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STATEMENT OF CERTIFICATION

January 2016

The water and sewerage projects and the water and sewer service areas proposed in the Master Plan for Water and Sewerage for Howard County are consistent with *PlanHoward 2030*, Howard County's General Plan, adopted on August 8, 2012 by the Howard County Council. The Master Plan for Water and Sewerage has been developed based upon land use objectives shown in the General Plan and population estimates provided by the Department of Planning and Zoning.

1-14-16

Valdis Lazdins, Director Date

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ENGINEER'S STATEMENT OF CERTIFICATION

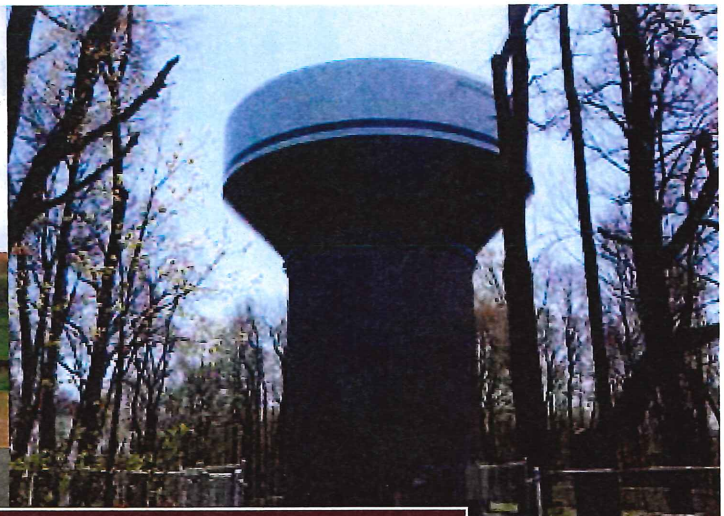
November 2015

The water and sewerage projects proposed in the Howard County Master Plan for Water and Sewerage are adequate to meet the future system requirements as projected. The Master Plan for Water and Sewerage has been prepared based on population estimates, basic policy edicts and other basic data provided by the Howard County Office of Planning and Zoning, the Department of Public Works and the Howard County Health Department.

James M. Irvin
Director

12/2/15

Date



Master Plan for Water and Sewerage, 2015 Amendment

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CHAPTER 1

OBJECTIVES AND ORGANIZATION

1.1 Requirements:

Title 9, Subtitle 5 of the Environment Article of the Annotated Code of Maryland requires that Howard County triennially review and adopt a Report of the Review and Amendments to the Master Plan for Water and Sewerage. Responsibility for implementation of Title 9 is assigned to the Maryland Department of the Environment (MDE) in accordance with Code of Maryland Regulation (COMAR) 26.03.01 - Regulations for Planning Water Supply and Sewerage Systems. Howard County Code (Subtitle 1. Public Utilities, Section 18.100A) establishes general procedures for the Howard County Master Plan for Water and Sewerage. Howard County formulated the Master Plan for Water and Sewerage within the framework of these regulations.

"Semiannual Amendments" may also be prepared to amend the Master Plan for Water and Sewerage more frequently than the regulations require. These Semiannual Amendments are prepared in accordance with the Environment Article of the Annotated Code of Maryland and COMAR 26.03.01. Usually, the following types of revisions will be incorporated into the Master Plan for Water and Sewerage through the Semiannual Amendment process:

1. Changes in capital projects related to the Annual Capital Budget, the Ten Year Capital Improvement Program, or completed engineering studies.

2. Entry of properties into the County's Metropolitan District.

3. Changes in service area priorities.

4. Changes in the water and sewer Planned Service Area.

The Maryland Department of the Environment processes construction permit applications for water and sewerage facilities to serve planned development in the Planned Service Area that is expected to be served by public water or sewer within five years, as shown on the facilities maps in Chapters 3 and 4. Permits are issued when all local and state requirements and regulations are satisfied, and adequate system capacity is available.

In accordance with State law, construction permits will only be issued for development that is consistent with this Master Plan. Since construction permits are valid for a three year period, except under special conditions specified in the Plan, the Maryland Department of the Environment interpreted the law to mean that it would be inconsistent with the Plan to issue a permit for development of a property that is not expected to be served by public water or sewer within five years. Before issuance of a construction permit for proposed development of a property designated within the 6-to-10 year or comprehensive service priority areas, where specified special conditions are not applicable, an amendment for the Master Plan for Water and Sewerage must be developed and approved to assign the property a 0-to-5 year service priority designation.

1.2 Objectives:

The Master Plan for Water and Sewerage is prepared with the intent of accomplishing the following objectives:

1. To further the health and welfare of citizens residing and/or working in Howard County through the development of adequate water and sewer systems.

2. To support County development policies including implementation of the General Plan through the timely completion of water and sewer facilities to accommodate future growth.

3. To provide a framework for the scheduling and prioritizing of water and sewer projects based on evaluation of existing facilities usage, public health considerations and projected growth patterns.

In August 2012, Howard County formally adopted PlanHoward 2030 as the General Plan for the County. The Plan was subsequently amended in February 2013 to adopt growth tiers. PlanHoward 2030 is a plan for land use and land conservation with multi-year development plans for transportation, public facilities, water, sewerage, parkland, housing, human services and environmental protection. PlanHoward 2030 is an update to the General Plan 2000 that was adopted in November 2000. Two amendments to General Plan 2000, the Water Resource Element and the Downtown Columbia Plan, are included in PlanHoward 2030 by reference.

Other law, policies, regulations, and planning documents are considered in the triennial update of the Master Plan. These include:

1. Policies relating to inclusion of properties in the Metropolitan District

2. Howard County Code, Title 18, Subtitle 12- Shared Sewage Disposal Facilities

3. Water and Sewer System Capacity Allocation Policy (Section 18.122B of the Howard County Code)

4. Subdivision and Land Development Regulations (Section 16 Subtitle 1 of the Howard County Code)

5. Howard County Plumbing Code

6. Maryland Department of the Environment Regulations (COMAR 26.04.03.02 and .03-Development Plan submission requirements.)

1.3 Planned Service Area

The eastern portion of the County has been delineated as the Planned Service Area (PSA) for public water and sewerage (refer to the Water Facilities Plan Map in EXHIBIT 1, and the Sewer Facilities Plan Map in EXHIBIT 2). This area consists of all properties within the County that have been approved by the Howard County Council to be in the Planned Service Area.

Revisions to the Planned Service Area require amendments to the General Plan. Several amendments to the Planned Service Area have been approved by the County Council following publication of the 2011 Water & Sewer Master Plan. These are described as follows:

1. Council Bill 9-2010 amended the Planned Service Area boundary for water and sewer service to include approximately 221.1 acres of the historic Doughoregan property known as tax map 23, grid 10, part of parcel 71. The parcel is located south of the intersection of Frederick Road and US Route 40, and east of Manor Lane in Ellicott City, Md.

2. PlanHoward 2030 amended the Planned Service Area for sewerage to include twenty properties in the Ellicott City area totaling 158.76 acres and bounded by US Route 40 on the north, Marriottsville Road on the west and Frederick Road to the south. The properties are part of the Alpha Ridge Water Service Area.

3. PlanHoward 2030 amended the Planned Service Area for water and sewerage to add four properties in the Clarksville area totaling 90.33 acres and bounded by Guilford Road on the north and MD Route 108 on the west.

4. PlanHoward 2030 amended the Planned Service Area for water and sewerage to add one property in the Fulton area totaling 91.25 acres and bounded by Scaggsville Road to the north and Murphy Road to the west.

The General Plan provides for expansion of the Planned Service Area under limited circumstances for certain public or institutional uses. Expansion for public or institutional uses must meet criteria limiting the parcel size to the minimum necessary for the proposed institutional use and requiring actual construction of the proposed use and connection to the public system by a specific deadline. Expansion of the PSA for institutional uses is limited to institutional properties that are adjacent to the existing boundary of the PSA and which continue the linear boundary line without including an intervening, privately-owned parcel that is currently not located in the Planned Service Area. Before obtaining public water or sewer service, a property within the PSA must enter the County's Metropolitan District. Property in the Metropolitan District is subject to fees, assessments and charges required to finance the construction, operation and maintenance of the public water and sewerage system.

Parcels of land within the designated "No Planned Service Area" of the Howard County Master Plan for Water & Sewerage are not eligible for connection to the public water and/or sewerage system. However, parcels that have been ordered by the Health Department's Bureau of Environmental Health to connect to the public system under emergency circumstances are eligible for connection if the public system is available to the property. These parcels will not be incorporated into the Metropolitan District after connection, nor brought into the Planned Service Area. They are subject to the fees, assessments, and charges to finance the construction, operation, and maintenance of the public water and sewerage systems to the same extent as parcels in the Metropolitan District. These connections must be in accordance with section 18.101 of the Howard County Code.

Orderly expansion of the public water and sewer system is controlled through the County's Capital Budget and Ten Year Capital Improvement Program, the Metropolitan District entry process, the subdivision plan review process, and the Water and Sewer Capacity Allocation Program. These processes and programs are more fully described in the following section.

In general, undeveloped properties within the Planned Service Area that are not to be serviced by planned capital projects are to be serviced via Developer Agreements. It is difficult to establish when specific parcels will be developed. Changes in economic conditions and other factors occurring after approval of the Master Plan for Water and Sewerage may result in a developer desiring to service a property at a time earlier than is specified by the Master Plan for Water and Sewerage. Similarly, a developer may desire to construct planned facilities in advance of the County capital project construction schedule. If the proposed development represents an orderly extension of the public water or sewer system and is consistent with the County's General Plan and subdivision regulations, the County grants the service priority change so development can occur. Therefore, service area priorities identified in the Master Plan for Water and Sewerage and associated maps are subject to change as development is proposed within the Metropolitan District. These changes are incorporated in semiannual and regular triennial amendments to the Plan as appropriate and are described below.

As noted under the discussion of the comprehensive priority area, the County shall not accept or approve a proposal to change the priority area designation for the provision of public sewerage service to any parcel in the Alpha Ridge Water Service Area unless sewer service is only being provided for the parcel to serve public facilities, or the General Plan is amended to designate the priority in this area for urban district land uses. Until one of these conditions is met, parcels in the Alpha Ridge Water Service Area shall remain in the comprehensive priority category for sewerage service.

Parcels of property in the Planned Service Area (including lots in a subdivision), are assigned water and sewer service priorities as delineated on the service area maps referenced in Chapters 3 and 4 based on the definitions and criteria described below:

A. Existing and Under Construction Priority

Parcels of land in the existing and under construction service priority area are served by water or sewer lines in operation or under construction (for capital projects a notice to proceed with a contract has been let, for developer projects a developer agreement has been executed), and are expected to be in operation immediately upon completion.

Parcels or lots assigned this service priority must be in the County's Metropolitan District and must meet one of the following three (3) criteria:

1. The parcel is developed, is not likely to be further subdivided, and fronts on an existing water or sewer line to which a house or building connection can be or has been made, or

2. The parcel is not developed, is likely to be developed without further subdivision, and fronts on an existing water or sewer line to which a house or building connection can be made, or

3. The parcel fronts on an existing water or sewer line to which a house or building connection can be made, and

    a. will likely be developed after a minor subdivision of the parcel, that is, subdivision of the parcel into four or fewer lots not involving construction of a new street, or

    b. will be developed such that the water demand and wastewater flows generated will not be great enough to warrant separate tracking of the parcel's development status in the Master Plan for Water and Sewerage.

It is assumed in evaluating parcels for inclusion in the existing service priority area that subdivision will occur in conformance with either existing zoning or the General Plan as amended, whichever provides for higher density development.

B. Zero to Five Year Priority

In conformance with direction received from the Maryland Department of the Environment by letter dated November 28, 1984, the previous S-2/W-2 Final Planning Area, S-3/W-3 Immediate Priority Area, and S-4/W-4 Three to Five Year Priority Area specified in COMAR 26.03.01.04.G(2) have been incorporated into a single zero to five (0-5) year service priority area. A parcel assigned this service priority must meet both of the following criteria:

1. Development of the parcel within the zero to five year time frame must be consistent with the General Plan and amendments, and related County policy.

2. In addition to the above, the parcel must meet one of the following four (4) criteria:

   a. The parcel is divided by or fronts on an existing water or sewer line, or one which will be constructed within a five year period as part of an established capital project, which can provide adequate service when development takes place. The parcel and water or sewer line must be located in the same sewer service area or water pressure zone, or

   b. The parcel will be subdivided and/or developed by a private party who:

      (1) Will provide public water or sewer service, and

      (2) Has submitted a sketch plan, preliminary plan, final subdivision plan or other adequate evidence for a development which is planned to occur within five years, which documents an orderly extension of the public water or sewer system within the sewer service area or water pressure zone in which the parcel is located, or

   c. The parcel is located within 1,000 feet of the existing water or sewer system which could be extended to provide adequate water or sewer service within the sewer service area or water pressure zone in which the parcel is located. This criteria is based in part on Department of the Environment criteria governing the construction of routine water main and sewer line extensions for which a State construction permit is not required, or

   d. The parcel is located within 1,000 feet of a portion of the water or sewer system which will be constructed within five years as part of an established capital project in the County's Ten Year Capital Improvement Program and could be further extended to provide adequate water or sewer service within the sewer service area or water pressure zone in which the parcel is located.

Parcels which are not in the County's Metropolitan District but otherwise meet the criteria for inclusion in the existing and under construction priority area are assigned to the 0-5 priority area.

As indicated above, one of the conditions for inclusion in the 0-5 year priority area is that adequate water and sewer facilities must be located within the water pressure zone or

sewer drainage area in which the parcel is located. Boundaries between adjacent drainage areas and zones are not static and may be altered on a temporary or permanent basis (by valves, force mains, etc.) to provide for the needs of parcels adjacent to or divided by these boundaries. Generally, the desirability of relocating a zone or drainage area boundary will be assessed by the Department of Public Works at the time of submission of a sketch plan or other preliminary document which describes provisions for water and sewer service in detail. The desirability of boundary relocations will be assessed on a case-by-case basis considering such factors as conformance of the proposed project with sound engineering practice, the existing and future impact on zones or drainage areas being altered, and the need for an orderly extension of existing facilities.

C. Six to Ten Year Priority

Parcels assigned this service priority must meet the following two (2) criteria:

1. Development of the parcel within the six to ten year time frame must be consistent with the General Plan and amendments.

2. The parcel must be located in a sewer service area or water pressure zone within which the major system components (primarily interceptors and transmission mains) are in place or are planned to be in place within ten years, or

The parcel will be subdivided and developed by a private party who:

a. Will provide public water and sewer service, and

b. Has submitted a plan or other adequate evidence for a development which is planned to occur within six to ten years, which documents an orderly extension of the public water or sewer system within the sewer service area and water pressure zone in which the parcel is located.

D. Comprehensive Priority

The comprehensive priority area is for the parcels located in the Planned Water and Sewerage Service Area which are not assigned one of the above service priorities and are not park or open space land. These parcels are designated for service after a ten-year period. Developed parcels located in service areas which will not have the major system components in place within ten years are assigned this service priority. The County will

not initiate capital projects to extend public water and sewer service to these areas for the purpose of promoting private development.

In 1993, the County Council amended the 1990 General Plan for Howard County by extending the Planned Service Area to incorporate certain properties in the Marriottsville Area as shown on Map 1 attached to County Council Resolution 145-1993 and the Map attached to Council Bill 73-1996. The properties added to the Planned Service Area are referred to in this chapter as the Alpha Ridge Water Service Area. The express intent of the amendments to the General Plan was to provide public water service to satisfy residents' concerns about potential groundwater contamination. The effect and intent of the Amendment to the 1990 General Plan were continued in the General Plan 2000 approved in November 2000.

Council bill 18-2006 amended the General Plan to allow for the provision of sewer service within the Alpha Ridge Water Service Area for qualifying parcels under certain conditions. A qualifying parcel is one that is owned either by Howard County Government or the Board of Education of Howard County. The qualifying parcel must adjoin another parcel where sewer service is available. Sewer service to a qualifying parcel may be extended only if sewer service can be extended without making sewer service available to any intervening non-qualifying parcel not owned by the Howard County Government or the Board of Education of Howard County. With the exception of qualifying parcels, the County's intent was also to maintain this service area in the comprehensive priority area for sewer service.

PlanHoward 2030 amended the Planned Service Area to allow for the provision of sewer service to twenty properties within the Alpha Ridge Service Area including parcels owned by the Board of Education.

The comprehensive priority area designation for sewer service shall remain in place unless the General Plan is amended to designate this area for urban district land uses. Until such amendment is approved, the County shall not accept or approve a proposal from a private party to amend the Sewer Service Area priority designation for a parcel in the Alpha Ridge Water Service Area. The only exceptions allowing for the provision of sewer service in the Alpha Ridge Water Service Area are for parcels on which public facilities are located, or for parcels which the Howard County Bureau of Environmental Health orders connected for emergency health reasons. An order for connections by the Health Department can only be implemented if the public sewerage system is available to service the parcel. Availability shall be determined by the Department of Public Works. Any connection made pursuant to Health Department order shall be restricted to the

minimum pipe size necessary to correct the health problems for the existing building (s) in use on the parcel at the time of the Health Department order.

E. Parks and Open Space

Public park land and designated open space areas within the Planned Service Area are separately identified on the water and sewerage maps. Since these properties will not be subdivided for residential or commercial/industrial development, they are not assigned a service priority. However, it is not intended to prevent the extension of water or sewer lines to these properties in the Planned Service Area if such extensions will provide for facilities consistent with the designated land use. For example, water and sewer extensions may be necessary to provide for:

1. Restrooms or other sanitary facilities.
2. Lawn/garden irrigation systems.
3. Potable drinking water supply.

It is intended that such extensions may occur at any time if the property is in the Metropolitan District; the water or sewerage system is adequate to provide the required service; and the project represents an orderly extension of the system. Occasionally, open space areas may be used for other public purposes. For example, possession may be given to the Board of Education as a location for a school. Provision of water and sewer service to such properties is considered in accordance with the intent of this Master Plan for Water and Sewerage provided the development meets all other County development criteria.

1.4 No Planned Service Area

Parcels in the No Planned Service Area will not be provided with public water or sewerage facilities. Shared Sewage Disposal Facilities and Multi-User Sewerage Systems, to the extent provided in the Howard County Code, may be used in the No Planned Service Area as described below. Generally, properties designated in the General Plan as Rural Conservation (RC) or Rural Residential (RR) are assigned to this service area. The associated population densities and land uses can be accommodated by private individual and small grouped systems. The extent of the No Planned Service Area may change if County land use plans, in particular, the General Plan, are revised to recommend land uses which require inclusion of affected properties in the Planned Service Area.

The County will no longer extend the Planned Service Area for RR and RC zoned parcels in order to address public health concerns. Such parcels will be provided with necessary connection to public water and/or sewerage service if, in the opinion of the Director of Public Works, public systems are available and connection to the public system is ordered by the Howard County Bureau of Environmental Health to protect public health and welfare. The parcels will not be included in the Metropolitan District.

The County provided a water main extension into the No Planned Service Area to the West Friendship Fire Station site at the intersection of Rt. 99 and Rt. 32. This main is utilized only for fire suppression at the West Friendship Fire Station site. Individual parcels outside of the Planned Service Area and fronting on this water main will not be allowed to connect.

A. Shared Sewage Disposal Facility

A "Shared Sewage Disposal Facility" means a sewerage system which serves more than one lot of land with public collector sewers, common septic tank and/or advanced pretreatment, and shared subsurface sewage disposal fields.

Undeveloped properties zoned RR and RC within the No Planned Service Area may be serviced by private individual on-site septic systems or shared sewage disposal facilities. Howard County Code Title 18, Subtitle 12, 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. Shared sewage disposal facilities are designed in accordance with County standards and must be approved by the Department of Public Works, the Department of Planning and Zoning, the Howard County Bureau of Environmental Health and, at their discretion, the Maryland Department of the Environment prior to construction. Shared sewage facilities that require a State Groundwater Discharge Permit issued by the Maryland Department of the Environment are prohibited under Section 18.1202 of the Howard County Code.

Shared sewage disposal facilities generally consist of pumps and controls located on individual parcels which discharge to a common sewer main. The sewer conveys collected sewage to a common pretreatment area consisting of septic tanks and other pretreatment. Treated effluent is discharged to a subsurface soil absorption area. Shared sewage disposal facilities and related easements become County property after construction. Operation and maintenance of shared sewage facilities is the responsibility of the Department of Public Works.

Parcels of land within the No Planned Service Area are assigned sewer service priorities only for shared sewage disposal facilities as delineated on the service area maps referenced in Chapter 4 based on the definitions and criteria described below. It is noted that only three service priorities are provided. Given that a developer's intention to provide a shared sewage disposal facility generally becomes known when development plans are submitted for County review, or as a result of pre-submission consultation, the "Six-to-Ten Year" and "Comprehensive" service priorities utilized within the Planned Service Area are not applicable to the No Planned Service Area.

B. Existing and Under Construction Priority Area

Parcels of land in the existing and under construction service priority area of the No Planned Service Area are served by shared sewage disposal facilities currently in operation, or which are under construction and are expected to be in operation immediately upon completion.

C. Zero to Five Year Priority Area

A parcel assigned this service priority within the No Planned Service Area will be served by a shared sewage disposal system and must meet both of the following criteria:

1. Development of the parcel within the zero to five year time frame must be consistent with the General Plan as amended and related County policy.

2. In addition, the parcel will be subdivided and/or developed by a private party who:

    a. will provide shared sewage disposal facilities, and
    b. has submitted a sketch plan, preliminary plan, final subdivision plan or other adequate evidence for a development which is planned to occur within five years.

D. No Planned Service Priority Area

Prior to the submission of development plans or other notification of a developer's intent to construct a shared sewage disposal facility, it is not possible to determine if a shared facility will be provided to service a subdivided property. For this reason, properties in the No Planned Service Area that are not included in one of the two priority areas described above, are simply designated as "no planned service". The "no planned service" priority assigned to a parcel can be revised if use of a shared sewage disposal

facility, in accordance with Title 18, subtitle 12 of the Howard County Code, is proposed in accordance with the criteria described for the "zero to five" year priority area.

1.5 Allocation of Water and Sewer Capacity

Howard County developed and implemented a capacity allocation program to control connections to the public water and sewerage systems in the Planned Service Area. Properties within the Metropolitan District are prioritized as to eligibility for connection in accordance with the requirements of Section 18.122B of the County Code. Regardless of the service area priority assigned to a parcel or subdivision in the Master Plan for Water and Sewerage, a capacity allocation must be granted under Section 18.122B prior to connection to the water or sewer system.

1.6 Extension of the Water or Sewerage System by Capital Projects

Capital Projects in the Planned Service Area are shown in the County's Capital Budget and Ten Year Capital Improvement Program with projected implementation schedules. These projects are also described in Tables 8 and 13 of Chapters 3 and 4, respectively. Interceptors, transmission mains, pumping stations, and storage facilities are identified on the facilities maps included with this plan.

1.7 Private Individual Water and Sewerage Systems

"Individual water supply system" means a single system of piping, pumps, tanks, or other facilities utilizing a source of ground or surface water to supply only a single lot.

"Individual sewerage system" means a single system of sewers and piping, treatment tanks or other facilities serving only a single lot and disposing of sewage or individual wastes of a liquid nature, in whole or in part, on or in the soil of the property, into any waters of this State or by other methods.

"Community sewerage system" means any system, whether publicly or privately owned, serving two or more individual lots, for the collection and disposal of sewage or industrial wastes of a liquid nature, including various devices for the treatment of the sewage and industrial wastes.

"Community water supply system" means a source of water and a distribution system, including treatment and storage facilities, whether publicly or privately owned, serving two or more individual lots.

The installation of public community water and sewerage facilities in the Planned Service Area eliminates the need for private water and sewerage systems in the areas for which public service is or will be provided. However, the implementation of public water and sewerage facilities occurs over several years, necessitating the installation of individual water or sewerage systems for new development where public facilities are not yet available. Installation of individual systems in the Planned Service Area is subject to the following conditions:

A. Public Community Water or Sewerage System is "adequate and available".

An individual water supply or individual sewerage system may not be installed on any parcel or lot where a public community water or sewer system is adequate and available.

An "adequate" public community water or sewerage system is defined as a system in which unused capacity exists for allocation. Adequacy is determined based on an analysis of hydraulic and treatment capacities versus current, allocated, measured and/or estimated use.

An "available" public community water or sewerage system is defined as a system to which a house or building connection can be made in a cost effective manner without excessive extension of the existing public community system. The Department of Public Works will determine whether or not a connection is cost effective or is an excessive extension. The Department of Public Works and the Maryland Department of the Environment are responsible for determining the adequacy of a public community system. In the context of this section of the Master Plan for Water and Sewerage, a public community water or sewerage system is a County owned water or sewerage system.

B. Public Community Water or Sewerage System will be "adequate and available" within a Two Year Period.

Where a parcel or lot will have an adequate public community system (constructed as part of a capital project) available within a two year period, installation of capped water and sewer lines will be required in accordance with County Subdivision Regulations, Section 16.131. Lines are constructed after execution of an appropriate Developer Agreement with Howard County. The final subdivision plat must include a statement

that the subdivision may only utilize interim individual water and sewerage systems for a maximum period of one (1) year after public water and sewer become available. Capacity will be reserved through the established allocation program for these subdivisions.

C. Public Community Water or Sewerage System will be "adequate and available" within a Five Year Period.

Interim individual water supply and interim individual sewer systems may be permitted to be installed on any parcel or lot which will have an adequate public community system (constructed as part of a capital project) available within a five year period provided that:

1. Permits for such interim individual systems bear a notice regarding the interim nature of the permit and stating that connection to a future public community system shall be made within one year after the public community system becomes "available",

2. Such interim individual systems are judged by the local Health Department, Bureau of Environmental Health and Department of Public Works to be adequate, safe, and in compliance with pertinent state and local regulations, including minimum lot ownership as set forth in COMAR 26.04.03.03, and

3. Such individual systems are located to allow future connections to the public community system in the most economical and convenient manner.

D. Public Community Water or Sewerage System will be "adequate and available" beyond a Five Year Period.

Individual water supply or individual sewer systems, not of an interim nature, shall be permitted to be installed on any parcel or lot which will not have an adequate public community system (constructed as part of a capital project) available within a five-year period. Such installations shall be governed by COMAR 26.04.03.02 and .03 as minimum requirements.

E. Individual Water Supply and Sewer Systems on Lots of Three (3) Acres or More.

Within the Planned Service Area, regardless of when an "adequate" community water and/or sewer system will be available, if the minimum lot size is three (3) acres a developer may utilize permanent on-site water supply and individual sewer systems.

F. Private Multi-User Water and Sewerage Systems.

A "multi-user sewerage system" means a single system serving a single lot, whether owned or operated by an individual or group of individuals under private or collective ownership, and serving a group of individuals for the collection and disposal of sewage or industrial wastes of a liquid nature, including various devices, if any, for the treatment of sewage and industrial wastes, having a treatment capacity in excess of 5,000 gallons per day.

A "multi-user water supply system" means a single system of piping, pumps, tanks, or other facilities utilizing a source of ground or surface water to supply a group of individuals on a single lot and having a capacity in excess of 1,500 gallons per day, as defined by COMAR 26.03.01.01

Multi-user sewerage systems which include devices for the treatment of sewage will not be permitted to serve any properties located within the Planned Service Area. In addition, residential multi-user water supply systems will not be permitted within the Planned Service Area. Multi-user Sewerage Systems located outside the Planned Service Area are regulated by the Maryland Department of the Environment and the Health Department, and under certain circumstances and in a limited capacity, as defined in Title 18, Subtitle 12, of the Howard County Code, may be subject to oversight responsibilities by the Department of Public Works.

Private multi-user sewerage pumping systems used to convey sewage to the public sewerage system, which typically consist of privately owned and constructed pumping station, force main and outfall used to provide sewer service to non-residential properties for which gravity service from the public sewerage system is not available, will be permitted if the following conditions are met:

1. The sewage pumping station, force main, and property served must be owned, operated and maintained by a single property owner.

2. Pumped sewer service is allowable only if gravity service is not available in a cost effective manner as determined by the Department of Public Works.

3. Capacity for the pumped (diverted) sewage flow must be available in the receiving area above the currently projected needs of the receiving area.

4. The discharge force main must terminate in a manhole located on the property served. The gravity outfall sewer must be able to connect to an

existing gravity sewer without the need to acquire additional public rights-of-way. Existing public rights-of-way may be used. However, any construction within a public right-of-way will become a public utility owned and operated by Howard County Department of Public Works. Any such construction must meet County standards and be approved by the County. The length of sewer in a public right-of-way which will not become a permanent part of the public sewerage system when the private pumping station is abandoned shall be minimized. All designs of private multi-user sewerage pumping systems shall take into account odor mitigation at the point of discharge, and protection of existing public gravity sewer mains from hydrogen sulfide deterioration.

5. The private pumping station must be abandoned when gravity sewer service becomes available to the property. The pumping station must be located such that future gravity service will be easily accessed.

6. The owner of the pumped system, which is a private system, is required to obtain all relevant permits, including plumbing permits, building permits, etc.

Privately owned pumping stations which serve more than one property are considered as private community systems. These systems are subject to the same criteria as private multi-user sewerage pumping systems as well as the additional requirements below:

7. The owner of the pumping station must submit to the Maryland Department of the Environment assurances in the form of legal documents that the facility will be maintained and operated so as to provide continuous acceptable sewage disposal service to the properties served.

8. The pumping station owner shall submit to the Maryland Department of the Environment evidence that a certified Class II System Operator (or a contracted utility service utilizing certified operators) has been hired to operate the pumping station.

1.8 Reclaimed Water System

Howard County's Bureau of Utilities has taken initiatives toward implementing a County-wide reclaimed water distribution network to utilize highly-treated effluent produced by the Little Patuxent Water Reclamation Plant to satisfy water demands for

non-potable use. In June 2014, the County completed preparation of two planning documents for reclaimed water development: the "Conceptual Reclaimed Water System Master Plan" and the "Reclaimed Water Management (RWM) Plan".

The "Conceptual Reclaimed Water System Master Plan" provides a concept for development of a reclaimed water distribution 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. Refer to Chapter 4 for additional detail.

1.9 History

In 1931, under special Maryland legislation, the Elkridge area was created as a special sanitary district, enabling the expansion of the Baltimore City water system to the area in order to relieve shortages of water. In 1943, with other areas of the County experiencing similar problems, the Maryland General Assembly authorized the formation of the Howard County Metropolitan Commission, which would have the authority to create sanitary districts. Each district was governed by the Commission which was responsible for construction, maintenance and operation of water, sewerage and drainage facilities.

In 1948, the Metropolitan Commission created the Elkridge Sub-District which included the old sanitary district. Five years later the Patuxent Sub-District was formed on petition from residents of that area. Agreement with the Washington Suburban Sanitary Commission provided the water supply to the Patuxent Sub-District. The Commission extended the Patuxent Sub-District to include the Savage area in 1955. With this extension the Commission purchased the existing local water and sewerage facilities previously constructed by the Savage Manufacturing Company. A year later the Commission took over the maintenance of the water mains in the Elkridge Sub-District previously maintained by Baltimore City. During 1957 the Commission created the Ellicott City Sub-District and obtained water from Baltimore City to serve that area.

With the increase in residential development partially due to an adequate water supply, the Commission recognized the growing problems of sewage disposal and authorized the preparation of a comprehensive master plan report for the collection and disposal of sewage. As a result of this report and subsequent supplementary financial analyses, the Commission proceeded to develop plans and construct sewerage facilities in those areas

over which it had jurisdiction. In 1964 the Commission prepared and adopted its first 5-Year Capital Improvements and Planning Objectives Program.

The Maryland General Assembly passed an act in 1965 under which the existing five Howard County Sub-Districts were combined into one sanitary district called the Metropolitan District. This single sanitary district greatly simplified the Commission's financial and administrative responsibilities.

In 1966 the Commission presented its second five-year capital improvement program and its third in 1968. These Five Year Program reports provided primary guidance in the planning and development of water and sewer services for the County.

1.10 Organization

When Howard County established the Charter form of government in 1969, the Metropolitan Commission was abolished and all administrative duties were transferred to the Executive Branch of government with specific responsibility assigned to the Department of Public Works. The Bureau of Engineering is charged with the design of water and sewerage facilities and with overseeing the construction and inspection of water and sewer projects. Operation and maintenance of water distribution, wastewater collection, and wastewater treatment facilities is the responsibility of the Bureau of Utilities. The Bureau of Utilities is also responsible for water and sewage system planning, including preparation of this Master Plan. Organizational charts are shown in **Figures 1-1 and 1-2,** which are provided at the end of this Chapter.

Citizen review is provided through several Boards. The Public Works Board, which is composed of five members appointed by the County Executive and approved by the County Council, makes recommendations to the Executive and to the County Council on planning and on policy matters under the jurisdiction of the Department of Public Works. The Planning Board, which is also composed of five members appointed by the County Executive and approved by the County Council, makes recommendations to the Executive and to the County Council on planning and on policy matters under the jurisdiction of the Department of Planning and Zoning. The Public Works Board and Planning Board review regular triennial amendments to the Master Plan for Water and Sewerage and make comments to the County Executive and County Council.

The legislative duties of the Metropolitan Commission were transferred to the County Council. The County Council has the following responsibilities:

1. Acts on legislative incorporations of properties requesting to be included into the Metropolitan District.

2. Annually reviews and approves water and sewerage system capital improvements as part of the Capital Budget.

3. Annually reviews and approves water and sewer rates, fees, and assessments through the budgetary process.

4. Approves regular triennial and semi-annual Master Plan amendments.

During the Fall of each year, the Department of Public Works solicits public input to assist with future planning for the extension of water and sewer facilities. This public input, in addition to other public requests received during the year, and data developed by the County Health Department, Bureau of Environmental Health and the Department of Public Works, is taken into consideration before water and sewer projects are proposed for inclusion in the Annual Capital Budget and the Ten Year Capital Improvement Program and which are in turn included in the Master Plan.

1.11 Master Plan Review Process - Triennial Amendments

State regulations require a review of the Master Plan for Water and Sewerage at least once every three years. The review and approval process utilized by the County is outlined below:

1. The Plan is reviewed and a preliminary draft amendment comprising all proposed revisions is developed by the Department of Public Works, Bureau of Utilities. The preliminary draft amendment is circulated to each County agency affected by its contents, including the Department of Planning and Zoning, Health Department, Bureau of Environmental Health, and other Bureaus within the Department of Public Works. The draft is also submitted to the Maryland Department of the Environment, Department of Natural Resources, and Department of State Planning for preliminary review. After revision based on comments received, a final draft is submitted to the Planning Board and Public Works Board for review.

2. Public meetings, preceded by printing of a public notice, are held with both the Planning Board and the Public Works Board. The Boards'

recommendations are incorporated into Department of Public Works testimony to the County Council.

3. The final draft is submitted to the County Council for consideration during an appropriate legislative session.

4. A public hearing, preceded by two printings of a public notice, is held by the County Council after which further revisions may be made. The Plan amendment is then formally approved by the County Council.

5. The locally approved amendment is submitted to the Maryland Department of the Environment for approval.

6. Following notification of State approval, the Plan amendment is reproduced and distributed in final form.

1.12 Master Plan Review Process - Semiannual Amendments

Semiannual Amendments to the Master Plan are developed more frequently than triennial amendments. Several types of revisions, as described on Page 1-1, are usually incorporated into the Master Plan by Semiannual Amendment. The review and approval process utilized by the County is outlined below:

1. The Plan is reviewed and the preliminary draft amendment comprising all proposed revisions is developed by the Department of Public Works, Bureau of Utilities in cooperation with the Bureau of Engineering and Department of Planning and Zoning. The preliminary draft amendment is circulated to each County agency affected by its contents, including the Department of Planning and Zoning, County Health Department, Bureau of Environmental Health, and other Bureaus within the Department of Public Works. Comments received are considered in the preparation of a final draft.

2. The final draft is submitted to the County Council for consideration during an appropriate legislative session.

3. A public hearing, preceded by two printings of a public notice, is held by the County Council after which further revisions may be made. The Plan amendment is then formally approved by the County Council.

4. The locally approved amendment is submitted to the State Department of the Environment.

5. Following notification of State approval, the Plan amendment is reproduced and distributed in final form.

1.13 Growth Management

Development in the County, both outside and within the Planned Service Area, must be in accordance with the approved General Plan and Comprehensive Zoning Plan. Changes in zoning for a given property must be approved by the Zoning Board which is comprised of the members of the County Council. When reviewing petitions filed by property owners for zoning changes, the Zoning Board considers the comments of County departments and agencies. The Department of Public Works provides information on the "availability and adequacy" of public water and sewerage facilities. The Board rules on zoning petitions considering, in addition to other information, the water and sewer data provided by the Department. To insure that growth occurs as specified by approved Plans, an extensive plan review and permit system has been established. Several elements of this system are designed to manage expansion and ensure orderly extension of public water and sewer facilities. These elements are described in the remainder of this chapter.

