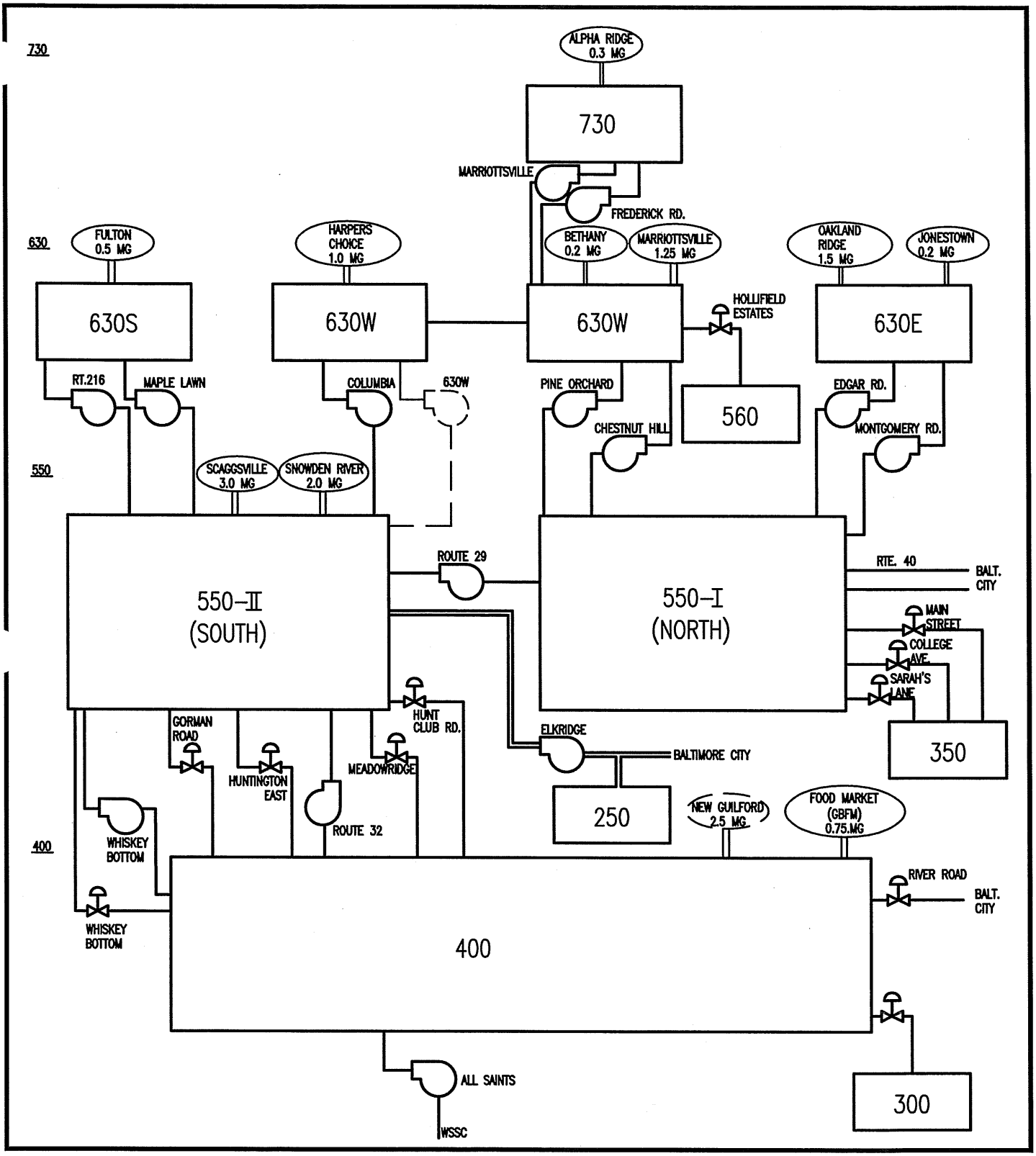


Whitman, Requardt & Associates, LLP 801 South Caroline Street, Baltimore, Maryland 21231	**Client** **HOWARD COUNTY, MD.**	**WATER SYSTEM SCHEMATIC**
Scale: NTS	**Date: NOV 2015**	**FIGURE 3-1**

Water Pressure Zones

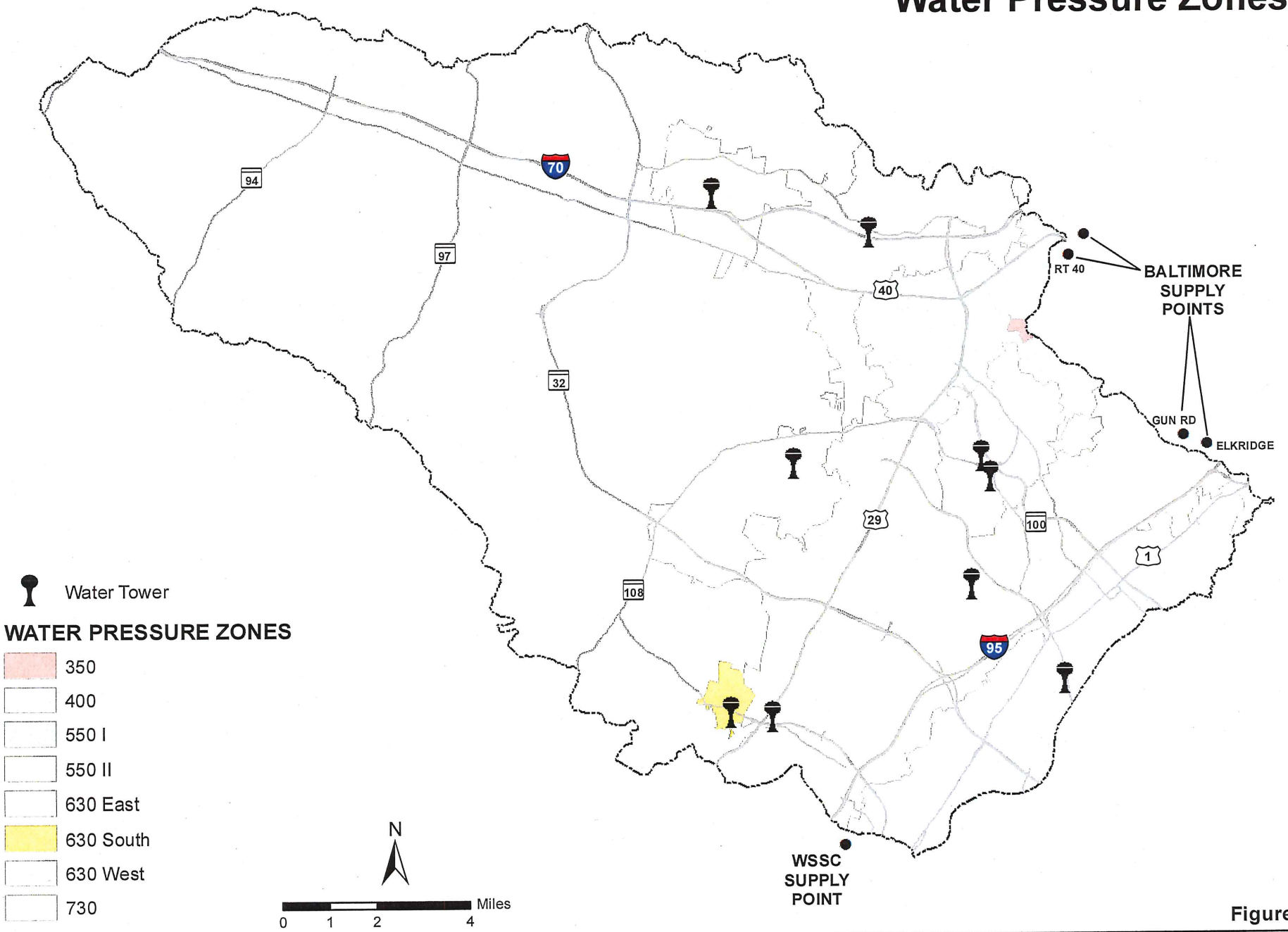
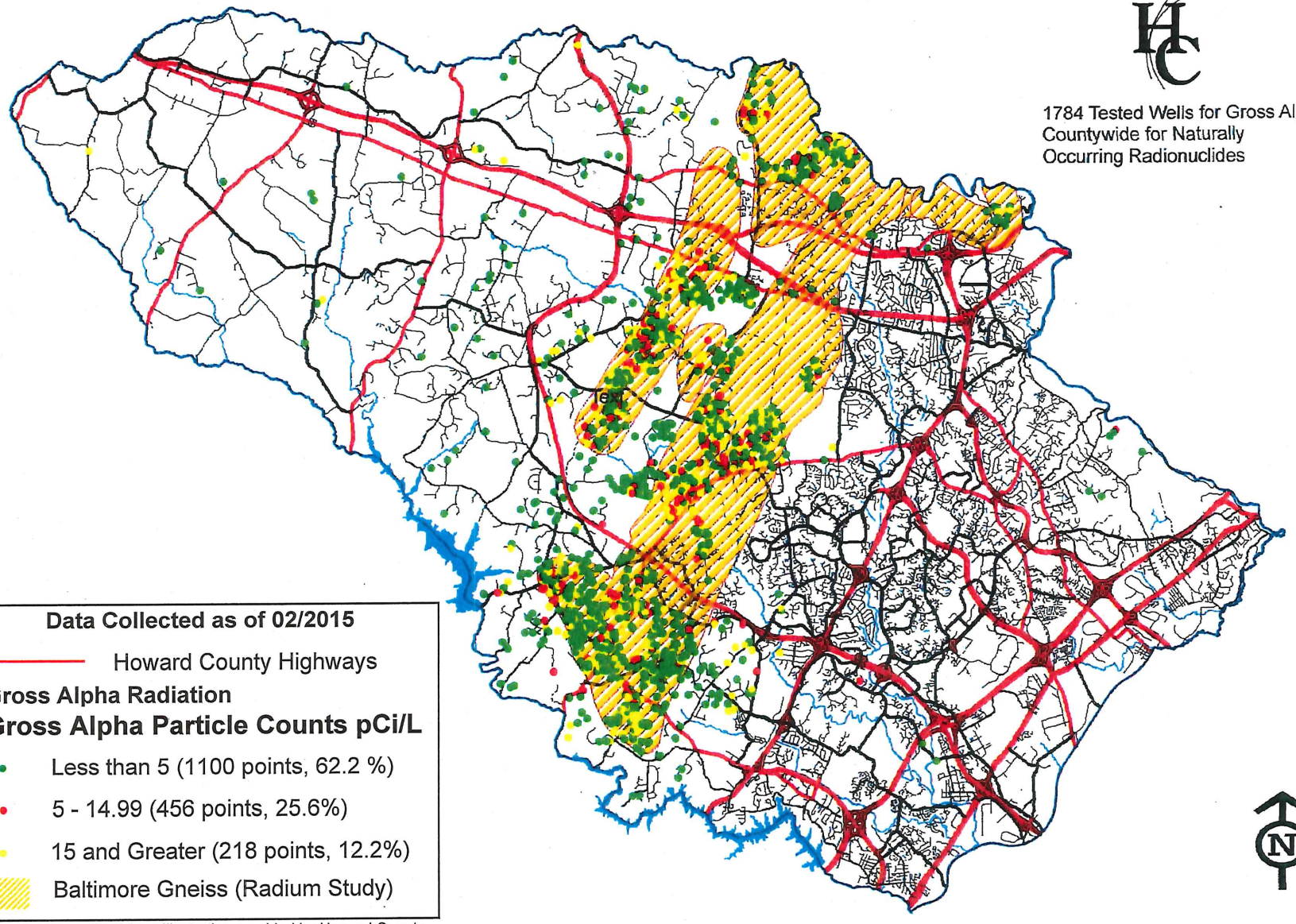


Figure 3-2

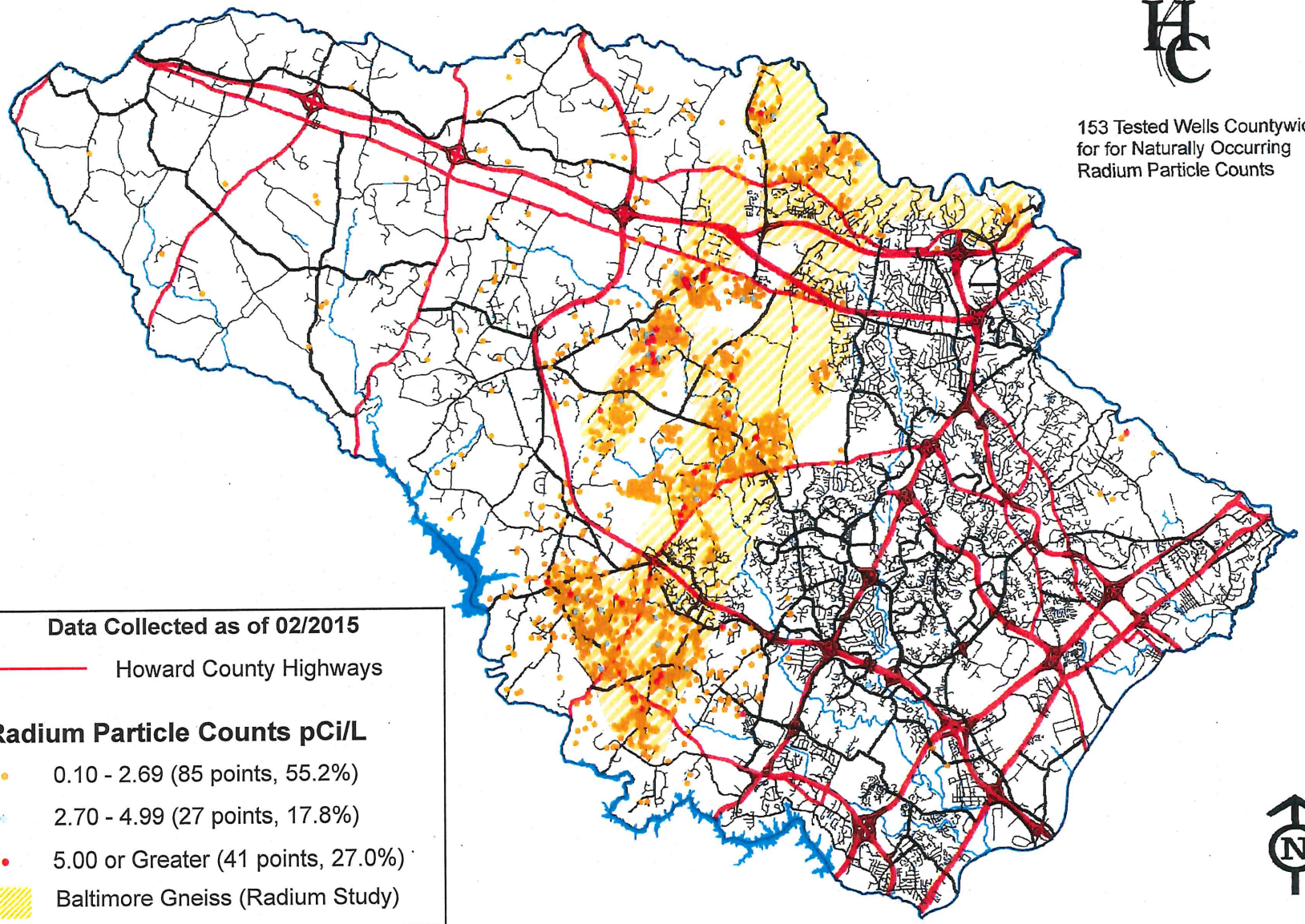
Howard County Health Department; Bureau of Environmental Health
On-Going Well Radium Project (Gross Alpha Radiation)



Note: Figure modified from Illustration provided by Howard County Health Department Public Information Act Request response dated 3/16/2015

FIGURE 3-3

Howard County Health Department; Bureau of Environmental Health
On-Going Well Radium Project (226/228 Particle Counts)



Note: Figure modified from Illustration provided by Howard County Health Department Public Information Act Request response dated 3/16/2015

FIGURE 3-3A

CHAPTER 4

THE SEWERAGE PLAN

4.1 General

Presently, sewage flows in the County's public system are divided between two service areas. These two areas are:

(1) The Patuxent service area, served by Howard County's Little Patuxent Wastewater Reclamation Plant (LPWRP) on the Little Patuxent River.
(2) The Patapsco service area, served by the Patapsco Interceptor which flows to Baltimore City's Patapsco Wastewater Treatment Plant.

Since a portion of Howard County is located in the Patapsco service area, planning for sewage disposal must take into consideration the planning of neighboring counties and Baltimore City. The remaining sewage not collected by the public system is disposed of utilizing private systems, including both individual and shared sewage disposal facilities.

4.2 Sewerage Collection & Treatment Requirements

The annual average daily sewage contribution to Howard County's public sewer system in 2013 was 25.5 MGD. Approximately 19.7 MGD of flow was generated in the Patuxent drainage basin, and approximately 5.8 MGD was generated in the Patapsco drainage basin. The public sewer system serves approximately 85.6% of the County's population. By the year 2040, the public sewer system is expected to serve approximately 86.0 % of the County population. This slight variation in the percentages is considered to be "no significant change" to the projected distribution of public sewer service throughout the County during the planning period. The projected population served by the system is illustrated in Chapter 2, Table 1B.

Table 9 shows the projected sewage flows and planned treatment capacity through the year 2040 for each of the major sewer service areas. Sewer service area boundaries have been adjusted following the 2011 Master Plan to match the drainage area boundaries developed for the sewer hydraulic model and improve the accuracy of flow projections.

The area served by the Route 108 Pump Station is identified separately from the Patuxent and Patapsco service areas. Normally, flow from the Route 108 Pump Station service

area is conveyed by gravity sewer to the Little Patuxent Interceptor sewer and the Little Patuxent Water Reclamation Plant. Under adverse conditions, however, when treatment capacity at the LPWRP is limited due to factors such as plant construction, process operational limitations or abnormally high flows, the flow from the Route 108 Pump Station service area may be diverted and pumped to the Patapsco service area for treatment at the Patapsco Wastewater Treatment Plant. The Route 108 Pump Station is maintained in standby service for use as needed.

Table 9A provides a detailed breakdown of the average flows for the sub-areas that comprise the major service areas. The locations at which the sub-area flows were computed are shown on the SEWER FACILITIES PLAN MAP included in EXHIBIT 2. The projections of average daily sewage flows for the years 2015 through 2040 that appear in Table 9A are based on population and land use projections obtained from the Department of Planning & Zoning for statistical areas where sewer service is planned.

The average daily Inflow & Infiltration (I&I) flow component for 2013 was computed using the difference between the total average daily flow recorded at the County's revenue meters (sewage and all extraneous flow) and the average daily base flow during non-rainfall periods (sewage only), which was computed based on water use from the water account billing records reported in the January 2014 Water & Sewer Allocation Report.

Sewage flow projections utilized in the evaluations for the sewer hydraulic model were developed based on (1) the data collected during flow monitoring programs that took place in 2001 and 2010, and (2) the water use records for the corresponding winter quarters for 2001 and 2010. The population and development projections from DPZ were used to allocate future growth and development. The data from the existing water records, flow monitoring results and DPZ population and development projections were combined with infiltration and inflow data to develop the flow inputs for the hydraulic model using XP-SWMM software. Future residential flows were peaked based on the results of the flow metering programs and the future commercial and future industrial flows were peaked based on a synthetic diurnal pattern. The maximum infiltration and inflow utilized in the model evaluations is assumed to equal that experienced during the extreme wet weather/snowmelt event that occurred March 12–14, 2010.

It is anticipated that infiltration and inflow will be controlled through the County's regular infiltration/inflow maintenance program. This program includes flow monitoring in interceptors and collectors, smoke testing to detect inflow sources, and televised inspection of sewer lines to detect other sources of extraneous flow. Corrective measures such as sewer TV inspection, test and seal grouting, mainline sewer relining, manhole

repair, and lateral/line repair are implemented when excessive extraneous flows are found. Additional major line rehabilitation will be performed as part of the infiltration and inflow program.

In response to EPA Regulations, the Howard County Council passed, and the County Executive signed into law, two sections of the Howard County Code to regulate sewer system flows and user charges. These Code sections, which are updated on a timely basis, establish sewer use charges, excess strength surcharges, and industrial pretreatment requirements.

Howard County received EPA approval of its user charge/surcharge program and established a surcharge recovery system for the Patapsco service area in cooperation with Baltimore City.

The purpose of the User Charge Program is to recover costs for operation and maintenance of the wastewater treatment and conveyance system. Each user's charge depends upon the volume of flow discharged. For industrial sewer system users there is an additional sewer use surcharge if their wastewater discharges have concentrations of suspended solids, biochemical oxygen demand or phosphorus greater than that normally found in domestic sewage.

A. Pre-treatment Program

Industries desiring to connect to the system are evaluated on a case-by-case basis. If the quantity or quality of the industry's discharge would interfere with or otherwise adversely affect the treatment capabilities of the treatment plant; or if the discharge contains materials which would damage the conveyance system or components of the treatment process; or if pretreatment standards would be violated, the County will require pretreatment of the waste prior to discharge.

The requirements for pretreatment are established by the County, based in part on standards developed by EPA. Local standards have been developed to protect operation of the Little Patuxent Water Reclamation Plant and to control the quality of sewage biosolids produced. The biosolids, which are primarily disposed of by surface application on agricultural land, must conform to contamination limitations established by regulations of the Maryland Department of the Environment (MDE).

Howard County began development of its Pretreatment Program in June, 1982. The Program was approved by MDE in August, 1985 and has since undergone periodic updates with current modifications being implemented as part of the Howard County

Consent Agreement with MDE (See paragraph below). The development of discharge standards is coordinated with Baltimore City so waste discharges to the Patapsco sewerage system will meet requirements established by the City. Details related to program operation may be found in the three volume report titled Howard County Industrial Wastewater Pretreatment Program. The bio-solids program for Howard County currently relies on the production of a Class A sludge (refer to Sludge Disposal section of this chapter).

B. Sewer Service Priority Categories

As specified in Chapter 1, parcels of property in the Planned Service Area are assigned sewer service priorities. Periodically, the Master Plan is amended to account for changes in service priorities as a result of subdivision and land development activity and capital construction. The SEWER FACILITIES PLAN MAP and the accompanying Table of Sewer Facilities Map Revisions provided in EXHIBIT 2 have been revised and updated to show service priority revisions for County capital and private development activities through December 2014. The following types of revisions have been incorporated into the 2015 Water & Sewer Master Plan and shown on the SEWER FACILITIES PLAN MAP:

1. Changes in Capital Project Scopes and Schedules- As capital projects progress from the planning phase to construction, the priority designations assigned to the properties served by these projects must be updated. The criteria for determining the appropriate priority designations are described in Chapter 1.

2. Changes in Status of Private Development- As planned private development progresses through the plan review and approval processes administered by the Department of Planning & Zoning (DPZ), the Master Plan priority designations for affected properties must be revised and updated in accordance with Chapter 1 criteria. These revisions are of particular importance since MDE will only approve water or sewer construction permits for proposed development that is assigned a priority that specifies service within five years.

3. Entries into or Removals from the Metropolitan District- Properties that have been incorporated into the Metropolitan District, or removed from the Metropolitan District require revision of the Metropolitan District boundaries shown on the Sewer Facilities Plan Map.

4. Addition to the Planned Service Area- Properties that have been added to the Planned Service Area in accordance with amendments to the Howard County General Plan 2000 and adoption of PlanHoward 2030 are incorporated into the Planned Service Area for Sewerage to provide consistency with the General Plan. Refer to the Planned Service Area section of Chapter 1.

4.3 Consent Agreement

In March of 2010, the Howard County Department of Public Works (DPW) entered into a Consent Agreement with MDE to take corrective actions on its sanitary sewer collection and treatment system in order to prevent sanitary sewer overflows (SSO's). Howard County agreed to a series of corrective measures including the development of a Capacity, Management, Operation, and Maintenance (CMOM) program along with performing Sanitary Sewer Evaluation Surveys (SSES) for each of its drainage basins.

As part of the CMOM program, DPW is proactively performing a systematic sewer cleaning, inspection, televised inspection, smoke testing, flow monitoring, and repair program based on metrics developed in the CMOM manual. The manual was submitted to and approved by MDE on June 30, 2011, and is currently being implemented. Howard County DPW created a full time position of "CMOM Manager", who along with an outside consultant is responsible for complete program development and insuring that milestones in the approved CMOM are being met. In-house DPW maintenance crews as well as outside contractors perform the necessary field work to insure compliance.

DPW also retained the services of two (2) outside consultants to conduct Sanitary Sewer Evaluation Surveys (SSES) for each of its drainage basins. The SSES for the Little Patuxent basin was submitted to MDE in May of 2010, and the Hammond/Guilford and Patapsco studies were submitted in 2011. Work identified in the LP basin SSES is underway. Construction of the new Little Patuxent Parallel sewer was completed in 2014. Various manhole and sewer deficiencies identified in the Little Patuxent SSES, as well as deficiencies discovered in the Hammond/Guilford and Patapsco/Deep Run basins are being corrected under the CMOM implementation program.

In addition to the SSES projects, flow monitoring programs utilizing hydraulic modeling and field flow measurements are being used to identify various sewer segments requiring additional capacity. The DPW Sewer Capital Improvements Program (CIP) has been updated to include new projects resulting from these analyses and is included as part of the Master Plan.

Amendments to the Howard County Fats, Oils, and Grease (FOG) program have been developed and updated as part of the Consent Agreement, and are currently being implemented.

Howard County DPW is fully committed to performing the sewer system maintenance and conducting the capital improvements work necessary to eliminate and/or minimize sanitary sewer overflows (SSO's) from its sanitary sewer collection and treatment system.

4.4 Sewage Disposal – Private Systems

Private individual septic systems presently serve approximately 14% of the population in Howard County and several commercial and industrial establishments. The efficiency of a septic system depends on soil characteristics. In July, 1968, the United States Department of Agriculture, Soil Conservation Service issued the results of a soil survey for Howard County. Accompanying the detailed description of soils in the publication are aerial maps detailing each soil area in the County. The survey indicates that the use of septic systems is severely limited for 47% of the County due to soils characterized by low permeability, shallow depth to bedrock or seasonal high water table. An additional 19% of the County is rated as having moderate limitations for the use of septic systems. 34% of the County's soils are rated as having slight limitations. Although severe limitations do not prevent the use of septic systems, special construction practices may be necessary to obtain County approval.

Private septic systems will continue to be used in the western portion of the County, while the use of private septic systems within the Metropolitan District will decrease as connections are made to the public sewerage system.

Private wastewater treatment plants other than septic systems are listed in **Table 10**. The County anticipates that industrial, commercial and institutional facilities located in the planned service area will eventually connect to the County's public sewerage system, provided they comply with capacity allocation and pretreatment requirements. Conveyance system improvements will be designed to accommodate flows from these facilities. Expected dates of abandonment have not been established for all of the facilities given in Table 10. **Table 10A** lists existing and planned wastewater discharges for which NPDES permits have been applied for or issued. **Table 10C** lists a summary of existing and planned community septic systems for facilities that have been assigned a permit number or have applied for one.

Wastewater disposal problem areas are inventoried in **Table 11**. The majority of the problem areas identified involve subdivisions where existing septic systems are failing. Areas with failing septic systems which can be served through an extension of the existing sewerage system are planned for service in accordance with schedules given in Table 13. Properties with failing septic systems outside the Planned Service Area will continue to be served by private on-site systems unless the properties are immediately adjacent to the PSA, have public sewer available as determined by the Director of Public Works, and have been ordered to connect to the public sewer by the County's Environmental Health Department. Therefore, existing failed systems will require replacement or repair in conformance with County Environmental Health standards.

Howard County DPW immediately responds to reports and complaints or observations of illicit discharges to streams. There are no known water quality problems resulting from storm drainage outfalls and non-point sources to report via Table 12, so Table 12 is not included in this report.

4.5 Shared Sewage Disposal Systems

Undeveloped properties zoned RR and RC within the No Planned Service Area may be serviced by shared sewage disposal facilities. Howard County Code Title 18, Subtitle 12, and Title 20, Subtitle 8 establishes requirements and procedures for shared disposal facilities to serve cluster development permitted on RR and RC zoned land. These systems are proposed and constructed by private developers of residential subdivisions, and are designed to serve individual residential lots within a contiguous subdivision. Public facilities such as schools may also be included in a shared sewage disposal system (SSDS) owned and operated by the Board of Education. Shared sewage disposal facilities are designed in accordance with Department of Public Works standards and those of the County Health Department and MDE. Each system must be reviewed and approved by the Department of Public Works, County Health Department, and MDE prior to construction.

Facilities generally consist of gravity collection systems or pressure collection systems with pumps located in easements on individual lots. All wastewater is collected and treated at a single, contiguous treatment area (primary treatment). After treatment, the wastewater is distributed to a subsurface soil absorption field.

Shared Sewage Disposal Systems with maximum daily design flow (MDDF) over 10,000 gallons per day (gpd) require a MDE Groundwater Discharge Permit. The Department of Public Works will approve and accept only those proposed public large systems ($\geq$ 10,000 gpd MDDF) that were identified and included in the January 2006 amendment to the Water and Sewer plan.

MDE Groundwater Discharge Permits require that wastewater must be treated at the headworks so that it contains no more than 30 parts per million (ppm) of BOD, 30 ppm TSS and 10 or 8 ppm total nitrogen before the wastewater enters the subsurface soil absorption fields. Nutrient removal technologies are needed to meet the treatment levels required by the permits. Nutrient removal technologies treat wastewater by subjecting it to an aerated zone or cycle, an anoxic zone or cycle, and clarification before distribution to the subsurface soil absorption fields. Sludge management systems are included with nutrient removal technologies to control solids inventory and minimize waste hauling. DPW will only accept nutrient removal technologies that have demonstrated successful BOD, TSS and nutrient removal at a facility within Maryland. The large, permitted systems will be owned and operated by the developer until one year following 80% occupancy of the homes connected to the system.

At the discretion of MDE, SSDS with MDDF between 5,000 and 10,000 gpd may be subject to a Discharge Permit if MDE is concerned with soil, hydraulic, or nutrient migration conditions. MDE may also require a Discharge Permit for SSDS and systems with less than 5,000 gallons MDDF that serve 6 houses or more if there are nutrient migration concerns. Homes within developments identified as having nutrient migration concerns may be required to have an on-site treatment system located on individual lots.

Smaller shared sewage systems with MDDF less than 5,000 gpd and less than 6 homes do not require a discharge permit under most circumstances. MDE reserves the right to place restrictions or apply permits to any systems that may increase the nitrogen content of ground or surface waters at significant levels deemed injurious to the Chesapeake Bay. MDE requires the pre-treatment of wastewater through the installation of Best Available Technology (BAT) for the removal of nitrogen. BAT systems shall be owned and maintained by the Department of Public Works. Primary treatment for the small, non-permitted systems in Howard County consist of septic tanks in a series that provide solids removal and the digestion of organic matter.

Shared sewage disposal facilities that do not require MDE discharge permits, and their related easements, become County property after construction. A developer's agreement, declaration of covenants, and deed of shared sewage disposal facility easement must be

signed and in effect before the County takes full ownership of the system. For the large permitted systems, in addition to the above mentioned documents, the property containing the treatment system and subsurface absorption fields will be deeded fee-simple to the Department of Public Works. Facilities operation and maintenance is the responsibility of the Department of Public Works. The users of the shared systems finance the maintenance of these systems through an annual payment of fees. **Table 10B** lists existing and planned shared sewage disposal facilities.

4.6 Sewage Conveyance and Treatment - Patapsco Basin

Presently, the Patapsco Interceptor, which is shared by Howard County, Baltimore County, Anne Arundel County and Baltimore City, receives sewage from Howard County at four metered connections: the Deep Run, Bonnie Branch, Tiber Branch and Sucker Branch Interceptors.

