

May 1, 2024 -- Draft for 60-day review by State+County

900 CHAPTER THREE:
901 NATURAL RESOURCES

902 FEDERAL AND STATE OBJECTIVES

903 Protection of the Town's natural and environmental resources is absolutely essential to maintaining
904 the quality of life that Mount Airy currently enjoys. Research is under way to identify how
905 development activity is affecting the natural ecosystem. In Maryland, this research has been
906 pursued diligently to understand how we may improve the conditions of the Chesapeake Bay.
907 While Mount Airy is over 60 miles from the shores of the Chesapeake Bay, stream tributaries that
908 begin in Mount Airy eventually terminate in the bay.

909 To coordinate environmental efforts across the State, and ultimately improve the condition of the
910 Chesapeake Bay, the State has adopted several regulations requiring local governments to address
911 specific environmental issues. These laws, the *Maryland Economic Growth, Resource Protection,*
912 *and Planning Act of 1992 (as amended)*, and *1991 Forest Conservation Act*, and *Federal Clean*
913 *Water Act*, including storm water management, NPDES permit requirements and wetland
914 protection laws, along with the *Smart Growth Legislation of 1997 and Land Use-Local*
915 *Government Planning of 2006 (HB 1141)*. The latter legislation addressed land use, development
916 and water resources and requires that local comprehensive plans contain a Water Resources
917 Element and a Municipal Growth Element. In addition to these State regulatory measures, the
918 Town has independently addressed protection of steep slopes, floodplains and town well watershed
919 areas. This chapter reviews these regulations, and explores the relationships between natural
920 resource protection and land-use planning. The *Priority Preservation Area Element* was also
921 approved during the 2006 Legislative Session as part of HB 2 and is now required to be part of the
922 County Comprehensive Plan.

923

924 GENERAL CLIMATE

925 Mount Airy sits astride Parris Ridge, and has a humid, temperate climate with four rather well-
926 defined seasons. The general atmospheric flow is from west to east but alternate surges of cold air
927 from the north and of warm humid air from the south occurs in the area, causing highly variable
928 weather. Nearness to the Atlantic Coast allows coastal storms to make up any deficiency of
929 precipitation resulting from the passage of weather systems over the mountains to the west.

930 The average annual temperature is approximately 54 degrees, with January generally the coldest
931 month and July the warmest. Temperatures exceed 90 degrees Fahrenheit an average of 35 days a

932 year. The Town of Mount Airy is in the USDA Plant Hardiness Zone 7A for an annual extreme
933 minimum temperature of 0-5 degrees Fahrenheit.

934 The average annual precipitation totals about 48 inches, with February the driest and September
935 the wettest month. During the growing season, which averages about 177 days from April through
936 September, the last part of July through the first part of August is the driest. The average seasonal
937 snowfall is 21 inches.¹ The monthly precipitation is about even all year compared to climates
938 elsewhere. The wettest month is a result from storm events which tend to be spotty and quick.
939 Conversely, precipitation in spring is more even with many small events.

940 TOPOGRAPHY

941 Topography, the shape and lay of the land, is a major factor in controlling and guiding the density,
942 type and direction development is to take place in any area. Severely sloping terrain (i.e., greater
943 than 25-degrees), if not retained and protected in an undeveloped state, is suitable only for low-
944 density residential use or forestation, while land, which is moderately sloped or rolling, can be
945 appropriate for low, medium, and high-density residential development. In addition, it is the level
946 areas, which are most easily adaptable for industrial and commercial land use.

947 Mount Airy's Main Street, for the most part, runs atop Parris Ridge in a northeast-southwest
948 direction with elevations ranging between 800-850+ feet, which descend in two directions roughly
949 perpendicular to the ridge's spine. Numerous valleys that extend outward toward the east and west
950 from this ridge cause the unusually hilly topography. The present downtown area is located in one
951 of the more pronounced of these valleys and this funnel-like location causes many challenges with
952 regard to development and road network. Although this rough, sloping terrain adds character and
953 creates diversity throughout the Town, the most severe slopes are avoided in order to reduce hazard
954 and eliminate risk in future development.

955 Mount Airy straddles the division of two major drainage basins. Within the Frederick County
956 portion of the Town are the headwaters of Woodville Branch and Ben's Branch which are parts of
957 the Linganore Watershed, as well as the headwaters of Bush Creek, another Frederick County
958 Watershed. The Linganore Watershed drains into Lake Linganore, a secondary source of public
959 water for Frederick County. Both the Linganore and Bush Creek Watersheds are nested in the
960 Lower Monocacy River Watershed, with eventual drainage to the Potomac River. The east side
961 drains into the Chesapeake Bay via tributaries of Middle Run and the South Branch of the Patapsco
962 Rivers.

963

¹ Data and climatology analysis taken from the National Weather Service, NOAA, 1991-2020.

964

GEOLOGY

965 Geologic formations that underlie an area can be vital to the type of future development the land
966 may sustain. The quality, quantity, and accessibility of ground water are directly linked to the type
967 of rock formation or aquifer involved. The depth of bedrock and the presence of rock outcroppings
968 both have an effect on certain land uses and developmental patterns.

969 Ijamsville Formation and Marburg Schist are found throughout the Mount Airy area. The Marburg
970 Schist is mainly a bluish gray to green, fine-grained muscovite-chlorite schist, containing a
971 considerable amount of quartzite. Ijamsville Formation is blue, green, or purple phyllite and
972 phyllitic slate, with interbedded metasiltstone and metagraywacke.

973

SOILS²

974 Soils data are useful in helping to determine areas most suitable for future development. By using
975 soil studies, sound estimates can be made about where people will be living, working and playing.

976 This general soil survey and analysis takes into consideration the limitations, restrictions, and
977 hazards involved in the development of various soils areas in Mount Airy. By selecting an
978 unsuitable use for a specific soil, the risk of loss to the developer and to the Town can be very
979 high. The soils of our region which includes Mount Airy can be grouped into four major series
980 classifications as follow: a) Chester, b) Glenville, c) Mount Airy and d) Manor. Each has
981 characteristics that should be taken into consideration by those who propose to develop and use
982 the land.

