

## **NATURAL FEATURES**

### **(a.) General Geography**

Williamsport lies in the central portion of Washington County in central western Maryland. Washington County is bounded on the east by Frederick County and west by Allegheny County. The Commonwealth of Pennsylvania lies to the north, West Virginia to the south.

Williamsport is an incorporated town on the Potomac River at its confluence with Conococheague Creek in Washington County, Maryland. The State of West Virginia is directly across from the town and in effect the Potomac River is the border between Williamsport and the State of West Virginia. The town is adjacent to Interstate Route 81 near Interstate 70, and on Route 11 and other state highways giving it a high degree of accessibility by highway. The Town's population was 1,868, which is a decrease from the 2,103 in 1990 but all in all the population has been fairly stable for a number of years. The 2010 Census has not been completed, therefore, the population cannot be ascertained with any degree of certitude. Williamsport is a community of mixed use, with a number of historic buildings, grade and terrain is relatively level with the highest elevations just east of

Conococheague Street; the land slopes downward from this point to Conococheague Creek and the Potomac.

Washington County includes part of the western slopes of the Blue Ridge, the broad Hagerstown Valley, which is part of the Great Limestone Valley system of the United States, and part of the Appalachian Mountain system. It is characterized by rolling, productive agricultural lands that are flanked on the east and west by forested mountains. The County is well suited for agricultural development since more than sixty (60) percent of the acreage is suitable for regular cultivation. Another fifteen (15%) percent is more limited but still suitable for some cultivation, twelve and one-half (12-½) percent is not well suited for crops but good for pasture. The remaining thirteen (13%) percent of the County is mostly rough, very rocky or stony, and in some places weverly eroded.

The Hagerstown Valley forms the eastern and central parts of the County, between the Blue Ridge and the Appalachian ridges and valleys. The highest point in the County is the crest of Quirauk Mountain of the blue Ridge at an elevation of 2,145 feet above sea level. The Valley covers more than half the County, ranging in elevation from 300 feet near the Potomac River to 600 feet at the boundary with Pennsylvania.

Approximately thirty (30%) percent of the County's land area has slopes in excess of fifteen (15%) percent while the Hagerstown Valley portion (which comprises more than half of the land area of the County) is essentially level or with very gentle slopes. Along the streams and rivers are large areas of alluvial terraces and flood plains. The latter are nearly level and lying just above the normal stages of the streams. However, the alluvial terraces are considerably above the streams and rivers. Washington County is entirely within the draining system of the Potomac River Basin, traversed by several streams which generally flow southward.

**(b). Geological Characteristics**

The County's geology is complex. All of the surface rock strata and most of the subsurface rocks in Washington County are of sedimentary origin and consist of limestone, shale, and sandstone. The Hagerstown Valley is underlain predominately by relatively soluble limestone and shows evidence of sinkholes and caverns as well as underground channels through which water may flow. Groundwater is abundant within the limestone, and as a result of the geologic structure, there is potential for ground water degradation from septic tanks and other disposal systems that does not exist to the same degree in most other parts of the Maryland.

The 1974 Plan described Williamsport's geology as follows:

"The bedrock beneath the Town and its immediate vicinity consists of limestone and shale formed during the Ordovician Period, about 435 - 500 million years ago. A major fault line extends diagonally in a northeast-southwest direction through the extreme western portion of Williamsport (directly west of the intersection of Potomac and Conococheague Streets, and Frederick and Vermont Streets) separating the shale and limestone. Visually, this fault forms the ridge that extends along the eastern side of the Conococheague Creek and the Potomac River."

"Two different, but similar limestone formations occur in the territory east of this faultline. The older Stonehenge Limestone Formation adjoins this fault and occupies a band about one-third mile wide. This formation is estimated to be 500 to 800 feet thick. It contains massively bedded clayey limestone at its base and this conglomeratic beds in its upper portion."