The maintenance of water quality within the County's existing watersheds is given a high priority in the management of growth and development. As certain Tier II waterways have been identified within the Planned Service Area (PSA) for water and sewerage, intense watershed planning is necessary to insure continued protection of such high quality waters. Those waterways identified as Tier II by the Maryland Department of the Environment are given special consideration as outlined in the 2010 Water Resources Element (WRE), which is included as an appendix to the Plan. Particular attention should be paid to the section on "Water Quality in Local Streams" beginning on Page 28 of the WRE. PlanHoward 2030 further addresses growth management within these areas.

1.14 Metropolitan District Entry Procedure

To establish eligibility for water and sewerage service, properties must gain entry into the Metropolitan District unless the Health Department, Bureau of Environmental Health, has ordered connection due to emergency circumstances. The Metropolitan District was established as a special assessment district to finance water and sewerage services.

Public water and sewerage service is restricted by the Howard County Code to properties in the District which pay an annual benefit assessment to fund construction of system improvements and extensions (see sections on Financing Water Improvements and Financing Sewerage Improvements, Chapters 3 and 4). Once a property is accepted into the District, extension of the public water and sewerage systems to provide service is controlled through the subdivision review and permit process, or the water and sewer Capital Improvement Program, and through the capacity allocation program.

The procedures of incorporating a property into the Metropolitan District are established by the Howard County Code (Subtitle 1. Public Utilities, Sec. 18.101. Metropolitan District; Creation; Incorporation of Additional Property. A property located in the Planned Service Area under the definition by this Plan is eligible for entering the Metropolitan District in one of three ways. They are outlined as follows:

1. Administrative Incorporation,
2. Legislative Incorporation, or
3. Emergency Incorporation.

Entry of the property into the Metropolitan District must be accomplished before service can be provided either by a capital project or private developer.

1.15 Subdivision Plan Review Process

The subdivision review and approval process, outlined below, is graphically illustrated on **Figure 1-3,** which is included at the end of this chapter.

Property owners may develop land in the County in accordance with the General Plan as adopted by the County Council, which is the basis for the Zoning Map and Zoning Regulations as adopted by the Zoning Board. The subdivision and development of land must be in accordance with Subdivision and Land Development Regulations which are adopted and periodically amended by the County Council. The Department of Planning and Zoning administers the Subdivision and Land Development Regulations with the assistance of County and State agencies, including the Department of Public Works, which provides comments on submitted plans. In cases where strict adherence to the Subdivision Regulations imposes extraordinary hardship or practical difficulty, a land owner or developer may petition the Department of Planning and Zoning for a waiver to relax the minimum requirements. However, the intent of the Regulations must be maintained.

The review of subdivision and land development plans may be completed by one of two submission processes: the Standard Plan Submission process and the Alternate Plan Submission process. The Standard Plan Submission process consists of Sketch (S) Plan, Preliminary (P) Plan, Final (F) Subdivision Plan and plat, and Site Development Plan (SDP) review stages. For the Alternate Plan Submission process, the Sketch Plan and Preliminary Plan stages are replaced by a single Preliminary Equivalent Sketch (SP) Plan review stage in which the sketch plan and preliminary plans are combined in a single submission.

In addition to the above processes, an Environmental Concept Plan (ECP) is required for submission with the sketch plan or preliminary equivalent sketch plan prior to the submission of site development plans and minor subdivision/re-subdivision final plans. Each review stage is described below.

A. Environmental Concept Plan

The Environmental Concept Plan is the first of three required plan approvals that provides the information necessary to allow an initial evaluation of a proposed project. The ECP includes a conceptual design for storm water management, erosion and sediment control and the delineation of environmental features. Pre-submission of an ECP to the Department of Planning & Zoning is required for proposed storm water management facilities to demonstrate that the environmental site design is achieved to the maximum extent practicable.

B. Sketch Plan

The primary purpose of the sketch plan is to inform the County of a developer's intent to develop property. The plan must show the proposed development density, road network, lot sizes and other pertinent factors in a non-detailed format. Copies of the sketch plan are circulated to the reviewing agencies. At this stage, the developer indicates a desire to either connect to the public water and/or sewer system, to construct on-site facilities, or shared sewage disposal facilities (in accordance with Title 18, Subtitle 12 of the Howard County Code). The Development Engineering Division of the Department of Planning and Zoning conducts a preliminary review to determine the status of public water and sewer service for the proposed development. Factors considered include Metropolitan District status, hydraulic capacity, existing system alignment, and status of future capital projects to serve the area. Proposed development for which adequate water/sewer facilities are available will normally be required by the Department of Public Works to connect to the public system(s).

Where adequate capacity is not available or where the existing public system alignment makes connection infeasible, individual or multi-user systems may be acceptable. These systems are subject to approval by the County Health Department, Bureau of Environmental Health, in conformance with COMAR 26.04.03.02 and .03. Criteria and requirements for the use of these systems were detailed previously in the Private Individual Water and Sewerage Systems section of this chapter.

For properties which are scheduled for public service within 0 to 2 years, Section 16.131 of the County Code requires that the developer install capped water and sewer lines to serve the property or subdivision after public service becomes available. Prior to the availability of public service, the proposed development may be constructed with private systems if approved by the County Health Department, Bureau of Environmental Health. If the approval of the Bureau of Environmental Health cannot be attained, development must be delayed until public water and/or sewer can be provided. As an alternative, the developer may be allowed to enter into a Developer Agreement with the County and fund extension of the existing public system to the property.

A Developer Agreement would be executed by the County only if adequate public system capacity is available at the time the development is proposed, and the construction represents an orderly extension of existing facilities.

For properties not scheduled for service by a Capital Project within two years, sketch plans are reviewed by the Development Engineering Division to determine the feasibility of extending the public system by means of a Developer Agreement. A Developer Agreement would be acceptable if adequate capacity is available at the time development is proposed and an orderly system extension would result. In lieu of a public system extension, private systems may be installed subject to County Health Department, Bureau of Environmental Health approval as previously discussed. In cases where a Capital Project will be constructed to serve the proposed development after two years but within five years, connection to the public system would be required within one year after the system is available. Where a Capital Project will not be constructed within five years, a private system may be considered permanent unless failures make connection to an adequate public system necessary.

For RC and RR zoned properties within the No Planned Service Area for which shared sewage disposal facilities are proposed, the plan must delineate existing and proposed individual wells, individual septic systems, and the proposed shared sewage disposal facilities.

After meeting with the developer and reviewing all recommendations, the Department of Planning and Zoning must correspond with a developer within sixty (60) days of application, indicating approval, approval with modifications, or denial of the sketch plan.

C. Preliminary Plan

The purpose of the preliminary plan is to present a plan showing detailed data based on the approved sketch plan, which will enable the County to determine whether the proposed layout is satisfactory, and fulfills the detailed requirements of applicable regulations. The preliminary plan, sealed and signed by a registered engineer or other person qualified by law and licensed in Maryland, is submitted to the Department of Planning and Zoning. As with the sketch plan, distribution is made to the reviewing agencies. These plans include proposed alignment and sizing of public water and sewer systems, when on-site systems are not being installed, or where capped systems are required. In cases where shared sewage disposal facilities are proposed for cluster subdivisions, the shared facilities along with the results of soil percolation tests and the locations of water wells are to be indicated on the plans. Review by the Department of Public Works is conducted to insure that the proposed utility design meets established County standards.

Within sixty (60) days after formal plan submittal, the Department of Planning and Zoning must take action on the plan and communicate same to the developer.

D. Preliminary Equivalent Sketch Plan

The purpose of the preliminary equivalent sketch plan is to provide an alternate plan process that includes all the information normally required with both the sketch and preliminary plan submission on one plan. The preliminary plan stage may be omitted if a developer selects the preliminary equivalent sketch plan process in lieu of the separate sketch and preliminary plan submissions.

The plan review process and capacity allocation procedures for the preliminary equivalent sketch plan are similar to those described herein for the sketch and preliminary plans. The preliminary equivalent sketch plan is sealed and signed by a registered engineer or other person qualified by law and licensed in the State of Maryland.

The Department of Planning and Zoning must take action on the plan and communicate same to the developer within sixty (60) days after the formal plan submittal. Upon

approval of the preliminary equivalent sketch plan, the developer would proceed directly to the final plan submission process.

E. Final Subdivision Plan and Final Plat

The final subdivision plan must be submitted to the Department of Planning and Zoning within the required adequate public facilities milestone date of 4, 6, or 9 months as specified in Section 16.144 of the Subdivision and Land Development Regulations. The submission includes copies of a final plat which will become the official record of the subdivision of land within a development and construction drawings which are distributed for comments. The Department of Public Works reviews the construction drawings to insure that design and construction standards are met.

All subdivision plats must also receive approval by the Bureau of Environmental Health of the County Health Department in accordance with the County Subdivision Regulations, Section 16.144 of the County Code.

Where private systems or shared sewage disposal facilities are to be installed, final plans must be in conformance with State and County Health Department regulations and a shared sewage disposal facility plan shall be submitted to receive Department of Public Works, Bureau of Utilities approval in accordance with Section 18 of the Howard County Code. Within sixty (60) days after final plan approval by the Department of Planning and Zoning, the developer must submit the original construction drawings (roads, storm drainage, water, and sewer) for signatures after which the final plat is approved. The final plat must delineate all access and maintenance easements for shared sewage disposal facilities. A temporary allocation of water and/or sewer capacity is granted at the time of final plat approval for development in the Planned Service Area. This allocation is held for one hundred eighty (180) days during which time the developer must execute a Developer Agreement for water, sewer and/or shared sewage disposal facilities and for roads and storm drains. If the Developer Agreement for water and/or sewer is not executed within this time period, then the allocation becomes void unless an extension is granted.

Upon execution of the Developer Agreement, the allocation is formally granted to the property in accordance with the provisions of the agreement. A prerequisite to the execution a Developer Agreement is the posting of a performance bond with the County by the developer to ensure the facilities construction. After execution of appropriate Developer Agreements, and within 180 days after final plan approval, the final plat is recorded in the Land Records of Howard County which allows the legal sale of each lot. In cases where a property owner wished to create four (4) or fewer lots, known as a minor

subdivision, only a final plat is required in the subdivision process. In this case, review of the final plat is conducted to determine the adequacy of provisions for water and sewer service based on the criteria previously described for sketch plans.

F. Site Development Plan (SDP)

The site development plan is a detailed design drawing required for all commercial, institutional, and industrial development and for the following types of residential lots:

1. Single family detached lots
2. Single family attached lots
3. Multi-family lots
4. Mobile home lots

In addition, all portions of the County zoned for "New Town" development require submission of a site development plan regardless of development type.

The site development plan may be submitted simultaneously with a final plat. The site development plan review and approval process is illustrated in **Figure 1-4**. The Department of Planning and Zoning distributes this plan for comment by the reviewing agencies. On the site development plan, existing and proposed building locations, structures, walkways, vegetative cover, existing and proposed grades, landscaping, and sediment and erosion control measures are identified. After plan approval, a building permit may be processed. Issuance of a building permit is contingent on execution of a Department of Public Works Developer Agreement where required.

1.16 Capacity Allocation Program

Howard County has developed and implemented a capacity allocation program to control connections to the public water and sewer systems in the Planned Service Area. Properties within the Metropolitan District are prioritized as to eligibility for connection in accordance with the requirements of Section 18.122B, "Allocation of Water and Sewer Capacity" of the Howard County Code.

Property in the Metropolitan District for which a subdivision has been recorded or which is undergoing the subdivision process is subject to the allocation program. Six (6) priority classifications have been established and each property is assigned one of these classifications. Capacity is reserved to satisfy the demands for priority no. 1 properties first, for priority no. 2 properties second, etc. until all available capacity is allocated. If insufficient capacity is available to satisfy all demands for priorities 1 through 6, then properties with lower assigned priorities cannot be given a capacity allocation. As a result, unless these properties are later assigned a higher priority in accordance with Section 18.122B, or additional capacity becomes available, connection to the public system cannot be made.

The assignment of priorities is a dynamic process. Priorities for properties undergoing subdivision are revised as certain steps in the subdivision process are reached. This process is further described in the following priority descriptions:

Priority No. 1, Buildings Under Construction - Buildings under construction which will be connected to the utility have the highest allocation priority.

For properties not requiring subdivision approval, a capacity allocation is assigned when a building permit is issued. If building footings are not installed within six months, or the building permit is revoked, the allocation is forfeited. A six-month extension of the footings installation deadline may be granted at the discretion of the Director of the Department of Inspections, Licenses, and Permits. If the allocation is forfeited, the property is assigned to priority category no. 5 until such time as a building permit may be reissued.

For a property located in an active subdivision for which a building permit has been issued, the allocation is a portion of that assigned to the subdivision at the time of execution of a Developer Agreement. This allocation is assigned for the term of the Developer Agreement and is forfeited when the Agreement expires. The term of the agreement may not exceed three years for commercial and single-family detached residential development. For all residential development except single-family detached, the term of the agreement may be up to four years. A request for a one-year extension of the Developer Agreement may be granted by the County at the discretion of the Director of the Department of Public Works. Portions of a subdivision remaining undeveloped upon expiration of the Agreement are assigned to priority category no. 5.

Priority No. 2, Buildings Required to Connect - Buildings in this category are existing structures which have been ordered to connect to public water or sewer by the County Health Department, Bureau of Environmental Health.

Priority No. 3, Buildable Lots in Active Subdivisions - Lots in subdivisions for which Developer Agreements have been executed and for which Building Permits have not been issued are assigned to this category. Once a building permit is issued for a property within an active subdivision, that property is assigned to priority category no. 1.

Priority No. 4, Properties Dependent upon Capital Project Completion - Developed properties presently utilizing private individual water supply or wastewater systems which can or must connect to the public system upon completion of a Capital Project are assigned to this category. The capital projects which will front these properties must be under construction, have grant funds approved, or be certified by the Director of the Department of Public Works as meeting County legislative requirements.

Priority No. 5, Other Buildable Lots - Legally buildable lots located within older inactive subdivisions and buildable lots in subdivisions for which Developer Agreements have expired are assigned to this category. On an annual basis the number of former inactive properties for which building permits will be requested is estimated. Capacity, when available, is assigned to this category to satisfy the anticipated demand. Once a building permit is issued, an allocation is assigned, and the property is moved to priority category no. 1. A building permit for a structure requiring connection to the public water or sewer system will not be issued if the property does not front an existing water or sewer line.

Priority No. 6, Proposed Subdivisions - This category contains all properties which have reached the final subdivision plat approval stage of the subdivision review process and require connection to the public water and sewer system. At this point, the subdivision is assigned a tentative water and/or sewer system allocation if capacity is available. Within 180 days from the date of approval of the final subdivision plat, the developer must enter into a Developer Agreement with the County to guarantee construction of required utilities. If this Agreement is not executed within 180 days, the tentative allocation is forfeited and the final plat approval is revoked. If the Agreement is executed, the subdivision allocation is assigned for the duration of the Agreement and the property is assigned to priority category no. 3.

The size of a capacity allocation assigned to a given property is determined based on the guidelines given in part (C)(7)(d) of Section 18.122B of the County Code.

CHAPTER 1

FIGURES

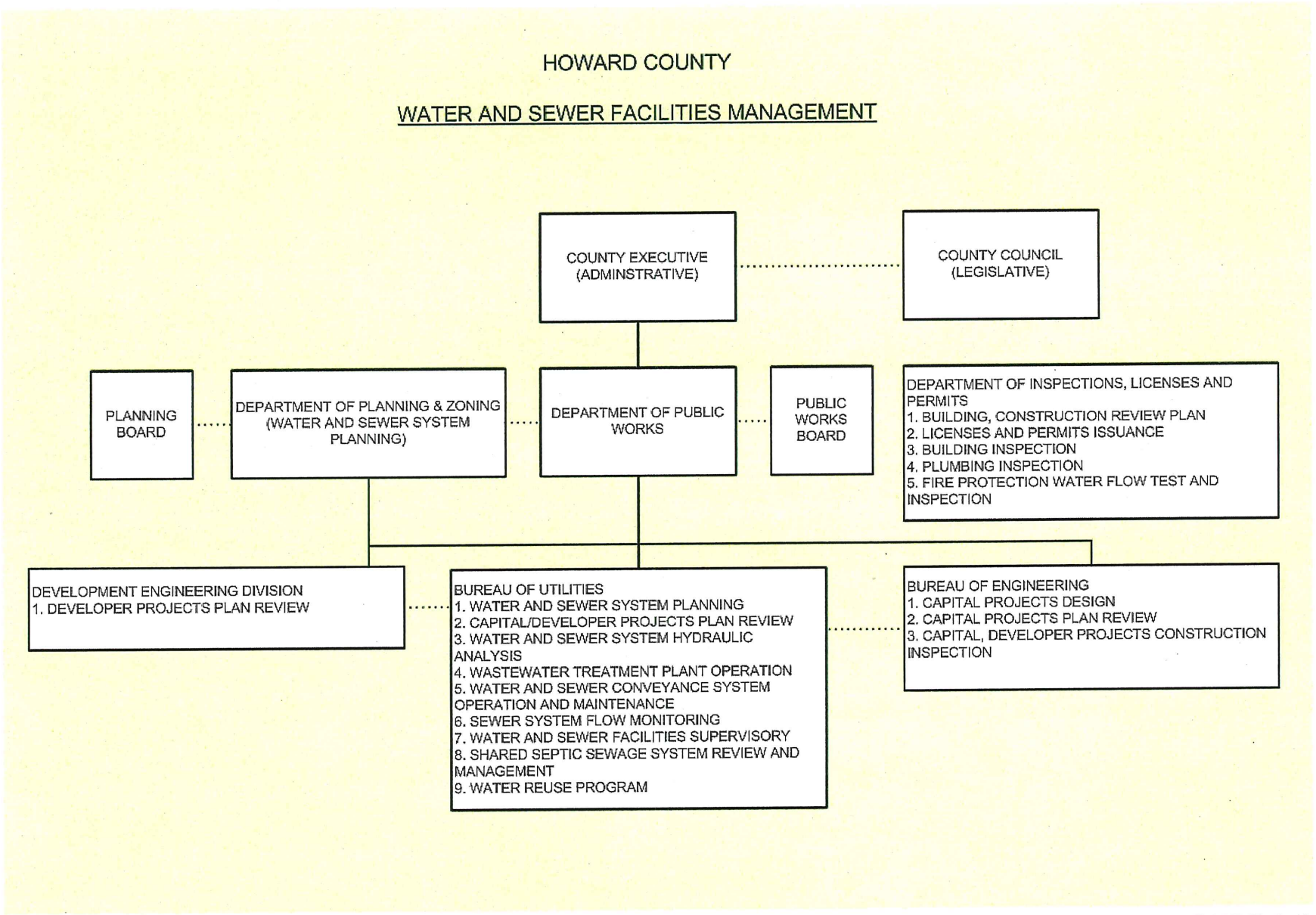


FIGURE 1-1

November 2015

WATER AND SEWER PLANNING AND GRANTS ADMINISTRATION

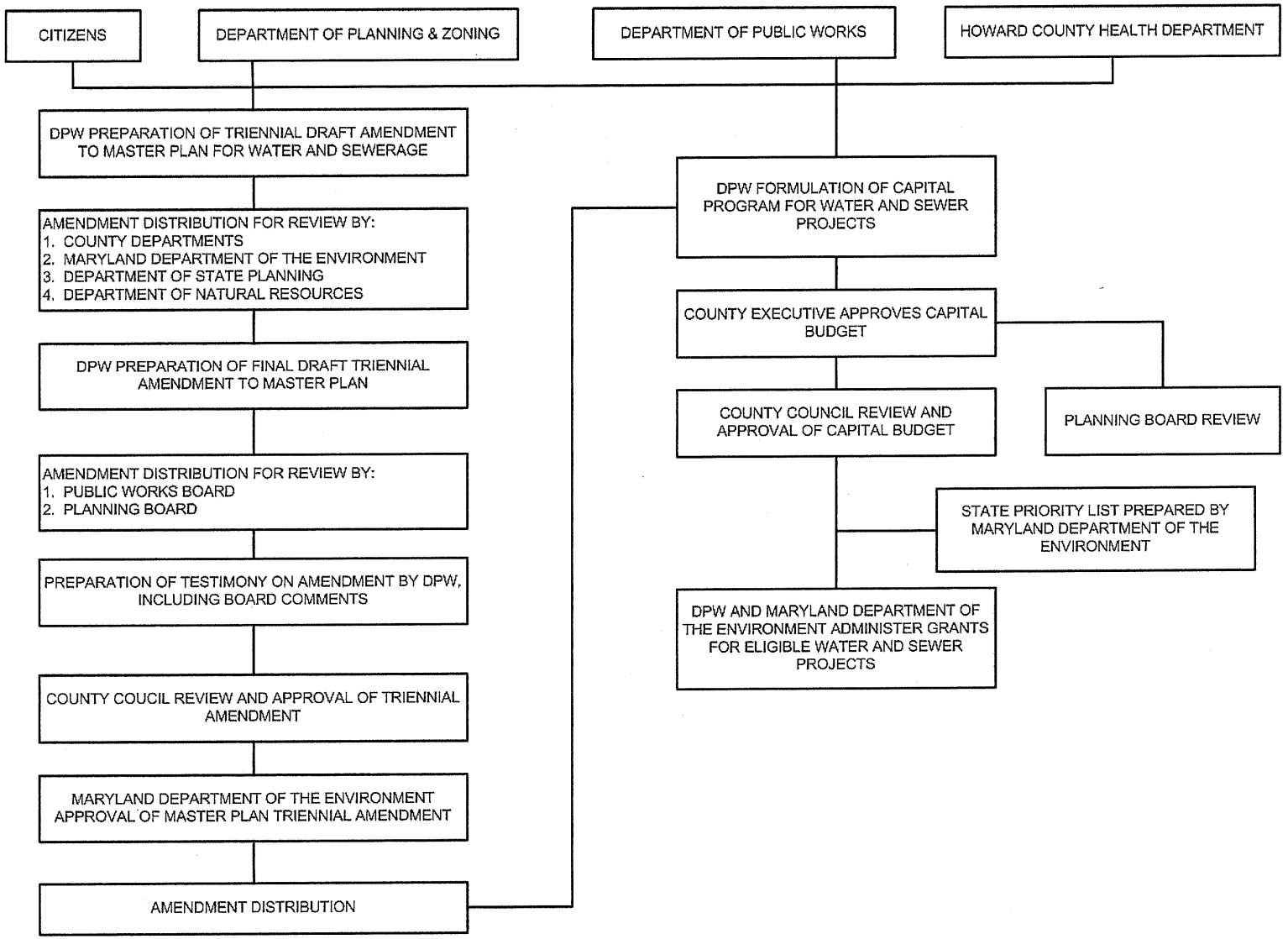
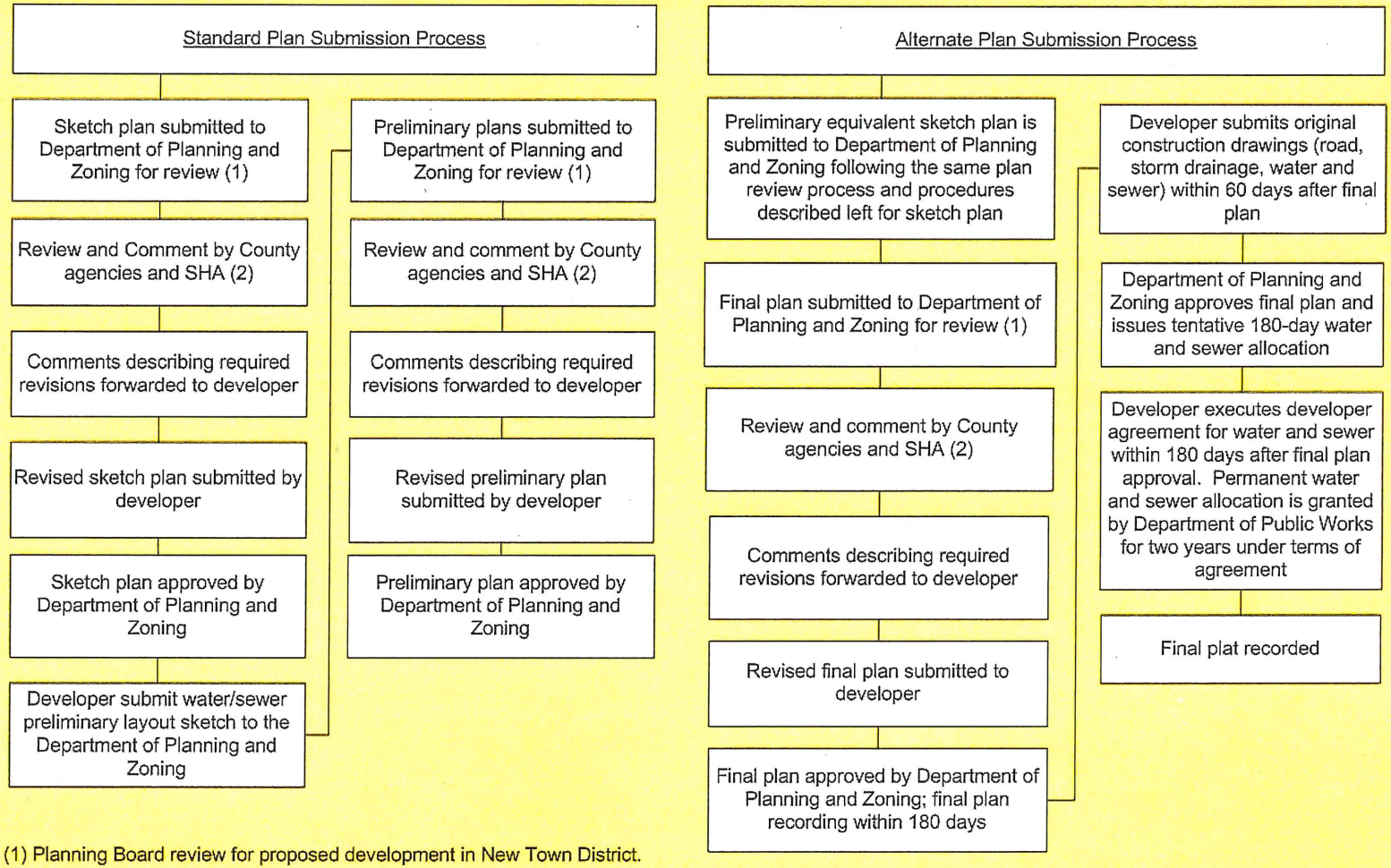


FIGURE 1-2

November 2015

SUBDIVISION PLAN REVIEW AND CAPACITY ALLOCATION PROCEDURE



(1) Planning Board review for proposed development in New Town District.
(2) County agencies include:

- Department of Planning and Zoning
- Department of Public Works
- Soil Conservation District
- Health Department
- Department of Fire and Rescue Services
- Department of Recreation and Parks
- Department of Education
- Department of Inspections, Licenses, and Permits

FIGURE 1-3

November 2015

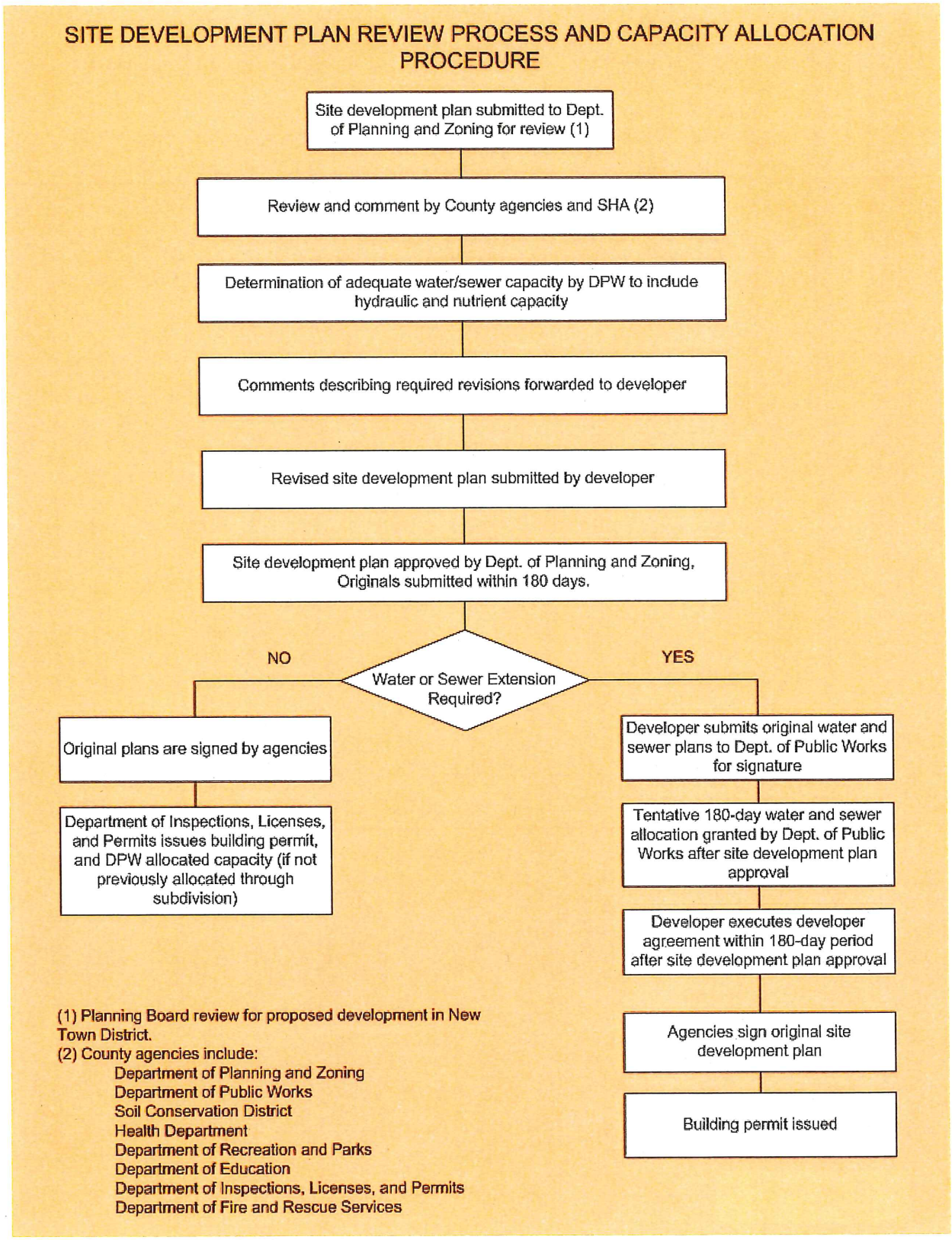

SITE DEVELOPMENT PLAN REVIEW PROCESS AND CAPACITY ALLOCATION PROCEDURE
Site development plan submitted to Dept. of Planning and Zoning for review (1)
Review and comment by County agencies and SHA (2)
Determination of adequate water/sewer capacity by DPW to include hydraulic and nutrient capacity
Comments describing required revisions forwarded to developer
Revised site development plan submitted by developer
Site development plan approved by Dept. of Planning and Zoning, Originals submitted within 180 days.
Water or Sewer Extension Required?
NO
YES
Original plans are signed by agencies
Department of Inspections, Licenses, and Permits issues building permit, and DPW allocated capacity (if not previously allocated through subdivision)
Developer submits original water and sewer plans to Dept. of Public Works for signature
Tentative 180-day water and sewer allocation granted by Dept. of Public Works after site development plan approval
Developer executes developer agreement within 180-day period after site development plan approval
Agencies sign original site development plan
Building permit issued
(1) Planning Board review for proposed development in New Town District.
(2) County agencies include:
Department of Planning and Zoning
Department of Public Works
Soil Conservation District
Health Department
Department of Recreation and Parks
Department of Education
Department of Inspections, Licenses, and Permits
Department of Fire and Rescue Services

FIGURE 1-4

CHAPTER 2

HOWARD COUNTY PROFILE AND GENERAL DATA

2.1 General

Howard County, an area of about 251 square miles, is situated in central Maryland. As shown in **Figure 2-1,** which is included at the end of this Chapter, it is bounded by Baltimore, Anne Arundel, Prince George's, Montgomery, Frederick and Carroll Counties. A mix of rural and suburban areas, Howard County lies between the two merging metropolitan areas of Baltimore and Washington, D.C. The County has realized a direct product of this merging of Baltimore and Washington in the town of Columbia and surrounding residential areas along Route 29 and in the industrial development along the I-95 and Route 1 corridors.

2.2 Natural Resources

Howard County lies primarily in the Piedmont Plateau with a small portion along the southeastern border in the Atlantic Coastal Plain physiographic region. The gently rolling terrain and soil characteristics throughout the middle and western parts of the County provide suitable areas for agricultural uses. Ground elevation varies from a low point of 20 feet in the east to as high as 875 feet in the west. A topographic map of Howard County is included in this Plan as **EXHIBIT 12**.

Howard County is classified into nine primary soil associations. **Figure 2-2**, which is included at the end of the Chapter, is a generalized soil map of the County that illustrates the location and extent of these soil associations. A soil association is an area with a distinctive pattern of soils with similar characteristics. It normally consists of one or more major soils and at least one minor soil, and is named for the major soils. The soils in one association may occur in another, but in a different pattern.

An evaluation of soil characteristics shows that about 85 percent of Howard County consists of well-drained and excessively-drained soils. About 10 percent of the County has somewhat poorly-drained soils and only 5 percent has poorly-drained soils. Approximately 65 percent of the soils are well suited for cultivation. Fifteen percent of the land can support occasional cultivation and 19 percent is unsuitable for cultivation but can be used for trees and some forage crops. Erosion is a potential problem when the

soils are cultivated. At least 87 percent of the land suitable for cultivation requires erosion control to lessen non-point source pollution.

The occurrence of groundwater in Howard County is largely dependent on the character, extent and structure of the rock formations. Most of the County is underlain by hard un-weathered crystalline rock of low porosity. Therefore, the amount of water that can be stored underground is relatively low and groundwater yields are variable. During dry periods, the water table may drop and reduce the yields from wells and springs. Most groundwater derived from wells occurs predominantly under unconfined conditions in the shallow or more permeable part of the crystalline rocks. In general, the water quality of the groundwater withdrawn is acceptable for potable use. It is acidic, soft, and may contain significant levels of iron. **Figure 2-3** provides a generalized view of County geology. Further information on groundwater supplies is presented in Chapter 3, The Water Plan.

The major watersheds in Howard County are the Patapsco, Patuxent, Middle Patuxent, and Little Patuxent Rivers. **Figure 2-4** shows the major surface water patterns in the County. Data for the major watersheds is provided below:

USGS Gage Station ID	Stream	Drainage Area	Average Discharge	Maximum Discharge	Minimum Discharge
01589000	Patapsco	285 Sq. Miles	*	80,600 cfs	6.00 cfs
01591000	Patuxent	34.8 Sq. Miles	39.4 cfs	21,800 cfs	0.20 cfs
01592500	Patuxent	132 Sq. Miles	**	26,000 cfs	0.05 cfs
01593500	Little Patuxent	38 Sq. Miles	42.6 cfs	12,400 cfs	0.00 cfs
01591610	Patuxent	78.6 Sq. Miles	**	17,800 cfs	1.20 cfs
01591400	Patuxent/ Cattail Creek	22.9 Sq. Miles	24.9 cfs	4,000 cfs	1.80 cfs

Notes:
* Flow is regulated by Liberty Reservoir
** Flow is regulated by Triadelphia and T. Howard Duckett Reservoirs

Triadelphia Reservoir and T. Howard Duckett Reservoir on the Patuxent River have a combined storage volume of 12.5 billion gallons and are used as a source of water supply by the Washington Suburban Sanitary Commission. Smaller reservoirs for recreational purposes have been constructed in Columbia. The flow in the Patapsco River along the northern boundary of the County is regulated by Liberty Reservoir in Baltimore County and to a lesser degree by Piney Run Reservoir in Carroll County.

All surface waters in Howard County are classified by the Maryland Department of the Environment according to certain standards. This classification is based upon the Code of Maryland Regulations; COMAR 26.08.01, "Water Quality and Water Pollution Control." Standards are established for bacteriological (fecal coliform) populations, dissolved oxygen, temperature, pH and turbidity. These standards also include the prohibition of chlorine discharge to Class III Waters, "Natural Trout Waters." Waters within the County are classified as indicated in **Figure 2-5**.

2.3 Population

Howard County's total household population in 2014 was estimated at 306,606. The Howard County Department of Planning and Zoning has projected that in the year 2040 the total household population will be approximately 363,891. The population growth projected for Howard County is the result of two major factors - (1) its strategic location near the center of the expanding Baltimore-Washington region; and (2) that the major transportation corridor connecting the two metropolitan areas shifted from Anne Arundel County to Howard County via Interstate 95 and the dualization and interchange improvements of U.S. Route 29. **Figure 2-6** presents the population growth for Howard County from 1960 projected to 2040. **Table 1** presents household population projections by water zone for the planning period 2015 to 2040. **Table 1A** presents the non-residential acreage, by water zone, for the planning period. Similarly, **Tables 1B and 1C** present the household populations and non-residential acreages by sewer shed for the planning period. **Table 1D** presents Non-Residential Redevelopment numbers within Howard County.