The Furnace Avenue meter in Elkridge registers the flow from the Deep Run Interceptor serving most of the U.S. Route 1/Interstate 95 corridor from Elkridge to Waterloo and Jessup, and includes sewage flow from Anne Arundel County through various sewage flow meters and direct interceptor connections. The Bonnie Branch Interceptor connects to the Patapsco Interceptor at Illchester Road and serves the Illchester, Worthington and Rockburn Park areas. The Main Street meter in Ellicott City registers flow from the Tiber Branch Interceptor which serves Ellicott City and areas immediately west of Route 29. The Route 108 Pumping Station is also tributary to the Tiber Branch Interceptor. Its discharge will flow through the Main Street meter when the pumping station is in operation. The Sylvan Lane meter registers flow in the Sucker Branch Interceptor, which serves the area north of Ellicott City and west to Mount Hebron

Collected flow data is used to analyze system flows and to determine the County's share of operating and maintenance costs for the Patapsco interceptor, pump station, and Patapsco Treatment Plant. Several agreements have been developed and approved between Howard and Baltimore Counties concerning the sharing of costs and capacity in the Patapsco system. The first agreement, executed on May 6, 1963 and later modified on February 28, 1964, provided for construction of the Patapsco Interceptor from Herbert Run to the Deep Run Interceptor and from the Deep Run Interceptor to Oak Forest Branch. In addition, the agreement provided for construction of the interceptor from Sucker Branch to a point 3,500 feet south of Ellicott City, terminating at a temporary treatment plant which has since been deactivated.

The second agreement, dated August 2, 1968 provided for construction of the Patapsco Interceptor from Oak Forest Branch to the temporary treatment plant specified above.

The third agreement, dated June 4, 1979 updated portions of the previous agreements, specified new cost sharing criteria, and established a peak flow limitation for Howard County at the Patapsco Pump Station of 17.8 MGD. The agreement was amended on June 5, 1982 to address conditions for construction of the parallel Patapsco Relief Interceptor. This amendment specified cost sharing arrangements and provided Howard County with a peak flow capacity downstream from the Deep Run Interceptor to the pump station of 27.6 MGD.

The fourth and final agreement, dated May 3, 1982, specified peak flow capacity purchased by Howard County in segments of the Patapsco Interceptor located upstream of the Deep Run Interceptor. The allocated capacities are given below:

INTERCEPTOR SEGMENT	ALLOWABLE PEAK FLOW(MGD)
Deep Run to Bull Branch	16.1
Bull Branch to Tiber Branch	15.1
Tiber Branch to Sucker Branch	4.0

The Patapsco Sewage Pump Station was planned for an initial flow of 45 MGD with provisions for future expansion to 70 MGD, and a current capacity of 59 MGD. Howard County's contracted share of the pump station's peak capacity is 39.6%. Therefore, when the pump station is upgraded to accommodate projected flows, Howard County is to assume the costs for providing 27.6 MGD of the total 70 MGD capacity. This capacity share will be adequate to provide for the County's needs until after year 2040.

The Patapsco 201 Facilities Plan indicates that the current 2-year frequency peak flow to the Patapsco Pump Station is conservatively estimated to be 61.9 MGD. The difference between this flow rate and the initial pump station capacity of 41.5 MGD can be attributed to higher than anticipated flows from the Baltimore County portion of the service area. In 1985, Baltimore County installed a third pump in the station that increased the safe capacity to 59 MGD. The station was designed to allow for a fourth pump to be installed which would increase the safe capacity of the station to 70 MGD. The Patapsco 201 Plan also recommends an immediate increase in the station's safe capacity to at least 91 MGD which will be required to provide for future growth. The increase in future station capacity from 70 MGD to 91 MGD is necessary to accommodate flows from Baltimore County, which will be higher than originally projected.

The table below addresses capacity allocations for Howard County in the Patapsco interceptor. It was determined that existing allocations may not supply adequate capacity for all contributing jurisdictions, and Baltimore County's current 2-year frequency peak flow may exceed that jurisdiction's allocation in the interceptor between manhole no. 34848 and the Patapsco Pump Station and in the pump station itself. Flow allocations are specified in the June 4, 1979 agreement and the June 5, 1982 amendment. Howard County's capacity allocation and projected peak flows in sections of the Patapsco Interceptor are as shown below:

BRANCH DISCHARGE LOCATION	CUMULATIVE PEAK DESIGN FLOWS (MGD) IN PATAPSCO INTERCEPTOR (2)		CONTRACTED PEAK FLOW CAPACITY (MGD)
	2014	2040	
Sucker Branch	3.58	4.04	4.0
Tiber Branch	5.28	5.78	15.1
Bonnie Branch	6.83	7.58	15.1
Deep Run (1)	12.15	14.82	27.6

(1) – Includes flow from Anne Arundel County

(2) – Excludes flow from Baltimore County

It has been determined that, based on present flow projections and increased levels of infiltration/inflow reduction, adequate interceptor hydraulic capacity is available to Howard County for the projected year 2040 flows. A reallocation of available capacity and cost shares through inter-jurisdictional agreements may be necessary to provide for each jurisdiction's needs as conditions within the drainage basin change.

Four agreements are in effect between Howard County and Anne Arundel County concerning construction cost and capacity allocation for the Deep Run Interceptor. The first agreement, dated August 28, 1963, covered the construction of the interceptor from the Patapsco Interceptor to Elkridge. This agreement provided a peak capacity of 4.42 MGD to Anne Arundel County and the remainder of the rated 10.4 MGD total capacity to Howard County. A 33" diameter parallel sewer line was constructed under County contract 10-1809 to provide adequate capacity to convey Howard County flows. In addition, a 400 ft. section of the existing 33" diameter line was rerouted and replaced with a 42" diameter line to accommodate the construction of Interstate Route 195. The siphon structure crossing the Patapsco River was reconstructed in 2005 under County contract 10-4109 to accommodate the projected flows as well as provide for a future third

siphon barrel that is currently under construction. Anne Arundel County informed Howard County that their existing capacity allocation of 4.42 MGD is adequate to meet future needs. Therefore, the provision of the increased capacity was funded entirely by Howard County.

The second section of the Deep Run Interceptor, between Elkridge and Hanover Road, was constructed under an agreement dated June 30, 1970, which allotted to Howard County a peak flow limitation of 19.78 MGD. The third agreement, dated December 11, 1973, covered the extension of the interceptor from Hanover Road to the town of Dorsey, Maryland. This agreement divides the portion of the interceptor addressed into three segments with capacity allocations as specified below:

INTERCEPTOR SEGMENT	ALLOWABLE PEAK DESIGN FLOW (MGD)
Hanover Road to Piney Run	12.48
Piney Run to Licking Creek	11.96
Licking Creek to Dorsey	5.8

The interceptor portion between Licking Creek and Dorsey serves Howard County only. Therefore, Howard County's flows in this segment are limited by the hydraulic capacity of the interceptor.

On March 30, 1979, Howard County and Anne Arundel County entered into an agreement to construct the Licking Creek Interceptor, a tributary to the Deep Run Interceptor along Licking Creek and Montevideo Road. This agreement includes cost sharing provisions and allocates peak flow capacity to Howard County of 1.76 MGD. Howard County's capacity allocations and projected peak flows in the Deep Run Interceptor are shown in the table that follows:

LOCATION ON DEEP RUN INTERCEPTOR	PROJECTED PEAK DESIGN FLOWS (MGD) (1)		CONTRACTED PEAK CAPACITY (MGD)
	2014	2040	
Patapsco Interceptor to Elkridge (Contract 22-S)	6.83	7.66	14.70
Elkridge to Hanover Road (Contract 181-S)	6.01	6.46	19.78
Hanover Road to Piney Run (Contract 291-S)	3.85	4.24	12.48
Piney Run to Licking Creek (Contract 291-S)	3.84	4.23	11.96

(1) –Excludes flow from Anne Arundel County

Sewer restrictions were imposed in the Patapsco service area in 1974 as a result of the limited treatment capacity of the Patapsco Wastewater Treatment Plant. With the enactment of the County's present water and sewer capacity allocation law in 1979, the lack of treatment capacity resulted in a complete moratorium on new connections. To provide relief from the moratorium, Howard County constructed a 1.0 MGD interim wastewater treatment plant located on the Deep Run tributary to the Patapsco River. All of the sewage flow in the Deep Run Interceptor at this point was diverted to the interim treatment plant.

In 1983, additional capacity became available at the Patapsco Wastewater Treatment Plant. Sufficient capacity was allocated to Howard County to allow for the Deep Run Plant to be taken out of service in December, 1984. The interim plant was maintained in a standby capacity. The County subsequently completed a study of the Deep Run Plant to determine if the plant could be modified to meet more stringent discharge limits that would be imposed by the State should the County need to reactivate the plant. It was determined that extensive modifications would be necessary to meet current NPDES discharge standards. Since the expansion of the Patapsco plant was completed, the Deep Run plant is targeted for demolition. Howard County will retain ownership of the plant site.

In May, 1984, the jurisdictions contributing flows to the Patapsco Wastewater Treatment Plant entered into a Memorandum of Understanding which is included in this Plan as EXHIBIT 8. This memorandum specifies shares of the total design treatment capacity of

the Patapsco Wastewater Treatment Plant owned by each jurisdiction. The capacity shares are as follows:

JURISDICTION	CAPACITY SHARE (MGD)
Howard County	10.0
Baltimore City	19.6
Baltimore County	34.7
Anne Arundel County	5.7
TOTAL	70.0

The May 1984 memorandum also describes capacity allocation procedures and the method to be used in computing future capacity allocations for each jurisdiction. Baltimore City undertook a 17.5 MGD incremental expansion of the existing facilities to a total design capacity of 87.5 MGD. The 17.5 MGD expansion completed in 1998 included the addition of a single pure oxygen activated sludge reactor to the existing process train; incorporated three primary settling tanks, one secondary clarifier, and one chlorine contact basin. Two of the primary settling tanks replaced six old primary tanks to provide redundancy for maintenance purposes. Biological nutrient removal (BNR) was incorporated into the treatment process. Howard County's share of the incremental capacity increase was 2.4 MGD, bringing the County's total planned capacity share to 12.4 MGD.

Enhanced Nutrient Removal (ENR) upgrades to the Patapsco plant are currently underway and may result in a reduction of plant capacity. The planned capacity of the plant is 81 MGD and the County's total share capacity is projected to be approximately 11.4 MGD. As of December 31, 2014, the NPDES permitted capacity of the Patapsco WWTP was 73.0 MGD.

4.7 Sewage Conveyance and Treatment - Patuxent Basin

The Little Patuxent Water Reclamation Plant (LPWRP) is currently the only municipal wastewater treatment facility operated by the Howard County Department of Public Works in the Patuxent Basin. The first treatment unit of the contact stabilization type with a capacity of 1 MGD was completed and put into service in November, 1965. Additional construction over the years has brought the present (2015) NPDES permitted annual average hydraulic capacity to 29.0 MGD, with associated nutrient loading caps of 309,715 lbs of Total Nitrogen (TN) per year and 23,258 lbs of Total Phosphorous (TP) in the effluent per year. Projected demands and planned capacity for the Patuxent service

area are given in **Table 9**. A diagram of the present treatment processes at the Little Patuxent Plant is shown in **Figure 4-1**. The site plan for existing facilities is shown on **Figure 4-2**.

The highest single day flow through the LPWRP was 36.74 MGD on September 9, 2011. The highest hourly flow experienced was 47.45 MGD, occurring at 10:00 pm on March 10, 2011.

The Patuxent River Basin Water Quality Management Plan, prepared under Section 303 (e) of the Federal Water Pollution Control Act Amendments of 1972 by the State Water Resources Administration, includes the Little Patuxent Water Reclamation Plant as a permanent component of the region's sewage treatment facilities. The State Department of the Environment and EPA expressed concern regarding the health impacts related to an effluent discharge into the Little Patuxent River at the plant site. The intake for Fort Meade's water treatment facility is located approximately four miles downstream from the Little Patuxent Plant. The Howard County Department of Public Works evaluated several alternatives to alleviate potential health concerns in a report titled Savage Wastewater Treatment Plant Discharge Evaluation (October, 1976). The alternative recommended and implemented extended the effluent discharge to a point below the Fort Meade water intake through construction of a 54 inch diameter pipeline parallel to the Little Patuxent River. The NPDES Discharge Permit for this effluent discharge point is included as EXHIBIT 9. With the deactivation of the Fort Meade Water Treatment Plant, Anne Arundel County has removed the intake from service and currently relies on groundwater.

The fourth addition to the plant expanded its capacity to 15 MGD, including primary and secondary treatment, nitrification, phosphorus removal, filtration, disinfection, and sludge handling facilities.

In 1989, Howard County entered into a Phase I BNR Agreement with the Maryland Department of the Environment which required the County to implement Biological Nutrient Reduction (BNR). The fifth addition to the Little Patuxent Water Reclamation Plant, which was in response to this Phase I Agreement, was completed in 1994. This addition utilized BNR technology for both nitrogen and phosphorus removal. The facilities provided a total capacity of 20 MGD, which provided for the plant needs through Year 2005.

Howard County entered into a Phase II BNR agreement with the Maryland Department of the Environment in 1994 to determine the technical feasibility of further reductions in total nitrogen removal to a seasonal level of 3 mg/l using increased internal recycle as

well as methanol addition. The results of that study as well as a demonstration scale test determined that it was not technically feasible using the methodologies described.

The sixth addition to the Little Patuxent Water Reclamation Plant was completed in 2004. This addition upgraded the hydraulic capacity of the plant to 25 MGD, and provided for additional nitrogen reduction and enhanced solids handling capability. The plant incorporated the modified Johannesburg process, which is a further refinement of the BNR process. Construction of this expansion helped further reduce the total nitrogen discharge, and enhanced the solids handling and treating ability by adding centrifuges for dewatering. This expansion provided hydraulic capacity for the sewage projection through Year 2020 in the basin including the Route 108 Pumping Station tributary.

The seventh (7^{th}) addition to the Little Patuxent Water Reclamation Plant for Enhanced Nutrient Removal (ENR) facilities was completed in 2012 to further reduce total nitrogen and phosphorous in the effluent. The County is pursuing grant opportunities with the Maryland Department of the Environment to obtain Bay Restoration Funds as well as State Revolving Loan Funds to help finance the project.

Previously, the County acquired a vacant property adjacent to the plant. This property may be utilized for any additional treatment capacity expansion or sludge management facilities beyond what can be built on the existing plant site, if needed. This property is "Parcel 165" located adjacent to the eastern boundary of the existing plant site.

Operation and maintenance costs at the Little Patuxent Water Reclamation Plant in fiscal year 2014 averaged $1,820.33 per million gallons treated for an average flow of approximately 20.4 MGD. An additional 1.3 MGD from the Patuxent Basin was pumped to the Patapsco Basin via the Route 108 Pumping Station during this period.

The Patuxent Institute for Defective Delinquents and the Clifton T. Perkins Hospital are served by sewage collection and treatment systems owned and operated by the State of Maryland. The sewage collected at the Institute is pumped to the treatment facility at the Maryland House of Correction in Jessup. The Maryland Environmental Service has constructed improvements to the Jessup Plant. The Wholesale Food Market, a state property, is provided public sewerage service by Howard County.

Several properties along Dorsey Run Road were in need of public sewerage service. Providing service to these properties using Howard County's sewer system would require construction of a sewer pumping station. In a cooperative effort with Maryland Environmental Service and the Maryland Department of Public Safety and Correctional Services, an agreement was executed in September, 1992 to allow the properties along

Dorsey Road to use the nearby State sewer system, which would allow these properties to be provided gravity sewer service, eliminating the need for an expensive sewage pumping station. In exchange, Howard County agreed to construct a sewer line to divert the sewage from several State properties into the County's sewer system. By agreement, the flow diverted from the State properties to the County's sewer system will always be equal to or greater than the flow diverted from properties in the County to the State's sewer system. If necessary, the County also agreed to divert flows from the Patuxent Institute to the County's sewer system in order to maintain a balance in sewage flows diverted between the State and Howard County. Construction on this "Patuxent Diversion Sewer" has been completed, and the Patuxent Institute's flow has been diverted on a proportional basis to Howard County facilities.

Presently, there are six major interceptors flowing to the Little Patuxent Plant: the Hammond Branch, Little Patuxent, Middle Patuxent, Guilford Run, Patuxent and Dorsey Run Interceptors. The flows in the Patuxent Interceptor are pumped by the North Laurel Pump Station to the Hammond Branch Interceptor. The Hammond Branch Interceptor serves the Hammond Branch drainage basin from the Anne Arundel County boundary to Fulton. The Guilford Run Interceptor serves the area along Route 32 from Annapolis Junction to Guilford. The Guilford Interceptor also carries flows pumped from the Dorsey Run Interceptor. The Dorsey Run Interceptor serves the Greater Baltimore Food Market and vicinity and, the area parallel to and west of Route 175 from Jessup to Jonestown.

The Little Patuxent Interceptor, which extends from Savage northward to above Route 40, is the major contributor to the Little Patuxent Water Reclamation Plant. Flow in the Little Patuxent Interceptor above Route 108 can either flow by gravity downstream to the Little Patuxent Water Reclamation Plant or be diverted to the Patapsco service area by the Route 108 Pump Station. A force main from the pumping station carries the flow to the Cat Rock Run Interceptor, which is a tributary to the Patapsco Interceptor via the Tiber Branch connection. Howard County is currently allotted 15.1 MGD in the Patapsco Interceptor immediately downstream from the Tiber Branch connection, which is adequate through build-out to accommodate the Tiber Branch gravity flows plus the Rte. 108 Pumping Station flows. The Rte. 108 Pumping Station is used on an "as-needed" basis to reduce flows to the Little Patuxent Water Reclamation Plant during periods of construction or in order to reduce loadings. A capital project to upgrade the Rte. 108 SPS was completed, which included a new flow diversion structure adjacent to the station for balancing flows, new odor control facilities, and individual variable speed drive units on each pump.

The Middle Patuxent Interceptor connects to the Little Patuxent Interceptor north of Savage. The planned service area will include the area bounded approximately by Route 108 to the north and west, Md. Route 32 to the south, and the natural drainage fall line to the east. This encompasses the Village of River Hill and areas of Clarksville. A special sub-district of the Metropolitan District was established for properties served by the Middle Patuxent Interceptor to recover the construction cost of the interceptor, however the special construction charge was discontinued as the remaining funds are sufficient to pay off the bonds.

4.8 Deep Run Water Reclamation Plant

The Deep Run plant has been out of service and decommissioned since the mid 1980's. The plant is targeted for demolition.

4.9 Sanitary Sewer System Hydraulic Modeling for Capacity Evaluation

In order to determine capacity needs in the sanitary sewer conveyance system, the County uses a sanitary sewer hydraulic model that includes all interceptors 12-inch diameter and larger. There are two separate hydraulic models: one for the Little Patuxent drainage area and the other for the Patapsco drainage area. Each model has several different scenarios representing current and future flows and current and future piping.

Sewage flows were projected using data obtained from flow metering programs in 2001 and 2010 along with 2014 winter quarter water usage records and future population and land use projection information from the Howard County Department of Planning and Zoning (DPZ). Flows were developed at Years 2013 (current), 2015, 2020, 2025, 2030, 2035 and 2040, which is considered build-out. The DPZ data was comprised of projected population, commercial development and industrial development which were processed to develop corresponding flow projections.

For groundwater infiltration and rainfall-dependent infiltration and inflow (RDII), data from the March 12-14, 2010 heavy rainfall and snowmelt event (designated "Rainfall Event A") were used. Data from the County's as-built drawings were used in conjunction with pipe roughness coefficients developed from previous hydraulic modeling work and flow metering programs to create sewer pipe and manhole asset data such as pipe lengths, pipe diameters, invert elevations, grades, manhole depths, etc.

Year 2040 ultimate flow conditions were simulated in the XP-SWMM hydraulic model to identify those pipes with insufficient capacity and to determine the improvements

necessary to provide supplemental capacity. Sewer capacity was evaluated based on the County's goal of achieving a depth-to-diameter (d/D) ratio of 0.80 or less (i.e. 80% full based on depth) in all sewer pipes under design conditions. The construction of parallel sewer pipelines was used as a reliable "default" method to increase pipeline capacity, but other methods and technologies will be considered and evaluated as projects are developed.

The full set of recommended hydraulic improvements identified in **Table 13 – Immediate, 5-Year, 10-Year, and Comprehensive Priorities for Sewer System Development** and shown on **Figure 4-3: Immediate, 5-Year, 10-Year and Comprehensive Priorities for Water System Development** will achieve the capacity goals with only minimal exceptions such as inverted siphons. In order to prioritize the capacity improvements, the improvements were further evaluated to determine which portions of the ultimate improvements would prevent flooding/overflow even if it would result in pipes exceeding the goal of 0.80 d/D ratio. These capacity improvements are designated for implementation in the 0-to-5 year range.

Table 15A– Flow Analysis Table provides an abbreviated version of the hydraulic modeling results. Focusing on the bottom pipe segment of each major branch, it shows the peak flow rate and available capacity under current conditions and the peak flow rate and available capacity under future conditions with the improvements listed in Table 13 – Immediate, 5-Year, 10-Year, and Comprehensive Priorities for Sewer System Development implemented.

For those capacity improvements that are under construction, the hydraulic model was updated to include the planned improvements based on the contract award plans that will be supplanted by the as-built plans upon project completion. The capacity improvements currently under construction are as follows:

Capital Project No. S-6189 :	North Laurel Wastewater Pumping Station
Capital Project No. S-6271:	Furnace Ave Sewer and Deep Run Inverted Siphon Improvements

For those capacity improvements that are currently in the design phase, the hydraulic model continues to utilize the aforementioned "default" parallel pipeline method to increase capacity even though the design engineer may ultimately select alternative methods. However, data gathered during the design phase of the improvement projects that improve the accuracy of the model, including field-measured corrections of sewer sizes and pipe grades/inverts, were added to the model to more accurately simulate the existing system. The capacity improvement projects currently under design are as

follows:

Capital Project No. S-6280: Hammond Branch & Patuxent Interceptor Improvements
Capital Project No. S-6281: Dorsey Run & Guilford Run Interceptor Improvements
Capital Project No. S-6282: Bonnie Branch & Rockburn Branch Interceptor Improvements
Capital Project No. S-6283: Tiber Branch & Sucker Branch Interceptor Improvements
Capital Project No. S-6284: Deep Run & Shallow Run Interceptor Improvements

Other factors that should be taken into consideration in order to determine the priority for capacity improvements beyond the 0-to-5 year range include the following:

1. Present Worth Analysis – Compare the cost of constructing the full set of ultimate improvements in the near term versus constructing the project in stages over a longer period.

2. System Hydraulics – Consider such factors as maintaining minimum allowable flow velocities; evaluating differences in pump or pipe sizes required for initial improvements versus long-range improvements, etc., which can be affected by when improvements come on-line.

3. System Reliability – Determine if existing facilities have defects, corrosion, or other factors that warrant making the improvements sooner rather than later so that the failing assets could be taken offline either for repair / rehabilitation or with all flow going to the improvements.

4. Construction & Permit Limitations – Determine if it is advantageous to construct all improvements at one time rather than stage construction over a longer period.

In terms of selecting pipe sizes and the location and limits of the proposed improvements, the capacity improvements indicated in Table 13– Immediate, 5-Year, 10-Year, and Comprehensive Priorities for Sewer System Development and shown on the SEWER FACILITIES PLAN Map (EXHIBIT 2) are solely for planning purposes. During design, the design engineer may consider other approaches including in-trench replacement of existing pipelines with enlarged pipe sizes, or expanding or contracting the limits of the capacity improvements based on specific, detailed site data acquired during the design phase.

4.10 Required Local System Improvements based on Capacity Evaluation

Patuxent Sewer Drainage Basin

In the Little Patuxent Water Reclamation Plant drainage basin, the improvements needed to provide adequate capacity for future flows are listed below for the tributary drainage areas.

A. Little Patuxent Sewer Drainage Basin- south of MD Route 108

Analysis of the Little Patuxent drainage basin shows that no further hydraulic capacity improvements are required through the year 2040. The recent completion of construction contracts under Capital Project No. S-6175– Little Patuxent Parallel Interceptor Sewer addressed the capacity needs along the main Little Patuxent Interceptor from the LPWRP to MD Route 108.

B. Route 108 Pumping Station Drainage Basin (Little Patuxent Sewer - north of MD Route 108)

Hydraulic improvements are needed in this drainage area. The improvements to the Little Patuxent Interceptor under Capital Project No. S-6274– Little Patuxent Parallel Sewer will extend from MD Route 108 upstream to the Red Hill Branch Interceptor to address hydraulic deficiencies.

The Planned Service Area for sewerage was expanded to add Parcel 11, consisting of 239.78 acres of the County's Alpha Ridge landfill, to the sewer service area (refer to EXHIBIT 2, revision S-02). Sewerage service for the expanded area is available from the 16-inch diameter Little Patuxent I-70 Interceptor that was constructed under County contract no. 3692.

As described in Chapter 1, the Planned Service Area boundary was expanded to include approximately 221.1 acres of the historic Doughoregan property (refer to EXHIBIT 2, revision S-01), and twenty properties in the Marriottsville Road area of west Ellicott City and totaling 158.76 acres (refer to EXHIBIT 2, revision S-03) that lie within the Route 108 Pumping Station sewer drainage basin. The sewer flow projections for these areas are included in Tables 1B and 1C of Chapter 2. Based on current zoning densities and sewer flow projections, hydraulic analysis shows that the major sewer facilities (interceptor sewers 12-inch diameter and larger, sewage pumping stations and water

reclamation plants) are adequate for the increased sewer flows through the planning period.

1. Sewerage service for the expanded service area of the Doughoregan property (the Westmount subdivision) is available from the 12-inch diameter Little Patuxent Interceptor sewer constructed under County contract no. 179-S.

2. Sewerage service to the expanded service area of west Ellicott City near Marriottsville Road is available from the 16-inch diameter Albeth Heights sewer constructed under County contract no. 3447. County Capital Project S-6293 is planned to extend a collector sewer from the Albeth Heights sewer to Board of Education parcel 203 in west Ellicott City.

3. The capacity of local sewerage collection facilities and necessary improvements will require further evaluation as existing and proposed development plans are prepared.

C. Middle Patuxent Sewer Drainage Area

Analysis of the Middle Patuxent drainage area showed that no further hydraulic capacity improvements will be required through the year 2040.

As described in Chapter 1, the Planned Service Area boundary was expanded to include four properties comprising 90.33 acres in the Guilford Road area of Clarksville (refer to EXHIBIT 2, revision S-04) that lie within the Middle Patuxent sewer drainage area. The sewer flow projections for the area are included in Tables 1B and 1C of Chapter 2. Based on current zoning densities and sewer flow projections, hydraulic analysis shows that the major sewer facilities (interceptor sewers 12-inch diameter and larger, sewage pumping stations and water reclamation plants) are adequate for the increased sewer flow through the planning period. Sewer service for the expanded area is available from the 12-inch diameter Cricket Creek Interceptor sewer constructed under County contract no. 3096. The capacity of local sewerage collection facilities and the improvements necessary to accommodate the proposed development will require further evaluation as development plans are prepared.

D. Hammond Branch Sewer Drainage Area

Hydraulic improvements are needed in this drainage area. Additional capacity is needed on the Hammond Branch Interceptor between the two sets of inverted siphons and a

portion upstream of the inverted siphons, plus portions of the HB1A- branch.

Portions of the existing HB1A- branch have been improved by Cured-In-Place Pipe (CIPP) lining and pipe bursting but additional capacity is still needed. The HB1A- branch receives flow from the North Laurel Pumping Station, which will be replaced with a new pump station with greater capacity that is currently under construction. Improvements to the Hammond Branch Interceptor and side branches are being developed under Capital Project No. S-6280– Hammond/Patuxent Interceptor Improvements which is currently in design.

As described in Chapter 1, the Planned Service Area boundary was expanded to include approximately 91.25 acres of land in the Scaggsville Road area of Fulton (refer to EXHIBIT 2, revision S-05) that lie within the Hammond Branch sewer drainage area. The sewer flow projections for the area are included in Tables 1B and 1C of Chapter 2. Based on current zoning densities and sewer flow projections, hydraulic analysis shows that the major sewer facilities (interceptor sewers 12-inch diameter and larger, sewage pumping stations and water reclamation plants) will be adequate for the increased sewer flow through the planning period. Sewer service for the expanded area is available from the 16-inch and 12-inch diameter Western School Complex Interceptor sewer constructed under County contract no. 3506. The capacity of local sewerage collection facilities and the improvements necessary to accommodate the proposed development will require further evaluation as development plans are prepared.

E. North Laurel Sewer Drainage Area

Hydraulic improvements are needed in this area. Additional capacity is needed for the lower half of the Patuxent Interceptor. Previous hydraulic model evaluations identified the NL1A- (Naces Branch) and NL1AA branches for additional capacity but subsequent updates to the model resulted in their elimination. Improvements to the Patuxent Interceptor are being developed under Capital Project No. S-6280– Hammond/Patuxent Interceptor Improvements, which is currently in design.

F. Guilford Run Sewer Drainage Area

Analysis of the Guilford Run drainage area showed that no hydraulic improvements are needed. The previous hydraulic model evaluations identified the "GR1A-" and "GR1B-" branches for additional capacity but subsequent updates to the model resulted in their elimination.

G. Dorsey Run Sewer Drainage Area

Hydraulic improvements are needed in this area. Additional capacity is needed for approximately the lower one-third of the Dorsey Run Interceptor. In addition to the supplemental capacity needed, the lower portion of the existing Dorsey Run Interceptor needs to be re-configured to remove a nearly 180-degree bend in the existing interceptor that contributes to surcharging in the Dorsey Run Interceptor.

The previous hydraulic model evaluations identified other portions of the Dorsey Run Interceptor and the DO1A- branch for additional capacity but subsequent updates to the model resulted in their elimination. Improvements to the Patuxent Interceptor are being developed under Capital Project No. S-6281 – Dorsey/Guilford Interceptor Improvements, which is currently in design.

Patapsco Sewer Drainage Basin

In the Patapsco Wastewater Treatment Plant drainage basin, the improvements needed to provide adequate capacity for future flows are listed below for the tributary drainage areas.

H. Bonnie Branch and Rockburn Branch Sewer Drainage Area

Hydraulic improvements are needed in this drainage area south of Ellicott City. Additional capacity is needed for various segments of the Bonnie Branch Interceptor including the billing meter at the downstream end. The previous hydraulic model evaluations identified the full length of the Bonnie Branch Interceptor and the full length of the Rockburn Branch Interceptor for additional capacity but subsequent updates to the model resulted in the reduction of the Bonnie Branch Interceptor improvements and elimination of the Rockburn Branch improvements.

The planned reinstatement of the Kerger Road Pumping Station will divert flow away from the Rockburn Interceptor to the Shallow Run Interceptor, which resulted in the reduction of improvements. Improvements to the Bonnie Branch Interceptor will be developed under Capital Project No. S-6282– Bonnie/Rockburn Branch Interceptor Improvements.

I. Tiber Branch Sewer Drainage Area

Hydraulic improvements are needed in this drainage area that serves Ellicott City. Additional capacity is needed for much of the Tiber Branch Interceptor including the

billing meter at the downstream end and portions of the Cat Rock Run Interceptor (the PA1GB branch). The portions of the Tiber Branch Interceptor in need of additional capacity are the lower section, especially the billing meter, and the central portion.

The Route 108 Pumping Station is occasionally used to divert flow from the Little Patuxent Water Reclamation Plant drainage basin to the Patapsco Wastewater Treatment Plant drainage basin through the Cat Rock Run Interceptor. The improvements to the Cat Rock Run Interceptor are needed only for operation of the Route 108 Pumping Station. Improvements to the Tiber Branch Interceptor are being developed under Capital Project No. S-6283– Tiber/Sucker Branch Interceptor Improvements, which is currently in design. Improvements to the Cat Rock Run Interceptor will be developed under Capital Project No. S-6285– MD 108 Pump Station Outfall Improvements.

J. Sucker Branch Sewer Drainage Area

Hydraulic improvements are needed in this drainage area north of Ellicott City. Additional capacity is needed for various segments of the Sucker Branch Interceptor including the billing meter at the downstream end. Portions of the existing interceptor were paralleled under previous contracts; however, the earlier paralleling efforts did not encompass the full length of the interceptor. In some cases, the parallel sewer was not large enough to provide the full amount of capacity needed. As a result, supplemental capacity is needed for much of the length of the Sucker Branch Interceptor. Improvements to the Sucker Branch Interceptor are being developed under Capital Project No. S-6283– Tiber/Sucker Branch Interceptor Improvements, which is currently in design.