983
984 1. CHESTER – The Chester series consists of deep, well-drained soils that are usually found on
985 hilltops and the upper part of slopes. Hard rock is generally at a depth of more than five feet
986 but quartzite fragments are common throughout the soil. Chester soils are strongly acidic and
987 have a high available moisture capacity. These soils are found south of Route 40 in the
988 Montgomery County area and any dense development should be avoided or compensated for
989 on slopes greater than 15%.

990 2. GLENVILLE – The Glenville series consists of moderately well drained, very strongly acid
991 soils that occur primarily on flats and at the foot of slopes. The depth to bedrock is generally
992 more than 5 feet; the soils are only moderately productive; and they have a limited capacity to
993 store moisture. The Glenville soils are in limited areas found in the southern section of the

² The Soil Conservation Service (USDA) in cooperation with the Maryland Agricultural Experiment Station develops Soil Survey material for Carroll, Howard, Frederick, and Montgomery Counties

994 Town vicinity and dense development should be avoided or compensated for because of a high-
995 water table.

996 3. MOUNT AIRY – The Mount Airy series consists of moderately deep, very strongly acid
997 soils that are somewhat excessively drained. The depth to bedrock in this soil is usually about
998 30 inches; they have a low to moderate available moisture capacity, and if well managed are
999 moderately productive. These soils are found in the Carroll, Montgomery, and Howard County
1000 sections that surround the Town. Furthermore, the shallow depth to bedrock will cause
1001 inconvenience in relation to any subsurface excavation.

1002 4. MANOR – The Manor series consists of shallow, excessively drained and immature soils that
1003 are not especially fertile or productive. These soils have a high available moisture capacity
1004 and are strongly acid. Although very susceptible to erosion they are suitable for a variety of
1005 uses. These soils are primarily found to the west of Mount Airy.

1006 HYDROLOGIC SOIL GROUPS³

1007 Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil
1008 Groups (HSGs) based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C
1009 and D. Where A's generally have the smallest runoff potential and D's have the greatest.

1010 **Group A** is sand, loamy sand or sandy loam types of soils. It has low runoff potential and high
1011 infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively
1012 drained sands or gravels and have a high rate of water transmission.

1013 **Group B** is silt loam or loam. It has a moderate infiltration rate when thoroughly wetted and
1014 consists chiefly or moderately deep to deep, moderately well to well drained soils with moderately
1015 fine to moderately coarse textures.

1016 **Group C** soils are sandy clay loam. They have low infiltration rates when thoroughly wetted and
1017 consist chiefly of soils with a layer that impedes downward movement of water and soils with
1018 moderately fine to fine structure.

³ Details of this classification can be found in 'Urban Hydrology for Small Watersheds' published by the Engineering Division of the Natural Resource Conservation Service, United States Department of Agriculture, and Technical Release-55.

1035

SENSITIVE AREAS

1036 The 1992 Planning Act defines sensitive areas as streams and stream buffers, 100-year floodplain,
1037 endangered species habitat, and steep slopes. An evaluation of Mt. Airy's topography helps to
1038 describe the sensitive areas in the Town.

1039 The Town of Mount Airy developed along Main Street. Generally, Main Street follows the peaks
1040 of Parr's Ridge. Parr's Ridge runs in a northeast-southwest direction and several minor ridges
1041 extend like fingers to the east and west. Between these minor ridges are small valleys in which
1042 the many branch streams surrounding the Town begin. Most land slopes at 8 -10% and areas where
1043 slopes exceed 15% are common. Land areas within the 100-year floodplain are minimal, located
1044 mostly along low-lying streambeds. Similarly, few wetlands have been identified outside the
1045 stream valleys. Less than a quarter mile south of Mount Airy the South Branch of the Patapsco
1046 River begins at Parr's Spring. The Town limits extend east to the South Branch of the Patapsco
1047 River, which meets the Carroll and Howard County boundaries.

1048 WATER

1049 The following discussion addresses the surface and groundwater sources of Mount Airy and their
1050 importance to the future development of the community.

1051 *Groundwater*

1052 The unconfined fractured rock aquifer within the Ijamsville Formation and Marburg Schist is the
1053 source of groundwater supply for the Town of Mount Airy. At the end of 2023, the Town's water
1054 supply system depends upon eleven (11) wells to obtain its drinking water. According to the 1958
1055 report on the Water Resources of Frederick and Carroll County,⁴ the Marburg Schist well yields
1056 from 1 to 223 gpm and averages about 17 gpm. Well depths average 87 feet. Except for limited
1057 areas along the crest of Parrs Ridge in the Ridgeville area, adequate supplies of ground water can
1058 be obtained from wells nearly anywhere within the schist area.
1059

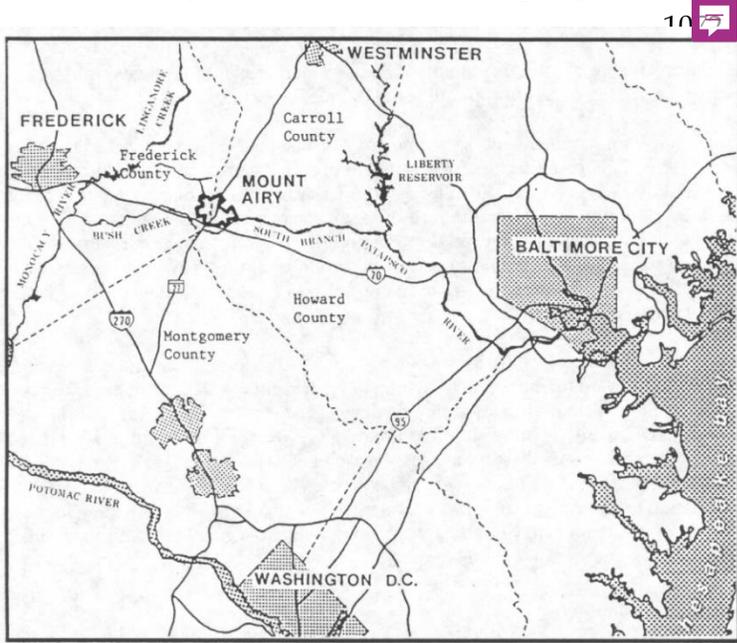
⁴ The Water Resources of Carroll and Frederick Counties, Department of Geology, Mines and Water, Baltimore, Maryland. 1958. The South Branch mainstem originates at Parrs Spring about 1.6 miles south of Mouth Airy and flows in a northeasterly direction where it is joined by several unnamed tributaries that flow east from the Town. The mainstem receives wastes from the possible overflow of individual sewage disposal systems until well east of Mount Airy. However, headwater streams of the South Branch Patapsco that flow into the mainstem receive stormwater runoff from Mount Airy, as well as treated wastewater releases from the Town.

