

Environment

Overview

Many natural environmental features characterize Manassas Park. Natural features such as streams, ponds, wetlands, floodplains, woodlands, steep terrain and wildlife habitats create natural borders around its urban neighbors. As the city develops, consideration should be given to preserving some land in its natural form, conserving open space and minimizing pollution.

The planning, development and use of any place is strongly affected by the characteristics of the land, including geology, climate, soils, topography and streams. From the earliest development through the most recent, these characteristics remain an important part of life in Manassas Park.

Natural Features

Geology

The city lies astride the boundary between the Piedmont Uplands and the Triassic Basin or Piedmont Lowlands. The line runs through south central Fairfax County along the valley of Russia Branch, skirting the western boundary.

The area is characterized by deeply weathered, poorly exposed bedrock with a high degree of geological complexity. Although depth to bedrock varies in most places, it is generally within two to six feet.

With the exception of designated floodplains, most areas of the city are generally suitable for development if the site is properly engineered. Developers must refer to the city's Planning and Public Works Departments for more information and recommended resources concerning the engineering limits of the underlying geology.

Air Quality

Ambient air quality is not a measure for the city alone but rather for the region. National Ambient Air Quality Standards (NAAQS) exist for seven pollutants established by the U.S. Environmental Protection Agency (EPA) and adopted by the Virginia State Air Pollution Control Board.

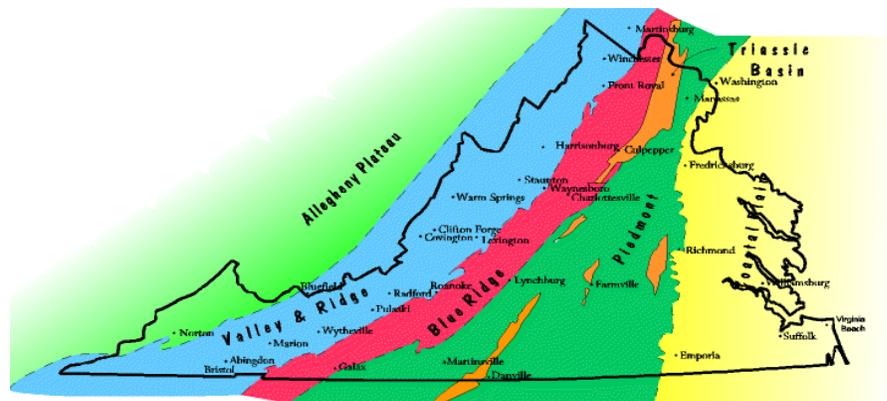


Figure 7.1 Geologic Regions of Virginia

The air quality in the region is determined through measurement of seven pollutants. Existing levels of six of the seven pollutants, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), hydrocarbons (HC), lead (Pb), carbon monoxide (CO) and suspended particulates, pose little or no threat to air quality in the region. These six pollutants are all a direct result of reactions caused by combustion engines. Ground level ozone, the seventh pollutant, is a colorless gas formed by a chemical reaction between volatile organic compounds (VOC) and oxides of nitrogen in the presence of sunlight. The Washington Metropolitan area, based on the 1990 Clean Air Act Amendments, is classified as a “serious non-attainment area” with respect to ground-level ozone pollution.

Since 1990, the region has violated the federal standard for ozone an average of six days each summer. Metropolitan Washington Council of Governments (MWCOG) declares air pollution alerts in response to the accelerated ozone levels. These alerts are directed toward the young, elderly and individuals with respiratory disorders.

The city, as a member of MWCOG, integrates its planning efforts with those of the region. While local jurisdictions are cooperating to control ozone, the Commonwealth of Virginia is required to develop control strategies for regions with non-attainment status. The federally-mandated State Implementation Plan (SIP) for the Northern Virginia region (reviewable by the EPA)

includes more stringent vehicle emissions inspection, requiring Stage II vapor-recovery nozzles at gasoline pumps and clean fleet standards for both public and private vehicle fleets.

