludge. Rebuild bar screen. New 50K gpd plant; utilize existing buildings.	Occasional Ammonia limit (8) violations during winter. Currently a rock trickling filter w/fixed nozzles. Needs new bar screen. Plant rated/permitted at .05 MGD. Serves approximately 135 people.	2013	2014	DJS	$2,516,000	$2,516,000	$216,000	$2,300,000							

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
8		State Water Towers	Minor rehab & painting	Camp Fretterd (Witches Hat) (200K) ($448.2K); MCI-H (Standpipe) (300K) ($511.4K); Victor Cullen (300K) ($544.4K); . FY12 REQUEST (970K - P/C)	N/A	2013		$1,504,000	$1,504,000	$1,504,000								
9	62	Charlotte Hall VA Home - WTP	Construct a new, separate treatment building next to existing treatment to house softening units and store salt and other chemicals.		Design Funds Secured	2014	DVA	$210,000	$210,000		$210,000							
10	60	MCI -WWTP	Replace gas chlorine storage and feed system with UV disinfection units; cover the two (2) secondary clarifiers launders; install fermentation tank; install denitrification filters and associated carbon source feed system; install treated wastewater supply system for washing belt and polymer mixing during sludge dry; replace existing emergency 1200KVA generator; construct pole building for equipment and chemical storage; paint 300,000 gallon standpipe; design and construct new 500,000 gallon elevated storage tank.	No violations. Nitrogen & Phosphorus added 01/01/11. Waiting to learn of state's share (ENR grant - $$$ unknown); Possibly $3M each. MDE first wants feasibility study conducted - MES has funds for study (not going to BPW until June or July 2011). DNR Component: Automation, DO monitors, pumps, alkalinity addition. sulfur dioxide and 1 ton chlorine storage (safety issue). FY12 REQUEST (3.7M - P/C)	Design Funds Secured	2014	DPSCS	$6,000,000	$3,000,000		$3,000,000							
11	55	Southern MD Pre-Release -WWTP	New plant - MBR Plant	Design 80% complete; Existing plant is a buried steel tank. Holes visible above ground. No violations. Electrical system in a trailer (violated code). 20 year old plant. FY12 REQUEST (1.471M - P/C)	Design Funds Secured	2014	DPSCS	$3,000,000	$3,000,000		$3,000,000							
12		State Water Towers	Minor rehab & painting	Crownsville Hospital (Front) (250K) ($450,000); Victor Cullen (75K) ($300,000). MCI -H (500K Elevated) ($625,000) Does not required design.	N/A	2014		$1,375,000	$1,375,000			$1,375,000						
13	55	Cunningham Falls SP - WTP	New water treatment plant	Manual system; must have staff 8 hrs/day during summer season. While plant is currently operational, it was constructed in 1973 and is at the end of its useful life. Major deficiencies include: Total manual operation, very inefficient, operator must be onsite at all times when plant is running. Examples - Backwashing is problematic, no flexibility with backwashing due to requirement of operator onsite. Significant safety risk - operators must reach into the panel to pull relays to start and stop the plant. Relays must be pulled when plant is offline due to frequent lightning strikes which cause severe damage to controls.	2015	2015	DNR	$3,000,000	$3,000,000			$3,000,000						
14	55	WCI -WWPS (old)	Move controls above ground; need new pumps; inline grinder requested for bypass channel.	Steel wet well - rusting out. Confined space (safety concerns)	2015	2015	DPSCS	$750,000	$750,000			$750,000						

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
15	50	Camp Fretterd - WTP & WD	WATER: Relocate switches from main electrical panel to a separate, weatherproof enclosure; replace heaters in storage and treatment areas; replace roof; install mission control unit; construct new treatment facility for proposed new well; construct new well at higher elevation; construct new elevated tank; paint 100,000 gallon elevated water storage tank. WASTEWATER: replace two (2) submersible pumps in duplex pump station.	Design based on Watek's recommendations can begin on or after June 2011. WTP: only 1 well exists. DS: need booster station, close loops. FY11 REQUEST (236K - P) FY12 REQUEST (188K - P)	2015	2017	MM	$1,970,000	$1,970,000			$197,000		$1,773,000				
16		State Water Towers	Minor rehab & painting	ECI (Front) (500K) ($625,000); Sandy Point (100K) ($175,000)	2015	2015		$800,000	$800,000			$800,000						
17	49	Poplar Hill	Propose new mechanical plant.	Lagoon system; spray field.	2017	2018	DPSCS	$3,160,000	$3,160,000					$316,000	$2,844,000			
18	47	Swallow Falls SP - WWTP & WTP	New plant; maybe SBR.	Lagoon based system; Can not discharge in summer; from 7 days before Memorial Day through 7 days after Labor Day. 2/3 cost estimate for WW. 60K gpd.	2017	2019	DNR	$3,688,000	$3,688,000					$368,800		$3,319,200		
19	41	Fair Hill NRMA - WTP & WD	Propose new plant and tank	Lead paint & glass lined tank. WTP control center in metal shed.	2017	2018	DNR	$1,709,000	$1,709,000					$170,900	$1,538,100			
20	40	St. Mary's College	WDS: Replace 3-inch piping student residences; close loops at seven (7) locations; new service line to Admissions building and ww pumping station. WTP: Replace flow meter at well no. 1; install automated well controls.	Design underway. Construction ready drawings scheduled for completion in August 2011.	2017	2017	UNIVERS.	$636,000	$636,000					$636,000				
21	39	Cheltenham -WWTP	WASTEWATER - Install new headworks; upgrade electrical service; install new blowers; replace RBC's with SBR's; construct building for new treatment plant; replace valves; upgrade Dynasand filters; install continuous DO meter. WATER - Repair Well #2; relocate hypo and Day tanks to existing chlorine room; paint storage tank.	Digester needs work w/aeration system.	2017	2018	DJS	$7,050,000	$7,050,000					$705,000	$6,345,000			
22		State Water Towers	Minor rehab & painting	Crownsville Hosp (Back) (250K) ($375,000) (2017); Elk Neck S.P. (60K) ($150,000) (2017); Charlotte Hall (250K) ($375,000) (2018); Rocky Gap (500K) ($625,000) (2019); Camp Fretterd (300K) ($450,000) (2019)	2017	2017		$1,975,000	$1,975,000					$1,975,000				
23	35	Gunpowder (MNG)	Extra well needed. Update controls. Heating system in poor condition. Fence around small reservoir.	Operating on only 1 well.	2020	2021	MM	$116,000	$116,000								$11,600	$104,400
24	34	Eastern Pre-Release - WWTP	Propose new WWTP.	Lagoon system; discharge to stream. Lagoon dredging completed Spring 2011. Currently 20K gpd.	2020	2021	DPSCS	$3,160,000	$3,160,000								$316,000	$2,844,000

TABLE II
2011 MARYLAND ENVIRONMENTAL SERVICE WATER & WASTEWATER MASTER PLAN
CAPITAL IMPROVEMENT REQUEST

2011 RANK	2011 RANKING SCORE	FACILITY	DESCRIPTION OF PROPOSED WORK	COMMENTS	DESIGN (FY)	CONSTRUCTION (FY)	AGENCY	TOTAL COST	FUNDING REQUEST COST	FISCAL YEAR 2013	2014	2015	2016	2017	2018	2019	2020	2021
25	27	Meadow Mountain Youth Center -WS	Repair treatment building roof leaks. Construct new well.		2020	2020	DJS	$256,000	$256,000								$256,000	
26	20	U of M Agr Center -WTP&WD	New treatment control building for Well #1 to replace "shed" like structure. Add 500 gallon storage at treatment building in case line to tower is interrupted. Construct new water treatment facilities for Well #2. Backfill well vault and extend well above grade. Rehab Well #2.	Not a reimburseable project - but could become one.	2020	2020	UNIVERS.	$402,000	$402,000								$402,000	
27	17	O'Farrell Youth Center (Henryton) - WWPS	Replace building door, build curb around grinder channel, paint generator fuel tank.	NOT CIP; Maintenance item.	2020	2020	DJS	$20,000	$20,000								$20,000	
28	40 HOLD - push back as far as possible until clear scope of work defined	Savage Mountain Youth Center - WS	Maintain with acid wash; scrap new well. Evaluate for water re-use.	First wanted replacement well - not feasible at this site - too difficult to find water. NOT CIP; Maintenance item.	2021	2021	DJS	$497,000	$497,000									$497,000
						GRAND TOTAL		**$103,658,000**	**$76,789,000**	**$12,193,000**	**$12,982,000**	**$13,122,000**	**$10,550,000**	**$5,944,700**	**$10,727,100**	**$3,319,200**	**$1,005,600**	**$3,445,400**