May 1, 2024 -- Draft for 60-day review by State+County

1060 According to the 2010 Carroll County Water Resources Element (WRE), prepared by Malcolm
1061 Pirnie, Inc., consultant for Carroll County Government, the water supply is susceptible to
1062 contamination by nitrates, Volatile Organic Compound (VOC) [except well #8], Synthetic Organic
1063 Compounds (SOC), per- and poly-fluoroalkyl substances (PFAS), and radionuclides, but not
1064 susceptible to protozoans. Further, wells #2 and #7 are susceptible to bacteria and viruses. As the
1065 Town is “sitting” on its own water supply, as shown from the WRE, the water over time has risk
1066 of introduced undesirable contaminants in the form of road salts applied during the winter,
1067 fertilizer applications, an unintentional leaky sanitary sewer, etc. Carroll County will update the
1068 WRE in 2024.

1069

1070 Springheads are generally common in this schist formation, but are not a major source of water in
1071 the Mount Airy area. There is a small spring in Summit Ridge, at Main Street and Prospect Rd.



The pond at the Four County Farm just south of the Town is also spring fed.

The quality and quantity of groundwater is particularly important to the Town, which relies entirely on groundwater for its water supply. Development affects water quality in numerous ways: the introduction of impervious surfaces, mass grading which removes existing vegetation, concentration of pollutants into single high-volume drainage areas (stormwater management ponds), and potential application or spill of

1087 chemicals that are not naturally absorbed or filtered. Common sources of contamination include
1088 salt from road de-icing, excessive fertilizer and pesticide application, a leaking sanitary sewer
1089 system, leaking underground storage tanks, and other “non-point source” pollution.

1090

1091 **Surface Water**

1092 Because of its unique location at the perimeter of two major watersheds it is not surprising that
1093 Mount Airy does not have a large supply of surface water. The most important watershed is the
1094 South Branch of the Patapsco River that is located directly southeast of the Town limits. Other
1095 minor streams that affect Mount Airy are Bens Branch, and several unnamed tributaries of Bush
1096 Creek, Woodville Branch, and Middle Run.

1097

May 1, 2024 -- Draft for 60-day review by State+County

1098 The Town upgraded its sewage treatment plant in 1999 to Biological Nutrient Removal (BNR)
1099 and in 2011 to Enhanced Nutrient Removal (ENR); cleaning the effluent discharging into the
1100 South Branch of the Patapsco River. The quality and composition of the discharge is regularly
1101 tested in order to meet rigorous State standards. 

1102 STREAMS AND STREAM BUFFERS

1103 Requiring undisturbed, vegetated stream buffers often regulates the protection of streams.
1104 Vegetated buffers can slow the flow of stormwater, reducing the erosion of stream banks.
1105 Vegetation also absorbs water and acts as a "filter" for pollutants and nutrients. By slowing the
1106 flow of rainwater, buffers allow the water temperature to moderate before entering streams,
1107 reducing shock to aquatic species. Stream buffers provide other benefits as well, including
1108 improved wildlife habitat and scenic value in developed areas.

1109

1110 The Town of Mount Airy, through its adoption of the Water Resources Management Chapter of
1111 the Code of Public Laws and Ordinances of Carroll County, Maryland restricts development along
1112 streams, requiring a 50-foot-wide stream buffer from each stream bank. Several "models" exist
1113 by which an appropriate stream buffer could be established. Rather than establish a uniform buffer
1114 width for all streams, most models recommend that a buffer width be established to accomplish
1115 specific goals. A review of studies conducted nationwide finds that to significantly reduce the
1116 level of phosphorous entering streams, a 300-foot buffer on each side of the stream is necessary.
1117 However, if the goal is a reduction of sedimentation of the stream, a 100-foot buffer may suffice.
1118 Frederick County adopted strong stream protection regulations in 2008, which includes a variable
1119 width buffer based on degree and extent of slope, plus extra setbacks from streams in the Linganore
1120 Watershed to help reduce the sedimentation of Lake Linganore. These buffer regulations were
1121 amended by the Frederick County BOCC on October 31, 2013 and reduced the required setback
1122 distances.

1123 The effectiveness of a buffer is determined by many factors, including the steepness and length
1124 of slope within the buffer, the type of vegetative cover, the soil erodibility, and the presence of
1125 impervious surfaces (such as pavement or rooftops). Carroll County recommends a 300-foot
1126 buffer around a water supply, and a 100-foot buffer for all other tributaries; however, in
1127 calculating the buffer, impervious surface area and slopes exceeding 25% do not count towards
1128 the buffer width requirement in order to give environmentally sensitive areas maximum
1129 protection.

1130 100-YEAR FLOODPLAIN

1131 In 2006, the Town Council enacted Chapter 61 of the Town of Mount Airy Code whereby the
1132 Town adopted the Carroll County Floodplain Management Ordinance codified in Chapter 114 of
1133 the Carroll County Code. In January 2012, the Town Council formally designated Carroll County,

1134 under the National Flood Insurance Program as the entity responsible for floodplain administration
1135 within the Town. Mount Airy does not permit development within the 100-year floodplain (Town
1136 Code §112-10, *Structures and Land Development in Floodplain*).

1137 ENDANGERED SPECIES HABITATS

1138 In an effort to preserve habitat, 300-foot-wide forested buffers should be encouraged where
1139 practical and beneficial to wildlife. Land-use policies, parks planning, and forestation resulting
1140 from the Forest Conservation Act should contribute to enhancement of these corridors. Several
1141 species of plants and animals are listed as rare, threatened, or endangered in Frederick County and
1142 Carroll County.⁵

1143 STEEP SLOPES

1144 Mount Airy does not permit development on slopes equal to or greater than ~~in excess~~ of 25% and
1145 are not considered as part of any minimum lot area. The State Forest Conservation Act defines
1146 steep slopes as greater than 25%, or slopes greater than 15% with a K value (soil erodibility) of
1147 greater than 0.35. It is difficult to develop at any density on slopes in excess of 15% without
1148 significant grading.