Soils

Soils developed from rocks and minerals from the Piedmont division form acid, infertile soils, with sandy loam surfaces. Many of the clayey sub-soils are red or yellowish-red due to the oxidized iron weathered from the primary minerals. Natural fertility is low, however, so these soils respond well to liming and fertilization. With some exceptions, the soils of the city are well suited for urban development. Much of the land within the floodplain is poorly drained, subject to flooding, and is not considered suitable for urban development. Shrink-swell soils are associated with substantial shrink and swell behavior in response to changes in water content, resulting in ground instability. Developments in these areas are discouraged, unless adequate engineering measures can be taken to prevent future structural damage. Developers must refer to the city’s Planning Department for more information and recommended resources concerning the engineering capacity of the underlying geology.

Climate

Virginia's climate is a diverse one, with temperature and precipitation that vary significantly throughout the state. See chart below.

Table 7.1 Average Climate and Weather Conditions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Days with precipitation	10	9	10	10	12	10	11	10	9	8	9	10
Wind speed (mph)	8.3	8.8	9.2	9.0	7.6	7.0	6.4	6.0	6.4	6.8	7.8	7.9
AM humidity (%)	76	77	77	76	82	83	85	87	89	88	82	78
PM humidity (%)	58	54	52	49	55	56	55	55	56	54	54	58
Sunshine (%)	46	50	55	57	58	64	62	62	61	59	51	46
Days w/no clouds	7	7	7	7	7	6	8	8	9	11	7	7
Partly cloudy days	7	6	8	9	10	12	11	11	9	8	8	7
Cloudy days	17	15	16	14	14	12	12	12	12	12	15	17
Snowfall (in)	7.3	6.3	3.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.3
Average temp (°F)	31	34	43	53	62	71	75	74	67	55	45	36
High temp (°F)	42	46	55	66	74	82	87	86	79	68	57	46
Low temp (°F)	21	23	31	40	50	59	64	62	55	42	33	25
Precipitation (in)	3.2	2.8	3.7	3.3	4.4	3.9	3.7	3.8	4.0	3.5	3.4	3.1

Topography

Manassas Park is situated on a relatively flat or gently rolling land between Western Fairfax County and the greater Eastern Prince William County region.

Any development or redevelopment within the city must take topographic constraints into consideration. Steep slopes in excess of 15% and slopes located along streams are susceptible to erosion, and therefore particular care must be taken when planning to develop a site with these characteristics.

Few areas of the city's land area have slopes greater than 15%. These areas are primarily associated with the eastern side of the city. Truly steep slopes, greater than 25%, occur along the banks of the Bull Run. Stream valley slopes often serve as vegetative buffers that filter storm water runoff, while providing

wildlife habitat corridors for movement and should be considered during development.

If improperly developed, these areas may lose soil stability and increase storm water runoff, causing construction failure, erosion, downstream flooding, and other hazards. Development on steep slopes requires high volumes of "cut" and "fill". Such earthmoving is subject to erosion and sedimentation causing adverse effects on surface water quality.

Major Streams and Watersheds

The City of Manassas Park is located in the Chesapeake Bay and the Occoquan River Watersheds. Watersheds and their associated stream floodplains are an important environmental concern. They provide natural storm drainage systems that are susceptible to erosion and pollution resulting from urbanization.



Figure 7.2 Pond at Signal Bay Park

Development expands the amount of impervious surface, increasing storm water runoff. Increased runoff may exceed the capacity of the natural flood plain to contain the flow, resulting in flood damage. In addition, contaminants washed into the runoff contribute to the pollution of surface and groundwater for miles downstream. The city, therefore, has a vital interest in the protection of its watersheds and streams.

Two perennial waterways, Russia Branch and Bull Run, bound the City on the west and north, respectively. Both are considered Class 3 streams, free flowing streams categorized below mountain streams but above estuaries. Russia Branch is a second order stream, receiving small tributaries, and flows along the western boundary of the Signal Hill Tract, which drains and then flows into the Union Mill Tract and parallel to its western border. It also flows into Bull Run, another second order stream, at the northwest corner of the Park. The western portion of

the Union Mill Tract drains into Russia Branch and the remainder of the tract drains into Bull Run via various small streams.

Bull Run is a major tributary of the Occoquan River Watershed and contributes to the regional drinking water supply. The estimated 100-year floodplain of Russia Branch was designated a “Zone A – Special Flood Hazard Area”.