Agency Summary

UNIVERSITY SYSTEM OF MARYLAND

INTRODUCTION

The University System of Maryland (USM) is comprised of eleven (11) universities, two (2) research institutions, two (2) regional higher education centers, and a system office. The USM provides access to excellent higher education opportunities, performs groundbreaking research, offers vital services to communities and individuals, and fuels economic and workforce development. As a public system of higher education, the USM advances the State of Maryland and benefits all of society. The University System serves approximately 112,000 students and more than 600 bachelors, masters, doctoral, and professional programs at approximately 100 locations. The Maryland Environmental Service (MES) provides water and wastewater services to the following facilities:

FACILITY NAME	WATER SOURCE	WATER TREATMENT	WATER DISTRIBUTION	WASTEWATER TREATMENT	WASTEWATER COLLECTION
St Mary's College	MES	MES	MES	St. Mary's County	MES
University of MD Ag Center	MES	MES	University of Maryland	University of Maryland	University of Maryland
Horn Point WWPS	University of Maryland	University of Maryland	University of Maryland	City of Cambridge	MES

AGENCY CAPITAL IMPROVEMENT PLANS

MES requested a copy of the USM Capital Improvements Master Plan and were informed one did not exist. Therefore the Agency's plans for expansion or proposed change in use are unknown at this time. MES based recommended improvements and/or expansions to the water and wastewater systems at these sites on the agency's five-year plan, which was submitted to the Maryland Department of Budget and Management.[1]

FACILITY	PROJECT DESCRIPTION	PROJECT COST (DOLLARS)	PROJECT SCHEDULE	INCREASE W/WW FLOWS	W/WW CAPACITY IMPACTED
St Mary's College - Anne Arundel	Demolish & Replace	31,391,000	Construction 2013	No	No

[1] State of Maryland, Department of Budget and Management, FY 2009 – 2013 Capital Improvement Plan, http://dbm.maryland.gov/dbm_publishing/public_content/dbm_taxonomy/budget/capital_budget/capital_improvement_plans/toc_fy2009_2013capimprovplan.html

FACILITY	PROJECT DESCRIPTION	PROJECT COST (DOLLARS)	PROJECT SCHEDULE	INCREASE W/WW FLOWS	W/WW CAPACITY IMPACTED
Hall					
St Mary's College - Bruce Davis Theater	Renovation	2,655,000	Design 2011	No	No
St Mary's College - Student Services Building	Construct New	19,866,000	Construction 2009	Yes	No
St Mary's College - Music & Auditorium Building	Construct New	5,550,000	Design 2011	Yes	No
St Mary's College - Calvert Hall	Renovations	25,800,000	Design 2012/Construction 2013	No	No

CAPITAL IMPROVEMENT PLANS FOR FACILITIES SERVED BY MARYLAND ENVIRONMENTAL SERVICE

MES provides both water and wastewater services for the facilities listed above. The following section provides summaries of the proposed capital improvement needs for each facility. More detailed descriptions of each facility are included in the Facility Master Plan Report.

I. HORN POINT ENVIRONMENTAL LABORATORY (UNIVERSITY OF MARYLAND CENTER FOR ENVIRONMENTAL SCIENCE)

- Install risers and valves in all 17 grinder pump stations.

  Projected Cost: $60,000
  Planning and Design: N/A
  Construction: Fiscal Year 2018

II. AGRICULTURAL EXPERIMENT STATION - UNIVERSITY OF MARYLAND

A. WATER TREATMENT PLANT

- The facility has two (2) wells, but only one is used
- The well is in a vault below a manhole (confined space)
- The water is disinfected with sodium hypochlorite, which is housed in an 8 ft. by 10 ft. plywood building
- The space in the building is limited

- An 85 gallon storage tank in the treatment plant is inadequate for supplying the buildings uphill

B. WATER SOURCE

- Construct a new well in an appropriate location to provide redundancy in supplying water to the facility.

Projected Cost: $402,000
Planning and Design: Fiscal Year 2019
Construction: Fiscal Year 2019

III. ST. MARY'S COLLEGE OF MARYLAND

A. WATER DISTRIBUTION SYSTEM

- Looping across St. Johns Pond
- Looping to Matapany Road
- Looping along Fishers Road West and Route 5
- New service to the Admissions building
- Loping the Admissions building and the wastewater pumping station
- Looping at St. Mary's Hall
- Looping across the Townhouse Green & Student Residences
- Replace 3-inch piping at Townhouse Green & Student Residences
- Looping at Student Pavilion/Stadium

B. WATER TREATMENT PLANTS

- Replace flow meter at Well No. 1
- Install controls to automate the operation of all wells

Projected Cost: $1,098,000
Planning and Design: Fiscal Year 2010
Construction: Fiscal Year 2017

The Maryland Environmental Service Water and Wastewater Master Plan projects the cost for upgrades to USM water and wastewater facilities through Fiscal Year 2021 to be **$1,098,000.**

FACILITIES NOT SERVED BY THE MARYLAND ENVIRONMENTAL SERVICE

There are several facilities falling under the jurisdiction of the University System of Maryland that are not served by the Maryland Environmental Service; local jurisdictions or sanitary authorities provide water and/or sewage collection and treatment services. A description of the facilities and water and wastewater service for each is not included within this document. Information on these systems may be included in future updates to this plan. MES recommends the existing infrastructure be evaluated at these facilities in order to avoid potential disruption to water and sewerage service in the future.

SUMMARY

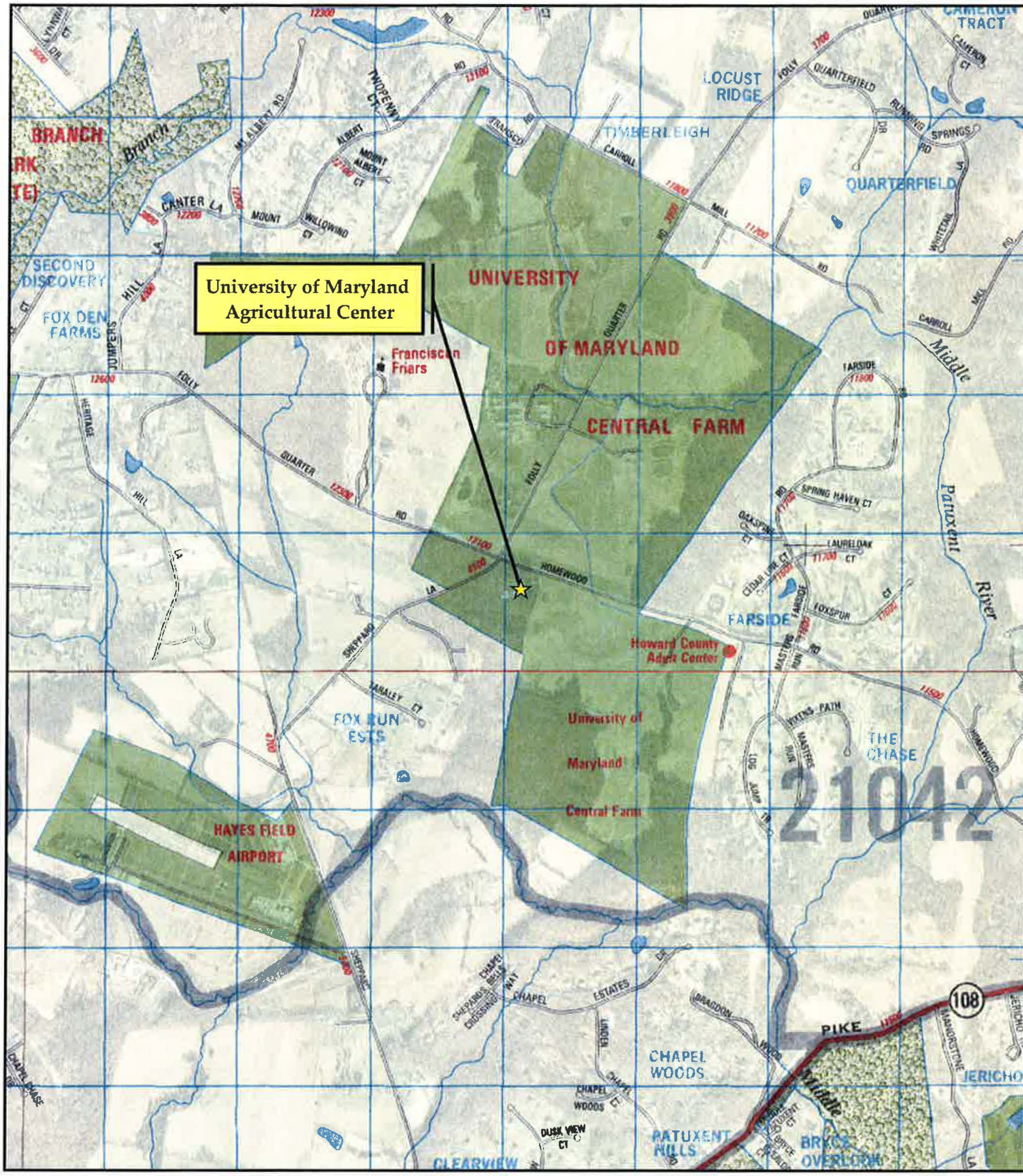
Detailed descriptions of the water and wastewater facilities operated by MES for the University System of Maryland are included in this volume, as well as the following information:

- Operations data
- Regulatory compliance history and future regulatory constraints
- A listing of operational and infrastructure deficiencies
- Capital improvements and major maintenance funding history
- Recommended improvements and estimated costs (in 2008 dollars)
- Proposed schedule of implementation
- Supplemental information

MES will continue to work closely with of USM to keep abreast of their planning activities to ensure there will be an adequate water supply and sewerage service for proposed facility expansions or changes in use.