"Immediately east of the Stonehenge Limestone lies a younger and harder limestone formation, the Rockdale Run Formation. This extensive formation occupies all the remaining portion of Williamsport, east of the faultline. Where the soil about the Rockdale Run Formation is more shallow, grading or excavation for foundations or utility lines is comparatively more expensive as it encounters this hard dolomitic limestone."

"The State's geologic map shows that the area west of this fault line contains Martinsburg Shale. This formation is found throughout Washington County, along the meandering sections of the Conococheague. In Williamsport, it underlies the area southeast of the confluence of the Conococheague Creek and the Potomac River. To the degree that its upper portion contains more shale than limestone or sandstone, it should be comparatively easier to grade or excavate than the limestone formations to the east."

"A final geologic feature influencing the Williamsport area is not really a formation, but has been caused by countless river terrace deposits in the area along the Potomac River flood plain. This deposit known as "Potomac River Alluvium," consists chiefly of brown, poorly-sorted, fine to medium sand and silt, with some gravel. This alluvium covers only the portion of Williamsport adjacent to the Potomac River and Conococheague Creek. Its depth to bedrock, near the Town, is reported to be from 21 to 27 feet."

"Although this alluvial material is easily excavated for development, flooding causes a severe hazard. Although these areas should not be

developed, they can still provide for the enjoyment of open space and serve for certain types of recreation uses."<sup>1</sup>

**(c.) Soil Characteristics**

A knowledge of soils and their properties provides a solid foundation for understanding human settlement and other types of land uses. For example, the suitability of soils for on-lot subsurface sewer disposal systems is not always given sufficient importance in reviewing proposals for development: many occupants of the land feel that septic system usage is a matter of right rather than a privilege. Many feel that as long as no surface malfunctioning is apparent, their household septic system is operating properly, and little concern is directed toward the issuance of groundwater contamination and its effects on neighbors.

Potential erosion problems which might threaten the stability of structures if not properly designed are another concern related to soil characteristics. Soils of Washington County have been considered in four broad groups according to their position. They are (1) soils of the uplands; (2) soils of old colluvial deposits; (3) soils of the old stream terraces, and (4) soils of the flood plains.

Within each of these groups, soils vary according to parent materials.

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<sup>1</sup> Note - Reference is made to Map 4 - Geologic Features and Map 5 - Mineral Resource Geology

Soils of the upland, developed in place from materials weathered from the underlying rocks, cover about seventy-one (71%) percent of the County's land. Soils of old colluvial deposits, transported by gravity, represent about sixteen (16%) percent, while soils of old stream terraces, previously floodplains created when the streambeds were at a higher current level, make up about five (5%) percent. The balance of eight (8%) percent is covered by soils of the flood plains of more recent occurrence.

These soils shape the County's landscape. The differences among them are fairly easy to notice. The more obvious differences are in the shape, steepness, length of slopes; the width, volume, and speed of streams; and the size and shape of the valleys.

In the County there are fourteen general soil patterns referred as soil associations. These associations have been grouped by the Soil Conservation Service of the U.S. Department of Agriculture into four divisions according to drainage and depth of soils.

The divisions are (1) well-drained, stony, and very stony soils; (2) well to excessively drained, shallow, medium-textured soils; (3) moderately well to well-drained, deep, medium-textured soils; and (4) well drained, deep, medium-textured soils.

The first division occupies about ten (10%) percent of the County's land area, the second covers about twenty-five (25%) percent, the third makes up about two (2%) percent, while the fourth makes about sixty-three (63%) percent of the entire County.

According to the Town's 1974 plan, the chief soil conditions of concern in Williamsport are (1) wetness and flooding, and (2) shallowness. The principal limiting condition occurs in the Lindside silt loam in the floodplains of the Potomac and Conococheague Creek, an area that should be reserved from development in any case because of periodic flooding. These conditions occur in an 800-foot band along the Potomac and a narrower 300-foot strip on the eastern side of the Conococheague. Another area of potential flooding is the area of Dunning and Melvin silty clay loams along a small creek flowing from the southern portion of the high school site through the Park.