1149 STATE FOREST CONSERVATION ACT

1150 In 1991, the State of Maryland adopted the first edition of the Forest Conservation Act, which
1151 provides that forest retention, reforestation, and/or afforestation be required of new land
1152 development. Subsequent reviews of statutory and regulatory requirements of the Forest
1153 Conservation Act resulted in the release of second and third editions of the manual, in 1995 and
1154 1997, respectively. This legislation allows local governments to develop their own programs,
1155 provided they meet the intent of the State Law. The Town of Mount Airy worked closely in
1156 conjunction with Carroll County to develop a program that could be implemented in the Town.
1157 The program has been administered successfully since 1993.

1158 The current program implemented for Carroll County stresses retention of existing forest area as
1159 the primary objective in order to fulfill the requirements of the ordinance. For every square acre
1160 of forest removed, the same amount will have to be replaced (reforested) on-site or somewhere
1161 within the same County managing the forestation bank. Afforestation, establishing a forest where
1162 there is none, is also required to meet the State objective of increasing forest cover in the State.
1163 Any residential development on property that has less than 20% of its land in forest cover must
1164 provide a 20% threshold of afforestation. Industrial and commercial lands are permitted slightly
1165 lesser criteria, requiring a minimum of 15% of the post-development land to be forested. To guide
1166 forestation decisions, priority retention areas and priority forestation areas are defined. These areas
1167 include stream buffers, steep slopes, wildlife corridors, and similarly valued natural areas. The

⁵ Maryland Department of Natural Resources

May 1, 2024 -- Draft for 60-day review by State+County

1168 requirements of the Forest Conservation Act have contributed to the preservation and aesthetic
1169 retention of natural and conservation areas within the Town limits. Although the Town has
1170 allowed developers to utilize certain dedicated "open space" and other natural drainage areas or
1171 steep slope areas within established subdivisions, lack of suitable land quickly has become a
1172 dilemma. The Town has subsequently allowed developers of commercial and industrial projects
1173 to fulfill their forestation requirements through Carroll County approved "Forestation Banks".
1174 These banks are located in various areas throughout the county but have a set number of acres that
1175 can be purchased by developers to fill their requirements. The banking has worked well in the
1176 County because the land used for these banks is located in strategic areas either along streambeds;
1177 steep slopes or other officially designated environmentally sensitive areas. Through the successful
1178 partnership between the Town and Carroll County, there now exists the opportunity to allow
1179 additional landscape plantings within developments that could meet forestation requirements. This
1180 proposed flexibility in the Forestation Ordinance requirements would encourage more on-site
1181 plantings instead of being forced to use off-site forestation banks.

1182 Natural tree cover in the older residential neighborhoods is an environmental benefit while in other
1183 sections of town; trees have been preserved in their original stands or removed for development
1184 purposes. The trees are hardwoods composed primarily of ash, oak and poplar.

1185
1186 **CARROLL COUNTY WATER RESOURCE MANAGEMENT CODE**
1187 **AND THE**
1188 **WATER RESOURCE MANAGEMENT MANUAL**

1189 In April 2004, the County Commissioners adopted Ordinance No. 04-08, which created Chapter
1190 154, *Water Resource Management of the County Code*. This new chapter formalized and
1191 strengthened the ability to manage and protect water resources within the county. The chapter
1192 provides for the delineation of management areas, and the ability to perform a water resource
1193 impact review on all proposed development projects within the county. Mt. Airy is among the
1194 several municipalities which have also adopted Chapter 154 (Town Code §110-1, *Adoption of*
1195 *County Provisions*).

1196 Updated in September, 2019, the Water Resource Management Manual has the overall goal to
1197 allow development to proceed in a manner that will minimize adverse impacts on the water supply.
1198 Some of Carroll County's geology and land use are unique and standards were developed to
1199 address local needs.

1200

1201 2023 TRIENNIAL UPDATE TO THE CARROLL COUNTY WATER
1202 AND SEWER MASTER PLAN

1203 Adopted in June, 2023, this updated plan implements the County Master Plan and guides the
1204 municipalities’ Master Plans. The County’s Water & Sewer Master Plan has the following three
1205 goals:

1206 **Goal 1:** Establish cost-effective public water and wastewater facilities that are consistent with
1207 the type and timing of planned development;

1208 **Goal 2:** Identify and plan for specific water and wastewater facilities that will accomplish Water
1209 Resource Element goals and strategies;

1210 **Goal 3:** Provide information about private water and wastewater users to inform planning-related
1211 analysis and decision-making.

1212 This Water and Sewer Master Plan and Chapter 154 of the County Code identify our county’s
1213 public water supply sources as the following Water Resource Management Areas:

1214

1215 A. **Carbonate Rock Area:** Presently, Mt. Airy has no Carbonate Rock Area beneath its
1216 boundaries.

1217

1218 B. **Wellhead Protection Area:** This area represents those regions that contribute
1219 groundwater to the indicated sources. These areas are based on “capture areas” as
1220 estimated from available field-testing data, hydrologic flow equations, and groundwater
1221 availability estimates, in combination with the hydrogeological characteristics of the
1222 subject aquifers. The Town has a wellhead protection ordinance to protect the well
1223 recharge areas around all of its current eleven (11) wells.

1224

1225 C. **Aquifer Protection Area:** This area encompasses regions within 2,000 feet of each
1226 Designated Growth Area (DGA) boundary, as well as any watershed-draining tributary to
1227 the Aquifer Protection Area (APA). The groundwater recharge available is assumed to be
1228 that which could be captured by gravity drainage into each of these areas. These areas,
1229 therefore, constitute the potential groundwater resource available to serve DGAs into the
1230 future. Mt. Airy is among the County’s DGAs.

1231

1232 D. **Surface Watershed Area:** This area encompasses the drainage basins of all existing and
1233 proposed surface water reservoirs in Carroll County. The delineation of these areas is
1234 based on topography and gravity drainage to the reservoirs.

1235

1236

1237 The triennial update also emphasizes that conservation of water as a fundamental aspect of
1238 resource protection and management. This component of Carroll County’s Water Resource
1239 Management Program consists of three elements: educate the public, update the plumbing code
1240 for new construction, and retrofit plumbing in existing construction. The Town complies with
1241 the County mandates for water conservation devices in new construction and requires that
1242 certain plumbing fixtures that are newly installed meet specified flow rates.