Location of the Occoquan Basin

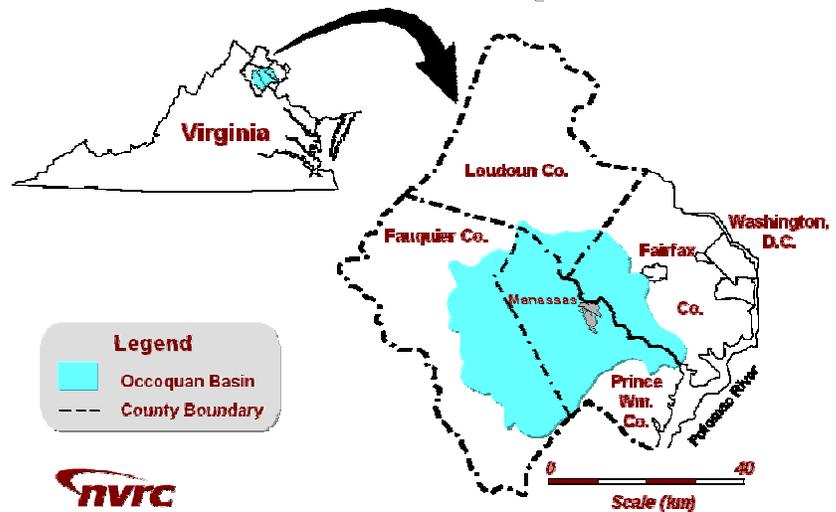


Figure 7.3 Location of the Occoquan Basin

Natural Resources

The city has several categories of natural resources that are easily impaired by urban land uses. Of particular concern are water quality, floodplains, wetlands, woodlands and wildlife.

Surface Water Quality

It is imperative that the city preserve the quality of both surface and groundwater through sound quality

management programs. Of particular concern are the many pollutants that can affect groundwater quality in urban areas. These materials include motor oil, road salt, and pollutants from underground storage tanks. Once these materials find their way into the groundwater, they may be transported through the soil to contaminate surface waters.

The City's water resources are under increasing demand as the area becomes more urbanized. Manassas Park obtains its water from city wells and the City of Manassas. The City discharges wastewater to the Upper Occoquan Sewage Authority (UOSA) which treats the wastewater to a high level before discharge. All of the city residents receive their water from the city's public water system.

To preserve the water resources, the city seeks to protect its waters from the effects of point sources such as leaking underground storage tanks or above ground chemical spills and non-point sources such as erosion, runoff containing fertilizer, pesticides and other chemicals.

Wetlands

Wetlands are an important natural resource because they store floodwater, perform a filtration function that can improve water quality, and provide essential habitat for wildlife. Wetlands can continue to perform these vital roles in the midst of development if they are carefully incorporated as natural areas. Wetlands that are not "wet"

during much of the year can also support active and passive recreation with little disturbance.

Though not extensive, wetlands are found throughout the City of Manassas Park. The federal government, through the U.S. Army Corps of Engineers, regulates construction in wetland areas. The city requires that development proposals involving wetlands demonstrate compliance with federal policy.

Floodplains

A floodplain is land along a natural drainage way that is subject to continuous or periodic inundation or flooding. For the purpose of protecting the general public from the hazards of flooding, the City of Manassas Park establishes and regulates an official 100-year floodplain. This especially designated area comprises lands with at least a one percent chance of being flooded in any given year. In the City of Manassas Park, the official 100-year floodplain is generally limited, for regulatory purposes, to lands associated with a watershed of at least 100 acres.

Floodplains in the city lie throughout the city and consist of either natural land surface or impervious surfaces associated with development. City ordinances regulate development within the floodplain to protect the community from loss of life and property and to maintain the natural integrity of streams. Any alteration of floodplains to make land developable requires prior approval

by FEMA, which establishes the floodplain boundaries.

Woodlands/Tree Cover

Because the City of Manassas Park is almost entirely developed, few significant vegetation stands remain. Those that still exist, whether public or private, deserve special attention so that their aesthetic and ecological benefits to the city are not lost. In addition to these stands, city streets and medians are lined with trees, shrubs, and ground cover. These provide both the aesthetic benefits of a canopy and the framing of streets, as well as cooling of microclimates.

The largest city-owned vegetation stand is located in Signal Hill Park. The park covers 108 acres, of which approximately 30% remains in a natural state. Signal Hill contains oaks, hickories, and chestnuts as well as a beech understory.

Other woodland species predominant in the city include a bottomland hardwood mixed with beech, maple, sycamore, tulip and black cherry. Other forested areas show signs of Virginia pine thickets being replaced by young hardwoods of the oak-hickory association.

