4 Environment and Sustainability

This Chapter is supported by two Guiding Principles: Natural Environment and Sustainability Initiatives. The Natural Environment Guiding Principle focuses on the physical and geographic context of the City and the impact on local and regional environmental resources. The City has several types of environmental resources that are easily impaired by urban land uses. Encompassing the headwaters of Accotink Creek, the measures the City has taken to protect water quality, riparian and floodplain areas, open space, and the urban forest are critical to support regional efforts to improve environmental health. Located within the Chesapeake Bay Watershed, the City is committed to reducing stormwater runoff in order to protect the Bay through the adoption of the Chesapeake Bay Preservation Plan (Appendix A) and enforcement of other federal, state, and local stormwater regulations.

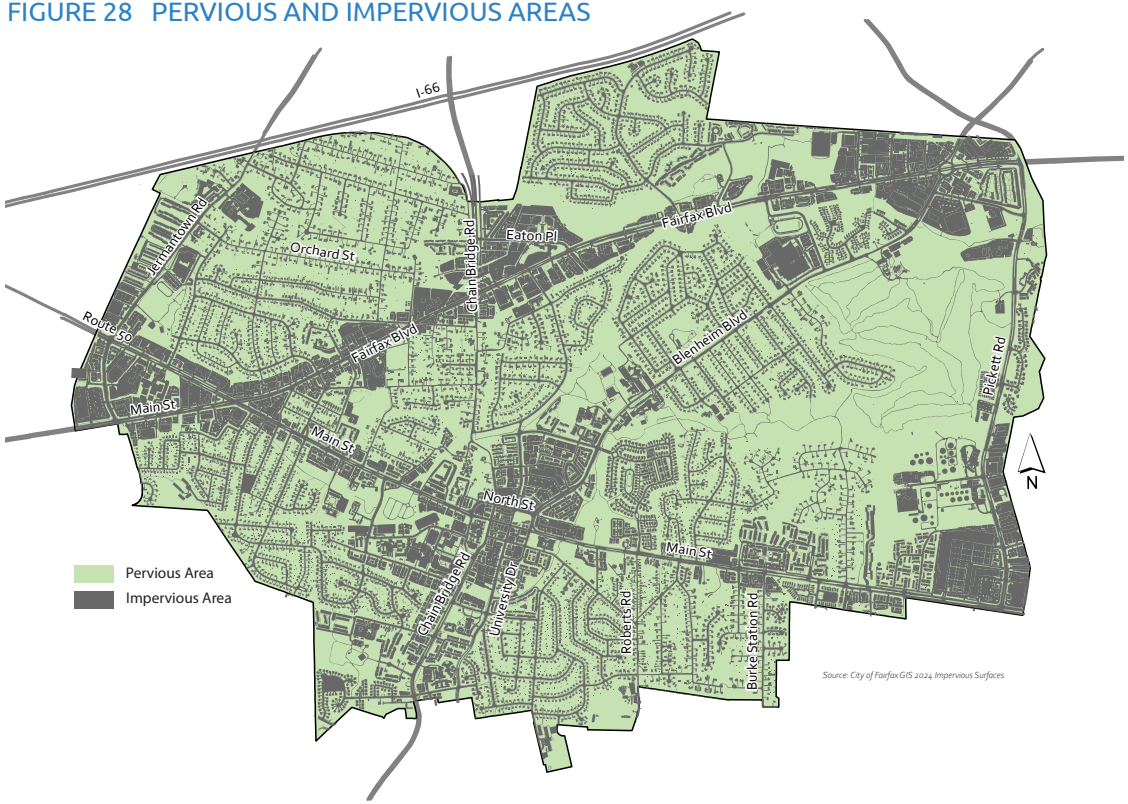
The Sustainability Initiatives Guiding Principle focuses on City practices with a more global interest. This includes specific actions that support sustainable practices that can decrease greenhouse gas emissions from both building energy use and transportation, increase energy efficiency, increase utilization of renewable energy, increase waste reduction and recycling, conserve water, and support healthy lifestyles. It is important to recognize that sustainability practices address a broad range of social, economic, and environmental issues, and therefore are incorporated throughout the Comprehensive Plan.