Most of the area west of Artizan Street, and virtually all of central Williamsport is underlain by extremely rocky silty clay loam soils that are very shallow over bedrock. The 1974 plan notes that "typically, as much as 40 percent of the surface area in this soil type consists of outcropping ledges and reefs of hard limestone bedrock". This soil presents severe obstacles to development because it is subject to erosion and because construction of



foundations and basements into the bedrock may be expensive and difficult. Most of this area is already developed, and these limitations apply largely to a few infill sites.

**(d.) Surface Water Characteristics**

As previously mentioned, Washington County lies totally within the Potomac River Basin and is drained by the Conococheague Creek in the western portion of the Great Valley and by the Antietam Creek in the eastern section. The majority of the County lies within the Upper Potomac River Sub-Basin. The remainder, a small section in the southwestern portion of the County, lies within the limits of the Middle Potomac River Sub-Basin.

The pattern and intensity of water surface is dictated by the County's location in the Valley and Ridge physiographic province characterized by long, ridge-like, parallel mountains and intervening valleys. In the western part, the streams have rather flashy runoff as a result of steeply sloping terrain and rough topography.

In Williamsport, surface drainage runs to the Potomac and Conococheague. There are few steeply sloped areas except along the flood plains of the major watercourses.

**(e.) Water Quality**

According to the County's amendments to the Water and Sewer Plan adopted on May 17, 1994 by the Board of County Commissioners, the quality of the Washington County's surface water as a source of supply would necessitate considerable treatment prior to consumption. Even a generalized analysis of the sampling date indicates a high coliform count. In addition, most of the water courses were quite alkaline because of the limestone formation. The predominant causes of degradation of water quality of the watercourses in the County are agricultural and urban runoff and industrial and sewage treatment discharges.

A report to the EPA conducted in 1988 stated that "water quality in the Upper Potomac River Sub-Basin is good and suited to water contact recreation and aquatic life and, where classified, trout production. Elevated suspended sediment, nutrient and bacterial and nutrient levels are observed in the Sub-Basin. Overall, water quality has degraded slightly in the Upper Potomac Sub-Basin between 1976 and 1985." The Town is governed to a great extent by the County Water and Sewer Plan insofar as they are adopted and they are applicable to the Town.

**(f). Water Quality in Conococheague Creek**

Conococheague Creek runs along the western boundary of Williamsport. Its drainage area extends well up into Pennsylvania, and includes 65.8 square miles of land. The mainstream length is 22 miles.

Conococheague Creek exhibited poor water quality from 1966 to 1969. Extremely high bacteriological values were recorded just downstream from the Pennsylvania border, and bacterial water quality of the remainder of the stream's length did not meet acceptable water quality standards. By 1974 water quality in the Creek had improved. Fecal coliform values still violated the numerical standard but has decreased. Dissolved oxygen values were generally high at no time went below the standard. The stream water was alkaline and contained large amounts of dissolved solids. Nitrate concentrate was high and phosphate was unusually high.

Within Maryland, the Creek is polluted by farm wastes and individual septic-system seepage. A wastewater treatment plant serving the Garden state tannery discharges into the Creek just about its mouth.<sup>2</sup> In 1992 the Washington County Sanitary District began using a 2.5 million galls per day (MGD) wastewater treatment plant that serves a large portion of the Conococheague drainage basin with the Hagerstown Urban Growth Area,

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<sup>2</sup> Garden State Tannery is no longer operative and apparently is not discharging into the Creek any great amount of wastewater at this time. The Tannery is considered a Brownfield at this juncture.