Agricultural Experiment Station

University of Maryland



☆ Sites	Water and Wastewater Master Plan 2008	NAD 1983 StatePlane Maryland FIPS 1900 (feet) Projection: Lambert Conformal Conic GCS: North American 1983
Figure 1	MARYLAND ENVIRONMENTAL SERVICE GIS SERVICES 259 Najoles Road Millersville, MD 21108 (410) 729- 8200	0 500 1,000 1,500 2,000 2,500 Feet I:\GIS\Projects\MES\MES Sites\Sites.mxd

AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MARYLAND

BACKGROUND

The Maryland Agricultural Experiment Station is owned and operated by the University of Maryland College of Agriculture & Natural Resources. The 925-acre facility is home to the University's dairy research program, as well as crop research and waste management use. The facility is located at the intersection of Folly Quarter Lane and Homewood Road in Clarksville, Howard County. The facility is comprised of 29 permanent staff and approximately 51-faculty members who use the facility.

University of Maryland has no expansion plans for this planning period.

The Maryland Environmental Service (MES) operates the water source and treatment systems for the facility. The University staff maintains the water distribution system, the elevated storage tank, and the on-site disposal systems.

WATER FACILITIES DESCRIPTION

A. WATER TREATMENT

The Station's water system consists of two (2) drilled wells, a treatment facility, a 50,000-gallon elevated storage tank, and a distribution network. The treatment plant consists of chemical feed facilities for sodium hypochlorite, a bladder tank, two (2) booster pumps and controls. Please refer to Supplemental Information Section – Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

The Station has two (2) wells. Well No. 1 is located approximately 25 feet from the treatment building. Well No. 2 is located approximately 1,200 feet from the elevated water storage tank. Well No. 2 is currently not in service. There are approximately 3,800 feet of water mains and service lines ranging from 1-inch to 4-inch. Please refer to Supplemental Information Section – Facility Description – WS&D.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the average flow was 12,758 gallons per day. Additional 2010 operations data is included in the Supplemental Information Section – Operation Data

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:

Water Treatment Plant

- The treatment units for Well No. 1 are housed in a 10 ft. long by 8 ft. wide plywood building. The space is limited and the building is in poor condition
- The existing bladder tank is inadequate for the pressure and storage required for an uphill building
- There is no treatment for Well No. 2

Water Source

- Well No. 2 is not in service. There is no backup source available
- Well No. 1 is located in a vault that is a confined space

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility has had no violations in the past 15 years. The location of the well in a vault constitutes a safety hazard (confined space). No additional future regulations are expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

MES has made no capital improvement or critical maintenance requests since it began operating this facility.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

Water Treatment

- Construct a new water treatment building for Well No. 1
- Install additional storage for Well No. 1
- Construct new water treatment facilities for Well No. 2

Water Source

- Backfill the well vault and extend the well above grade with a new, pit less adapter
- Rehabilitate Well No. 2

The above improvements will be part of a Capital Improvement Request. The total projected cost is **$402,000,** which includes design, inspection, testing and construction costs.

Note: The cost estimate is based on 2008 dollars and is subject to change based on implementation schedule, inflation rate, regulatory requirements and other factors that cannot be forecast at the present time

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: 2020
- Construction: Fiscal Year: 2020

SUPPLEMENTAL INFORMATION

AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MARYLAND

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

The waterworks consists of two (2) drilled wells, a treatment facility, a 50,000 gallon elevated storage tank, and a distribution network.

Well No. 1 - The operating well (HO73-0482) was drilled in 1973 and is 200 ft. deep. The well is located in a below grade vault approximately 25 feet from the treatment building. The well is equipped with a submersible pump rated at an unknown capacity. The pump is set at an unknown depth.

Well No. 2 – This well (HO88-2274) was drilled in 1993 to a depth of 520 feet and is located 1,200 feet from the elevated tank. This well has an estimated yield of 30 gpm, but is not in service.

The water distribution system for the Station consists of a 50,000 gallon elevated water storage tank and approximately 38,000 feet of water mains and service lines, ranging from 4-inch to 1-inch. The elevated water storage tank supplies the animal research area and minimal irrigation. The well supplies the remaining parts of the complex.

WATER TREATMENT

The waterworks consist of two (2) drilled wells, a treatment facility; a 50,000 gallon elevated storage tank, and a distribution network.

The treatment building is 12 ft. long by 8 ft. wide. The treatment plant consists of chemical feed equipment for sodium hypochlorite, a bladder tank, two (2) booster pumps, and controls.

The chemical feed facilities for sodium hypochlorite consist of a 55 gallon day tank and a chemical metering pump rated at 30 gpd @100 psi. The treated water is supplied to the complex via an 85-gallon bladder tank and two (2) 2 hp booster pumps. The treated water is stored in a 50,000 gallon elevated storage tank.

Site Name: Agricultural Experiment Station - U of M

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

None

Indicate the Fiscal Year of Previous Funding Rec'd	N/A
Amount of Previous CIP Funding	$0.00
Amount of Current CIP funding	$0.00
Anticipated Date for current CIP funding	N/A
Estimated future CIP funds needed	
FY that CIP funding is needed	

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
76° 57' 57.28" W	39° 38' 45.66" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request

Amount of future MM funding needed

FY that MM funding is needed

Description of MM needs

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Agricultural Experiment Stati...	Water System	UMD	Central

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Agricultural Experiment Station - U of M

Address: 11975-A Homewood Road, Ellicott City, MD 21042

Comments:

Agency: UMD

Region: Central

Average Daily Demand (ADD) (gal/day): 11,787

Peak Day Demand (gal/day): 105,400

WTP Design Capacity: n/a

Total No. of Wells: 2

Average Daily Run Time of Wells (Hrs):

Capacity w/ largest Well Offline:

GW Appro. Permit Number (GAP): HO1974G003(04) ☐ N/A

Total GW. Appro. (GAP) (ave.day) (gal/day): 10,000

% of ADD to GAP: 118%

General Discharge Permit Number:

W/WW Engr. Project Mgt: PB

Location of Asbuilt Drawings or CDs:

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Laura	Gabbard	(410) 799-7339	(443) 569-9648
Lance	Fierro	(410) 799-7339	(410) 271-6156
Bobby	Forsyth	(410) 799-7339	(410) 271-6156

Surface Water Appr. Permit Number: __________(__) ☑ N/A

Surface Water Appr. Amount (SAP) (ave. day) (gal/day): N/A

% of ADD to SAP: N/A

Amount of Water Storage (gallons):

Days of Storage at ADD:

PDWIS WTP Number: 113-0024

Appropriation Permit Exp. Date: 10/1/2010 ☐ N/A

Est. Total length of Water Lines (feet):

Number of permit violations:

Violations

DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit

AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MARYLAND

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER TREATMENT PLANT

Conditional Analysis:
- N/A

Proposed Improvements:
- N/A

WASTEWATER COLLECTION / ON-SITE DISPOSAL

Conditional Analysis:
- N/A

Proposed Improvements:
- N/A

WATER TREATMENT PLANT

Conditional Analysis:
- The facility has two (2) wells but only one is used
- The well is in a vault below a manhole (confined space)
- The water is disinfected with sodium hypochlorite, which is housed in an 8 ft. by 10 ft. plywood building
- The space in the building is limited
- An 85 gallon storage tank in the treatment plant is inadequate for supplying the buildings uphill

Proposed Improvements:
- A new treatment building to replace the existing "shed like" structure with a more substantial building with more space
- Add 500 gallons of storage at the treatment building so that it can supply the nearby buildings for several hours if the line to the tower is interrupted
- Backfill the well vault and extend the well above grade with a new pitless adapter

WATER SOURCE

Conditional Analysis:
- The system is currently relying on single source. If problems arise with the existing well, there is no backup source is available

Proposed improvements:

- The second well (near the Cow barns) is not in service. Complete all work needed to make this well functional and connected to the system
- Build a treatment building for operating the well and treating the water from this well