No large privately-owned tract of land in the city remains heavily wooded. Although the development of property generally requires the removal of a large proportion of the site's tree cover, it is often possible to designate areas of tree protection to include clusters of trees or individual trees of significance. Developers should follow the

appropriate procedures to protect clusters and individual trees throughout development. Particular attention should be given to native species.

Saving mature trees to minimize net loss of tree cover as the city reaches build-out is important to the health of the city's urban forest and microclimate. Where realistic, developers should seek to transplant trees that are removed during the development process, perhaps in public areas or rights-of-way, at the city's discretion. The overriding goal is the preservation of a mix of older specimen trees along with planted or saved saplings to ensure the abundance of healthy, valuable trees.

One tree, a white oak, located in Costello Park, has been identified by arborists as being noteworthy due to size, age, and significance of species. The city continually seeks grants to supplement city funding of landscape plantings and maintenance efforts.

Wildlife

The tree canopies of residential neighborhoods and city parks support many species of birds and other animals. The variety of species that remain in the city, though, is limited. Much of the wildlife that once existed no longer finds a habitat in the city. The varied requirements that are necessary to support the entire activities through the life cycle of many plants and animals native to the area are no longer supported by the city's environment. Maintaining wildlife habitats in open space corridors and in city parks will help

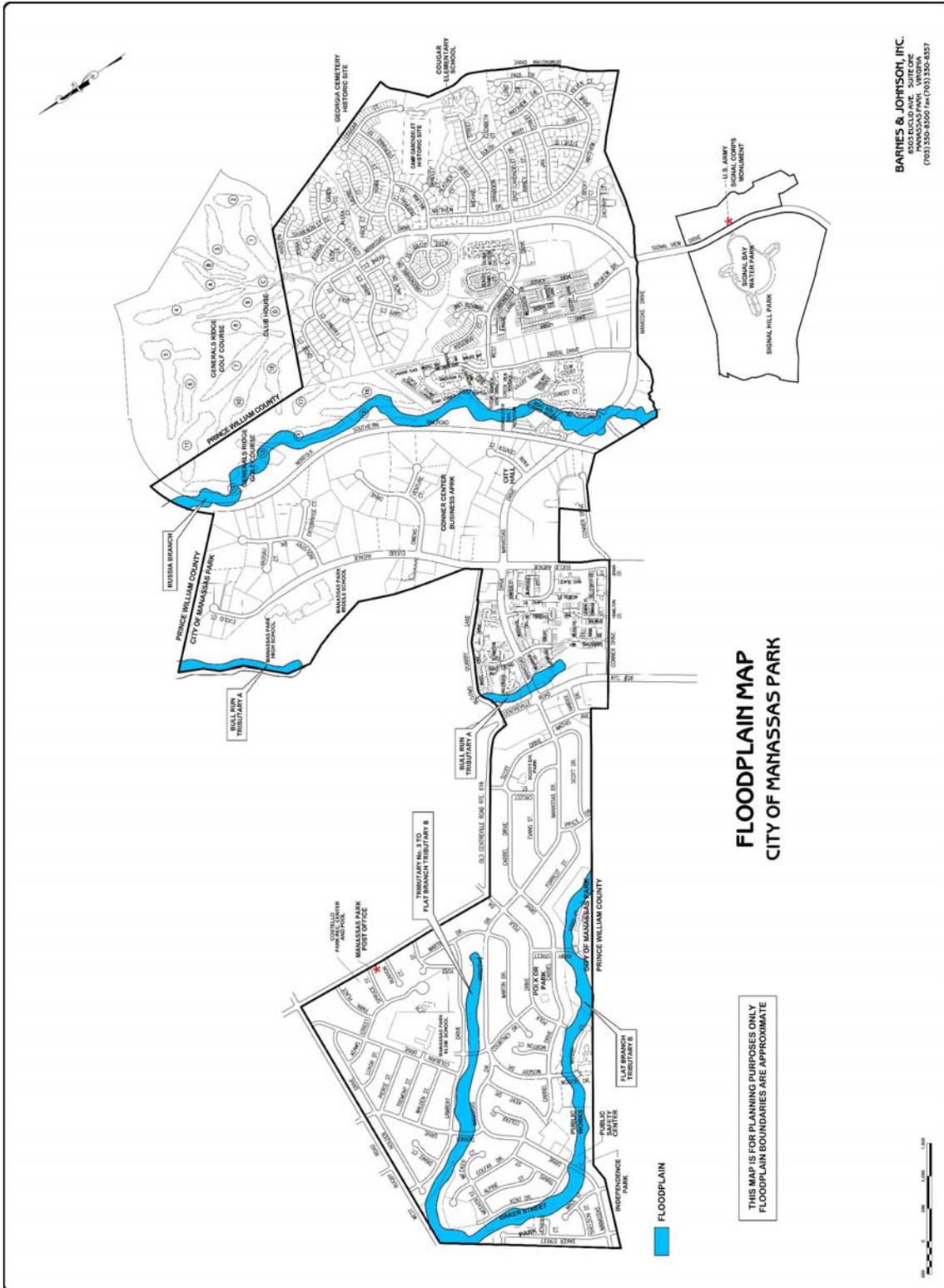


Figure 7.4 Floodplain Map

preserve the diversity of life while providing animal species with more desirable alternatives than invading human living spaces.

Because the city has very little land that has not been actively appropriated for human use in recent times, the small amount of natural area that remains is all the more valuable to the city.

Storm Water Management

The purpose of storm water management is to reduce the adverse effects of storm water and enhance water quality. The city's storm water management system is composed of natural drainage ways such as streams and manmade structures such as storm drains in public and private ownership. The manmade structures minimize the negative effects of land development such as flooding and erosion.

Radon

The City of Manassas Park is located within the Triassic Basin, an area that is known to have high radon potential. Radon is a naturally occurring gas that is radioactive, invisible and odorless. It forms from the natural breakdown of uranium and radium in the rock. Research has shown a link between lung cancer and high levels of exposure to radon.

Radon levels can be highly variable, therefore concerned private and public entities should use readily available test kits to measure radon at their particular structure. If radon levels are found to be high, they should take mitigative action such as sealing foundation cracks or installing a specialized ventilation system.