K. Deep Run Interceptor Sewer Drainage Area

Hydraulic improvements are needed in this drainage area in eastern Howard County. Additional capacity is needed for approximately the upstream half of the Deep Run Interceptor ("DR1—") that is located upstream and west/northwest of the Anne Arundel County border. The downstream portion of the interceptor following along the Howard County/Anne Arundel County border has sufficient capacity. Improvements to the Deep Run Interceptor are being developed under Capital Project No. S-6284– Deep Run/Shallow Run Interceptor Improvements, which is currently in design.

Additional capacity is needed through the inverted siphon that conveys flow from the Deep Run Interceptor across the Patapsco River to the Patapsco Interceptor in Baltimore County. The capacity improvement is currently being addressed by construction of a

third siphon barrel under Capital Project No. S-6271– Furnace Avenue Sewer and Deep Run Inverted Siphon Improvements.

Improvements are currently being constructed for the area served by the Furnace Avenue sewer under Capital Project No. S-6271. The downstream portion is under construction but the upstream portion also requires additional capacity.

L. Shallow Run Sewer Drainage Basin

Hydraulic improvements are needed within the Shallow Run drainage area, which is part of the area served by the Deep Run Interceptor. Additional capacity is needed for the Shallow Run Interceptor. The previous hydraulic model evaluations identified fewer portions of the Shallow Run Interceptor for additional capacity but subsequent updates to the model expanded the portions in need of improvements.

The planned reinstatement of the Kerger Road Pumping Station will divert flow away from the Rockburn Interceptor to the Shallow Run Interceptor which resulted in the increased need for improvements. Improvements to the Shallow Run Interceptor are being developed under Capital Project No. S-6284– Deep Run/Shallow Run Interceptor Improvements, which is currently in design.

M. Sewage Pumping Station Improvements

In evaluating pumping stations for capacity, the pumps and the accompanying force mains are considered to comprise individual comprehensive systems. In other words, pumping stations that require additional capacity may require improvements to the force main as well as the pump station itself. For both the Little Patuxent Water Reclamation Plant drainage basin and the Patapsco Wastewater Treatment Plant drainage basin, the improvements to pumping stations that are needed to provide adequate capacity for future flows are listed below by individual pumping station.

North Laurel Sewage Pumping Station

The need for additional pumping capacity within the North Laurel Pumping Station is currently being addressed by construction of a new pumping station to replace the existing station. Improvements are currently being constructed under Capital Project No. S-6189– North Laurel Wastewater Pumping Station.

Dorsey Run Sewage Pumping Station

An updated analysis of hydraulic capacity showed that no hydraulic improvements are needed for the Dorsey Run station. Previous hydraulic modeling had

identified the need for additional pumping capacity but subsequent updates to the model determined that sufficient capacity currently exists.

Henkel's Lane/Annapolis Junction Sewage Pumping Station
Updated analysis determined that no hydraulic capacity improvements are required for this station.

US Route 40 Sewage Pumping Station
Updated analysis determined that no hydraulic capacity improvements are required for this station.

Rockburn Sewage Pumping Station
Updated analysis determined that no hydraulic capacity improvements are required for this station. The previous hydraulic model evaluations identified the Rockburn Pumping Station for additional capacity but subsequent updates to the model resulted in the elimination of the improvements. The planned reinstatement of the Kerger Road Pumping Station will divert flow away from the Rockburn Interceptor and the Rockburn Pumping Station to the Shallow Run Interceptor, which eliminated the need for additional capacity at the Rockburn pump station.

Kerger Road Sewage Pumping Station
Improvements to the Kerger Road Pumping Station are being developed under Capital Project No. S-6282– Bonnie/Rockburn Branch Interceptor Improvements, which is currently in design. The Kerger Road pump station will enable diversion of excess flow away from the Rockburn Interceptor and Rockburn Pumping Station to the Shallow Run Interceptor.

Meadowridge Road Sewage Pumping Station
No hydraulic capacity improvements are required for this station.

Old Landing Sewage Pumping Station
No hydraulic capacity improvements are required for this station.

4.11 Biosolids and Residual Solids Processing and Disposal

Biosolids and other residual solids are currently generated at the Little Patuxent Water Reclamation Plant by the removal of suspended and dissolved solids during the wastewater treatment processes, and by the collection of wastes from private septic systems and shared sewage disposal facilities throughout the County. Septic tank

biosolids are collected by private haulers and haulers under contract to the County who dispose of it for treatment at the Little Patuxent Plant.

Sewage biosolids are currently thickened at the Little Patuxent Water Reclamation Plant by dissolved air flotation and gravity thickening. The thickened biosolids are dewatered by centrifuge to a density of approximately 25 percent dry solids by weight. The dewatered biosolids are then alkaline (lime) stabilized or pasteurized to a Class A "exceptional quality" (EQ) product. The stabilized biosolids are then removed from the plant by a biosolids disposal contractor and applied in bulk as a soil amendment/fertilizer to agricultural fields, mostly in Maryland.

The reliability of a land application program for biosolids is dependent on the availability of application sites, which is in turn a function of landowner perception of the program, cropping practices, regulatory constraints, and the amount of undeveloped land available. Currently, this operation is contracted to a biosolids disposal contractor that is responsible for locating sites for land spreading the stabilized biosolids and obtaining the required permits for hauling, handling and application of the biosolids. The contractor may at its option haul biosolids to a landfill outside of Howard County for disposal.

In 2006, a comprehensive biosolids management study was completed for LPWRP. The study evaluated biosolids treatment and disposal options to identify the long term approach best suited for the Little Patuxent Plant and recommended continued reliance on land application with landfilling as a standby option. A biosolids processing train was constructed as part of the LPWRP Sixth Addition improvement project and consisted of gravity thickening of primary solids, flotation thickening of waste activated biosolids, blending of thickened solids, dewatering with centrifuges, and lime stabilization or pasteurization. The LPWRP Seventh Addition improvement project, completed in 2012, added a third centrifuge to augment two existing centrifuges.

Recent and emerging regulatory changes in Maryland that prohibit winter land application and may prohibit the continued application of biosolids on a large number of farm fields threaten the long-term sustainability and cost-effectiveness of current biosolids management practices. In order to address the uncertainty of the regulatory environment and the costs and operational demands associated with lime stabilization process, Howard County commissioned the preparation of a Biosolids Master Plan for the Little Patuxent Water Reclamation Plant in 2013. The 2013 Biosolids Master Plan recommended that the County shift from lime stabilization and land application of biosolids to Anaerobic Digestion and Heat Drying (AD+HD) to produce a versatile biosolids product with multiple and diverse end use markets.

Table 16 presents the estimated biosolids production and **Table 16A** provides a summary of the biosolid treatment and disposal information for the Little Patuxent Plant.

4.12 Reclaimed Water System

Howard County has taken initiatives to develop a reclaimed water distribution system to provide an alternative to the consumption of potable water for non-potable water uses, and to provide beneficial use for the high quality water discharged from the Little Patuxent Water Reclamation Plant.

In June 2014, Howard County completed the preparation of two planning documents for reclaimed water: the "Conceptual Reclaimed Water System Master Plan" and "Reclaimed Water Management (RWM) Plan". The Conceptual Reclaimed Water System Master Plan provides a conceptual plan for development of the reclaimed water system including a conceptual layout and staging plan for the system. The Reclaimed Water Management (RWM) Plan is a supplement to the Master Plan and provides additional detail regarding reclaimed water production and treatment, transmission and distribution, market and customer development, monitoring and reporting, and public health and safety controls. The RWM Plan was produced in accordance with the standards and specifications of the Maryland Department of Environment as outlined in Chapter 7 of the proposed "Guidelines for Use of Reclaimed Water" and is included as EXHIBIT 11.

In addition to the Reclaimed Water Master and Management Plans, Capital Project W-8325: Reclaimed Water System Development was established by the County to develop a market for reclaimed water and to plan, design and construct a reclaimed water system to serve the eastern portion of the County with reclaimed water from the Little Patuxent Water Reclamation Plant. The capital project provides funding to extend a reclaimed water pipeline from the LPWRP to an existing 2.5 million gallon water storage tank that will be modified for use as a reclaimed water storage facility.

All reclaimed water utilized in Howard County is expected to be obtained from the high quality effluent produced by the Little Patuxent Water Reclamation Plant (LPWRP). The rated capacity of LPWRP is 29.0 mgd, however the current average daily flow is approximately 20 mgd, all of which is available for use as reclaimed water. Based on the standards established within the MDE "Guidelines for Use of Reclaimed Water", the effluent discharge from LPWRP complies with the standards for Class IV water quality, which is suitable for all approved reclaimed water uses.

Howard County is currently in the process of implementing a reclaimed water system in association with Fort Meade in Anne Arundel County to reduce the Fort's dependency on

groundwater for non-potable water use. The Fort Meade reclaimed water system is a 5.0 MGD facility consisting of an outfall diversion structure, pumping station, an elevated storage tank and a reclaimed water distribution system for the Fort George Meade east campus expansion. The project will reduce Fort Meade's dependency on groundwater from a hydraulically stressed aquifer. The system is projected to utilize 1.62 MGD of reclaimed water obtained from the effluent pipeline of the Little Patuxent Water Reclamation Plant (LPWRP) starting in 2015, and gradually increase withdrawals from the pipeline to approximately 5.0 mgd by 2025. The NPDES permit for the LPWRP was modified to incorporate this system as another outfall (Discharge Point 102- Reclaimed Water Pumping Station) which includes monitoring and reporting the flow through the monthly Discharge Monitoring Reports (DMR's).

Several other commercial entities including Dreyer's Grand Ice Cream, Inc. and Laurel Sand and Gravel, Inc. have expressed mild interest in the potential use of reclaimed water but have not proceeded with plans to facilitate connection to the system.

4.13 Septage Collection and Treatment

Fourteen percent of the population of Howard County comprising approximately 13,560 households and a small number of businesses within and outside of the Planned Sewer Service Area utilize private on-site septic systems or shared sewage disposal facilities for sewage treatment. These systems utilize septic tanks and holding tanks to collect and separate the settleable and floating solids from the liquid waste and retain the waste for eventual removal and disposal at a septage receiving facility.

Septic tanks require periodic cleaning and maintenance to maintain optimum performance of the soil treatment system. The usual procedure is to pump out the entire contents of the tank each time the tank is cleaned out. The quantity of septage produced by each unit is affected by the number of persons served by the unit, waste characteristics and volume, the size of the septic tank unit and the cleaning frequency. Using a typical value of 100 gallons of septage waste production per person per year, the total volume of septage waste generated annually and stored within septic tanks in Howard County is estimated as follows:

Year 2015: 43,947 persons x 100 gals/year = 4.4 million gallons/year
Year 2040: 50,918 persons x 100 gals/year = 5.1 million gallons/year

The sole designated location for disposal of septage waste in Howard County is the Little Patuxent Water Reclamation Plant. The County's primary objectives for receiving

hauled wastes are to (1) prevent illegal dumping, and (2) provide a service for County residents in rural areas and County businesses.

Comprehensive administrative and operational controls have been in place for several years to manage septage waste at this facility. Septage haulers desiring to discharge collected waste at the plant must obtain both an operating permit from the Howard County Health Department as well as a discharge permit from the treatment plant. The discharge permit specifies rules and conditions which must be satisfied by the septage hauler to retain permission to discharge at the plant. Haulers must maintain records of customers serviced, maintain their equipment in good operating condition, follow certain operational procedures while on the plant site, and provide the County with a Surety (bond, deposit, etc.) that can be applied against any overdue charges or damages.

In February 2013, Howard County completed construction of a Septage Acceptance Plant (SAP) and Aerobic Digester (AD) for grease pretreatment within the Little Patuxent Water Reclamation Plant. Prior to construction of the SAP and AD, waste haulers dumped their wastes into an influent manhole at the plant and weighed their trucks before and after discharging to determine the amount of waste discharged. The plant experienced operational and maintenance problems including excessive fouling of equipment resulting from grease accumulation at various locations in the plant. Following construction and implementation of the pretreatment facilities including the SAP and AD processes, the negative impacts of receiving hauled waste have been reduced.

A. Historical Loadings at the LPWRP Septage Receiving Facility

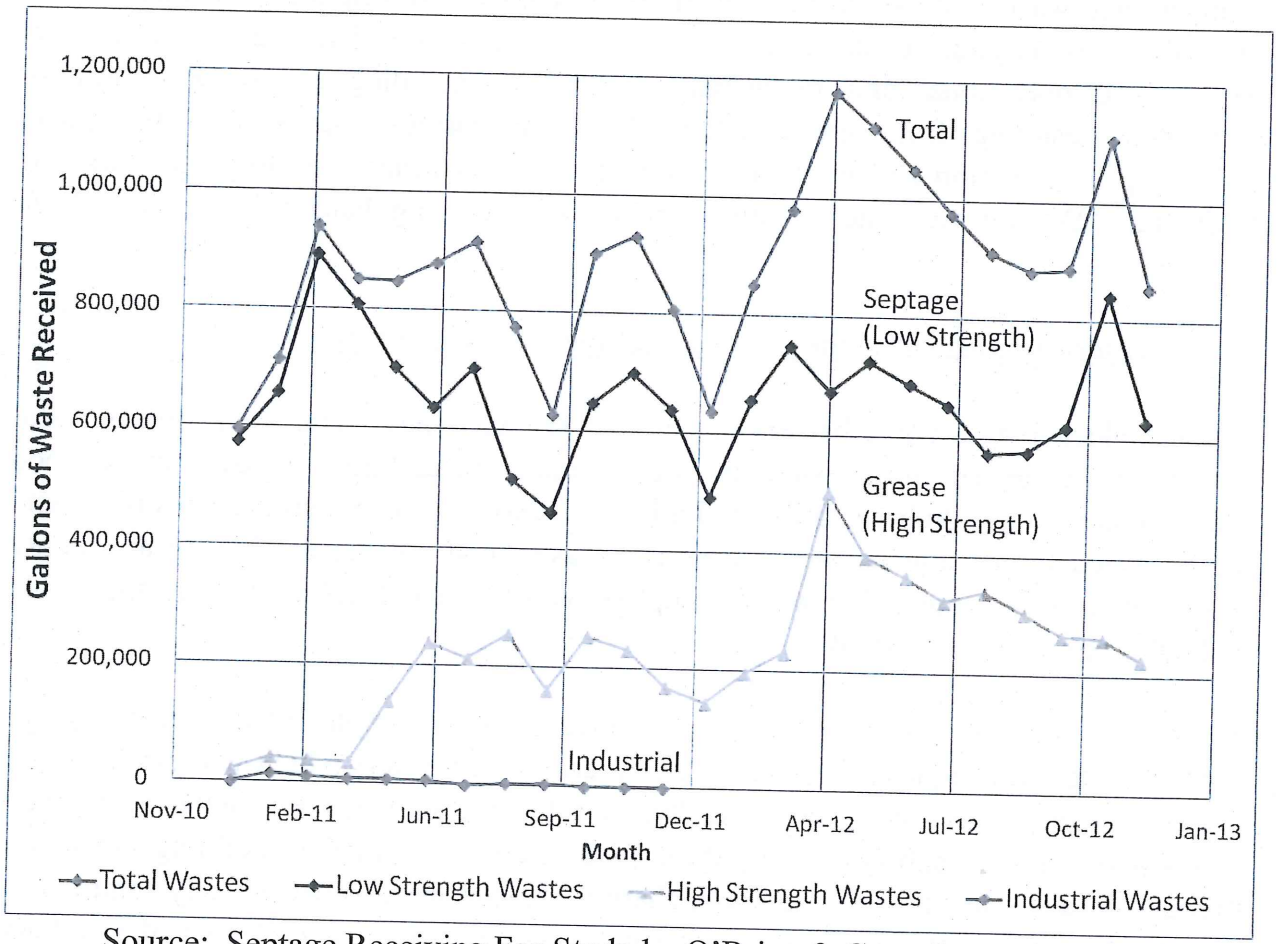
Waste collected by septage haulers consists of several types. The predominant waste type is that collected from residential septic tanks. In addition, grease traps at food preparation facilities, holding tanks, and a limited amount of commercial/industrial waste are collected by septage haulers. Industrial wastes may not be discharged at County receiving facilities unless that waste complies with adopted local as well as applicable Federal pretreatment standards.

A sampling program was implemented to collect random samples of delivered septage waste. Collected samples are routinely analyzed for parameters which will establish the strength of the waste loads. Specifically, samples are analyzed for BOD, Suspended Solids and Total Phosphorous since these parameters are critical in defining the waste strength for assessment of high strength charges. Loads are also periodically sampled to test for other pollutants such as heavy metals. Samples may be collected of any load which appears to be industrial in nature. Haulers of industrial waste are required to

obtain prior permission from the treatment plant prior to discharge. If such permission is not obtained and a load is delivered for disposal, that load may be visually inspected and sampled to insure pretreatment standards compliance.

The County maintains records of the high, low, and industrial strength wastes received to help in the billing process of septage receiving. In 2011, the LPWRP received a total of 9,800,000 gallons of hauled waste from 14 different waste haulers. Of the total waste received that year, 81% was defined as low strength waste (7.9 million gallons), 18% was designated high strength wastes (1.8 million gallons) and 1% was industrial waste (51,000 gallons). All of the industrial flow received in 2011 was from a single waste hauler.

In 2012, the total gallons of hauled waste received increased by approximately 17%, with a total of 11.4 million gallons of hauled waste received that year. The facility again received waste from 14 different haulers; however, the haulers were not all the same haulers that discharged in 2011.



Source: Septage Receiving Fee Study by O'Brien & Gere, September 2013

While the overall total increased in 2012, the volume of septage (i.e., low strength waste) received in 2012 remained fairly similar (1% difference) to the volume of septage received in 2011. In addition, no industrial wastes were discharged in 2012. The increase in overall gallons received was due to an increase in high strength wastes, which was almost double the volume received in 2011.

From 2011 to 2012, the LPWRP received an average of 10,609,944 gallons of hauled waste per year, or approximately 29,000 gallons per day (GPD). During the monitoring period, approximately 75% of the received hauled waste was low strength and the remaining 25% was high strength waste.

B. Anticipated Loadings

Overall, the total septage and grease received at LPWRP increased through the time period reviewed (2011-2012). Despite the overall increase, the data suggested that the overall increase really corresponded to the overall increase in grease received through the time period reviewed. There did not appear to be a specific seasonal trend; the loadings varied year-to-year and season-to-season. Despite the overall increase in grease, there was also a recent downward trend, beginning in April 2012 that started to show the volume of grease received returning to lower volumes. Despite these fluctuations, the amount of low strength or septage waste through the time period appeared to remain fairly stable.

While the County experienced a downturn in grease reception in 2012, it is noteworthy that WSSC announced that it will stop receiving wastes from outside of the Blue Plains service area (Prince George's County, Montgomery County, Fairfax County and Loudon County). The outside haulers that hauled septage to WSSC facilities will need a new station to discharge and may come to Howard County to do so, if permitted, which will increase the grease received. This may offset the recent downturn in numbers.

Septage or low-strength waste reception seems steady; however, WSSC's recent change in septage origin policy may initiate additional grease loadings at LPWRP.

4.14 Financing Sewerage Improvements

The Department of Public Works assumed the functions of the Howard County Metropolitan Commission when the County Charter was adopted in 1968. Under the

Charter and existing local public laws, the following charges are authorized to finance the construction, operation, maintenance and administration of sewerage facilities:

1. Ad Valorem Assessment
2. Front Foot Benefit Assessment
3. In-Aid-of-Construction Charge
4. Sewer House Connection Fees
5. Sewer User Charges and Surcharges
6. Reclaimed Water User Charges
7. Operation and Maintenance Fee, Shared Sewage Disposal Facilities
8. Other Sources of Sewerage System Funds

A. Ad Valorem Assessment

A yearly levy of $0.08 per $100 of assessed property value is made against all properties within the Metropolitan District. The assessment is a source of revenue designated to cover the cost of retiring bonds issued by the County and can be used to cover the payment of salaries and other expenses of the Department of Public Works related to the water and sewerage systems.

B. Front Foot Benefit Assessment

The front foot benefit assessment is levied against all properties provided with sewer service and the revenue is used for bond debt service. The residential front foot assessment rate for FY2015 (July 1, 2014-June 30, 2015) is $1.13 per foot for the first 150 feet, $0.85 for the next 150 feet, and $0.42 per foot for additional footage. The commercial front foot assessment rate for sewer service is $1.41 per foot of total frontage. Front Foot Benefit Assessments are no longer applied to capital projects funded after FY2005.

C. Sewer In-Aid-of-Construction Charge (Sewer IACC)

This fee is applicable to all users of the sewer system and is a source of revenue designated to cover the cost to Howard County of construction or purchase of public sewer facilities which serve or will serve all properties connected to the system, whether or not these facilities are located in the County. The fee structure was modified for Fiscal Year 2012, and is now a one-time charge based on the size of the water meter, with additional fees collected if a change in meter size is required. The current fee structure is tabulated as follows:

Size of Water Meter	Sewer IACC Fee (FY2015)
5/8 – 1"	$600
1 ½"	$4800
2"	$7680
3"	$16,800
4"	$28,800
6"	$64,800
8"	$230,400
10"	$336,000
12"	$422,400

The above charges, fees, and assessments are reviewed and readopted annually by the County Council with appropriate changes.

D. Sewer House Connection Fees

After June 30, 2007, individual residential connections to the public sewer system are performed by Howard County licensed on-site utility contractors under contract with the property owner. The County charges a $300 inspection and administration fee and holds a 10% retainer based on the estimated construction cost. Under special circumstances as approved by the Director of Public Works, a one-time charge may be used for connections to the public sewer system that are constructed under Howard County capital projects. This charge covers the construction of the connection from the sewer lines in the public right-of-way to the abutting property line of the property served. Under these special circumstances, an individual homeowner is charged $4500 for a 4 inch sewer connection to a residential property. Connections larger than 4-inches and sewer connections for commercial properties will continue to be performed by the Advanced Deposit Order (ADO) process.

E. Sewer User Charges and Surcharges

Metered water consumption is the basis for the sewer user charge. The sewer user charge rate for FY 15 is $3.10 per unit (1 unit = 100 cubic feet), and a quarterly account user charge of $11.13. A flat rate of $81.23/quarter is charged to customers with sewer service but no water service. Additional surcharges are charged to non-residential sewer system users discharging wastes which exceed established concentration limits for BOD, suspended solids and phosphorus. Revenues collected recover costs incurred in the

operation and maintenance of the sewerage system by the jurisdictions collecting and treating the flows generated.

F. Reclaimed Water User Charges

Since reclaimed water is a byproduct of the wastewater treatment process, there is no cost for supply. However there is the cost for initial construction of the distribution system and operation & maintenance. Initial construction of reclaimed water facilities will be funded through bonds. User fees based on the amount of reclaimed water used and ad valorem charges will be used to retire bonds and for normal operation & maintenance. Reclaimed water user rates are established on a volumetric basis. The FY 15 rates are as follows:

Volumetric Rate	$1.22/ 100 cu ft.	
Quarterly Account User Fee	5/8"-1" meter	$ 14.57
	1 ½" – 3" meter	$ 47.04
	4" and over	$ 239.20

G. Operation and Maintenance Fee, Shared Sewage Disposal Systems

The owner of each lot connected to a shared sewage disposal system (SSDS) shall pay the County an annual fee for the operation and maintenance of the facility. The fee consists of three funds:

(1) a fund for the routine operation and maintenance of the SSDS
(2) a replacement fund for the expected replacement of the SSDS
(3) an insurance fund to cover unplanned major replacement costs

User fees are based upon the projected yearly operation and maintenance costs for each type of system. In FY15, users of systems that operate with a MDE issued discharge permit have an annual charge of $1,100 per year, users of systems without a permit have an annual charge of $535 per year and users of the Sheppard Manor system have an annual charge of $6,000 per year.

H. Other Sources of Sewerage System Funds

In addition to fees and charges to property owners as sources of construction revenue, the County has the following sources of funds:

1. Federal Grants
2. State Assistance

3. Chesapeake Bay Restoration Fund
4. Developer Agreements
5. Interest Income

- State Assistance - In response to the 1987 Clean Water Act the Maryland Water Quality Revolving Loan Fund was created. The Fund is being capitalized primarily by Federal grants and matching funds from the State. The Fund is used to finance loans to local governments for municipal wastewater treatment projects and other water quality projects such as sewer interceptor construction and rehabilitation. Loans made to local governments must be paid back in full, but interest rates charged on the loans are at below market interest rates. In addition, the Water Quality Financing Administration, with monies provided under the Bay Restoration Fund Act, provides grant funding for Enhanced Nutrient Removal (ENR) upgrades to existing treatment facilities. The seventh addition to the LPWRP has qualified for grant funding for its ENR portion of the upgrade.

- Developer Agreements - The Developer Agreement is a method for financing the construction of collector sewers and shared waste disposal facilities in new subdivisions. For collector sewers the developer advances the total system construction cost including engineering and administrative expenses. Prior to 2005, after connection to the system, the developer was rebated for each single-family detached residential lot fronting on and served by the sewer line constructed under the Developer Agreement, and may have recovered up to 100% of the construction costs. Rebates varied for other types of residential, commercial and industrial properties. For shared waste disposal facilities, the developer posts security guaranteeing the construction and warranty of the facilities. No rebates are applicable. After 2005, the Developer rebate program was ended for all new subdivisions, and the developer can recover his construction costs through the price of the lot or through creation of a private water company (under Maryland State Law) to bill the costs through the users.

  Refunds for major sewer facilities are covered by separate Developer Major Facility Agreements. Refunds are paid to the developer based on connections by properties served by the major sewer facilities. These refunds may be based on the In-Aid-of-Construction charges collected for each connection or a percentage of ad valorem taxes collected for properties served by the facility or any combination of these. The maximum refund paid to the developer shall not exceed 100% of the project construction cost. Agreements for major facilities are effective for 10 years after which no further refunds are paid to the developer.

- Interest Income - Proceeds from bonds and revenues earmarked for construction are invested and earn interest until they are needed. Due to the irregularity of disbursements and receipts, annual interest income varies considerably.

4.15 Financial Management Plan

The Department of Public Works is responsible for operating and maintaining all public sewer facilities in Howard County. A Water and Sewer Enterprise Fund was established to provide the funding mechanism for the operation and maintenance of the public sewer system as well as to provide financing for the retirement of debt incurred for the construction of the sewer system. This Fund is financed through the use of user charges, front foot benefit and ad valorem assessments, connection fees, in-aid-of-construction fees, and other revenue sources as shown in Schedule FS - Financial Management Statistics. Schedule FS- Financial Management Statistics provides a summary of the expenses incurred and revenues received by the County's Water and Sewer Fund for Fiscal Years 2012, 2013 and 2014.

In addition, the portion of Howard County in the Patapsco sewer service area is provided wastewater treatment services by Baltimore City at the Patapsco Wastewater Treatment Plant. Sewage from Howard County must first flow through the Patapsco Interceptor in Baltimore County before reaching the Patapsco Wastewater Treatment Plant. Howard County has several sewer service agreements with Baltimore County which provide the mechanism for Howard County to pay for these wastewater conveyance and treatment services. Baltimore County, in turn, has similar agreements with Baltimore City.

SCHEDULE FS

FINANCIAL MANAGEMENT STATISTICS

COUNTY WATER & SEWER PLANS

County Name: Howard

System Name: Patuxent/Patapsco

Fiscal Year # 1 FY12
Fiscal Year #2 FY13
Fiscal Year #3 FY14

A: FISCAL YEAR (Combined W&S)	FY 12	FY 13	FY 14
B: User (W&S) Charge Revenue	$44,415,649	$47,540,099	$52,558,292
C: Misc Sales	$3,234,841	$4,325,626	$4,742,596
D: Total Operating Revenue	$47,650,490	$51,865,725	$57,300,888
E: Other Revenue (see page 2)	$32,549,816	$31,768,153	$31,656,579
F: Total Revenue	$80,200,306	$83,633,878	$82,957,467
G: Operations Expense	$8,639,533	$8,902,114	$9,347,249
H: Maintenance Expense	$8,639,533	$8,902,114	$9,347,249
I: Replacement Expense	$8,639,534	$8,902,115	$9,347,250
J: Fees Paid to Other Jurisdictions	$19,614,655	$19,901,479	$23,242,984
K: Total O,M & R (1)	$45,533,255	$46,607,822	$51,284,733
L: Interest Expense (2)	$8,189,329	$8,891,733	$9,185,598
M: Depreciation Expense	$14,210,826	$18,300,074	$18,981,709
N: Total Expense	$67,933,390	$73,799,579	$79,452,040
O: Debt Interest	$109,427,770	$114,621,216	$115,604,931
P: Debt Principal (2)	$230,582,942	$247,620,116	$306,860,789
Q: Total Flow Volume, MG (combined W&S)	18,141	17,812	18,323

Source: Comprehensive Annual Financial Report (CAFR)

R: Extraordinary repairs and maintenance are those that are of such nature as to be beyond those in the annual budget. Examples of "extraordinary" breakdowns may include failure of a blower in the aeration system, large pump system motor and control failure, clarifier sludge scraper arm and bearing failures, etc. Please identify the most costly potential repair and maintenance problem for this sewage system.

Sewerage System: Howard County operates only one wastewater treatment, the Little Patuxent Water Reclamation Plant in Savage, MD. The plant has a design capacity of 29.0 Million Gallons per Day and provides enhanced biological nutrient removal and treatment (ENR). Due to the numerous and complex interrelated treatment systems, it is not practical to identify one item as the single most costly repair and maintenance problem.

Water Supply System: Howard County purchases 100% of its water from Baltimore City and the Washington Suburban Sanitary Commission.

S: Approximate cost of (extraordinary) repair: Up to $100,000 per event.

T: Describe the source of funds to cover this extraordinary item (a bond, line of credit, escrow account, working capital, etc.)

The cost of these unplanned expenses are covered by surpluses contained in the existing budget.

U: Additional comments:

Due to the nature of the budget process in Howard County, it is not feasible to precisely separate all revenues and expenses incurred during operation of the County's public water system from those associated with operation of the public sewer system. Therefore, for the purposes of this report, combined revenues and expenses have been shown equally based on the cost of operation, maintenance and replacement for the County public water and sewer systems.

V: Detail of other revenue on line E (if applicable)

Non-Operating Revenues	**Year 2012**	**Year 2013**	**Year 2014**
	Amount	Amount	Amount
Ad Valorem	$29,880,497	$29,006,605	$29,196,783
Interest on Investment	$140,567	$146,756	$132,869
Other	$(318,913)	$(33,059)	$71,879
Water/Sewer Assessment Charges	$2,757,412	$2,760,499	$2,420,937
Interest Expenses	$(8,189,329)	$(8,891,733)	$9,185,598)
TOTAL	$24,270,234	$22,989,068	$22,636,870

Capacity (water) 41.5 MGD;
(sewer) 41.4 MGD

Users (2014) Residential: 71,000 accounts
Commercial: 4,042 accounts

User Rates & Fees (2014)
Water (a) Winter rate= $1.93 per 100 cu. ft.
(b) Summer rate= $2.15 per 100 cu. ft.

Wastewater rate= $3.10 per 100 cu. ft.