Increasing urbanization is planned for the eastern portion of the County. Most of the population growth will be absorbed in Columbia and adjacent areas with residential development generally concentrating along the US Route 29, Route 40 and Route 1 corridors. **Figure 2-7, Figure 2-8 and Figure 2-9** show the existing and expected population densities by statistical area for the years 2015, 2025, and 2035 respectively.

2.4 Land Use

Howard County as it exists today is a diversified residential, agricultural, and industrial community. High and medium density residential development is centered in Columbia and in areas along U.S. Route 29, Route 40 and Route 1. Industrial development is located along the Interstate 95 and U.S. Route 1 corridor in the eastern portion of the County and in several planned industrial parks located in Columbia.

Agricultural and low-density rural residential areas of the County lie to the west of the planned water and sewerage service area. The existing land use pattern is given in **Figure 2-10**. Shown in **Figure 2-11** is the County's present zoning classification. **Table 2** summarizes the present zoning and existing land use of Howard County.

Figure 2-12 shows the existing and proposed major public institutions (such as schools, hospitals, correction facilities, and government complexes) in the County. **Table 2A** provides a summary of the approximate populations of these facilities.

The General Plan for Howard County, originally adopted in 2000 and updated in 2012 with the adoption of PlanHoward 2030, is a policy guide for general land use and development practices. One policy of the plan is to guide land development to those locations where the programmed capacity of public utilities and community facilities are designed to accommodate the expected levels of development. The PlanHoward 2030 "Designated Place Types Map" for Howard County is included as **EXHIBIT 13**.

CHAPTER 2

TABLES AND FIGURES

TABLE 1
HOUSEHOLD POPULATION PROJECTIONS for PUBLIC WATER SERVICE

2015 Totals

	Housing Category							
Water Service Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Total
NPS	42,223	0	9	8	37	99	0	
350 Zone	574	72	62	0	0	0	0	
400 Zone	17,663	13,558	7,891	1,678	32	67	0	
550 II Zone (South)	57,207	28,605	19,345	1,749	32	810	1,643	
550 I Zone (North)	16,954	4,840	7,481	0	0	239	1,349	
630 East Zone	16,389	4,910	4,709		0	138	0	
630 South Zone	433	393	47	0	0	0	0	
630 West Zone	34,585	8,973	6,949	0	109	425	236	
730 Zone	1,735	1,074	337	0	153	303	481	
TOTAL IN PSA	**145,540**	**62,425**	**46,821**	**3,427**	**326**	**1,982**	**3,709**	**264,230**
TOTAL IN COUNTY	**187,763**	**62,425**	**46,830**	**3,435**	**363**	**2,081**	**3,709**	**306,606**

2020 Totals

	Housing Category							
Water Service Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Total
NPS	43,490	0	9	8	37	99	0	
350 Zone	571	72	61	0	0	0	0	
400 Zone	18,474	15,336	14,375	1,661	32	67	0	
550 II Zone (South)	58,784	28,973	22,863	1,731	41	1,011	1,715	
550 I Zone (North)	17,303	5,222	7,975	0	53	252	1,715	
630 East Zone	16,321	5,078	4,661	0	0	138	0	
630 South Zone	1,363	616	47	0	0	0	0	
630 West Zone	36,012	9,930	7,861	0	109	688	612	
730 Zone	1,752	1,064	334	0	313	387	585	
TOTAL IN PSA	**150,580**	**66,291**	**58,177**	**3,392**	**548**	**2,543**	**4,627**	**286,158**
TOTAL IN COUNTY	**194,070**	**66,291**	**58,186**	**3,400**	**585**	**2,642**	**4,627**	**329,801**

2025 Totals

	Housing Category							
Water Service Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Total
NPS	44,568	0	9	8	37	99	0	
350 Zone	593	71	61	0	0	0	0	
400 Zone	19,624	16,776	15,542	1,644	32	67	0	
550 II Zone (South)	60,893	29,593	25,941	1,716	41	1,011	1,814	
550 I Zone (North)	18,135	5,253	8,244	0	53	252	1,772	
630 East Zone	16,543	5,197	4,615	0	0	138	0	
630 South Zone	1,350	681	46	0	0	0	0	
630 West Zone	37,223	10,258	8,065	0	109	850	668	
730 Zone	1,789	1,053	330	0	313	387	585	
TOTAL IN PSA	**156,150**	**68,882**	**62,844**	**3,360**	**548**	**2,705**	**4,839**	**299,328**
TOTAL IN COUNTY	**200,718**	**68,882**	**62,853**	**3,368**	**585**	**2,804**	**4,839**	**344,049**

NPS= No Planned Public Water Service
SFD= Single Family Detached Unit
SFA= Single Family Attached Unit
APT= Apartment Unit (rental or condo)
MH= Mobile Home

AR-SFD= Age-Restricted Single Family Detached Unit
AR-SFA= Age-Restricted Single Family Attached Unit
AR-APT= Age-Restricted Apartment Unit (rental or condo)
PSA= Planned Public Water Service Area

TABLE 1
HOUSEHOLD POPULATION PROJECTIONS for PUBLIC WATER SERVICE

2030 Totals

	Housing Category							
Water Service Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Total
NPS	46,065	0	9	8	37	99	0	
350 Zone	603	76	61	0	0	0	0	
400 Zone	20,328	17,415	17,542	1,644	32	67	0	
550 II Zone (South)	61,618	29,777	28,565	1,716	41	1,011	1,814	
550 I Zone (North)	18,649	5,417	8,332	0	53	252	1,772	
630 East Zone	16,687	5,205	5,062	0	0	138	0	
630 South Zone	1,350	681	46	0	0	0	0	
630 West Zone	37,958	10,281	8,083	0	109	850	668	
730 Zone	1,842	1,053	330	0	313	387	585	
TOTAL IN PSA	**159,035**	**69,905**	**68,021**	**3,360**	**548**	**2,705**	**4,839**	**308,413**
TOTAL IN COUNTY	**205,100**	**69,905**	**68,030**	**3,368**	**585**	**2,804**	**4,839**	**354,631**

2035 Totals

	Housing Category							
Water Service Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Total
NPS	47,547	0	9	8	37	99	0	
350 Zone	603	76	61	0	0	0	0	
400 Zone	20,328	17,486	19,565	1,644	32	67	0	
550 II Zone (South)	61,883	29,827	30,894	1,716	41	1,011	1,814	
550 I Zone (North)	18,649	5,417	8,332	0	53	252	1,772	
630 East Zone	16,697	5,205	5,062	0	0	138	0	
630 South Zone	1,350	681	46	0	0	0	0	
630 West Zone	38,087	10,283	8,083	0	109	850	668	
730 Zone	1,885	1,053	330	0	313	387	585	
TOTAL IN PSA	**159,482**	**70,028**	**72,373**	**3,360**	**548**	**2,705**	**4,839**	**313,335**
TOTAL IN COUNTY	**207,029**	**70,028**	**72,382**	**3,368**	**585**	**2,804**	**4,839**	**361,035**

2040 Totals

	Housing Category							
Water Service Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Total
NPS	49,035	0	9	8	37	99	0	
350 Zone	603	76	61	0	0	0	0	
400 Zone	20,328	17,486	19,855	1,644	32	67	0	
550 II Zone (South)	62,303	29,860	30,905	1,716	41	1,011	1,814	
550 I Zone (North)	18,649	5,417	8,332	0	53	252	1,772	
630 East Zone	16,715	5,205	5,062	0	0	138	0	
630 South Zone	1,350	681	46	0	0	0	0	
630 West Zone	38,555	10,362	8,083	0	109	850	668	
730 Zone	1,934	1,053	330	0	313	387	585	
TOTAL IN PSA	**160,437**	**70,140**	**72,674**	**3,360**	**548**	**2,705**	**4,839**	**314,703**
TOTAL IN COUNTY	**209,472**	**70,140**	**72,683**	**3,368**	**585**	**2,804**	**4,839**	**363,891**

NPS= No Planned Public Water Service
SFD= Single Family Detached Unit
SFA= Single Family Attached Unit
APT= Apartment Unit (rental or condo)
MH= Mobile Home

AR-SFD= Age-Restricted Single Family Detached Unit
AR-SFA= Age-Restricted Single Family Attached Unit
AR-APT= Age-Restricted Apartment Unit (rental or condo)
PSA= Planned Public Water Service Area

TABLE 1A

DEVELOPMENT of NON-RESIDENTIAL ACREAGE for PUBLIC WATER SERVICE

2015 Totals

Water Service Area	Industrial Land	Commercial Land
No Planned Public Water Service	45.85	434.02
350 Zone	0.10	5.98
400 Zone	2,915.21	1,000.69
550-II Zone (South)	512.63	2,363.55
550-I Zone (North)	28.22	414.55
630 East Zone	53.56	220.42
630 South Zone	0.00	34.52
630 West Zone	20.73	337.88
730 Zone	4.23	47.73
TOTAL	**3,580.53**	**4,859.34**
Combined TOTAL	**8,439.87**	

2020 Totals

Water Service Area	Industrial Land	Commercial Land
No Planned Public Water Service	45.85	459.47
350 Zone	0.10	5.98
400 Zone	3,064.30	1,032.87
550-II Zone (South)	536.50	2,522.11
550-I Zone (North)	28.22	414.55
630 East Zone	61.76	221.34
630 South Zone	0.00	45.00
630 West Zone	20.73	404.89
730 Zone	4.23	47.73
TOTAL	**3,761.69**	**5,153.94**
Combined TOTAL	**8,915.63**	

2025 Totals

Water Service Area	Industrial Land	Commercial Land
No Planned Public Water Service	45.85	494.17
350 Zone	0.10	5.98
400 Zone	3,182.80	1,059.37
550-II Zone (South)	547.08	2,575.76
550-I Zone (North)	28.22	414.55
630 East Zone	61.76	247.18
630 South Zone	0.00	55.33
630 West Zone	20.73	419.10
730 Zone	4.23	47.73
TOTAL	**3,890.77**	**5,319.17**
Combined TOTAL	**9,209.94**	

TABLE 1A
DEVELOPMENT of NON-RESIDENTIAL ACREAGE for PUBLIC WATER SERVICE

2030 Totals

Water Service Area	Industrial Land	Commercial Land
No Planned Public Water Service	45.85	521.27
350 Zone	0.10	5.98
400 Zone	3,286.26	1,107.19
550-II Zone (South)	608.59	2,644.14
550-I Zone (North)	28.22	414.55
630 East Zone	61.76	266.96
630 South Zone	0.00	55.33
630 West Zone	20.73	419.10
730 Zone	14.23	47.73
TOTAL	**4,065.74**	**5,482.25**
Combined TOTAL	**9,547.99**	

2035 Totals

Water Service Area	Industrial Land	Commercial Land
No Planned Public Water Service	45.85	521.27
350 Zone	0.10	5.98
400 Zone	3,342.17	1,107.19
550-II Zone (South)	661.70	2,644.14
550-I Zone (North)	28.22	414.55
630 East Zone	61.76	266.96
630 South Zone	0.00	55.33
630 West Zone	20.73	419.10
730 Zone	24.20	47.73
TOTAL	**4,184.73**	**5,482.25**
Combined TOTAL	**9,666.98**	

2040 Totals

Water Service Area	Industrial Land	Commercial Land
No Planned Public Water Service	45.85	521.27
350 Zone	0.10	5.98
400 Zone	3,452.48	1,107.19
550-II Zone	661.70	2,644.14
550-I Zone	28.22	414.55
630 East Zone	61.76	266.96
630 South Zone	0.00	55.33
630 West Zone	20.73	419.10
730 Zone	48.40	95.46
TOTAL	**4,319.24**	**5,529.98**
Combined TOTAL	**9,849.22**	

TABLE 1B

HOUSEHOLD POPULATION PROJECTIONS for PUBLIC SEWERAGE SERVICE

2015 Totals

Sewer Drainage Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Totals
NPS	42,223	0	9	8	37	99	0	42,376
AR	1,571	0	0	0	0	0	0	1,571
BB1	5,784	147	0	0	0	239	425	6,595
BB2	2,083	0	0	0	0	0	0	2,083
D	1,314	302	0	0	0	0	0	1,616
DP1	2,390	65	365	0	0	0	0	2,819
DP11	5,122	7,343	4,780	1,748	0	20	132	19,147
DP2	1,907	341	416	0	0	0	0	2,664
DP3	2,450	1,240	1,174	0	0	96	144	5,104
DP5	5,411	1,472	941	457	0	36	311	8,629
DP8	279	49	0	0	0	0	0	328
DR	3,356	3,105	1,785	870	0	418	225	9,759
EC	6,415	1,842	822	0	0	0	0	9,079
GR1	6	0	182	0	0	0	0	189
GR2	2,189	2,947	1,189	10	32	38	86	6,493
HB1	0	0	0	0	0	0	0	0
HB2	9,275	7,380	283	0	0	0	276	17,214
HB3	706	0	744	105	0	0	0	1,554
LP1	2,014	413	1,350	0	0	0	0	3,777
LP2	33,055	18,164	16,344	0	32	196	439	68,230
MP	18,011	5,685	5,840	0	0	44	29	29,608
NL1	4,746	4,939	1,681	235	0	29	0	11,630
PS1	29,275	5,262	3,254	0	262	675	906	39,632
RB	2,293	0	0	0	0	0	0	2,293
SB1	2,384	501	2,571	0	0	0	500	5,956
SB2	3,504	1,230	3,098	0	0	191	236	8,258
TOTAL IN PSA	**143,968**	**62,426**	**46,820**	**3,426**	**326**	**1,982**	**3,709**	**262,658**
TOTAL IN COUNTY	**187,763**	**62,426**	**46,829**	**3,434**	**363**	**2,081**	**3,709**	**306,606**

2020 Totals

Sewer Drainage Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Totals
NPS	43,490	0	9	8	37	99	0	43,642
AR	1,590	0	0	0	0	0	0	1,590
BB1	5,956	187	244	0	0	239	425	7,050
BB2	2,087	0	0	0	0	0	0	2,087
D	1,391	299	0	0	0	0	0	1,690
DP1	2,546	504	2,338	0	0	0	0	5,388
DP11	5,124	8,224	7,377	1,731	0	84	179	22,719
DP2	1,963	506	497	0	0	0	0	2,965
DP3	2,515	1,261	1,163	0	0	96	144	5,179
DP5	5,645	1,460	932	453	0	36	311	8,837
DP8	286	471	0	0	0	0	0	756
DR	3,537	3,079	2,093	862	0	418	225	10,212
EC	6,397	1,936	814	0	0	13	30	9,190
GR1	6	0	751	0	0	0	0	757
GR2	2,382	2,918	1,177	10	32	38	86	6,644
HB1	0	0	0	0	0	0	0	0
HB2	10,338	7,569	291	0	0	0	276	18,474
HB3	733	0	737	103	0	0	0	1,573
LP1	2,022	460	1,336	0	0	0	0	3,818
LP2	32,724	17,982	19,398	0	32	196	439	70,772
MP	18,831	6,073	5,781	0	9	180	55	30,929
NL1	5,114	5,099	3,470	233	0	29	0	13,946
PS1	30,382	6,365	3,842	0	475	978	1,431	43,473
RB	2,540	8	0	0	0	0	0	2,548
SB1	2,404	673	2,546	0	0	0	500	6,121
SB2	4,068	1,217	3,392	0	0	236	526	9,439
TOTAL IN PSA	**148,989**	**66,290**	**58,178**	**3,392**	**548**	**2,543**	**4,627**	**284,568**
TOTAL IN COUNTY	**194,069**	**66,290**	**58,187**	**3,400**	**585**	**2,642**	**4,627**	**329,800**

SFD = Single Family Detached Unit
SFA = Single Family Attached Unit
APT = Apartment Unit (rental or condo)
MH = Mobile Home
AR-SFD= Age Restricted SFD
AR-SFA= Age Restricted SFA
AR-APT= Age Restricted APT

NPS = No Planned Public Svc
AR= Alpha Ridge
BB = Bonnie Branch
D = Danials
DP = Deep Run

DR = Dorsey Run
EC = Ellicott City
GR = Guilford Run
HB = Hammond Branch
LP = Little Patuxent

MP = Middle Patuxent
NL = North Laurel Pumping Station
PS = Rt 108 Pumping Station
RB = Rockburn Pumping Station
SB = Sucker Branch

TABLE 1B

HOUSEHOLD POPULATION PROJECTIONS for PUBLIC SEWERAGE SERVICE

2025 Totals

Sewer Drainage Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Totals
NPS	44,568	0	9	8	37	99	0	44,720
AR	1,599	0	0	0	0	0	0	1,599
BB1	6,505	241	273	0	0	239	425	7,683
BB2	2,100	0	0	0	0	0	0	2,100
D	1,592	296	0	0	0	0	0	1,889
DP1	2,589	499	2,422	0	0	0	0	5,509
DP11	5,214	8,420	7,518	1,716	0	84	278	23,231
DP2	2,066	916	804	0	0	0	0	3,787
DP3	2,690	1,286	1,165	0	0	96	144	5,381
DP5	5,909	1,544	994	448	0	36	311	9,243
DP8	443	559	156	0	0	0	0	1,158
DR	4,046	3,640	2,107	853	0	418	225	11,289
EC	6,607	1,947	806	0	0	13	30	9,403
GR1	6	0	744	0	0	0	0	750
GR2	2,546	2,909	1,198	10	32	38	86	6,819
HB1	0	0	0	0	0	0	0	0
HB2	10,797	8,129	590	0	0	0	276	19,792
HB3	726	13	844	102	0	0	0	1,684
LP1	2,041	504	1,323	0	0	0	0	3,868
LP2	32,437	17,802	21,978	0	32	196	439	72,885
MP	19,408	6,081	5,723	0	9	180	55	31,456
NL1	5,275	5,377	3,916	231	0	29	0	14,829
PS1	31,754	6,726	4,281	0	475	1,058	1,529	45,824
RB	3,056	94	0	0	0	0	0	3,150
SB1	2,567	694	2,520	0	0	0	500	6,281
SB2	4,178	1,205	3,480	0	0	317	541	9,722
TOTAL IN PSA	**154,551**	**68,882**	**62,842**	**3,361**	**548**	**2,705**	**4,840**	**297,729**
TOTAL IN COUNTY	**200,718**	**68,882**	**62,851**	**3,368**	**585**	**2,804**	**4,840**	**344,048**

2030 Totals

Sewer Drainage Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Totals
NPS	46,065	0	9	8	37	99	0	46,218
AR	1,639	0	0	0	0	0	0	1,639
BB1	6,767	281	273	0	0	239	425	7,984
BB2	2,115	0	0	0	0	0	0	2,115
D	1,639	296	0	0	0	0	0	1,935
DP1	2,598	499	2,958	0	0	0	0	6,055
DP11	5,229	8,526	7,563	1,716	0	84	278	23,397
DP2	2,097	954	953	0	0	0	0	4,004
DP3	2,745	1,286	1,165	0	0	96	144	5,437
DP5	5,912	1,681	1,076	448	0	36	311	9,465
DP8	446	559	667	0	0	0	0	1,672
DR	4,596	4,091	2,107	853	0	418	225	12,290
EC	6,782	1,982	806	0	0	13	30	9,614
GR1	6	0	744	0	0	0	0	750
GR2	2,564	2,909	1,198	10	32	38	86	6,837
HB1	0	0	0	0	0	0	0	0
HB2	11,163	8,202	837	0	0	0	276	20,478
HB3	726	13	844	102	0	0	0	1,684
LP1	2,041	511	1,323	0	0	0	0	3,875
LP2	32,437	17,802	24,759	0	32	196	439	75,667
MP	19,608	6,081	5,723	0	9	180	55	31,656
NL1	5,337	5,380	4,638	231	0	29	0	15,615
PS1	32,563	6,840	4,299	0	475	1,058	1,529	46,764
RB	3,142	101	0	0	0	0	0	3,243
SB1	2,629	704	2,608	0	0	0	500	6,440
SB2	4,255	1,205	3,480	0	0	317	541	9,799
TOTAL IN PSA	**157,395**	**69,905**	**68,020**	**3,361**	**548**	**2,705**	**4,840**	**306,774**
TOTAL IN COUNTY	**205,099**	**69,905**	**68,029**	**3,368**	**585**	**2,804**	**4,840**	**354,630**

SFD = Single Family Detached Unit
SFA = Single Family Attached Unit
APT = Apartment Unit (rental or condo)
MH = Mobile Home
AR-SFD= Age Restricted SFD
AR-SFA= Age Restricted SFA
AR-APT= Age Restricted APT

NPS = No Planned Public Svc
AR= Alpha Ridge
BB = Bonnie Branch
D = Danials
DP = Deep Run

DR = Dorsey Run
EC = Ellicott City
GR = Guilford Run
HB = Hammond Branch
LP = Little Patuxent

MP = Middle Patuxent
NL = North Laurel Pumping Station
PS = Rt 108 Pumping Station
RB = Rockburn Pumping Station
SB = Sucker Branch

TABLE 1B

HOUSEHOLD POPULATION PROJECTIONS for PUBLIC SEWERAGE SERVICE

2035 Totals

Sewer Drainage Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Totals
NPS	47,547	0	9	8	37	99	0	47,699
AR	1,682	0	0	0	0	0	0	1,682
BB1	6,767	281	273	0	0	239	425	7,984
BB2	2,115	0	0	0	0	0	0	2,115
D	1,639	296	0	0	0	0	0	1,935
DP1	2,598	499	3,344	0	0	0	0	6,441
DP11	5,242	8,526	7,563	1,716	0	84	278	23,409
DP2	2,097	954	953	0	0	0	0	4,004
DP3	2,745	1,286	1,165	0	0	96	144	5,437
DP5	5,912	1,681	1,303	448	0	36	311	9,692
DP8	446	559	1,203	0	0	0	0	2,208
DR	4,605	4,091	2,107	853	0	418	225	12,299
EC	6,782	1,982	806	0	0	13	30	9,614
GR1	6	0	744	0	0	0	0	750
GR2	2,567	2,980	1,316	10	32	38	86	7,029
HB1	0	0	0	0	0	0	0	0
HB2	11,163	8,202	837	0	0	0	276	20,478
HB3	726	13	844	102	0	0	0	1,684
LP1	2,041	511	1,323	0	0	0	0	3,875
LP2	32,594	17,853	27,088	0	32	196	439	78,203
MP	19,817	6,083	5,723	0	9	180	55	31,868
NL1	5,337	5,380	5,394	231	0	29	0	16,371
PS1	32,575	6,840	4,299	0	475	1,058	1,529	46,776
RB	3,142	101	0	0	0	0	0	3,243
SB1	2,629	704	2,608	0	0	0	500	6,440
SB2	4,255	1,205	3,480	0	0	317	541	9,799
TOTAL IN PSA	**157,797**	**70,029**	**72,373**	**3,361**	**548**	**2,705**	**4,840**	**311,653**
TOTAL IN COUNTY	**207,026**	**70,029**	**72,382**	**3,368**	**585**	**2,804**	**4,840**	**361,034**

2040 Totals

Sewer Drainage Area	SFD	SFA	APT	MH	AR- SFD	AR-SFA	AR-APT	Totals
NPS	49,035	0	9	8	37	99	0	49,187
AR	1,731	0	0	0	0	0	0	1,731
BB1	6,767	281	273	0	0	239	425	7,984
BB2	2,115	0	0	0	0	0	0	2,115
D	1,639	296	0	0	0	0	0	1,935
DP1	2,598	499	3,344	0	0	0	0	6,441
DP11	5,248	8,526	7,563	1,716	0	84	278	23,415
DP2	2,097	954	953	0	0	0	0	4,004
DP3	2,745	1,286	1,165	0	0	96	144	5,437
DP5	5,912	1,681	1,303	448	0	36	311	9,692
DP8	446	559	1,276	0	0	0	0	2,281
DR	4,618	4,091	2,107	853	0	418	225	12,311
EC	6,782	1,982	806	0	0	13	30	9,614
GR1	6	0	744	0	0	0	0	750
GR2	2,570	2,980	1,316	10	32	38	86	7,032
HB1	0	0	0	0	0	0	0	0
HB2	11,163	8,202	837	0	0	0	276	20,478
HB3	726	13	844	102	0	0	0	1,684
LP1	2,041	511	1,323	0	0	0	0	3,875
LP2	32,861	17,883	27,099	0	32	196	439	78,512
MP	20,435	6,164	5,723	0	9	180	55	32,567
NL1	5,337	5,380	5,611	231	0	29	0	16,587
PS1	32,575	6,840	4,299	0	475	1,058	1,529	46,776
RB	3,142	101	0	0	0	0	0	3,243
SB1	2,629	704	2,608	0	0	0	500	6,440
SB2	4,255	1,205	3,480	0	0	317	541	9,799
TOTAL IN PSA	**158,704**	**70,141**	**72,673**	**3,361**	**548**	**2,705**	**4,840**	**312,972**
TOTAL IN COUNTY	**209,470**	**70,141**	**72,682**	**3,368**	**585**	**2,804**	**4,840**	**363,890**

SFD = Single Family Detached Unit
SFA = Single Family Attached Unit
APT = Apartment Unit (rental or condo)
MH = Mobile Home
AR-SFD= Age Restricted SFD
AR-SFA= Age Restricted SFA
AR-APT= Age Restricted APT

NPS= No Planned Public Svc
AR= Alpha Ridge
BB = Bonnie Branch
D = Danials
DP = Deep Run

DR = Dorsey Run
EC = Ellicott City
GR = Guilford Run
HB = Hammond Branch
LP = Little Patuxent

MP = Middle Patuxent
NL = North Laurel Pumping Station
PS = Rt 108 Pumping Station
RB = Rockburn Pumping Station
SB = Sucker Branch

TABLE 1C
DEVELOPMENT of NON RESIDENTIAL ACREAGE for PUBLIC SEWERAGE SERVICE

2015 Totals

Sewer Drainage Area	Industrial Land	Commercial Land	Combined
NPS	434.02	45.85	479.87
AR	0.00	0.00	0.00
BB1	9.80	0.00	9.80
BB2	0.00	0.00	0.00
D	0.57	13.97	14.54
DP1	187.12	221.02	408.14
DP11	100.02	28.45	128.47
DP2	51.66	21.47	73.13
DP3	49.93	213.12	263.05
DP5	131.82	392.06	523.88
DP8	84.25	290.65	374.90
DR	491.70	949.51	1,441.21
EC	128.83	21.66	150.49
GR1	64.86	423.87	488.73
GR2	416.52	299.49	716.01
HB1	4.80	68.66	73.46
HB2	207.94	55.92	263.86
HB3	20.03	72.50	92.53
LP1	64.35	108.82	173.17
LP2	1,129.18	284.79	1,413.97
MP	660.03	5.60	665.63
NL1	107.57	36.01	143.58
PS1	366.41	21.79	388.20
RB	0.00	0.00	0.00
SB1	16.99	5.32	22.31
SB2	130.94	0.00	130.94
Subtotal PSA	**4,425.32**	**3,534.68**	**7,960.00**
Total County	**4,859.34**	**3,580.53**	**8,439.87**

2020 Totals

Sewer Drainage Area	Industrial Land	Commercial Land	Combined
NPS	459.47	45.85	505.32
AR	0.00	0.00	0.00
BB1	9.80	0.00	9.80
BB2	0.00	0.00	0.00
D	0.57	13.97	14.54
DP1	187.12	257.54	444.66
DP11	102.75	28.45	131.20
DP2	52.42	21.69	74.11
DP3	52.12	218.94	271.06
DP5	151.12	408.18	559.30
DP8	84.25	338.52	422.77
DR	500.52	986.60	1,487.12
EC	128.83	21.66	150.49
GR1	65.62	430.46	496.08
GR2	433.97	302.34	736.31
HB1	6.78	68.66	75.44
HB2	296.45	57.81	354.26
HB3	20.35	72.50	92.85
LP1	66.76	108.82	175.58
LP2	1,144.12	305.51	1,449.63
MP	706.31	5.60	711.91
NL1	119.14	36.25	155.39
PS1	403.72	27.74	431.46
RB	0.00	0.00	0.00
SB1	19.31	5.32	24.63
SB2	147.14	0.00	147.14
Subtotal PSA	**4,699.17**	**3,716.56**	**8,415.73**
Total County	**5,158.64**	**3,762.41**	**8,921.05**

Ind = Industrial Land
Com - Commercial Land

NPS = No Planned Public Sewer
AR= Alpha Ridge (NPS)
BB = Bonnie Branch
D = Daniels
DP = Deep Run
DR = Dorsey Run
EC = Ellicott City
GR = Guilford Run

HB = Hammond Branch
LP = Little Patuxent
MP = Middle Patuxent
NL = North Laurel Pump Station
PS = Rt 108 Pump Station
RB = Rockburn Pump Station
SB = Sucker Branch

TABLE 1C
DEVELOPMENT of NON RESIDENTIAL ACREAGE for PUBLIC SEWERAGE SERVICE

2025 Totals

Sewer Drainage Area	Industrial Land	Commercial Land	Combined
NPS	494.17	45.85	540.02
AR	0.00	0.00	0.00
BB1	9.80	0.00	9.80
BB2	0.00	0.00	0.00
D	0.57	13.97	14.54
DP1	187.12	277.06	464.18
DP11	128.91	28.45	157.36
DP2	53.98	21.69	75.67
DP3	56.88	232.12	289.00
DP5	154.32	418.01	572.33
DP8	84.25	361.15	445.40
DR	509.92	1,032.23	1,542.15
EC	128.83	21.66	150.49
GR1	65.62	444.05	509.67
GR2	442.79	302.34	745.13
HB1	6.78	68.66	75.44
HB2	319.50	57.81	377.31
HB3	21.84	72.50	94.34
LP1	66.76	109.02	175.78
LP2	1,144.12	307.58	1,451.70
MP	716.31	8.03	724.34
NL1	127.02	36.25	163.27
PS1	437.93	27.74	465.67
RB	0.00	0.00	0.00
SB1	19.31	5.32	24.63
SB2	147.14	0.00	147.14
Subtotal PSA	**4,829.70**	**3,845.64**	**8,675.34**
Total County	**5,323.87**	**3,891.49**	**9,215.36**

2030 Totals

Sewer Drainage Area	Industrial Land	Commercial Land	Combined
NPS	521.27	45.85	567.12
AR	0.00	0.00	0.00
BB1	9.80	0.00	9.80
BB2	0.00	0.00	0.00
D	0.57	13.97	14.54
DP1	187.12	315.96	503.08
DP11	131.15	36.63	167.78
DP2	53.98	21.69	75.67
DP3	56.88	243.12	300.00
DP5	154.32	421.26	575.58
DP8	84.25	364.91	449.16
DR	512.27	1,053.36	1,565.63
EC	128.83	21.66	150.49
GR1	65.62	446.00	511.62
GR2	442.79	317.34	760.13
HB1	11.46	74.18	85.64
HB2	340.84	89.41	430.25
HB3	25.68	73.95	99.63
LP1	67.92	109.02	176.94
LP2	1,144.12	307.58	1,451.70
MP	761.11	13.36	774.47
NL1	162.81	54.15	216.96
PS1	457.71	37.74	495.45
RB	0.00	0.00	0.00
SB1	19.31	5.32	24.63
SB2	147.14	0.00	147.14
Subtotal PSA	**4,965.68**	**4,020.61**	**8,986.29**
Total County	**5,486.95**	**4,066.46**	**9,553.41**

Ind = Industrial Land
Com - Commercial Land

NPS = No Planned Public Sewer
AR= Alpha Ridge (NPS)
BB = Bonnie Branch
D = Daniels
DP = Deep Run
DR = Dorsey Run
EC = Ellicott City
GR = Guilford Run

HB = Hammond Branch
LP = Little Patuxent
MP = Middle Patuxent
NL = North Laurel Pump Station
PS = Rt 108 Pump Station
RB = Rockburn Pump Station
SB = Sucker Branch

TABLE 1C
DEVELOPMENT of NON RESIDENTIAL ACREAGE for PUBLIC SEWERAGE SERVICE

2035 Totals

Sewer Drainage Area	Industrial Land	Commercial Land	Combined
NPS	521.27	45.85	567.12
AR	0.00	0.00	0.00
BB1	9.80	0.00	9.80
BB2	0.00	0.00	0.00
D	0.57	13.97	14.54
DP1	187.12	336.59	523.71
DP11	131.15	36.63	167.78
DP2	53.98	21.69	75.67
DP3	56.88	243.12	300.00
DP5	154.32	421.26	575.58
DP8	84.25	374.91	459.16
DR	512.27	1,070.70	1,582.97
EC	128.83	21.66	150.49
GR1	65.62	446.00	511.62
GR2	442.79	351.98	794.77
HB1	11.46	74.18	85.64
HB2	340.84	115.82	456.66
HB3	25.68	73.95	99.63
LP1	67.92	109.02	176.94
LP2	1,144.12	307.58	1,451.70
MP	761.11	13.36	774.47
NL1	162.81	54.15	216.96
PS1	457.71	47.71	505.42
RB	0.00	0.00	0.00
SB1	19.31	5.32	24.63
SB2	147.14	0.00	147.14
Subtotal PSA	**4,965.68**	**4,139.60**	**9,105.28**
Total County	**5,486.95**	**4,185.45**	**9,672.40**

2040 Totals

Sewer Drainage Area	Industrial Land	Commercial Land	Combined
NPS	521.27	45.85	567.12
AR	0.00	0.00	0.00
BB1	9.80	0.00	9.80
BB2	0.00	0.00	0.00
D	0.57	13.97	14.54
DP1	187.12	373.99	561.11
DP11	131.15	36.63	167.78
DP2	53.98	21.69	75.67
DP3	56.88	243.12	300.00
DP5	154.32	421.26	575.58
DP8	84.25	403.99	488.24
DR	512.27	1,114.53	1,626.80
EC	128.83	21.66	150.49
GR1	65.62	446.00	511.62
GR2	442.79	351.98	794.77
HB1	11.46	74.18	85.64
HB2	340.84	115.82	456.66
HB3	25.68	73.95	99.63
LP1	67.92	109.02	176.94
LP2	1,144.12	307.58	1,451.70
MP	761.11	13.36	774.47
NL1	162.81	54.15	216.96
PS1	457.71	47.71	505.42
RB	0.00	0.00	0.00
SB1	19.31	5.32	24.63
SB2	147.14	0.00	147.14
Subtotal PSA	**4,965.68**	**4,249.91**	**9,215.59**
Total County	**5,486.95**	**4,295.76**	**9,782.71**

Ind = Industrial Land
Com - Commercial Land

NPS = No Planned Public Sewer
AR= Alpha Ridge (NPS)
BB = Bonnie Branch
D = Daniels
DP = Deep Run
DR = Dorsey Run
EC = Ellicott City
GR = Guilford Run

HB = Hammond Branch
LP = Little Patuxent
MP = Middle Patuxent
NL = North Laurel Pump Station
PS = Rt 108 Pump Station
RB = Rockburn Pump Station
SB = Sucker Branch

TABLE 1D
REDEVELOPMENT CUMULATIVE DATA

Year	Retail Space (gsf)	Office Space (gsf)
2015	39,640	333,318
2020	218,264	961,528
2025	534,622	2,736,706
2030	841,567	3,690,876
2035	1,260,846	5,346,886
2040	1,638,010	7,061,418
TOTAL	**4,532,949**	**20,130,732**
Combined TOTAL	**24,663,681**	

gsf= gross square feet

TABLE 2

LAND USE IN HOWARD COUNTY

LAND USE (September 30, 2014)		
Land Use	**Acres**	**Percentage of Total**
Developed Residential	56,052	34.9%
Commercial, Industrial, Government, Transportation, Communication, and Utilities	25,344	15.8%
Parks and Open Space	29,009	18.1%
Preservation Easements/Historic Districts	31,543	19.6%
Undeveloped Land (Including non-preserved Ag Land)	18,692	11.6%
TOTAL County Acres	**160,640**	**100.0%**

EXISTING ZONING		
Land Use (Undeveloped Land)	**Acres**	**Percentage of Total**
RESIDENTIAL	16,995	90.9%
COMMERCIAL	706	3.8%
INDUSTRIAL	770	4.1%
GOVERNMENT AND INSTITUTIONAL	222	1.2%
TOTAL	**18,692**	**100.0%**

TABLE 2A

Estimated Enrollments/Population of Schools and Institutions in Howard County - 2014 (1)