Solid Waste Management

Through a private contractor, the city provides once-a-week curbside collection in all residential areas. The same contractor collects waste deposited in dumpsters at commercial establishments, as well as recyclables. Recyclable materials are trucked to a commercial recycling operation; other waste is disposed by the private contractor.

Noise

City residents are increasingly aware of noise as an unwanted intrusion. Noise in the city is primarily produced by surface vehicles, construction, and to a lesser degree, by airplanes. Additionally, the City Code contains noise-related regulations, which are enforced by the Police Department. Over the past several years, the city has taken an active role in amending its noise ordinances and working with businesses to find ways to contain and minimize noises found to be particularly objectionable to neighbors in certain areas.

Goals, Objectives & Action Strategies

The goal is to ensure that in developing the city, the natural beauty is preserved; water quality is protected; property values and quality of life are enhanced; wildlife deaths are mitigated; and ecological diversity is preserved. With sound protection measures, City of Manassas Park residents, business community, and visitors enjoy a healthy environment together with a vibrant economy. In this regard, the plan is to be used to address environmental issues, evaluate development proposals in their earliest stages, and develop ordinances to support these goals.

Goal E1

Preserve, protect, and enhance the significant environmental resources and features of the city, including air quality, topography, soils, ground and surface water, biotic communities, sensitive plant and animal species, and natural view sheds.

Objective E1.1

Consider environmental concerns at all levels of land use associated with decision-making.

Action Strategy E1.1.1 Update the zoning ordinances to require rezoning and special use permit applicants to submit an environmental constraints analysis. This analysis shall provide information with the applications where such environmental conditions exist:

- A description or generalized mapping of natural site conditions with an emphasis on significant environmental features possibly affected by the proposed development and retained upon completion of the project. The mapped information shall address the following:
 - Chesapeake Bay Resource Protection Areas;
 - Areas of 15 percent slope and greater;
 - Impervious and proposed pervious surfaces;
 - Existing natural ground surface features and drainage patterns;
 - Areas that will remain in a natural or undisturbed state upon completion of a project;
 - Critical habitat, that have been listed as Federal or State threatened or endangered species, or species of special concern, by the US Fish and Wildlife Service or the Virginia Department of Conservation and Recreation;
 - 100 – year floodplain boundaries;
 - Areas of highly erodible and permeable soils;

- A description of appropriate avoidance and/or mitigation efforts, including preservation or conservation areas that will be provided as part of the proposed development;
- A study of steeply-sloped and sensitive soil areas.