Contact Person Name: Jeffrey K. Welty
Address: Howard County, Bureau of Utilities
8250 Old Montgomery Road
Columbia, MD 21045
Telephone: 410-313-4900

CHAPTER 4

TABLES AND FIGURES

TABLE 9
PROJECTED SEWER FLOWS & CAPACITIES

Sewer Drainage Basin	Household Population			Average Flow (MGD)		Available or Planned Treatment Capacity (MGD)
	Total	Unserved	Served			
2015						
NPS & AR	43,947	43,947	0			0.00
Patuxent	148,454	0	148,454	17.87	22.09	29.00
Rt 108 SPS	39,632	0	39,632	4.22		
Patapsco	74,572	0	74,572	5.48		12.40
TOTAL	**306,606**	**43,947**	**262,658**	**27.57**		**41.40**
2020						
NPS & AR	45,232	45,232	0			0.00
Patuxent	157,124	0	157,124	18.82	23.52	29.00
Rt 108 SPS	43,473	0	43,473	4.71		
Patapsco	83,970	0	83,970	6.00		12.40
TOTAL	**329,800**	**45,232**	**284,568**	**29.53**		**41.40**
2025						
NPS & AR	46,319	46,319	0			0.00
Patuxent	163,372	0	163,372	19.44	24.50	29.00
Rt 108 SPS	45,824	0	45,824	5.06		
Patapsco	88,534	0	88,534	6.38		12.40
TOTAL	**344,048**	**46,319**	**297,729**	**30.88**		**41.40**
2030						
NPS & AR	47,856	47,856	0			0.00
Patuxent	168,852	0	168,852	20.10	25.33	29.00
Rt 108 SPS	46,764	0	46,764	5.23		
Patapsco	91,158	0	91,158	6.59		12.40
TOTAL	**354,630**	**47,856**	**306,774**	**31.91**		**41.40**
2035						
NPS & AR	49,381	49,381	0			0.00
Patuxent	172,557	0	172,557	20.48	25.72	29.00
Rt 108 SPS	46,776	0	46,776	5.24		
Patapsco	92,320	0	92,320	6.68		12.40
TOTAL	**361,034**	**49,381**	**311,653**	**32.40**		**41.40**
2040						
NPS & AR	50,918	50,918	0			0.00
Patuxent	173,796	0	173,796	20.62	25.85	29.00
Rt 108 SPS	46,776	0	46,776	5.24		
Patapsco	92,399	0	92,399	6.73		12.40
TOTAL	**363,890**	**50,918**	**312,972**	**32.58**		**41.40**

NPS = No Planned Service Area

AR = Alpha Ridge Water Service Area (No Planned Sewer Service)

TABLE 9A
FLOW PROJECTIONS BY DRAINAGE AREA (MGD)

2015

Location Code	Subdrainage Area	Population Served	Average Residential Flow[1]	Industrial Commercial Acres	Average Industrial Commercial Flow[2]	Average I&I Flow[3]	Total Average Flow
DR	DORSEY RUN PUMPING STATION	9,759	0.59	1,441	0.70	0.51	1.80
GR1	GUILFORD RUN (LP WRP)	189	0.01	489	0.64	0.26	0.91
GR2	GUILFORD RUN (ANNAPOLIS	6,493	0.35	716	0.23	0.23	0.81
HB1	HAMMOND BRANCH	0	0.00	73	0.01	0.01	0.02
HB2	HAMMOND BRANCH	17,214	1.39	264	0.43	0.72	2.54
HB3	HAMMOND BRANCH	1,554	0.13	93	0.35	0.19	0.68
LP1	LITTLE PATUXENT	3,777	0.19	173	0.04	0.09	0.33
LP2	LITTLE PATUXENT	68,230	3.73	1,414	1.15	1.94	6.82
MP	MIDDLE PATUXENT	29,608	1.73	666	0.39	0.84	2.96
NL1	NORTH LAUREL PUMPING	11,630	0.65	144	0.08	0.29	1.02
PS1	RT 108 PUMPING STATION	39,632	2.71	388	0.30	1.20	4.22
	Total Patuxent	188,087	11.47	5,860	4.33	6.29	**22.09**
BB1	BONNIE BRANCH (METER)	6,595	0.40	10	0.03	0.06	0.49
BB2	BONNIE BRANCH (ROCKBURN	2,083	0.10	0	0.00	0.02	0.12
D	DANIELS AREA	1,616	0.09	15	0.00	0.01	0.11
DP1	DEEP RUN	2,819	0.16	408	0.30	0.07	0.53
DP2	DEEP RUN	2,664	0.15	73	0.04	0.03	0.22
DP3	DEEP RUN	5,104	0.26	263	0.04	0.05	0.35
DP5	DEEP RUN	8,629	0.53	524	0.15	0.10	0.78
DP8	DEEP RUN	328	0.02	375	0.05	0.01	0.07
DP11	DEEP RUN	19,147	0.59	128	0.10	0.10	0.80
EC	ELLICOTT CITY	9,079	0.46	150	0.17	0.10	0.73
RB	ROCKBURN BRANCH	2,293	0.10	0	0.00	0.02	0.12
SB1	SUCKER BRANCH	5,956	0.39	22	0.03	0.06	0.48
SB2	SUCKER BRANCH	8,258	0.47	131	0.12	0.09	0.68
	Total Patapsco	74,572	3.72	2,100	1.05	0.71	**5.48**
	Total in PSA	262,658	15.19	7,960	5.38	7.00	**27.57**

2020

Location Code	Subdrainage Area	Population Served	Average Residential Flow[1]	Industrial Commercial Acres	Average Industrial Commercial Flow[2]	Average I&I Flow[3]	Total Average Flow
DR	DORSEY RUN PUMPING STATION	10,212	0.61	1,487	0.73	0.53	1.87
GR1	GUILFORD RUN (LP WRP)	757	0.04	496	0.64	0.27	0.95
GR2	GUILFORD RUN (ANNAPOLIS	6,644	0.35	736	0.25	0.24	0.84
HB1	HAMMOND BRANCH	0	0.00	75	0.02	0.01	0.02
HB2	HAMMOND BRANCH	18,474	1.46	354	0.50	0.78	2.74
HB3	HAMMOND BRANCH	1,573	0.13	93	0.35	0.19	0.68
LP1	LITTLE PATUXENT	3,818	0.19	176	0.04	0.10	0.33
LP2	LITTLE PATUXENT	70,772	3.88	1,450	1.17	2.01	7.07
MP	MIDDLE PATUXENT	30,929	1.80	712	0.42	0.88	3.11
NL1	NORTH LAUREL PUMPING	13,946	0.77	155	0.09	0.34	1.20
PS1	RT 108 PUMPING STATION	43,473	3.02	431	0.35	1.34	4.71
	Total Patuxent	200,598	12.27	6,166	4.56	6.70	**23.52**
BB1	BONNIE BRANCH (METER)	7,050	0.42	10	0.03	0.07	0.52
BB2	BONNIE BRANCH (ROCKBURN	2,087	0.10	0	0.00	0.02	0.12
D	DANIELS AREA	1,690	0.10	15	0.00	0.01	0.11
DP1	DEEP RUN	5,388	0.30	445	0.32	0.09	0.72
DP2	DEEP RUN	2,965	0.17	74	0.04	0.03	0.24
DP3	DEEP RUN	5,179	0.27	271	0.05	0.05	0.36
DP5	DEEP RUN	8,837	0.54	559	0.18	0.11	0.82
DP8	DEEP RUN	756	0.04	423	0.07	0.02	0.13
DP11	DEEP RUN	22,719	0.63	131	0.11	0.11	0.85
EC	ELLICOTT CITY	9,190	0.47	150	0.17	0.10	0.74
RB	ROCKBURN BRANCH	2,548	0.11	0	0.00	0.02	0.13
SB1	SUCKER BRANCH	6,121	0.40	25	0.04	0.06	0.50
SB2	SUCKER BRANCH	9,439	0.53	147	0.13	0.10	0.77
	Total Patapsco	83,970	4.08	2,250	1.14	0.78	**6.00**
	Total in PSA	284,568	16.34	8,416	5.70	7.48	**29.53**

Notes:

1. Ave Residential Flow (gcpd) is based on existing residential use summarized by flow meter drainage area and DPZ population projections.
2. Ave Industrial Commercial Flow is based on existing use plus the incremental acreage provided by DPZ multiplied by
3. I/I Contribution is based on the Allocation Report comparison of metered flows versus billed water usage as follows:

PATUXENT = 72% of Total Average Flow attributed to Water Usage
PATAPSCO = 87% of Total Average Flow attributed to Water Usage

TABLE 9A
FLOW PROJECTIONS BY DRAINAGE AREA (MGD)

2025

Location Code	Subdrainage Area	Population Served	Average Residential Flow[1]	Industrial Commercial Acres	Average Industrial Commercial Flow[2]	Average I&I Flow[3]	Total Average Flow
DR	DORSEY RUN PUMPING	11,289	0.67	1,542	0.76	0.57	2.00
GR1	GUILFORD RUN (LP WRP)	750	0.04	510	0.65	0.27	0.96
GR2	GUILFORD RUN	6,819	0.36	745	0.25	0.24	0.86
HB1	HAMMOND BRANCH	0	0.00	75	0.02	0.01	0.02
HB2	HAMMOND BRANCH	19,792	1.53	377	0.52	0.82	2.86
HB3	HAMMOND BRANCH	1,684	0.17	94	0.36	0.21	0.73
LP1	LITTLE PATUXENT	3,868	0.20	176	0.04	0.10	0.34
LP2	LITTLE PATUXENT	72,885	4.01	1,452	1.18	2.06	7.25
MP	MIDDLE PATUXENT	31,456	1.83	724	0.43	0.90	3.16
NL1	NORTH LAUREL PUMPING	14,829	0.80	163	0.09	0.36	1.25
PS1	RT 108 PUMPING STATION	45,824	3.23	466	0.38	1.44	5.06
	Total Patuxent	209,195	12.85	6,325	4.68	6.97	**24.50**
BB1	BONNIE BRANCH (METER)	7,683	0.45	10	0.03	0.07	0.55
BB2	BONNIE BRANCH	2,100	0.10	0	0.00	0.02	0.12
D	DANIELS AREA	1,889	0.11	15	0.00	0.02	0.13
DP1	DEEP RUN	5,509	0.33	464	0.33	0.10	0.77
DP2	DEEP RUN	3,787	0.21	76	0.04	0.04	0.29
DP3	DEEP RUN	5,381	0.28	289	0.06	0.05	0.39
DP5	DEEP RUN	9,243	0.58	572	0.18	0.11	0.88
DP8	DEEP RUN	1,158	0.06	445	0.08	0.02	0.16
DP11	DEEP RUN	23,231	0.66	157	0.13	0.12	0.91
EC	ELLICOTT CITY	9,403	0.48	150	0.17	0.10	0.75
RB	ROCKBURN BRANCH	3,150	0.13	0	0.00	0.02	0.15
SB1	SUCKER BRANCH	6,281	0.40	25	0.04	0.07	0.51
SB2	SUCKER BRANCH	9,722	0.55	147	0.13	0.10	0.78
	Total Patapsco	88,534	4.34	2,351	1.20	0.83	**6.38**
	Total in PSA	297,729	17.19	8,675	5.88	7.81	**30.88**

2030

Location Code	Subdrainage Area	Population Served	Average Residential Flow[1]	Industrial Commercial Acres	Average Industrial Commercial Flow[2]	Average I&I Flow[3]	Total Average Flow
DR	DORSEY RUN PUMPING	12,290	0.73	1,566	0.77	0.60	2.10
GR1	GUILFORD RUN (LP WRP)	750	0.04	512	0.65	0.27	0.97
GR2	GUILFORD RUN	6,837	0.36	760	0.26	0.25	0.87
HB1	HAMMOND BRANCH	0	0.00	86	0.02	0.01	0.03
HB2	HAMMOND BRANCH	20,478	1.57	430	0.55	0.84	2.97
HB3	HAMMOND BRANCH	1,684	0.21	100	0.39	0.24	0.84
LP1	LITTLE PATUXENT	3,875	0.20	177	0.05	0.10	0.34
LP2	LITTLE PATUXENT	75,667	4.17	1,452	1.18	2.13	7.47
MP	MIDDLE PATUXENT	31,656	1.84	774	0.47	0.92	3.23
NL1	NORTH LAUREL PUMPING	15,615	0.81	217	0.10	0.37	1.28
PS1	RT 108 PUMPING STATION	46,764	3.33	495	0.40	1.49	5.23
	Total Patuxent	215,616	13.28	6,568	4.84	7.21	**25.33**
BB1	BONNIE BRANCH (METER)	7,984	0.46	10	0.03	0.07	0.56
BB2	BONNIE BRANCH	2,115	0.11	0	0.00	0.02	0.12
D	DANIELS AREA	1,935	0.11	15	0.00	0.02	0.13
DP1	DEEP RUN	6,055	0.37	503	0.35	0.11	0.84
DP2	DEEP RUN	4,004	0.22	76	0.04	0.04	0.30
DP3	DEEP RUN	5,437	0.28	300	0.07	0.05	0.40
DP5	DEEP RUN	9,465	0.59	576	0.19	0.12	0.90
DP8	DEEP RUN	1,672	0.09	449	0.09	0.03	0.20
DP11	DEEP RUN	23,397	0.67	168	0.13	0.12	0.92
EC	ELLICOTT CITY	9,614	0.49	150	0.17	0.10	0.76
RB	ROCKBURN BRANCH	3,243	0.13	0	0.00	0.02	0.16
SB1	SUCKER BRANCH	6,440	0.41	25	0.04	0.07	0.52
SB2	SUCKER BRANCH	9,799	0.55	147	0.13	0.10	0.79
	Total Patapsco	91,158	4.49	2,418	1.24	0.86	**6.59**
	Total in PSA	306,774	17.76	8,986	6.08	8.07	**31.91**

Notes:

1. Ave Residential Flow (gcpd) is based on existing residential use summarized by flow meter drainage area and DPZ population projections.
2. Ave Industrial Commercial Flow is based on existing use plus the incremental acreage provided by DPZ
3. I/I Contribution is based on the Allocation Report comparison of metered flows versus billed water usage as follows:

PATUXENT = 72% of Total Average Flow attributed to Water Usage
PATAPSCO = 87% of Total Average Flow attributed to Water Usage

TABLE 9A
FLOW PROJECTIONS BY DRAINAGE AREA (MGD)

2035

Location Code	Subdrainage Area	Population Served	Average Residential Flow[1]	Industrial Commercial Acres	Average Industrial Commercial Flow[2]	Average I&I Flow[3]	Total Average Flow
DR	DORSEY RUN PUMPING	12,299	0.73	1,583	0.78	0.60	2.11
GR1	GUILFORD RUN (LP WRP)	750	0.04	512	0.65	0.27	0.97
GR2	GUILFORD RUN	7,029	0.37	795	0.28	0.26	0.91
HB1	HAMMOND BRANCH	0	0.00	86	0.02	0.01	0.03
HB2	HAMMOND BRANCH	20,478	1.57	457	0.57	0.85	2.99
HB3	HAMMOND BRANCH	1,684	0.26	100	0.39	0.26	0.90
LP1	LITTLE PATUXENT	3,875	0.20	177	0.05	0.10	0.34
LP2	LITTLE PATUXENT	78,203	4.32	1,452	1.18	2.19	7.68
MP	MIDDLE PATUXENT	31,868	1.86	774	0.47	0.93	3.25
NL1	NORTH LAUREL PUMPING	16,371	0.83	217	0.10	0.37	1.30
PS1	RT 108 PUMPING STATION	46,776	3.34	505	0.41	1.49	5.24
	Total Patuxent	219,333	13.51	6,657	4.89	7.32	**25.72**
BB1	BONNIE BRANCH (METER)	7,984	0.46	10	0.03	0.07	0.56
BB2	BONNIE BRANCH	2,115	0.11	0	0.00	0.02	0.12
D	DANIELS AREA	1,935	0.11	15	0.00	0.02	0.13
DP1	DEEP RUN	6,441	0.39	524	0.37	0.11	0.87
DP2	DEEP RUN	4,004	0.22	76	0.04	0.04	0.30
DP3	DEEP RUN	5,437	0.28	300	0.07	0.05	0.40
DP5	DEEP RUN	9,692	0.61	576	0.19	0.12	0.91
DP8	DEEP RUN	2,208	0.12	459	0.09	0.03	0.24
DP11	DEEP RUN	23,409	0.67	168	0.13	0.12	0.92
EC	ELLICOTT CITY	9,614	0.49	150	0.17	0.10	0.76
RB	ROCKBURN BRANCH	3,243	0.13	0	0.00	0.02	0.16
SB1	SUCKER BRANCH	6,440	0.41	25	0.04	0.07	0.52
SB2	SUCKER BRANCH	9,799	0.55	147	0.13	0.10	0.79
	Total Patapsco	92,320	4.55	2,449	1.26	0.87	**6.68**
	Total in PSA	311,653	18.06	9,105	6.15	8.19	**32.40**

2040

Location Code	Subdrainage Area	Population Served	Average Residential Flow[1]	Industrial Commercial Acres	Average Industrial Commercial Flow[2]	Average I&I Flow[3]	Total Average Flow
DR	DORSEY RUN PUMPING	12,311	0.73	1,627	0.81	0.61	2.15
GR1	GUILFORD RUN (LP WRP)	750	0.04	512	0.65	0.27	0.97
GR2	GUILFORD RUN	7,032	0.37	795	0.28	0.26	0.91
HB1	HAMMOND BRANCH	0	0.00	86	0.02	0.01	0.03
HB2	HAMMOND BRANCH	20,478	1.57	457	0.57	0.85	2.99
HB3	HAMMOND BRANCH	1,684	0.27	100	0.39	0.26	0.91
LP1	LITTLE PATUXENT	3,875	0.20	177	0.05	0.10	0.34
LP2	LITTLE PATUXENT	78,512	4.34	1,452	1.18	2.19	7.71
MP	MIDDLE PATUXENT	32,567	1.90	774	0.47	0.94	3.31
NL1	NORTH LAUREL PUMPING	16,587	0.83	217	0.10	0.37	1.31
PS1	RT 108 PUMPING STATION	46,776	3.34	505	0.41	1.49	5.24
	Total Patuxent	220,572	13.58	6,701	4.91	7.36	**25.85**
BB1	BONNIE BRANCH (METER)	7,984	0.46	10	0.03	0.07	0.56
BB2	BONNIE BRANCH	2,115	0.11	0	0.00	0.02	0.12
D	DANIELS AREA	1,935	0.11	15	0.00	0.02	0.13
DP1	DEEP RUN	6,441	0.39	561	0.39	0.12	0.90
DP2	DEEP RUN	4,004	0.22	76	0.04	0.04	0.30
DP3	DEEP RUN	5,437	0.28	300	0.07	0.05	0.40
DP5	DEEP RUN	9,692	0.61	576	0.19	0.12	0.91
DP8	DEEP RUN	2,281	0.12	488	0.11	0.03	0.26
DP11	DEEP RUN	23,415	0.67	168	0.13	0.12	0.92
EC	ELLICOTT CITY	9,614	0.49	150	0.17	0.10	0.76
RB	ROCKBURN BRANCH	3,243	0.13	0	0.00	0.02	0.16
SB1	SUCKER BRANCH	6,440	0.41	25	0.04	0.07	0.52
SB2	SUCKER BRANCH	9,799	0.55	147	0.13	0.10	0.79
	Total Patapsco	92,399	4.56	2,515	1.29	0.88	**6.73**
	Total in PSA	312,972	18.14	9,216	6.21	8.24	**32.58**

Notes:

1. Ave Residential Flow (gcpd) is based on existing residential use summarized by flow meter drainage area and DPZ population projections.
2. Ave Industrial Commercial Flow is based on existing use plus the incremental acreage provided by DPZ
3. I/I Contribution is based on the Allocation Report comparison of metered flows versus billed water usage as follows:

PATUXENT = 72% of Total Average Flow attributed to Water Usage
PATAPSCO = 87% of Total Average Flow attributed to Water Usage

TABLE 10
INVENTORY OF EXISTING WASTEWATER TREATMENT PLANTS

Name and Operating Agency	Treatment Type	Plant Coordinate Location (North/ East)	Occupied Acres	Vacant Acres	Point of Discharge	Max. Site Capacity Secondary (MGD)	Max. Site Capacity Advanced (MGD)	Existing Capacity (MGD)	Avg. Flow (MGD)	Peak Flow (MGD)	Planned or Expected Date to Abandon (if Interim)
Municipal (Public)											
Little Patuxent Water Reclamation Plant	BS-GR-PS-AS-NO-PR-NR-SF-CH-D-DW-CT-PA	531/1,365			Little Patuxent			29.0	17.2	36.0	
Sheppard Manor (Table 10B)	SS	575/1,331			Shared Septic			0.008	0.004	0.017	
Walnut Creek (Table 10B)	SS	562/1,325			Shared Septic			0.112	0.056	0.220	
Riverwood (Table 10B)	SS	576/1,339			Shared Septic			0.005	0.005	0.020	
Industrial											
Maryland-Virginia Milk Producers	PS-O-GC-AS	538/1,349			Hammond Branch				0.192	0.270	
Owens Corning Fiberglas	PS	538/1,372			Unnamed tributary to Dorsey Run				0.029		
Private, Community & Institutional											
St. Louis Catholic School	ST-ISF-CH-DC	555/1,327			Subsurface Discharge			.006	0.003	unknown	
Villas at Cattail Creek	ST-PS-NR-PA	588/1,300			Subsurface Discharge				0.017	0.0384	
Homeland Marriottsville Senior Center	ST-ISF-CH-DC	591/1,341			Subsurface Discharge				0.025	unknown	
Glenelg High School	BS-AE-NR	585/1,313			Subsurface Discharge				0.025	0.050	
Western Elementary School	BS-AE-NR	573/1,317			Subsurface Discharge				0.008	0.014	
Bushy Park Elementary, Glenwood Middle, Glenwood Park Elementary School	BS-AD-AN	595/1,308			Subsurface Discharge				0.012	0.023	

TABLE 10

INVENTORY OF EXISTING WASTEWATER TREATMENT PLANTS

Key to Treatment Types

AD	Aerobic Digestion
AE	Extended Aeration
AN	Anaerobic Digestion
AS	Activated Sludge
BS	Bar Screen
CG	Comminutor or Grinding
CH	Hypochlorate Chlorination
CIM	Clarigester
CT	Chemical Treatment
D	Dechlorination (other)
D	Disinfection (other)
DC	Dechlorination SO2 gas
DW	Sludge Dewatering – Mechanical
FTH	Filters - High Capacity
GC	Gas Chlorination
GR	Grit Removal
I	Sewage Application to Land
ISF	Intermittent Sand Filter
KC	Chemical Flocculation
L	Lagoon
NO	Nitrogen Oxidation
NR	Nitrogen Removal
O	Grease Removal
OZ	Ozonation Disinfection
PA	Post Aeration
PR	Phosphorus Removal
PS	Primary Settling
RBC	Rotating Biological Contractor
SB	Sand Drying Beds
SD	Secondary Treatment (other)
SF	Polishing Sand Filter
SS	Shared Septic
ST	Septic Tank
TF	Trickling Filter
UV	Ultraviolet Disinfection

TABLE 10A

SUMMARY OF EXISTING AND PLANNED PERMIT DISCHARGES

Facility	State Permit Number	NPDES Permit Number	Permit Type	Actual Average Flow (MGD)
Alpha Ridge Municiple Landfill	13DP3224	MD0067865	Industrial Individual	0.082
American Infrastructure-MD, Inc. - Jessup Asphalt	10MM2110	MDG492110	General Permit - Mineral Mine	NA
Annapolis Junction RMC Plant	10MM8018	MDG498018	General Permit - Mineral Mine	NA
Ashleigh Knolls Subdivision	14DP3102	MD3102N06	Groundwater	NA
Bardon, Inc. (dba Aggregate Industries)	10MM9804	MDG499804	General Permit - Mineral Mine	NA
Bay Ready Mix Concrete	10MM8028	MDG498028	General Permit - Mineral Mine	No Discharge
Carrs Mill Landfill	13DP3226	MD0067873	Industrial Individual	0.0627
Daniel G. Schuster Inc. - Jessup	10MM9739	MDG499739	General Permit - Mineral Mine	NA
Dayton Oaks Elementary School	09DP3479	MD3479N04	Groundwater	0.0042
Eyre's Bus Service, Inc.	11DP2349	MD2349N00	Groundwater	0.0017
General Electric Company - Former Appliance Park East Facility	12DP3245	MD0067938	Industrial Individual	0.01
Glenelg Country School WWTP	12DP3409	MD3409N02	Groundwater	0.0013
Glenelg High School WWTP	10DP3412	MD3412N02	Groundwater	0.025
Homeland Senior Living Community WWTP	10DP3435	MD3435N03	Groundwater	0.020
Howard County Bureau of Utilities - Elevated Water Tanks	11HT9501	MDG679501	Hydrostatic Testing	NA
Jessup Plant	10MM8053	MDG498053	General Permit - Mineral Mine	0.028
Jessup Ready Mix Concrete Plant	10MM8046	MDG498046	General Permit - Mineral Mine	No Discharge - less than 0.0001
Johns Hopkins University - Applied Physics Laboratory	11HT5179	MDG675179	General Permit - Hydrostatic Testing	NA
Johns Hopkins University - Applied Physics Laboratory	12DP3607	MD0070009	Industrial Individual	Pipe 1 - 0.044, Pipe 2 - NA
Lisbon Shopping Plaza WWTP	14DP3405	MD3405N02	Groundwater	System A- 0.0078, System B- NA
Little Patuxent Water Reclamation Plant	13DP1421	MD0055174	Surfacewater Municipal	20.7
Manor Hill Brewing	15DP3823	MD3823G15	Groundwater	NA
Marriotts Ridge High School WWTP	14DP3417	MD3417N02	Groundwater	0.009
Maryland & Virginia Milk Producers Assoc.	15DP0033	MD0000469	Industrial Individual	0.325
Modern Foundations Inc.	10MM8066	MDG498066	General Permit - Mineral Mine	0.002
Mount Airy Bible Church, Inc.	10DP3691	MD3691N10	Groundwater	NA
New Bushy Park Elementary & Glenwood Middle Schools WWTP	11DP3521	MD3521N05	Groundwater	0.0072
New Cut Landfill	13DP3262	MD0068039	Industrial Individual	0.085
Peddicord Property WWTP	11DP3506	MD3506N05	Groundwater	0.0025
Piccirilli Quarry	10MM9891	MDG499891	General Permit - Mineral Mine	No Discharge
Rockville Fuel and Feed	10MM9770	MDG499770	General Permit - Mineral Mine	0.00078
Savage Stone, LLC	10MM9765	MDG499765	General Permit - Mineral Mine	Pipe 1- 0.058, Pipe 2- 0.330
Riverwood Phase II Shared Sewage Facility	11DP3544	MD3544N06	Groundwater	0.0042
The Villas at Cattail WWTP & WTP	11HT5050	MDG675050	General Permit - Hydrostatic Testing	NA
The Villas at Cattail WWTP & WTP	14DP3260	MD3260N98	Groundwater	0.014
Triadelphia Ridge Elementary School	13DP3223	MD3223N07	Groundwater	0.0086
University of MD Agricultural Center	11HT5165	MDG675165	General Permit	NA
W.R. Grace & Company	07DP3254	MD0067997	Industrial Individual	No Discharge
Wah Property	14DP3598	MD3598N14	Groundwater	NA
Walnut Creek Subdivision	11DP3538	MD3538N06	Groundwater	NA
Walnut Grove Shared Facility WWTP	11DP3504	MD3504N05	Groundwater	0.0502
Western Regional Park WWTP	10DP3448	MD3448N03	Groundwater	0.00023

Note: Facilities that did have records of actual average flow or total design flow quantities are marked NA

TABLE 10B
EXISTING & PROPOSED SHARED SEPTIC SYSTEMS

Subdivision Name	Community	Contract No.	MDE Groundwater Permit	Gravity or Pressure Dose	Pre-Treatment	Code Requirement*1	No. of Connected Lots	MDF*2 (gpd)	ADF*3 (gpd)	Year In Service (FY)
Ashleigh Knolls	Clarksville	50-3357, 50-3382, 50-3383	Yes: Permit renewal pending SBR construction	Pressure	No	Yes	109	32,700	16,350	1996
Brantwood	West Friendship	50-3816	No	Gravity	No	Yes	7	5,250	2,100	2001
Edgewood Farm	Glenwood	50-4309	No	Gravity	No	Yes	8	4,800	2,400	2013
Friendship Lakes	West Friendship	50-3871	No	Gravity	No	Yes	5	3,750	1,875	2002
Fulton Ridge *6	Fulton	50-4293	No	Pressure	No	Yes	4	3,000	1,500	2008
Fulton Woods	Fulton	50-4361	No	Gravity	No	Yes	8	4,950	2,475	
Hopkins Choice*4	Glenelg	50-4254	No	Pressure Dose	No	Yes	16	9,900	4,950	2011
Kogan Trust Property	Glenelg	Not applied for	No	Gravity	No	Yes	3	2,250	1,125	
Lyndonbrook *4	West Friendship	50-3607	No	Gravity	No	Yes	11	6,600	3,300	1998
Maple Ridge	Cooksville	50-4046	No	Gravity	No	Yes	7	4,200	2,100	2003
Maplewood Farms	Glenwood	50-4458 50-4459	No	Pressure Dose	No	Yes	7	4,950	2,475	2011
Marty Howard Property *6	Clarksville	50-4381	No	Pressure Dose	Yes	Yes	5	3,750	1,875	
Musgrove Property *5	Glenelg	Board of Education Project	Yes	Pressure	Yes	Yes	31	18,600	9,300	2007

TABLE 10B
EXISTING & PROPOSED SHARED SEPTIC SYSTEMS

Subdivision Name	Community	Contract No.	MDE Groundwater Permit	Gravity or Pressure Dose	Pre-Treatment	Code Requirement*1	No. of Connected Lots	MDF*2 (gpd)	ADF*3 (gpd)	Year In Service (FY)
Neshawat Property *6	Glenelg	50-4294	No	Gravity	Yes	Yes	4	6,000	3,000	2009
Owings Property Lot 3	Highland	50-4157	No	Gravity	No	Yes	7	4,200	2,100	2006
Owings Property Lot 5	Highland	50-4436	No	Gravity	No	Yes	7	4,200	2,100	
Paddocks East	West Friendship	50-4156	No	Gravity	Yes	Yes	8	4,950	2,475	2010
Pickett Property	Lisbon	50-4386	Yes	Pressure Dose	Yes	Yes	21	13,500	6,750	
Pindell Woods	Fulton	50-3952	No	Gravity	No	Yes	2	1,200	600	2004
Quartz Hill Estates	Glenwood	50-4460	No	Gravity	No	Yes	6	3,750	1,875	
Regan Property	Highland	50-4748	No	Gravity	Yes	Yes	6	4500	2250	2014
Riggs Meadow	Cooksville	50-3606	No	Gravity	No	Yes	4	2,400	1,200	2002
Riverwood *5	Ellicott City	50-4287	06-DP-3544	Pressure Dose	Yes	Yes	18	10,800	5,400	2013
Sheppard Manor *5	Ellicott City	50-4357	05-DP-3506	Pressure Dose	Yes	Yes	11	8,250	4,125	2009
Triadelphia Crossing	Glenelg	50-4207	No	Gravity	No	Yes	8	4,800	2,400	2005

TABLE 10B
EXISTING & PROPOSED SHARED SEPTIC SYSTEMS

Subdivision Name	Community	Contract No.	MDE Groundwater Permit	Gravity or Pressure Dose	Pre-Treatment	Code Requirement*1	No. of Connected Lots	MDF*2 (gpd)	ADF*3 (gpd)	Year In Service (FY)
Walnut Creek *5	Clarksville	50-4440 Collection 50-4441 Treatment	Yes	Pressure Dose	Yes	Yes	149	111,750	55,875	2013
Walnut Grove *5	Clarksville	50-4330 Collection & 50-4359 Treatment	Yes	Pressure	Yes	Yes	87	65,250	32,625	2009
Willow Pond	Highland	50-4491	No	Pressure Dose	No	Yes	3	2,250	1,125	2011
Willow Ridge	Ellicott City	54-4301	No	Gravity	No	Yes	5	3,750	1,875	2013

*1 – Code Requirement is to meet current Howard County requirements
*2 – Maximum Daily Flow
*3 – Average Daily Flow
*4 – 2 separate areas
*5 – SBR
*6 – Private Units

TABLE 10C

SUMMARY OF EXISTING AND PLANNED COMMUNITY SEPTIC SYSTEMS

Facility Name	Community	Application/Permit Number	Permit or Revision Processing Status	Status / Date
Ellicott Meadows	Ellicott City	03-DP-3435	Permit Issued 2003	In operation, compliant
The Villas at Cattail Creek	Glenwood	05-DP-3260	Permit Issued, October 1, 2009	In operation, compliant

TABLE 11

PROBLEM AREAS INVENTORY - INDIVIDUAL AND COMMUNITY

Service Area	Problem Description	Location	Population (1)	Area (Acres) (2)	Treatment Demand (MGD) (3)	Planned Correction Date
Patapsco	7 overflowing septic systems	878-508 Rockburn Hill Road	21	5	.002	Comprehensive service area
Outside Planned Service Area	3 homes with advanced pretreatment; 1 home with a holding tank	Western side of Hall Shop Road, between Guilford Rd. and Simpson Rd.	21 homes	--	--	Outside planned service area
Outside Planned Service Area	An old town center with small lots. Close proximity of wells and onsite sewage disposal systems may be responsible for bacterial contamination of well water and ground water	Lisbon, a town center on Route 144 between the 15800 and 16100 blocks	Approx. 60 properties (Residential and Commercial)	--	--	Outside planned service area

(1) Population was computed by multiplying the average number of people per dwelling unit by the number of houses with failing septic systems. Assumed 3.0 persons/unit.