1243

1244 WATER CONTAMINATION

1245 Under the Federal Clean Water Act of 1972, the State is required to identify “impaired” water
1246 bodies, or those water bodies that do not meet their designated water quality standards.
1247 Impairments can come from nutrients such as nitrogen and phosphorus, sediment, pathogens,
1248 mercury, and other components (e.g. Per- and Polyfluorinated Substances commonly known as
1249 PFAS). Once a water body is deemed “impaired,” a Total Maximum Daily Load (TMDL) is
1250 developed by the Maryland Department of the Environment (MDE). A TDML is the maximum
1251 amount of a pollutant that the water body can assimilate and still meet water quality standards.
1252 To reduce pollutants of the receiving waters and address identified impairments, watershed
1253 implementation plans are required to be developed, at both the State and Local level.

1254 In 2023, the Town began routine well testing for PFAS contamination based upon EPA and
1255 MDE limits. Due to the contamination levels at some test sites, in 2024 the Town began the
1256 financial coordination with the State to design and install State-accepted PFAS mitigation
1257 equipment to be located at specific water pumping stations.

1258

1259 WATER RESOURCE MANAGEMENT STANDARDS 1260 AND THE MASTER PLAN

1261 The Carroll County Water Resource Management Standards/ Master Plan Compatibility Study
1262 prepared by Horsley Witten and Hegemann, Inc. reviewed the relationship between the proposed
1263 standards and their conflict or consistency with planning and zoning policies. If planning policies
1264 and regulations were not respectful of water resource issues, the success of water resource
1265 standards would be limited. The following recommendations apply to Mount Airy:

1266 *A. General Land Use Recommendations* - While contamination is a potential threat regardless of
1267 the land use, industrial uses are more likely to cause groundwater contamination from hazardous
1268 material accidents. However, increased nutrient loads and reduced groundwater recharge can
1269 result from intense development of any land use within a community well watershed. Water
1270 quality problems include excessive nitrate levels from residential and agricultural fertilizers and

1271 business wastewater, and phosphorus that is a result of surface run-off from residential,
1272 commercial, and agricultural uses.

1273 *B. Industrial Development* - The threat of groundwater contamination from industrial leaks and
1274 spills can be significant. The study recommends that existing and future industrial areas are subject
1275 to water resource management standards, and that future planning locate industrial activity outside
1276 potential community well watersheds.

1277 Currently, the Town has two wells whose watersheds include industrial land -- production well #6
1278 and production well #7. Production well #6 is located 1500 feet from current industrial land uses
1279 and is located at Watkins Regional Park. Production well #7 is located within the industrial park
1280 of the Twin Ridge Professional Center. The Town will continue to monitor all of our wells and
1281 remain vigilant for any activities that may adversely affect our wells.

1282 WELLHEAD PROTECTION AREAS

1283 Carroll County's water resource management standards require a 100-foot undisturbed buffer
1284 around community wells. The purpose of a buffer area is to ensure adequate time delay before
1285 contaminants could reach a well. The Horsley, Witten and Hegemann study explains that the
1286 buffer area should be sized according to the potential draw of the well, and most wells draw from
1287 an area larger than 100 feet. A well pumped at higher volumes will draw from a larger area over
1288 the same period of time than a lesser pumped well. Maryland Department of the Environment
1289 (MDE) has mapped recharge areas, but no studies have actually documented subsurface water flow
1290 under the Town.

1291 MOUNT AIRY WELLHEAD PROTECTION ORDINANCE

1292 In 1998, the Town of Mount Airy updated and adopted a Wellhead Protection Ordinance (Town
1293 Code §109, Article V, *Wellhead Protection*). The Ordinance designates a large portion of the
1294 Town boundary as the Wellhead Protection Area and therefore, regulates the review and provides
1295 a venue for analysis of all land uses within the Town boundaries. The Ordinance lists specific
1296 permitted uses, conditional uses, and prohibited uses.

1297 All of the conditional uses must come under an additional layer of review from the Town to ensure
1298 that the public groundwater supply will not be threatened by a particular use. The ordinance also
1299 specifies the documentation required by the landowner to ensure the prevention of any immediate
1300 or long-term hazard to the wellhead protection area of the Town. The majority of the conditional
1301 uses relate to fuel or gasoline storage, dry cleaning establishments, and heavy manufacturing uses.
1302 An example of prohibited uses may be junkyards, storage of hazardous materials, landfills and
1303 open burning or dumpsites.

1304

1305 MINIMUM WELL PRODUCTION ORDINANCE

1306 In October, 2023, the Town Council passed Ordinance 2023-40 to ensure a minimum flow of water
1307 from any new test well before it is accepted by the Town (Town Code §109-4, Wells). That
1308 minimum is at least a net yield of 75,000 gallons per day (GPD) after deductions based upon
1309 limiting factors including, but not limited to:

- 1310 (1) The Maryland Department of the Environment (MDE) annual average appropriation
1311 from the well,
- 1312 (2) The ability of the well to maintain production of at least 75,000 GPD during periods of
1313 drought., and
- 1314 (3) The availability of treatment facilities to treat the water from the well.

1315 The Ordinance does allow for acceptance of wells producing less than 75,000 GPD, but only when
1316 it is recommended by the Town Engineer and under such circumstances as:

- 1317 (a) The well is one of multiple wells to be simultaneously dedicated to the Town that
1318 collectively produce a net yield of at least 150,000 GPD after deduction of limiting factors.
- 1319 (b) The individual well produces at least a net yield of 50,000 GPD after deduction of
1320 limiting factors.

1321

1322 RESPONSIBILITY OF DEVELOPERS TO PROVIDE NEW WATER SOURCES

1323 In 1989, the Town adopted Ordinance No. 1989-2 that requires developers to find a significant
1324 well within their project area or pay a well exploration fee. Following adoption of this ordinance,
1325 several good wells have been found. However, the new wells may be located within the
1326 development regardless of the proposed density or permitted land use. As a requirement for most
1327 major residential annexations, the development of a well is a necessity. Growth of the Town over
1328 the last ten years has created the need for a new well for a major development to offset the draw
1329 on the existing water system.

1330 WATER RESOURCE COORDINATION COUNCIL (WRCC)

1331 Mt. Airy is among a group of 8 municipalities within Carroll County committed to working
1332 together to address water, wastewater and stormwater management issues. Their routine sharing
1333 of best-practices has proven to be an effective and efficient water management body.