WATER DISTRIBUTION SYSTEM

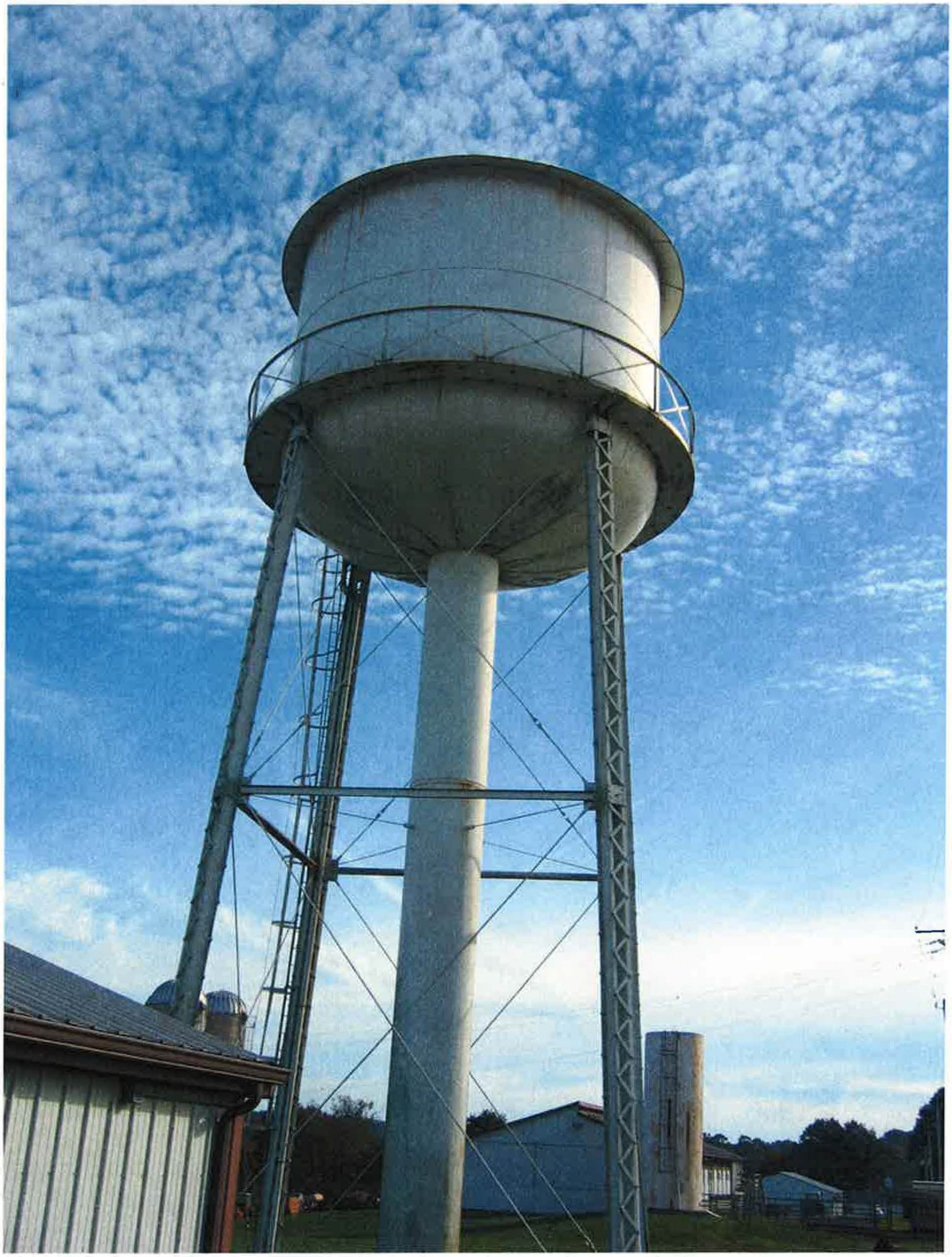
Conditional Analysis:

- Maintained by U of M

Proposed improvements:

- Inspect the elevated tower and paint/ repair as needed

Agricultural Experiment Station



50,000-Gallon Elevated Water Storage Tank


Well Number 1 Treatment Plant Overview

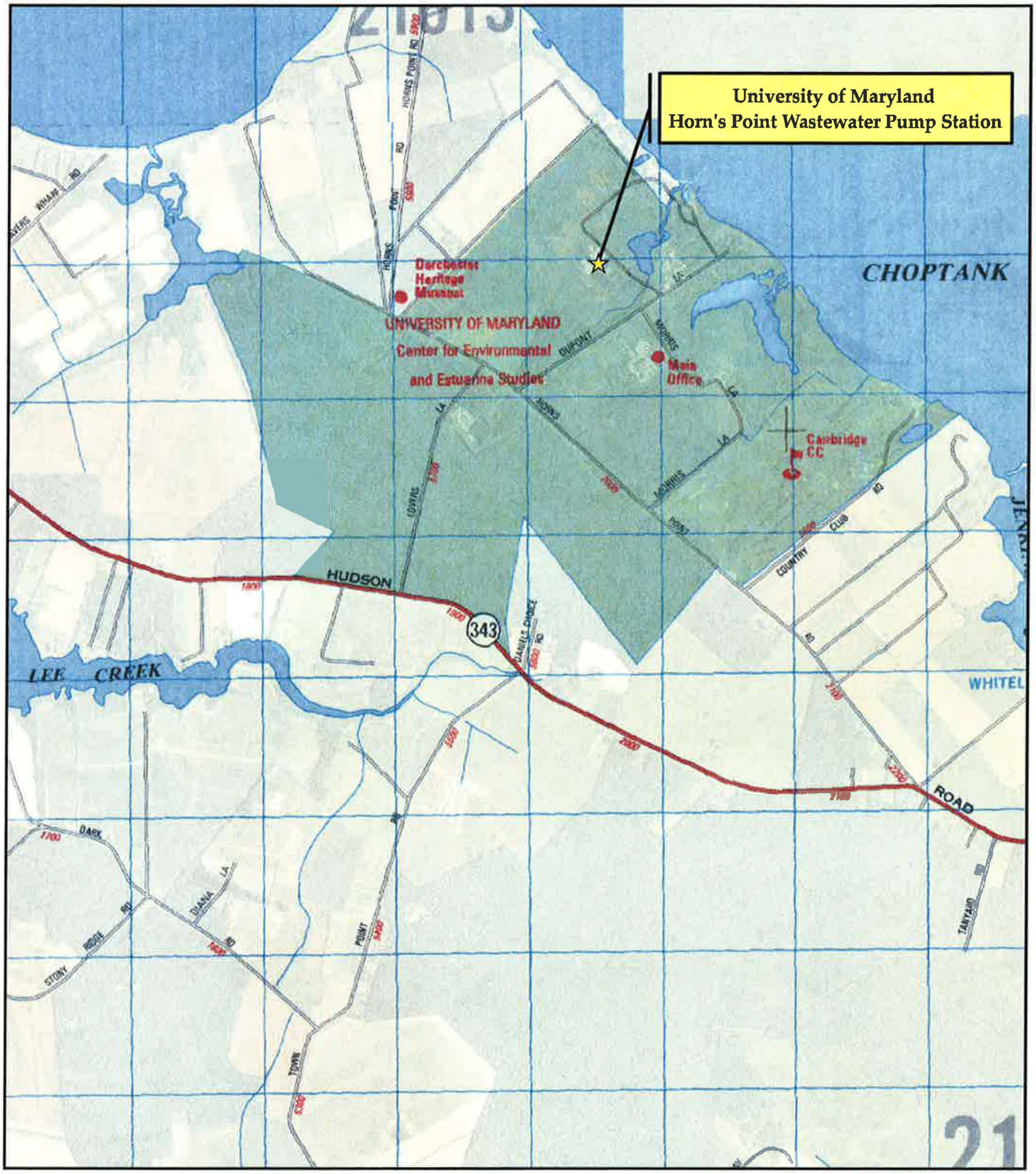
85-Gallon Bladder Tank

Well Number 1 Water Treatment Building

Horn Point Laboratory

University of Maryland

Center for Environmental Science



☆ Sites

Figure 1

Water and Wastewater Master Plan 2008

MARYLAND ENVIRONMENTAL SERVICE

259 Najoles Road
Millersville, MD 21108
(410) 729- 8200

NAD 1983 StatePlane Maryland FIPS 1900 (feet)
Projection: Lambert Conformal Conic
GCS: North American 1983

0 500 1,000 1,500 2,000 2,500
Feet

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HORN POINT LABORATORY
UNIVERSITY OF MARYLAND
CENTER FOR ENVIRONMENTAL SCIENCE

BACKGROUND

The Horn Point Laboratory (HPL) is an environmental research facility of the University of Maryland Center for Environmental Science (UMCES), which is the principal institution for advanced environmental research and graduate studies within the University System of Maryland. This facility is located at Horn Point on the Choptank River, 4 miles west of Cambridge in Dorchester County. HPL has approximately 120 persons, which includes faculty, students, support staff, and maintenance staff. A location map is included in Figure 1.