Institution	Address Number	Street Name	Street Type	City	Zip	Enrollments/ Population	Map Location ID (2)	Type
Atholton	6700	Seneca	DR	Columbia	21046	367	1	Elem School
Bellows Spring	8125	Old Stockbridge	RD	Ellicott City	21043	677	2	Elem School
Bollman Bridge	8200	Savage Guilford	RD	Jessup	20794	665	3	Elem School
Bryant Woods	5450	Blue Heron	LN	Columbia	21044	332	4	Elem School
Bushy Park	14601	Carrs Mill	RD	Woodbine	21797	607	5	Elem School
Centennial Lane	3825	Centennial	LN	Ellicott City	21042	684	6	Elem School
Clarksville	12041	Clarksville	PK	Clarksville	21029	485	7	Elem School
Clemens Crossing	10320	Quarterstaff	RD	Columbia	21044	489	8	Elem School
Cradlerock	6700	Cradlerock	WAY	Columbia	21045	426	9	Elem School
Dayton Oaks	4691	Ten Oaks	RD	Dayton	21036	601	10	Elem School
Deep Run	6925	Old Waterloo	RD	Elkridge	21075	653	11	Elem School
Ducketts Lane	6501	Ducketts	LN	Elkridge	21075	699	12	Elem School
Elkridge	7075	Montgomery	RD	Elkridge	21075	790	13	Elem School
Forest Ridge	9550	Gorman	RD	Laurel	20723	722	14	Elem School
Fulton	11600	Scaggsville	RD	Fulton	20759	705	15	Elem School
Gorman Crossing	9999	Winter Sun	RD	Laurel	20723	625	16	Elem School
Guilford	7335	Oakland Mills	RD	Columbia	21046	480	17	Elem School
Hammond	8110	Aladdin	DR	Laurel	20723	636	18	Elem School
Hollifield Station	8701	Stonehouse	DR	Ellicott City	21043	696	19	Elem School
Ilchester	4981	Ilchester	RD	Ellicott City	21043	721	20	Elem School
Jeffers Hill	6000	Tamar	DR	Columbia	21045	464	21	Elem School
Laurel Woods	9250	North Laurel	RD	Laurel	20723	562	22	Elem School
Lisbon	15901	Frederick	RD	Woodbine	21797	422	23	Elem School
Longfellow	5470	Hesperus	DR	Columbia	21044	420	24	Elem School
Manor Woods	11575	Frederick	RD	Ellicott City	21042	672	25	Elem School
Northfield	9125	Northfield	RD	Ellicott City	21042	691	26	Elem School
Phelps Luck	5370	Oldstone	CT	Columbia	21045	541	27	Elem School
Pointers Run	6600	South Trotter	RD	Clarksville	21029	746	28	Elem School
Rockburn	6145	Montgomery	RD	Elkridge	21075	608	29	Elem School
Running Brook	5215	West Running Brook	RD	Columbia	21044	488	30	Elem School
St. Johns Lane	2960	Saint Johns	LN	Ellicott City	21042	722	31	Elem School
Stevens Forest	6045	Stevens Forest	RD	Columbia	21045	396	32	Elem School
Swansfield	5610	Cedar	LN	Columbia	21044	546	33	Elem School
Talbott Springs	9550	Basket Ring	RD	Columbia	21045	427	34	Elem School
Thunder Hill	9357	Mellenbrook	RD	Columbia	21045	528	35	Elem School
Triadelphia Ridge	13400	Triadelphia	RD	Ellicott City	21042	509	36	Elem School
Veterans	4355	Montgomery	RD	Ellicott City	21043	811	37	Elem School
Waterloo	5940	Waterloo	RD	Columbia	21045	559	38	Elem School

TABLE 2A

Estimated Enrollments/Population of Schools and Institutions in Howard County - 2014 (1)

Institution	Address Number	Street Name	Street Type	City	Zip	Enrollments/ Population	Map Location ID (2)	Type
Waverly	10220	Wetherburn	RD	Ellicott City	21042	706	39	Elem School
West Friendship	12500	Frederick	RD	West Friendship	21794	287	40	Elem School
Worthington	4570	Roundhill	RD	Ellicott City	21043	552	41	Elem School
Bonnie Branch	4979	Ilchester	RD	Ellicott City	21043	643	42	Middle School
Burleigh Manor	4200	Centennial	LN	Ellicott City	21042	744	43	Middle School
Clarksville	6535	South Trotter	RD	Clarksville	21029	635	44	Middle School
Dunloggin	9129	Northfield	RD	Ellicott City	21042	608	45	Middle School
Elkridge Landing	7085	Montgomery	RD	Elkridge	21075	714	46	Middle School
Ellicott Mills	4445	Montgomery	RD	Ellicott City	21043	762	47	Middle School
Folly Quarter	13500	Triadelphia	RD	Ellicott City	21042	562	48	Middle School
Glenwood	2680	Rt 97		Glenwood	21738	555	49	Middle School
Hammond	8110	Aladdin	DR	Laurel	20723	552	50	Middle School
Harpers Choice	5450	Beaverkill	RD	Columbia	21044	523	51	Middle School
Lake Elkhorn	6700	Cradlerock	WAY	Columbia	21045	501	52	Middle School
Lime Kiln	11650	Scaggsville	RD	Fulton	20759	703	53	Middle School
Mayfield Woods	7950	Red Barn	WAY	Elkridge	21075	635	54	Middle School
Mount View	12101	Woodford	DR	Marriottsville	21104	750	55	Middle School
Murray Hill	9989	Winter Sun	RD	Laurel	20723	595	56	Middle School
Oakland Mills	9540	Kilimanjaro	RD	Columbia	21045	423	57	Middle School
Patapsco	8885	Old Frederick	RD	Ellicott City	21043	676	58	Middle School
Patuxent Valley	9151	Vollmerhausen	RD	Jessup	20794	653	59	Middle School
Thomas Viaduct	7000	Banbury	DR	Hanover	21076	525	60	Middle School
Wilde Lake	10481	Cross Fox	LN	Columbia	21044	523	61	Middle School
Atholton	6520	Freetown	RD	Columbia	21044	1,468	62	High School
Centennial	4300	Centennial	LN	Ellicott City	21042	1,409	63	High School
Glenelg	14025	Burntwoods	RD	Glenelg	21737	1,265	64	High School
Hammond	8800	Guilford	RD	Columbia	21046	1,244	65	High School
Howard	8700	Old Annapolis	RD	Ellicott City	21043	1,764	66	High School
Long Reach	6101	Old Dobbin	LN	Columbia	21045	1,466	67	High School
Marriotts Ridge	12100	Woodford	DR	Marriottsville	21104	1,167	68	High School
Mt. Hebron	9440	Old Frederick	RD	Ellicott City	21042	1,504	69	High School
Oakland Mills	9410	Kilimanjaro	RD	Columbia	21045	1,109	70	High School
Resevoir	11550	Scaggsville	RD	Fulton	20759	1,495	71	High School
River Hill	12101	Clarksville	PK	Clarksville	21029	1,312	72	High School
Wilde Lake	5460	Trumpeter	RD	Columbia	21044	1,263	73	High School
Applications & Research Lab	10920	State Route 108		Ellicott City	21042	558	74	Special School
Cedar Lane	11630	Scaggsville	RD	Fulton	20759	130	75	Special School

TABLE 2A

Estimated Enrollments/Population of Schools and Institutions in Howard County - 2014 (1)

Institution	Address Number	Street Name	Street Type	City	Zip	Enrollments/ Population	Map Location ID (2)	Type
Homewood	10914	State Route 108		Ellicott City	21042	145	76	Special School
Howard Community College	10901	Little Patuxent	Pkwy	Columbia	21044	9,500	77	College
JHU Engineering for Professionals	6810	Deerpath	Rd	Columbia	21044	2,974	78	College
Loyola University	8890	McGaw	Rd	Columbia	21045	345	79	College
Maryland University of Integrative Health	7750	Montpelier	Rd	Laurel	20723	500	80	College
University College	6865	Deerpath	Rd	Elkridge	21075	100	81	College
University of Phoenix	8830	Stanford	Blvd	Columbia	21045	1,000	82	College
Brighton Gardens	7110	Minstrel	Way	Columbia	21045	98	83	Group
Clifton T Perkins	8450	Dorsey Run	Rd	Jessup	20794	236	84	Group
Ellicott City Health & Rehab	3000	North Ridge	Rd	Ellicott City	21043	182	85	Group
Encore - Turf Valley	11150	Resort	Rd	Ellicott City	21042	157	86	Group
Harmony Hall	6336	Cedar	Ln	Columbia	21044	235	87	Group
Heartlands	3004	North Ridge	Rd	Ellicott City	21043	250	88	Group
Howard County Detention Center	7301	Waterloo	Rd	Jessup	20794	250	89	Group
Howard County General Hospital	5755	Cedar	Ln	Columbia	21044	180	90	Group
Lighthouse Senior Living	3100	North Ridge	Rd	Ellicott City	21043	34	91	Group
Lorien Elkridge	7615	Washington	Blvd	Elkridge	21075	64	92	Group
Lorien Nursing Home	6334	Cedar	Ln	Columbia	21044	209	93	Group
Morningside House	5330	Dorsey Hall	Dr	Ellicott City	21042	119	94	Group
Patuxent Institute	7555	Waterloo	Road	Jessup	20794	954	95	Group
Shangrila	4475	Montgomery	Rd	Ellicott City	21043	60	96	Group
Shepherd Pratt	4100	College	Ave	Ellicott City	21043	45	97	Group
Somerford Place	8220	Snowden River	Pkwy	Columbia	21045	64	98	Group
Sunrise Assisted Living at Hickory Ridge	6500	Freetown	Rd	Columbia	21044	96	99	Group
Vantage House Life Care Facility	5400	Vantage Point	Rd	Columbia	21044	260	100	Group
Atholton Adventist School	6520	Martin	Rd	Columbia	21044	178	101	Other
Bet Yeladim, Inc.	8910	State Route 108		Columbia	21045	160	102	Other
Bethel Christian Academy 5-8	9001	Vollmerhausen	Rd	Jessup	20794	95	103	Other
Bethel Christian Academy K-4	8455	Savage-Guilford	Rd	Savage	20763	215	104	Other
Bright Stars Learning Academy	5890	Cedar	Lane	Columbia	21044	66	105	Other
Brookfield Christian School	6347	Ten Oaks	Rd	Clarksville	21029	165	106	Other
Bryant Woods Montessori	10449	Green Mountain	Cir	Columbia	21044	35	107	Other
Celebration Christian Academy	6080	Foreland	Garth	Columbia	21045	57	108	Other
Chapelgate Christian Academy	2600	Marriottsville	Rd	Marriottsville	21104	374	109	Other
Children's Manor Montessori School	4465	Montgomery	Rd	Ellicott City	21043	134	110	Other
Children's Manor School	9008	Red Branch	Rd	Columbia	21045	13	111	Other
Children's World Learning Center (Kinder Care)	7195	Columbia Gateway	Dr	Columbia	21046	70	112	Other

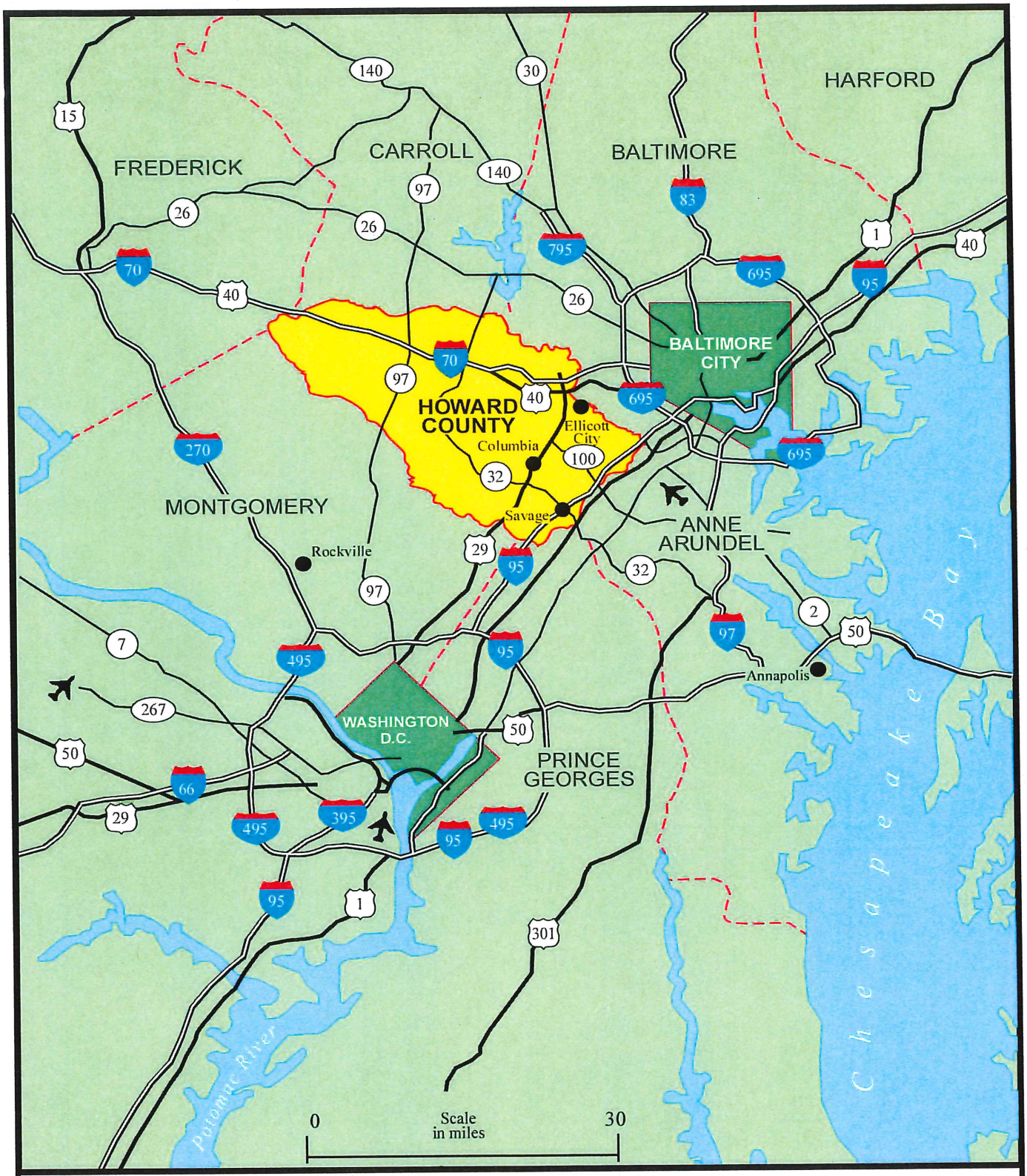
TABLE 2A

Estimated Enrollments/Population of Schools and Institutions in Howard County - 2014 (1)

Institution	Address Number	Street Name	Street Type	City	Zip	Enrollments/ Population	Map Location ID (2)	Type
Columbia Academy	10350	Old Columbia	Rd	Columbia	21046	250	113	Other
Columbia Montessori School	10508	Marble Faun	Ct	Columbia	21044	76	114	Other
Crossroads Adventist School	3291	Saint Johns	Lane	Ellicott City	21042	48	115	Other
Glenelg Country School	12793	Folly Quarter	Rd	Ellicott City	21042	800	116	Other
Goddard School	9100	Quarterstaff	Pkwy	Columbia	21045	120	117	Other
High School Road Academy	9705	Washington	Blvd	Laurel	20723	77	118	Other
Julia Brown Montessori School	9450	Madison	Ave	Laurel	20723	60	119	Other
Julia Brown Montessori School	9760	Owen Brown	Rd	Columbia	21045	100	120	Other
Kinder Ridge	8251	Tamar	Dr	Columbia	21046	152	121	Other
KinderCare Learning Center	7195	Columbia Gateway	Dr	Columbia	21046	80	122	Other
Lincoln Tech	9325	Snowden River	Pkwy	Columbia	21046	839	123	Other
Linwood Children's Center	3421	Martha Bush	Dr	Columbia	21043	89	124	Other
Lornwood	10453	Green Mountain	Cir	Columbia	21044	68	125	Other
Love of Learning Montessori School	9151	Rumsey	Rd	Columbia	21045	125	126	Other
Maryland School for the Deaf	8169	Old Montgomery	Rd	Columbia	21044	103	127	Other
Mt. Airy Christian Academy	16700	Old Frederick	Rd	Mt Airy	21771	285	128	Other
Nature's Way Children's Center	5890	Cedar	Ln	Columbia	21044	71	129	Other
Norbel School	6135	Old Washington	Road	Elkridge	21075	86	130	Other
Our Lady of Perpetual Help	4801	Ilchester	Rd	Ellicott City	21043	235	131	Other
Peter Pan Learning Center	1260	Driver	Rd	Marriottsville	21104	62	132	Other
Phillips School	8920	Whiskey Bottom	Rd	Laurel	20723	95	133	Other
Resurrection/St. Paul's School	3155	Paulskirk	Dr	Ellicott City	21042	534	134	Other
St. Augustine School	5990	Old Washington	Road	Elkridge	21075	238	135	Other
St. John's Parrish Day School	9130	Frederick	Rd	Ellicott City	21042	360	136	Other
St. Louis School	12500	State Route 108		Clarksville	21029	505	137	Other
The Young School	8310	Guilford	Rd	Columbia	21046	170	138	Other
Trinity School	4985	Ilchester	Rd	Ellicott City	21043	392	139	Other

(1) Used for 2015 Water and Sewer Master Plan Update.

(2) Corresponds to Figure 2-12



Howard County Regional Location

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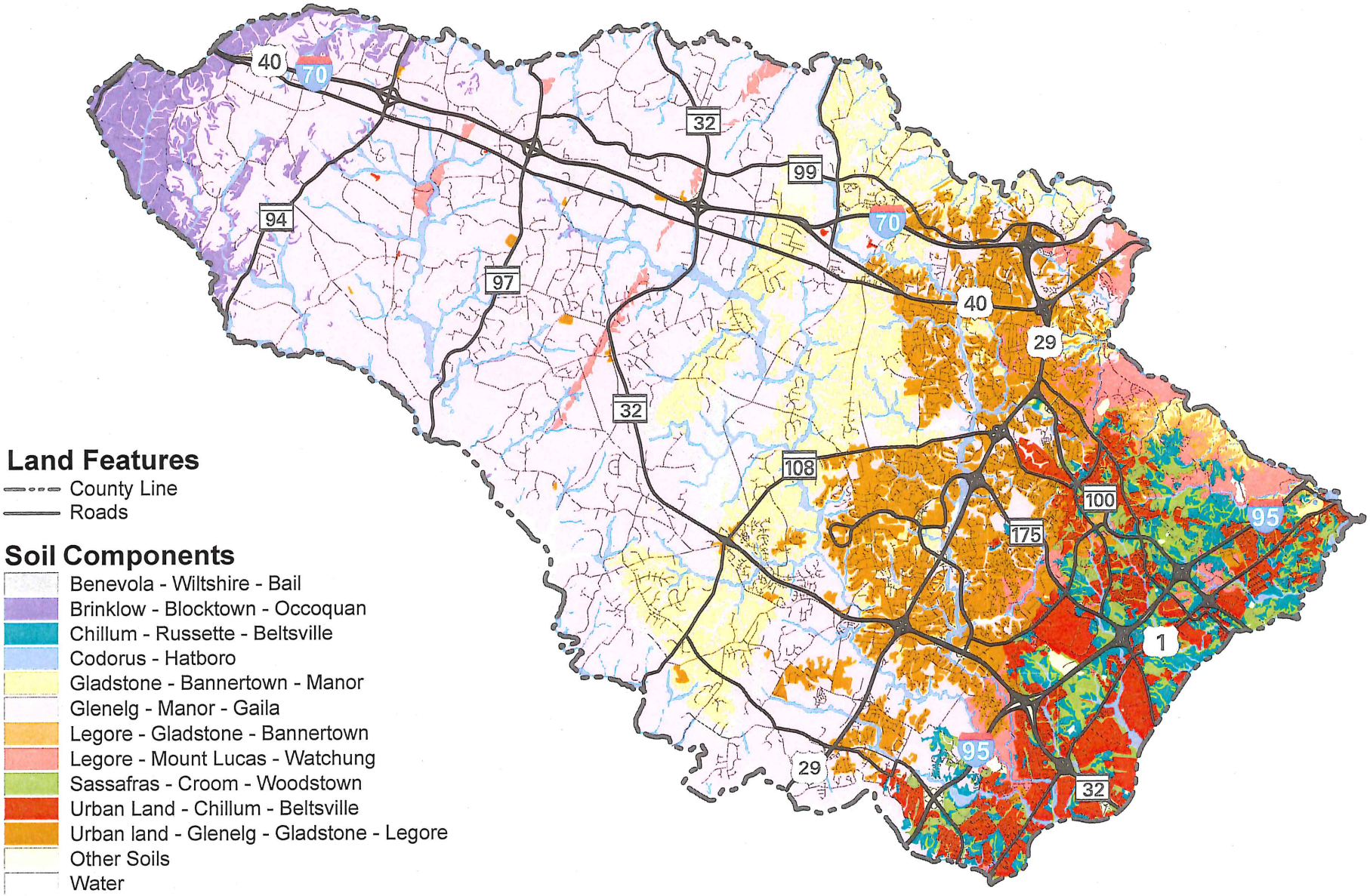
FIGURE 2-1

November 2015



Howard County
MARYLAND

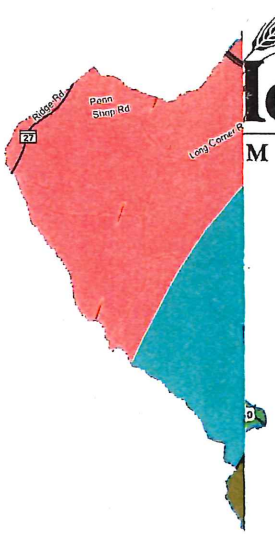
Soil Map

Soils data provided by
the Natural Resources
Conservation Service 2003

Scale: 1 Inch = 3 Miles
Data date: March, 2002

Note: Figure modified from Howard County GIS, Data and Download Viewer

Figure 2-2



Geologic Formations

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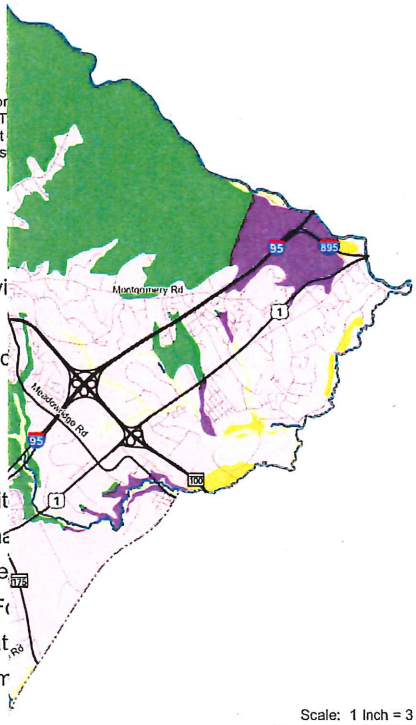
assumes all risks and liabilities whatsoever resulting from or arising out
this map. There are no oral agreements or warranties relating to the us

Formations

Sedimentary Rocks	Alluvium & Colluvi
	Terrace Gravel
	Patuxent Formatic
Intrusive Igneous Rocks	Diabase
	Pegmatite
	Guilford Granite
	Ellicott City Granit
Extrusive Igneous Rocks	James Run Forma
	Baltimore Comple
	Pleasant Grove Fc
Metasedimentary Rocks	Sykesville Format
	Morgan Run Form
	Gillis Group
	Prettyboy Schist
	Oella Formation
	Loch Raven Form
	Cockeysville Mark
	Setters Formation
	Baltimore Gneiss



Scale: 1 Inch = 3 Miles
Planimetrics date: March, 2002
Geologic Formation Information derived from Maryland Geolocial Survey "Geologic Map of Howard County" 1993
Map Date: 2004

GIS

FIGURE 2-3

COUNTYWIDE GEOLOGIC MAP

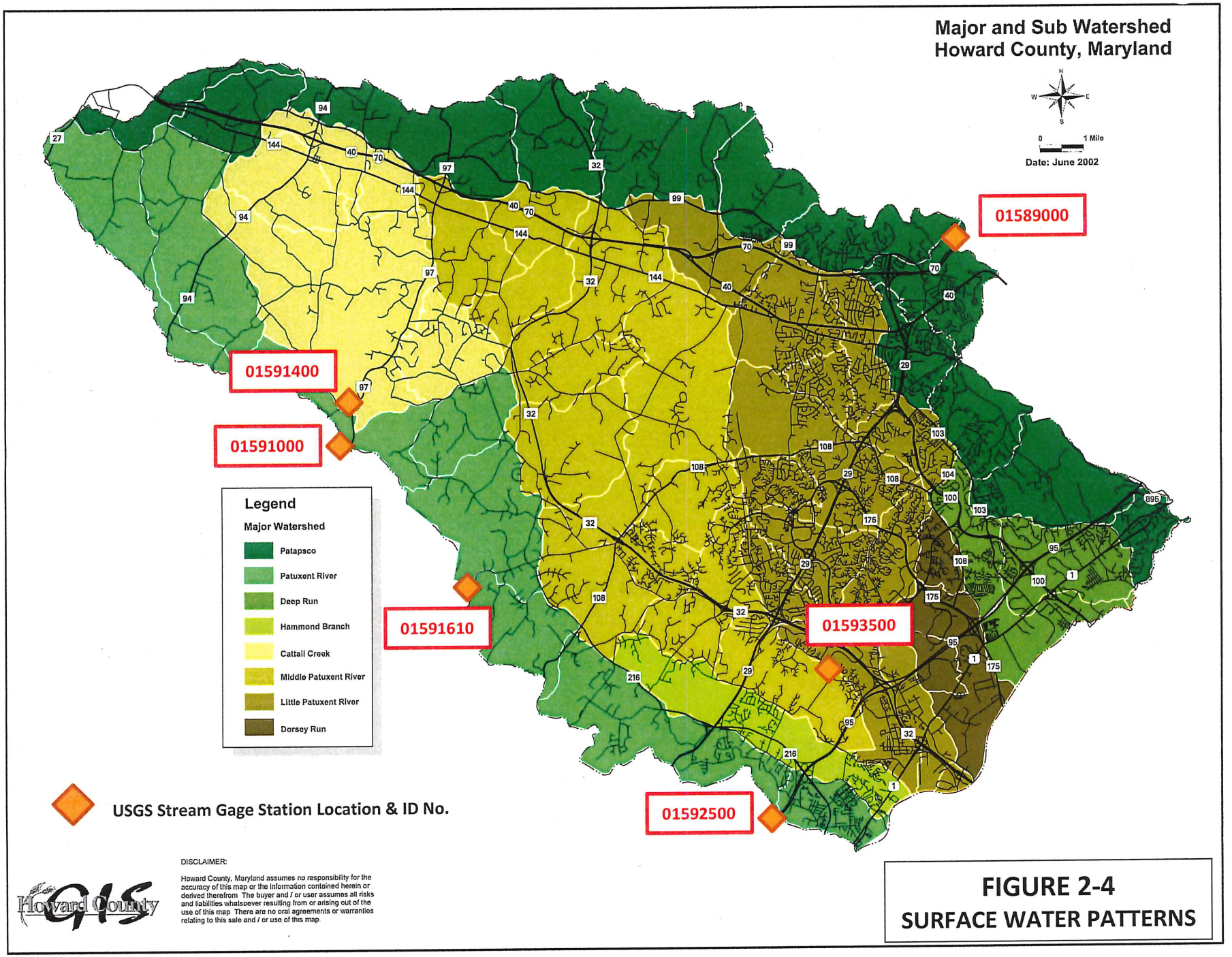


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FIGURE 2-4
SURFACE WATER PATTERNS

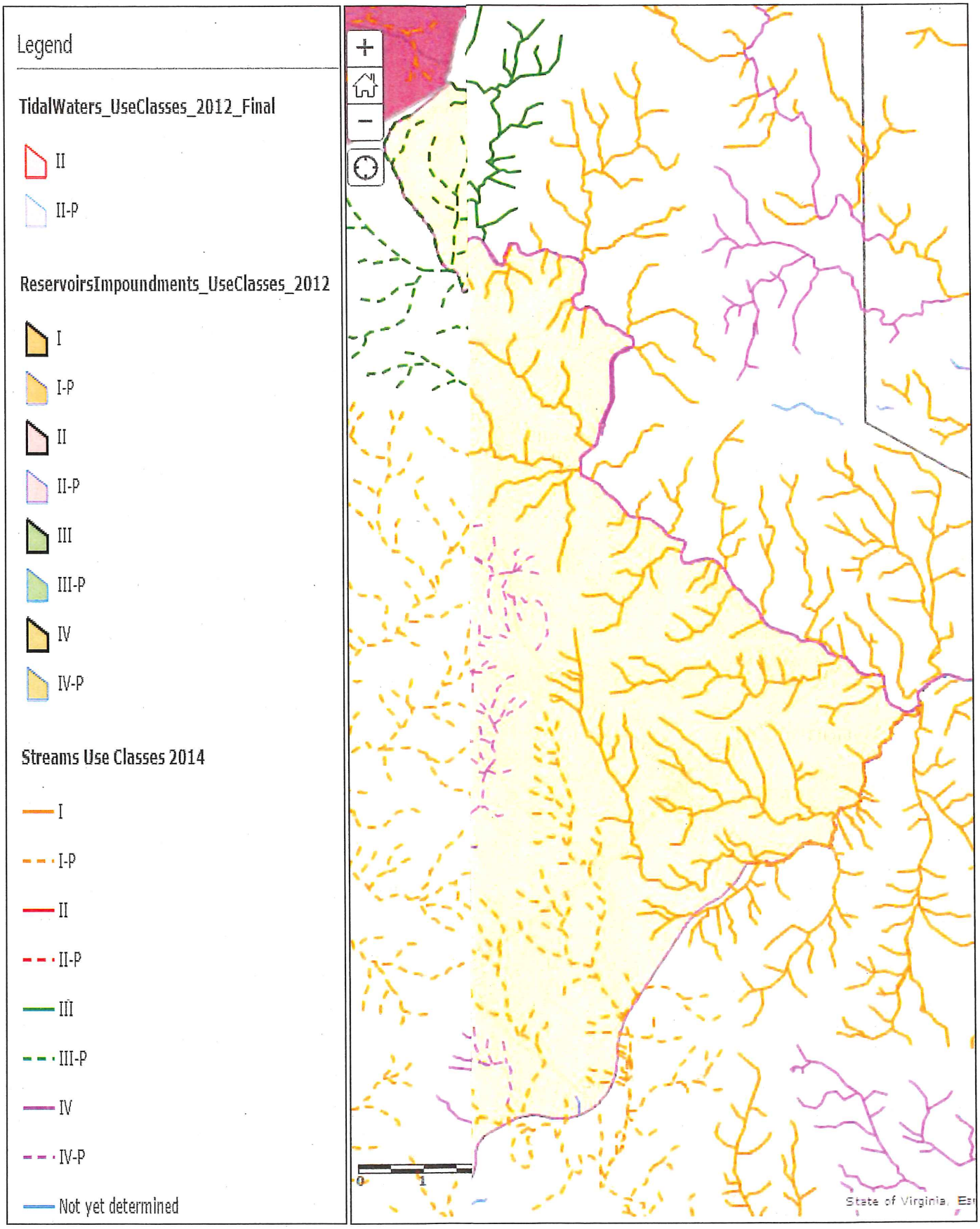
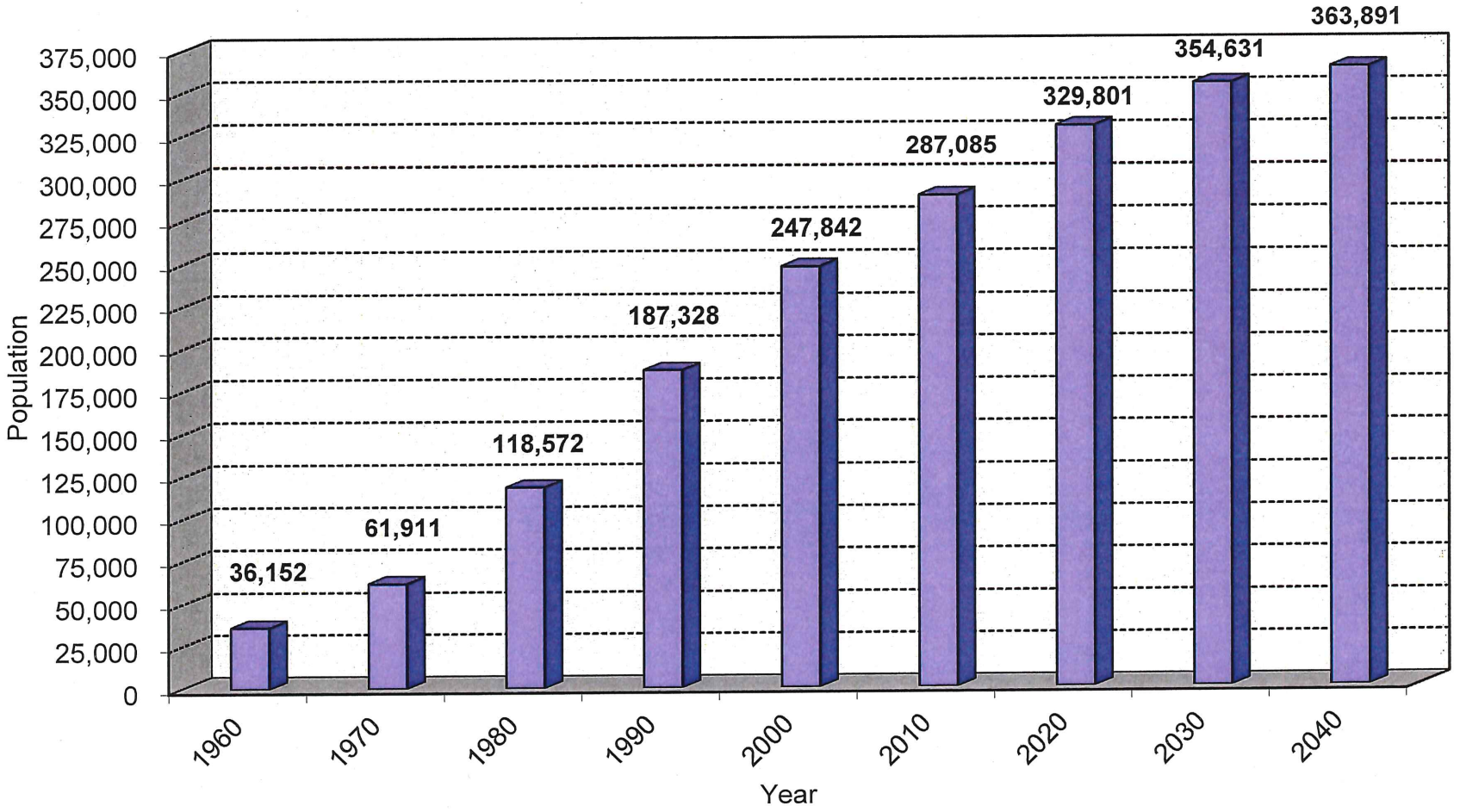


FIGURE 2–5
November 2015 Revision

Figure 2-6: Howard County Population Growth
Total Population: 1960 to 2010, Household Population: 2020 to 2040



Source: US Census Bureau, Total Population: 1960 to 2010
DPZ Round 8A Household Population Projections: 2020 to 2040