Action Strategy E1.1.2 The city departments involved in land use will coordinate with local, federal, state, and regional environmental organizations to facilitate the exchange of data and implementation of environmental protection measures.

Action Strategy E1.1.3 Encourage developers to incorporate into site planning various environmentally sensitive approaches to storm water management, including low-impact development techniques and preservation and restoration of natural landforms.

Action Strategy E1.1.4 Ensure that open space is maintained in the city and that a minimum of 30% of the total land area in the city will be retained as open space by build-out, through appropriate amendments to the zoning ordinances to increase open space requirements.

Action Strategy E1.1.5 Amend the open space requirements in the zoning ordinance to ensure preservation and provision of open space within all developments.

Objective E1.2

Increase the environmental awareness of residents.

Action Strategy E1.2.1 Develop educational programs regarding important environmental issues for the business and residential communities. Provide developers with information on city conservation requirements, such as tree preservation requirements.

Action Strategy E1.2.2 Seek grant funding from the federal and state governments to print educational materials regarding environmental resources and conservation methods.

Action Strategy E1.2.3 Continue to expand and promote the city's recycling program, aiming for a minimum goal of 25 % of the total waste stream.

Action Strategy E1.2.4 Maintain current informational brochures for public distribution, that explain the importance of protecting and managing the city's soils. In addition, the Soil and Conservation District, Department of Public Works, and the Cooperative Extension Service should be encouraged to collaborate to develop a single environmental

education publication that meets the needs of all three groups and educate the citizens.

Action Strategy E1.2.5 Develop public service announcements providing information about timing, selection, and appropriate application of appropriate chemical applications for residential and business landscaping, with a preference for environmentally-friendly amendments.

Action Strategy E1.2.6 Prepare or acquire informational brochures and public service announcements that explain the importance of water conservation and water quality protection.

Action Strategy E2.1.7 Prepare and distribute information on the appropriate handling and disposal of household hazardous waste.

Action Strategy E1.2.8 Enhance the litter control program.

Objective E1.3

Improve air quality within the City of Manassas Park.

Action Strategy E1.3.1 Establish procedures to monitor air quality.

Action Strategy E1.3.2 Encourage the Virginia Department of Environmental Quality (DEQ) to site additional air quality monitoring stations in the city.

Action Strategy E1.3.3 Seek input from the DEQ and the Metropolitan Washington Council of Governments (MWCOG) on rezoning or special use permit applications for facilities likely to emit air pollutants or produce particulate pollution.

Action Strategy E1.3.4 Review and consider air quality impacts of public utilities and private industries as part of the rezoning and/or special use permit application process.

Action Strategy E1.3.5 Encourage and pursue the development of inter-jurisdictional agreements and contingency plans to deal with stationary and mobile sources of pollution to protect residents, especially the young, elderly, and medically sensitive populations.

Action Strategy E1.3.6 Determine if adequate controls are in place to prevent metals, polychlorinated biphenyls (PCBs) and other carcinogenic materials from contaminating the emissions from public and private incinerators. Monitor this issue and ensure adequate controls are in place to maintain the safety of the environment.

Action Strategy E1.3.7 Encourage the reduction of point source pollution within the city.

Action Strategy E1.3.8 Monitor air quality along major transportation corridors and at congested intersections to better define the effects of vehicle-generated pollution.

Action Strategy E1.3.9 Encourage the Virginia Department of Transportation (VDOT) and developers to preserve vegetation buffers along arterial roadways as a means of filtering and absorbing pollutants.

Action Strategy E1.3.10 Reduce pollution from vehicles by encouraging the use of advanced technology and alternative modes of transport, including public transit, van/carpooling, bicycles, light rail, and pedestrian paths. Encourage the use of alternative fuels (such as natural gas and/or electric power) for public transit.

Action Strategy E1.3.11 Encourage utility companies to share easements where technically feasible.

Objective E1.4

Protect and manage the soils and natural vegetation in the city.