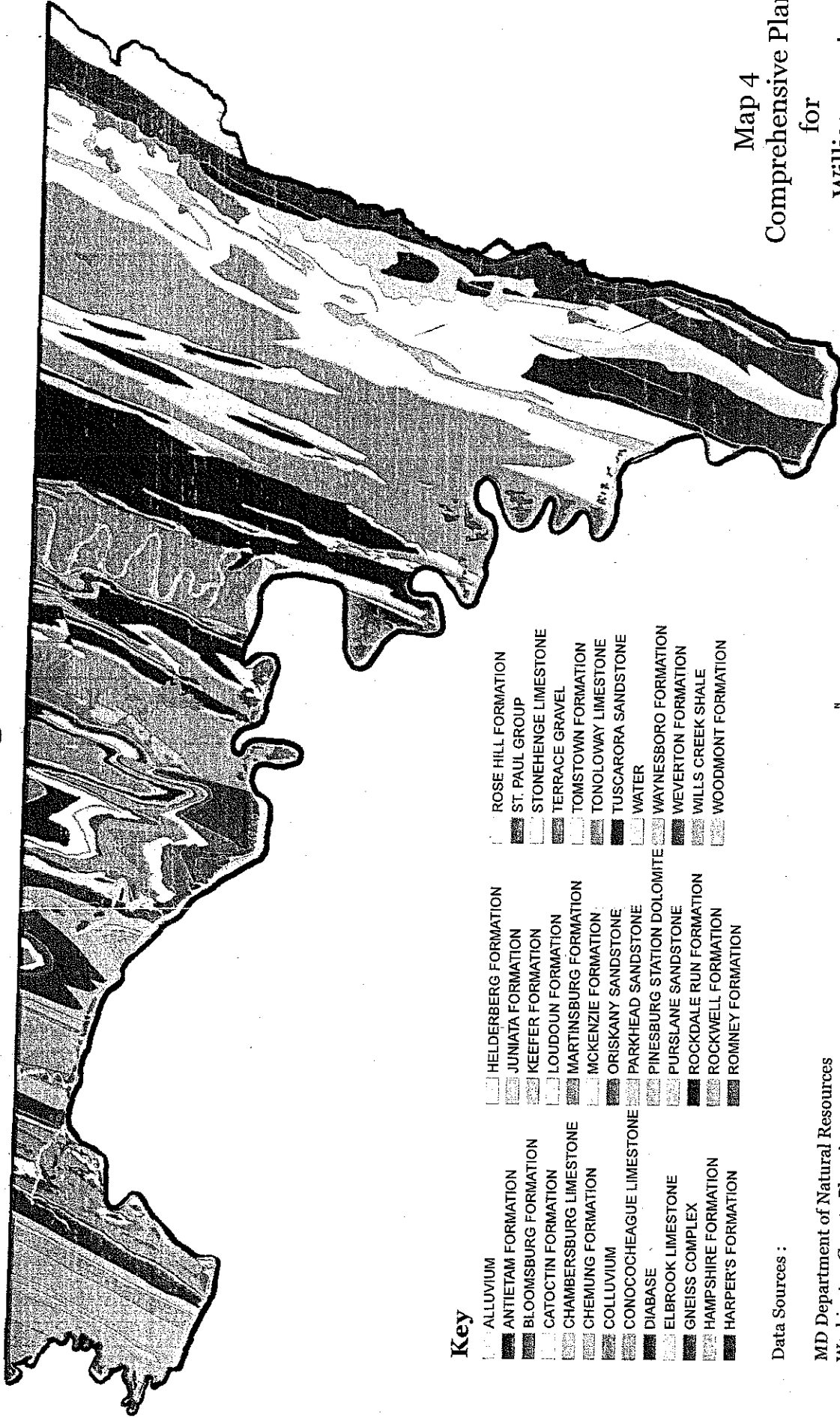
discharging directly into the Conococheague Creek at a point near Kemps Mill. Water quality in the Creek is now generally good.

## **CLIMATE**

Washington County has a climate typical of the middle Atlantic states: moderate with average temperatures of 53° F in the spring, 73° in summer, 55° in the fall, and 32.1° in the winter. Average annual rainfall is 37.96 inches, snowfall 29.7 inches and a total of 164 frost free days.