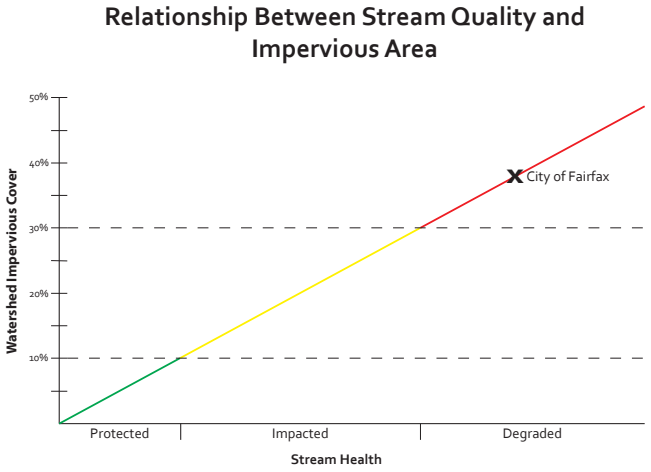
Opportunities and Challenges

Impervious surface

Previous land development has resulted in a large percentage of impervious areas, as shown in Figure 28. Impervious areas have structures such as pavement and buildings that do not allow rainwater to infiltrate into the ground, and increase the speed and amount of stormwater runoff resulting in negative impacts to streams. As shown in the chart "Relationship Between Stream Quality and Impervious Area," as the percentage of impervious cover in a watershed increases, stream quality declines. At 40% impervious cover, the City's streams are classified as "non-supporting streams." Streams in this category are usually so degraded they become a conduit for conveying stormwater and have poor stream quality. As is typical in urban areas, maintaining the health of streams in the City is a continual challenge. The City has an opportunity to increase the amount of pervious areas with redevelopment and to improve the stormwater management system in order to adequately manage stormwater runoff.