1334 The Water Resource Coordination Council (WRCC) was formed in March 2007 by a non-binding
1335 joint resolution between the County, municipalities, and Carroll County Health Department. The
1336 body provides a mechanism for cooperative problem solving of critical water resource
1337 management issues facing the County and municipalities. The body fosters discussion between
1338 jurisdictions in order to develop regional (watershed) or county-wide approaches to policies,
1339 procedures, and solutions regarding water resource development and protection. Most importantly,
1340 it provides a forum for the dissemination of ideas, solutions, and cost-saving approaches to water
1341 resource development and protection within Carroll County.

1342 STORMWATER MANAGEMENT

1343 Stormwater management facilities are an attempt to replace the natural network for rainwater travel
1344 and filtering in developed areas. Stormwater runoff is conveyed to a stormwater management
1345 facility via sheet flow, storm drain system or another method of conveyance. Once the runoff
1346 reaches the facility, its release rate and quality can be managed.

1347 There are various types of stormwater management facilities designed primarily to control the
1348 increased volume or rate of runoff and/or eliminate pollutants that result from rainfall on developed
1349 areas.  stormwater management structures help prevent the sudden flow of stormwater into
1350 streams, and thereby reduce the risk of erosion and sediment deposit. Stormwater management
1351 facilities also help prevent large volumes of runoff from damaging downstream properties.
1352 Another primary function of many stormwater management facilities is pollutant removal. In
1353 addition, stormwater management facilities often facilitate infiltration of surface water to replenish
1354 Mount Airy's groundwater (drinking water) supply.

1355 Although stormwater management facilities provide many benefits, problems relating to these
1356 facilities persist. Because facility design concentrates runoff in one location, there may be an
1357 increased loading of pollutants or nutrients at that location. The best way to minimize this loading
1358 is to provide as much natural vegetated surface area as possible throughout each new development.
1359 Vegetation will help treat pollutant-laden runoff. Stormwater management facilities also require
1360 substantial maintenance, which is typically provided by the Town at taxpayer expense within low-
1361 density residential developments.

1362 In 2007, House Bill (HB) 786, known as the Stormwater Management Act, was passed. This
1363 legislation requires stormwater management practices to mimic natural water runoff and minimize
1364 land development impact on water resources. The stricter standard reduces pollution runoff to the
1365 Bay from impervious surfaces such as pavement, roofs, and structures.

1366 Long range planning is the primary tool to address the stormwater challenges of the future which
1367 includes a multi-year program of stormwater upgrades to meet future needs and ever-increasing
1368 permit requirements. The impact of climate change on the current stormwater infrastructure shall

1369 be closely monitored moving forward and addressed in the design of new facilities which will
1370 result in increases in required funding of more robust stormwater management infrastructure. All
1371 major stormwater management projects will be coordinated with the aforementioned Water
1372 Resource Coordination Council (WRCC).

1373
1374

1375 STATE OF MARYLAND PROGRAM
1376 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

1377 The State of Maryland created and is an ongoing participant in the National Pollutant Discharge
1378 Elimination System (NPDES) for stormwater management. This program is designed to monitor
1379 stormwater flow for pollutants some of which are considered “non-point source” or generating
1380 from some distance away from the storm drain system but ultimately accessing the municipal
1381 storm drain system. These off-site pollutants make their way into the system and could potentially
1382 create a negative effect on the groundwater supply for the town.

1383 A NPDES Phase II permit is required from the State for all counties and municipalities to
1384 continuously monitor their stormwater flow for contaminants. This permitting process is required
1385 from the EPA as part of the Federal Clean Water Act. Under this permit, Best Management
1386 Practices are promoted and the implementation of the following six measures is encouraged:

- 1387
- 1388 • Public education and outreach
 - 1389 • Public participation and involvement
 - 1390 • Illicit discharge detection and elimination
 - 1391 • Construction site runoff control
 - 1392 • Post -construction runoff control
 - 1393 • Pollution prevention/good housekeeping

1394 This permit will be carried by Carroll County. The Town of Mount Airy will be attached to their
1395 permit and therefore be in compliance with the program. In order for the County to meet the
1396 requirements of the permit, the storm drain system for the County and all of the municipalities
1397 participating will need to be put into a mapping program. The County has hired a staff person to
1398 log in all new storm drain system information and make the necessary reporting requirements to
1399 the State, because so much information is needed to monitor storm water flow.

1400 GILLIS FALLS RESERVOIR

1401 In 1988, the Carroll County Bureau of Water Resources released a study including estimates of
1402 water supply and demand in southern Carroll County. That water resource study concluded that
1403 water demand would exceed supply by the year 2015. In order to plan for the future water usage,

May 1, 2024 -- Draft for 60-day review by State+County

1404 Carroll County planned for a surface water source, the Gillis Falls Reservoir, located 2 miles
1405 northeast of Mt. Airy. The reservoir was envisioned to require a dam. As of 2023, the County had
1406 purchased about 91% of the total 1,200 acres needed to establish the reservoir. The land of the
1407 reservoir watershed is primarily in conservation-zoning; thereby protecting the water quality of a
1408 possible future reservoir.

1409 Of note, the Carroll County 2023 Water and Sewer Master Plan includes the Gillis Falls Reservoir
1410 as one of the Town’s *potential* long-term (10+ years) options for an additional surface water
1411 source. That Master Plan recommendation also:

- 1412 • estimates a safe yield of 0 mgd from the reservoir,
- 1413 • encourages the Town and County to develop an intake pipeline for the reservoir on Carroll
1414 County-owned property, and
- 1415 • for the Town and County to establish a 100-120 mg off-stream storage impoundment.

1416 HARRISON/LEISHEAR PROPERTY

1417 An additional long-range recommendation from Carroll County for future groundwater
1418 exploration is the *potential* new water supply options within the nearby Carroll County-owned
1419 Harrison/Leishear property that is located just north of the current Town boundary. In the recent
1420 past, the Town worked with Carroll County and MDE for water appropriations to four wells on
1421 this property. That effort was being driven by discussions between the County and the Town to
1422 possibly annex that property into the Town. Based upon the Town’s testing during those
1423 annexation negotiations, the four wells have an anticipated (combined) appropriation amount of
1424 151,000 gpd. That amount would significantly mitigate the current (2023) projected water
1425 shortfall of 165,000 gpd to meet the Town’s future water demand needs. Unfortunately, the
1426 annexation discussions were paused indefinitely and will need to be restarted in order to seriously
1427 continue this much-needed nearby groundwater source for the Town’s future growth. But the fact
1428 that the 2023 Carroll County Water and Sewer Master Plan includes this option for the Town gives
1429 optimism to renewing those negotiations.