Population Per Acre

Projection Year 2015

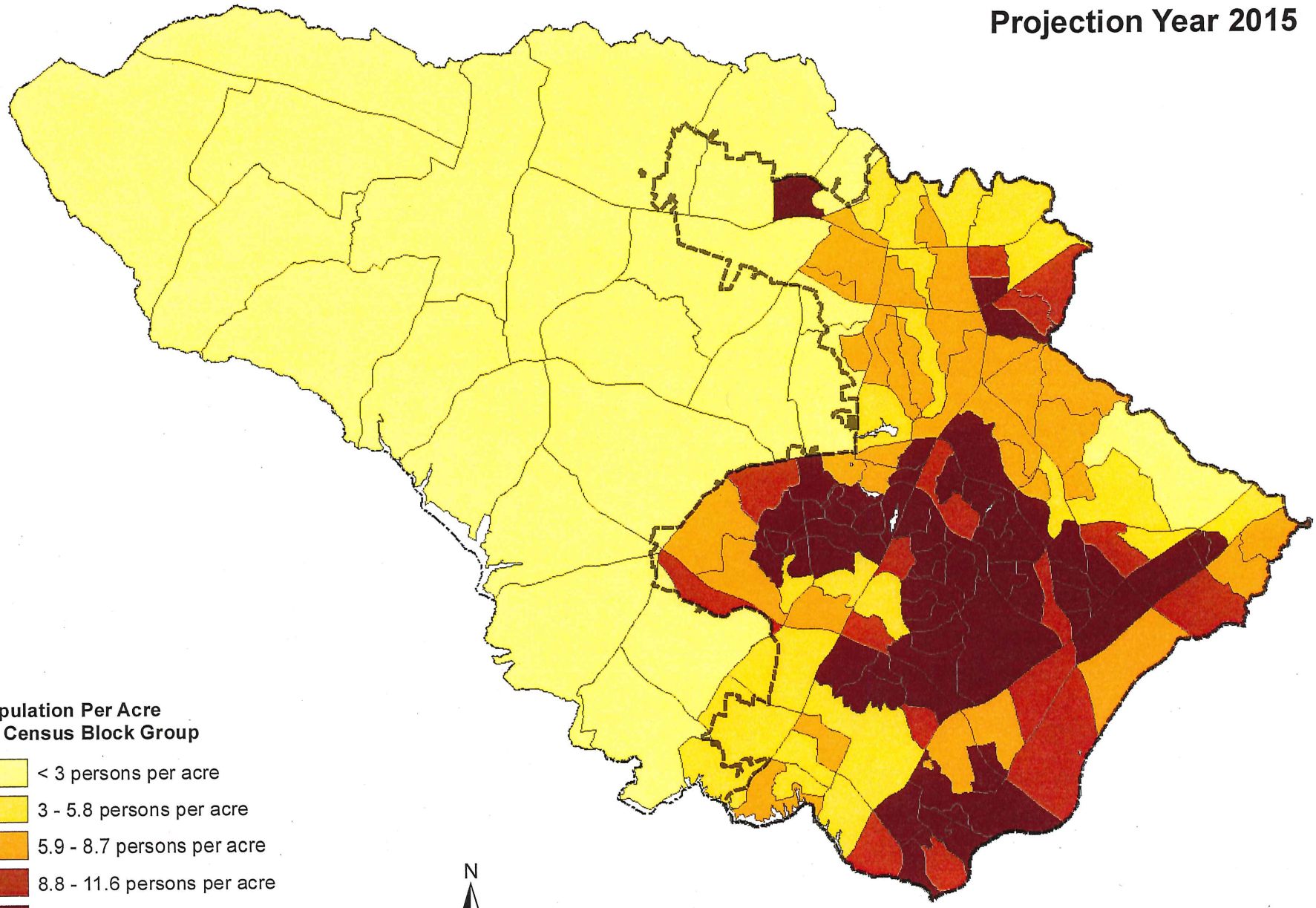


Figure 2-7

Population Per Acre
Projection Year 2025

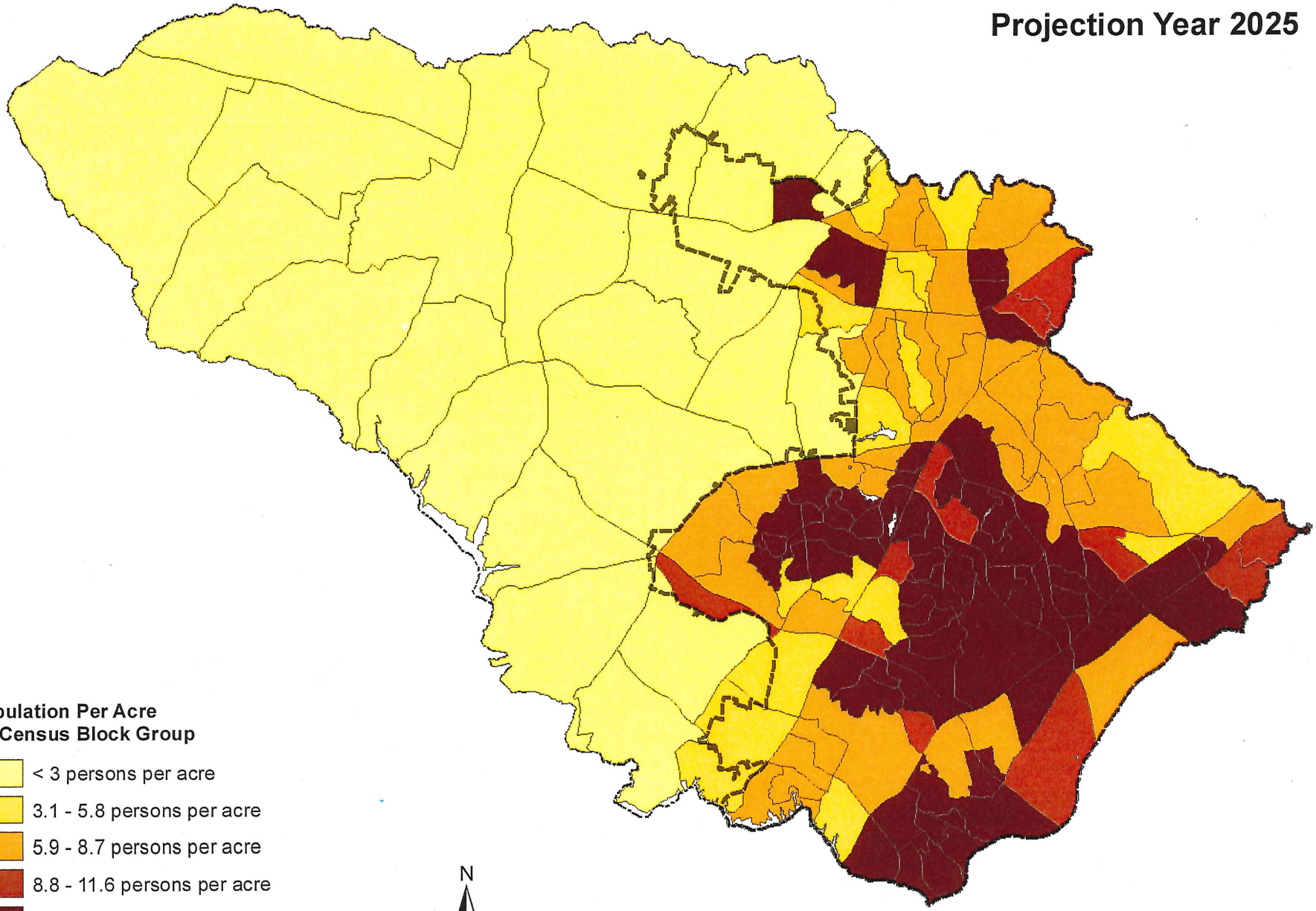


Figure 2-8

Population Per Acre

Projection Year 2035

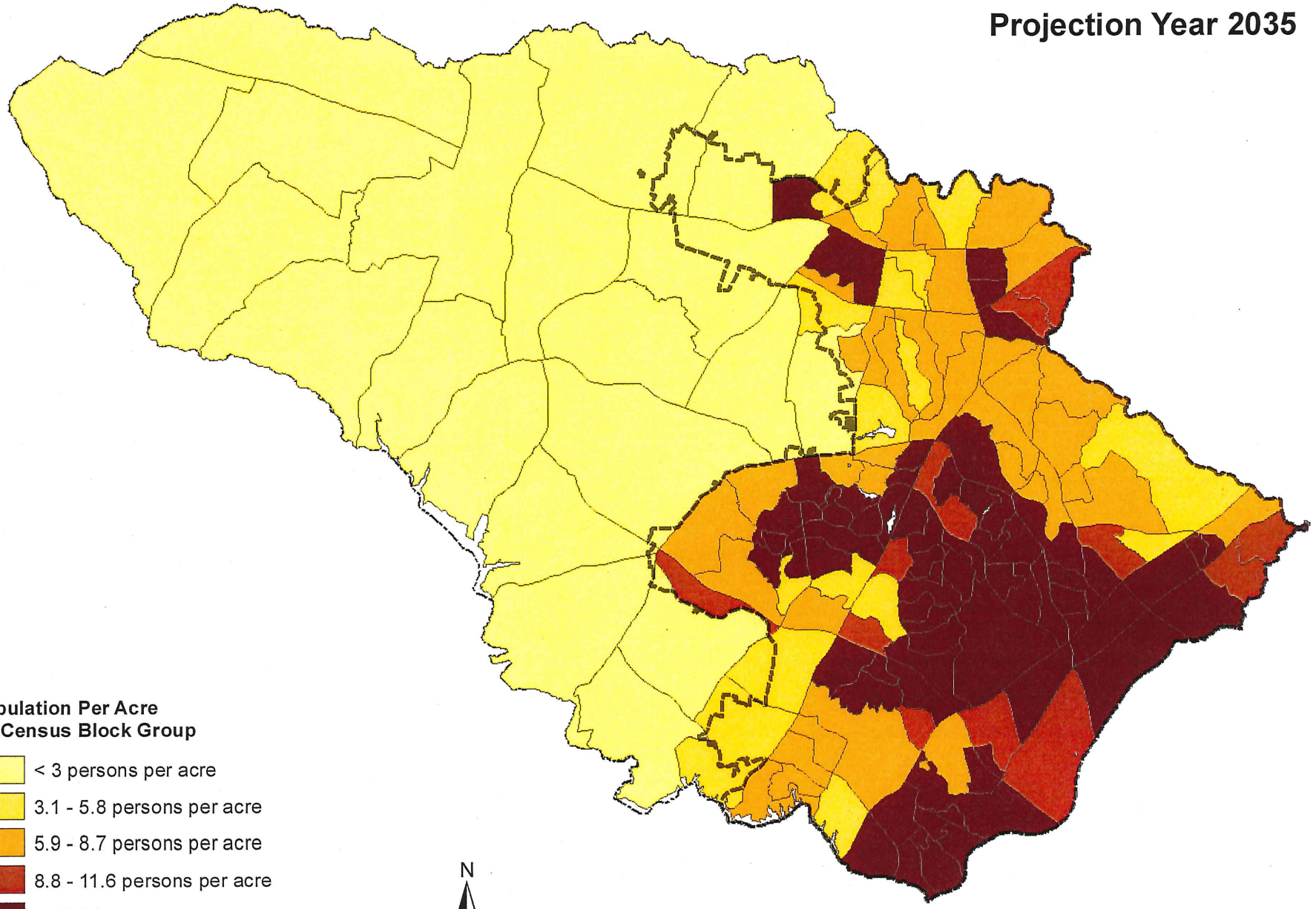
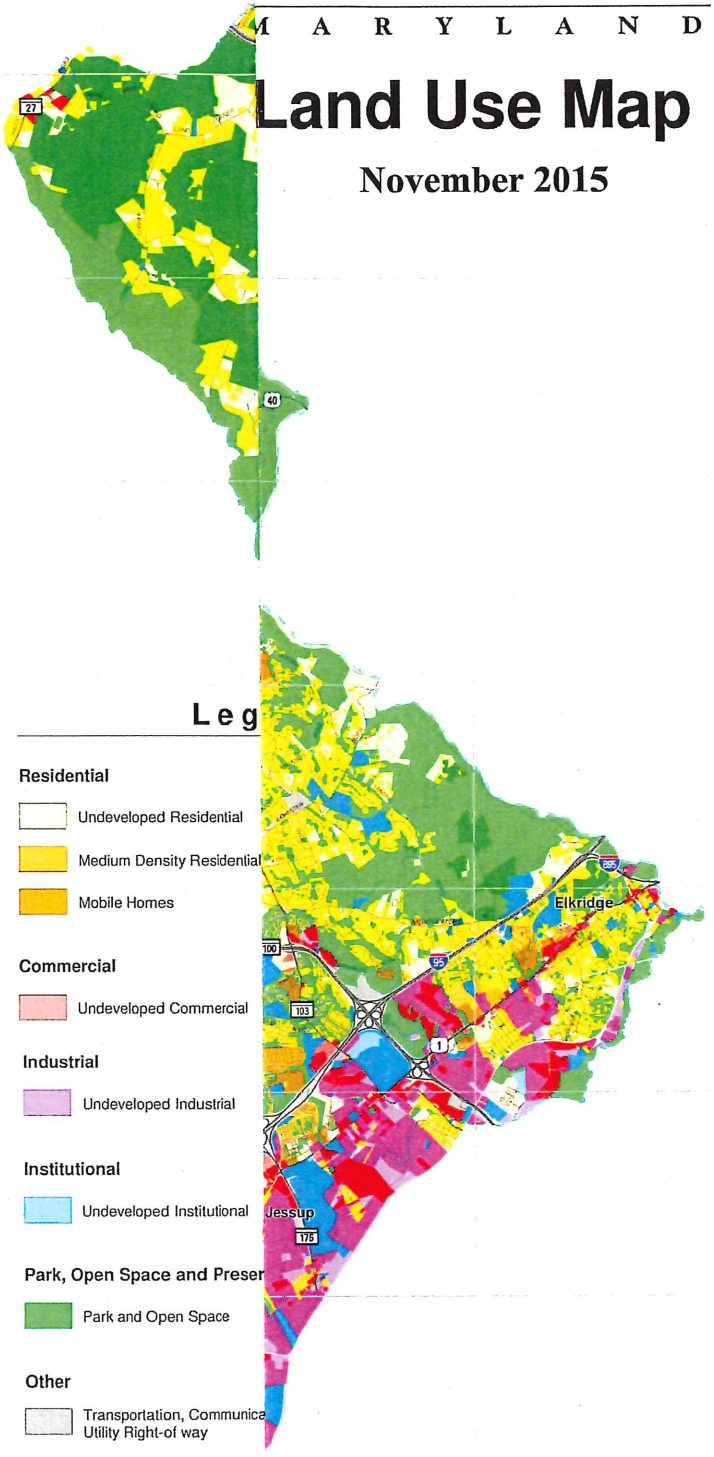


Figure 2-9

Howard County
MARYLAND

Land Use Map

November 2015



Leg

Residential

- Undeveloped Residential
- Medium Density Residential
- Mobile Homes

Commercial

- Undeveloped Commercial

Industrial

- Undeveloped Industrial

Institutional

- Undeveloped Institutional

Park, Open Space and Preser

- Park and Open Space

Other

- Transportation, Communica
  Utility Right-of way

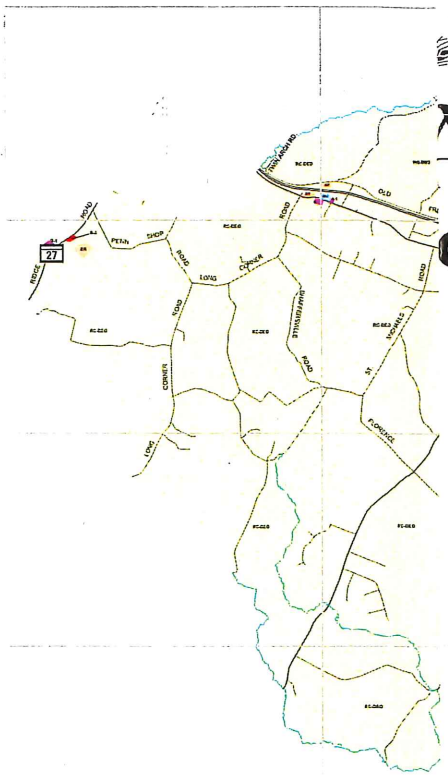
Howard County

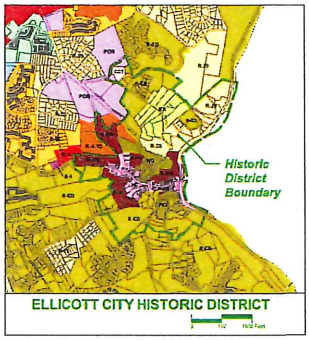
This map provides a general overview of Howard Cou
For parcel specific information please contact the Divi
Howard County Department of Planning and Zoning
Land Use data is continuing as of date of map produc

G:\MF_Dpt_Projects\Land Use\Land Use Jan 2014.

FIGURE 2-10

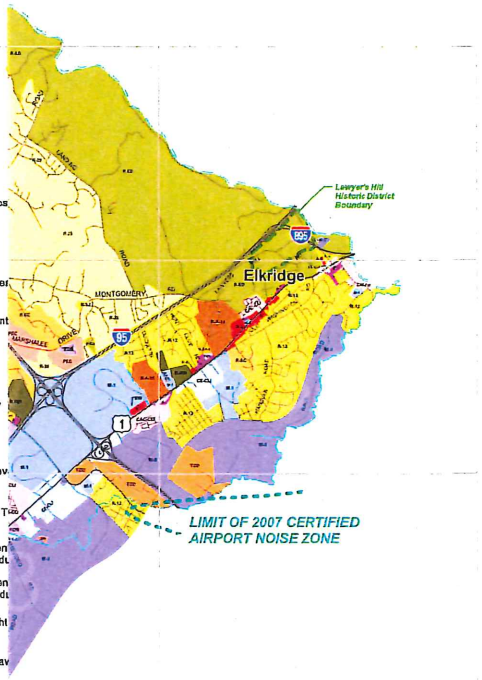
ward County
R Y L A N D
oning Map





Legend

- RC-DEO — Rural Conservation Density Exchange Option
- RR-DEO — Rural Residential Density Exchange Option
- R-ED — Residential: Environmental Development
- R-20 — Residential: Single (20,000 Square Feet)
- R-12 — Residential: Single (12,000 Square Feet)
- R-SI — Residential: Senior-Institutional
- R-SC — Residential: Single Cluster
- R-SC-I — Residential: Single Cluster-Institutional Overlay
- R-SA-8 — Residential: Single Attached
- R-SA-8-I — Residential: Single Attached-Institutional Overlay
- R-VH — Residential: Village Housing
- R-A-15 — Residential: Apartments
- R-APT — Residential: Apartments
- R-MH — Residential: Mobile Home
- R-H-ED — Residential: Historic - Environmental
- HO — Historic: Office
- HC — Historic: Commercial
- PSC — Planned Senior Community
- B-1 — Business: Local
- B-2 — Business: General
- BR — Business: Rural
- BRX — Business: Rural Cros
- SC — Shopping Center
- POR — Planned Office Resea
- PEC — Planned Employment
- NT — New Town
- PGCC — Planned Golf Course Community
- MXD — Mixed Use
- TOD — Transit Oriented Dev
- CCT — Community Center To
- CAC-CLI — Corridor Activity Cen Continuing Light Indu
- CE-CLI — Corridor Employmen Continuing Light Indu
- M-1 — Manufacturing: Light
- M-2 — Manufacturing: Heav
- SW — Solid Waste Overlay
- TNC — Traditional Neighborl
- CMF — Community Enhance
- CR — Commercial Redevlo



0 .5 1 2 MILES

This map provides a general overvie
Howard County Zoning Plan adopted
Howard County Council.
For parcel specific zoning Informatio
the 600' scale Official Sectional Zoni

Zoning effective October 6, 2013.
Prepared by the Howard County Dep
Planning and Zoning.

Howard County

G:\MIF_Dpz_Projects\Zoning\GeneralZoning.wor May 2014

Revisions

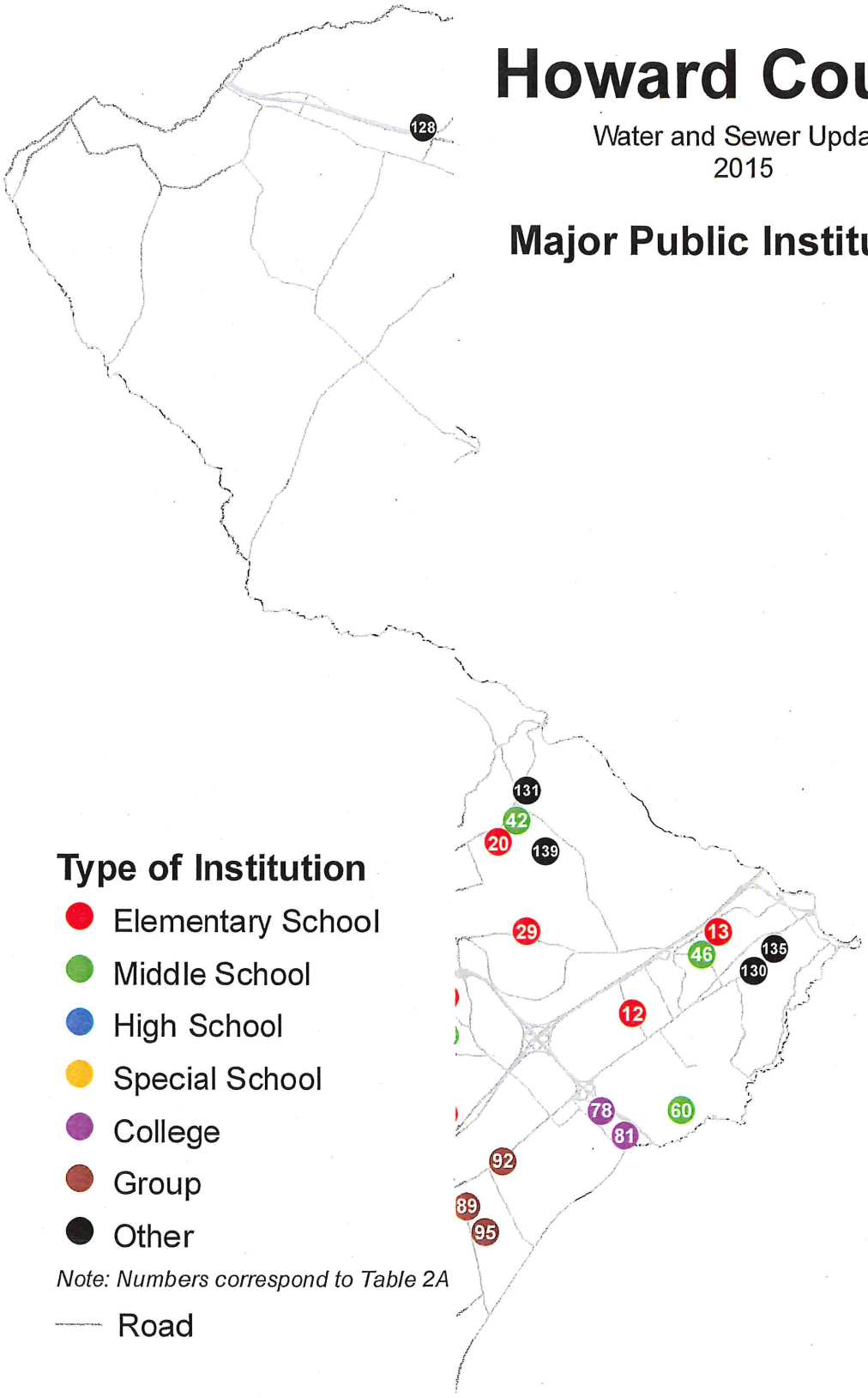
Zb #	Date	Description	Map #	Zb #	Date	Description	Map #

Figure 2-11

Howard County

Water and Sewer Update
2015

Major Public Institutions



Type of Institution

- Elementary School
- Middle School
- High School
- Special School
- College
- Group
- Other

Note: Numbers correspond to Table 2A

Road

N
W
E
S

0 1 2 3 4 5 Miles

Figure 2-12

CHAPTER 3

THE WATER PLAN

The purpose of this Chapter is to review the County's existing water system and determine the County's future water system requirements. Howard County depends upon Baltimore City and the Washington Suburban Sanitary Commission (WSSC) for all of its public potable water supply. The basis for these supplies is a series of negotiated legal agreements.

3.1 Water Requirements

The present annual average daily water requirement for the County is estimated at 25.5 million gallons per day (MGD). Approximately 22.6 MGD is supplied through the public system, which serves 86% of the County's population. The remainder of the County population is served by private wells or surface water supplies that produce an estimated 2.9 MGD. The projected population served by the water system is listed in Table 1, Chapter 2.

Existing water meter records (both water purchased by the county and water usage) are used to determine residential consumption, commercial/industrial consumption, and public consumption. **Table 3A** "Average Daily Water Demand Projections" shows the portion of total water use for each usage category through the year 2040. Existing unaccountable water use is determined as the difference between water usage metered in Howard County and water purchased by Howard County from Baltimore City and WSSC, less other non-metered authorized uses. Unaccountable water use includes leaks, water main breaks, storage tank overflows, water meter under-registration, and theft. Howard County's unaccountable water for the calendar years 2011, 2012 and 2013 was 5.8%, 10.7%, and 11.6%, respectively.

Table 3 "Projected Water Supply Demands and Planned Capacity" compares the population and total water use projections from Table 3A to contracted supplies at each of the County's connections with Baltimore County and WSSC. Included is an estimate of the future contracted supply at each connection for each design year, through the year 2040. Capacity increases at each connection will depend on the multi-jurisdictional legal agreements and financial commitments as described herein.

Table 3B "Projected Average Daily Demand and Contracted Average Daily Supply" makes a direct comparison between contracted supply limitations and the projected demand at each connection. Projected demand in this case is the demand determined by hydraulic analysis of the water system. This computerized analysis allows water tanks to fill or empty and pumped flows to vary with discharge head over an extended period. The analysis is discussed in greater detail later in this chapter.

The Howard County Plumbing Code complies with the Annotated Code of Maryland, Article 56, Section 445 - Water Conserving Fixtures. The Inspections and Enforcement Division of the Department of Inspections, Licenses and Permits conducts plumbing inspections within the County. A separate inspection for fixtures is conducted and approval/disapproval is noted on the inspection record. The inspector's approval signature on the inspection record officially certifies that all fixtures in the residence and their installation comply with the current adopted edition of the National Standard Plumbing Code Illustrated and local amendments incorporated in the Howard County Code.

Howard County inspectors do not approve an inspection if water conservation devices are not installed. If non-conserving water devices are installed, a notice of violation is issued. If the violation is not corrected at the time of re-inspection, a civil citation is issued. Neither a temporary nor final certificate of occupancy is issued to the owner until water conservation fixtures have been installed.

3.2 Existing Water Supply Facilities

Howard County's water system is the only public water system within the County. The other facilities in the County, as listed in **Table 6**, are relatively small privately owned systems. Withdrawals from private well systems and the few surface water supplies are expected to decrease from their present rates in the eastern portion of the County, as the public system expands. This is the result of users in the Metropolitan District abandoning their private wells and connecting to the public system. No other significant well supplies are anticipated.

The City of Baltimore and WSSC supply all of the potable water to the Howard County public system. The County's system is currently supplied through four (4) connections to the Baltimore County water system (which in turn is supplied from the Baltimore City system) and through one (1) connection from WSSC's system. Howard County both owns and operates the distribution system within its boundaries. The development, operation and maintenance of the water supply facilities, treatment plants, and distribution system located outside of Howard County are the responsibility of Baltimore

County, Baltimore City or WSSC as appropriate. Howard County participates in the planning, development, and capital costs of improvements to the public potable water system with these other jurisdictions.

3.3 Howard County's Existing Water System

Howard County's existing water system is divided into nine water pressure zones. Areas are placed in the water pressure zones based on ground elevations. The water supplied to each zone is maintained at a pressure sufficient to provide adequate service to the homes and businesses in each zone. Each zone is supplied by one or more water pumping stations or pressure reducing valves, which are needed to raise or lower the water pressures adequately to maintain pressure and fire flow capabilities in that zone. A schematic diagram of the County's existing water system is included as **Figure 3-1** and locations of the water pressure zones are shown on **Figure 3-2**.

A. 300 Pressure Zone

This pressure zone consists of lower Elkridge. A 2-inch and a 6-inch Pressure Regulating Valve (PRV) located in the same vault provide domestic service and fire protection for the zone from the 400 Zone, with a pressure relief valve for over-pressure protection. There is no water storage in this zone.

B. 350 Pressure Zone

This zone consists of historic Ellicott City. There are no water storage tanks in this zone, and three PRVs. The Main Street PRV, College Ave PRV, and Sarah's Lane PRV serve this zone from the 550 Zone. A pressure relief valve located near the Main Street PRV provides over- pressure protection for the zone.

C. 400 Pressure Zone

The 400 pressure zone extends from North Laurel in the south, to Elkridge in the north, east of Interstate 95. Water storage in this pressure zone consists of one existing tank, the Greater Baltimore Food Market (GBFM) Elevated Water Tank (EWT), and one future tank, the new Guilford EWT, currently in design under capital project W-8262. The storage capacity of each tank is 0.75 and 2.5 million gallons (MG) respectively. The 400 Zone has two main supplies, including the WSSC supply through the All Saints Water Pumping Station (WPS) (gravity service and pumped), and the River Road/Gun Road supply from Baltimore City (through the River Road PRV). In addition, pressure regulating valves at Meadowridge Road, Hunt Club Road, Huntington East, Gorman

Road, and Whiskey Bottom Road supply water from the 550 Zone. Two standby pumping stations, Rt. 32 WPS and Whiskey Bottom WPS, are available to provide supply from the 400 Zone to the 550 Zone.

D. 550 Pressure Zone

This is the Howard County water system's primary pressure zone with water storage consisting of two elevated water tanks; the Snowden River EWT, and the Scaggsville EWT with capacities of 2.0 MG and 3.0 MG respectively. This zone encompasses the center portion of the County's metropolitan district and extends from Ellicott City in the north to Scaggsville in the south along the US Rt. 29 corridor, encompassing most of Columbia. Water from Baltimore City's Western Third Zone enters the 550 Zone from the 20 MG Catonsville reservoir by gravity through parallel 48 and 24-inch connections along US Route 40 at a maximum gradient elevation of 567 feet. The Rt. 29 pumping station delivers water to both tanks, and can be controlled from the level of either tank.

A second water supply for the 550 Zone is from the Baltimore City Second Zone via the Southwest Transmission Main (Elkridge connection) that has a maximum gradient elevation of 353 feet. The supply is pumped into the 550 Zone by the Elkridge pumping station, with a maximum supply rate of 18 MGD.

Water from the 550 Zone is redistributed to the other pressure zones by water pumping stations (WPS, for higher elevations) or pressure regulating valves (PRV, for lower elevations).

E. 560 Pressure Zone

This pressure zone was established to serve the Hollifield Estates subdivision on Old Frederick Road. Three (3) inch and six (6) inch PRVs, located in the same vault, provide domestic service and fire protection for the zone from the 630 West Zone. There is no water storage in this zone.

F. 630 East Pressure Zone

The 630 East pressure zone consists of the Oakland Ridge area bounded by the southern part of Ellicott City to the north, College Avenue to the east, Rt. 29 to the west, and Rt. 175 to the south. This zone utilizes two existing elevated water tanks; Oakland Ridge and Jonestown, 1.5 and 0.2 MG respectively. Two pumping stations serve this zone and draw suction from the 550 Zone, Montgomery Road WPS and Edgar Road WPS.

G. 630 West Pressure Zone

The 630 West pressure zone encompasses the northern and western sections of Ellicott City, and extends south covering the western part of Columbia and Clarksville. Storage in this zone consists of three existing elevated water tanks; Bethany EWT, Harpers Choice EWT and Marriottsville Road EWT, 0.2 MG, 1.0 MG and 1.25 MG respectively. Three pumping stations serve this zone and draw suction from the 550 Zone; Chestnut Hill WPS, Pine Orchard WPS, and Columbia WPS.

H. 630 South Pressure Zone

The Fulton community is located west of US Route 29 between Johns Hopkins Road and MD Route 216. The western boundary of this area is just east of Pindell School Road. Approximately one-third of this area is served by the extension of existing mains in the 550 Zone. However, the remaining portions are too high in elevation to be served from this zone. A new pressure zone, the 630 South Zone, was created to serve this area. The Route 216 pumping station, with a capacity of 0.3 MGD, and the Maple Lawn pumping station, also with a capacity of 0.3 MGD, provide water to the 630 South Zone from the 550 Zone. The 0.5 MG Fulton EWT was constructed along Rt. 216 to serve the 630 South Zone.

I. 730 Pressure Zone

The 730-pressure zone is in the area of Ellicott City west of Marriottsville Road. This zone contains one elevated water tank, the Alpha Ridge EWT with a 0.3 MG storage capacity. Two pumping stations drawing from the 630 West Zone, the Frederick Road WPS and the Marriottsville Road WPS constructed in conjunction with the Marriottsville Road EWT, serve this zone. This zone is mostly in a "water only" area. The expansion of public sewer into a portion of this zone was recently approved under PlanHoward 2030. An upgrade to the Frederick Road WPS was completed under capital project W-8264.

J. Water Service Priority Categories

As specified in Chapter 1, parcels of property in the Planned Service Area are assigned water 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 WATER FACILITIES PLAN MAP and the accompanying Table of Water Facilities Map Revisions provided in EXHIBIT 1 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 as shown on the WATER 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 (DP&Z), 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 the Maryland Department of Environment 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 and 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 Water 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 Water to provide consistency with the General Plan. Refer to the Planned Service Area section in Chapter.1

3.4 City of Baltimore Supply

The primary source of water to Howard County from the City of Baltimore is the Ashburton Filtration Plant. The Ashburton Plant was placed in service in 1956 and is located on Druid Park Drive in Baltimore City. This plant has a raw water treatment capacity (peak) of 165 MGD, with four flocculators, four sedimentation basins, and twenty rapid sand filters.

The raw water supply to the Ashburton Filtration Plant is Liberty Reservoir located on the north branch of the Patapsco River. The reservoir has a storage capacity of 43 billion gallons and a safe yield of 93.0 MGD. Water from Liberty Reservoir flows by gravity through a concrete lined tunnel, 13 miles in length and 10 feet in diameter, to the filtration plant where it is stored in the 220 million gallon capacity Lake Ashburton Reservoir.

Water supplied to Howard County is pumped by the Ashburton and Leakin Park Pumping Stations. The Ashburton Pumping Station houses four 28 MGD pumps and has an apparent safe capacity of 84 MGD. However, system hydraulic constraints limit the maximum safe pumping station output (with three pumps operating and one pump held in reserve) to approximately 81 MGD. This flow rate was realized during the maximum day demand which occurred in June, 1986.
The Leakin Park Pumping Station, which went into operation in 1991 and was expanded in 2007, houses five 20 MGD pumps. The current safe capacity of the station is 80 MGD, using four pumping units with one standby unit.

The maximum combined output of the Leakin Park and Ashburton Pumping Stations was 102.6 MGD on July 15, 1995 prior to the expansion of the Leakin Park Pumping Station and completion of the parallel Catonsville Water Transmission Main in 2008. The flows through the Ashburton and Leakin Park Pumping Stations on that day were approximately 59 MGD and 44 MGD, respectively.

Baltimore City supplies water through Baltimore County to Howard County through four (4) connections: the Gun Road connection, two Route 40 connections, and the Elkridge connection. Howard County is billed on the basis of monthly meter readings and, in each case, the meter is located in Baltimore County near the boundary with Howard County.

The Gun Road connection was established by the August 14, 1934 Agreement between Baltimore City and Howard County (the 1934 Agreement). This agreement does not contain specific withdraw limitations although it has been assumed that an average daily flow of 1 MGD and a maximum daily flow of 1.7 MGD is allowable. The sources of supply are transmission mains from the Ashburton Pump Station. The connection originates in the Western Third Zone at Gun Road, crosses the Patapsco River, follows River Road to Lawyers Hill Road and, through the River Road pressure reducing valve, supplies the Howard County 400 pressure zone via Levering Avenue.

The Route 40 connection was originally established by the November 6, 1957 Agreement between Baltimore County, Baltimore City, and Howard County. By this agreement, Howard County was entitled to an average flow of 5.0 million gallons per day and a

maximum of 8.5 million gallons per day from the Western Third Zone. A new Third Zone Agreement executed on July 9, 1986 lifted this flow restriction. Under the new agreement, Howard County may exceed its previously specified maximum daily withdraw rate as long as unused capacity is available in the Western Third Zone. The agreement provides for an ultimate maximum day capacity of 50.5 MGD for Howard County from the Western Third Zone.

Specific improvements to the water system in the Western Third Zone have been built in accordance with the 1986 Agreement. Expansion of the Leakin Park Pump Station was completed in 2007 and construction of the parallel 48 & 42-inch diameter Catonsville Water Transmission Main was completed in 2008 to supply a maximum day demand of 50.5 MGD (48.8 MGD from the U.S. Route 40 connection and 1.7 MGD from the Gun Road connection) to Howard County. This capacity along with the capacity available from the County's other connections will satisfy Howard County's needs at build-out of the planned service area. Baltimore City does not, in general, cost-share in the new Western Third Zone improvements since these facilities will provide additional capacity for Howard and Baltimore Counties only. The City will, however, share in the cost of the following facilities:

1. Any local facilities within the City associated with construction of the Western Third Zone improvements.

2. Maintenance and rehabilitation of existing Western Third Zone facilities shared by the City.

Construction of the parallel Catonsville Water Transmission Main, Sections 1 through 4, was funded entirely by Howard County since the sole purpose was to provide increased capacity between the Leakin Park Pumping Station and the Howard County border.

The sources of the Western Third Zone supply to Howard County are transmission mains from the Ashburton and Leakin Park Pump Stations to the Howard County line at the Patapsco River. The Route 40 connection draws from the Central System's Western Third Zone at U.S. Route 40 and the Patapsco River to supply the County's 550 pressure zone.

The Elkridge connection was established by the October 22, 1969 Agreement between Baltimore County, Anne Arundel County, Howard County, and Baltimore City (the Second Zone Agreement). The cost of constructing three subsections of the related transmission mains was apportioned by a January 30, 1980 amendment between Baltimore County, Anne Arundel County, Howard County, and Baltimore City (the

Second Zone Amendment). Howard County is entitled to an average use of 8.8 million gallons per day and a peak hour demand of 17.6 million gallons per day through this connection. The connection originates in the Second Zone which receives treated water primarily from Lake Ashburton, which is supplied by the Ashburton Filtration Plant. The Second Zone also receives treated water from the Central System's First Zone via the Vernon Pump Station when the Ashburton Filtration Plant is unable to provide the complete needs of the Second Zone by itself. Similarly, the Hillen Road Pump Station also transfers water from the First Zone to the Second Zone. The Elkridge connection is supplied via the Southwest Transmission Main, crossing the Patapsco River and following River Road and Rockburn Branch to the Elkridge Pump Station, which supplies the County's 550 pressure zone.

3.5 WSSC Supply

WSSC supplies water to Howard County through the All Saints Road connection. A meter located in Howard County provides the basis for monthly water use billing by WSSC. The connection was originally established by the October 25, 1954 Agreement between WSSC and Howard County (the 1954 Agreement). Howard County was entitled to a maximum withdraw rate on any given day of 2.5 MGD under the 1954 Agreement, and is charged a volumetric rate equal to 70% of the prevailing retail rate charged to WSSC customers, based on a 240 gallons per day per household (gpd/household) usage rate .