**Note:** The following Maps are intended to graphically clarify and demonstrate the information set forth in the preceding text in this Chapter.

# Geological Features



## Key

- |                        |                            |                      |
|------------------------|----------------------------|----------------------|
| ALLUVIUM               | HELDERBERG FORMATION       | ROSE HILL FORMATION  |
| ANTIETAM FORMATION     | JUNIATA FORMATION          | ST. PAUL GROUP       |
| BLOOMSBURG FORMATION   | KEEFER FORMATION           | STONEHENGE LIMESTONE |
| CATOCTIN FORMATION     | LOUDOUN FORMATION          | TERRACE GRAVEL       |
| CHAMBERSBURG LIMESTONE | MARTINSBURG FORMATION      | TOMSTOWN FORMATION   |
| CHEMUNG FORMATION      | MCKENZIE FORMATION         | TONOLOWAY LIMESTONE  |
| COLLUVIUM              | ORISKANY SANDSTONE         | TUSCARORA SANDSTONE  |
| CONOCOHEAGUE LIMESTONE | PARKHEAD SANDSTONE         | WATER                |
| DIABASE                | PINESBURG STATION DOLOMITE | WAYNESBORO FORMATION |
| ELBROOK LIMESTONE      | PURSLANE SANDSTONE         | WEVERTON FORMATION   |
| GNEISS COMPLEX         | ROCKDALE RUN FORMATION     | WILLS CREEK SHALE    |
| HAMPSHIRE FORMATION    | ROCKWELL FORMATION         | WOODMONT FORMATION   |
| HARPER'S FORMATION     | ROMNEY FORMATION           |                      |

## Data Sources :

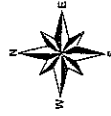
MD Department of Natural Resources  
Washington County Planning Dept

Note : This map is prepared for the sole purpose of illustrating the Comprehensive Plan. It should not be used for other purposes. Information shown on this map was compiled from various original sources as listed and is subject to change as source data changes.