(2) Acreage determined by multiplying the average lot size in the area by the number of dwellings with failing septic systems.

(3) Treatment demand determined by multiplying the population by an assumed per capita flow and with an infiltration/inflow allowance as used elsewhere in this Plan.

Table 12 (Storm Drainage Outfalls and Non-Point Sources)

is not part of this Water & Sewerage Master Plan.

TABLE 13

IMMEDIATE, 5-YEAR, 10-YEAR and COMPREHENSIVE PRIORITIES for SEWER SYSTEM DEVELOPMENT

Priorities Map Key (Fig 4-3)	Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs ($)			Project Schedule		
					Total	PL660 Eligibility	Local	Prelim. Plans	Start Const.	Compl. Const.
	S-6189	Under Const.	1363-524	A project for the design and construction of improvements to the North Laurel Sewage Pumping Station to increase the pumping capacity of the station.	9,130,000	–	9,130,000	2004	2014	2015
	S-6232	In Progress		A project to televise sewer pipes in the County's sanitary sewer system for evidence of corrosion. This project will effect repairs area where corrosion has compromised the integrity of the system.	11,975,000	-	11,975,000	on-going	on-going	on-going
	S-6237	In Progress		A project for Howard County's participation in the cost sharing for the capital funding of the Patapsco Treatment Plant at Wagners Point and the related Patapsco Interceptor, Pump Station, and Force Main.	58,000,000	-	58,000,000	on-going	on-going	on-going
	S-6249	In Progress		An appropriation is requested under this project to construct water, sewer and associated facilities in subdivisions where the developer has failed to build all facilities in accordance with the plans and Developer's Agreement.	3,600,000	-	3,600,000	on-going	on-going	on-going
	S-6260	Under Const.	1390-567	A project to provide sewer service to properties along Rockburn Hill Road.	4,025,000	-	4,025,000	2012	2014	2015
	S-6264	In Progress	1365-530	FY2008 Little Patuxent Water Reclamation Plant capital repairs	30,583,000	-	30,583,000	on-going	on-going	on-going
	S-6268	In Progress		A project to protect and stabilize sewers in areas where stream and soil erosion have compromised the integrity of the sewer system to convey wastewater to the County's treatment facilities.	6,780,000	-	6,780,000	on-going	on-going	on-going
	S-6269	Under Const.	1331-547	Design and installation of a sequential batch reactor wastewater treatment system for the Ashleigh Knolls Shared Septic Facility.	824,000	-	824,000	2014	2016	2017
A	S-6271	Under Const.	1386-555	Construction of 160 LF of Deep Run Inverted Siphon 3rd Barrel and replacement of 1,700 LF of existing sewer in Furnace Avenue.	1,660,000		1,660,000	2013	2014	2015
	S-6273	In Progress		A project to re-line and repair 55,000 LF of the original Little Pautuxent Interceptor sewer from LPWRP to MD Route 108.	12,000,000	-	12,000,000	2011	2013	2015
B	S-6274	0-5 Years		Design and construction of 2,500 LF interceptor sewer parallel to the existing Little Pautuxent Interceptor and upstream of MD Route 108 SPS.	2,000,000	-	2,000,000	2015	2017	2019
	S-6275	0-5 Years	1366-597	A project of the study, design and construction of a wastewater pumping station and force main to serve the Daniels Area east of Old Frederick Road including improvements and upgrades to the Old Frederick Road WWPS	1,800,000	-	1,800,000	2013	2015	2016
	S-6276	In Progress		Sewer manhole and pipeline cleaning and television inspection maintenance. Consent Agreement Compliance monitoring and reporting, and a sewer GIS database.	7,336,000	-	7,336,000	on-going	on-going	on-going
	S-6277	0-5 Years	1369-596	Design and construction of 750 linear feet sewer in Old Frederick Road north of Howard Run Drive to serve 6 properties.	230,000	-	230,000	2014	2014	2015
	S-6279	0-5 Years		Design and construction of 2,500 LF of 8-inch replacement force main and improvements to the Meadowridge Road Wastewater Pumping Station.	1,900,000	-	1,900,000	2014	2015	2016
C	S-6280	In Progress		A project for the study, design and construction of 20,000 LF of sewers to parallel existing sewers in the Hammond Branch and Patuxent sewer drainage areas to provide additional capacity.	26,505,000	-	26,505,000	2018	2021	2022

TABLE 13

IMMEDIATE, 5-YEAR, 10-YEAR and COMPREHENSIVE PRIORITIES for SEWER SYSTEM DEVELOPMENT

Priorities Map Key (Fig 4-3)	Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs ($)			Project Schedule		
					Total	PL660 Eligibility	Local	Prelim. Plans	Start Const.	Compl. Const.
D	S-6281	In Progress		A project for the study, design and construction of 14,600 LF of sewers parallel to existing sewers in the Dorsey Run and Guilford Run sewer drainage areas to provide additional capacity.	13,365,000	-	13,365,000	2019	2020	
E	S-6282	In Progress		A project of the design and construction of 6,000 LF of sewers parallel to existing sewers in the Bonnie Branch sewer drainage area to provide additional capacity. The project includes the upgrade and re-commissioning o the Kerger Road WWPS and force main.	5,325,000	-	5,325,000	2016	2017	2018
F	S-6283	In Progress		A project for the design and construction of 18,000 LF of sewers parallel to existing sewers in the Tiber Branch and Sucker Branch sewer drainage areas to provide additional capacity.	9,305,000	-	9,305,000	2016	2017	2018
G	S-6284	In Progress		A project of the design and construction of 39,000 LF of sewers parallel to existing sewers in the Deep Run and Shallow Run sewer drainage areas to provide additional capacity. Project will consist of 2 phases.	20,210,000	-	20,210,000	2017	2018	2019
H	S-6285	0-5 Years		A project for the design and construction of 1,700 LF of sewers parallel to existing sewers in the Tiber Branch sewer drainage area to support flow from the MD Route 108 WWPS	1,300,000	-	1,300,000	2017	2018	2019
	S-6286	In Progress		A project to upgrade and increase the pumping capacity of the Dorsey Run wastewater pumping station.	4,567,000	-	4,567,000	2016	2017	2018
	S-6287	6-10 Years		A project of the design and construction of 4,600 LF of force main parallel to the existing force main to supplement the pumping capacity of the North Laurel wastewater pumping station.	1,800,000	-	1,800,000	2021	2022	2023
	S-6288	6-10 Years		A project to upgrade and increase the pumping capacity of the Rockburn wastewater pumping station.	3,320,000	-	3,320,000	2020	2021	2022
	S-6289	0-5 Years		A project of the design and construction of 350 LF of 8-inch sewer to serve three properties on Park Avenue in Ellicott City.	225,000	-	225,000	2015	2016	2017
	S-6290	0-5 Years		A project of the study, design and construction to re-align 3,500 LF of sewers in the vicinity of Baltimore and Washington Streets in Savage, MD	3,250,000	-	3,250,000	2016	2017	2018
	S-6291	In Progress		A project of the design and construction of 250 LF of sewer to serve one property located on Old Frederick Road.	90,000	-	90,000	2014	2015	2015
	S-6292	In Progress		A project of the design and construction of 900 LF of sewer to serve four properties located on Old Frederick Road and Toby Lane.	300,000	-	300,000	2015	2016	2017
	S-6293	0-5 Years		A project of the design and construction of 2,000 LF of sewers to serve three properties located along US Route 40 near Turf Valley Road.	700,000	-	700,000	2016	2016	2017
	S-6294	0-5 Years		A project of the renovation of the Annapolis Junction wastewater pumping station on Henkel's Lane.	275,000	-	275,000	2015	2016	2017
	S-6295	0-5 Years		A project to design and construct new Biosolids Processing Facilities and the LPWRP to comply with new State biosolids and storage and disposal regulation, achieve biosolids volume reduction and enhance biosolids quality for end use purposes.	84,000,000	-	84,000,000	2016	2017	2019
	S-6296	0-5 Years		A project of the design and construction of 150 LF of sewer to serve one property on Harriet Tubman Lane.	440,000	-	440,000	2016	2017	2017

TABLE 13

IMMEDIATE, 5-YEAR, 10-YEAR and COMPREHENSIVE PRIORITIES for SEWER SYSTEM DEVELOPMENT

Priorities Map Key (Fig 4-3)	Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs ($)			Project Schedule		
					Total	PL660 Eligibility	Local	Prelim. Plans	Start Const.	Compl. Const.
	S-6297	0-5 Years		A project of the design and construction to upgrade and increase the pumping capacity of the Old Frederick Road wastewater pumping station. The project includes improvements to the discharge force main and downstream sewer.	1,735,000	-	1,735,000	2016	2018	2017
	S-6698	In Progress		A project to design and construct routine sewer main extensions in the Metro District requested by landowners. 1. To serve existing dwellings in recorded residential subdivisions where sewer mains have not been constructed. 2. With existing dwellings or businesses on failing private systems as identified by the County Health Department. 3. To serve parcels with existing dwellings. These routine extensions must also meet the following: a. A written request has been made by a property owner who is without a sewer main fronting their property. b. Properties to be served must abut County or State road. c. The extension is less than 1,000 feet. d. The extension is a gravity sewer main and continue a sewer main currently in the service within the sewer shed. e. It does not require acquisition of utility easements. f. Capacity is available per section 18.122B County Code. g. The extension is supported by a least 50% of the abutting property owners.	6,750,000	-	2,500,000	on-going	on-going	on-going
	S-6699	In Progress		A project of the study, design and construction of sewer infrastructure to convert existing properties that currently use on-site septic systems to public sewer service.	18,000,000	-	18,000,000	on-going	on-going	on-going
	S-6711	In Progress		A project to provide engineering or administrative services, computer asset management, inspection, testing, inspector training, supplies and equipment including vehicles necessary for site inspection for the implementation of developer projects to make additions to the public water and sewer systems.	6,000,000	-	6,000,000	on-going	on-going	on-going
	S-6812	In Progress		FY 2012, A project to provide construction and inspection service to sites which do not require developer agreement but require 8" and larger sewer house connections and other sewer appurtenances.	150,000	-	150,000	on-going	on-going	on-going
	S-6862	In Progress		FY 2012, A project to provide the construction of sewer house connections by the Bureau of Utilities for residential size (4" or 6") connections. These connections are made when new sewer house connection are required for lots or homes where none exists.	150,000	-	150,000	on-going	on-going	on-going
	S-6950	In Progress		A program for the reimbursement to developers for construction of water and sewer house connections to existing lots outside of their subdivision.	180,000	-	180,000	on-going	on-going	on-going

TABLE 13

IMMEDIATE, 5-YEAR, 10-YEAR and COMPREHENSIVE PRIORITIES for SEWER SYSTEM DEVELOPMENT

Priorities Map Key (Fig 4-3)	Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs ($)			Project Schedule		
					Total	PL660 Eligibility	Local	Prelim. Plans	Start Const.	Compl. Const.
	S-6960	In Progress		A program to reimburse developers for construction of major sewer and water facilities as shown on the approved Howard County Water & Sewer Master Plan	3,000,000	-	3,000,000	on-going	on-going	on-going
I		0-5 Years		Furnace Avenue Sewer Improvements Phase 1-A. Project for the design and construction of 1,420 LF of 12-inch to 15-inch supplemental parallel interceptor sewer to provide additional capacity						
J		6-10 Years		Furnace Avenue Sewer Improvements Phase 2-A. Project for the design and construction 1,820 LF of 12-inch to 18-inch supplemental parallel interceptor sewer.						
K		6-10 Years		Furnace Avenue Sewer Improvements Phase 2-A. Project of the design and construction of 255 LF of 8-inch supplemental parallel interceptor sewer to provide capacity						
L		6-10 Years		Licking Creek Interceptor Improvements Phase 2. A project for the design and construction of 3,600 LF of 12-inch to 16-inch supplemental parallel interceptor sewer to provide additional capacity.						
	Developer Project	0-5 Years	1344-597	Construction of 2,600 ft. of interceptor to serve areas west of Turf Valley Road.						
	Developer Project	6-10 Years	1390-566	Construction of two 100 gpm (0.14 mgd) pump stations and force mains in the Lawyer's Hill area to serve properties between Montgomery Road and I-95.						
	Developer Project	Comprehensive	1372-579	Construction of pump stations and force main with capacities of approximate 100 gpm (0.14 mgd) to serve properties east of College Avenue.						
	Developer Project	Comprehensive	1369-595	Construction of a 100 gpm (0.14 mgd) Church Lane pump station and force main to serve property north of Deerfield Road.						

	In Progress
	0-5 years (2020)
	6-10 years (2025)
	11-15 years (2030)

Table 14 (Water & Sewerage Map Symbols)

is not part of this Water & Sewerage Master Plan.

Map symbols are provided with the map legends.

TABLE 15

FLOW MONITORING DATA: WASTEWATER TREATMENT PLANTS

Service Area	Design parameters (permit)					CY 2013 Flow (mgd)		Development Units	
	Hydraulic (mgd)	Organic (Monthly, mg/l)						Existing	Anticipated Buildout
		BOD	TSS	Total N	TP	Average Day	Maximum Day		
Little Patuxent Water Reclamation Plant	29.0	5 (S) 26 (W)	26	309,715 lbs/yr[5]	23,358 lbs/yr[5]	18.9[3]	37.64	69,500 (R)	87,900 (R)
Patapsco Wastewater Treatment Plant	11.57[1]	165 to 251[2]	137 to 202	22.0 to 30.5 mg/l	3.2 to 4.4 mg/l	6.1[4]	N/A	26,900 (R)	37,400 (R)

(1) The County's total share capacity for the Patapsco WWTP is projected to be approximately 11.57 MGD.

(2) Influent flow and concentrations for the Patapsco WWTP from Year 1998 to Year 2006, from the *City of Baltimore Comprehensive Wastewater Facilities Master Plan, 2004*.

(3) The Annual Average Daily Flow for Calendar Year 2013 excludes approximately 1.3 MGD of flow that was flow diverted to the Patapsco WWTP basin through the Route 108 Pumping Station.

(4) The Annual Average Daily Flow for Calendar Year 2013 includes approximately 1.3 MGD of flow diverted to the Patapsco WWTP basin through the Route 108 Pumping Station.

(5) When the average annual wastewater flow approaches 29 MGD, an annual total nitrogen concentration of 3.5 mg/L and total phosphorus concentration of 0.25 mg/L would be necessary to achieve an annual TN load of 309,715 and TP load of 23,358 lbs/yr.

TABLE 15A
FLOW ANALYSIS TABLE

Drainage Area Location Code	Subdrainage Area	Pipe Segment(s)[1]		Current Piping (MGD)		Improved Piping (MGD)	
		Downstream Node ID	Upstream Node ID	Flow Capacity[2]	Projected Peak Flow[3]	Flow Capacity[2]	Projected Peak Flow[3]
PATUXENT SEWER DRAINAGE BASIN							
PS1	LITTLE PATUXENT AT ROUTE 108 P.S.	46361210b	9693	9.759	9.265	20.325	10.039
	System Improvement	4636-JC1e	LP2--001-				
LP2	LITTLE PATUXENT AT MIDDLE PATUXENT	4532-217	4532-218	58.061	25.438	58.061	25.709
LP1	LITTLE PATUXENT AT LP WRP	237-3733	4531--96	33.367	31.863	33.367	32.465
	System Improvement	237-3733	4531--98				
MP	MIDDLE PATUXENT	720-102	720-103	12.783	6.005	12.783	6.005
HB3	HAMMOND BRANCH AT BURSA ROAD	50-1105	50-1105A	3.690	5.345	7.613	7.208
	System Improvement	50-1105	HB1A1-01-				
HB2	HAMMOND BRANCH AT U.S. ROUTE 1	50-1105	50-1117	3.800	5.325	8.027	5.389
	System Improvement	50-1105	HB2--015-				
HB1	HAMMOND BRANCH AT LP WRP	1601-5	1601-6	25.243	8.601	25.250	12.318
NL1	NORTH LAUREL PUMPING STATION	NL1--001e	49-1070	2.023	3.097	4.466	3.743
	System Improvement	NL1--001e	Improvement				
GR2	GUILFORD RUN AT ANNAPOLIS JUNCTION	235-3163	235-3164	5.293	3.386	5.293	3.386
GR1	GUILFORD RUN AT LP WRP	235-3152	235-3153	14.173	12.715	14.173	13.033
DR	DORSEY RUN PUMPING STATION	Dorsey Run PS	678-9686	39.953	6.853	39.953	8.793
PATAPSCO SEWER DRAINAGE BASIN							
D	DANIELS AREA(5)	177-2069	177-1176	5.823	1.611	5.823	1.611
SB2	SUCKER BRANCH AT NORMANDY WOODS DR.	1305-P91A	1305-P92	3.218	3.660	8.447	4.393
	System Improvement	PA2H-036-	PA2H-037-				
SB1	SUCKER BRANCH AT FLOW METER	25-523	19-68	4.976	4.495	9.106	5.213
	System Improvement	25-523	PA2H-001-				
EC	TIBER BRANCH AT FLOW METER(4)	25-518C	26-1046A	0.026	9.443	73.210	16.998
	System Improvement	PA1--064A	Improvement				

Drainage Area Location Code	Subdrainage Area	Pipe Segment(s)[1]		Current Piping (MGD)		Improved Piping (MGD)	
		Downstream Node ID	Upstream Node ID	Flow Capacity[2]	Projected Peak Flow[3]	Flow Capacity[2]	Projected Peak Flow[3]
BB2	KERGER WEIR TO ROCKBURN P.S.	3697-29	3697-30	3.619	0.281	3.619	0.281
	KERGER ROAD P.S.	1215-108	1215-109	1.312	1.198	1.312	1.198
RB	ROCKBURN PUMPING STATION	3696-202	3696-203	1.952	1.833	4.265	1.877
	System Improvement	3696-202	PA1D2-53-				
BB1	BONNIE BRANCH AT FLOW METER	1659B	1659C	0.071	4.149	0.136	4.113
	System Improvement	1659B	PA1D2-01A				
DP11	DEEP RUN AT U.S. ROUTE 1	1850-1	36-1022	4.970	7.768	15.284	8.877
	System Improvement	DR2--102-	DR2--103-				
DP8	DEEP RUN AT DORSEY ROAD	24-465	1447-101	2.081	5.364	13.798	9.602
	System Improvement	DR2--074-	DR2--075-				
DP5	DEEP RUN AT B&O RAILROAD	506-1	23-385	4.059	5.561	7.846	7.410
	System Improvement	DR2B-021-	DR2B-022-				
DP3	DEEP RUN AT HANOVER ROAD	181-2576	181-2577	7.600	8.180	12.486	10.371
	System Improvement	181-2576	DR2B-001-				
DP1	DEEP RUN AT FLOW METER	25-276	1809-4	48.154	21.766	48.154	25.536
	System Improvement	1809-5	1809-4				
DP2	FURNACE AVENUE	DR1--009a	4727-280A	3.955	1.980	3.955	2.160

Notes:

(1) Pipe segment(s) selected near bottom of branch. Flow conditions may vary in upstream sewer segments with changes in size and slope.

(2) Flow capacity calculated using Manning Equation for gravity flow based on pipe size and slope from Howard County record drawings.

(3) Peak flow values are the peak instantaneous flow rates calculated in the sanitary sewer hydraulic model using Year 2040 projected flow with Rainfall Event A.

(4) Includes flow from Route 108 Pumping Station.

(5) Also includes flows from other portions of SB2 area upstream of this pipe segment.

TABLE 16

SEWAGE SLUDGE GENERATION

Little Patuxent Water Reclamation Plant

Year	Annual ADF (MGD)	Estimated Biosolids Production (Dry Tons/ Year)	Lime Addition or VS Reduction (Dry Tons/ Year)	Total Sewage Sludge Production (Dry Tons/ Year)	Estimated Sewage Sludge for Disposal (Wet Tons/ Year)
2013 (actual)	18.9	8,200	6,400	14,600	35,743
2015	22.1	9,600(1)	6,700	16,300(2)	40,700(3)
2015-2020 Advanced Lime RDP Process to be replaced by Anaerobic Digestion & Heat Drying Process					
2020	23.5	10,200(1)	-4,200(4)	6,000	6,500(5)
2025	24.5	10,600(1)	-4,400(4)	6,200	6,700(5)
2030	25.3	10,900(1)	-4,500(4)	6,400	7,000(5)
2035	25.7	11,100(1)	-4,600(4)	6,500	7,100(5)
2040	25.9	11,200(1)	-4,600(4)	6,600	7,200(5)

Notes:

(1) Based on biosolids production of 1.185 dry tons per MG of annual average daily flow determined from Annual Sewage Sludge Generator Reports and RDP Biosolids Processing System Evaluation, July 30, 2014, by HDR, Inc.

(2) Total solids production (biosolids and lime) of 2.019 dry tons per MG of annual average daily flow.

(3) Total sludge production of 5.047 wet tons per MG of annual average daily flow and 38%-41% total solids.

(4) Assumes volatile solids content of 85% and 50% VS destruction. Adapted from Biosolids Processing Facilities Improvements- Final Preliminary Engineering Report dated November 2014.

(5) 92% total solids content, adapted from anaerobic digestion and heat drying design parameters, Biosolids Processing Facilities Improvements- Final PER, Table 6-3.

TABLE 16A

SLUDGE TREATMENT AND DISPOSAL

Little Patuxent Water Reclamation Plant

A. Sludge Treatment Process:

1. Current Operations- Settled solids from the primary clarifiers are collected and pumped to a gravity thickener process. Settled waste activated solids (WAS) from the secondary clarifiers are collected and pumped to a dissolved air flotation process for thickening. After thickening, the solids are combined and dewatered using centrifuges. Lime is applied and mixed with the raw sludge and supplemental heat is added using the advanced alkaline RDP process to raise the temperature of the mix to 160 degrees F for not less than 30 minutes. The process destroys pathogens and produces a stabilized Class A/Exceptional Quality (EQ) sludge cake suitable for direct land application.

2. Future Operations (projected for implementation Year 2020)- Due to recent and pending regulatory changes by the Maryland Department of the Environment (MDE) and the Maryland Department of Agriculture (MDA) that regulate the application of biosolids to bulk agricultural land, the County undertook and completed a Biosolids Master Plan Study in 2013 to evaluate alternatives for biosolids handling, treatment, stabilization and disposal.

   The 2013 Biosolids Master Plan was followed by a detailed study and report of alternatives titled Biosolids Processing Facilities Improvements Preliminary Engineering Report, November 2014. The report recommended replacing the RDP advanced alkaline (lime) stabilization process with anaerobic digestion and direct heat drying processes (AD+HD) to "...reduce the County's exposure to the risk of increasing and uncertain regulatory restrictions on bulk land application." The report also concluded that the AD+HD processes represent "...the most cost-effective alternative, using proven and reliable technology, for meeting the County's objectives for volume reduction and a versatile, high-quality product with a variety of potential beneficial uses."

B. Chemical Additives: Lime, Polymers. Sodium Hypochlorite is used for odor control.

C. Solids Content (After Dewatering):

1. Current Operations produce a sludge filter cake with average 40% total solids content by weight following dewatering and the addition of lime.

2. Future Operations- The proposed AD+HD processes will produce a dried uniform granular product (pellets) with average 92% total solids content by weight.

D. Disposal/Utilization Methods

1. Current Operations- The RDP process mixes incoming, dewatered sludge with lime and provides supplemental heat to raise the temperature of the sludge/lime mix to 160 degrees F. The sludge then travels for 30 minutes through an oven prior to discharge to a transport vehicle. The process achieves complete pasteurization of the sludge producing Class A/EQ product suitable for marketing and general distribution.

   The County utilizes a sludge disposal contractor to haul and dispose of all sludge produced at the Little Patuxent Plant. The contractor is responsible for locating suitable sites and obtaining all required transport and application permits for land applying the hauled sludge. The County may, at its option, require or allow the contractor to haul sludge to the County's Alpha Ridge landfill for disposal or land-spreading. The contractor is required to produce Class A biosolids and to develop and maintain a marketing and distribution system.

2. Future Operations- The implementation of the proposed anaerobic digestion and heat drying processes will provide the following operational changes:
   - Primary and waste activated sludges will be thickened using gravity thickeners.
   - The thickened sludge will be pumped to new high-rate mesophilic anaerobic digestion reactors.
   - Digested solids will be pumped from the Digested Solids Storage Tanks to the centrifuges for dewatering, thereby increasing the solids content of the sludge from approximately 4% to 20% total solids content by weight.
   - The dewatered sludge cake will be conveyed to two new belt dryers utilizing natural gas and digester gas fuels to heat and dry the sludge, producing a granular product with approximately 92% total solids.

- Dried biosolids will be conveyed by pneumatic or drag-tube conveyor system to two elevated, bolted steel storage silos with hopper bottoms for drive-through truck loading directly beneath each silo.
- The new AD+HD processes will produce a Class A/EQ sludge product with greater flexibility for agricultural land application, and increased compatibility with numerous markets that are not currently available to the County including, but not limited to: turf production, fertilizer blending, commercial nursery applications, ornamental and landscaping applications, biofuel and soil manufacturing. Following implementation of the new biosolids processing facilities, the County may contract with one or more sludge disposal contractors to haul and dispose of all sludge produced at the Little Patuxent Plant. The contractor responsibilities will include locating sites for land spreading the hauled sludge.

TABLE 17

SEWER PUMPING STATIONS

Facility Name	Road Location	ADC Map Coordinates	Exisiting Design Capacity ADF (MGD)	Current Average Day Flow, ADF (MGD)[1]
ALLENFORD	10071 Green Clover	11H-2	0.810	0.111
ANNAPOLIS JUNCTION	8970 Henkels	20G-10	0.280	0.016
AUTUMN RIVER	5208 Bending Sky Way	12H-11	0.033	0.000
CHAMBERLEA	2835 Thornbrook	11K-1	0.600	0.076
CHERRY CREEK	11024 Scotts Landing	19B-7	0.140	0.034
CHERRY TREE FARMS	8409 Sweet Cherry Lane	19B-7	0.860	0.101
CHURCH AVE	2097 Church Ave	17K-7	0.100	0.000
COLLEGE AVE	College Ave	12H-12	0.300	0.061
DORSEY RUN	8181 Patuxent Range Rd	16H-6	3.500	1.147
FOREST HILL DRIVE	8100 Forest Hill Drive	12H-5	0.140	0.007
HOBSONS CHOICE	10169 Hobsons Choice Lane	11G-1	0.110	0.001
HOLLIFIELD	2250 River Terrace Ct	12G-1	0.180	0.017
ICE CRYSTAL DRIVE	8535 Ice Crystal Drive	19A-6	0.170	0.011
KERGER ROAD[2]	5357 Sunnyfield Ct	16K-5	0.720	0.000
NORTH LAUREL	US Rt 1 and Patuxent River	19K-14	2.880	1.013
MEADOWRIDGE	7304 Meadowridge Rd	17A-11	1.010	0.016
MOUNT HEBRON	9358 Furrow Ave	12B-1	0.680	0.105
NEW CUT ROAD	4747 New Cut	12F-12	0.520	0.053
~~NOTTINGHAM~~	~~7902 Nottingham~~	~~16H-1~~	ABANDONED	
OLD FREDERICK RD	8598 Old Frederick	12D-2	0.470	0.083
OLD LANDING RD	5780 Old Landing	17D-6	0.140	0.559
PATAPSCO	2206 Mt Hebron	12B-2	0.860	0.121
PINE VALLEY	10812 Harding	19C-8	0.170	0.005
RESERVOIR OVERLOOK	11300 Windsor Walk Way	19A-8	0.260	0.031
ROCKBURN	5390 Landing Road	17B-5	1.400	0.298

TABLE 17

SEWER PUMPING STATIONS

Facility Name	Road Location	ADC Map Coordinates	Exisiting Design Capacity ADF (MGD)	Current Average Day Flow, ADF (MGD)[1]
ROUTE 40	US Rt 40 between St. Johns Lane and Chatham Rd	12B-7	1.010	0.254
ROUTE 108	4820 Woodland	15J-1	6.370	0.009
TOWER ACRES	10161 Bond Mill	19D-8	0.190	0.036
VALLEY LANE	8101 Valley Lane	12G-5	0.140	0.004
WAVERLY	15599 Dorcester	11F-1	0.900	1.054
WILLOWS	8567 Willow Wisp	19C-7	0.140	0.016
FUTURE PUMPING STATIONS				
DANIELS (2) STATIONS		12F-2		
COLLEGE AVE (2) STATIONS		12H-11		
ROCKY GORGE (2) STATIONS		18K-8		
CHURCH LANE		12F-4		
ILCHESTER ROAD		11F-5		
LAWYERS HILL (2) STATIONS		17H-5		

Notes:
(1) FY2013 flows
(2) Currently out of Service, flows captured by Rockburn SPS

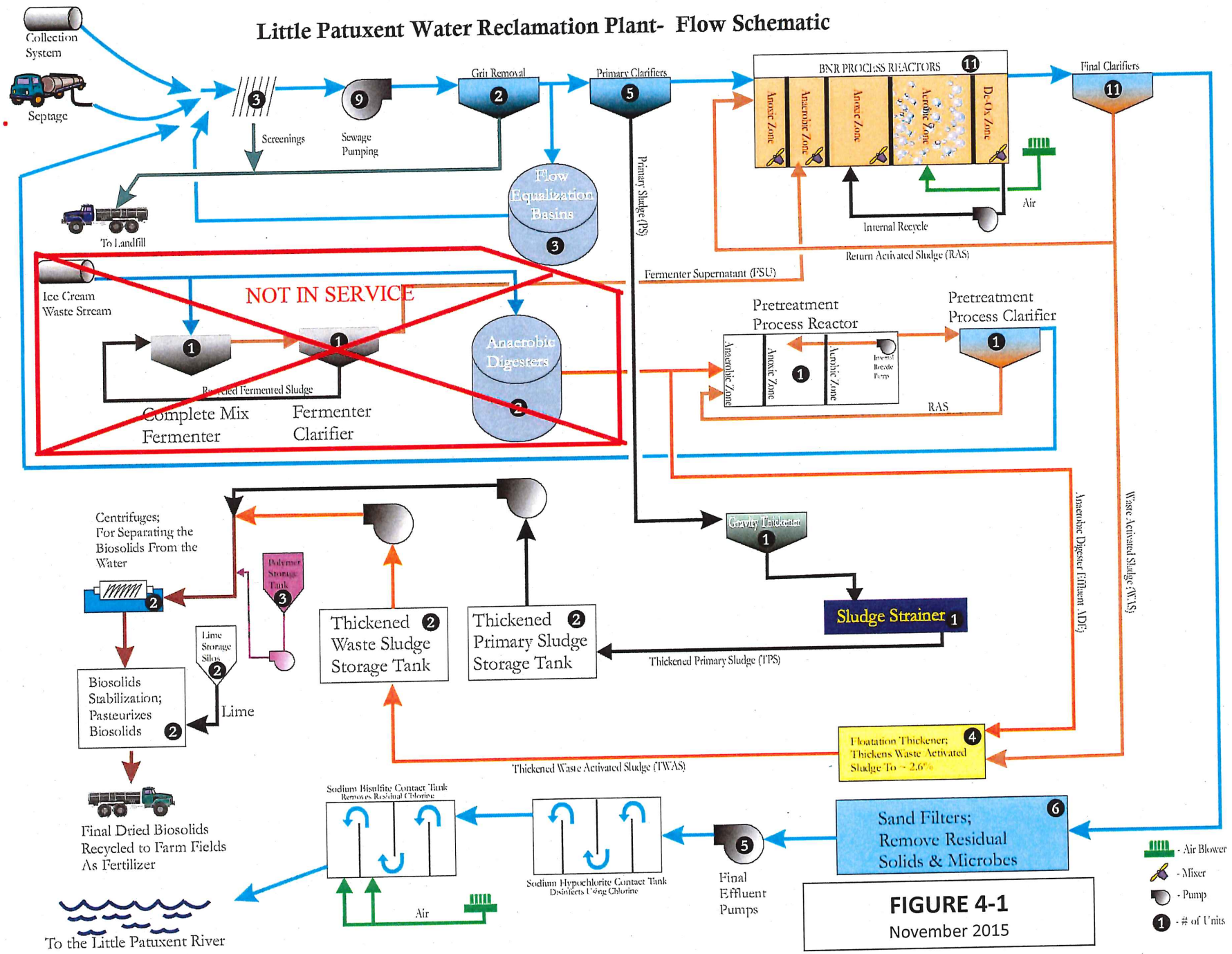
TABLE 18

IMMEDIATE, 5-YEAR, 10-YEAR, AND COMPREHENSIVE PRIORITIES FOR RECLAIMED WATER SYSTEM DEVELOPMENT

Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs ($)			Project Schedule		
				Total	PL660 Eligibility	Local	Preliminary Plans	Start Construction	Complete Construction
W-8323	Under Const.		Design and Construction of diversion structure, pumping station, elevated storage tank and reclaimed water lines to supply Fort Meade with reclaimed water.	55,000,000				2014	2016
W-8325	0 - 5 Years		LP WRP to Guilford RWST Reclaimed Water Main and conversion of existing Guilford Water Storage Tank to a reclaimed tank	8,465,000			2015	2016	2019
	6 - 10 Years		US Route 1 Reclaimed Water Main						
	6 - 10 Years		MD Route 216 Reclaimed Water Main						
	6 - 10 Years		MD Route 216 Reclaimed Water Pumping Station						
	6 - 10 Years		MD Route 216 Reclaimed Water Storage Tank						
	6 - 10 Years		MD Route 175 Reclaimed Water Main						
	6 - 10 Years		MD Route 175 Reclaimed Water Pumping Station						
	6 - 10 Years		MD Route 175 Reclaimed Water Storage Tank						
	6 - 10 Years		Old Columbia Road / Shaker Drive Reclaimed Water Main						
	Comprehensive		Gerwig Lane / Guilford Road Reclaimed Water Main						
	Comprehensive		Gerwig Lane to Route 103 Reclaimed Water Main						
	Comprehensive		Hammond Branch Reclaimed Water Main						
	Comprehensive		Hammond Branch Reclaimed Water Pumping Station						
	Comprehensive		Hammond Branch Reclaimed Water Storage Tank						
	Comprehensive		Cedar Lane Reclaimed Water Main						
	Comprehensive		Cedar Lane Reclaimed Water Pumping Station						
	Comprehensive		Cedar Lane Reclaimed Water Storage Tank						
	Comprehensive		US Route 1 Reclaimed Water Main						
	Comprehensive		MD Route 103 Reclaimed Water Main						
	Comprehensive		MD Route 103 Reclaimed Water Pumping Station						
	Comprehensive		MD Route 103 Reclaimed Water Storage Tank						
	Comprehensive		Shaker Drive Reclaimed Water Main						
	Comprehensive		Bethany Lane / US Route 40 / Frederick Road Reclaimed Water Main						
	Comprehensive		US Route 40 Reclaimed Water Pumping Station						
	Comprehensive		Bethany Lane Reclaimed Water Storage Tank						
	Comprehensive		I-70 Reclaimed Water Main						
	Comprehensive		I-70 Reclaimed Water Pumping Station						
	Comprehensive		I-70 Reclaimed Water Storage Tank						