Action Strategy E1.4.1 Preserve and conserve important natural landforms to achieve water quality targets, good community design objectives, and ecological diversity. Accordingly, discourage development adjacent to a perennial stream in the following areas:

- Wooded slopes of 25% and greater with highly erodible and permeable soils;
- Wooded slopes of 25% and greater having a continuous area of 10,000 square feet;
- Wooded slopes of 15% and greater with highly erodible and permeable soils;
- Wooded 100-year flood plain;
- Non-wooded slopes of 25% and greater with highly erodible and permeable soils;
- Non-wooded slopes of 25% and greater having a continuous area of 10,000-square feet;
- Non-wooded slopes of 15% and greater with highly erodible and permeable soils;
- Non-wooded 100-year flood plain.

Action Strategy E1.4.2 Seek commitments prior to rezoning and special use permit approval that many of the landforms identified in AS-2 (above) will be set-aside as preservation and conservation areas.

Action Strategy E1.4.3 Use native plants that are adapted to local soils and weather conditions when re-vegetating disturbed areas.

Action Strategy E1.4.4 Request that a rezoning and/or special use permit applicant submit the results of soil testing as part of the application when soil contamination is suspected, such as brownfields.

Action Strategy E1.4.5 Prohibit development at toxic waste sites to the extent provided by law.

Action Strategy E1.4.6 Maximize clearing of vegetation and disturbance of soils.

Objective E1.5

Maintain or enhance the integrity of surface water and watersheds.

Action Strategy E1.5.1 Encourage the use of no-net-gain standards to prevent nutrient loading and sediment runoff to nearby streams resulting from development practices.

Action Strategy E1.5.2 Encourage water quality amelioration during the redevelopment of properties located in intensely developed areas, through adoption of best management practices (BMPs); replacement of inefficient sanitary sewer lines or failing septic systems; use of low-impact development techniques; and re-vegetation along streams.

Action Strategy E1.5.3 Locate nonresidential activities that use, store, or manufacture significant quantities of hazardous substances away from the city's water bodies.

Action Strategy E1.5.4 Study and recommend measures to improve contingency planning by parties who use, handle, or store hazardous substances in sufficient quantities and pose a threat to surface and groundwater quality. The measures should identify: trigger amounts; procedures for prevention of leaks or spills; and materials or procedures for containment of leaks, spills, and runoff from fire fighting.

Action Strategy E1.5.5 Require industries and utilities to monitor for chemical leaks to the extent permissible under law.

Action Strategy E1.5.6 Develop general design evaluation guidelines, criteria, and techniques that promote the preservation of natural landscapes and apply them in the evaluation of rezoning and/or special use permit applications.

Action Strategy E1.5.7 Pursue and promote an “Adopt – A – Stream” program.

Action Strategy E1.5.8 Encourage leaving a natural buffer of existing woodland or forested area of at least 45 feet along each side of all waterways that are not otherwise protected under the Chesapeake Bay Resource Protection Area regulations or similar legislation.

Action Strategy E1.5.9 Encourage cluster development in areas of the city that are steep slopes with highly erodible soils.

Action Strategy E1.5.10 Require rezoning and special use permit applicants to describe, in general detail, the natural character of significant creeks, streams, rivers and ponds located on the property, as well as the 100-year flood plain and any Chesapeake Bay Resource Protection Area (RPA). Require applicants for such rezoning and/or special use permits to explain how the significant bodies of water to be retained upon completion of the project or protected during construction.

Action Strategy E1.5.11 Implement a watershed management program to provide regional storm water management and flood control facilities, where such facilities are feasible and permitted by federal and state agencies.

Action Strategy E1.5.12 Require adherence to the following guidelines for determination of density or intensity of development:

- Residential: Preclude the development of habitable structures within 100-year flood plains.
- Non-residential: On non-residential zoned property encumbered with portions of the 100-year flood plain the allowable intensity is determined based on the floor area ratio (FAR) specified by the existing or proposed zoning district and the total site area. Development within the 100-year flood plain is to be precluded.

Action Strategy E1.5.13 Develop and distribute public service information to reduce nutrient loading from storm water runoff.

Objective E1.6

Limit the amount and extent of impervious surfaces.

Action Strategy E1.6.1 Encourage the minimization of impervious surfaces from development and utilize acceptable retrofit techniques in redevelopment to minimize storm water runoff by using appropriate low-impact development techniques.

Action Strategy E1.6.2 Encourage the use of semi-pervious or pervious surfaces and other low-impact development techniques.

Action Strategy E1.6.3 Require, as part of an application for a rezoning and/or special use permit, the identification of impervious surfaces and include a statement indicating what the maximum quantity of impervious surfaces will result upon completion of the development.