1430

1431 WATER RESOURCE ELEMENT

1432 The Water Resource Element (WRE) is a statutory requirement for jurisdictions to ensure that
1433 municipalities including Mount Airy have comprehensive plans to meet current and future water
1434 and sewer demands. It sets out in detail the current status along with future plans for the town’s

May 1, 2024 -- Draft for 60-day review by State+County

1435 water and sewer capacity given the limitations and constraints of our water resources. The WRE
1436 is an integral part of the Master Plan.

1437 The Town of Mount Airy is a part of Carroll County and the Town’s WRE is incorporated into the
1438 County's WRE. The Town’s WRE is currently being updated (by the Town Engineer and the
1439 Water & Sewer Commission) and will replace the 2010 WRE.

1440 Noteworthy is the addition of climate change considerations as they may impact the potential of
1441 flooding into the town's water system, our Waste Water Treatment Plant
1442 (WWTP), and stormwater facilities. The town also monitors PFAS levels at all 11 well quarterly
1443 test results are a key factor in our ongoing remediation program and those results are available on
1444 the Town's website.

1445

1446 WATER/WASTEWATER

1447 WATER SUPPLY

1448 The Town of Mount Airy is not only located in two counties, but also divided into five different
1449 watersheds. From 2005 to 2011, the Town was under a Consent Order with the Maryland
1450 Department of the Environment to find additional source water for the Town’s increasing water
1451 supply demands. The Town operates strictly off of groundwater supply, and all other options for
1452 a long-term water supply have been limited due to financial considerations. In recent years the
1453 Town replaced more than 15,000 Linear Feet of pipe for the water main, increasing to a 12" main
1454 between all three elevated storage tanks.

1455 The unconfined fractured rock aquifer is the source of water supply for the Town. The system uses
1456 11 wells to provide a municipal water supply for over 9,600 residents. The Town’s existing water
1457 supply system consists of eleven wells, transmission and feeder mains and five water
1458 treatment/booster pumping stations. The Town also operates three elevated tanks capable of
1459 holding over 1,700,000 gallons in reserve. The main well field is located in Frederick County and
1460 consists of wells #1-4. Wells #5 and #6 are located in Carroll County west of MD 27. Wells #7
1461 (Twin Ridge Subdivision) and #8 (Summit Ridge Subdivision) were brought on line as a result of
1462 those two subdivisions. Public Well #9 was on Town owned property and subsequently developed
1463 and well #10, was brought on by way of development activity. Public well #11, recently brought
1464 on line within the last year is located on South Main Street, is located on Town owned property
1465 and put into service to fulfill the requirements of MDE to satisfy the water allocation of existing
1466 approved developments.

1467

May 1, 2024 -- Draft for 60-day review by State+County

Well Number	MDE Approved Allocations based on Yearly Average	Current Demand	
Wells 1-4	255,000 gpd		
Well 5	43,000 gpd		
Well 6	149,000 gpd		
Well 7	99,000 gpd		
Well 8	150,000 gpd		
Well 9	79,000 gpd		
Well 10	77,000 gpd		
Well 11	75,000 gpd		
Total Gallons Per Day Allocation	927,000 gpd		765,000 gpd

Current Maryland Department of the Environment has allocated and permitted the Town for a total of 927,000 gallons per day to be extracted from all eleven wells currently on line. The Town has three (3) water storage tanks (i.e. water towers). The most recent third water storage tank is capable of holding 1,000,000 gallons per day of water in reserve.

WATER SUPPLY LIMITATIONS

The Town of Mount Airy has historically utilized groundwater wells for its primary water supply. The emphasis on groundwater supply has served the Town well over the last forty years and the Town has been fortunate to find, purchase and drill several large production wells, the majority within our municipal boundaries.

The Town would like to continue this trend of reliance on groundwater resources within the municipal boundaries. The Town also understands that a long-term water solution may not fit within these desired criteria. Most importantly, the ultimate water supply side must not exceed the design capacity of our WWTP, which is currently permitted at 1.2 million gallons per day processing capacity.

WASTEWATER

The Town of Mount Airy currently has 11 wastewater pump stations that move wastewater over the various ridges throughout the Town which all feed into a single wastewater treatment plant.

1499 The Town’s Wastewater Treatment Plant (WWTP) is located approximately one mile east of MD
1500 27 along an abandoned length of the B&O Railroad. The plant treats the wastewater and
1501 discharges the flow into the South Branch of the Patapsco River.

1502 The Sewer System camera inspections in 2007 identified three major infiltration leaks which were
1503 immediately corrected followed by 4,000 linear feet of fold and form repairs in 2010. Manhole
1504 inspections and repairs occurred over the next several years. In the last five years, nighttime
1505 inspections identified an additional six miles of infiltrating pipes which were repaired with cured-
1506 in-place pipe linings (CIPP) utilizing American Rescue Plan Act (ARPA) funding. The average
1507 flow into the WWTP has steadily increased through the years from an average of 515,000 gpd in
1508 1998 to 737,000 gpd in 2013. The net difference between wastewater flow and supply water
1509 became extreme and suggested that a growing source of rainwater was inflowing and/or infiltrating
1510 (I&I) the collection system. The Town therefore ramped-up its I&I reduction program.

1511 The treatment process consists of the following: a bar screen, grit removal, Biological Nutrient
1512 Removal (BNR) aeration, clarification, Enhanced Nutrient Removal (ENR) filtration, ultraviolet
1513 light and post aeration, solids process, sludge holding, and belt filter press with lime
1514 stabilization. This plant has a permitted treatment capacity of 1.2 million gallons per day. This
1515 plant was built with the original sewer system in 1972 and has undergone 3 major upgrades.

1516 This plant has a permitted treatment capacity of 1.2 million gallons per day. This plant was built
1517 with the original sewer system in 1972 and has undergone 3 major upgrades.