HPL has approximately 17 buildings including the following facilities:
- Aquaculture & Restoration Ecology Laboratory
- Oyster Hatchery
- Multiscale Experimental Ecosystem Research Center
- Seawater System
- Dormitories

The University System of Maryland has no expansion plans for this planning period.

Maryland Environmental Service (MES) operates the wastewater collection system for UMCES.

WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of a sewage pumping station, seventeen (17) grinder pump stations, and 19,000 ft. of forced mains ranging from 1-½ inch to 6-inches. There is also approximately 1,100 feet of 8-inch gravity sewer. The Horn Point wastewater collection system has been operated by MES since the 1980s. The sewage pumping station discharges into the City of Cambridge Wastewater Treatment Plant. Please refer to Supplemental Information Section – Facility Description - WWCS

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, the Sewage Pump Station average flows were 20,000 gallons per day. Peak flow information is not available. Additional operations data is included in Supplemental Information Section.

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the site assessment for the Master Plan, the following deficiencies were identified:
- There are no provisions to isolate each grinder pump station for repairs

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

This facility has had no violations in the past 15 years. Future regulations are not expected to impact this facility.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

MES has made no capital improvement requests since it began operating this facility. Currently, a critical maintenance request to the Department of General Services (DGS) is being made for $8,930 to replace pumps and piping. This request is waiting for approval. Please refer to Supplemental Information Section – CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

- Install risers and valves in all of the seventeen (17) grinder pump stations.

The above improvements will be part of a Capital Improvement Request. The total projected cost is **$60,000,** which includes design, inspection, testing, and construction costs.

Note: The cost estimate is based on 2008 dollars and is subject to change based on implementation schedule, inflation rate, regulatory requirements and other factors that cannot be forecasted at the present time

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: N/A
- Construction: Fiscal Year 2022

SUPPLEMENTAL INFORMATION

HORN POINT LABORATORY
UNIVERSITY OF MARYLAND
CENTER FOR ENVIRONMENTAL SCIENCE

FACILITY DESCRIPTIONS

WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of a sewage pumping station, seventeen (17) grinder pump stations, 19,000 ft. of forced mains ranging from 1½-inch to 6-inches. Also, there is approximately 1,100 feet of 8-inch gravity sewer. The Horn Point collection system is operated by the Maryland Environmental Service since the 1980s. Sewage pumping stations discharge into the City of Cambridge Wastewater Treatment Plant.

PUMP STATION

Gravity sewer pipes collect wastewater from each individual building. Then, wastewater enters each of the fifteen (15) simplex Hydromatic grinder pump stations and the two (2) duplex Hydromatic grinder pump stations. Each simplex Hydromatic grinder pump station consists of a grinder pump rated at 50 gpm @ 40 ft. TDH with 2 hp motors. Each duplex pump station consists of two (2) grinder pumps rated at 125 gpm @ 70 ft. TDH with 5 hp motors each.

All pump stations discharge raw sewage into the Morris Lane Pump Station via 4-inch forced mains. The raw sewage flows enter the Morris Lane pump station wet well that is 7 ft. in diameter by 10 ft deep. The pump station has two (2) submersible pumps rated at 200 gpm @ 49 ft. TDH with 7.5 hp motors. The wastewater is discharged via 10,750 feet of 6-inch forced main to a manhole on the outskirts of the City of Cambridge. Approximately 1,110 feet of 8-inch gravity sewer main transfers sewage from the manhole to the City of Cambridge Wastewater Treatment Plant.

The Morris Pump Station site has a flow meter, a valve vault, and a 30 KW, 3 phase 240 Volt emergency generator.

Site Name: Horn Point Laboratory

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

Indicate the Fiscal Year of Previous Funding Rec'd

Amount of Previous CIP Funding

Amount of Current CIP funding

Anticipated Date for current CIP funding

Estimated future CIP funds needed

FY that CIP funding is needed

Description of CIP Needs

Facility Location Coordinates: *Latitude* 76° 11' 45.27" W *Longitude* 38° 36' 12.12" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request	N/A
Amount of future MM funding needed	$8,930.00
FY that MM funding is needed	2009

Description of MM needs

-Replace pumps and piping.

Date of facility SWPPP expiration

Date of facility SPCC expiration

Are AST/USTs in compliance with testing reqmts.

Are Security Measures Adequate?

	FacilityName	FacilityType	Agency	Region
Details	Horn Point Laboratory	Wastewater System	UMD	Eastern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: Horn Point Laboratory

Address: 2058 Horns Point Road
Cambridge, MD 21613-3368

Agency: UMD

Region: Eastern

Annual Average Daily Flow (gal/day): 20,000

Peak Day Flow (gal/day): N/A

Ratio Peak Flow to ADD: N/A

WWTP Design/Permit Capacity (gal/day): N/A

% of ADD to Design Capacity: N/A

NPDES Permit Number: ______ N/A

State Permit Number: N/A

NPDES Permit Exp. Date: __/__/____ N/A

W/WW Engr. Project Mgt: MM

Location of Asbuilt Drawings or CDs: 46

WWTP Process Description - List Unit Processes: Appendix A N/A

Sewer Collection Distribution: Appendix B

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
"Buddy" John	Norman	(410) 228-4466	(410) 353-0408
Kenny	States	(410) 228-4466	(410) 980-2635
Craig	Russell	(410) 228-4466	(410) 228-4466

Will future limits be more stringent?

GW Disposal Permit Exp. Date: __/__/____ N/A

Is more land needed for disposal? N/A

No. of Sludge Disposal Options available: N/A

Are additional sludge disposal permits needed? N/A

Number of sludge permit violations: 0

Number of permit violations

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	1/25/1997	TSS	monthly	mg/l	33	30

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
Horn Point	TSS	1/25/1997	monthly	mg/l	33	30	Low mlss	New plant under construction

HORN POINT LABORATORY
UNIVERSITY OF MARYLAND
CENTER FOR ENVIRONMENTAL SCIENCE

CONDITIONAL ANALYSIS AND PROPOSED IMPROVEMENTS

WASTEWATER COLLECTION SYSTEM

Conditional Analysis:

- There are no provisions to isolate each grinder pump station to repair

Proposed Improvements:

- Install riser and valve in all seventeen (17) grinder pump stations

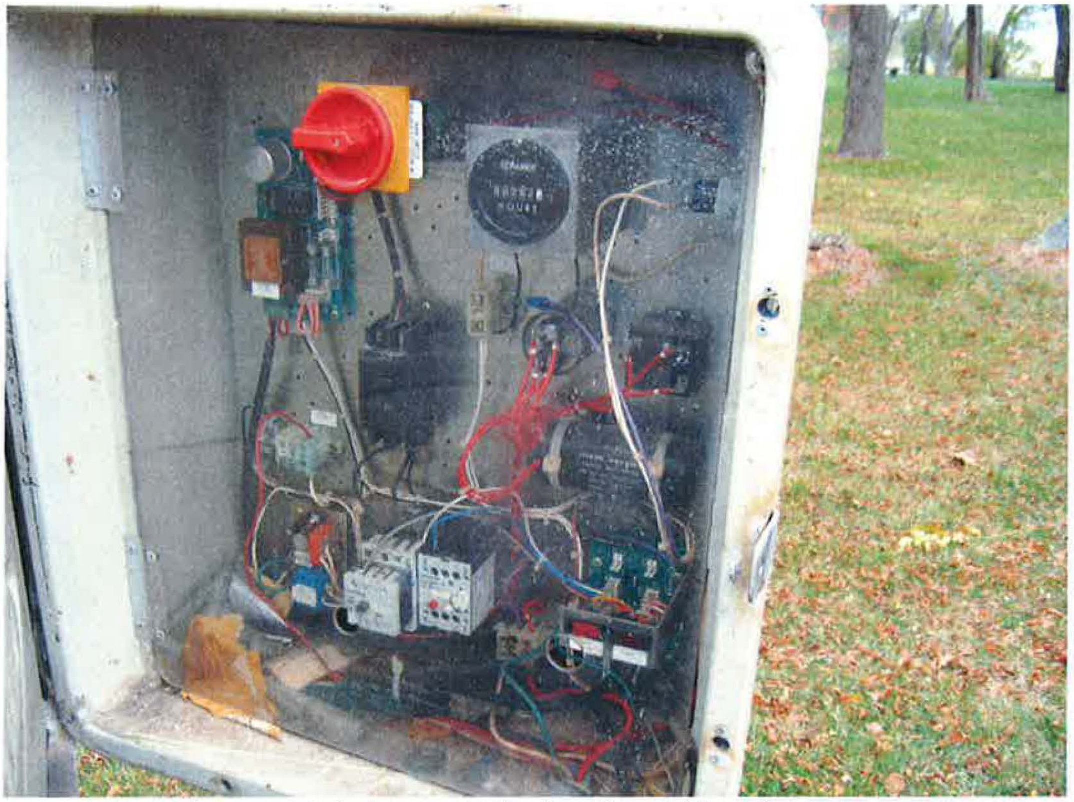
Horn Point Laboratory

Sewage Pump Station

Sewage Pump Station Valves

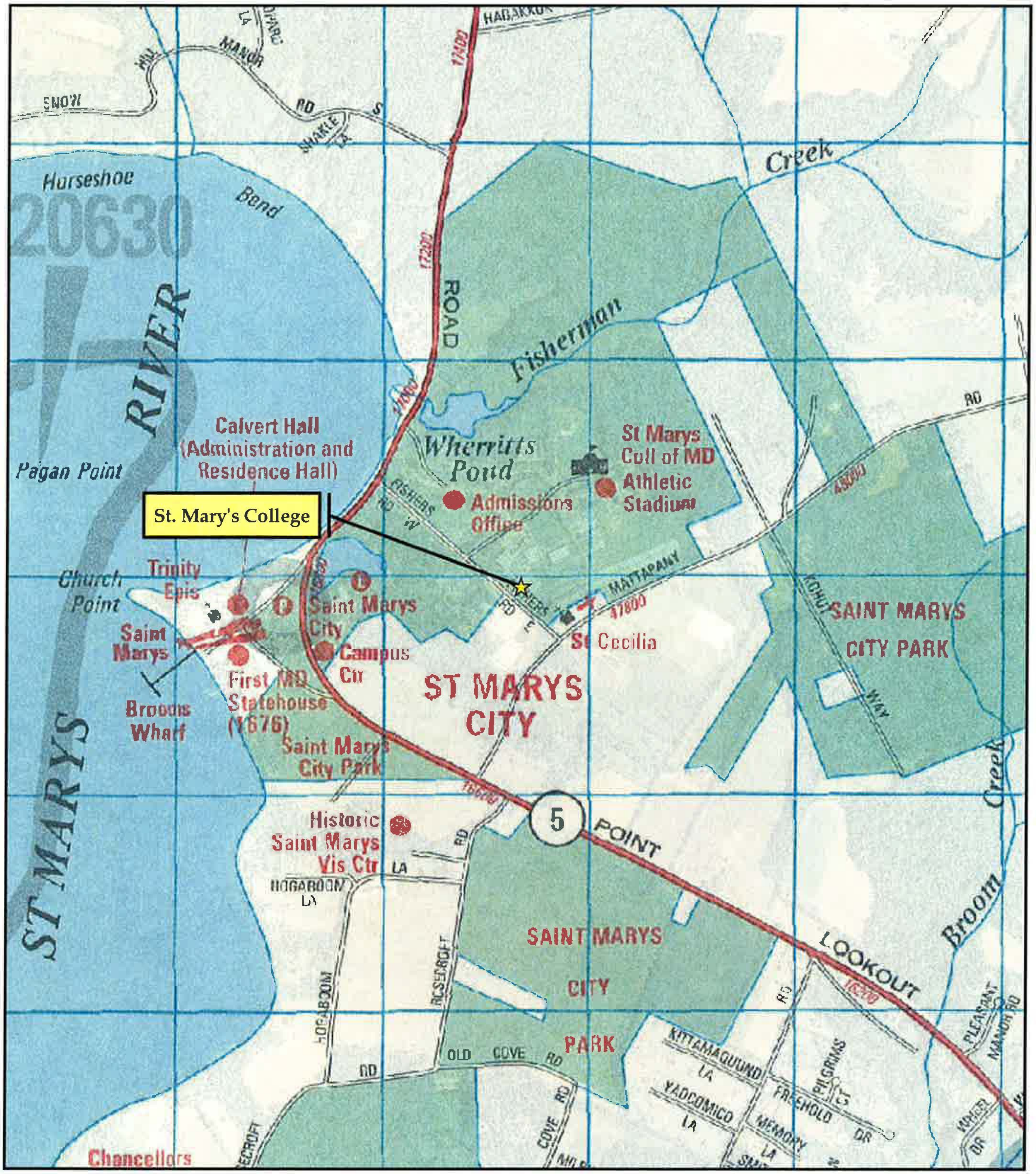
Emergency Generator

Grinder Pump Station



Grinder Pump Station Control Panel

St. Mary's College of Maryland



☆ Sites	Water and Wastewater Master Plan 2008	NAD 1983 StatePlane Maryland FIPS 1900 (feet) Projection: Lambert Conformal Conic GCS: North American 1983
Figure 1	MARYLAND ENVIRONMENTAL SERVICE 259 Najoles Road Millersville, MD 21108 (410) 729- 8200	0 500 1,000 1,500 2,000 Feet I:\GIS\Projects\MES\MES Sites\Sites.mxd

ST. MARY'S COLLEGE OF MARYLAND

BACKGROUND

St. Mary's College of Maryland (SMCM) is an independent, four (4) year college, which offers degrees in the liberal arts. The College is located in St. Mary's City, adjacent to State Route 5, in St. Mary's County. SMCM has approximately 47 buildings, a stadium, a baseball field, a practice field, and an Olympic size swimming pool occupying a 318-acre campus. Current enrollment is approximately 2,000 fulltime and 120 part-time students with approximately 420 faculty and staff members associated with the College.

The college is currently undergoing an expansion and, according to their master plan, the following new facilities and renovations are projected for this campus:

Facility	Area (square feet)	Projected Water Usage (gallons per day)
Student Services Building	26,000	1,300
River Center	11,667	585
Amphitheater	N/A	N/A
Anne Arundel Hall	34,500	1,725
MD Heritage Interpretive Center	15,500	775
Music and Auditorium- 700 seats	115,000	5,750
Calvert Hall	28,500	1,425
New Practice Field	79,200	1,818
Renovation of Bruce Davis Theater	N/A	N/A
Renovation of Montgomery Hall	N/A	N/A
Merging of Maintenance with St. Mary's City	N/A	N/A
New Administration and Visitor Facility (in planning phase)	Not available	Not available

The increase in water demand is expected to be approximately 14,000 gpd with these additions. Current demands are at 116,000 gpd and projected demands are at 130,000 gpd. There is no expected impact on the current capacity of the water and wastewater facilities from these expansions.

Maryland Environmental Service (MES) operates the water source, water treatment, water distribution, and wastewater collection systems. St. Mary's County Metropolitan Commission operates the main sewage pump station that collects wastewater from the entire campus and discharges to the County's wastewater treatment plant.

WATER AND WASTEWATER FACILITIES DESCRIPTION

A. WATER TREATMENT

The SMCM water system consists of three (3) drilled wells, a distinct treatment facility for each well, and a 400,000 gallon elevated storage tank. Well No. I and 5 treatment plants consist of gas chlorine feed units, and the Well No. 6 treatment plant consists of sodium hypochlorite feed facilities. Please refer to Supplemental Information Section - Facility Description - WTP.

B. WATER SOURCE AND DISTRIBUTION

The College has three (3) wells. Well No. 1 is located near the Caroline Hall Parking lot off of East Fisher Road. Well No. 5 is located near Library Building. Well No. 6 is located near the 400,000-gallon elevated water storage tank, which is 425 feet west of Mattapany Road, nearly two miles away from the SMCM Campus. Well Nos. 1 and 6 discharges to a 400,000 gallon elevated water storage tank. Well No. 5 supplies water directly to the distribution network. The water distribution system consists of a 400,000 gallon elevated water storage tank and approximately 20,835 feet of water mains and service lines ranging from 3-inches to l6-inches. Please refer to Supplemental Information Section - Facility Description - WS&D.

c. WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of two (2) grinder sewage-pumping stations, approximately 1,600 feet of force mains, 9,000 feet of gravity sewer pipes, and approximately 60 manholes. Please refer to the Supplemental Information Section - Facility Description - WWCS.

EXISTING CONDITIONS OF WATER AND WASTEWATER FACILITIES

A. 2010 OPERATIONS INFORMATION

In 2010, average and peak water flows were 106,550 gallons per day and 359,350 gallons per day, respectively. Additional 2010 operations data is included in Supplemental Information Section - Operation Data

B. OPERATIONAL AND INFRASTRUCTURE DEFICIENCIES

During the 2008 site assessment for the Master Plan, certain deficiencies were observed and MES has recently retained the services of an A/E firm to design the improvements to the water system. The following deficiencies were identified:

Water Distribution System

- The water distribution for the old campus has bottlenecks
- The water distribution of the newly constructed facilities are not looped with the old system to provide uninterrupted supply of water in the event of a water main break
- Fire flows are not adequate in certain areas of the campus

Water Treatment Plants

- The flow meter for Well No. 1 is not operating properly
- All wells are not interconnected in such way that can be operated in an automated mode

REGULATORY COMPLIANCE HISTORY AND FUTURE REGULATORY CONSTRAINTS

Overall compliance history of the St. Mary's College water facilities has been generally satisfactory. Future regulations are not expected to impact water facilities for the College.