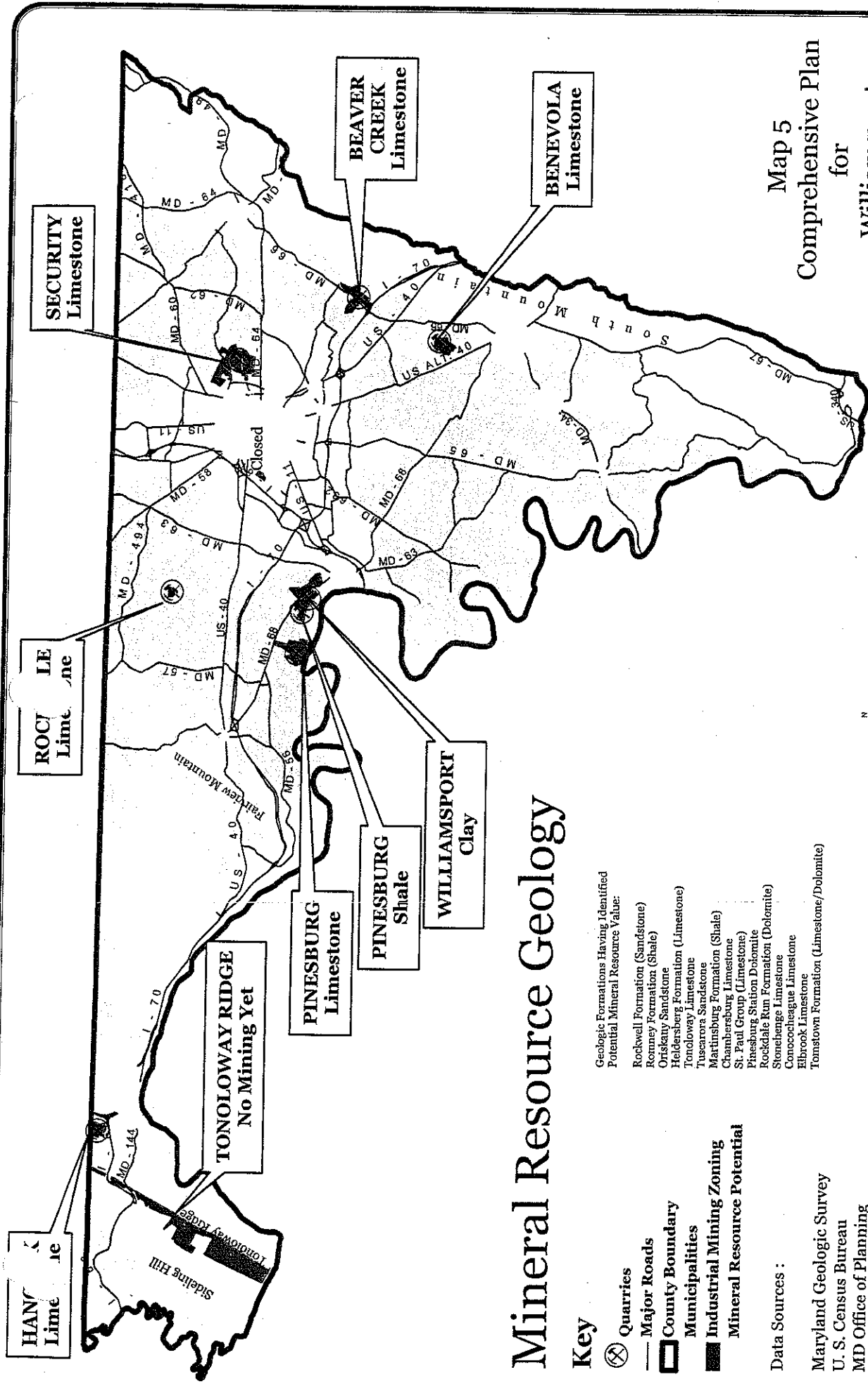
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## Map 4 Comprehensive Plan for Williamsport, Maryland 2010

Prepared by the  
Washington County  
Planning Department  
Geographic Information System



6-25-2010



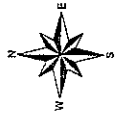
Map 5  
Comprehensive Plan  
for  
Williamsport,  
Maryland  
2010

Prepared by the  
Washington County  
Planning Department  
Geographic Information System

# Mineral Resource Geology

## Key

- Quarries
  - Major Roads
  - County Boundary
  - Municipalities
  - Industrial Mining Zoning
  - Mineral Resource Potential
- Data Sources :**
- Maryland Geologic Survey
  - U. S. Census Bureau
  - MD Office of Planning
  - Washington County Planning Dept
- Geologic Formations Having Identified Potential Mineral Resource Value:**
- Rockwell Formation (Sandstone)
  - Remney Formation (Shale)
  - Oriskany Sandstone
  - Heldersberg Formation (Limestone)
  - Tonoloway Limestone
  - Tuscarora Sandstone
  - Martinsburg Formation (Shale)
  - Chambersburg Limestone
  - St. Paul Group (Limestone)
  - Pinesburg Station Dolomite
  - Rockdale Run Formation (Dolomite)
  - Stonehenge Limestone
  - Conococheague Limestone
  - Elbrook Limestone
  - Tomstown Formation (Limestone/Dolomite)