WSSC agreed by letter dated December 24, 1986, on an interim basis, to allow Howard County a maximum daily withdraw rate of 3.5 MGD pending execution of a long-term agreement. This was followed by a long term agreement between Howard County and WSSC which was executed June 16, 1988. The 1988 Agreement replaced the 1954 agreement. It revises outdated provisions of the 1954 Agreement and provides for an increase in the allowable maximum daily flow through the All Saints Road connection to 5.0 MGD. As part of the new agreement, Howard County contributed towards the construction of a 12" water main along Montgomery Street in Laurel. This main will ensure that a 330 ft. hydraulic grade can be maintained at the suction side of the All Saints Road Pump Station under anticipated flow conditions. In addition, this main will provide a second suction main to the pump station which will guard against service interruption in the event of a main break.

Based on the observed ratio of 1.5-to-1 for maximum day to average day flow and a maximum day draw of 5.0 MGD, the allowable average day withdrawal equals 3.3 MGD. This amount of water will be available at normal system operating pressure except during

unusual or emergency conditions. The agreement provides for additional capacity of up to 10 MGD, if requested by Howard County and approved by the WSSC.

With current reserved capacity of 5 MGD, the additional 5 MGD would not be reserved and used only when conditions in the WSSC distribution system permit. This is as a result of WSSC's desire to utilize excess capacity in its Patuxent Water Treatment Plant (currently rated at 56 MGD), and Howard County's desire to have additional useable sources to meet both existing and emergency needs. In the event an Agreement is put in place, Howard County will need to significantly upgrade the All Saints pumping station to increase the supply into the County's 400 Zone, the Whiskey Bottom and Rt. 32 pumping stations to pump additional capacity into the 550 Zone, and interconnecting transmission mains for distribution.

The First Addendum to the 1988 Agreement was passed in 2008. Under the First Addendum, a six-month pilot program was conducted for Howard County to test the capacity of its equipment and facilities, and to determine what portion of its withdrawal allotment it could guarantee to utilize on a daily basis. A Second Addendum to the 1988 Agreement was passed in 2009. This Addendum establishes the billing rate and the withdrawal amounts between WSSC and Howard County. Under the Second Addendum, Howard County agrees to purchase a minimum of 2.5 MGD, regardless of the actual withdrawal rate, and at the same billing rate as charged by Baltimore City. The maximum daily withdrawal rate remains 5.0 MGD.

The raw water source for the WSSC supply is the T. Howard Duckett Reservoir on the Patuxent River. Water is treated at the Patuxent Water Filtration Plant, then conveyed east through a 24-inch main which branches to a 16-inch main with a 12 inch backup loop to the County's 400 pressure zone. The 16-inch main connects to the All Saints Road Pump Station which currently has a capacity of 5.0 MGD.

The WSSC water supply hydraulic gradient ranges from 10 to 30 feet below the 400 pressure zone hydraulic gradient which it serves, while the Baltimore water supply system gradient must be reduced through a pressure reducing valve before entering the 400 pressure zone. The 400 Zone is also supplied through pressure reducing valves from the 550 Zone which is in turn supplied from the Baltimore County water connections.

Future increases in demands in the 400 Zone and the 550 Zone will normally be supplied from the Baltimore City Central System. However, potential increases in available maximum day supply from WSSC would provide Howard County with the flexibility to supplement or partially replace supplies from the Baltimore Central System connections during emergencies and high demand periods. Provision of this flexibility is considered

to be in the best interests of Howard County since the County does not have direct control over its water supply sources.

3.6 Future Construction

The Baltimore City Central Water supply system and the Washington Suburban Sanitary Commission system have adequate transmission and supply capabilities to meet existing supply needs. However, in emergency or drought conditions, some user restrictions could be placed on Howard County by the suppliers.

The Baltimore Central System requires major new facilities to develop additional water supplies and to provide for the future water needs of Howard County. The facilities required within the Western Third Zone of the Central System are addressed in detail in the 2003 Baltimore Central System Report. Most of the facilities described in the Report have been constructed and placed in service.

The Central System Report states that the Western Third Zone presently has adequate storage and only 600,000 gallons of additional storage capacity will be necessary to meet year 2025 demands. The Zone currently has 37.4 MG of storage capacity located in three storage facilities (Catonsville Reservoir 1, Melvin Avenue Tank and the Pikesville Reservoir). Most of the storage is provided by Catonsville Reservoir 1, which was placed in service in 1995 and is located west of the intersection of U.S. Route 40 and Rolling Road in Catonsville. Catonsville Reservoir 1 was constructed as the first phase of a two-phase project with a capacity of 20 MG, of which approximately 10 MG of storage was allocated to Howard County. The second phase of the project was planned to provide an additional 32 MG of storage.

In lieu of constructing the proposed Catonsville Reservoir 2, the Central System Report suggested that the City consider taking advantage of the surplus supply capacity of the Ashburton and the Leakin Park Pumping Stations to satisfy future demand. When operating together, the capacity of the two stations exceeds the projected year 2025 maximum day demands of the Western Third Zone and dependent upper zones. The reliability of this suggestion was tested, however, in December 2010 when a pipe leak at the Leakin Park Pumping Station forced a shutdown of the station. City staff responded quickly to activate backup pumps at the Ashburton Pump Station to maintain water flow to the Catonsville Reservoir. The water supply to the Western Third Zone may have been significantly compromised if the station shutdown occurred under higher demand conditions.

Howard County anticipates entering into an inter-jurisdictional agreement with Baltimore City, Baltimore County, and Anne Arundel County to address construction of the required central system improvements. This agreement will specify construction schedules and jurisdictional cost shares. In addition, it will specify water demands and flow limitations for each participating jurisdiction. The facilities which are anticipated to benefit Howard County are individually discussed below.

Fullerton Filtration Plant - The filtration plant will treat water from the Susquehanna River, and must accomplish softening and corrosivity reduction in addition to the normal filtration processes. The facility will have a minimum capacity of 66 MGD. However, computer simulations indicate a more balanced operation of the system when operating the Fullerton Filtration Plant at a maximum day rate of 101 MGD. Further, a maximum day capacity of 120 MGD will be needed if the Montebello Filtration Plant is partially taken out of service for an extended repair. A final determination of the size of the Fullerton Plant has not yet been made.

The Fullerton Filtration Plant will provide water directly to the eastern side of the First Zone, thus reducing the demands on the Montebello Filtration Plant in this area. This plant will also supply the Fullerton Second and Eastern Third Zone Pump Stations via the Fullerton Reservoir. Potable water supplied by the plant will eliminate the need of expansion of the Ashburton Filtration Plant since a portion of the required Second Zone supply will be pumped from the First Zone.

Deer Creek Pump Station, Pumps Addition - The Deer Creek Pump Station is/will be used to pump raw water from the Susquehanna River through the Susquehanna Transmission Main to both the Fullerton and Montebello Filtration Plants. The existing Deer Creek Pump Station has three 50 MGD pumps installed. With one pump in reserve, the station has a safe capacity of 100 MGD. There is space available for adding additional pumps to the Deer Creek Pump Station which will provide a safe capacity of 250 MGD.

Given below is a listing of the various Central System improvements required and the approximate time frames as given in the 2003 Central System Report and later reports.

	PROJECT	Projected Completion Date
1.	Fullerton Reservoir	2015
2.	Addition of Two 50 MGD Pumps at Deer Creek Pump Station	2015
3.	Fullerton Filtration Plant	2015 (delayed by funding)

3.7 Groundwater Supply

Approximately 15 percent of the population of Howard County relies upon ground water for its water supply. Ground water is the major source of potable water where public water service is not available. Ground water from the crystalline rock formations will continue to be a major source of potable water in the western areas of Howard County, where new private individual wells will continue to be developed in the "No Planned Service" area. Howard County has no plans to allow the development of community wells.

Table 4 is an inventory of the existing well and surface water supplies in Howard County. The table was compiled from the list of active State Water Appropriation Permits that is maintained by the Maryland Department of the Environment.

Information about the ground water conditions in Howard County was obtained from the study "Water Resources of Howard County, Maryland" which was published by the Maryland Geological Survey in 1995, as Bulletin 38. That study was based on review of well records for over 2,000 wells, and chemical sampling and analysis of water from over 80 wells.

Bulletin 38 reported the State's investigation of 2,354 crystalline-rock wells in Howard County. The reported well depths in their study ranged from 13 to 750 feet. In recent years it has become more common for residential and commercial crystalline-rock wells to be drilled deeper than 750 feet, in order to reach deeper water-bearing fractures and to increase the volume inside the well that can be used for water storage. The majority of these wells have a diameter of 6 inches. Some of the higher-yielding wells will have diameters of 8 inches.

Approximately 25.5 MGD of water was used in Howard County in 2013. Of this amount, 2.9 MGD was obtained from private ground water systems and from private surface water systems, and 22.6 MGD was delivered by two public water systems. The public water systems are the Baltimore City system and the Washington Suburban Sanitary Commission system.

Howard County has parts of two physiographic provinces within its boundaries. The Coastal Plain, which occupies the extreme eastern part of the County (10%), has gravel, sand, silt and clay which were deposited in layers upon the eastward-dipping surface of the bedrock. The Piedmont province, which is present in the other 90% of the County, is characterized by an undulating surface with ridges and narrow stream valleys, underlain by crystalline rocks. The Fall Zone forms a boundary area between the Piedmont and

Coastal Plain provinces. The Fall Zone trends in a northeast-southwest direction through Howard County, roughly parallel with I-95.

The geology of the County influences the ground water availability. Figure 2-2 in Chapter 2 is a generalized geologic map of Howard County which shows the geologic formations underlying the land surface. The Coastal Plain area in eastern Howard County is underlain by sediments of the Potomac Group. The remainder of the County is underlain by metamorphic and igneous rocks of the Piedmont. The Piedmont geology is complex, due to multiple episodes of folding, faulting, and intrusions by magma throughout geologic time.

In the Piedmont province, ground water is found in the joints and fractures of the igneous and metamorphic rocks. Higher-yielding wells tend to intersect a greater number of water-bearing fractures, and intersect more productive fractures. The layer of weathered rock and soil that rests on top of the bedrock is called saprolite. The saprolite functions as a reservoir that supplies water to the fractures in the bedrock.

Although the overwhelming majority of the wells in Howard County (98%) are in the Piedmont area, wells also exist which obtain water from the intergranular spaces of the sediments of the Coastal Plain. The Coastal Plain has unconsolidated layers of sediments belonging to the Cretaceous-age Patuxent Formation, and the Tertiary-Quaternary age terrace gravels, alluvium (stream deposits), and colluvium (slope deposits). In Howard County the maximum thickness of the Coastal Plain deposits is about 140 feet. In some areas the water-bearing sands are confined beneath impermeable clays, while in other areas unconfined, or water-table conditions exist.

The fractured-rock aquifers are generally more susceptible to contamination than the Coastal Plain aquifers, because contaminants are absorbed to a greater degree on unconsolidated sediments than on bedrock fractures. The fractured-rock aquifers are also more susceptible in areas where the soil and saprolite are thin, and rapid recharge to the aquifer occurs.

In the Cockeysville Marble, the natural process of rock dissolution produces solution channels and other openings in the bedrock, such as sinkholes. The dissolution is caused by the movement of acidic ground water through the marble, and it can lead to relatively faster travel times for contaminants through the aquifer.

The natural quality of the ground water in Howard County is generally good, with the exception that the water is somewhat acidic in most areas. Some results of acidic water may include corroded plumbing, stained laundry, and an unpleasant taste. Acidic water

may be addressed in residential water systems by addition of a substance to raise the pH of the water.

For wells completed in the Cockeysville Marble formation, the ground water may be naturally "hard" due to the presence of dissolved calcium and magnesium originating from the rock. Hard water may present difficulty in washing, or may cause mineral deposits in plumbing; it is typically addressed in residential supplies by a water softener system.

In Howard County, two naturally occurring radioactive elements in the ground water, radium and radon, have attracted attention. These elements emit a form of radiation known as alpha radiation. The U.S. Environmental Protection Agency (EPA) has indicated that some people who drink water containing alpha emitters in excess of EPA's standard over many years may have an increased risk of getting cancer. EPA's standards are not intended to regulate private wells, however they are provided here for reference.

Beginning in the early 2000's, but notably around 2006, the Howard County Health Department (HD) began and has continued collecting well water samples for Gross Alpha, Gross Beta and Radium 226/228 from properties in and immediately around the Baltimore Gneiss geologic formation in Howard County. These naturally occurring radionuclides have been linked to this type of geology. The Maryland Geological Survey has identified this formation running in a north to south direction generally down the central part of the County. The Howard County Health Department initially concentrated its sampling efforts on existing properties, but over the past few years is more focused on new construction and pre-emptive identification of potentially impacted wells. The Environmental Protection Agency (EPA) has established a maximum contaminant level (MCL) of 15 picocuries per liter (pCi/L) for Gross Alpha and 5pCi/L for combined Radium 226/228. EPA has also established a target value of 50pCi/L for Gross Beta. As of early February 2015, the Health Department has tested approximately 1780 wells (totaling about 2245 samples) for these parameters. To date, data indicates that approximately 13% of wells tested, have exceeded a Gross Alpha and /or Gross Beta value. Approximately 2% have also shown an elevated combined Radium 226/228, which has known links to bone cancer. All newly constructed wells showing elevated levels are required to have appropriate treatment installed prior to occupancy, and are subject to signed "Treatment Agreements" by the owners and are recorded in the County Land Records. Up to date results of County testing are shown in **Figures 3-3 and 3-3A**.

Radon has also been detected in samples from wells completed in the Baltimore Gneiss in Howard County. The EPA proposed a water radon standard of 300 picoCuries per liter. In the above-referenced Maryland Geological Survey study of Howard County, the

dissolved radon concentrations of ground water ranged from 800 to 40,000 picoCuries per liter, with a median of 3,400 picoCuries per liter. Radon in air is more dangerous than radon in water, and there are no plans at present for remediation.

A ground water balance indicates that adequate ground water resources are available in the Piedmont area of Howard County for the current uses. The average annual hydrologic budget for the Piedmont part of Howard County is as follows: precipitation (42 inches) equals evapotranspiration (28 inches) plus overland runoff (5 inches) plus ground water runoff (9 inches). Part of the ground water runoff is used for water supply. In this analysis, the ground water part of the budget may be halved to 4.5 inches/year to conservatively represent drought conditions. (Palmer Drought Severity Index data maintained by the National Climatic Data Center indicates that "extreme" drought conditions occurred in central Maryland, in five different years during the 30-year period of 1976 to 2005.) The drought-year ground water recharge of 4.5 inches distributed over the 226-square mile Piedmont part of the County is equivalent to 48.4 MGD. The 1990 estimate of the combined private ground water and surface water withdrawals of 3.1 MGD represents 6 percent of the drought-year ground water recharge. This magnitude of ground water withdrawal is reasonable and sustainable.

The preceding ground water balance is regional, and site-specific characteristics such as the local geology, the extent of bedrock fractures, and localized ground water contamination will continue to influence how much ground water is available from a given property. The Howard County Health Department has indicated that several areas with ground water problems exist. **Table 7** is an inventory of these problem areas.

3.8 Other Supply

Surface waters are not available for development by Howard County as public water supply sources since the larger streams have already been developed by others to a high degree. The major surface waters in Howard County include the Patuxent River, the Little and Middle Patuxent Rivers, Dorsey Run, Deep Run and the Patapsco River.

Planning by WSSC suggests utilization of the Patuxent River to its fullest extent. Existing reservoirs are required to discharge sufficient flow to maintain downstream aquatic life in accordance with reservoir discharge permits issued by the Department of Natural Resources. In addition, the Patuxent River is used for the assimilation of sewage effluent from the Maryland City Sewage Treatment Plant in Anne Arundel County.

The Middle and Little Patuxent Rivers and tributaries thereto are utilized to a small extent by several manufacturers and institutions in Howard County. Fort Meade also withdraws

water from the Little Patuxent River downstream from the Howard County line. The Little-Middle Patuxent flows in Howard County are used for the assimilation of sewage effluent from the Little Patuxent Wastewater Treatment Plant which has a treatment capacity of 25.0 MGD. It is expected that the Little and Middle Patuxent Rivers and associated tributaries in Howard County will be developed to provide water for recreational purposes. The County has no plans to develop these sources as a potable water supply beyond the present limited industrial use. Three lakes have been constructed in Columbia, in the Little Patuxent Basin for recreational use. Although not designated for this purpose, these lakes also provide for stormwater management. **Table 5** lists existing impounded potable water supplies in Howard County.

Dorsey Run is used to assimilate effluent from the State's sewage treatment plant in Jessup. Due to its small size, and use by the State, Dorsey Run does not offer the potential to supply any significant quantity of water for potable or industrial use in Howard County.

The Patapsco River is the only water course which has a potential for contributing to the public water supply in Howard County. However, several factors limit the safe yield of the river: (1) natural flow alteration by the Liberty Reservoir; (2) withdrawals by numerous industries, institutions, and towns en route; and (3) deposition of sewage and waste by industries, institutions, and towns en route.

3.9 Water System Hydraulic Modeling

The water system has been modeled considering present and future demands to the year 2040. This includes areas of known development and areas of infill development through the year 2040. Areas with inadequate hydraulic capacity were identified and alternative solutions tested. Additionally, the water quality was modeled using water age analysis and solutions to high water ages were identified and tested. **Table 8**, Priorities for Water System Development, was revised in accordance with these analyses. The modeling effort is described below.

The County is utilizing H2O Map, a fully calibrated hydraulic distribution system modeling software, for all water system modeling. This software is comprised of approximately 13,500 nodes and 15,000 pipes, ranging in size from 8 to 48 inches. This program can be utilized for regular (steady-state) and extended period simulations. The extended period simulations are useful in studying system response to demands over time, such as an entire day or multiple days. Fluctuations in water tank levels caused by variation in water demand over the day are considered. Extended period simulations are also useful in analyzing water age in tanks and nodes in the system over time, as an

indication of water quality. Extended Period Simulations were performed using 24 hour periods or longer to ensure that system components are adequately sized to refill storage tank levels lowered during peak demands.

The County's water mapping system was used to develop the initial water model, along with the diameter and length of transmission mains, the elevation of junctions, elevated water tank characteristics (capacity, maximum and minimum water levels), and the pump curves for each water pump station obtained from record drawings and other sources. A countywide base model with the pressure zones connected via pumping stations and pressure reducing valves (PRV) was developed to simulate the water transmission as close as possible to the real scenario. Calibration of the model was performed by conducting various fire flow tests within the system at various demand conditions, and results were analyzed to ensure a match with actual conditions. The system information was input for each water pressure zone and used as part of the model database, and a skeletonization program was used to consolidate redundant piping systems and eliminate insignificant pipes. Accordingly, the output report for each zone can be extracted and summarized individually for further analyses.

The County maintains a record of recent development and improvements to the water system using the County's GIS system. The piping network in the initial water model was updated using the County's GIS system to represent the current Howard County water network.

The Department of Planning and Zoning provided geocoded population projections, which located projected populations and commercial/industrial acreage to be served by the public water system for the years 2015, 2020, 2025, 2030, 2035 and 2040. This population data was incorporated in the computer model data base using determined demand factors.

Demand factors (per capita use, etc.) used in the model are determined from existing Howard County metered water purchase data and metered water usage data. Individual factors were determined for Residential, Commercial, and Industrial flows and applied to the model using the Department of Planning and Zoning's projections. Projected water usage due to Commercial Redevelopment data provided by the Department of Planning and Zoning was developed using projection factors from the 2012 MDE Design Guidelines for Sewerage Facilities. To better model the daily flow pattern, a diurnal curve was developed based on flow data and applied to all demand nodes. A peaking factor of 1.5 was applied to all time steps to determine maximum day use based on 10 years of historical data provided by the County which showed peaking factors ranging from 1.16 to 1.48.

Zones were also modeled with maximum day demands plus simultaneous fire demands. The fire demands were assumed to be located in the portion of each zone which has the lowest operating pressure for maximum day demand. Other locations were selected for fire flow simulations based on size of supply main, ground elevation, system looping, etc. This analysis identified areas lacking adequate water pressure to fight fires. For detached housing in residential areas, the water demand for fire-fighting was assumed to be 750 gallons per minute (GPM), while for commercial/industrial and multi-family housing areas, the water demand for fire-fighting was assumed to be 1,500 GPM as specified in the Howard County Design Manual. Areas with inadequate pressures were determined and corrective measures selected.

As an input to the H2O Map software for sizing pump stations, pump curves are utilized to allow analysis of system operating pressures. For future pumping stations, actual rating curves are not available. However, for modeling purposes, estimated pumping curves were selected from information provided by pump manufacturers. Estimated pump curves were used since they provide a more accurate simulation of pump station operation than do theoretical horsepower ratings. The actual curve of the pump station, when built, may be different from the estimated curve and will be determined at the actual time of pump station design.

The hydraulic water model was also used to analyze the predicted water age in the system, as an indicator of potential water quality problems. Water age was evaluated using extended period simulations, under average day demands, and was evaluated at system nodes and tanks.

The flow projections given in Tables 3, 3A, and 3B are for the twenty-five year planning period. This period is selected for analysis in the Master Plan since twenty-five year development and population projections are prepared by the Department of Planning and Zoning. The results of the hydraulic analysis served as a basis for identifying projects to be included in Table 8.

Table 6A lists public water storage tanks, both existing and proposed, which are part of the Howard County public system. **Table 6B** lists existing and proposed public system water pump stations. Table 8 provides a complete listing of proposed water facilities projects in the 0 to 5 year, 6 to 10 year, and Comprehensive Plan categories. The existing and proposed water facilities are shown on the attached **Figure 3-4: Immediate, 5-Year, 10-Year and Comprehensive Priorities Map for Water System Development**.

It is noted that the pipe sizes given in Table 8 and on the WATER FACILITIES PLAN MAP for proposed projects are for ultimate development since the design life of transmission mains exceeds 25 years. Ultimate flow projections are based on existing development patterns and densities and on the allocated capacity of undeveloped land as provided by the Department of Planning and Zoning. It is often advantageous from an engineering or economic perspective to initially size and construct conveyance facilities based on the ultimate development potential of the area served. In determining whether or not a facility should be initially constructed to meet twenty-five year (build-out demands), the following must be addressed in an engineering analysis of the proposed project:

1. Present worth analysis, comparing the cost of phased implementation (construction of parallel mains, incremental pump station expansion, etc.) with the cost of a facility initially providing capacity for ultimate development.

2. System hydraulics, considering such factors as differences in pump or pipe sizes required for twenty-five year and ultimate flows, head losses, retention time, etc.

3. System reliability, considering the advisability of having parallel facilities to provide for limited flow capacity during maintenance or repair periods.

4. Construction limitations, considering the difficulties involved with constructing parallel facilities after initial construction is complete.

5. System design life, considering the useful life of the facility.

3.10 Required Local System Improvements

A. 300 Pressure Zone

Analysis of the 300 water pressure zone (lower Elkridge and vicinity) shows that no further expansion will be required during the length of the planning period (2040).

B. 350 Pressure Zone

The analysis of the 350 water pressure zone (Ellicott City and immediate surroundings) showed that no further system expansion will be required through the year 2040.

C. 400 Pressure Zone

A new 2.0 MG EST, the Guilford Tank (W8262), is planned for the 400 Zone. The existing ground level Guilford Tank, currently out of service, will be converted to a reclaimed water tank (see Chapter 4). The new elevated tank is currently in the planning process, and was evaluated for inclusion in the Year 2020 time step of the model. The new tank will be used in conjunction with the existing GBFM tank (0.75 MG) to provide storage capacity and redundancy for the 400 Zone in the future. With the addition of the new Guilford Tank, PRV controls will need to be updated to coordinate with levels in the new tank.

High velocities (above 6 ft/s) are projected to occur in the existing 12-inch diameter cast iron water main located at the north end of the 400 zone that supplies water from the Gun Road supply through the Patapsco Valley State Park to Levering Avenue in Elkridge. By Year 2016, a new section of 12-inch and 16-inch water main (approx. 6,600 lf) from Edgewood Road in Patapsco State Park in Baltimore County to Levering Avenue in Howard County to US Route 1 will increase the reliability of the water supply to the 400 Zone and decrease velocities in the supply line (W8300). This project is currently under construction.

The existing Whiskey Bottom Road water pumping station contains one booster pump and a pressure reducing valve (PRV). The PRV supplies water from the southern portion of the 550 zone into the 400 zone. The booster pump remains in service for standby purposes to provide the ability to supply water from the 400 Zone to the 550 Zone, if needed. A new project, Capital Project W8320, is under way to relocate the existing Whiskey Bottom pump station and PRV. The purpose of this project is to re-structure the existing water distribution to accommodate the expansion of residential and commercial development in the Whiskey Bottom Road area. At completion, the County will have increased flexibility to move water between the 400 and 550 Zones more freely in this area.

There are several areas in the 400-pressure zone that have experienced low pressures (below 40 psi) due to their relatively high elevations. Low pressures were observed near the Whiskey Bottom Pump Station (and PRV) and Gorman Road PRV. When the County experiences low pressures in these areas, the Whiskey Bottom PRV and Gorman Road PRV are manually opened to increase pressure locally above 40 psi.

Additional improvements were identified in the 400-pressure zone to serve new areas of development, or to provide additional system looping. These improvements are as follows:

1. By Year 2015, the installation of approximately 5,500 linear feet of 12-inch water main along Dorsey Run Road (W8292).

2. For Year 2020, the installation of approximately 1,000 linear feet of 12-inch diameter water main along Anderson Avenue in the Harwood Park area will be needed to complete the replacement and enlargement of the Contract 2-W water main from Loudon Avenue to Hanover Road (Capital Project no. W-8303).

D. 550 Pressure Zone

An analysis of the 550-water pressure zone identified problems in meeting future demands if no further system improvements are made. These problems include areas of inadequate pressures and high pipe velocities.

A series of improvements are recommended in the 550 Zone to increase the north to south flow of water in the zone. The addition of these projects alleviates a majority of the problems in the 550 Zone. Phasing of these improvements is as follows:

1. The installation of an 18,000 linear feet of 36-inch water main along Route 29 between Route 108 and Broken Land Parkway to parallel existing mains is recommended (W8296). Construction of this water main is currently in progress.

2. For Year 2016, the installation of a 4,100 linear feet of 30-inch water main along Broken Land Parkway from Steven Forest Road to Cradlerock Way is recommended (W8307).

3. For Year 2030, the installation of 14,000 linear feet of 24-inch water main to parallel existing water mains along Route 29 from Route 32 to Route 216 is recommended (W8308).

As an alternative to some of the recommended piping improvements, it was observed using the model that additional water may be available to southern portions of the 550 Zone by adjusting operations of the Whiskey Bottom pumping station and PRV. Currently the Whiskey Bottom PRV is in service to supplement the 400 Zone supply; while the pumping station is under standby. The Whiskey Bottom pumping station could be used to provide flow to the 550 Zone from the 400 Zone, especially after the construction of the new Guilford Tank provides additional storage to the 400 Zone.

Design is in progress to relocate the Whiskey Bottom pumping station and PRV and upgrade the station pumping capabilities (Capital Project no. W-8320).

The zone analysis also showed that the existing water storage capacity provided in the Snowden River and Scaggsville tanks will be sufficient to meet the zone's demands beyond 2040.

E. 560 Pressure Zone

The analysis indicates that no further expansion of the 560 zone (Hollifield area) will be required during the planning period (2040).

F. 630 East Pressure Zone

An analysis of the 630 East Zone showed the existing distribution system and storage available to be adequate through year 2040. This Zone is supplied from the 550 Zone with water pumped through the Edgar Road and Montgomery Road pump stations. The stations are capable of supplying average day demands to the zone. The existing storage at the Oakland Ridge and Jonestown tanks was shown to be adequate through 2040.

Low pressures and available fire flows were observed in the eastern portion of the 630 East zone off of Illchester Road. The area in question is served by a single 8-inch water main along Illchester Road, which serves as a bottleneck. In Year 2016, the service to the area will be increased to a 12-inch line to provide adequate flow and pressure to the area. By making these improvements, pressures and available fire flow issues will be resolved.

G. 630 West Pressure Zone

In previous amendments to the Water & Sewer Master Plan, growth projections for the 630 West water pressure zone indicated that main extensions, storage, and pumping facilities were needed to serve new development. In order to provide adequate water pressure to areas west of Turf Valley Road during peak demand periods, a 20-inch main was constructed in 1990 along US Route 40 from Dogwood Lane to Bethany Lane where it connected with the 630 West Zone distribution system. This main serves as the suction and discharge main for the Pine Orchard pumping station. Upgrades to the Pine Orchard pumping station were completed in 2014 to increase the station capacity from 3.7 MGD to 5.2 MGD.

The current hydraulic analysis shows that the Harpers Choice Tank cycles regularly through year 2040. Expansion of the Columbia Pumping Station pump capacity is not shown to be needed.

Previously, storage capacity in this zone was considered deficient based on Howard County design criteria. The Marriottsville EWT, located off Marriottsville Road on property of the Alpha Ridge landfill, was constructed and placed into service in 2014 with capacity of 1.25 Million Gallons (MG) to mitigate the storage shortage.

In an effort to increase redundancy and improve the reliability of water supplied to the portion of the 630 West Zone south of Maryland Route 108 and west of US Route 29, the Department of Public Works commissioned an evaluation and study of water supply and storage alternatives for the area that includes central Columbia and Clarksville. The study recommended construction of a new water pumping station in the southern portion of the 630 West Zone to provide a second pump feed to supplement the Columbia Pumping Station. Capital Project W-8328 was created for design and construction of the new 630 West water pumping station.

As described in Chapter 1, the Planned Service Area was expanded to include approximately 221.1 acres of the historic Doughoregan property (refer to EXHIBIT 1, revision W-01) and four properties comprising 90.33 acres in the Clarksville area (refer to EXHIBIT 1, revision W-02) within the 630 West water zone. The water demand projections for these areas are included in Tables 1 and 1A of Chapter 2. Based on current zoning densities and water demand projections, hydraulic analysis shows that the major water facilities (transmission mains 12-inch diameter and larger, pumping stations and water storage) are adequate for the increased demand through the planning period.

1. Water service to the expanded service area of the Doughoregan property (Westmount subdivision) is available from the US Route 40 West 16-inch diameter water main constructed under County contract 1446, and the Centennial Lane 12-inch diameter water main constructed under various County contracts.

2. Water service to the expanded service area in the Clarksville/Guilford Road area is available from the Guilford Road 12-inch diameter water main constructed under County contract 3299.

3. The capacity of local water distribution facilities and necessary improvements will require evaluation as development plans are prepared.

H. 630 South Pressure Zone

Analysis shows that the Fulton Tank and associated pump stations will supply appropriate pressures and fire flow through full build-out of this zone in 2040. New development projects will continue in the 630 South Zone through Year 2025, including approximately 28,000 linear feet of 12" water distribution main to complete looping. The zone analysis also showed that the water storage capacity provided by the Fulton Tank will be sufficient to meet the zone's demands beyond 2040.

As described in Chapter 1, the Planned Service Area was expanded under PlanHoward 2030 to include approximately 91.25 acres of land in the Fulton area (refer to EXHIBIT 1, revision W-03) within the 630 South Water Zone. The water demand projections for this area are included in Tables 1 and 1A of Chapter 2. Based on current zoning densities and water demand projections, hydraulic analysis shows that the major water facilities (transmission mains 12-inch diameter and larger, pumping stations and water storage) are adequate for the increased demand through the planning period.

Water service to the expanded service area is available from the Scaggsville Road 16-inch diameter water main constructed under County contract 3505. The capacity of local water distribution facilities and necessary improvements will require evaluation as development plans are prepared.

I. 730 Pressure Zone

The Waverly Woods subdivision in western Ellicott City was initially planned to be served within the 630 West Zone. However, the westernmost portion of the Waverly Woods subdivision from Dorchester Way to Marriottsville Road was converted from the 630 West to the 730 Zone in the mid-2000s due to changes in residential fire protection sprinkler requirements. The demand added to the 730 Zone water system required additional pumping capacity at the Frederick Road water pumping station. To meet this demand, the upgrade and expansion of the Frederick Road WPS from capacity of 0.58 MGD to 1.6 MGD was completed in 2012.

A new pumping station was constructed in the base of the new 630 West Marriottsville EWT tank to provide a redundant water supply for the 730 Zone. The Marriottsville Road water pumping station can supply up to 3.2 MGD to the 730 Zone under peak flow conditions as backup to the Frederick Road WPS. Construction of the tank and the Marriottsville Road pumping station were completed in 2014.

The zone analysis showed an area of reduced pressure (below 40 psi) along Mount View Road due to the relatively high elevations; however it adequately meets County standards. The Marriottsville Tank and the Alpha Ridge Tank and associated pump stations will be able to supply appropriate pressures and fire flow through full build-out in 2040.

3.11 Water Quality Modeling

The H2O Map hydraulic water model was used to model water age throughout the Howard County system. Water age analysis is often used as an indication of water quality, as long system retention times can lead to the deterioration of quality. Problems associated with longer system retention times include the formation of disinfection byproducts, decay of disinfectants, and poor color, taste and odor. The American Water Works Research Foundation (AWWARF) recommends water age under 2.5 days in system tanks, which equates to an approximately 40% turnover rate per day. However, water age may not accurately predict poor water quality in every water system. In addition to modeling, Howard County has commissioned several rounds of biological testing and sampling to test system wide water quality.

Modeling analyses were conducted through Year 2040 using Average Day Demand Extended Period Simulations to test water age at demand nodes and tanks. All required local system improvements were included in the appropriate modeling years. Since Howard County receives all of its system water supply from surrounding areas, each supply point has an initial water age. The water age for the main supply points (Elkridge, Route 40, Gun Road and WSSC) are 60 hrs, 37 hrs, 75 hrs and 24 hrs respectively. Water age results by zone from the hydraulic model are as follows:

A. 350 Pressure Zone

Analysis of water age in the 350 water pressure zone shows that water age ranges from 2.5 days to 7.5 days except for nodes at the end of lines which experience greater water age due to the lack of circulation. Water age does not greatly differ between time steps in the model. This zone does not contain a water storage tank, therefore; water age is dictated mainly by the retention of water within the water mains that supply this area.

B. 400 Pressure Zone

According to modeling results, water age is lowest (less than 2.5 days) at the southern end of the zone due to WSSC having the lowest initial water age. As the demand in the zone increases through build out in 2040, water age slightly worsens in the southern end

of zone with a portion having a water age between 2.5 and 7.5 days. Maximizing the supply of water from the WSSC system to the southern portion of the 400 Zone should help reduce the water age in the 400 Zone.

Improvement in water age in the 400 Zone can be achieved when the Zone's two tanks are cycled more deeply by adjusting PRV and pump controls. Water system operations can be managed to provide deeper tank cycling to reduce the water age but must be balanced with the need to maintain a sufficient volume of water for equalization, firefighting and water supply emergencies.

C. 550 Pressure Zone

Modeling results indicate that water age throughout the majority of the zone remains under 2.5 days through 2040. Water age increases towards the southern end and the outer extremities of the 550 Zone away from the central supply line. In the area of the Scaggsville Tank at the southern end of the 550 Zone, water age is between 2.5 to 7.5 days. Increases in age in the Snowden River and Scaggsville Tanks remain linear through year 2040. Water system operations can be managed to provide deeper tank cycling to reduce high water age but deeper cycling must be balanced with the need to maintain a sufficient volume of water for equalization, firefighting and water supply emergencies.

D. 630 East Pressure one

Modeling efforts show that the majority of water age in this zone ranges between 2.5 to 7.5 days through full build-out (2040) with minimal improvement in the northern end of zone. Water age at nodes does not greatly differ between time steps. Both the Jonestown EWT and Oakland Ridge EWT have water ages greater than 2.5 days. As demand in the Zone increases through year 2040, water age in these tanks decreases slightly due to greater tank cycling. Water system operations can be managed to provide deeper tank cycling to reduce the high water age but deeper cycling must be balanced with the need to maintain a sufficient volume of water for equalization, firefighting and water supply emergencies.

E. 630 West Pressure Zone

Analysis of water age in the 630 West Zone indicates that water age is greatest in the western portions of the zone with the majority of the zone between 2.5 to 7.5 days. The addition of the Marriottsville tank and the east-west piping increased water supply to this area and decreased water age in the northern portion of the zone. Both the Marriottsville

and Bethany tanks have water ages higher than 2.5 days. The greatest improvement to water age in this section occurs when cycling in the two tanks increases. Water system operations can be managed to provide deeper tank cycling to reduce the high water age but must be balanced with the need to maintain a sufficient volume of water for equalization, firefighting and water supply emergencies.

In the southwest section of the 630 West Zone, analysis shows that the majority of water age is above 2.5 days. Modeling results show that the addition of piping along Guilford Road to increase system looping and water movement does not significantly impact water age. Water system operations can be managed to provide deeper cycling in the Harper Choice tank to reduce the high water age but deeper cycling must be balanced with the need to maintain a sufficient volume of water for equalization, firefighting and water supply emergencies.