1518 The first upgrade was around 1989 and expanded the plant to meet the capacity of numerous
1519 developments occurring in the Town.

1520 In 1999, the plant was expanded again to its current design capacity, but also improved with
1521 Biological Nutrient Removal (BNR) technology which includes the installation of aerobic and
1522 anoxic zones. The biological processes involve the use of micro-organisms and oxidation to reduce
1523 both total nitrogen (TN) and total phosphorous (TP) from the water. During nitrification the
1524 ammonia is oxidized to nitrite and then to nitrate in the presence of oxygen under aerobic
1525 conditions. This is followed by the denitrification of nitrates which biologically reduces to nitric
1526 oxide, nitrous oxide and nitrogen gas, in the absence of oxygen under anoxic conditions. Total
1527 phosphorous in wastewater is a combination of soluble and particulate phosphate. The solids, or
1528 particulates, are easily removed through the solids removal process. During aerobic conditions the
1529 soluble phosphorus is solidified by aerobic heterotrophs and then broken down under anaerobic
1530 conditions to the release of phosphorus. This process is repeated with the return sludge system.

1531 In 2010, the wastewater plant was upgraded again to Enhanced Nutrient Removal (ENR)
1532 technology. The TETRA Denite system combines the denitrifications and filtration process to
1533 further reduce TN and TP below the stringent 3mg/liter and 0.3mg/liter discharge limitations,
1534 respectively.

May 1, 2024 -- Draft for 60-day review by State+County

1535 This effective removal process is undertaken by introducing methanol as a carbon source. It has
1536 proven to be very effective in meeting the State’s requirements.

1537

1538 WASTEWATER LIMITATIONS

1539 The Town needs to keep our long-term ter supply options open, but with serious consideration
1540 of what the long-term financial limitations are for a smaller municipality. Because of these
1541 potential financial limitations, the Town may not be able to seriously consider all possible options.
1542 It is the Town’s intention to only pursue long-term planning, development and a rate of growth
1543 that is responsive to and in balance with both the (known or demonstrated) capacity of the Town’s
1544 ter resources and the future growth preferences of the Town’s residents.

1545 NATURAL RESOURCES POLICY SUMMARY

1546 Increased awareness of the effects of development on the environment has led to additional
1547 environmental legislation at the State and local levels. The *1992 Maryland Economic Growth*
1548 *Resource Protection and Planning Act*, the *1991 Forest Conservation Act* and the *1997 Smart*
1549 *Growth Legislation* will significantly affect the planning policies of the Town. Mount Airy’s
1550 reliance on groundwater for the Town’s water system will require comprehensive groundwater
1551 management as the Town grows.

1552
1553
1554
1555
1556
1557
1558
1559
1560
1561
1562
1563
1564
1565
1566
1567
1568
1569
1570
1571



1572
1573
1574
1575

1576
1577
1578
1579
1580
1581

1582
1583

1584

1585

1586
1587
1588
1589
1590

1591

1592
1593
1594

1595
1596
1597
1598
1599
1600
1601
1602
1603
1604
1605

Natural Resources

Objectives and Implementing Strategies **aligned with the Town’s Strategic Goals**

STRATEGIC GOAL A: Achieve More-Than-Adequate Public Facilities: Don’t settle for “adequate.” Improve the capacity and quality of all seven (7) areas of our Public Facilities so that we can increase the Quality of Life for all residents. This will also create a reserve capacity in order to support population increases and absorb unpredicted impacts (e.g. droughts, ground water contamination, major road detours/closures, unplanned reduction of waste water treatment capacity, etc.).

Objective A.3.1: Increase the Town’s well water reserve.

Objective Leader: Town Engineer

Implementation:

- Search for additional drinking water sources via well drilling or Brinkley Bill application of existing wells where source capacity already exists.
- Require large developments to provide ample water capacity with their development to support the Town’s calculation of proposed demand and drought reserve (Category 11).

=====

STRATEGIC GOAL B: Responsible Growth: Provide growth through infill development, redevelopment and annexations while erasing our Open Space deficit, protecting our environment and preserving our cultural/historical resources and community identity.

Objective B.3.1: Continuously improve water testing technology.

Objective Leader: Town Engineer

Implementation:

- Implement the installation of better PFAS monitoring technology at all of the Town’s Water Treatment Plants.
- Replace existing equipment with newer monitoring technology for all known contaminants.

1606 **Objective B.3.2:** Document and enforce stormwater runoff within the Town.

1607

1608 **Objective Leader:** Town Engineer in coordination with the Public Works Director

1609

1610 **Implementation:**

1611

1612 ➤ Continue to work with Carroll County to meet the State mandated NPDES and stormwater
1613 management improvements and mapping on existing land development.

1614 ➤ Ensure all new development is thoroughly reviewed by Carroll County’s stormwater
1615 management office to meet the requirements of the State and Town code.

1616 ➤ Establish new metrics to measure and monitor the impact of climate change on the current
1617 stormwater infrastructure. Apply those results towards increased funding of more robust
1618 and/or improved stormwater management infrastructure.



1619

1620 **Objective B.3.3:** Increase forested land within, and adjacent to the Town.

1621

1622 **Objective Leader:** Town Engineer

1623

1624 **Implementation:**

1625 ➤ Ensure all new development is thoroughly reviewed to determine compliance with the 20%
1626 forested (residential) and 15% forested (industrial) requirements for the minimum amount
1627 of forested land in those districts.

1628 ➤ In cooperation with both Counties, review the current Forestation Banks Program with the
1629 objective to encourage any developer who cannot meet the above requirements to:

1630 ○ provide forestation plantings on equal acreage on in-Town parcels; or

1631 ○ require any outside-Town Forestation Bank purchase by a developer to be provided
1632 on available land adjacent to the Town’s boundaries.

1633 ➤ In cooperation with the appropriate Town Commission and /or Board, assess those Town-
1634 owned areas where additional forestation or shrubbery can benefit residents. Then, use
1635 that list:

1636 ○ in the implementation efforts above, and

1637 ○ in cooperation with the Maryland Department of Natural Resources, Frederick
1638 County and /or Carroll County, seek a cooperative agreement on a reforestation
1639 project to fulfill those prioritized Town forestation/shrubbery needs. If necessary,
1640 use the 2008 effort in Watkins Park as a model and precedence case.

1641