FIGURE 28 PERVIOUS AND IMPERVIOUS AREAS



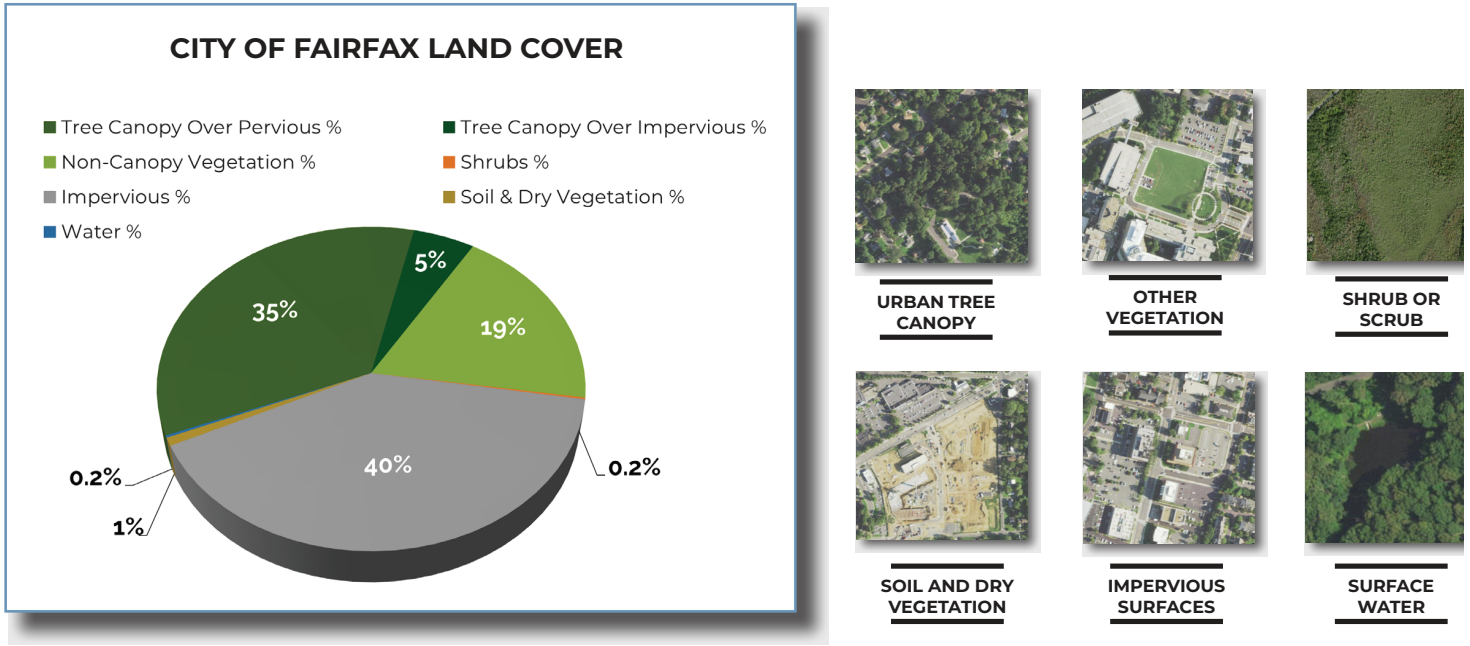


As impervious ground cover increases, stream health and quality declines. With 40% of its ground area covered by impervious surfaces, the City's streams are considered degraded with poor quality.

Tree cover

Tree canopy coverage offers many benefits, such as conserving energy due to the reduction of temperatures from shading, improving air quality, reducing stormwater runoff, improving property values, and beautifying the community. 40% of the City is covered by impervious surfaces, primarily in Activity Centers and along Commercial Corridors. The few significant forested areas that remain, whether public or private, deserve specific attention so that their aesthetic and ecological benefits to the City are not lost.

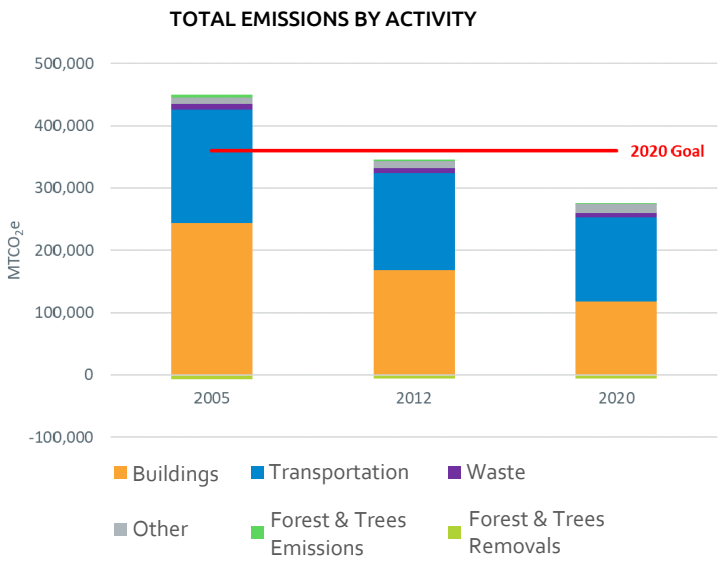
FIGURE 29 TREE CANOPY



Greenhouse gas emissions

Scientific consensus accepts the reality of climate change and recognizes that human activity, especially the combustion of fossil fuels that creates greenhouse gases, is an important driver of climate change. The City, along with the entire Mid-Atlantic region, can anticipate changes in temperature, precipitation, water supply, and air quality as a result of the changing climate. Local governments are responding to new demands on infrastructure as well as impacts to natural resources related to weather instability and changing, uncertain climatic conditions. The City is committed to exploring the potential benefits and costs of adopting policies and participating in programs that promote the long-term goal of greenhouse gas emissions reduction while maximizing economic and social benefits. A summary of greenhouse gas emissions from community activities in the City is provided in Figure 30. The City will explore and prioritize strategies that could best aid in reducing greenhouse gas emissions and mitigate the effects of climate change.