	In Progress
	0 - 5 Years
	6 - 10 Years
	Beyond 10 Years

LP WRP - Little Patuxent Water Reclamation Plant
RWST - Reclaimed Water Storage Tank
RWPS - Reclaimed Water Pumping Station


Little Patuxent Water Reclamation Plant- Flow Schematic
Collection System
Septage
Screenings
Sewage Pumping
Grit Removal
Primary Clarifiers
BNR PROCESS REACTORS
Final Clarifiers
Anoxic Zone
Anaerobic Zone
Aerobic Zone
De-Ox Zone
Air
Internal Recycle
Return Activated Sludge (RAS)
Primary Sludge (PS)
Flow Equalization Basins
To Landfill
Ice Cream Waste Stream
NOT IN SERVICE
Recycled Fermented Sludge
Complete Mix Fermenter
Fermenter Clarifier
Anaerobic Digesters
Fermenter Supernatant (FSU)
Pretreatment Process Reactor
Pretreatment Process Clarifier
RAS
Centrifuges; For Separating the Biosolids From the Water
Polymer Storage Tank
Lime Storage Silos
Lime
Biosolids Stabilization; Pasteurizes Biosolids
Thickened Waste Sludge Storage Tank
Thickened Primary Sludge Storage Tank
Gravity Thickener
Sludge Strainer
Thickened Primary Sludge (TPS)
Anaerobic Digester Effluent (ADE)
Waste Activated Sludge (WAS)
Floatation Thickener; Thickens Waste Activated Sludge To ~ 2.6%
Thickened Waste Activated Sludge (TWAS)
Final Dried Biosolids Recycled to Farm Fields As Fertilizer
Sodium Bisulfite Contact Tank Removes Residual Chlorine
Sodium Hypochlorite Contact Tank Disinfects Using Chlorine
Final Effluent Pumps
Sand Filters; Remove Residual Solids & Microbes
To the Little Patuxent River
- Air Blower
- Mixer
- Pump
- # of Units
FIGURE 4-1
November 2015

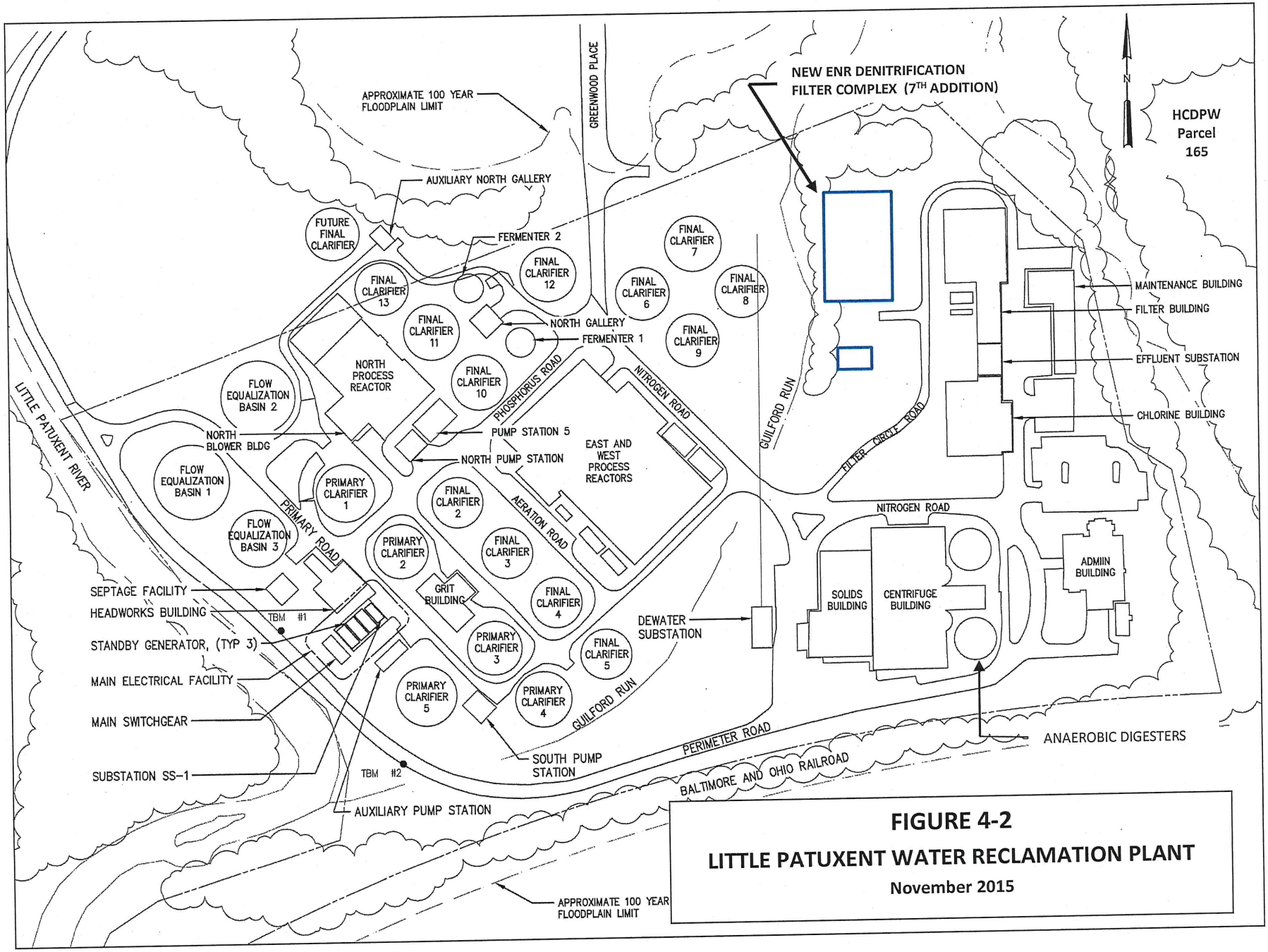


FIGURE 4-2

LITTLE PATUXENT WATER RECLAMATION PLANT

November 2015

EXHIBIT 1

Table of Water Service Priority

Revisions 2011- 2014

&

2015 Water Facilities Plan Map

EXHIBIT 1- WATER FACILITIES PLAN MAP UPDATES

Revisions to Water Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
W-01	MAP 16, GRID 24; MAP 23, GRID 6-18	WESTMOUNT SUBDIVISION; PART OF DOUGHOREGAN PROPERTY	221 ACRES PART OF PARCEL 71, LOT PAR 3	ADDITION OF PARCEL TO WATER & SEWER PSA	HOWARD COUNTY COUNCIL BILL 9-2010
W-02	34, GRID 18	CLARKSVILLE PIKE & GUILFORD ROAD: HODDINOTT PROPERTY & OTHERS	FOUR PARCELS TOTALING 93.3 AC: HODDINOTT P 88; HIGGS PROPERTY P 162; CLARKSVILLE PROF CENTER P 426	ADDITION OF PARCELS TO WATER & SEWER PSA; 6-TO-10 YEAR SERVICE CATEGORY	PLANHOWARD 2030, CHAPTER 6
W-03	46, GRID 02	MAPLE LAWN FARMS, FULTON MD	PARCEL 113- 91.25 ACRES	ADDITION OF PARCEL TO WATER & SEWER PSA; 6-TO-10 YEAR SERVICE CATEGORY	PLANHOWARD 2030, CHAPTER 6
W-04	31, GRID 17	MCCARTHY PROPERTY	5041 LANDING ROAD; PARCEL 608	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2011
W-05	31, GRID 16	ANDERSON PROPERTY	5211 TALBOTS LANDING; PARCEL 707, P/O LOT 12D	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 08-2011
W-06	35, GRID 2	TAJ PROPERTY	5644 TROTTER ROAD; PARCEL 5, LOT 1	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 09-2011
W-07	41, GRID 6	HUFFMAN PROPERTY	10606 VISTA ROAD; PARCEL 220, LOT 33	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2012
W-08	35, GRID 2	TROTTER POINT, LLC	5770 & 5790 TROTTER ROAD; PARCEL 8, LOT 15	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 02-2012
W-09	42, GRID 7	KINGS COVE HOA, INC.	8509 GUILFORD ROAD; PARCEL 61, P/O LOT 4	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 03-2012

EXHIBIT 1- WATER FACILITIES PLAN MAP UPDATES

Revisions to Water Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP N	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
W-10	35, GRID 2	TROTTER CROSSING LLC	5674, 5680 & 5686 TROTTER ROAD; 11712 & 11716 TROTTER CROSSING LANE; PARCEL 481	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 04-2012
W-11	31, GRID 16	TURLEY PROPERTY; TURLEY'S OVERLOOK	SOUTH ILCHESTER ROAD AT TALBOTS LANDING; PARCEL 739, LOT 02	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 05-2012
W-12	41, GRID 6	LEE PROPERTY	10718 HUNTING LANE; PARCEL 252, LOT 69	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 06-2012
W-13	29, GRID 20	SAMUEL & AMBILY PROPERTY	5517 TROTTER ROAD; PARCEL 88, LOT 4	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2013
W-14	41, GRID 6	FEDAK & PETRY PROPERTY	10710 HUNTING LANE; PARCEL 174, LOT 15	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 02-2013
W-15	41, GRID 11	SCHARNHORST PROPERTY	10734 JUDY LANE; PARCEL 420, LOT 3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 03-2013
W-16	35, GRID 17	HAGOOD PROPERTY	10829 BRAEBURN ROAD; PARCEL 228, LOT 34	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 04-2013
W-17	35, GRID 24	PANDEY & KAPADIA PROPERTY	8030 HARRIET TUBMAN LANE; PARCEL 129	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 05-2013
W-18	35, GRID 17	CORNERSTONE HOLDINGS LLC	10879, 10883 & 10887 HARMEL DRIVE; PARCEL 101, LOTS 1-3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 06-2013
W-19	35, GRID 8	EMERY & GAJEWSKI PROPERTY	6301 TROTTER ROAD; PARCEL 66	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 07-2013
W-20	41, GRID 12	JACOBS PROPERTY	10709 JUDY LANE; PARCEL 253, LOT 18	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 08-2013
W-21	35, GRID 8	RISTWAY PROPERTY	5946 TROTTER ROAD; PARCEL 373, LOT 6	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 09-2013

EXHIBIT 1- WATER FACILITIES PLAN MAP UPDATES

Revisions to Water Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
W-22	31, GRID 10	CASCADE WALTHUR LLC	4806, 4810, 4814 & 4822 WELLSTONE WAY; PARCEL 133, LOTS 4-11-	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 10-2013
W-23	31, GRID 10	WILLIAMSBURG GROUP LLC	4811, 4818 & 4819 WELLSTONE WAY; PARCEL 133, LOTS 1-3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 11-2013
W-24	31, GRID 10	CASCADE OVERLOOK 4 HOA	WELLSTONE WAY OPEN SPACE LOT 08	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 12-2013
W-25	31, GRID 24	GEELHAAR PROPERTY	5295 LANDING ROAD; PARCEL 619, LOT 3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2014
W-26	47, GRID 3	BEAZER HOMES CORP	10010 GORMAN ROAD; PARCEL 472	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 02-2014
W-27	10, GRID 13	DORSEY FAMILY HOMES, INC.	1670 HENRYTON ROAD; PARCEL 184	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 03-2014
W-28	35, GRID 8	SARY PROPERTY	5960 TROTTER ROAD; PARCEL 163	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 04-2014
W-29	34, GRID 18	ISICOFF PROPERTY	6215 GUILFORD ROAD; PARCEL 163	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 05-2014
W-30	41, GRID 5	SD PROPERTIES LLC	10821 HUNTING LANE; PARCEL 273, LOT 54	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 06-2014
W-31	34, GRID 12	HO PROPERTY	6118 TULANE DRIVE; PARCEL 123	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 07-2014
W-32	37, GRID 5	ROCK BURN LLC	MONTERY ROAD; PARCEL 52, P/O PARCEL A	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 08-2014
W-33	35, GRID 23	PASS PROPERTY	7831 HARRIET TUBMAN LANE; PARCEL 117	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 09-2014
W-34	37, GRID 20	SADEGHI-BAJGIRAN PROPERTY	NORTH LARK BROWN ROAD; PARCEL 508	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 10-2014

EXHIBIT 1- WATER FACILITIES PLAN MAP UPDATES

Revisions to Water Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
W-35	16, GRID 14	ARAGHI & ANSARI PROPERTY	2840 KINGS GIFT DRIVE; PARCEL 367, LOT 50	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 11-2014
W-36	35, GRID 23	ARMSTRONG & RINALDI PROPERTY	7938 HARRIET TUBMAN LANE; PARCEL 321	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 12-2014
W-37	23, GRID 10	CARROLL PROPERTY	FREDERICK ROAD; PARCEL 149, LOT 1	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 13-2014
W-38	23, GRID 10	CARROLL PROPERTY	10575 FREDERICK ROAD; PARCEL 149, LOT PARCEL A	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 14-2014
W-39	18, GRID 01	PHELPS PROPERTY	PARCEL 357, LOT 2; 3.41 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-042 FINAL PLAN RECORDED
W-40	17, GRID 16	MT. HEBRON OVERLOOK; LOTS 1-25	PARCEL 416	CHANGE 6-TO-10 YEARS TO EXISTING	F-11-064 FINAL PLAN SUBMITTED
W-41	25, GRID 01	ALTA AT REGENCY CREST	PARCEL 01, LOT PARCEL A; 5.8 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-08-165 FINAL PLAN RECORDED
W-42	24, GRID 01	TOWNS AT PATUXENT ORCHARD	PARCEL 647, LOT 2; 5.08 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-078 FINAL PLAN RECORDED
W-43	23, GRID 10	WESTMOUNT SUBDIVISION	PARCEL 149, LOT 1 & LOT PAR A	CHANGE NO PLANNED SERVICE TO 6-TO-10 YEARS	SP-14-008 PLAN SUBMITTED
W-44	24, GRID 09	LUTHERAN VILLAGE AT MILLER'S GRANT	PARCEL 1001; 49.68 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-10-083 FINAL PLAN RECORDED
W-45	25, GRID 14	AUTUMN OVERLOOK	PARCEL 0095	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-081 FINAL PLAN RECORDED
W-46	25, GRID 14	AUTUMN RIVER PHASE 3	PARCEL 279, LOT 108 PARCEL 0172; LOTS 69-108	CHANGE 0-TO-5 YEARS TO EXISTING	F-10-067 FINAL PLAN RECORDED
W-47	31, GRID 04	LOCUST CHAPEL & LOCUST CHAPEL SEC 01	PARCEL 115, LOTS 1-69	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-009 FINAL PLAN RECORDED
W-48	30, GRID 02	CENTENNIAL LAKE OVERLOOK SEC 01 & 02	PARCEL 086, PAR A & B	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-002 FINAL PLAN RECORDED
W-49	31, GRID 10	CASCADE OVERLOOK SEC 04	PARCEL 133, LOTS 1-10	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-074 AND F-12-075 FINAL PLANS RECORDED

EXHIBIT 1- WATER FACILITIES PLAN MAP UPDATES

Revisions to Water Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
W-50	31, GRID 16	TURLEY'S MEADOW AND TURLEY'S OVERLOOK	PARCEL 738, LOTS 1-4	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-084 AND F-14-079 FINAL PLANS RECORDED
W-51	41, GRID 21	ENCLAVE AT PARK FOREST	PARCEL 516, UNITS 1-45	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-129 FINAL PLAN RECORDED
W-52	38, GRID 03	CYPRESS SPRINGS	PARCEL 46, LOTS 1-17	CHANGE 0-TO-5 YEARS TO EXISTING	F-10-028 FINAL PLAN RECORDED
W-53	37, GRID 10	THE WELLNESS CENTER OF HOWARD COUNTY	PARCEL 687, LOT E-1	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-107 FINAL PLAN RECORDED
W-54	37, GRID 03	FOX HUNT ESTATES	PARCEL 606, LOTS 36	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-016 FINAL PLAN RECORDED
W-55	35, GRID 02	TROTTER POINT	PARCELS 8, 9, 165; LOTS 15	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-004 FINAL PLAN RECORDED
W-56	34, GRID 18	ENCLAVE AT TIERNEY FARM	PARCEL 88; 89.95 ACRES	CHANGE NO PLANNED SERVICE TO 6-TO-10 YEARS	ECP-15-005 PLAN SUBMITTED
W-57	41, GRID 22 & 46, GRID 03	MAPLE LAWN FARMS	PARCEL 124; LOTS C-28, C-29 & OS LOT 03	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-086 FINAL PLAN RECORDED
W-58	46, GRID 03	MAPLE LAWN FARMS	PARCEL 124; NON-B PAR C-27 WEST DIST PAR P	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-015 FINAL PLAN RECORDED
W-59	46, GRID 11	RESERVOIR ESTATES (HIGDON PROPERTY)	PARCEL 56, LOTS 1-26	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-003 FINAL PLAN RECORDED
W-60	42, GRID 21 47, GRID 2	WINCOPIA FARMS	PARCEL 472127.6 ACRES	CHANGE 6-TO-10 YEARS TO EXISTING	F-13-003 FINAL PLAN RECORDED
W-61	47, GRIDS 2-8	WALDEN WOODS	PARCEL 4, LOTS 98	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-032 FINAL PLAN RECORDED
W-62	47, GRID 06	NORDAU SUBDIVISION	PARCEL 668, SEC E-1, LOTS 13-18	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-047 FINAL PLAN RECORDED
W-63	43, GRID 19	CHASE LAND SUBDIVISION	PARCEL 235, LOT 2; 23.2 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-09-071 FINAL PLAN RECORDED

EXHIBIT 1- WATER FACILITIES PLAN MAP UPDATES

Revisions to Water Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
W-64	37, GRID 16-22	THE MEADOWS CORPORATE PARK	PARCEL 173, LOT A-6; 33.16 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-035 FINAL PLAN RECORDED
W-65	38, GRID 09	SHADY LANE CROSSING	PARCEL 235, LOTS 1-25	CHANGE 0-TO-5 YEARS TO EXISTING	F-06-097 FINAL PLAN RECORDED
W-66	38, GRIDS 14-15	WINTER CREST	PARCEL 868, LOTS 1-8	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-076 FINAL PLAN RECORDED
W-67	47, GRIDS 19-20; 50, GRIDS 1-2	HIGH RIDGE MEADOWS SEC 01 (DEER SPRINGS SEC 01)	PARCELS 363 & 542; LOT B; 36.94 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-022 FINAL PLAN RECORDED
W-68	41, GRIDS 5, 6 AND 11	RIVERSIDE ESTATES	VISTA ROAD, HUNTING LANE, JUDY LANE, NEWBERRY DRIVE, LONG VIEW ROAD, MOOSEBERGER CT AND CLEOS CT	CHANGE 0-TO-5 YEARS TO EXISTING	MAP CORRECTION
W-69	37, GRID 01	VILLAGE OF MONTGOMERY RUN	MONTGOMERY RUN ROAD	CHANGE 0-TO-5 YEARS TO EXISTING	MAP CORRECTION
W-70	24, GRID 06	HOWARD COUNTY HOUSING COMMISSION	8720 RIDGE ROAD; PARCEL 56, PAR B	CHANGE 0-TO-5 YEARS TO EXISTING	MAP CORRECTION
W-71	32, GRID 20	ROCKBURN LANDING AREA	6150-6400 ROCKBURN HILL ROAD & CROSSVIEW ROAD	CHANGE 0-TO-5 YEARS TO EXISTING	COMPLETED CONSTRUCTION OF WATER CONTRACT 14-4715
W-72	47, GRID 05	HOWARD COUNTY BOARD OF EDUCATION	PARCEL 25; PATUXENT VALLEY MS AND BOLLMAN BRIDGE ES	CHANGE 0-TO-5 YEARS TO EXISTING	MAP CORRECTION

EXHIBIT 2

Table of Sewer Service Priority

Revisions 2011- 2014

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2015 Sewer Facilities Plan Maps

East- Planned Service Area

West- No Planned Services Area

EXHIBIT 2- SEWER FACILITIES PLAN MAP UPDATES

Revisions to Sewer Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
S-01	MAP 16, GRID 24; MAP 23, GRID 6-18	WESTMOUNT SUBDIVISION; PART OF DOUGHOREGAN PROPERTY	221 ACRES PART OF PARCEL 71, LOT PAR 3	ADDITION OF PARCEL TO WATER & SEWER PSA	HOWARD COUNTY COUNCIL BILL 9-2010
S-02	16, GRID 02	ALPHA RIDGE LANDFILL, HOWARD COUNTY MD	PARCEL 11, 239.78 AC	ADDITION OF PARCEL TO SEWER PSA; 6-TO-10 YEARS SERVICE CATEGORY	PLANHOWARD 2030, CHAPTER 6
S-03	16, GRID 22	BOARD OF EDUCATION; ELLICOTT MEADOWS; CADOGAN PROPERTY AND OTHERS	TWENTY PARCELS TOTALING 158.75 AC BD OF EDUCATION- P 203, 41.15 AC; ELLICOTT MEADOWS- P 446, 86 AC; CADOGAN PROPERTY- P 248, 15.8 AC	ADDITION OF PARCELS TO SEWER PSA; 6-TO-10 YEAR SERVICE CATEGORY	PLAN HOWARD 2030, CHAPTER 6; CAPITAL PROJECT S-6293
S-04	34, GRID 18	CLARKSVILLE PIKE & GUILFORD ROAD: HODDINOTT PROPERTY & OTHERS	FOUR PARCELS TOTALING 93.3 AC: HODDINOTT PARCEL 88; HIGGS PROPERTY PARCEL 162; CLARKSVILLE PROF CENTER PARCEL 426	ADDITION OF PARCELS TO WATER & SEWER PSA; 6-TO-10 YEAR SERVICE CATEGORY	PLANHOWARD 2030, CHAPTER 6
S-05	46, GRID 02	MAPLE LAWN FARMS, FULTON MD	PARCEL 113- 91.25 ACRES	ADDITION OF PARCEL TO WATER & SEWER PSA; 6-TO-10 YEAR SERVICE CATEGORY	PLANHOWARD 2030, CHAPTER 6
S-06	31, GRID 17	MCCARTHY PROPERTY	5041 LANDING ROAD; PARCEL 608	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2011
S-07	31, GRID 16	ANDERSON PROPERTY	5211 TALBOTS LANDING; PARCEL 707, P/O LOT 12D	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 08-2011
S-08	35, GRID 2	TAJ PROPERTY	5644 TROTTER ROAD; PARCEL 5, LOT 1	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 09-2011
S-09	41, GRID 6	HUFFMAN PROPERTY	10606 VISTA ROAD; PARCEL 220, LOT 33	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2012

EXHIBIT 2- SEWER FACILITIES PLAN MAP UPDATES

Revisions to Sewer Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP N	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
S-10	35, GRID 2	TROTTER POINT, LLC	5770 & 5790 TROTTER ROAD; PARCEL 8, LOT 15	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 02-2012
S-11	42, GRID 7	KINGS COVE HOA, INC.	8509 GUILFORD ROAD; PARCEL 61, P/O LOT 4	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 03-2012
S-12	35, GRID 2	TROTTER CROSSING LLC	5674, 5680 & 5686 TROTTER ROAD; 11712 & 11716 TROTTER CROSSING LANE; PARCEL 481	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 04-2012
S-13	31, GRID 16	TURLEY PROPERTY; TURLEY'S OVERLOOK	SOUTH ILCHESTER ROAD AT TALBOTS LANDING; PARCEL 739, LOT 02	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 05-2012
S-14	41, GRID 6	LEE PROPERTY	10718 HUNTING LANE; PARCEL 252, LOT 69	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 06-2012
S-15	29, GRID 20	SAMUEL & AMBILY PROPERTY	5517 TROTTER ROAD; PARCEL 88, LOT 4	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2013
S-16	41, GRID 6	FEDAK & PETRY PROPERTY	10710 HUNTING LANE; PARCEL 174, LOT 15	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 02-2013
S-17	41, GRID 11	SCHARNHORST PROPERTY	10734 JUDY LANE; PARCEL 420, LOT 3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 03-2013
S-18	35, GRID 17	HAGOOD PROPERTY	10829 BRAEBURN ROAD; PARCEL 228, LOT 34	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 04-2013
S-19	35, GRID 24	PANDEY & KAPADIA PROPERTY	8030 HARRIET TUBMAN LANE; PARCEL 129	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 05-2013
S-20	35, GRID 17	CORNERSTONE HOLDINGS LLC	10879, 10883 & 10887 HARMEL DRIVE; PARCEL 101, LOTS 1-3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 06-2013
S-21	35, GRID 8	EMERY & GAJEWSKI PROPERTY	6301 TROTTER ROAD; PARCEL 66	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 07-2013

EXHIBIT 2- SEWER FACILITIES PLAN MAP UPDATES

Revisions to Sewer Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
S-22	41, GRID 12	JACOBS PROPERTY	10709 JUDY LANE; PARCEL 253, LOT 18	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 08-2013
S-23	35, GRID 8	RISTWAY PROPERTY	5946 TROTTER ROAD; PARCEL 373, LOT 6	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 09-2013
S-24	31, GRID 10	CASCADE WALTHUR LLC	4806, 4810, 4814 & 4822 WELLSTONE WAY; PARCEL 133, LOTS 4-11-	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 10-2013
S-25	31, GRID 10	WILLIAMSBURG GROUP LLC	4811, 4818 & 4819 WELLSTONE WAY; PARCEL 133, LOTS 1-3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 11-2013
S-26	31, GRID 10	CASCADE OVERLOOK 4 HOA	WELLSTONE WAY OPEN SPACE LOT 08	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 12-2013
S-27	31, GRID 24	GEELHAAR PROPERTY	5295 LANDING ROAD; PARCEL 619, LOT 3	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 01-2014
S-28	47, GRID 3	BEAZER HOMES CORP	10010 GORMAN ROAD; PARCEL 472	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 02-2014
S-29	10, GRID 13	DORSEY FAMILY HOMES, INC.	1670 HENRYTON ROAD; PARCEL 184	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 03-2014
S-30	35, GRID 8	SARY PROPERTY	5960 TROTTER ROAD; PARCEL 163	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 04-2014
S-31	34, GRID 18	ISICOFF PROPERTY	6215 GUILFORD ROAD; PARCEL 163	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 05-2014
S-32	41, GRID 5	SD PROPERTIES LLC	10821 HUNTING LANE; PARCEL 273, LOT 54	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 06-2014
S-33	34, GRID 12	HO PROPERTY	6118 TULANE DRIVE; PARCEL 123	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 07-2014
S-34	37, GRID 5	ROCK BURN LLC	MONTERY ROAD; PARCEL 52, P/O PARCEL A	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 08-2014

EXHIBIT 2- SEWER FACILITIES PLAN MAP UPDATES

Revisions to Sewer Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
S-35	35, GRID 23	PASS PROPERTY	7831 HARRIET TUBMAN LANE; PARCEL 117	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 09-2014
S-36	37, GRID 20	SADEGHI-BAJGIRAN PROPERTY	NORTH LARK BROWN ROAD; PARCEL 508	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 10-2014
S-37	16, GRID 14	ARAGHI & ANSARI PROPERTY	2840 KINGS GIFT DRIVE; PARCEL 367, LOT 50	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 11-2014
S-38	35, GRID 23	ARMSTRONG & RINALDI PROPERTY	7938 HARRIET TUBMAN LANE; PARCEL 321	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 12-2014
S-39	23, GRID 10	CARROLL PROPERTY	FREDERICK ROAD; PARCEL 149, LOT 1	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 13-2014
S-40	23, GRID 10	CARROLL PROPERTY	10575 FREDERICK ROAD; PARCEL 149, LOT PARCEL A	ENTERED METRO DISTRICT	METRO DISTRICT DECISION NO. 14-2014
S-41	17, GRID 11	ESTATES AT PATAPSCO PARK	PARCEL 751, LOT PAR 3; 43.78 ACRES	CHANGE COMPREHENSIVE TO 0-TO-5 YEARS	F-14-124 PLAN SUBMITTED
S-42	18, GRID 01	PHELPS PROPERTY	PARCEL 357, LOT 2; 3.41 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-042 FINAL PLAN RECORDED
S-43	17, GRID 16	MT. HEBRON OVERLOOK; LOTS 1-25	PARCEL 416	CHANGE 6-TO-10 YEARS TO EXISTING	F-11-064 FINAL PLAN SUBMITTED
S-44	25, GRID 01	ALTA AT REGENCY CREST	PARCEL 01, LOT PARCEL A; 5.8 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-08-165 FINAL PLAN RECORDED
S-45	24, GRID 6	ELLICOTT MILLS OVERLOOK AND ELLICOTT CROSSING PARTS 1 & 2	PARCEL 852, LOTS E, K	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-014, F-13-043 FINAL PLANS RECORDED
S-46	24, GRID 01	TOWNS AT PATUXENT ORCHARD	PARCEL 647, LOT 2; 5.08 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-078 FINAL PLAN RECORDED
S-47	23, GRID 06	KAUFUSS AND CALABRESE LANDS, RITE AID SITE	PARCEL 10, LOT PAR A	CHANGE 0-TO-5 YEARS TO EXISTING	F-09-084 FINAL PLAN RECORDED