CAPITAL IMPROVEMENT AND MAJOR MAINTENANCE FUNDING HISTORY

In the period between 1993 and 1994, $325,000 in capital improvement requests were made for the design and construction of water system improvements. In the period between 2003 and 2004, $800,000 in capital improvement requests were made for the design and construction of water distribution and wastewater collection system improvements. Please refer to Supplemental Information Section - CIP and Critical Maintenance Funding History.

COST ANALYSIS AND RECOMMENDED IMPROVEMENTS

During the site assessment for the Master Plan, the following improvements were identified and recommended:

Water Distribution System

- Looping across St. Johns Pond
- Looping to Mattapany Road
- Looping along Fishers Road West and Route 5
- New service to the Admissions building
- Loping the Admissions building and the wastewater pumping station
- Looping at St. Mary's Hall
- Looping across the Townhouse Green & Student Residences
- Replace 3-inch piping at Townhouse Green & Student Residences
- Looping at Student Pavilion/Stadium

Water Treatment Plants

- Replace flow meter at Well No. 1
- Install controls to automate the operation of all wells

The above improvements will be part of a Capital Improvement Request. The total projected cost is **$636,000 (based on 2010 dollars)** which includes design, inspection, testing and construction costs.

SCHEDULE OF IMPLEMENTATION OF IMPROVEMENTS

The recommended improvements will be implemented according to the following schedule:

- Planning and Design: 2010
- Construction: Fiscal Year 2017

SUPPLEMENTAL INFORMATION

ST. MARY'S COLLEGE OF MARYLAND

FACILITY DESCRIPTIONS

WATER SOURCE AND DISTRIBUTION SYSTEM

St. Mary's College has three (3) wells, a treatment facility for each individual well, a 400,000-gallon elevated water tank, and a water distribution network.

Well No. 1 - This source is located near the Caroline Hall Parking lot, off of East Fisher Road. The well, drilled in 1984, is 8-inches in diameter and has a total depth of 580 feet. It is provided with an 8-inch steel casing and 8-inch screen. The well has a presumed yield of 150 gpm. The well is equipped with a 15 hp submersible pump rated at 75 gpm. The static water level is at 91 feet. The pump is set at 280 feet and was installed in 1984.

Well No. 5 - This well is located near the Library building. The well, drilled in 1999, is 8-inches in diameter and has a total depth of 550 feet. It is provided with 8-inch casing. The well yield and drawdown test indicates a presumed yield of 201 gpm. A 15 hp submersible pump, manufactured by Goulds, which is capable of delivering 125 gpm @ 340 ft. TDH, pumps water from the well. The static water level is at 116 ft. The pump is set at 231 ft. and was installed in 1999.

Well No. 6 - This well is located near the 400,000 gallon elevated water storage tank, which is 425 feet west of Mattapany Road, nearly two (2) miles away from College Campus. The well, drilled in 2005, is 8-inches in diameter and has a total depth of 625 feet. It is provided with 8-inch casing and 8-inch screen. The well yield and drawdown test indicates a presumed yield of 258 gpm. A 40 hp submersible pump, manufactured by Goulds, which is capable of delivering 250 gpm, pumps water from the well. The static water level is at 204 ft. The pump is set at 336 ft. and was installed in 2005.

Well Nos.1 and 6 discharges to a 400,000-gallon elevated water storage tank. Well No. 5 supplies water directly to the distribution network.

The 400,000 gallon elevated water storage tank provides water to the Campus by gravity. The tank is 87 feet high and has an 8-inch overflow pipe. The overflow elevation is 184 feet and the grade elevation is 97 feet. The inlet/outlet pipe is 12-inch.

The water is distributed via 4,020 ft. of 16-inch diameter ductile iron transmission main that runs parallel to Mattapany Road from the elevated tank to the Main Campus. The distribution mains within the campus are predominantly 12-inch and 8-inch diameter cast iron pipes. Each building is served by individual service lines, ranging from 4-inches to 6-inches in diameter. The total length of the distribution system is approximately 20,835 feet.

WATER TREATMENT

The waterworks consist of three (3) drilled wells, with a distinct treatment facility for each well, and a 400,000 gallon elevated storage tank.

The treatment building for Well No. 1 is a concrete building; 20 ft. long by 12 ft. wide, and has two (2) separate rooms. One of the rooms' house chemical feed facilities and the other room houses electrical controls. The gas chlorine feed facilities are rated at 40 ppd. The gas chlorination facilities include 150 lb cylinders, a booster pump, a vacuum regulator, an automatic switchover, an ejector, a rotometer, a solenoid valve, a gate valve, a pressure gauge, a cylinder repair kit, panic hardware, a chlorine scale, a vent, a leak detection alarm, an outside entrance/exit, and cylinder chains. Gas chlorine is injected in piping through an underground valve pit.

The treatment facility for Well No. 5 consists of gas chlorine feed facilities rated at 40 ppd. The gas chlorine feed facilities are housed in one room of a brick building, which is 16 ft. long and 12 ft. wide. The gas chlorination facilities include 150 lb. cylinders, a ¾ hp booster pump, a vacuum regulator, an automatic switchover, an ejector, a rotometer, a solenoid valve, a gate valve, a pressure gauge, a cylinder repair kit, panic hardware, a chlorine scale, a vent, a leak detection alarm, an outside entrance/exit, and cylinder chains. The second room of the building houses electrical controls and a hydropneumatic tank that is 4.5 ft. long and 3.5 ft. in diameter and has a rated volume of 300 gallons.

The treatment facility for Well No. 6 is located in the base of the 400,000-gallon elevated water tank, and consists of a chemical feed facility for the sodium hypochlorite feed. The chemical metering pump and the day tank are housed in the base of the tank in a separate room, which is 13 ft. long and 10 ft. wide. The room is equipped with an exhaust fan, a heater, and a dampener. The sodium hypochlorite is stored in a 35 gallon day tank and is fed by a chemical metering pump rated at 2 gph @ 50 psi. An additional 385 gallons of liquid sodium hypochlorite is stored on site. There is a separate room in the base of tank that houses the motor control center, an exhaust fan, a heater, a flow totalizer, and the transformer. The flow meter is housed in the piping room.

WASTEWATER COLLECTION SYSTEM

The wastewater collection system consists of two (2) grinder sewage-pumping stations, approximately 1,600 feet of force mains, 9,000 feet of gravity sewer pipes, and approximately 60 manholes. The SMCM wastewater collection system is operated by MES. All of the sewage pumping stations discharges into the Main Submersible Pump Station, which is owned and operated by St. May's County Metropolitan Commission.

Grinder Pump Station No.1

The pump station is a below grade structure located at the Commons complex. The station has two (2) grinder pumps manufactured by Myers, and is rated at 80 gpm @ 40 ft. TDH with 3 hp motors each. The wet well is 10 feet in diameter and 10 feet deep.

Grinder Pump Station No.2

The pump station is a below grade structure located near the Physical Plant. The station has one (1) grinder pump rated at 30 gpm @ 70 ft. TDH with a 2 hp motor. The wet well is 2 feet in diameter and 6 feet deep.

Site Name: St. Mary's College of Maryland

Background

File Link to Facility Photos

...

Open

Describe CIP of MM work currently in progress

-Design and construct improvements to the wastewater pumping station.
-Design and construct improvements to the water distribution and

Indicate the Fiscal Year of Previous Funding Rec'd	1994
Amount of Previous CIP Funding	$325,000.00
Amount of Current CIP funding	$800,000.00
Anticipated Date for current CIP funding	2004
Estimated future CIP funds needed	
FY that CIP funding is needed	

Description of CIP Needs

Facility Location Coordinates:

Latitude	Longitude
76° 25' 15.89" W	38° 16' 52.50" N

Conditional Analysis

CIP Funding

Description

MM Funding

Amount of Current Major Maint. funding request	
Amount of future MM funding needed	
FY that MM funding is needed	

Description of MM needs

Date of facility SWPPP expiration	
Date of facility SPCC expiration	
Are AST/USTs in compliance with testing reqmts.	
Are Security Measures Adequate?	