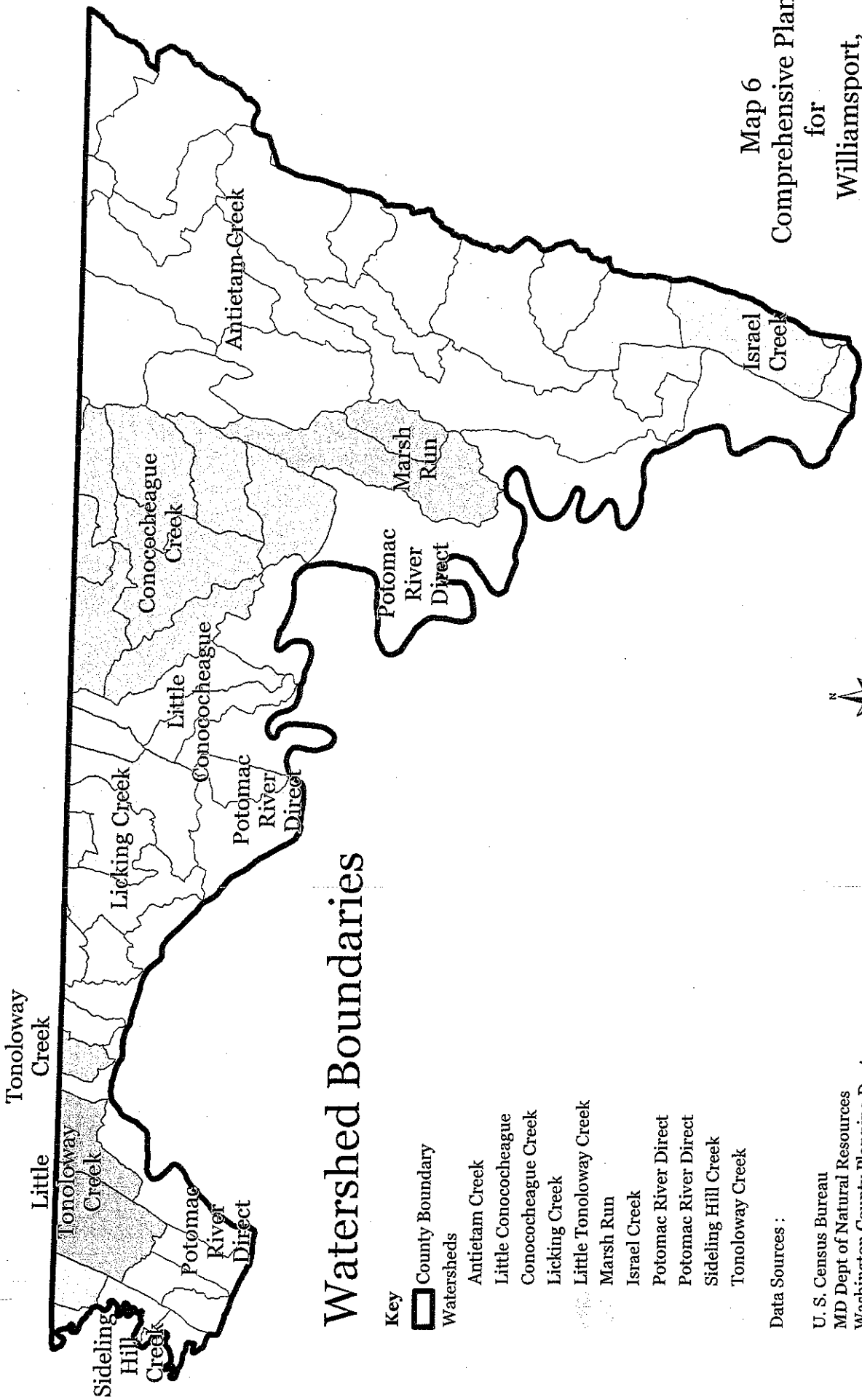
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Map 6  
Comprehensive Plan  
for  
Williamsport,  
Maryland  
2010

Prepared by the  
Washington County  
Planning Department  
Geographic Information System



# Watershed Boundaries

**Key**

County Boundary

Watersheds

Antietam Creek

Little Conococheague

Conococheague Creek

Licking Creek

Little Tonoloway Creek

Marsh Run

Israel Creek

Potomac River Direct

Potomac River Direct

Sideling Hill Creek

Tonoloway Creek

**Data Sources :**

U. S. Census Bureau

MD Dept of Natural Resources

Washington County Planning Dept

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