EXHIBIT 2- SEWER FACILITIES PLAN MAP UPDATES

Revisions to Sewer Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
S-48	23, GRID 10	WESTMOUNT SUBDIVISION	PARCEL 149, LOT 1 & LOT PAR A	CHANGE NO PLANNED SERVICE TO 6-TO-10 YEARS	SP-14-008 PLAN SUBMITTED
S-49	24, GRID 09	LUTHERAN VILLAGE AT MILLER'S GRANT	PARCEL 1001; 49.68 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-10-083 FINAL PLAN RECORDED
S-50	25, GRID 14	AUTUMN OVERLOOK	PARCEL 0095	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-081 FINAL PLAN RECORDED
S-51	25, GRID 14	AUTUMN RIVER PHASE 3	PARCEL 279, LOT 108 PARCEL 0172; LOTS 69-108	CHANGE 0-TO-5 YEARS TO EXISTING	F-10-067 FINAL PLAN RECORDED
S-52	31, GRID 04	LOCUST CHAPEL & LOCUST CHAPEL SEC 01	PARCEL 115, LOTS 1-69	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-009 FINAL PLAN RECORDED
S-53	30, GRID 02	CENTENNIAL LAKE OVERLOOK SEC 01 & 02	PARCEL 086, PAR A & B	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-002 FINAL PLAN RECORDED
S-54	31, GRID 10	CASCADE OVERLOOK SEC 04	PARCEL 133, LOTS 1-10	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-074 AND F-12-075 FINAL PLANS RECORDED
S-55	31, GRID 16	TURLEY'S MEADOW AND TURLEY'S OVERLOOK	PARCEL 738, LOTS 1-4	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-084 AND F-14-079 FINAL PLANS RECORDED
S-56	41, GRID 21	ENCLAVE AT PARK FOREST	PARCEL 516, UNITS 1-45	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-129 FINAL PLAN RECORDED
S-57	38, GRID 03	CYPRESS SPRINGS	PARCEL 46, LOTS 1-17	CHANGE 0-TO-5 YEARS TO EXISTING	F-10-028 FINAL PLAN RECORDED
S-58	37, GRID 10	THE WELLNESS CENTER OF HOWARD COUNTY	PARCEL 687, LOT E-1	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-107 FINAL PLAN RECORDED
S-59	47, GRID 02	SCARBOROUGH ESTATES	PARCEL 25, LOTS 1-4	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-091 FINAL PLAN RECORDED
S-60	37, GRID 03	FOX HUNT ESTATES	PARCEL 606, LOTS 36	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-016 FINAL PLAN RECORDED
S-61	35, GRID 02	TROTTER POINT	PARCELS 8, 9, 165; LOTS 15	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-004 FINAL PLAN RECORDED
S-62	34, GRID 18	ENCLAVE AT TIERNEY FARM	PARCEL 88; 89.95 ACRES	CHANGE NO PLANNED SERVICE TO 6-TO-10 YEARS	ECP-15-005 PLAN SUBMITTED

EXHIBIT 2- SEWER FACILITIES PLAN MAP UPDATES

Revisions to Sewer Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
S-63	41, GRID 22 & 46, GRID 03	MAPLE LAWN FARMS	PARCEL 124; LOTS C-28, C-29 & OS LOT 03	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-086 FINAL PLAN RECORDED
S-64	46, GRID 03	MAPLE LAWN FARMS	PARCEL 124; NON-B PAR C-27 WEST DIST PAR P	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-015 FINAL PLAN RECORDED
S-65	46, GRID 03	ST. FRANCIS OF ASSISSI SUBDIVISION	PARCEL 337, LOT 01	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-061 FINAL PLAN RECORDED
S-66	46, GRID 11	RESERVOIR ESTATES (HIGDON PROPERTY)	PARCEL 56, LOTS 1-26	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-003 FINAL PLAN RECORDED
S-67	42, GRID 21 47, GRID 2	WINCOPIA FARMS	PARCEL 472127.6 ACRES	CHANGE 6-TO-10 YEARS TO EXISTING	F-13-003 FINAL PLAN RECORDED
S-68	47, GRIDS 2-8	WALDEN WOODS	PARCEL 4, LOTS 98	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-032 FINAL PLAN RECORDED
S-69	47, GRID 06	NORDAU SUBDIVISION	PARCEL 668, SEC E-1, LOTS 13-18	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-047 FINAL PLAN RECORDED
S-70	43, GRID 19	CHASE LAND SUBDIVISION	PARCEL 235, LOT 2; 23.2 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-09-071 FINAL PLAN RECORDED
S-71	37, GRID 16-22	THE MEADOWS CORPORATE PARK	PARCEL 173, LOT A-6; 33.16 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-035 FINAL PLAN RECORDED
S-72	38, GRID 09	SHADY LANE CROSSING	PARCEL 235, LOTS 1-25	CHANGE 0-TO-5 YEARS TO EXISTING	F-06-097 FINAL PLAN RECORDED
S-73	38, GRIDS 14-15	WINTER CREST	PARCEL 868, LOTS 1-8	CHANGE 0-TO-5 YEARS TO EXISTING	F-12-076 FINAL PLAN RECORDED
S-74	48, GRID 02	DORSEY WOOD	PARCEL 134, LOT PAR B	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-086 FINAL PLAN RECORDED
S-75	47, GRID 08	EMERSON	PARCEL 1051, SEC 03, AREA 01, LOT PAR B	CHANGE 0-TO-5 YEARS TO EXISTING	F-13-073 FINAL PLAN RECORDED
S-76	47, GRID 20	REVITZ PROPERTY	PARCEL 165, LOT PAR D-1	CHANGE 0-TO-5 YEARS TO EXISTING	F-11-052 AND F-11-094 FINAL PLANS RECORDED

EXHIBIT 2- SEWER FACILITIES PLAN MAP UPDATES

Revisions to Sewer Service Categories for Subdivision Activity from 2011 through December 2014.

MAP ID	TAX MAP	SUBDIVISION OR OWNER NAME	SECTION/AREA/ BLOCK/ PARCEL/LOTS	PROPOSED REVISION	REVISION JUSTIFICATION
S-77	47, GRIDS 19-20; 50, GRIDS 1-2	HIGH RIDGE MEADOWS SEC 01 (DEER SPRINGS SEC 01)	PARCELS 363 & 542; LOT B; 36.94 ACRES	CHANGE 0-TO-5 YEARS TO EXISTING	F-14-022 FINAL PLAN RECORDED
S-78	17, GRID 19	CARLEE RUN COURT AREA	PARCEL 123, LOTS 1-26	CHANGE 0-TO-5 YEARS TO EXISTING	COMPLETED CONSTRUCTION OF SEWER CONTRACT 20-4643
S-79	32, GRID 20	ROCKBURN LANDING AREA	ROCKBURN HILL ROAD & CROSSVIEW ROAD	CHANGE 0-TO-5 YEARS TO EXISTING	COMPLETED CONSTRUCTION OF SEWER CONTRACT 14-4715
S-80	32, GRID 20	ELIBANK DRIVE AREA	6400-6450 ELIBANK DRIVE	CHANGE FROM COMPREHENSIVE TO 6-TO-10 YEARS	COMPLETED CONSTRUCTION OF SEWER CONTRACT 14-4715
S-81	29, GRID 12	CLARKSVILLE PIKE AREA	10400-10600 CLARKSVILLE PIKE	CHANGE 0-TO-5 YEARS TO EXISTING	COMPLETED CONSTRUCTION OF SEWER CONTRACT 24-4690

EXHIBIT 3

1986 Baltimore City &

Howard County Water Agreement

AGREEMENT

JUL 9 1986

THIS AGREEMENT, made this _____ day of _____, 1986, by and between the Mayor and City Council of Baltimore, a municipal corporation of the State of Maryland, hereinafter referred to as BALTIMORE CITY; and Baltimore County, Maryland, a body corporate and politic of the State of Maryland, hereinafter referred to as BALTIMORE COUNTY; and Howard County, Maryland, a body corporate and politic of the State of Maryland, hereinafter referred to as HOWARD COUNTY.

WHEREAS, the General Assembly of the State of Maryland has established through Legislative Acts that BALTIMORE CITY has a statutory obligation to supply water to the Metropolitan District of BALTIMORE COUNTY; and

WHEREAS, BALTIMORE CITY, BALTIMORE COUNTY and HOWARD COUNTY entered into an agreement dated November 6, 1957, hereinafter referred to as the "1957 Agreement", for the purpose of extending water supply mains and constructing appurtenant works for furnishing water from the Western Third Zone of BALTIMORE CITY'S water distribution system through BALTIMORE COUNTY to HOWARD COUNTY; and

WHEREAS, under the terms of the 1957 Agreement, BALTIMORE CITY, BALTIMORE COUNTY and HOWARD COUNTY constructed sections of a water transmission main from the intersection of Wetheredsville Road and Windsor Mill Road in BALTIMORE CITY, to the boundary separating BALTIMORE COUNTY and HOWARD COUNTY at the Baltimore National Pike (U. S. Route 40); and

WHEREAS, under the terms of the 1957 Agreement, BALTIMORE CITY installed larger pumps at the Ashburton Pumping Station, in part for the purpose of supplying HOWARD COUNTY with water at a maximum daily rate of 8.5 million gallons per day, and at an average daily rate of 5.0 million gallons per day; and

WHEREAS, under the terms of the 1957 Agreement, BALTIMORE COUNTY acquired a site near the intersection of U. S. Route 40 and Rolling Road upon which to construct the Rolling Road Reservoir, now known as the Catonsville Reservoir; and

WHEREAS, the Catonsville Reservoir, which was to have been constructed by BALTIMORE COUNTY under the terms of the 1957 Agreement, has not yet been constructed; and

WHEREAS, there have been, and will continue to be, substantial changes in the size and location of the population served from the Western Third Zone water distribution system; and

WHEREAS, the increased water demands associated with the projected changes in population cannot be supplied by the existing system of water supply mains and appurtenant works within the Western Third Zone; and

WHEREAS, it is the desire of all parties to this agreement that certain water supply mains and appurtenant works within the Western Third Zone be constructed to accommodate the future water demands of the parties hereto; and

WHEREAS, it is the intent of all parties to this agreement that capacity shares and a method for the computation and payment of capital costs be established for water supply mains and appurtenant works to be constructed under this agreement; and

WHEREAS, analyses have been completed, are underway, or will be conducted in the future to determine the sizing, construction scheduling, and capacity shares of future water supply mains and appurtenant works through year 2025.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH; that in consideration of the covenants, agreements, and payments set forth herein, it is mutually covenanted and agreed as follows:

ARTICLE I - DEFINITIONS

A. "Party or Parties" shall mean BALTIMORE CITY, BALTIMORE COUNTY and/or HOWARD COUNTY, as appropriate, each of these jurisdictions being a signatory to this agreement.

B. "Jointly-Used Facility" is any installation, including real and personal property, specifically identified in this agreement which distributes, transmits, pumps, and/or treats potable water in the Western Third Zone for more than one party to this agreement.

C. "Capital Cost" is the net cost involved in the construction, installation or rehabilitation of a water supply facility and shall include, but not be limited to, the sum of the following items: Land and/or easements; consultants' fees including those for design and inspection; material; labor; utility relocations; overhead which may include a proportionate allocation of in-house costs associated with design, field engineering, surveys, borings, materials testing, maps and records maintenance, inspection, right-of-way expenses, advertising, administrative services, clerical services, stenographic services, office space use and building operation and maintenance; and all other contributing costs or expenses. Capital cost does not include operation and maintenance costs incurred after the completion and final acceptance of the facility.

D. "Design Flow Method" is a method of cost allocation for a jointly used facility which is based upon the allocation of the total design capacity of said facility among the parties. The ratio of cost responsibility for a party is determined by dividing the portion of the total design capacity of the jointly used facility allocated to the party by the total design capacity of the facility.

E. "Director" shall mean the Director of Public Works of any party to this agreement, or his duly authorized representatives or agents.

F. "Purchased Design Capacity" is that portion of the total design capacity of a jointly used facility that the capital cost payment of any one party bears to the total capital cost for construction or installation of said facility.

ARTICLE II - FINANCING OF JOINTLY USED FACILITIES

A. All parties shall share the capital cost associated with constructing, installing or rehabilitating jointly used facilities as specified in Article III, Paragraphs (B) and (C).

B. The total capital cost for any jointly used facility specified in Article III, Paragraphs (B) and (C), shall be apportioned to each party by the Design Flow Method at the time of construction, installation or rehabilitation.

C. The party responsible for construction, installation or rehabilitation of a jointly used facility shall, as construction progresses, issue periodic billings based upon work completed to the other parties sharing in the capital cost of the jointly used facility. Such billings shall be payable not later than thirty (30) days after issuance.

D. The party responsible for construction, installation or rehabilitation of a jointly used facility shall, upon completion of said facility, prepare a final audit of all related capital costs. The other parties shall, upon receipt of the final audit and a final billing, pay any balance due for their respective shares of the capital cost as determined by the Design Flow Method. In the event that the respective sums previously billed and paid are in excess of the parties' respective capital cost shares as determined by the Design Flow Method, the party responsible for construction, installation or rehabilitation of the jointly used facility shall return to each affected party the difference between the sum paid by that party and the capital cost share owed by that party, in accordance with the final audit.

E. Each party shall have the right to audit another party's statements and accounts related to the performance of this agreement. Such audits shall be made at the auditing party's expense.

ARTICLE III - JOINTLY USED FACILITIES

A. All parties shall participate in the construction, installation or rehabilitation of the jointly used facilities specified and described in Paragraphs (B) and (C) of this Article, and as generally identified

on the Map included as Attachment No. 1 to this agreement. It is the intent of this agreement that each jointly used facility described in Paragraphs (B) and (C) of this article shall be constructed, installed or rehabilitated as set forth hereinafter. Cost share ratios, expressed as percentages by jurisdiction for each jointly used facility, are based on the Design Flow Method of cost allocation. The derivation of cost share ratios for each jointly used facility are given in Attachment No. 3 to this agreement.

B. The jointly used facilities to be constructed or installed under the terms of this agreement are as follows:

1. Catonsville Transmission Main, Section 2

BALTIMORE COUNTY shall design and construct Section 2 of the Catonsville Transmission Main, as soon as practicable with a target date of 1986, which main shall be 48" in diameter and shall extend along Forest Park Avenue from Cooks Lane to the intersection of Harlem Lane and U. S. Route 40, a distance of approximately 5,300 linear feet. The parties agree to share in the cost of this main at the following percentages: 9.25% to be paid by BALTIMORE COUNTY; and 90.75% to be paid by HOWARD COUNTY.

2. Catonsville Transmission Main, Section 4

HOWARD COUNTY shall design and construct Section 4 of the Catonsville Transmission Main, as soon as practicable with a target date of 1988, which main shall be 48" in diameter and shall extend along U. S. Route 40 from the existing 36" diameter Catonsville Pumping Station suction main to the border separating HOWARD and BALTIMORE COUNTIES, a distance of approximately 6,100 linear feet. HOWARD COUNTY shall also design and construct a meter along the transmission main at a location near the border separating HOWARD and BALTIMORE COUNTIES as specified in Article VI (A). The parties agree to share in the cost of this main and meter at the following percentages: 100% to be paid by HOWARD COUNTY.

3. Catonsville Reservoir, East Bay

BALTIMORE COUNTY shall design and construct the East Bay of the Catonsville Reservoir, as soon as practicable with a target date of 1988, which bay shall have a storage capacity of approximately 30 million gallons and an overflow elevation of 567.4 feet. The East

Bay shall be located at the site owned by BALTIMORE COUNTY upon which the Catonsville Pumping Station is presently located. The actual storage capacity shall be determined from an engineering study prepared by BALTIMORE COUNTY. The East Bay shall provide for the necessary storage requirements requested by each party, and specified in Attachment No. 2. The East Bay shall be designed and constructed to allow for the future construction of additional storage facilities to provide for the year 2025 storage requirements requested by each party, and specified in Attachment No. 2. The parties agree to share in the cost of the East Bay at percentages derived using the design flow method of cost allocation as applied using the storage requirements of each party. The general method of cost allocation to be used is detailed in Attachment No. 3, Section (C).

4. Leakin Park Pumping Station

BALTIMORE CITY shall design and construct the Leakin Park Pumping Station, as soon as practicable with a target date of 1988, which station shall be located in Leakin Park at a site determined from an engineering design study prepared by BALTIMORE CITY. Construction of the pumping station shall include the installation of the pumps recommended for initial installation in the engineering design study. These pumps shall provide, in conjunction with the Ashburton Pumping Station, for the necessary maximum day demands requested by each party, and specified in Attachment No. 2. The pumping station shall be designed and constructed to allow for the future installation of additional pumps as specified in the engineering design study. These additional pumps shall provide, in conjunction with the Ashburton Pumping Station, for the year 2025 maximum day demands requested by each party, and specified in Attachment No. 2. HOWARD COUNTY agrees to advance funds to BALTIMORE CITY for the design of the pumping station. The parties agree to share in the cost of the Leakin Park Pumping Station at percentages derived using the design flow method of cost allocation as applied using the maximum day demands of each party. The general method of cost allocation

to be used is detailed in Attachment No. 3, Section (D). BALTIMORE COUNTY agrees to reimburse HOWARD COUNTY for a percentage of the design cost of the pumping station, said percentage being that derived as BALTIMORE COUNTY'S share in the cost of the Leakin Park Pumping Station.

5. Catonsville Transmission Main, Section 1-S

BALTIMORE CITY shall design and construct Section 1-S of the Catonsville Transmission Main as soon as practicable with a target date of 1988, which main shall be 60" in diameter and shall consist of the suction and discharge mains for the Leakin Park Pumping Station. The suction main shall be located between the existing 66" diameter stub along the Gwynns Falls Transmission Main and the Leakin Park Pumping Station. The discharge main shall be located between the Leakin Park Pumping Station and the existing 48" diameter Leakin Park transmission main. HOWARD COUNTY agrees to advance funds to BALTIMORE CITY for the design of the transmission main. The parties agree to share in the cost of Section 1-S of the Catonsville Transmission Main at the same percentages derived for sharing in the cost of constructing the Leakin Park Pumping Station. BALTIMORE COUNTY agrees to reimburse HOWARD COUNTY for a percentage of the design cost of the transmission main, said percentage being that derived as BALTIMORE COUNTY'S share in the cost of the Leakin Park Pumping Station.

C. The jointly used facilities to be rehabilitated under the terms of this agreement are as follows:

1. Melvin Avenue Transmission Main, Cleaning and Lining

BALTIMORE COUNTY shall clean and line a portion of the existing Melvin Avenue Transmission Main as soon as practicable with a target date of 1989, which main is 20" in diameter and extends along Melvin Avenue from the existing Melvin Avenue storage tank to the intersection of Melvin Avenue and Frederick Avenue, a distance of approximately 1,200 linear feet. The parties agree to share in the cost of this rehabilitation at the following percentages: 64.36% to be paid by BALTIMORE COUNTY; and 35.64% to be paid by HOWARD COUNTY.

2. Harlem Lane Transmission Main, Cleaning and Lining

BALTIMORE COUNTY shall clean and line a portion of the existing Harlem Lane Transmission Main as soon as practicable with a target date of 1989, which main is 16" in diameter and extends along Harlem lane, Edmondson Avenue, and Melvin Avenue from U. S. Route 40 to the existing Melvin Avenue storage tank, a distance of approximately 8,975 linear feet. The parties agree to share in the cost of this rehabilitation at the following percentages: 64.36% to be paid by Baltimore County; and 35.64% to be paid by HOWARD COUNTY.

3. Rolling Road Transmission Main, Cleaning and Lining

BALTIMORE COUNTY shall clean and line the existing Rolling Road Transmission Main as soon as practicable with a target date of 1990, which main is 16" in diameter and extends along Rolling Road from Newburg Avenue to Wilkens Avenue, a distance of approximately 5,340 linear feet. The parties agree to share in the cost of this rehabilitation at the following percentages: 65.79% to be paid by BALTIMORE COUNTY; and 34.21% to be paid by HOWARD COUNTY.

D. All parties recognize that the sizing of jointly used facilities and the years and cost shares specified in Paragraphs (B) and (C) of this Article, for construction, installation, and rehabilitation of jointly used facilities have been determined based upon hydraulic modeling and upon the projected demands given in Attachment No. 2 of this agreement. All parties agree that if projected demands or hydraulic modeling results change, this agreement shall be revised by amendment to provide for the sizing, cost sharing, and scheduling of jointly used facilities compatible with the revised projected demands and hydraulic modeling results. This agreement shall also be revised to incorporate the revised projected demands and hydraulic modeling results as appropriate.

E. All parties recognize that additional jointly used facilities not presently identified in this agreement will be required in the future as specified in the Western Third Zone Study prepared by the Water Analyzer Office and dated August, 1984. All parties agree that this agreement shall be revised when necessary to incorporate

those jointly used facilities which are recommended in the Western Third Zone Study for construction, installation, or rehabilitation within a six (6) year period following issuance or revision of the study.

F. All parties agree that the Western Third Zone Study shall be jointly reviewed at three (3) year intervals, or at other times if requested in writing by any party, to determine the need for updating projected demands, hydraulic modeling results, implementation schedules, or any other portions of the study affecting the construction, installation, or rehabilitation of jointly used facilities. Appropriate revisions shall be made to the study after review and approval by each party.

ARTICLE IV - DESIGN AND CONSTRUCTION OF JOINTLY USED FACILITIES

A. All jointly used facilities located in BALTIMORE CITY and BALTIMORE COUNTY, including the flow metering facilities as described in Article III, Paragraph (B)(2), shall be designed, constructed, rehabilitated, installed and tested in accordance with the applicable codes, rules and regulations of BALTIMORE CITY and BALTIMORE COUNTY.

B. Any party shall, upon request, have the right to review reports, plans, specifications and bids for the rehabilitation, construction and/or installation of any jointly used facility owned or operated by another party. Where a party requests review of any or all of the documents specified above, said documents, including significant revisions, shall not be approved without the consent of the reviewing party. Any costs incurred for said review by BALTIMORE COUNTY or HOWARD COUNTY shall be borne exclusively by the reviewing party. Any costs incurred for said review by BALTIMORE CITY shall be borne by BALTIMORE COUNTY and HOWARD COUNTY, and shall be divided based on the cost share percentages for the applicable jointly used facility as given in Article III, Paragraphs (B) AND (C).

C. All jointly used facilities shall be constructed, installed, or rehabilitated in accordance with the approved plans and specifications.

ARTICLE V - INSPECTION OF JOINTLY USED FACILITIES AND RECORDS

A. The premises of any jointly used facility, which is being constructed, rehabilitated, or installed, may be entered and inspected by any party with previous written notice to the party which owns the jointly used facility. Inspection of a jointly used facility shall be accomplished by the Directors of the parties involved.

B. Each party shall have ready access to all design data, construction plans, specifications, schedules, office and field records, costs records and files for the jointly used facilities of any other party.

C. Any costs incurred by BALTIMORE COUNTY or HOWARD COUNTY associated with the inspection of any jointly used facility being constructed, rehabilitated, or installed shall be borne by the inspecting party. Any costs incurred by BALTIMORE CITY for the inspection of any jointly used facility being constructed, rehabilitated, or installed shall be borne by BALTIMORE COUNTY and HOWARD COUNTY, and shall be divided based on the cost share percentages for the applicable jointly used facility as given in Article III, Paragraphs (B) and (C).

D. Each party shall maintain copies of records as specified in this Article, Paragraph (B), for the jointly used facilities constructed, rehabilitated, or installed by that party.

ARTICLE VI - METERING

A. In order to measure and record automatically the volume and flow rate of water supplied to Howard County from the Catonsville Transmission Main, Section 4, as described in Paragraph (B)(2) of Article III, a recording and registering flow meter, satisfactory to and approved by the Directors of HOWARD COUNTY and BALTIMORE CITY, shall be constructed, installed, and ready for regular continuous service near the border separating BALTIMORE and HOWARD COUNTIES at such time as the transmission main is placed in service. The cost of said meter and its installation shall be borne entirely by HOWARD COUNTY. The meter shall be operated and maintained by BALTIMORE CITY and the cost of said operation and maintenance shall be borne entirely by HOWARD COUNTY.

B. In the event of failure of the meter installed as specified in Paragraph (A) of this Article, or in the event of failure of the meter previously installed on the existing 24" diameter transmission main along U. S. Route 40, BALTIMORE CITY agrees to proceed with repairs within 60 days or to order replacements within 60 days.

ARTICLE VII - OWNERSHIP AND MAINTENANCE RESPONSIBILITY

A. Legal title to a jointly used facility constructed or installed under the terms of this agreement shall be and remain with the party in which the jointly used facility is located.

B. At no time may any party's use of a jointly used facility exceed that party's purchased design capacity of said facility except as specified in Paragraph (C) of this Article without the express written permission of the other parties and the execution of appropriate amendments to this agreement which specify the adjusted purchased design capacities for each party.

C. Paragraph (B) of this Article does not apply to the Leakin Park Pumping Station and its associated suction and discharge mains. At no time may any party's combined use of the Leakin Park Pumping Station (including its suction and discharge mains) and the Ashburton Pumping Station exceed the flow rates applicable to that party as specified in Attachment No. 2 to this agreement without the expressed written permission of the other parties and the execution of appropriate amendments to this agreement which specify the adjusted allowable flow rates for each party. Paragraph (B) of this Article also does not apply in the event of an emergency during which BALTIMORE CITY is required to provide water service in accordance with Article 25, Section 168 of the Annotated Code of Maryland.

D. No party may relinquish all or part of that party's purchased design capacity and related cost sharing responsibility in a jointly used facility, nor may any party increase that party's purchased design capacity and related cost sharing responsibility in a jointly used facility, without the expressed written permission of the other parties, and the execution of appropriate amendments to this agreement which specify the adjusted purchased design capacities for each party.

E. Whenever an amendment to this agreement results in a change to any party's purchased design capacity in a jointly used facility, the cost sharing responsibility for the construction or installation of said facility shall be adjusted accordingly. Immediately after execution of amendments to this agreement which specify the adjusted purchased design capacities, each party owed an adjustment in cost sharing responsibility shall invoice the owing party for said adjustment. The party liable for the adjustment shall remit the owed amount in a lump sum cash payment no later than sixty (60) days after receipt of the invoice for said adjustment.

F. BALTIMORE CITY shall be responsible for and shall supervise the operation and maintenance of jointly used facilities located within BALTIMORE CITY and BALTIMORE COUNTY in accordance with previous agreements.

G. All parties recognize that the construction, installation, or rehabilitation of the jointly used facilities specified in Paragraphs (B) and (C) of Article III, shall not, except as noted in Item H of this Article, entitle any party to additional water supply volumes or flow rates from the Ashburton Filtration Plant and the Ashburton Pumping Station above those specified in previously executed agreements. All parties further recognize that a permanent increase in the water supply volumes and flow rates available to each party will be contingent upon the execution of a future agreement addressing facilities within the BALTIMORE CITY central water system.

H. All parties agree that HOWARD COUNTY shall be allowed to exceed the maximum daily withdraw rate specified in the November 6, 1957 agreement until such time as the jointly used facilities specified in Paragraph (B) of Article III are constructed and a central water system agreement is executed. All parties further recognize that this item will be effective only if unused capacity is available in the Western Third Zone.

ARTICLE VIII - EXCHANGE OF INFORMATION

A. The Director of each party shall annually prepare a listing of the jointly used facilities specified in Paragraphs (B) and (C) of Article III which are located within that party's borders and which

the Director intends to include in his party's proposed Five-Year Capital Improvement Program. The listing shall include a description, estimated cost, and schedule for proposed construction, installation, or rehabilitation of each jointly used facility. The listing shall be transmitted to the Directors of the other parties by November 1 of each year.

B. Giving consideration to the listings transmitted as specified in Paragraph (A) of this Article, the Director of each party shall prepare a proposed Five-Year Capital Improvement Program which provides for the construction, installation, or rehabilitation of jointly used facilities specified in Paragraphs (B) and (C) of Article III by the years indicated. Each Director shall include adequate funding in that party's proposed annual fiscal budget for the jointly used facilities specified in his Capital Improvement Program.

C. Upon approval of the annual fiscal budget, each Director shall notify the other Directors of those jointly used facilities which have been included in that party's officially adopted annual fiscal budget and Capital Improvement Program. Each such annual notification will be deemed to supercede all prior such notifications.

D. Before any party commences construction, installation, or rehabilitation of a jointly used facility, the other parties shall certify that funds for their capital cost shares are available. In the event that funds are not available from a party, that party shall attempt to obtain funds as quickly as possible or to make other mutually agreeable arrangements for payments.

ARTICLE IX - RIGHTS AND LIMITATIONS

A. Nothing in this agreement shall limit or abrogate any right or rights of any party to enter into other separate agreements for the planning, design and construction of water supply facilities providing such separate agreements do not conflict with this agreement or any prior agreements made between the parties.

B. Nothing contained in this agreement shall limit or abrogate any right or rights delegated to each party by Acts of the General Assembly of the State of Maryland.

C. Nothing contained in this agreement shall be construed to abridge or restrict the police, legislative or governmental powers of any party to this agreement.

D. Each party shall recognize all rights and privileges acquired by another party through the acquisition of property and/or rights-of-way.

E. This agreement, except as specifically noted, applies only to those portions of BALTIMORE CITY, BALTIMORE COUNTY, and HOWARD COUNTY which are served or will be served by the Western Third Zone water distribution system.

F. The agreement dated November 6, 1957 between BALTIMORE CITY, BALTIMORE COUNTY and HOWARD COUNTY is hereby updated. In the event that any terms or conditions in this agreement are found to conflict with terms or conditions in the November 6, 1957 agreement, this agreement shall supersede the conflicting terms or conditions of the November 6, 1957 agreement.

ARTICLE X - REVISIONS AND DISPUTES

A. The terms and conditions provided for in this agreement shall continue in full force and effect until the parties amend this agreement or execute a new replacement agreement.

B. If, in the opinion of any party, it becomes necessary or desirable, to amend this agreement or execute a new agreement, that party shall so notify the other parties in writing. The written notification shall include a draft of the desired amendment or new agreement. If the parties are unable to agree on the proposed amendment or new agreement, the present agreement shall continue in full force and effect until such time as legal remedies available to a party, if pursued, result in an amendment to this agreement or a new agreement.

IN WITNESS WHEREOF, the parties hereto have properly executed this agreement, as of the day, month, and year first above written.

BALTIMORE CITY, MARYLAND
Mayor and City Council of Baltimore

ATTEST:

By: _____
Mayor

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

Approved:

_____
Asst. City Solicitor

_____
Director of Public Works

APPROVED BY THE BOARD OF ESTIMATES OF THE CITY OF BALTIMORE THIS 9 DAY OF JULY, 1985

_____
Clerk of the Board of Estimates

BALTIMORE COUNTY, MARYLAND

ATTEST:

By: _____ 5/14/86
County Executive
[FOR DONALD P. HUTCHINSON]

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

Approved:

_____
Dep. County Solicitor

_____ 5/9/86
Director of Public Works

HOWARD COUNTY, MARYLAND

ATTEST:

By: _____
County Executive

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

Approved:

_____
County Solicitor

_____ 5-6-86
Director of Public Works

5/16/86

AGREEMENT ATTACHMENT NO. 2

AVERAGE DAY WATER DEMANDS , MAXIMUM DAY WATER DEMANDS AND STORAGE REQUIREMENTS

A. Assumptions and Conditions

1. The Ashburton Pumping Station and the Leakin Park Pumping Station shall together have adequate capacity to pump the total maximum day water demands for the Western Third Zone.

2. Projected maximum and average day water demands assumed for BALTIMORE CITY and BALTIMORE COUNTY are as given in the Western Third Zone Study prepared by the Water Analyzer Office and dated August, 1984. Flows are given for the years 1980, 2000 and 2025 (the design year). It is assumed that maximum and average day demands will increase linearly between years 1980 and 2000, and between years 2000 and 2025.

3. Projected maximum and average day water demands assumed for HOWARD COUNTY are as given in the Western Third Zone Study for years 1980 and 2025, and as given in the 1985 Howard County Master Plan for Water and Sewerage for years 1990, 1995, 2000, and 2005. It is assumed that average and maximum day demands will increase linearly between years 1980 and 1990; between years 1990 and 1995; between years 1995 and 2000; between years 2000 and 2005, and between years 2005 and 2025.

4. The Ashburton Pumping Station has a current capacity equal to 79 mgd based on the measured flow pumped for the maximum day realized during the summer of 1983. Based upon hydraulic modeling using pump curves for the Leakin Park Pumping Station specified in the engineering design study prepared by BALTIMORE CITY, it is anticipated that the capacity of the Ashburton Pumping Station will decrease below 79 mgd by the design year (2025). It is assumed that the pump station's capacity will decrease linearly from 79 mgd in 1985 to the identified lower capacity in 2025.