	FacilityName	FacilityType	Agency	Region
Details	St. Mary's College of Maryland	Water System	SMC	Southern

Select type of New Facility: Water System | Wastewater System | Onsite Sewer Disposal System | Other System

Facility Name: St. Mary's College of Maryland

Address
18952 E. Fisher Road
St. Mary's City, MD 20686

Comments:

Agency: SMC

Region: Southern

Average Daily Demand (ADD) (gal/day)	120,155
Peak Day Demand (gal/day)	674,000
WTP Design Capacity	792,000
Total No. of Wells	3
Average Daily Run Time of Wells (Hrs)	9.0
Capacity w/ largest Well Offline	641,000
GW Appro. Permit Number (GAP)	SM1969G001(05) ☐ N/A
Total GW. Appro. (GAP) (ave.day) (gal/day)	130,000
% of ADD to GAP	92%
General Discharge Permit Number	06HT5039

W/WW Engr. Project Mgt: PT

Location of Asbuilt Drawings or CDs: 54

WTP Process Description - List Unit Processes: Appendix C

Water source and Distribution System Description: Appendix D

Cost Analysis: Link

Contact(s):

FirstName	LastName	OfficeNumber	WorkNumber
Eric	Barnes	(301) 872-4401	(301) 980-2902
Sylvester	Ball	(301) 884-5593	(301) 536-5901
Sibaji	Bandyopadhyay	(301) 872-4401	(410) 315-0013

Surface Water Appr. Permit Number	☑ N/A
Surface Water Appr. Amount (SAP) (ave. day) (gal/day)	N/A
% of ADD to SAP	N/A
Amount of Water Storage (gallons)	400000
Days of Storage at ADD	3.3
PDWIS WTP Number	018-0013
Appropriation Permit Exp. Date	10/1/2014 ☐ N/A
Est. Total length of Water Lines (feet)	
Number of permit violations	

Violations

	DateVio	Parameter	Duration	Units	ReportedValue	PermitLimit
Details	1/3/2006	Coliform	daily	mg/l	present	absent

COMPLIANCE HISTORY

Facility	Parameter	Date	Duration	Units	Reported Value	Permit Limit	Description/Cause of Violation	Corrective Action
St. Mary's College WTP	Coliform	1/3/2006	daily	mg/l	present	absent		

St. Mary's College of Maryland

Requesting Agency	CIP Request Date/ Year	CIP Request Amount	Type of Upgrade
USM	1987	$7,275,000	Alter and construct addition to Baltimore Hall.
USM	1989	$580,000	Purchase capital equipment for alterations and addition to Baltimore hall.
USM	1990	$10,814,000	Construct a new academic building.
USM	1995	$381,000	Prepare detialed plans for alterations to Kent Hall.
USM	1996	$4,045,000	Construct alterations to Kent Hall.
USM	1997	$775,000	Provide additional construction funds and purchase capital equipment for the alterations to Kent Hall.
USM	1997	$585,000	Relocate and improve atheltic fields to provide space for the expansion of Somerset Hall.
USM	1999	$11,000,000	Provide additional funds to complete detailed plans and a portion of the funds to construct alterations and an addition to Somerset Hall.
USM	2000	$1,087,000	Provide additional funds for design, renovation and expansion of Somerset Hall.
SMCM	2001	$2,072,000	Provide preliminary design funds for a new student services building and to construct related stie improvements.
SMCM	2001	$981,000	Provide preliminary design f unds for a new academic building.
SMCM	2001	$980,000	Provide funds for hazardous material abatement in Calvert Hall.
SMCM	2002	$1,443,000	Provide funds to prepare detailed design for the new Academic Building and the extension of utilities to other campus facilities.
SMCM	2002	$2,167,000	Provide supplemental construction funds to renovate Somerset Hall.
SMCM	2002	$1,087,000	Provide supplemental funds for design, renovation and expansion of Somerset Hall.
SMCM	2002	$415,000	Provide funds to prepare detailed plans for the construction of a new Student Services Building and additional funds for the construction of a new parking lot and the realignment of the access road.
SMCM	2003	$1,900,000	Provide funds to demolish the existing water tower, construct a replacement tower, and construct the Student Services Building.
SMCM	2003	$1,150,000	Provide additional construction funds and a portion of the funds to equip Somerset Hall.
SMCM	2003	$2,299,000	Provide funds to construct and equip a new duct bank to serve the north campus of the College.
SMCM	2004	$8,109,000	Provide funds to construct the new Student Services Building.
SMCM	2004	$18,576,000	Provide funds to construct the new Academic Building.
SMCM	2005	$3,300,000	Provide additional funds to construct the new Academic Building.
SMCM	2006	$8,600,000	Provdie funds to supplement previous appropriations to construct the new Student Services Building.
SMCM	2006	$1,050,000	Provide funds to equip the new Academic Building.
SMCM	2007	$1,077,000	Provide funds to equip the new Academic Building.
SMCM	2008	$2,402,000	Provide funds to renovate and equip the Bruce David theater.
SMCM	2008	$1,195,000	Provide funds to equip the new Student Services Building.
	Total:	**$95,345,000**	
MES	1993	$30,000	Design improvements to water system.
MES	1994	$295,000	Construct improvements to water system.
MES	2003	$362,000	Design and construct improvements to the wastewater pumping station.
MES	2004	$438,000	Design and construct improvements to the water distribution and wastewater collection system.

Total: **$1,125,000**

ST. MARY'S COLLEGE OF MARYLAND

CONDITIONAL ANAYLYSIS AND PROPOSED IMPROVEMENTS

WATER TREATMENT PLANT

Conditional Analysis:
- Well No. 1 flow meter is not operating properly
- All wells are not connected to operate automatically

Proposed Improvements:
- Replace flow meter at Well No. 1
- Install controls to automate operations of wells

WATER SOURCE

Conditional Analysis:
- Operating satisfactorily

Proposed Improvements:
- None

WATER DISTRIBUTION

Conditional Analysis:
- Water distribution of old campus has bottlenecks
- Water distribution of newly constructed facilities are not looped with old system to provide water in event of break of pipelines
- Fire flows are not adequate in certain areas of the campus

Proposed Improvements:
Water distribution improvements:
- Looping across St. Johns Pond
- Looping to Matapany Road
- Looping along Fishers Road West and Route 5
- New Service to Admissions building
- Loping Admissions building and wastewater pumping station
- Looping at St. Mary's Hall
- Looping across Townhouse Green & Student Residences
- Replace 3-inch piping at Townhouse Green & Student Residences
- Looping at Student Pavilion/Stadium

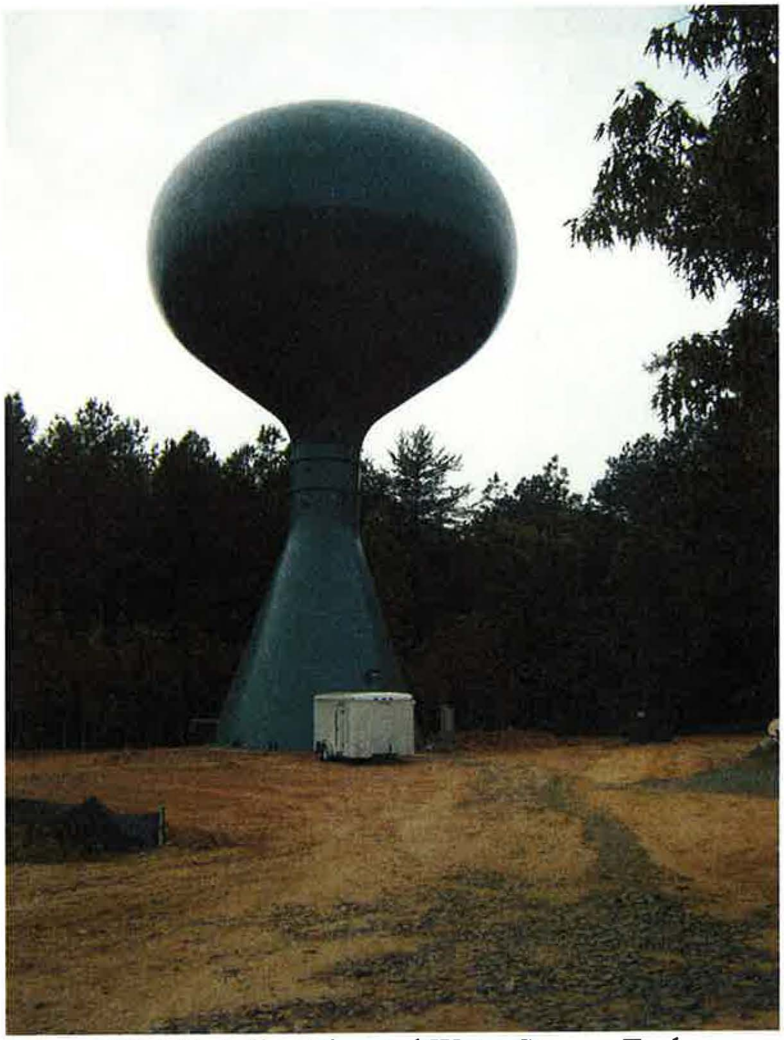
St. Mary's College of Maryland

WTP

Well Number 6

Sodium Hypochlorite Feed at Well Number 6

WTP



400,000-Gallon Elevated Water Storage Tank

WTP

Well Number 5 Treatment Overview

WTP

Well Number 1

Well Number 1 Treatment Building

WTP

Gas Chlorine for Well Number 1

WWTP

Grinder Pump Station