FIGURE 30 GREENHOUSE GAS EMISSIONS



Note: Other refers to emissions associated with the release of Hydrofluorocarbons, emissions resulting from local natural gas system losses within the community, as well as emissions from Agriculture.

Source: MWCOG Community-Wide Greenhouse Gas Inventory Summary - City of Fairfax, Virginia, 2022.

Buildings
Emissions from electricity consumption, and combustion of natural gas and other fuels. Buildings

Transportation
On-road vehicular travel, air travel, and commuter rail travel undertaken by residents, business, and visitors in the city, and off -road activities such as use of construction and landscaping equipment.

Photo Credit: Virginia Department of Transportation

Waste
Pumping and treatement of water and wastewater and collection and treatment of solid waste produced by residents and activities.

Photo Credit: Virginia Department of Transportation

Other
Fugitive emissions from ozone depleting chemicals, natural gas, and agriculture.

Photo Credit: PiccoloNamek

Forest & Trees Emissions
Emissions from the removal of forests and trees which releases sequestered carbon.

Photo Credit: TreeHugger

Forest & Trees Removal
Forests sequester CO_2 during the process of photosynthesis and store this carbon in leaves, roots, branches, trunks, soil, and woody debris and other plant litter.

Green building practices

With new public and private development projects, the City has ample opportunity to encourage the use of green building practices (Figure 31). In addition to the environmental benefits of green buildings (e.g., reducing energy use, greenhouse gas emissions, construction waste, etc.), they can also enhance the economics of local development. Recent trends show that office space that meets green building standards generally experiences higher demand and can be a catalyst for bringing new businesses to a community.

FIGURE 31 GREEN BUILDINGS

PROJECT NAME	LOCATION	LEED SYSTEM	POINTS ACHIEVED	CERTIFICATION LEVEL	CERTIFICATION DATE
Fairfax County Health Dept Laboratory	10310 Layton Hall Dr	LEED-NC 2.2	41	Gold	6/8/2011
Barcelo Crestline	3950 University Drive	LEED-CI 2.0	23	Certified	11/5/2010
PNC Bank Branch- Main St & Judicial Ave	10649 Main Street	LEED-NC 2.2	27	Certified	6/28/2013
Fair City Mall	9652 Main St	LEED for Retail (New Construction) Pilot	22	Certified	1/31/2011
Residence Inn	3565 Chain Bridge Road	LEED-NC v2009	42	Certified	6/12/2012
Fairfax Marketplace	10944 Fairfax Boulevard	LEED-EB:OM v2009	40	Certified	4/30/2015
TD Bank - Fairfax Turnpike Shopping Center	Pickett Road and Main Street	LEED-NC Retail v2009	72	Gold	7/25/2012
Healthy Buildings East Coast HQ	3251 Blenheim Blvd	LEED-CI 2009	54	Silver	5/15/2017

Data Source: The Green Building Information Gateway (GBIG) (http://www.gbig.org/). Data was provided to the City of Fairfax on 08/07/24.