5. Storage for the Western Third Zone shall be provided by the Melvin Avenue storage tank, the Pikesville Reservoir, and the Catonsville Reservoir. The Melvin Avenue tank is assumed to be taken out of service by 2005.

6. Criteria utilized to determine storage requirements for the Western Third Zone are taken from the 1955 Geyer-Wolff Report and are as follows:

   a. Provide storage to meet daily demand fluctuations in the Western Third Zone (equal to 20% of the maximum day's demand in the Western Third Zone).

b. Provide fire fighting reserve of 4.8 million gallons (8 hours flow duration at a flow rate of 10,000 gallons per minute).

c. Provide reserve equal to one-half of one day's demand in the Western Third Zone at the annual average demand rate in that zone.

d. For the dependent higher zones that have no ground storage, provide reserve for fire fighting (if not available in the higher zone) and for one half day's demand at the annual average rate. Fire fighting reserve is available in the Catonsville Fourth, Pikesville Fourth, and Reisterstown Fifth higher zones.

6. For projected flows the following ratios were assumed for each party relating maximum day demand to average day demand:

BALTIMORE CITY	(for years 2000 and 2025)	1.3
BALTIMORE COUNTY,	all zones except Catonsville Fourth Zone (for years 2000 and 2025)	1.6
BALTIMORE COUNTY,	Catonsville Fourth Zone (for years 2000 and 2025)	1.5
HOWARD COUNTY	(for years 1990, 1995, 2000, 2005, and 2025)	1.7

B. Average day demand projections for each party

	YEAR					
	1980	1990	1995	2000	2005	2025
BALTIMORE CITY	28.35	27.34	26.84	26.34	26.41	26.70
BALTIMORE COUNTY	23.32	27.62	29.77	31.92	33.54	40.00
HOWARD COUNTY	7.1	13.3	14.9	17.5	19.9	29.7
TOTAL AVERAGE DAY DEMAND	58.77	68.26	71.51	75.76	79.85	96.40

All flows above are given in units of million gallons per day.

C. Maximum day demand projections for each party

	YEAR					
	1980	1990	1995	2000	2005	2025
BALTIMORE CITY	32.03	33.13	33.69	34.24	34.33	34.71
BALTIMORE COUNTY	11.60	13.80	14.90	16.00	16.00	16.00
WESTERN THIRD ZONE BALTIMORE COUNTY	22.20	28.16	31.14	34.12	36.70	46.98
UPPER ZONES HOWARD COUNTY	11.18	22.61	25.33	29.75	33.83	50.50
TOTAL MAXIMUM DAY DEMAND	77.01	97.70	105.06	114.11	120.85	148.19

All flows above are given in units of million gallons per day.

D. Storage projections for each party

	1980	1990	YEAR 1995	2000	2005	2025
BALTIMORE CITY:						
Daily fluctuations reserve	6.41	6.63	6.74	6.85	6.87	6.94
1/2 average day reserve	14.17	13.67	13.42	13.17	13.20	13.35
Fire fighting reserve	2.4	2.4	2.4	2.4	2.4	2.4
BALTIMORE CITY Totals	22.98	22.70	22.56	22.42	22.47	22.69
BALTIMORE COUNTY:						
Daily fluctuations reserve (Western Third Zone Only)	2.32	2.76	2.98	3.2	3.2	3.2
1/2 average day reserve (Western Third and Upper Zones)	11.66	13.81	14.88	15.96	16.77	20.00
Fire fighting reserve	2.4	2.4	2.4	2.4	2.4	2.4
BALTIMORE COUNTY Totals	16.38	18.97	20.26	21.56	22.37	25.60
HOWARD COUNTY:						
Daily fluctuations reserve	2.24	4.52	5.07	5.95	6.77	10.10
1/2 average day reserve	3.55	6.65	7.45	8.75	9.95	14.85
HOWARD COUNTY Totals	5.79	11.17	12.52	14.70	16.72	24.95
Total Storage Required	45.15	52.84	55.34	58.68	61.56	73.24

All storage volumes are given in units of million gallons.

E. Projected storage to be supplied by the Catonsville Reservoir

	YEAR					
	1980	1990	1995	2000	2005	2025
TOTAL STORAGE REQUIRED	45.15	52.84	55.34	58.68	61.56	73.24
AVAILABLE STORAGE WITHOUT CATONSVILLE RESERVOIR	25.40	25.40	25.40	25.40	21.40	21.40
DIFFERENCE = CATONSVILLE RESERVOIR STORAGE	19.75	27.44	29.94	33.28	40.16	51.84

All storage volumes are given in units of million gallons.

AGREEMENT ATTACHMENT NO. 3

DERIVATION OF COST SHARE RATIOS FOR JOINTLY USED FACILITIES

A. Catonsville Transmission Main, Section 2

Total maximum day flow in parallel main for design year 2025	=	46.28 mgd
Howard County maximum day flow to U. S. Route 40 and Gun Road connections for design year 2025	=	50.50 mgd
Maximum day flow allowed to Howard County by November 6, 1957 Agreement	=	8.50 mgd
Maximum day capacity required by Howard County = 50.50 mgd - 8.50 mgd	=	42.00 mgd
Howard County cost share ratio in parallel main = 42.00/46.28	=	90.75%
Baltimore County cost share ratio in parallel main = 100 - 90.75	=	9.25%

B. Catonsville Transmission Main, Section 4

Total maximum day flow in parallel main and existing main for design year 2025	=	48.80 mgd

This main serves only Howard County and is, therefore, funded by Howard County at the 100% level

C. Catonsville Reservoir, East Bay

The East Bay is to provide adequate storage until such time as the reservoir West Bay is constructed.

1. Based on Attachment No. 2, Item E, determine the year in which the total storage provided by the Catonsville Reservoir East Bay will be fully utilized. Assume a linear increase in storage requirements for years between the five year increments given. The year so determined is the year by which the Reservoir West Bay must be constructed.

2. From Attachment No. 2, Item D, obtain the storage requirements for each party for the five year increments which immediately preceed and follow the year determined in Step (1) above.

3. Assuming that storage requirements for each party increase linearly for years between the five year increments identified in Step (2) above, calculate each party's storage requirements for the year determined in Step (1) above. To simplify the explanation of the following calculations, assume Baltimore City's storage requirements = (A); Baltimore County's storage requirements = (B); and Howard County's storage requirements = (C).

4. Total existing storage available prior to construction of the Reservoir East Bay is as follows:

Pikesville Reservoir	=	21.40 MG
Melvin Avenue Tank	=	4.00 MG
TOTAL	=	25.40 MG

5. Portion of existing storage (Pikesville Reservoir and Melvin Avenue Tank) available for use by Baltimore County prior to construction of the Reservoir West Bay = 25.40 MG - (A) = (D).

   Where: (D) - is the portion of existing storage available for use by Baltimore County.

6. Additional storage in East Bay required by Baltimore County = (B) - (D) = (E).

   Where: (E) is the East Bay storage required by Baltimore County.

7. Storage in East Bay required by Howard County = (C).

8. Baltimore County cost share ratio in East Bay = (E) total storage provided by East Bay.

9. Howard County cost share ratio in East Bay = (C) total storage provided by East Bay.

D. Leakin Park Pumping Station

Howard County maximum day flow to U. S. Route 40 and Gun Road connections for design year 2025 = 50.5 mgd

Maximum day flow allowed to Howard County by November 6, 1957 agreement = 8.50 mgd

Maximum day capacity required in Leakin Park Pumping Station by Howard County = 50.5 MGD - 8.50 mgd = 42.00 mgd

Baltimore City maximum day flow for design year 2025, to be supplied by Ashburton Pumping Station = 34.71 mgd

Baltimore County maximum day flow for design year 2025 = 62.98 mgd

Portion of Baltimore County maximum day flow for design year 2025 to be provided by Ashburton Pumping Station = (A) - (8.50 mgd + 34.71 mgd) = (B)

Where: (A) - is the maximum day flow capacity of the Ashburton Pumping Station in the design year 2025 as determined by the Water Analyzer Office using pump curves for the Leakin Park Pumping Station specified in the engineering design study prepared by Baltimore City.

(B) - is the portion of the Baltimore County maximum day flow for design year 2025 to be provided by Ashburton Pumping Station.

Portion of Baltimore County maximum day flow for design year 2025 to be provided by Leakin Park Pumping Station = 62.98 mgd - (B) = (C)

Where: (C) - is the portion of the Baltimore County maximum day flow for design year 2025 to be provided by Leakin Park Pumping Station.

Total maximum day flow from Leakin Park Pumping Station in 2025 = 42.00 mgd + (C) = (D)

Where: (D) - is the total maximum day flow from Leakin Park Pumping Station in 2025

Baltimore County cost share percentage in Leakin Park Pumping Station = [(C)/(D)] x 100%

Howard County cost share percentage in Leakin Park Pumping Station = [42.00/(D))] x 100%

E. Catonsville Transmission Main, Section 1-S

Since this main consists of the suction and discharge mains for the Leakin Park Pumping Station, cost share ratios are as given in Item (D) for the Pumping Station

F. Melvin Avenue Transmission Main, Cleaning and Lining

Total maximum day flow in main for design year 2025	=	4.77 mgd
Howard County maximum day flow in main for design year 2025	=	1.70 mgd
Baltimore County maximum day flow in main for design year 2025	=	3.07 mgd
Howard County cost share ratio in cleaning and lining = 1.70 mgd/4.77 mgd	=	35.64%
Baltimore County cost share ratio in cleaning and lining = 3.07 mgd/4.77 mgd	=	64.36%

G. Harlem Lane Transmission Main, Cleaning and Lining

Total maximum day flow in main for design year 2025	=	1.88 mgd
Howard County maximum day flow in main for design year 2025	=	0.67 mgd
Baltimore County maximum day flow in main for design year 2025	=	1.21 mgd
Howard County cost share ratio in cleaning and lining = 0.67 mgd/1.88 mgd	=	35.64%
Baltimore County cost share ratio in cleaning and lining = 1.21 mgd/1.88 mgd	=	64.36%

H. Rolling Road Transmission Main, Cleaning and Lining

Total maximum day flow in main for design year 2025	=	4.97 mgd
Howard County maximum day flow in main for design year 2025	=	1.70 mgd
Baltimore County maximum day flow in main for design year 2025	=	3.27 mgd
Howard County cost share ratio in cleaning and lining = 1.70 mgd/4.97 mgd	=	34.21%
Baltimore County cost share ratio in cleaning and lining = 3.27 mgd/4.97 mgd	=	65.79%

EXHIBIT 4

1988 WSSC &

Howard County Water Agreement

AGREEMENT

THIS AGREEMENT, made this 16 day of June, 1988, by and between the Washington Suburban Sanitary Commission, hereinafter referred to as WSSC; and Howard County, Maryland, a body corporate and politic of the State of Maryland, hereinafter referred to as HOWARD COUNTY.

WHEREAS, the General Assembly of the State of Maryland has established through Legislative Acts, as specified in the Annotated Code of Maryland, Article 29, Title 15, that WSSC may enter into any contract or agreement with the HOWARD COUNTY Department of Public Works to furnish water to HOWARD COUNTY; and

WHEREAS, WSSC and HOWARD COUNTY entered into an agreement dated October 25, 1954, hereinafter referred to as the "1954 Agreement", for the purpose of extending water supply mains and constructing appurtenant works for furnishing water from the WSSC water distribution system to HOWARD COUNTY; and

WHEREAS, both WSSC and HOWARD COUNTY constructed water supply mains and appurtenant works described in the 1954 Agreement; and

WHEREAS, under the terms of the 1954 Agreement, WSSC was to maintain and operate those portions of the water system of HOWARD COUNTY which were supplied from the water system to WSSC; and

WHEREAS, under the terms of the 1954 Agreement, WSSC agreed to furnish HOWARD COUNTY not more than 2.5 million gallons of potable water per day, and HOWARD COUNTY desires to increase this daily flow limitation to accommodate future water demands in HOWARD COUNTY; and

WHEREAS, there have been substantial changes in responsibilities for construction, operation, and maintenance of the portion of HOWARD COUNTY'S water system which is supplied by the WSSC water system, thus rendering the 1954 Agreement obsolete.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH; that in consideration of the covenants, agreements, and payments set forth herein, it is mutually covenanted and agreed as follows:

ARTICLE I - DEFINITION

1. "Party or Parties" shall mean WSSC and/or HOWARD COUNTY, as appropriate, each being a signatory to this Agreement.
2. "Capital Costs" is the net cost involved in the construction of a water supply facility and shall include, but not be limited to, the sum of the following items: Land and/or easements; consultants' fees including those for design and inspection; material; labor; utility relocations; overhead which may include a proportionate allocation of in-house costs associated with design, field engineering, surveys, borings, materials testing, maps and records maintenance, inspection, right-of-way expenses, advertising, administrative services, clerical services, stenographic services, office space use and building operation and maintenance; and all other contributing costs or expenses. Capital cost does not include operation and maintenance costs incurred after the completion and final acceptance of the facility.
3. "12-Inch Water Main" is the proposed 12-inch diameter water main located along Montgomery Street in Laurel from Eleventh Street to Woodview Terrace, a distance of approximately 1,230 linear feet. The general location of this main is shown on the attached map included as Attachment No. 1 to this Agreement.
4. "Public Water System" is the system of water lines, storage tanks, pumping stations and other appurtenant structures for the purpose of distributing potable water to the public.
5. "Maximum Daily Rate" is the maximum volume of water which passes through the interconnection between consecutive midnights.

ARTICLE II - DESIGN, CONSTRUCTION, INSPECTION AND FUNDING OF IMPROVEMENT TO THE WSSC WATER SYSTEM REQUESTED BY HOWARD COUNTY

1. The WSSC shall proceed with design and construction of the 12-inch water main on a schedule to be coordinated with the City of Laurel. The capital cost of the 12-inch water main shall be paid by HOWARD COUNTY.

2. HOWARD COUNTY agrees to advance funds to WSSC equal to 25% of the estimated capital cost of the 12-inch water main. HOWARD COUNTY shall advance these funds prior to the acceptance of construction bids by WSSC. The estimated capital cost is $80,000.
3. The WSSC shall submit billings and provide updates of the estimated total cost at the following stages of project completion; 25%, 50%, and 75%.
4. WSSC shall, upon completion of construction of the 12-inch water main, prepare a final billing of the total actual capital costs, less the funds previously advanced by HOWARD COUNTY. HOWARD COUNTY shall, upon receipt of the final accounting and final billing from WSSC, pay any balance due for the capital cost. HOWARD COUNTY shall have the right, prior to payment of the final billing, to independently review the statements and accounts of WSSC related to the construction of the 12-inch water main. The review or audit shall be made at the expense of HOWARD COUNTY and shall be made available to WSSC upon completion.
5. HOWARD COUNTY shall make complete payments for all billings within 30 days of receipt.
6. The 12-inch water main shall be designed, constructed and tested in accordance with the applicable codes, rules and regulations of WSSC.
7. HOWARD COUNTY shall have the right to review reports, plans, specifications and bids for the construction of the 12-inch water transmission main. Said documents, including significant revisions, shall not be approved without the consent of HOWARD COUNTY. Any costs incurred for said review shall be borne exclusively by HOWARD COUNTY. The 12-inch water transmission main shall be constructed in accordance with the approved plans and specifications.

ARTICLE III - OWNERSHIP AND MAINTENANCE RESPONSIBILITY

1. WSSC shall own the 12-inch water main constructed under the terms of this Agreement. HOWARD COUNTY shall own all portions of the public water system located in HOWARD COUNTY which are necessary to transport water supplied to HOWARD COUNTY by WSSC. HOWARD COUNTY shall expand and

improve the public water system in HOWARD COUNTY at no cost to WSSC, and in accordance with the applicable codes, rules, and regulations of HOWARD COUNTY.

2. WSSC shall be responsible for and shall supervise the operation and maintenance of the public water system located within the Washington Suburban Sanitary District. In addition, WSSC shall be responsible for and shall supervise the operation and maintenance of the metering facilities located on Summit Avenue in HOWARD COUNTY near the HOWARD COUNTY boundary. Should it become necessary for WSSC to replace the existing meter or related equipment, the replacement meter or equipment shall be approved by HOWARD COUNTY, prior to installation. In the event of failure of the meter or related equipment, WSSC will proceed as promptly as possible with repairs. WSSC shall operate and maintain the public water system in the Washington Suburban Sanitary District, and the metering facilities located in HOWARD COUNTY, at no cost to HOWARD COUNTY other than those costs described in Article IV below.
3. HOWARD COUNTY shall be responsible for and shall supervise the operation and maintenance of the public water system located within HOWARD COUNTY. HOWARD COUNTY shall operate and maintain the public water system in HOWARD COUNTY at no cost to WSSC.

ARTICLE IV - WATER SUPPLY LIMITATIONS & PAYMENT FOR WATER FURNISHED

1. WSSC agrees to furnish potable water to HOWARD COUNTY through the connection between the public water systems of WSSC and HOWARD COUNTY as identified on Attachment No. 1 to this Agreement. Potable water shall be furnished at a maximum daily rate not to exceed 5.0 million gallons per day. The maximum daily rate will be supplied to the interconnection at a minimum hydraulic grade of 330 feet under normal operating conditions. The WSSC will be responsible for identifying and resolving conditions under which the minimum hydraulic grade cannot be maintained. If maintaining the minimum hydraulic grade requires construction of additional water system facilities, the parties will enter into an agreement for sharing the cost of those facilities. HOWARD COUNTY will

be responsible for ensuring that the peak instantaneous flow through the interconnection does not exceed the maximum daily rate, except for a margin attributable to the vagaries of pump operation.

2. HOWARD COUNTY will be responsible for the installation and maintenance of devices which provide effective back flow prevention for the interconnection.
3. In the event of a water supply emergency in the WSSC system, the WSSC may request that Howard County provide a reverse supply through the interconnection at a rate to be determined by Howard County. The WSSC will provide payment for such water in a manner identical to the payments made by Howard County for WSSC water.
4. HOWARD COUNTY shall purchase the potable water supplied by WSSC. The rate of payment shall reflect the cost incurred by WSSC to provide potable water to HOWARD COUNTY, exclusive of costs such as those for meter maintenance, meter reading, and customer billing which are not incurred by WSSC in supplying water to HOWARD COUNTY. The rate of payment will initially be seventy percent (70%) of the prevailing rate WSSC charges a customer having an average daily consumption of 240 gallons. The rate of payment shall be reviewed every five years by the WSSC and shall be adjusted as necessary to conform with the terms of this Agreement. HOWARD COUNTY shall have the right to review or audit the statements and accounts of WSSC related to the setting of the rate of payment. Such a review or audit shall be made at the expense of HOWARD COUNTY and shall be made available to WSSC upon completion.
5. HOWARD COUNTY shall make monthly payments to the WSSC based on the volume of water furnished to HOWARD COUNTY as recorded by the Summit Avenue water meter. WSSC shall bill HOWARD COUNTY monthly, indicating the amount due and the volume of water used. In the absence of an accurate meter reading, the volume of water furnished to HOWARD COUNTY shall be estimated based on previous meter readings.

ARTICLE V - FUTURE ADDITIONAL INTERCONNECTIONS

1. HOWARD COUNTY intends to request additional interconnections with the WSSC in the future. The total supply requested by HOWARD COUNTY from the WSSC may increase to 10 mgd or more. The WSSC will review any such requests according to the precedents established for this Agreement and any appropriate additional considerations.
2. Both parties shall explore, and if mutually agreeable, proceed with projects which provide the ability for increased emergency supply of water to either jurisdiction.

ARTICLE VI - RIGHTS AND LIMITATIONS

1. Nothing in this Agreement shall limit or abrogate any right or rights of any party to enter into other separate agreements for the planning, design and construction of water supply facilities providing such separate agreements do not conflict with this agreement.
2. Nothing contained in this Agreement shall limit or abrogate any right or rights delegated to each party by Acts of the General Assembly of the State of Maryland.
3. Nothing contained in this Agreement shall be construed to abridge or restrict the police, legislative or governmental powers of any party to this agreement.
4. Each party shall recognize all rights and privileges acquired by another party through the acquisition of property and/or rights-of-way.
5. The Agreement dated October 25, 1954 between WSSC and HOWARD COUNTY is hereby replaced by this Agreement.
6. The terms and conditions provided for this Agrement shall continue in full force and effect until the parties amend this Agreement or execute a new replacement agreement.
7. WSSC shall not be responsible for its inability to furnish water to HOWARD COUNTY as provided in this agreement due to an emergency arising from a break in WSSC's public water system or other emergency condition. In such event, however, WSSC will take whatever action may be necessary to restore service as promptly as possible.

8. Should it become necessary for WSSC to impose water use restrictions within the Washington Suburban Sanitary District, the amount of water furnished under this Agreement may be reduced as applicable to other WSSC customers.

ARTICLE VII - AMENDMENT OF THE AGREEMENT

1. Any increases above the maximum daily rate of 5.0 million gallons per day to HOWARD COUNTY or to provide for increased emergency supply of water to either jurisdiction shall be by amendment to this Agreement.

IN WITNESS WHEREOF, the parties hereto have properly executed this Agreement, as of the day, month, and year first above written.

ATTEST:

Timothy D. Kirrel

WASHINGTON SUBURBAN SANITARY COMMISSION

By: Robert J. Hoffman
General Manager

ATTEST:

William E. Eakle

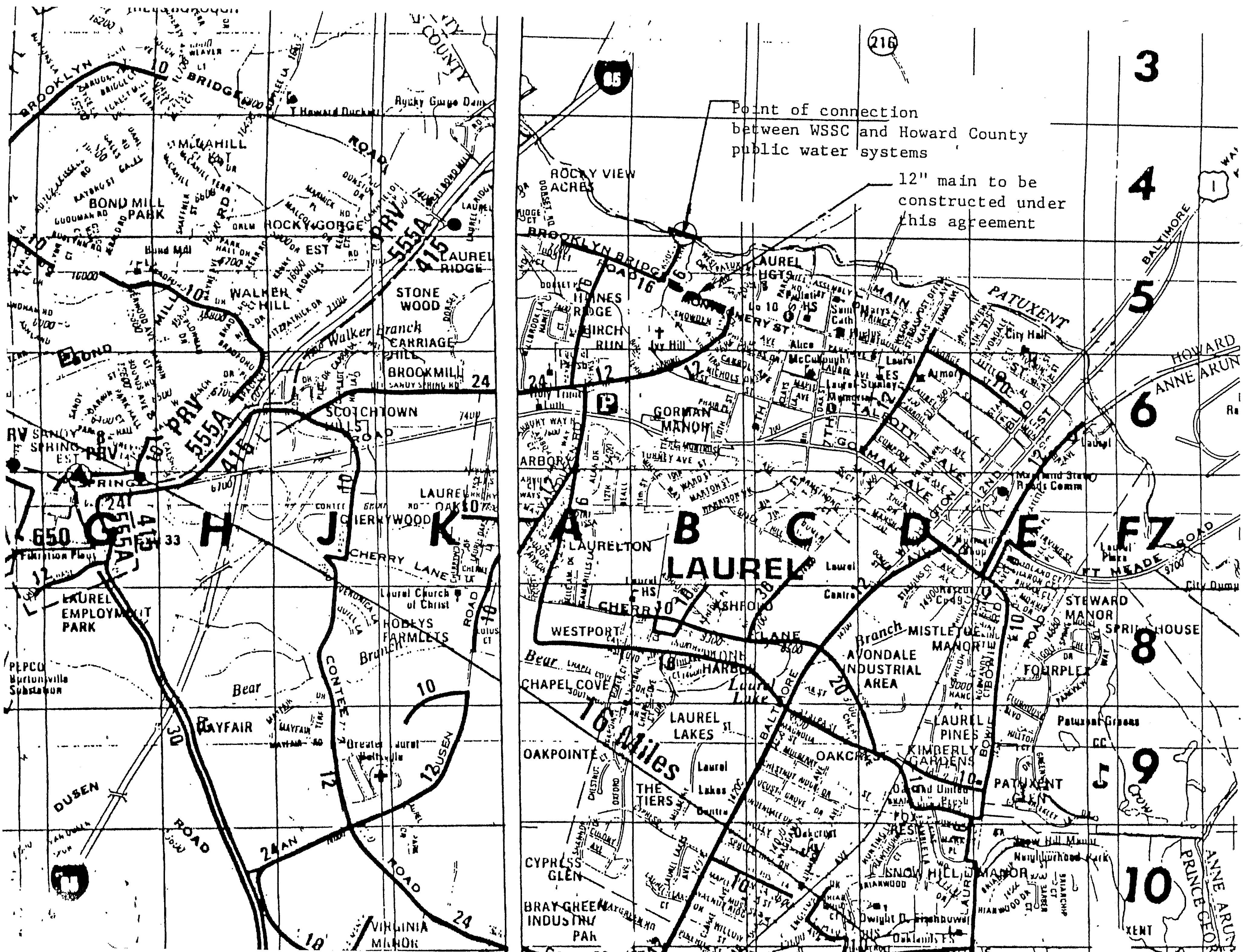
By: Elizabeth Bobo
County Executive

APPROVED AS TO FORM AND LEGAL SUFFICIENCY:

Barbara M. Cook 6/15/88
County Solicitor

Approved:

James M. Lewis 6/14/88
Director of Public Works



Point of connection
between WSSC and Howard County
public water systems
12" main to be
constructed under
this agreement
LAUREL
G
H
J
K
A
B
C
D
E
F
3
4
5
6
7
8
9
10
BROOKLYN BRIDGE ROAD
BOND MILL PARK
ROCKY GORGE EST
WALKER HILL
STONE WOOD
LAUREL RIDGE
CARRIAGE HILL
BROOKMILL
SCOTCHTOWN HILLS
SANDY SPRING EST
LAUREL EMPLOYMENT PARK
PEPCO Burtonsville Substation
MAYFAIR
CHERRYWOOD
LAUREL OAKS
HOBLYS FARMLETS
Laurel Church of Christ
CONTEE ROAD
DUSEN ROAD
VIRGINIA MANOR
ROCKY VIEW ACRES
HAINES RIDGE
BIRCH RUN
Ivy Hill
GORMAN MANOR
LAUREL HGTS
MONTGOMERY ST
LAURELTON
WESTPORT
CHAPEL COVE
OAKPOINTE
THE TIERS
LAUREL LAKES
CYPRESS GLEN
BRAY GREEN INDUSTRIAL PARK
AVONDALE INDUSTRIAL AREA
MISTLETOE MANOR
STEWARD MANOR
SPRING HOUSE
FOURPLEX
LAUREL PINES
KIMBERLY GARDENS
PATUXENT GLEN
SNOW HILL MANOR
OAKCREST
Patuxent Greens
Snow Hill Manor Neighborhood Park
Laurel Plaza
FT MEADE ROAD
BALTIMORE
PATUXENT
HOWARD
ANNE ARUNDEL
PRINCE GEORGES
City Hall
Maryland State Roads Comm
Laurel Lake
16 Miles
PRV 555A
415
416

SECOND ADDENDUM TO AGREEMENT

THIS SECOND ADDENDUM (the "Second Addendum") is made this 24th day of August, 2009, by and between the Washington Suburban Sanitary Commission, hereinafter referred to as "WSSC", and Howard County, Maryland, a body corporate and politic of the State of Maryland, hereinafter referred to as "HOWARD COUNTY".

WHEREAS, WSSC and HOWARD COUNTY entered into an agreement dated June 16, 1988 (the "Agreement") for the purpose of extending water supply mains and constructing appurtenant works for furnishing water from the WSSC water distribution system to HOWARD COUNTY; and

WHEREAS, under the terms of the Agreement, WSSC agreed to furnish HOWARD COUNTY with up to 5.0 million gallons of potable water per day, but HOWARD COUNTY has not been purchasing its full allotment due to the higher cost of WSSC's water compared to that of HOWARD COUNTY'S other main supplier, Baltimore City; and

WHEREAS, pursuant to an addendum to the Agreement, dated October 6, 2008 (the "First Addendum"), HOWARD COUNTY conducted a pilot program for a period of six months, during which time it tested the capacity of its current equipment and facilities to determine what portion of its current allotment it could guarantee to utilize on a daily basis. During this pilot period, WSSC charged HOWARD COUNTY the same wholesale service rate that HOWARD COUNTY pays to Baltimore City; and

WHEREAS, HOWARD COUNTY will agree herein to purchase a Minimum Daily Rate (defined below), if WSSC agrees to charge a billing rate for the water that is comparable to that of Baltimore City's billing rate.

NOW, THEREFORE, in consideration of the foregoing, and the terms and conditions set forth herein, the parties agree that the Agreement is amended as follows:

1. All capitalized terms not defined herein shall have the same meaning ascribed to them in the Agreement.

2. The Agreement hereby is amended as follows:

a. The First Addendum is superseded by this Second Addendum.

b. Section 1 of Article IV of the Agreement is amended by deleting the second and third sentences in said section and inserting the following sentences in their place:

> For each full day that WSSC furnishes water, HOWARD COUNTY shall purchase a minimum of 2.5 million gallons per day (the "Minimum Daily Rate"), regardless of its actual draw, but will purchase no greater than the 5.0 million gallons Maximum Daily Rate established in the Agreement. The "Minimum Daily Rate" will be calculated as a monthly daily average beginning at midnight of the 1st day of the month and ending at midnight of the last day of the month. Howard County shall not be required to purchase any minimum amount of water for any day that (i)

WSSC furnishes water for less than a full day, or (ii) WSSC provides a restricted water supply at any time during the same period of time, or (iii) WSSC and HOWARD COUNTY mutually agree to waive the minimum purchase. In such event, the Minimum Daily Rate for that month shall be adjusted by eliminating that day. WSSC shall supply daily at the least the Minimum Daily Rate and all water shall be supplied to the interconnections at a minimum hydraulic grade of 330 feet under normal operating conditions.

c. Section 4 of Article IV of the Agreement is deleted in its entirety and replaced by the following paragraph:

WSSC agrees to set its current billing rate for all potable water supplied to HOWARD COUNTY at the "Wholesale Service Rate" charged HOWARD COUNTY by Baltimore City for each billing period, beginning at $1304.80 per million gallons. HOWARD COUNTY agrees to promptly notify WSSC of any changes in Baltimore City's billing rate and, annually on June 30, provide certification to WSSC of the current Baltimore City rate. All such changes in Baltimore City's billing rate will be applied retroactively to WSSC's billing rate as of the date of the Baltimore City rate change. HOWARD COUNTY shall have the right to review and audit the statements and accounts of WSSC related to the supply of and billing for the potable water. Such a review or audit shall be made at the expense of HOWARD COUNTY and shall be made available to WSSC upon completion. WSSC shall have the right to review and audit the statements and accounts of HOWARD COUNTY related to the supply of and billing for the potable water, and such a review or audit shall be made at the expense of WSSC and made available to HOWARD COUNTY upon completion.

3. These changes shall be effective as of April 1, 2009. The parties agree to review the Minimum Daily Rate, Maximum Daily Rate and billing rate at least once every five years, or earlier upon request of either party. Any further amendments to the Agreement, as amended hereby, shall be in writing and only effective if signed by all of the parties.

4. All terms and conditions of the Agreement not modified hereby are ratified and confirmed.

[Signatures follow on next page.]

IN WITNESS WHEREOF, the parties hereto have properly executed this Agreement, as of the date first above written.

WASHINGTON SUBURBAN SANITARY COMMISSION

Approved As To Form and Legal Sufficiency:

Laura Swisher
Associate Counsel II

Approval Recommended:

Thomas Traber
Chief Financial Officer

ATTEST:

Approved:

Teresa D. Daniell
Interim General Manager

WITNESS/ATTEST:

Lonnie R. Robbins
Chief Administrative Officer

HOWARD COUNTY, MARYLAND

BY: _____ (SEAL)
Ken Ulman
County Executive

APPROVED:

8/2/05

James M. Irvin, Director
Department of Public Works

APPROVED FOR SUFFICIENCY OF FUNDS:

for SFG 8/24/05

Sharon F. Greisz, Director
Department of Finance

APPROVED FOR FORM AND LEGAL SUFFICIENCY
this 2nd day of September, 2009:

Margaret Ann Nolan
County Solicitor