Action Strategy E1.6.4 Continue a monitoring and enforcement program to ensure that, during and after development, peak storm water flows do not exceed pre-development peak flows, in terms of quantity, quality, and volume.

Action Strategy E1.6.5 Seek commitments to use low-impact design to mitigate the impact of parking areas and encourage structured parking at the time of application for a rezoning or special use permit.

Objective E1.7

Promote the preservation and use of natural ground surface features that effectively manage storm water runoff.

Action Strategy E1.7.1 Investigate and implement innovative storm water management measures. These may include low-impact development standards that require all development projects to establish systems, preferably natural, for filtering the “first flush” of urban runoff (delivery of disproportionately large amounts of pollutants that occurs during the early stages of a storm) near its source.

Action Strategy E1.7.2 Require the installation of sediment-trapping devices close to the sources of soil erosion.

Action Strategy E1.7.3 Maintain or establish areas of natural vegetation downstream of disturbed soils to help filter sediments and other pollutants.

Action Strategy E1.7.4 Request the applicant to show the natural ground surface features and drainage patterns that will be preserved for purpose of managing storm water runoff on rezoning applications that

include generalized development plans or on special use permit applications.

Action Strategy E1.7.5 Incorporate options for low-impact development techniques in the City of Manassas Park.

Objective E1.8

Protect the City's groundwater and aquifers.

Action Strategy E1.8.1 Identify Critical Ground Water Areas (CGWAs) in coordination with the Health Department and State Water Control Board.

Action Strategy E1.8.2 Develop procedures to protect or improve the quality of CGWAs.

Action Strategy E1.8.3 Evaluate potential pollution of ground water from leaking underground storage tanks by using available data from the Virginia Department of Environmental Quality.

Action Strategy E1.8.4 Promote the use of secondary containment storage tanks for petroleum products and other hazardous materials.

Action Strategy E1.8.5 Review and upgrade best management practices for soil and erosion maintenance enforcement programs for all types of development.

Action Strategy E1.8.6 Promote the use of lined catchments or water quality inlets for storm water runoff and small spills or leakages on sites where petroleum products or hazardous wastes are handled.

Action Strategy E1.8.7 Encourage the use of appropriate vegetation in the storm water system that will remove nutrients from the storm flow.

Objective E1.9

Set sewer force mains and petroleum and hazardous substances lines away from the water's edge.

Action Strategy E1.9.1 Encourage the location of sewer force mains and petroleum and hazardous substances lines outside stream channels and other water bodies except where a crossing is needed.

Objective E1.10

Ensure the high quality of public drinking water

Action Strategy E1.10.1 Continue to support the Occoquan Watershed Program

Action Strategy E1.10.2 Continue to support Prince William County and the City of Manassas to ensure that the public water supply uses best management practices, since they are the primary drinking water sources for the City of Manassas Park.

Action Strategy E1.10.3 Support Prince William County’s effort to restrict by ordinance the use of internal combustion engines on the Occoquan Reservoir.

Objective E1.11

Preserve natural vegetation, especially mature trees, and provide for the replacement of trees.

Action Strategy E1.11.1 Maintain and update the city’s buffer areas, landscaping, and tree cover requirements contained in the zoning ordinances. Promote tree preservation instead of tree replacement.

Action Strategy E1.11.2 Adopt a ‘Tree Preservation Ordinance’, as allowed by state law.

Action Strategy E1.11.3 Adopt a ‘Tree Replacement Program’, as allowed by state law, and in coordination with the Virginia Department of Forestry.

Action Strategy E1.11.4 Identify the mature hardwood canopies and the location of those areas deserving special protection through the services of an arborist.

Action Strategy E1.11.5 Consider acquisition of select sites for public parks and encourage the dedication of such sites by private property owners.

Objective E1.12

Identify, manage, and protect all ecological communities and wildlife, as identified in official federal and state lists.

Action Strategy E1.12.1 Establish an identification and monitoring system for the city’s resident animal or plant species.

Action Strategy E1.12.2 Develop and implement protective guidelines for endangered and threatened populations of plants and wildlife that occur in the city.

Action Strategy E1.12.3 Identify areas suitable for wetlands restoration and develop procedures whereby a developer/landowner can contribute to such wetlands when no alternative to wetland preservation exists on-site.