**Data excludes confidential projects and LEED Neighborhood Development (ND) certifications*

Fairfax Marketplace

Fair City Mall

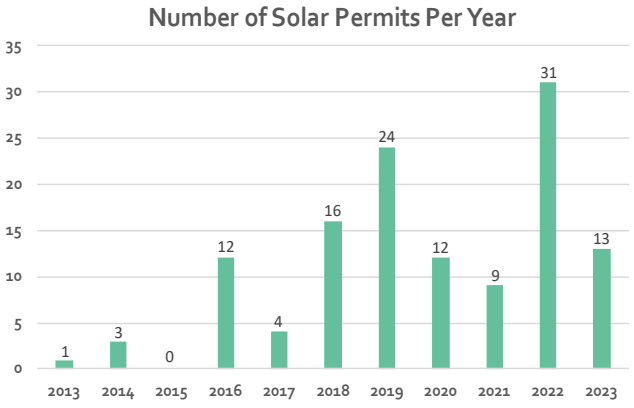

Residence Inn

PNC Bank Branch

Solar installations

In recent years, the City has seen an increase in the number of solar energy installations (Figure 32). Increasing the use of renewable energy sources will benefit the resilience and economic competitiveness of our community. Since 2014, the City has participated in the Solarize Virginia campaign, a yearly effort to encourage incorporation of solar power into individual homes and businesses throughout the state. This is accomplished through incentives such as free solar assessments. In 2017, the City received a "Bronze" designation from the national program SolSmart for encouraging solar energy growth and removing obstacles to solar development.

FIGURE 32 BUILDING PERMITS FOR RESIDENTIAL SOLAR PANELS



Source: Fairfax City GIS and Code Administration Building Permits 3/2024

The Northern Virginia Solar Map is a web tool that homeowners and business owners can use to get an estimate for the potential size of a solar photovoltaic system that can be placed on the roof and the potential annual electricity savings.

Source: Northern Virginia Regional Commission Solar Map
www.novasolarmap.com

Green Infrastructure and Sustainable Landscaping

One way to increase harmony between the natural and built environment is investing in green infrastructure. Green infrastructure is an approach to stormwater management that more closely mimics nature by filtering and absorbing stormwater where it falls rather than the traditional curb and gutter systems that aims to move stormwater away quickly. Examples of green infrastructure include bioswales, rain gardens, green roofs, permeable pavers, and many others.

Sustainable landscaping maximizes environmental and human health benefits for current and future generations by protecting clean air and water, building healthy and fertile soil, and conserving resources. By prioritizing sustainable landscaping practices like erosion control and eco-friendly lawns, the City can protect the natural environment from hazards like pesticides and fertilizers and enhance and restore previously damaged areas by increasing biodiversity and native species.

FIGURE 33 EXAMPLES OF GREEN INFRASTRUCTURE AND SUSTAINABLE LANDSCAPING

Top Left: Example of a bioswale which collects rain water during storm events and allows it to infiltrate into the soil rather than running to a stream. **Top Right:** Example of a green roof which reduces run off and can be used to harvest stormwater. **Bottom Left:** Sustainable landscaping with plants native to Northern Virginia and habitat for pollinators. **Bottom Right:** A rain garden populated with native plants that can provide a habitat for native species and help with stormwater management.

Local Food Access

Urban agriculture refers to various practices of cultivating, processing, and distributing food in urban areas. This often involves indoor farming techniques like hydroponics or vertical farming, or outdoor spaces for community gardens. Urban agriculture provides an opportunity to increase the community's access to healthy, locally grown foods with less food waste and resource consumption. Additionally, these spaces can increase environmental stewardship and civic engagement.

FIGURE 34 COMMERCIAL AND NON-COMMERCIAL URBAN AGRICULTURE

Top Left and Bottom Left: Community garden at Kutner Park. **Top Right:** Example of commercial urban agriculture. **Bottom Right:** Community garden at City Hall.

Natural Environment

One of the characteristics of the City that makes it a desirable and healthy place in which to live is the extent, diversity, and quality of its environmental resources. The City's main environmental resources include wetlands, ponds, streams, public parks, open space, and urban forests. As the City continues to grow and redevelop, these resources are at risk of being impaired. Growth and development often cause pollution to the water, air, and soil, degradation to ecosystems, and loss of natural areas that contribute to residents' quality of life. Continuing to preserve and restore our environmental resources ensures a healthy environment with clean air, clean water, healthy ecosystems, and high quality recreation areas. The City is also at risk from impacts caused by natural and man-made hazards. Reducing threats to the community and environment from these hazards will foster a safer and healthier community.

Guiding Principle:

In 2035, Fairfax is a city with... a healthy ecosystem of naturally flowing streams, native plants, wildlife, contiguous natural habitat areas, and a healthy tree population.