F. 630 South Pressure Zone

Modeling shows that the water age in the 630 South Zone and in the Fulton Tank is between 7.5 to 10 days. The results indicate that additional pipe looping within the zone does not significantly impact water age. Currently, the 630 South Zone is supplied water by two pump stations that pull from the southern portion of the 550 Zone. Therefore, water age in this zone depends on the water age in the southern portion of the 550 Zone, which is between 2.5 to 7.5 days. Improvements in the 550 Zone cause a slight reduction in the water age in the 630 South Zone to between 2.5 to 7.5 days but the water age still remains above 2.5 days through the year 2040. Water system operations can be managed to provide deeper cycling in the Fulton tank to reduce high water age but deeper cycling must be balanced with the need to maintain a sufficient volume of stored water for equalization, firefighting and water supply emergencies.

G. 730 Pressure Zone

Initial modeling results for Year 2015 show that the water age in this zone is greater than 2.5 days throughout, with the oldest water occurring in the western-most portion of the zone being between 7.5 to 10 days. The model results show that the water age remains greater than 2.5 days with a maximum water age of 10 days in the western portion of zone through full build-out in Year 2040. The high water age in the Alpha Ridge area is primarily due to the length of distribution pipeline installed to provide service to the low density residential area. Water system operations can be managed to provide deeper cycling in the Alpha Ridge tank to provide minor reduction of the water age but deeper cycling must be balanced with the need to maintain a sufficient volume of water for equalization, firefighting and water supply emergencies.

H. Summary

Overall modeling results indicate that the water age in the majority of the existing system is greater than 2.5 days. The water age is lowest at the US 40 supply towards the north end of the system, along the north-south water mains running the length of Route 29, and at the WSSC supply in the southern part of the 400 zone; age in these areas runs from 0 to 2.5 days.

The zones that experience the longest system retention times are the 630 South Zone and the 730 Zone. While water age decreases in the 630 South Zone through Year 2040, the model shows that it remains between 2.5 to 7.5 days. The water age in the 730 Zone slightly decreases but remains with a maximum water age of 10 days in the western portion of zone.

Additional pipe looping to increase the movement of water was tested but modeling shows it does not significantly impact water age in the system. The greatest decrease in overall system water age occurred with increased tank cycling. Water system operations can be managed to achieve deeper cycling in the water tanks to reduce high water age but deeper cycling must be balanced with the need to maintain a sufficient volume of water in each zone for equalization, firefighting and water supply emergencies.

3.12 Water Sampling Results

The water system hydraulic model showed the potential for high water age in many areas of the Howard County system, specifically in the 730 and 630 South pressure zones. High water age *can* be an indicator of water quality problems, but sampling is needed to confirm problems.

The County started a water testing program in 2008 to test for disinfection by-products (DBPs) and high chlorine residuals. Sampling was completed at multiple test locations throughout the system in areas that experienced longer retention times. The sampling efforts have shown acceptable levels of DBPs and chlorine residuals in these areas. The County maintains a regular sampling program and has not reported any problems to date. A summary of the sampling results are included as EXHIBIT 5.

3.13 Financing Water Improvements

The Department of Public Works assumed the function and duties of the Howard County Metropolitan Commission when the Charter form of government was established. Under the Charter and existing local public laws, the following charges are authorized to finance the construction, operation, maintenance and administration of water facilities:

1. Ad Valorem Assessment
2. Front Foot Benefit Assessment
3. Water House Connection Fees
4. Water User Charges
5. In-Aid-of-Construction Charges
6. Other Sources of Water System Funds

A. Ad Valorem Assessment

A yearly levy of $0.08 per $100 of assessed property value is currently 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 water service and the revenue is used for bond debt service. The current residential front foot assessment rate for fiscal year FY2015 is $ 0.81 per foot for the first 150 feet, $ 0.61 per foot for the second 150 feet, and $ 0.30 per foot for all frontage over 300 feet. The commercial front foot assessment rate for water service is $ 1.01 per foot of total frontage. Front Foot Benefit Assessment fees are no longer collected to recover costs for capital projects after FY2005.

Fixed frontages are as follows: 25 feet per unit for apartments, 45 feet per unit for mobile homes, and 12.5 feet per unit for motels.

C. Water House Connection Fees

After June 30, 2007, individual residential connections to the public water system shall be 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 water system that are constructed by Howard County capital projects. This charge covers the construction of the connection from the water main in the public right-of-way to the abutting property line of the property served. Under these special circumstances, an individual homeowner is charged $2400 for a standard 1½-inch water service connection with a 1-inch meter. Connections larger than 1½-inches and commercial connections will continue to be performed by the Advanced Deposit Order (ADO) process.

D. Water Service Charges

Water to the user is metered and paid under the prevailing schedule of charges. The rate consists of a two part charge; one being a volumetric charge based on a winter / summer usage differential, the other being a quarterly account user charge based on meter size. The current charges are as follows:

1. Quarterly Account User Charges (as of July 1, 2014):

Meter Size	Charge
5/8"-1"	$ 14.57
1 ½"-3"	$ 47.03
4"- up	$ 239.20

2. Volumetric Rates:

Winter rate -	$1.93/ 100 cubic ft.
Summer rate -	$2.15/ 100 cubic ft.

E. Water In-Aid-of-Construction Charge (IACC)

This fee is applicable to all users of the water system and is a source of revenue designated to cover the cost to Howard County of construction or purchase of public water 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 change size is required. The current FY2015 fee structure is as follows:

Size of Water Meter	IACC Fee	Size of Water Meter	IACC Fee
5/8 – 1" meters	$ 600	6" meter	$ 64,800
1 ½" meter	$ 4,800	8" meter	$230,400
2" meter	$ 7,680	10" meter	$336,000
3" meter	$ 16,800	12" meter	$422,400
4" meter	$ 28,800		

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

F. Other Sources of Water System Funds

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

1. Developer Agreements - A Developer Agreement is the method of financing the construction of water distribution mains in a new subdivision. The developer advances the total construction cost of the mains including engineering and administrative expenses. The developer may recover his construction cost through the price of the lots or by creation of a private water company (under Maryland State law) to bill the cost through the users.
2. 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, the annual interest income varies considerably.

CHAPTER 3

TABLES AND FIGURES

TABLE 3

PROJECTED WATER DEMANDS AND PLANNED CAPACITY
HOWARD COUNTY PUBLIC WATER SYSTEM

	Household Population & Projected Water Demands					Baltimore City Contracted Supply			WSSC Supply	
Year	Total	Unserved	% served	Served	Average Daily Use (mgd) (2)	Gun Road	US Rt 40 (3)	Elkridge	All Saints (4)	Total supply
2013 [1]	--		--	261,789	----	1.0	28.7	8.8	3.0	**41.5**
2015	306,606	42,376	86%	264,230	**25.0**	1.0	28.7	8.8	3.0	**41.5**
2020	329,801	43,643	87%	286,158	**26.9**	1.0	28.7	8.8	3.0	**41.5**
2025	344,049	44,721	87%	299,328	**28.3**	1.0	28.7	8.8	3.0	**41.5**
2030	354,631	46,218	87%	308,413	**29.3**	1.0	28.7	8.8	3.0	**41.5**
2035	361,035	47,700	87%	313,335	**29.9**	1.0	28.7	8.8	3.0	**41.5**
2040	363,891	49,188	86%	314,703	**30.3**	1.0	28.7	8.8	3.0	**41.5**

Notes:

(1) Unit demand flows developed for 2013 were not applied to previous years. Population and acreage shown are 8A values for 2013.

(2) Average Day use including residential, commercial/industrial and redevelopment from Table 3A.

(3) Supply established by July 1986 Agreement.

(4) By 1988 Agreement, 3.0 ADF, 5.0 MDF

TABLE 3A

AVERAGE DAILY WATER DEMAND PROJECTIONS

	2013 [1]	2015	2020	2025	2030	2035	2040
Residential Use							
Population Served	261,789	264,230	286,158	299,328	308,413	313,335	314,703
Average Daily Demand (mgd)	17.3	17.4	18.9	19.8	20.4	20.7	20.8
Commercial Use							
Acreage served	4,108	4,425	4,694	4,825	4,961	4,961	5,009
Average Daily Use(2)	4.7	5.0	5.3	5.5	5.6	5.6	5.7
Industrial Use							
Acreage served	3,403	3,535	3,716	3,845	4,020	4,139	4,273
Average Daily Use(3)	2.4	2.5	2.6	2.7	2.8	2.9	3.0
Redevelopment Use							
Retail Area served (gsf)		39,640	218,264	534,622	841,567	1,260,846	1,638,010
Office Area Served (gsf)		333,318	961,528	2,736,706	3,690,876	5,346,886	7,061,418
Average Daily Demand (mgd) (4)	----	0.04	0.12	0.33	0.46	0.66	0.87
TOTAL	**24.3**	**25.0**	**26.9**	**28.3**	**29.3**	**29.9**	**30.3**

Notes:

(1) Unit demand flows developed for 2013 were not applied to previous years. Population and acreage shown are 8A values for 2013.

(2) Based on 2013 estimated unit demand values (Commercial - 1138 gpd/acre)

(3) Based on 2013 estimated unit demand values (Industrial - 699 gpd/acre)

(4) Based on MDE Sewerage design standards (Retail - 0.05 gpd/gsf, Office - 0.09 gpd/gsf)

TABLE 3B

AVERAGE DAY DEMAND AND
CONTRACTED WATER SUPPLY PROJECTIONS

Connection	Agreement	Current Contracted Supply Capacity	Projected Water Supply at Points of Connection (MGD) [1]					
		(MGD)	2015	2020	2025	2030	2035	2040
Baltimore City								
Gun Road	1934 Agreement	1.0	1.4	1.8	1.9	1.9	1.9	2.0
U.S. Rt 40	Third Zone Agreement	28.7	17.6	19.0	20.2	21.1	21.6	21.8
Elkridge	Second Zone Agreement	8.8	3.0	3.1	3.2	3.3	3.4	3.5
WSSC								
All Saints	1988 Agreement	3.0	3.0	3.0	3.0	3.0	3.0	3.0
TOTAL		**41.5**	**25.0**	**26.9**	**28.3**	**29.3**	**29.9**	**30.3**

Notes:

(1) For Years 2015 through 2040, the projected demands are based on average day supply rates as determined by the hydraulic model and planned system operations.

TABLE 4
INVENTORY OF EXISTING MULTI-USE COMMUNITY WELL AND SURFACE WATER SUPPLY

Water Appropriation Permit Number and Revision	Owner	Effective Year	Aquifer	Remarks	Average Limit (gal./day)	Maximum Month Limit (gal./day)	North Coord.	East Coord.
HO1950G001(07)	WILLIAMS TRANSCO PIPELINE	2006	LOWER PELITIC SCHIST WISSAHICKON	COMPRESSOR STATION 190 - ELLICOT CITY	500	1,000	522	820
HO1955G001(07)	W. R. GRACE & CO.	2006	LOWER PELITIC SCHIST WISSAHICKON	WASHINGTON RESEARCH CENTER	70,000	140,000	495	827
HO1958G001(05)	KONTERA LIMITED PARTNERSHIP	2005	PATUXENT FORMATION	LAUREL SAND & GRAVEL PLANT	500	1,000	496	881
HO1958G006(05)	MANGIONE ENTERPRISES OF TURF VALLEY	2013	COCKEYSVILLE MARBLE	TURF VALLEY GOLF COURSE	2,000	5,000	533	832
HO1961G004(04)	BOARMAN, FLORENTINE J.	1998	BALTIMORE GNEISS	BOARMAN'S MARKET	500	600	490	811
HO1962G005(05)	MARYLAND STATE HIGHWAY ADMIN	2007	LOWER PELITIC SCHIST WISSAHICKON	SHA GARAGE AT DAYTON	1,600	2,700	516	806
HO1963G006(04)	CONVENTUAL FRANCISCAN FRIARS	2001	LOWER PELITIC SCHIST WISSAHICKON	FRANCISCAN FRIAR RESIDENCE	1,500	2,300	518	817
HO1963G008(06)	SISTERS OF BON SECOURS USA	2010	SWIFT RUN FORMATION	RETREAT HOUSE & CONVENT	17,000	22,000	545	830
HO1965G003(02)	RONO RURAL ENTERPRISES, INC.	2002	LOWER PELITIC SCHIST WISSAHICKON	DRIVING RANGE	500	20,000	475	826
HO1966G006(04)	MT. AIRY HOWARD CHAPEL CHURCH,	1998	IJAMSVILLE FORM.-MARBURG SCHIST	CHURCH	100	500	540	755
HO1967G001(05)	HOWARD COUNTY PUBLIC SCHOOLS	2005	BOULDER GNEISS WISSAHICKON FORM.	GLENWOOD M. S.	5,000	7,000	532	792
HO1967G010(04)	NERI, LUIGI, AND ANNA	1998	PATUXENT FORMATION	ANNAPOLIS JUNCTION POST OFFICE	500	600	472	858
HO1968G001(04)	BROWN'S CHAPEL, UNITED METHODIST	2001	LOWER PELITIC SCHIST WISSAHICKON	BROWNS CHAPEL, UMC	100	200	512	802
HO1969G002(06)	A.J.R. PROPERTIES, LLC.	2010	PATUXENT FORMATION	MANUFACTURE CINDER BLOCKS	700	900	471	859
HO1971G006(02)	EXXON MOBIL CORPORATION	2001	BALTIMORE GNEISS	EXXON STATION NO 27459	500	800	500	816
HO1972G002(04)	DAYTON ROD AND GUN CLUB, INC.	2004	LOWER PELITIC SCHIST WISSAHICKON	CLUB	100	200	509	801
HO1973G003(04)	HOWARD COUNTY PUBLIC SCHOOLS	2003	BOULDER GNEISS WISSAHICKON FORM.	GLENELG H. S.	7,100	10,300	525	799
HO1973G004(05)	HOWARD COUNTY PUBLIC SCHOOLS	2005	WISSAHICKON FORMATION	LISBON E. S.	2,500	3,000	547	780
HO1973G006(04)	HOWARD COUNTY PUBLIC SCHOOLS	2005	LOWER PELITIC SCHIST WISSAHICKON	WEST FRIENDSHIP E. S.	1,500	2,000	535	815
HO1973G011(04)	FAITH COMMUNITY CHURCH	2005	IJAMSVILLE FORM.-MARBURG SCHIST	CHURCH	300	500	549	758
HO1974G001(03)	LIBERTY BAPTIST CHURCH	2002	WISSAHICKON FORMATION	CHURCH	100	300	548	780
HO1974G002(04)	FERGUSON, SR, JAMES, R.	2006	WISSAHICKON FORMATION	SAND & GRAVEL HAULING	250	500	543	791
HO1975G003(04)	THE ROMAN CATHOLIC ARCHBISHOP	2003	METAGABBRO AND AMPHIBOLITE	CHURCH HALL	800	1,000	548	770
HO1975G009(05)	GLENELG COUNTRY SCHOOL	2008	SETTERS FORMATION	SCHOOL POTABLE, COOLING, IRRIGATION	8,000	12,000	517	811
HO1976G001(03)	HOWARD CO DEPT RECREATION	1998	LOWER PELITIC SCHIST WISSAHICKON	CENTENNIAL PARK	1,000	2,500	513	839
HO1978G005(03)	INTERMEDIA COMMUNICATIONS, INC.	2002	WISSAHICKON FORMATION	TOWER AND MAINT FACILITY UNMANNED	100	100	541	792
HO1979G005(05)	MOUNT AIRY BIBLE CHURCH	2005	WISSAHICKON FORMATION	CHURCH & SCHOOL	2,000	4,000	552	772
HO1981G003(04)	LISBON UNITED METHODIST CHURCH	2013	WISSAHICKON FORMATION	CHURCH/DAY CARE	500	800	546	781
HO1981G004(03)	ARMSTRONG, WILLIAM	2004	LOWER PELITIC SCHIST WISSAHICKON	GWHP	3,000	6,000	504	800
HO1981G006(03)	GLYNN, JAMES C.	2004	BALTIMORE GNEISS	SMALL BUSINESS OFFICE	100	200	490	812
HO1981G007(03)	J.R. ENTERPRISES	2003	LOWER PELITIC SCHIST WISSAHICKON	EYRE BUS SERVICE	2,000	2,500	521	803
HO1981S005(04)	TRANSCONTINENTAL GAS PIPELINE	2003	MIDDLE PATUXENT RIVER	HYDROSTATIC PRESSURE TEST	18,000	3,100,000	522	829
HO1982G003(02)	LANEVE, RONALD, S.	1998	SETTERS FORMATION	CEASAR'S III RESTAURANT	2,000	2,600	533	820
HO1982G004(04)	HOWARD COUNTY DPW	2005	LOWER PELITIC SCHIST WISSAHICKON	DAYTON HIGHWAY MAINTENANCE SHOP	800	1,000	516	806
HO1983G001(03)	WEST HOWARD COUNTY SWIM CLUB	1993	WISSAHICKON FORMATION	SWIMMING POOL	500	2,000	552	779
HO1983G004(04)	CALVARY LUTHERAN CHURCH	2006	WISSAHICKON FORMATION	CHURCH-CALVARY LUTHERAN	1,000	1,700	551	777
HO1983G006(03)	IGENE BIOTECHNOLOGY	2005	LOWER PELITIC SCHIST WISSAHICKON		250	500	509	852
HO1983G008(04)	HO CO PUBLIC SCHOOLS	2007	BOULDER GNEISS WISSAHICKON FORM.	BUSHY PARK ELEMENTARY SCHOOL	3,500	5,000	534	739
HO1984G001(03)	SHEPHERD OF THE GLEN LUTHERAN	2006	BOULDER GNEISS WISSAHICKON FORM.	CHURCH	200	500	527	794
HO1984G002(03)	COMMUNITY BIBLE CHURCH HIGHLAND	2006	BALTIMORE GNEISS	CHURCH	250	600	492	813
HO1984G009(02)	HO CO DEPARTMENT OF RECREATION	1996	BOULDER GNEISS WISSAHICKON FORM.	LAND PRESERVATION FUND	200	300	542	811
HO1985G001(02)	HOWARD COUNTY RECREATION	1997	GUNPOWDER GRANITE	SCHOOLEY MILL PARK	600	2,400	486	811
HO1986G009(02)	GROUP 5 PARTNERSHIP	2002	LOWER PELITIC SCHIST WISSAHICKON	PATRICK CLARK & ASSOC. INSURANCE	100	200	480	822
HO1986G012(02)	LISBON VOLUNTEER FIRE CO.	1998	WISSAHICKON FORMATION	FIRE COMPANY	200	1,000	547	778
HO1987G003(02)	MIKOLASKO, ERIC, J.	1999	IJAMSVILLE FORM.-MARBURG SCHIST	WASHINGTONIAN LANDSCAPE CO.	600	2,400	542	761

TABLE 4
INVENTORY OF EXISTING MULTI-USE COMMUNITY WELL AND SURFACE WATER SUPPLY

Water Appropriation Permit Number and Revision	Owner	Effective Year	Aquifer	Remarks	Average Limit (gal./day)	Maximum Month Limit (gal./day)	North Coord.	East Coord.
HO1987G005(06)	LISBON PLAZA, LLC.	2014	WISSAHICKON FORMATION	LISBON SHOPPING CENTER WELL	10,000	14,500	552	781
HO1987G007(03)	CREST LAWN MEMORIAL GARDENS, INC.	2001	WISSAHICKON FORMATION	CEMETERY OFFICE	800	1,200	538	819
HO1988G003(02)	WILLOW SPRINGS I LIMITED PARTNERSHIP	2001	BOULDER GNEISS WISSAHICKON FORM.	GOLF COURSE IRRIGATION - 3 WELLS	20,000	125,000	540	809
HO1988G007(08)	SUNOCO, INC.	2009	BALTO. GABBRO COMPLEX	STATION # 0003-4587	1,000	3,000	526	846
HO1988G103(01)	WILLOW SPRINGS I LIMITED PARTNERSHIP	2001	BOULDER GNEISS WISSAHICKON FORM.	WILLOW SPRINGS CLUB HOUSE	1,000	2,000	540	809
HO1988S003(02)	WILLOW SPRINGS I LIMITED PARTNERSHIP	2001	UNNAMED TRIB	GOLF COURSE IRRIGATION, SPRING PONDS	15,000	200,000	540	809
HO1988S017(03)	COLUMBIA ASSOCIATION, INC.	2007	MIDDLE PATUXENT RIVER	HOBBIT'S GLEN GOLF CLUB	52,000	350,000	507	827
HO1989G003(03)	THOMPSON, CARL A. & SANDY, A.	2013	LOWER PELITIC SCHIST WISSAHICKON	RESIDENTIAL GWHP - RECHARGE WELL	3,000	6,000	507	797
HO1989G016(07)	TARO INVESTMENT CORPORATION	2013	COCKEYSVILLE MARBLE	BRICK HOUSE FARM BOTTLED WATER	116,000	152,000	512	817
HO1990G016(03)	CATTAIL CREEK COUNTRY CLUB, INC.	2013	BOULDER GNEISS WISSAHICKON FORM.	CATTAIL CREEK GOLF COURSE	42,000	300,000	525	787
HO1990G017(04)	HOWARD COUNTY GOVERNMENT	2011	BALTO. GABBRO COMPLEX	TIMBERS AT TROY GOLF COURSE	71,000	260,000	498	867
HO1990S016(03)	CATTAIL CREEK COUNTRY CLUB, INC.	2013	EAST BRANCH	CATTAIL CREEK GC - MAIN POND	43,000	288,000	524	787
HO1990S017(04)	HOWARD COUNTY GOVERNMENT	2011	DEEP CREEK	TIMBERS AT TROY GOLF COURSE	3,600	7,300	498	867
HO1992G015(03)	MANGIONE ENTERPRISES OF TURF VALLEY	2012	COCKEYSVILLE MARBLE	TURF VALLEY GOLF COURSE	113,000	311,000	534	833
HO1992G202(01)	WARREN H. BOYER, INC.	2004	BOULDER GNEISS WISSAHICKON FORM.	WELL FOR SHOP AND OFFICE	100	1,000	530	793
HO1992S010(02)	COLUMBIA ASSOCIATION, INC.	2005	LITTLE PATUXENT RIVER	FAIRWAY HILLS GOLF COURSE	45,000	250,000	511	843
HO1993G005(02)	WEST FRIENDSHIP CENTER, LLC.	2005	LOWER PELITIC SCHIST WISSAHICKON	HIGH'S STORE OF WEST FRIENDSHIP	200	400	536	813
HO1993S008(05)	MANGIONE ENTERPRISES OF TURF VALLEY	2012	LITTLE PATUXENT RIVER	GOLF COURSE IRRIGATION - CHANGE	40,000	580,000	533	831
HO1993S014(01)	KRATZ, CHARLES, E.	1993	MIDDLE PATUXENT RIVER	SHRUBS AND GRASSES IRRIGATION	1,200	3,000	528	808
HO1994G003(02)	WAVERLY WOODS GOLF CLUB, LLC.	2006	BALTIMORE GNEISS	WAVERLY WOODS IRRIGATION WELL(S)	14,000	72,000	538	831
HO1994G009(02)	DOWD, TIMOTHY	2007	WISSAHICKON FORMATION	TENNIS CLUB	3,000	9,000	539	785
HO1994S003(02)	WAVERLY WOODS GOLF CLUB, LLC.	2006	DAVIS BRANCH	IRRIGATION POND	60,000	450,000	538	831
HO1995G005(03)	J.R. ENTERPRISES, LLP.	2010	BOULDER GNEISS WISSAHICKON FORM.	INWOOD VILLAGE SHOPPING CENTER	5,000	7,500	535	794
HO1995G009(02)	ROMAN CATHOLIC ARCHBISHOP	2007	LOWER PELITIC SCHIST WISSAHICKON	CHURCH	1,300	2,200	478	826
HO1995G020(03)	MANNARELLI, SR., MARIO, F.	2013	BOULDER GNEISS WISSAHICKON FORM.	33-LOT SBDN	7,000	11,700	523	786
HO1996G011(02)	TARO INVESTMENT CORPORATION	2008	COCKEYSVILLE MARBLE	TARO INVESTMENT CORPORATION	500	800	512	817
HO1997G001(02)	HOWARD COUNTY DPW	2009	BALTIMORE GNEISS	HOWARD COUNTY ALPHA RIDGE LANDFILL	252,000	288,000	538	824
HO1997G004(02)	HOWARD COUNTY DPW	2010	WISSAHICKON FORMATION	CARRS MILL LANDFILL	90,000	144,000	541	785
HO1997G014(04)	GENERAL ELECTRIC COMPANY	2011	BALTO. GABBRO COMPLEX	GROUND WATER REMEDIATION	9,500	12,500	490	852
HO1997G021(05)	THE VILLAS AT CATTAIL CREEK, LLC.	2014	SYKESVILLE FORMATION	VILLA AT CATTAIL CREEK	14,000	19,600	526	788
HO1997G024(01)	STATE HIGHWAY ADMIN	1997	LOWER PELITIC SCHIST WISSAHICKON	STATE HIGHWAY SHOP	700	1,000	516	806
HO1998G002(02)	HOWARD CO BUR ENVIRONMENTAL	2010	BALTO. GABBRO COMPLEX	HO CO DPW NEW CUT LF REMEDIATION	94,000	144,000	516	857
HO1998G005(01)	JOHN FRANK, DEPUTY FIRE CHIEF	1998	BOULDER GNEISS WISSAHICKON FORM.	FIRE & RESCUE TRAINING	500	12,000	541	798
HO1998G009(01)	GLENWOOD BAPTIST CHURCH	1998	BOULDER GNEISS WISSAHICKON FORM.	GLENWOOD BAPTIST CHURCH	100	300	521	787
HO1998G010(02)	LYNNGATE PROPERTIES, LLC.	2010	LOWER PELITIC SCHIST WISSAHICKON	TERMINAL TIRES, INC.	300	500	522	803
HO1998G013(03)	HOWARD COUNTY DPW	2010	BOULDER GNEISS WISSAHICKON FORM.	WELL FOR GLENWOOD FIRE STATION	3,400	6,400	536	791
HO1999G001(01)	CHAU MINH DO	1999	WISSAHICKON FORMATION	IRRIGATION-GROW SPROUTS	200	500	552	777
HO1999G017(01)	UNITED STATES POSTAL SERVICE	1999	BALTIMORE GNEISS	UNITED STATES POST OFFICE - HIGHLAND	100	300	491	811
HO1999S004(02)	RLO CONTRACTORS INC.	2011	CHESAPEAKE BAY	COMMERCIAL	6,000	36,000	510	803
HO1999S009(02)	COLUMBIA PARK & RECREATION ASSOC.	2012	UNNAMED TRIBUTARY	PARK & RECREATION	800	2,000	504	842
HO2000G002(02)	EDDY'S WELDING	2000	COCKEYSVILLE MARBLE	EDDY'S WELDING	1,000	1,500	540	853
HO2000G004(01)	BIG BRANCH, LLC.	2000	BOULDER GNEISS WISSAHICKON FORM.	HOMEBUILDER TOLL BROTHERS	100	200	514	798
HO2000S010(01)	FOREST RECYCLING PROJECT INC.	2000	UNNAMED TRIB	FOREST RECYCLING PROJECT	7,000	20,000	511	813
HO2000S014(02)	CATTAIL CREEK COUNTRY CLUB, INC.	2013	LITTLE CATTAIL CREEK	CATTAIL CREEK GC - SWM POND	15,000	288,000	525	786
HO2001G004(02)	3881 TEN OAKS MANAGEMENT, LLC.	2005	LOWER PELITIC SCHIST WISSAHICKON	COMERCIAL & RETAIL CENTER	2,500	3,800	522	804

TABLE 4
INVENTORY OF EXISTING MULTI-USE COMMUNITY WELL AND SURFACE WATER SUPPLY

Water Appropriation Permit Number and Revision	Owner	Effective Year	Aquifer	Remarks	Average Limit (gal./day)	Maximum Month Limit (gal./day)	North Coord.	East Coord.
HO2001G007(02)	HOWARD COUNTY PUBLIC SCHOOLS	2009	LOWER PELITIC SCHIST WISSAHICKON	FOLLY QUARTER MIDDLE SCHOOL	5,000	8,000	522	805
HO2001G009(02)	GLENWOOD, LLC	2013	WISSAHICKON FORMATION	GLENWOOD, LLC	3,000	4,000	535	794
HO2002G004(01)	CHANYASULKIT, JOHN & ANNA	2002	IJAMSVILLE FORM.-MARBURG SCHIST	CHLAYASLILKIT	2,000	3,000	550	748
HO2002G007(01)	THOMPSON, DALE	2002	BALTIMORE GNEISS	HOME BUILDER/DEVELOPER	1,700	2,900	491	813
HO2002G009(02)	PULTE HOME CORPORATION	2004	ULTRAMAFIC ROCKS	PADDOCKS EAST 22 LOTS	4,700	7,800	525	806
HO2002G012(02)	WOODMONT ACADEMY, INC.	2014	BOULDER GNEISS WISSAHICKON FORM.	WOODMONT ACADEMY	8,300	11,000	541	799
HO2002G013(01)	CHASE MINING, LLC.	2003	BALTO. GABBRO COMPLEX	CHASE MINING	280,000	698,000	482	855
HO2002G015(02)	ST. JAMES UNITED METHODIST	2005	LOWER PELITIC SCHIST WISSAHICKON	CHURCH AND DAY SCHOOL	800	1,200	541	816
HO2002S006(02)	EASTER, JIM	2014	UNNAMED TRIB	PRIVATE RESIDENCE	200	300	492	814
HO2002S113(01)	CHASE MINING, LLC.	2003	BALTO. GABBRO COMPLEX	CHASE MINING	120,000	4,100,000	482	855
HO2003G006(02)	TOLL MD II LIMITED PARTNERSHIP,	2004	LOWER PELITIC SCHIST WISSAHICKON	90 LOT SBDN	19,100	31,900	510	825
HO2003G007(01)	RADUE, PETER	2003	IJAMSVILLE FORM.-MARBURG SCHIST	DAMASCUS EQUINE ASSOCIATES	300	500	542	757
HO2003G008(01)	RAPFALIDES, MARIA	2003	LOWER PELITIC SCHIST WISSAHICKON	W. FRIENDSHIP SHOPPING CENTER	4,300	6,100	535	813
HO2003G010(01)	GLYNN, JAMES & CAROLE	2003	BALTIMORE GNEISS	CONSIGNMENT SHOP	100	200	491	812
HO2003G011(01)	TRINITY QUALITY HOMES, INC.	2003	WISSAHICKON FORMATION	RESIDENTIAL-TRINITY QUALITY HOMES	4,500	7,500	543	776
HO2003G012(01)	HOWARD COUNTY CONSERVANCY	2003	BALTIMORE GNEISS	HOWARD COUNTY CONSERVANCY, INC.	600	1,200	540	833
HO2003G015(02)	HOWARD COUNTY PUBLIC SCHOOLS	2004	METAGRAYWACKE WISSAHICKON FORM.	WESTERN ELEM SCHOOL - TEN OAKS RD	2,100	7,700	513	804
HO2003G016(01)	DORSEY MILL, LLC.	2003	BOULDER GNEISS WISSAHICKON FORM.	RESIDENTIAL	5,500	9,200	520	795
HO2004G001(01)	GOOD HOPE REFORMED PRESBYTERIAN CHURCH	2004	BALTIMORE GNEISS	CHURCH	300	400	483	818
HO2004G002(01)	ST. PAUL'S EPISCOPAL CHURCH	2004	WISSAHICKON FORMATION	EPISCOPAL CHURCH	100	200	552	774
HO2004G003(01)	BORNEMANN, DVM, VALERIE	2004	WISSAHICKON FORMATION	GLENELG ANIMAL HOSPITAL	600	700	542	793
HO2004G005(01)	TOLL BROTHERS, INC.	2004	BOULDER GNEISS WISSAHICKON FORM.	27 RESIDENTIAL SINGLE FAMILY	5,800	9,700	519	795
HO2004G007(03)	HOMEWOOD, LLC.	2007	LOWER PELITIC SCHIST WISSAHICKON	HOMEWOOD, LLC - ADDING ONE LOT	17,200	28,300	516	825
HO2004G008(01)	MACBETH FARM, LLC.	2004	BALTIMORE GNEISS	RESIDENTIAL REAL ESTATE DEVEL	7,700	13,000	495	816
HO2004G010(01)	HOWARD COUNTY DPW	2005	WISSAHICKON FORMATION	GLENWOOD COMMUNITY CENTER	2,400	4,800	536	791
HO2004G011(01)	TRIADELPHIA FARM, LLC.	2004	BOULDER GNEISS WISSAHICKON FORM.	SUBDIVISION	6,000	11,400	522	790
HO2004G013(02)	LIME KILN VALLEY, LLC.	2006	LOWER PELITIC SCHIST WISSAHICKON	SUBDIVISION	7,800	13,000	480	810
HO2004G014(01)	MMGMB, LLC.	2004	BOULDER GNEISS WISSAHICKON FORM.	GENERAL OFFICE BUILDING	1,400	2,000	531	790
HO2005G002(01)	MUSGROVE FARM, LLC.	2005	BOULDER GNEISS WISSAHICKON FORM.	RESIDENTIAL SUBDIVISION	6,600	11,130	524	798
HO2005G005(01)	HIGHLAND CROSSING, LLC.	2005	BALTIMORE GNEISS	HIGHLAND CROSSING, LLC	2,000	2,500	490	812
HO2005G006(01)	HERITAGE LAND DEVELOPMENT	2006	COCKEYSVILLE MARBLE	WALNUT GROVE	19,200	32,100	508	817
HO2005G007(02)	WILLIAMSBURG GROUP, LLC.	2006	LOWER PELITIC SCHIST WISSAHICKON	RESIDENTIAL SUBDIV	4,300	7,000	512	816
HO2005G009(01)	SHALEHEARTH,LLC.	2006	BALTIMORE GNEISS	SADLEBROOK FARM 13-LOT SBDN	2,800	4,700	542	835
HO2006G001(03)	RUTAN, ROBERT	2011	LOWER PELITIC SCHIST WISSAHICKON	PRIVATE RESIDENCE DEWATERING	8,500	20,000	510	836
HO2006G002(01)	HIGHLAND DEVELOPMENT CORP.	2006	LOWER PELITIC SCHIST WISSAHICKON	RESIDENTIAL SUBDIVISION 23 LOTS	4,800	7,300	500	800
HO2006G003(01)	D.R. HORTON, INC.	2006	BALTIMORE GNEISS	TURNBURY GROVE 33-LOT SBDN	7,000	11,700	499	814
HO2006G004(01)	TOLL BROTHERS, INC.	2007	BOULDER GNEISS WISSAHICKON FORM.	EDGEWOOD FARM SUBDIVISION - 60 LOTS	12,700	21,200	519	793
HO2006G005(01)	MANNARELLI & SONS	2006	WISSAHICKON FORMATION	MANNARELLI & SONS	2,400	4,000	555	783
HO2006G006(01)	CLOVERFIELD/PFEFFERKORN, LLC.	2006	BOULDER GNEISS WISSAHICKON FORM.	CLOVERFIELD/PFEFFERKORN, LLC	4,700	7,800	535	803
HO2006G007(01)	MANNARELLI & SONS	2006	WISSAHICKON FORMATION	MANNARELLI & SONS	3,200	5,300	555	783
HO2006G009(01)	WARFIELD, JR., MR & MRS K.	2006	BOULDER GNEISS WISSAHICKON FORM.	69 LOT WARFIELDS SUBDIVIVISION	15,000	22,000	516	796
HO2006G011(01)	LDG INCORPORATED	2006	LOWER PELITIC SCHIST WISSAHICKON	RESIDENTIAL SUBDIVISION	4,900	8,200	540	812
HO2006G012(01)	HAILEY DEVELOPMENT, LLC.	2006	LOWER PELITIC SCHIST WISSAHICKON	HAILEY DEVELOPMENT, LC	2,750	3,300	528	811
HO2006G014(01)	LEE, BRUCE	2006	WISSAHICKON FORMATION	16 LOT SBDN	3,400	5,700	552	780
HO2006G015(01)	FULTON RIDGE, LLC	2006	LOWER PELITIC SCHIST WISSAHICKON	RESIDENTIAL SUBDIVISION	3,000	5,000	485	819