Natural Environment Goal 1

Preserve, promote, and enhance a healthy environment.

The local environment will be preserved and protected through insightful policies and programs that improve the quality of the City's natural resources. Managing the stormwater that runs off land surfaces is a fundamental practice to mitigate the adverse effects of urban development by reducing flow velocities and volumes to enhance water quality. Several federal, state, and local regulations and the City's adoption of the Chesapeake Bay Preservation Plan are enacted to protect the region's water resources.

The City has the opportunity to protect and increase the tree canopy by identifying the greatest challenges facing the urban forest (e.g. development, disease, invasive species, etc.) and developing and implementing an urban forest management plan that includes detailed strategies for attaining a diverse, native, and well-managed urban forest.

OUTCOME NE1.1:	A thriving, healthy environment is preserved and protected.
ACTION NE1.1.1	Pursue sustainability frameworks, such as LEED for Cities and Communities, Tree-City USA, and Biophilic Cities Network, to guide decision making.
ACTION NE1.1.2	Engage and empower the community to instill environmental stewardship and connection to the natural environment and provide meaningful opportunities for all community members to participate in decisions that may affect their environment or their health.
ACTION NE1.1.3	Inform City policies and projects using environmental information and data generated during the development review process.
ACTION NE1.1.4	Compile and maintain a city-wide natural resources inventory that catalogs and monitors the location and condition of the city's natural resources to evaluate the impacts of City policies, projects, programs, and decisions.
ACTION NE1.1.5	Address environmental protection in tandem with other Comprehensive Plan goals and policies, such as those addressing land use, mobility, equity, housing, health, economic vitality, and community facilities and services and ensure such protections are prioritized in the design and development of public and private projects.
ACTION NE1.1.6	Ensure equitable protection from all types and sources of environmental pollution.
OUTCOME NE1.2:	Water resources and watersheds in the City are clean and protected.
ACTION NE1.2.1	Reaffirm and implement the CIty's Chesapeake Bay Preservation Plan (Appendix A) and zoning regulations.
ACTION NE1.2.2	Develop a green infrastructure plan and use regulations and incentives, public investments, and partnerships to create a connected green infrastructure network.
ACTION NE1.2.3	Enhance zoning regulations and building codes to support initiatives that encourage the use of nature-based solutions and stormwater management best practices on private and public property.
ACTION NE1.2.4	Retain and acquire riparian areas and areas within the floodplain as open space or parkland.

Natural Environment Goal 1

ACTION NE1.2.5	Conduct and implement watershed management plans to evaluate conditions and identify actions that would improve watershed health and prevent pollution.
OUTCOME NE1.3:	Clean, healthy air supports plant, animal, acquatic, and human life.
ACTION NE1.3.1	Develop and implement a Climate and Energy Action Plan to acheive regional greenhouse gas emissions reduction goals (20% reduction from 2005 level by 2020, 80% reduction from 2005 level by 2050) as committed to in the Greater Washington 2050 Compact.
ACTION NE1.3.2	Identify and implement strategies to reduce airborne pollutants known to cause health problems.
OUTCOME NE1.4:	The urban forest is diverse, well-managed and dominated by native species.
ACTION NE1.4.1	Develop and implement an urban forest management plan to protect the City's urban forest and increase the quantity, density, and diversity of trees on public and private land.
ACTION NE1.4.2	Support incentives, provide education, and partner with public and private groups to encourage mature tree preservation and native tree planting.
ACTION NE1.4.3	Update zoning regulations and the public facilities manual, and other standards for tree maintenance and care, preservation, removal, planting conditions, and planting of preferred tree species.
ACTION NE1.4.4	Identify and establish measures to conserve and protect existing natural resources such as those that provide habitats for species designated as vulnerable, threatened, or endangered or that support equitable access to forests for public health.
ACTION NE1.4.5	Develop a tree ordinance to help manage trees on both public and private land.