TABLE 4
INVENTORY OF EXISTING MULTI-USE COMMUNITY WELL AND SURFACE WATER SUPPLY

Water Appropriation Permit Number and Revision	Owner	Effective Year	Aquifer	Remarks	Average Limit (gal./day)	Maximum Month Limit (gal./day)	North Coord.	East Coord.
HO2006G018(01)	DAVIS BRANCH ESTATES, LLC.	2006	BALTIMORE GNEISS	MYRTUE PROPERTES	6,600	11,100	542	835
HO2006G020(02)	HERITAGE LAND DEVELOPMENT	2009	BALTIMORE GNEISS	160-L WALNUT CREEK SUBD	34,000	56,000	510	815
HO2006G021(03)	JEANNE C. HODDINOTT	2010	BALTIMORE GNEISS	ENCLAVE AT TIERNEY FARM RES SUBD	8,500	14,100	496	817
HO2007G001(01)	RIDGE VIEW, LLC.	2007	IJAMSVILLE FORM.-MARBURG SCHIST	SINGLE FAMILY HOME SUBDIVISION	3,800	6,400	546	757
HO2007G002(01)	GRAYSON DEVELOPMENT CO.	2007	BOULDER GNEISS WISSAHICKON FORM.	GRAYSON DEVELOPMENT CO.	9,700	16,200	530	787
HO2007G003(03)	SPRING MILL, LLC.	2013	BOULDER GNEISS WISSAHICKON FORM.	15-L CLOVERFIELD SECTION II RES SUBD	3,200	5,300	536	802
HO2007G004(01)	GREEN, KATHLEEN	2007	LOWER PELITIC SCHIST WISSAHICKON	CROSSROADS PUB - PDWIS# 113-1026	400	600	512	804
HO2007G005(04)	ELM STREET DEVELOPMENT, INC.	2012	IJAMSVILLE FORM.-MARBURG SCHIST	14-L CHELSEA KNOLLS RES SUBD	3,000	5,000	540	757
HO2007G011(01)	QUARTZ HILL, LLC.	2007	BOULDER GNEISS WISSAHICKON FORM.	QUARTZ HILL RESIDENTIAL SUBDIV	2,600	4,500	550	796
HO2007G012(01)	HOMEWOOD, LLC.	2007	LOWER PELITIC SCHIST WISSAHICKON	HOMEWOOD, LLC - RIVERWOOD SUBDIV	300	500	516	825
HO2007G013(01)	SKIRVEN ENTERPRISES, INC.	2008	WISSAHICKON FORMATION	29-LOT THE LEGACY RES SUBD	6,400	10,000	522	774
HO2008G001(02)	GREENFIELD HOMES, INC.	2009	BALTIMORE GNEISS	14-LOT WILLOW POND RESIDENTIAL SUBD	3,000	5,000	495	814
HO2008G004(01)	JOHNS HOPKINS UNIV/APL	2008	LOWER PELITIC SCHIST WISSAHICKON	COOLING WATER, IRRIGATION, BACKUP	5,000	10,000	487	830
HO2008G010(01)	HERITAGE LAND DEVELOPMENT	2009	BOULDER GNEISS WISSAHICKON FORM.	MERIWETHER-SECT.2, PHASE 1&2	9,700	16,200	519	791
HO2008S006(01)	THOMAS, BENNETT AND HUNTER	2008	PATAPSCO RIVER	DUST CONTROL, PATAPSCO WATERSHED	1,000	5,000	550	834
HO2008S007(01)	THOMAS, BENNETT AND HUNTER	2008	PATUXENT RIVER	DUST CONTROL, PATAPSCO WATERSHED	1,000	5,000	540	754
HO2008S008(01)	STATE HIGHWAY ADMINISTRATION	2008	PATUXENT RIVER	WATER FOR DRILLING AND CORING	300	1,000	500	860
HO2008S009(01)	RED HILL LAWN SERVICE, INC.	2008	PATUXENT RIVER	HYDROSEEDING	1,500	6,000	500	860
HO2009G001(01)	THE BRANTLEY GROUP	2009	LOWER PELITIC SCHIST WISSAHICKON	TERRAPIN CROSSING SUBDIVISION	9,900	16,600	532	811
HO2010G001(01)	VLADIMIR BLYUKHER	2010	LOWER PELITIC SCHIST WISSAHICKON	GWHP- STANDING COLUMN WELL	6,000	9,000	513	830
HO2013G001(01)	JOHNSTON CONSTRUCTION COMPANY	2013	LOWER PELITIC SCHIST WISSAHICKON	MINE CONSTRUCTION AND DEWATERING	400	1,300	603	833
HO2013S001(01)	HOWARD COUNTY DPW	2013	PATUXENT FORMATION	SEWAGE TREATMENT PLANT	1,800	60,000	470	853
HO2013S003(01)	EAST COAST GREEN, INC.	2013	CHESAPEAKE BAY	IRRIGATION	2,000	35,000		
HO2013S004(01)	J.K. PATTON TURF FARM, LLC.	2013	CHESAPEAKE BAY	IRRIGATION	3,000	21,000		
HO2013S005(01)	HOWARD CO. BUREAU OF ENV. SERVICES	2013	PATUXENT RIVER	HOWARD COUNTY ALPHA RIDGE LANDFILL	900	6,000	538	824
HO2014G002(01)	M.B. HIGHLAND RESERVE, LLC.	2014	BALTIMORE GNEISS	HIGHLAND RESERVE RESIDENTIAL SUBDIV	5,100	8,400	492	816
HO2014G003(01)	GREENBERRY, INC.	2014	LOWER PELITIC SCHIST WISSAHICKON	RESIDENTIAL SUBDIV	5,700	10,000	510	808
HO2014S002(01)	BUFFALO CONSTRUCTION COMPANY, INC.	2014	PATAPSCO RIVER	COMMERCIAL	800	4,000		

TABLE 5

INVENTORY OF EXISTING IMPOUNDED WATER SUPPLIES IN HOWARD COUNTY

Reservoir Characteristic	Municipal Reservoirs	
Name of Reservoir	Triadelphia Reservoir	T. Howard Duckett Reservoir
Owner	Washington Suburban Sanitary Commission	Washington Suburban Sanitary Commission
Crest Elevation (Feet above Sea Level)	366.4	286.4
Spillway Length (Feet)	234	190
Total Length of Dam (Feet)	995	840
Flooded Crest Above Stream Bed (Feet)	65	126
Area of Crest Elevation (Acres)	800	810
Length of Shoreline at Crest Elevation	15 miles	20 miles
Area of Land Owned (Acres)	5986	
Water Overflowed Crest First Time (Date)	1943	1954
Capacity of Reservoir (Million Gallons)	6500	6000
Safe Yield (MGD)	70	
Average Daily Withdrawals (MGD)	56	

TABLE 6
INVENTORY OF EXISTING WATER TREATMENT FACILITIES

Owner	Address	Water Source [1] (PWSID No.)	Type of Treatment [2]	Plant Coordinate Location (N; E)	Rated Plant Capacity (MGD)	Average Production (MGD)	Max. Peak Flow (MGD)	Storage Capacity (MGD)	Planned Expansion MGD/Date	Sludge Disposal Method	Operating Agency
Community Water Supplies											
Villas at Cattail Creek				587; 1,300		0.025	0.038				Private
Franciscan Fathers			PC,pH,CC	578; 1,331				0.006			Private
Non-transient, Non-Community - Institutional Use											
Howard County Bd of Education			pH,CC								HC BdEd
Bushy Park E.S.			pH,CC	595; 1,305							HC BdEd
Clarksville E.S.			pH,CC	566; 1,332							HC BdEd
Gateway			pH,CC	562; 1,328							Private
Gateway School				554; 1,332							Private
Glenelg Country School				578; 1,323							Private
Glenelg High School				586; 1,311							HC BdEd
Glenwood M.S.			pH,CC	594; 1,305							HC BdEd
Howard Vocational Tech.			pH,CC								HC BdEd
Lisbon Children Christian School											Private
Lisbon E.S.			pH,CC	605; 1,292							HC BdEd
Marriottsville Spiritual Center				606; 1,341	0.01	0.01		0.05			Private
Our Lady of Perpetual Help			PC	573; 1,378							Private
Saint Louis School			pH,CC, GAC	560; 1,328							Private
Scaggsville Public Works Annex				539; 1,340							HC DPW
Sisters of Bon Secour			F,pH	606; 1,341	0.01	0.016		0.008			Private
University of Maryland Agricultural Experiment Farm			pH,PC	579; 1,330	0.043	0.035		0.05			Private
West Friendship E.S.			pH,CC	595; 1,327							HC BdEd

Notations in Red indicate new and updated data.

TABLE 6
INVENTORY OF EXISTING WATER TREATMENT FACILITIES

Owner	Address	Water Source [1] (PWSID No.)	Type of Treatment [2]	Plant Coordinate Location (N; E)	Rated Plant Capacity (MGD)	Average Production (MGD)	Max. Peak Flow (MGD)	Storage Capacity (MGD)	Planned Expansion MGD/Date	Sludge Disposal Method	Operating Agency
Transient, Non-Community - Commercial & Institutional Use											
Bistro Blanc	3800 Ten Oaks Rd	1131064	SOFT, F, UV	583; 1,315							Private
Boarman's Meat Market	13402 Route 108	1131104	NO3, UV, GAC	551; 1,324							Private
Boarman's Foodland				550; 1,324							Private
Bureau of Highways, Frederick Rd	14212 Frederick Rd	1131105	None								HC DPW
Calvary Lutheran Church	16151 Old Frederick Rd	1131046	None								Private
Cattail Creek Country Club	3600 Cattail Creek Rd	1131068	F,pH,SOFT,CL	583; 1,303							Private
C.J.'s Beef Barn				595; 1,306							Private
Circle D Farm- Clubhouse	15535 Carrs Mill Rd	1131005	pH,SOFT	598; 1,298							Private
Circle D Farm- Pool	15535 Carrs Mill Rd	1131093	pH, F	599; 1,298							Private
Citgo Gas Station- Frederick Road	15943 Frederick Rd	1131103	GAC, UV								Private
Clarksville Vol. Fire Co.				562; 1,329							Private
Columbia One LDS Church	6020 Ten Oaks Rd	1131324	F								Private
Cooksville Carry-Out				605; 1,306							Private
County Line Deli				613; 1,341							Private
Crossroad's Pub	4809 Ten Oaks Rd	1131026	pH,SOFT,UV								Private
Crown's Pub				570; 1,348							Private
Dayton Repair & Comm Bldg	4301 Route 32	1131110	None								HC DPW
Dayton Repair Facility	4301 Route 32	1131104	GAC								HC DPW
Duke's Place				618; 1,321							Private
Evergreen Stables Farm	8250 Old Columbia Rd	1131101	None								Private
Fox Valley Pool	3320 Great Valley Dr	1131100	None								Private
Friendship Baptist Church	1391 Sykesville Rd	1131323	pH,SOFT,UV								Private
George's Superthrift											Private
Gethsemane Bapt Church	14135 Burntwoods	1131111	F,pH,SOFT								Private
Glenwood Baptist Church	3875 Route 97	1131073	F,UV								Private
Glenwood Community Center	2400 Route 97	1131318	SOFT,pH,CL	597; 1,306							Ho Co
Glenwood Library	2350 Route 97	1131320	SOFT,pH,CL	597; 1,306							HoCo
Henkel's Restaurant				531; 1,371							Private
High's-Clarksville				561; 1,329							Private
High's of Cooksville	2091 Route 97	1131091	SOFT,pH								Private
High's of Fulton	11848 Lime Kiln Rd	1131098	F	541; 1,334							Private
High's-Glenelg	3932 Ten Oaks	1131074	F, GAC								Private
High's of West Friendship	12780 Frederick Rd	1131090	F,GAC,UV								Private
Howard Co. ARC/Ellicott City				574; 1,335							Private

Notations in Red indicate new and updated data.

TABLE 6
INVENTORY OF EXISTING WATER TREATMENT FACILITIES

Owner	Address	Water Source [1] (PWSID No.)	Type of Treatment [2]	Plant Coordinate Location (N; E)	Rated Plant Capacity (MGD)	Average Production (MGD)	Max. Peak Flow (MGD)	Storage Capacity (MGD)	Planned Expansion MGD/Date	Sludge Disposal Method	Operating Agency
Larriland Farms	2415 Route 94	1131052	None	600; 1,283							Private
Ledo's Pizza- Fulton Station	11845 Route 216	1131057	F, SOFT,pH,UV	540; 1,333							Private
Lee's Market				607; 1,292							Private
Lisbon BP Gas Station	15882 Frederick Rd	1131115	UV								Private
Lisbon UM Church	15875 Frederick Rd	1131020	F,SOFT,pH,UV								Private
Lisbon Vol. Fire Dept.	1220 Route 94	1131021	UV	607; 1,291							Private
Little George's				595; 1,306							Private
Lu & Joes Restaurant	1024 Ridge Rd	1131029	F,UV	611; 1,261							Private
Marshall's Pub				574; 1,317							Private
McDonalds of Lisbon	702 Lisbon Center Dr	1131080									Private
Morgan Station Inn	15400 Frederick Rd	1131028	None	606; 1,298							Private
Mountain View Inn				610; 1,260							Private
New Hope 7th Day Adventist	12350 Hall Shop Rd	1130033	None								Private
Peter Pan Day Care											Private
Pizza Hut of Lisbon	706 Lisbon Center Dr	1131082	SOFT,UV								Private
Poplar Springs Inn				610; 1,286							Private
Royal Farms Store- Clarksville	3701 Ten Oaks Rd	1131096	F,GAC,pH,SOFT								Private
Saint Andrews Epis Chapel	2770 Route 97	1131084	None	593; 1,305							Private
Saint Andrews Epis Parish	2892 Route 97	1131112	pH	593; 1,305							Private
Saint James UM Church	12450 Old Frederick Rd	1131036	F,SOFT	602; 1,328							Private
Saint Marks Epis Church	12700 Hall Shop Rd	1131107	F								Private
Saint Michaels Catholic Church	1125 St Michaels Rd	1131114	pH								Private
Schooley Mill Park	12975 Hall Shop Rd	1131056	CL	547; 1,323							Ho Co
Springs Landing Pub	17004 Frederick Rd	1131032	F,UV								Private
State Highway Administration	4401 Route 32	1131113	F,GAC								State
Sykesville Station				618; 1,321							Private
Temple Isaiah Synagogue	12200 Scaggsville Rd	1130037	F,SOFT,pH,UV	546; 1,330							Private
Ten Oaks Triangle	3881 Ten Oaks Rd	1131322	RO,pH,SOFT								Private
Thompsons Liquors				543; 1,342							Private
TRRC	3750 Shady Lane	1131097	UV								Private
Trusted System Information											Private
Turf Valley Golf Course Bath	2700 Turf Valley Rd		None								Private
W. Friendship Shopping Center											Private
West Howard Swim Club	16131 Old Frederick Rd	1131058	None	612; 1,292							Ho Co
Western Regional Park	14800 Carrs Mill Rd	1131319	CL								Ho Co
Western Reg Pk Pavilion Well	14800 Carrs Mill Rd	1131116	CL								Ho Co

Notations in Red indicate new and updated data.

TABLE 6
INVENTORY OF EXISTING WATER TREATMENT FACILITIES

Owner	Address	Water Source [1] (PWSID No.)	Type of Treatment [2]	Plant Coordinate Location (N; E)	Rated Plant Capacity (MGD)	Average Production (MGD)	Max. Peak Flow (MGD)	Storage Capacity (MGD)	Planned Expansion MGD/Date	Sludge Disposal Method	Operating Agency
Willow Springs Golf Course	12980 Livestock Rd	1131067	pH	599; 1,322							Private
Woodbine Inn	401 Woodbine Rd	1131041	UV	616; 1,294							Private
Woodstock Inn	1415 Woodstock Rd	1131042	F,UV	605; 1,349							Private
Woodstock Snowball Stand	1970 Woodstock Road	1131071		601; 1,345							Private
Transient, Non-Community - Industrial & Recreational Uses											
Belmont Conference Center - Manor House - Carriage House	6555 Belmont Woods Rd			578; 1,385							Ho Co
Church of God Campground			PC	577; 1,345							Private
Concrete Pipe and Products				543; 1,373							Private
C.R. Daniels			PC	600; 1,365		0.003		0.047			Private
Hammond Park Pool				540; 1,346							Private
Howard County Fair Grounds - Office & Dining Hall - Poultry Bldg - Main Exhibit Hall - Wash Racks - 4H Hall	2210 Fairgrounds Rd	1131050 1131075 1131078 1131076 1131088	UV	599; 1,320							Private
Hydronautics Inc.		Wells & Surface		548; 1,335							Private
Nixon's Farm Inc.	2800 Route 32	1131030	F,UV	594; 1,325							Private
Rocky Gorge Driving Range				535; 1,338							Private
Transco Company Town			None	582; 1,330		0.05					Private

NOTES:

[1] Water Sources are wells unless otherwise noted. PWSID= Public Water Supply ID Number. Refer to TABLE 4 for Inventory of Multi-Use Community Wells and Surface Water Supplies.

[2] Types of Treatment:

CC= Corrosion Control
CL=Chlorine Disinfection
F= Filtration
GAC= Granular Activated Carbon
PC= Prechlorination
pH= pH Adjustment
RO= Reverse Osmosis
SOFT= Softening
UV= Ultraviolet Disinfection

Notations in Red indicate new and updated data.

TABLE 6A
PUBLIC WATER STORAGE FACILITIES

Facility	Road Location	ADC Map Coordinates	Overflow Elevation (Feet)	Useable Capacity (MG)
Snowden River	Snowden River Parkway	16-D11	550	2.00
Scaggsville	Clifford Ct near US Rt 29	19-B5	545	3.00
Oakland Ridge	Md. Rt 108	16-D4	630	1.50
Jonestown	Md. Rt 108	16-E5	630	0.20
Harpers Choice	Cedar Lane	15-C4	630	1.00
Bethany	Md. Rt 99	11-H4	630	0.20
Greater Baltimore Food Market	Md. Rt 175	20-J3	400	0.75
Alpha Ridge	Alpha Ridge Landfill	10-J2	730	0.30
Fulton	Md. Rt 216	18-J5	630	0.50
Marriottsville	Alpha Ridge Landfill	11-A2	630	1.25
Proposed				
New Guilford	US Rt 1	20-E5	400	2.50
Reclaimed Water				
Guilford	US Rt 1	20-E5	390	3.00*

* Useable Capacity 1.0 MG

TABLE 6B
WATER PUMPING STATIONS

Facility Name	Road Location	ADC Map Coordinates	Lower/Upper Zone	Exisiting /Design Capacity (MGD)
All Saints	Superior Avenue	19-G11	330/400	5.00
Chestnut Hill	US Rt 40	12-G5	550/630W	1.60
Columbia	Banneker Rd	15-F6	550/630W	4.00
Edgar Rd	US RT 108	16-A1	550/630E	2.80
Elkridge	Elibank Drive	17-G5	2nd Zone/550	18.00
Frederick Rd	Rt 144	11-C6	630W/730	0.58
Montgomery Rd	Montgomery Rd	12-E13	550/630E	2.60
Pine Orchard	US Rt 40	11-J7	550/630E	5.20 (4)
Rt 29	US Rt 29	15-K1	550/550 (2)	24.00 (3)
Rt 32	Guilford Road	20-C4	400/550	Standby (1)
Rt 216	Rt 216	19-A5	550/630S	0.30
Maple Lawn	Maple Lawn Boulevard	19-A4	550/630S	0.30
Whiskey Bottom	Whiskey Bottom Rd	19-H9	400/550	Standby (1)
Marriottsville	Alpha Ridge Landfill	11-A2	630W/730	3.20 (5)
Proposed				
630 West Zone	TBD	TBD	550/630W	TBD
New Whiskey Bottom	Stephens Rd	TBD	400/550	Standby (1)(6)
Reclaimed Water				
LPWRP PS	Greenwood Place	20-D9	400 Zone (reclaimed)	3.00 (5)

Notes:

1) Pump stations designated as "standby" are utilized only during emergency periods.
2) Transmission Booster Station in the 550 Zone
3) Projected Ultimate Capacity; initial installed capacity is 16 mgd
4) Projected Ultimate Capacity; initial capacity is 3.7 mgd
5) Initial Capacity. One pump can be added to increase capacity to 5 mgd.
6) Projected Ultimate Capacity of 5 mgd; initial capacity of 3 mgd

TABLE 7

INVENTORY OF GROUND WATER PROBLEM AREAS IN HOWARD COUNTY, MARYLAND

1.	**Location:**	Beaufort Park Subdivision, off Reservoir Road, South of Route 216
	Service:	No planned service area
	Nature of Problem:	Some residents have reported difficulties in obtaining adequate yields from wells.
	Planned Correction Date:	The subdivision is located outside the Metropolitan District; no service extension is planned.
2.	**Location:**	Lisbon, a town center on Route 144 in the western part of the County
	Service:	No planned service area
	Nature of Problem:	Lisbon is an area of older residences and business which are situated in relatively close proximity, on comparatively small lots. The results of well sampling indicate that the ground water has bacteriological contamination likely caused by subsurface wastewater disposal; and also petroleum hydrocarbon contamination possibly related to the two fuel service stations, or other sources in Lisbon. The County's consultant (KCI) obtained samples from thirty wells at twenty-nine properties in September-October 2006. The results of the sampling were as follows: the nitrate concentrations in five samples exceeded the EPA maximum contaminant level of 10 milligrams per liter; the total coliform concentrations in seventeen samples exceeded the maximum contaminant level; and in three of the seventeen samples with coliforms, E. coli were detected. Petroleum compounds have been detected in ground water at the two service stations in Lisbon.
	Planned Correction Date:	The County recommended a shared subsurface wastewater disposal facility for the Lisbon historic district. A majority of the property owners were not interested in a County owned system at this time.
3.	**Location:**	Ritz Estates Subdivision, north of Route 144 in the western part of the County
	Service:	No planned service area
	Nature of Problem:	Nitrate concentrations exceeding the maximum contaminant level of 10 milligrams per liter have been detected in residential wells.
	Planned Correction Date:	The subdivision is outside the Metropolitan District. No service extension is planned. Individual nitrate removal devices may be used to reduce excessive nitrates.

TABLE 7

INVENTORY OF GROUND WATER PROBLEM AREAS IN HOWARD COUNTY, MARYLAND

4.	**Location:**	Gaither Farm Estates, on Route 108 northeast of Clarksville
	Service:	No planned service area
	Nature of Problem:	Nitrate concentrations exceeding the maximum contaminant level of 10 milligrams per liter have been detected in residential wells.
	Planned Correction Date:	The subdivision is outside the metropolitan district. No service extension is planned. Individual nitrate removal systems may be used to reduce excessive nitrates.
5.	**Location:**	Meadow Ridge subdivision, off Henryton Road in the northern part of the County
	Service:	No planned service area
	Nature of Problem:	Some residents have reported difficulty in obtaining adequate yields from wells.
	Planned Correction Date:	The subdivision is outside the Metropolitan District. No service extension is planned.
6.	**Location:**	Wynfield subdivision, off Route 144
	Service:	No planned service area
	Nature of Problem:	Some residents have reported difficulty in obtaining adequate yields from wells
	Planned Correction Date:	The Subdivision is outside the Metropolitan District. No service extension is planned.
7.	**Location:**	Fox Creek Subdivision, Off Route 144
	Service:	No planned service area
	Nature of Problem:	Some residents have reported difficulty in obtaining adequate yields from wells.
	Planned Correction Date:	The subdivision is outside the Metropolitan District. No service extension is planned.
8.	**Location:**	Monticello Drive
	Service:	No planned service area
	Nature of Problem:	The Maryland State Highway Administration (SHA) has replaced wells at four homes along Monticello Drive due high sodium chloride levels. Residents expressed concern when water heaters, shower fixtures, etc. needed to be replaced due to the corrosive nature of the groundwater with high chloride levels.
	Planned Correction Date:	The subdivisions are outside the Metropolitan District. No service extension is planned. The Health Department will continue to work with property owners and SHA to determine if alternate well sites, point of use reverse osmosis systems (RO), or whole house RO will solve the problem.

TABLE 7

INVENTORY OF GROUND WATER PROBLEM AREAS IN HOWARD COUNTY, MARYLAND

9.	**Location:**	Friendship Manor and Fox Creek
	Service:	No planned service area
	Nature of Problem:	Some property owners in these subdivisions and the adjacent section along Frederick Road have high levels of sodium chloride. One property owner has been negotiating with the Maryland State Highway Administration (SHA) regarding the installation cost of a whole house reverse osmosis system (RO) and the associated on-site sewage disposal system upgrade required to handle the additional water discharged as a result of the RO treatment.
	Planned Correction Date:	The subdivisions are outside the Metropolitan District. No service extension is planned. The Health Department will continue to work with property owners and SHA to determine if alternate well sites, point of use RO systems, or whole house RO will solve the problem.

TABLE 8
IMMEDIATE, 5-YEAR, 10-YEAR and COMPREHENSIVE PRIORITIES for WATER SYSTEM DEVELOPMENT

Priorities Map Key (Fig 3-4)	Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs ($)			Project Schedule			Pressure Zone	Model Run Year
					Total	PL660 Eligibility	Local	Prelim Plans	Start Const.	Compl. Const.		
	W-8146	In Progress	Various Sites	Resolution of easement and right-of-way issues on exsitng water and sewer projects.	6,000,000	-	6,000,000	on-going	on-going	on-going	N/A	N/A
	W-8206	In Progress	Various Sites	A project to fund the study, maintenance and remediation of corrosion related failures.	4,900,000	-	4,900,000	on-going	on-going	on-going	N/A	N/A
	W-8207	In Progress	Various Sites	A project to investigate and determine the condition of all prestressed concrete cyliner pipe transmission mains in the distribution system.	N/A			on-going	on-going	on-going	N/A	N/A
	W-8220[1]	In Progress	N/A	A project for the planning, design and construction of major water facilities, mains, pumping stations, reservoirs and treatment plants in the Baltimore City Central Water System.	121,050,000	-	121,050,000	on-going	on-going	on-going	N/A	N/A
	W-8245	In Progress	Various Sites	Project to repair/repave existing county roads due to watermain breaks.	4,537,000		4,537,000	on-going	on-going	on-going	N/A	N/A
	W-8248	In Progress		Design and construction of water and sewer lines in conjunction with Maryland State Highway Administration and Howard County road projects prior to road construction.	7,650,000	-	7,650,000	on-going	on-going	on-going	-	N/A
A	W-8262	0-5 Years	1366-541	Design and construction of a 2.0 million gallon elevated water storage tank and related piping to serve the 400 Water Service Zone. (Guilford)	5,530,000	-	5,530,000	2004	TBD	TBD	400	2020
B*	W-8265	In Progress	1353-560	Rehabilitation or replacement of 1,000 linear feet of 30-inch diameter water main in the vicinity of US 29 and Broken Land Parkway.	4,480,000	-	4,480,000	2005	2011	2015	550	N/A
	W-8267	In Progress	Various Sites	Project to develop a water valve database and provide for a continuing maintenace program for excercising of valves.	1,837,000	-	1,837,000	2008	on-going	on-going	on-going	on-going
	W-8269[2]	In Progress		Design and construction of major transmission mains to convey public water from Baltimore City to Howard County. The project will fund a cost sharing agreement between Baltimore City, Baltimore County and Howard County on improvements to the Baltimore City's Western Third Zone.	35,000,000	-	35,000,000	2005	on-going	on-going	N/A	N/A
	W-8274	In Progress	Various sites	Project to Upgrade the Bureau of Utilities SCADA System.	4,834,000	-	4,834,000	2007	2007	2018		
	W-8276	In Progress	1396-568	A project to evaluate the condition of 38,000 feet of 54-inch and 36-inch PCCP water transmission mains in Baltimore and Howard Counties and to repair or replace defective portions of pipeline.	25,500,000	-	25,500,000	2005	2013	2015	N/A	N/A
	W-8289	In Progress	Various Sites	Project to replace/upgrade batteries and radio modules for the County's radio read water meter system.	16,976,000	-	16,976,000	N/A	2009	2019	N/A	N/A
	W-8290	In Progress		Project to Upgrade the Bureau of Utilities maintenance Yard.	2,680,000	-	2,680,000	2011	2015	2016	N/A	N/A
	W-8291	In Progress		Project to provide recoating/repairs of the County's Elevated Water Tanks.	6,242,000	-	6,242,000	on-going	on-going	on-going	N/A	N/A
C	W-8292	In Progress	1379-547	Design and construction of 5,500 feet of 12-inch water main and relocation of 1,500 feet of sewer main within proposed Dorsey Run Road.	1,900,000	-	1,900,000	2009	2014	2015	400	2020

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					Total	PL660 Eligibility	Local	Prelim Plans	Start Const.	Compl. Const.		
D*	W-8296	In Progress	1354-564	Construction of 18,000 ft. of 36" water transmission main along U.S. Route 29 from the Route 29 Pumping Station to Broken Land Parkway.	27,500,000	-	27,500,000	2010	2015	2017	550	2020
E*	W-8300	In Progress	1395-565	Construction 3,900 ft. of 12-inch water parallel transition main along Levering Ave and Main Steet.	3,286,000	-	3,286,000	2010	2015	2016	400	2020
F	W-8301	In Progress	1338-556	Construction of a water transmission main along Guilford Road from Quiet Night Ride east to W.R Grace. This main will consist of 900 ft. of 12" pipe.	420,000	-	420,000	2012	TBD	TBD	550/630-W	2020
G	W-8303	6-10 Years	1387-556	Construction of approximately 3,000 ft. of 8" and 12" water main along Loudon Avenue and the railroad from Loudon Avenue to Hanover Rd.	1,000,000	-	1,000,000	2018	2019	2020	400	2020
	W-8304	0-5 Years		A project to upgrade the Columbia Water Pumping Station.	1,250,000	-	1,250,000	2015	2017	2018	630-W	
H	W-8305	0-5 Years	1377-569	Construction of 4,300 ft. of 12" water main in Landing Road from Grovement Subdivision to Montgomery Road.	1,500,000	-	1,500,000	2018	2019	2020	550	2020
I	W-8306	0-5 Years	1341-549	630 South Zone Extension of approximately 1,000 linear feet of 12" pipe.	2,000,000		2,000,000	2015	2016	2016		2020
J*	W-8307	0-5 Years	1354-554	Construction of a water transmission main along Broken Land Pkwy. from Stevens Forest Road to Cradlerock Way. This main will consist of 4,100 ft. of 30" pipe, and will provide for improved integration of the U.S. Route 40 and Elkridge supplies.	5,000,000	-	5,000,000	2013	2015	2016	550	2020
K*	W-8308	11-15 Years	1344-547	Construction of 14,000 ft. of 24" water transmission main along U.S. Route 29 from Old Columbia Road to MD Route 216.	10,500,000	-	10,500,000	2017	TBD	TBD	550	2030
L	W-8309	0-5 Years	1368-547	Construction of a water main from Mission Road to and along MD Route 175 and across I-95 to connect to Columbia Gateway. This main will consist of approximately 9,500 ft. of 12" pipe.	2,360,000	-	2,360,000	2015	2016	2017	550	2015
	W-8312	In Progress		Design and construction of 1,200 LF of 8-inch water main from the terminus of County owned Rockburn Hill Road, west to Crossview Roud to sreve 6 properties	705,000	-	705,000	2014	2014	2015	550	N/A
	W-8313	In Progress	Various Sites	Project to provide on going fire hydrants inspections and maintenance.	6,000,000	-	6,000,000	on-going	on-going	on-going	N/A	N/A
	W-8314	0-5 Years		Project to study the implementation of a Reclaimed Water System.	150,000	-	150,000	2012	N/A	N/A	N/A	N/A
M*	W-8316	0-5 Years	1375-569	Replace approximately 5,800 ft. of 8" pipeline in Ilchester Road with 12" water main and/or construct additional looping	3,050,000	-	3,050,000	2014	2015	2015	630-E	2020
	W-8317	0-5 Years		Design and installation of a 1,000 kW emergency generator and electrical, mechanical and structural improvements at the Elkridge Pumping Station.	3,100,000	-	3,100,000	2014	2015	2015	550	N/A
	W-8318	0-5 Years		Project to replace approximately 12,000 ft of deteriorated 12-inch cast iron watermain, including valves, along Montgomery Road from Layers Hill to Rockburn Drive.	5,610,000	-	5,610,000	2014	2015	2016	550	N/A

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	W-8319	0-5 Years		Design and construction of 2,200 LF of water main and 2,200 LF of sewer to serve Blandair Regional Park.	515,000	-	515,000	2013	2014	2015	550	N/A
N	W-8320	0-5 Years		A project to relocate the Whiskey Bottom Road pumping station and related suction and discharge pipelines and to increase pumping capacity.	5,000,000	-	5,000,000	2015	2016	2017	550/400	2020
	W-8321	In Progress		Design and construction of 3,000 LF of 8" water main within the PirchWay/Aspen Drive Community.	1,315,000	-	1,315,000	2011	2015	2015	550	N/A
	W-8322	In Progress		A project to determine the condition of 44,000 LF of water main in the Wilde Lake Community area and to perform any necessary repairs of replacements.	1,700,000	-	1,700,000	2015	2016	2016	550	N/A
	W-8323	In Progress		Design and construction of a diversion structure, pumping station, elevated storage tank and reclaimed water pipelines to supply Fort Meade with reclaimed water for non-potable water use.	55,000,000		55,000,000	2013	2014	2015	N/A	N/A
	W-8324	In Progress	Various Sites	Design and construction of various water system upgrades and improvements to meet County Standards for water system redundancy, pressure and flow rates.	4,000,000	-	4,000,000	on-going	on-going	on-going	N/A	N/A
	W-8325	0-5 Years	Various Sites	Develop, design and construct a reclaimed water distribution system to serve various parts of the County with reclaimed water produced by the Little Patuxent Water Reclamation Plant.	8,465,000	-	8,465,000	2015	2016	2019	400	N/A
	W-8326	0-5 Years		Design and construction of 400 LF of 8" water main in Saint Paul Street.	400,000	-	400,000	2014	2015	2016	350	N/A
	W-8327	0-5 Years		Replacement of 2,300 LF of 8" water main in Old Lawyers Hill Road.	950,000	-	950,000	2014	2015	2017	400	N/A
O*	W-8328	0-5 Years		Design and construction of a pumping station to serve the 630-W Zone, including required piping improvments for suction and discharge.	10,000,000	-	10,000,000	2015	2017	2018	550/630-W	2025
	W-8329	In Progress	Various Sites	A project to investigate and determine the condition of all prestressed concrete cyliner pipe transmission mains in the distribution system.	4,000,000	-	4,000,000	on-going	on-going	on-going	N/A	N/A
	W-8600	In Progress		Design and construction of various additions and improvements to the water and sewer system utility or its associated infrastructure.	12,615,000	-	12,615,000	on-going	on-going	on-going	-	N/A
	W-8601	In Progress	Various Sites	A project to resolve easement and rights-of-way issues for water and sewer projects that hae been constructed and special quick response projects of a captial nature that require title searches, appraisals and acquisition. Replaces W-8146 in FY2016.	N/A	-	N/A	on-going	on-going	on-going		
	W-8602	In Progress	Various Sites	Funding for design and construction of sewer and water lines in conjunction with Maryland State Highway Administration (MSHA) and Howard County road projects prior to road construction. Replaces W-8248 in FY 2016.	N/A	-	N/A	on-going	on-going	on-going		

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					Total	PL660 Eligibility	Local	Prelim Plans	Start Const.	Compl. Const.		
	W-8698	In Progress		A project to design and construct routine water main extensions in the Metro District request by landowners. 1. To serve existing dwelling in recorded residential subdivisions where water mains have not been constructed. 2. With existing dwellings or businesses on failing private systems identified by the County Health Department; and 3. To serve parcels with existing dwellings. The routine extensions must meet the following criteria: a. A written request has been made by a property owner who is without a water main fronting their property. b. Property to be served must abut a County or State road. c. The extension is less than 1000 feet. d. The extension must be a continuation of a water main currently in service in the same pressure zone. e. Acquisition of utility easements are not required. f. Capacity is available per section 18.122B County Code. g. Extension is supported by 50% of the property owners whose front foot benefit charges would change following construction.	6,775,000	-	6,775,000	on-going	on-going	on-going	N/A	N/A
	W-8812	0-5 Years		A project to provide construction and inspection service for sites which do not require developer agreement but require larger than 1" water house connection, fire hydrants and other water appurtenances.	252,000	-	252,000	on-going	on-going	on-going	N/A	N/A
	W-8862	0-5 Years		A project to provide for the construction of water house connections by the Bureau of Utilities for residential size (1-inch) connections. These connections are made when new connections are required for lots or homes where none exists.	552,000	-	552,000	on-going	on-going	on-going	N/A	N/A
P	Developer Project	6-10 Years	1347-595	Construction of a water transmission main from Resort Road to Bethany Lane and associated pipes. This main will consist of approximately 4,200 ft. of 12" pipe.							550	
Q	Developer Project	6-10 Years		Construction of approximately 28,000 ft. of 12" water distribution main south of Johns Hopkins Road and West of Route 29.							630-S	2010
	Developer Project	Compre-hensive	1393-559	Construction of 6,500 ft. of 8" water main along Race Road from Hanover Road to the existing 8" main in Race Rd.							400/300	
	Developer Project	6-10 Years	1379-574	Construction of 8" water main connecting Landing Road to College Ave.							550	

[1] Scheduling of facilities to be determined by Water Analyzer Office and specified in Central System Report.

[2] Required facilities were identified in the Report on the Western Third Zone of the Baltimore Water System (August, 1984).

*Priority Projects

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

Note: Projects which are not identified as capital projects may be constructed in the time frame indicated, or at an earlier time by a private developer if earlier construction would provide an orderly system extension.