Natural Environment Goal 1

OUTCOME NE1.5:	The population of native vegetation is diverse and protected from invasive plants.
ACTION NE1.5.1	Develop a strategy to control invasive species including identifying and mapping areas impacted by invasive plants.
ACTION NE1.5.2	Support the development of community and habitat gardens and planting of native vegetation.
ACTION NE1.5.3	Provide education and partner with public and private groups to promote and encourage the preservation and planting of native plants, sustainable landscaping techniques, and management of invasive plants.
ACTION NE1.5.3	Develop a sustainable landscaping policy.
OUTCOME NE1.6:	Natural open spaces and contiguous greenway corridors are restored, preserved, and provide natural habitats for plants and wildlife.
ACTION NE1.6.1	Restore disturbed areas along streams and in conservation easements with native species.
ACTION NE1.6.2	Pursue opportunities to purchase and preserve in perpetuity natural privately-owned open space.
ACTION NE1.6.3	Ensure new development protects and preserves environmentally-sensitive areas and natural features, such as tree cover (especially significant stands of trees and healthy, mature trees), native vegetation, streams, riparian areas, wildlife habitat, and natural topography.

Natural Environment Goal 2

Prepare for the impacts and improve resiliency from natural and man-made hazards.

Extreme weather events such as prolonged heat, hurricanes, and flash flooding have contributed to negative health impacts, damaged homes and businesses, destroyed critical infrastructure, and interrupted the region's economic activity. These types of weather events are projected to increase in frequency and magnitude. There is also a risk that the community could be exposed to a variety of pollutants and hazardous chemicals, which may have negative effects on human health and the environment. The City should take steps to prepare for and mitigate these hazards to increase the resiliency of infrastructure and the community.

OUTCOME NE2.1:	Risk is reduced and preparedness is improved to meet the challenges associated with natural and man-made hazards to improve the City's resiliency.
ACTION NE2.1.1	Participate in the National Flood Insurance Program's (NFIP) Community Rating System, a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.
ACTION NE2.1.2	Continue to reference FEMA flood maps, models, projections, and other relevant data sources to address potential impacts of climate change.
ACTION NE2.1.3	Ensure that exposure of the City's natural floodplains to new development and redevelopment is minimized.
ACTION NE2.1.4	Conduct climate vulnerability and risk assessments to regularly assess the vulnerability of residents, infrastructure, critical facilities, and large developments to climate-related hazards.
ACTION NE2.1.5	Develop and implement a resiliency plan to set priorities and allocate resources to manage risks associated with natural and man-made hazards.
ACTION NE2.1.6	Continue to work with the Northern Virginia Hazard Mitigation Advisory Committee to regularly update the Northern Virginia Hazard Mitigation Plan.
ACTION NE2.1.7	Reduce the urban heat island effect, targeting those areas with the greatest potential for community benefit.
ACTION NE2.1.8	Expand and leverage the ability of nature-based solutions and the beneficial ecosystem services they provide to mitigate natural hazards.
ACTION NE2.1.9	Design infrastructure and develop guidelines for development to address and mitigate vulnerabilities posed by future climate impacts.
ACTION NE2.1.10	Increase the resilience of the City's energy system through partnerships to achieve a secure and reliable energy infrastructure that is also resilient and able to respond to and restore services rapidly in the event of an outage.
ACTION NE2.1.11	Plan for post-disaster recovery, including restoration of essential services, reconstruction, economic recovery, and human wellness.

Natural Environment Goal 2

OUTCOME NE2.2:	Exposure to pollutants and hazardous chemicals in the environment is reduced or eliminated.
ACTION NE2.2.1	Continue to enhance exterior lighting standards, develop a dark sky policy, and pursue certification as an International Dark Sky Community to reduce light pollution and protect nighttime skies.
ACTION NE2.2.2	Continue to enforce noise standards, and review and revise them as necessary.
ACTION NE2.2.3	Promote the proper disposal or recycling of household hazardous waste.
ACTION NE2.2.4	Educate on the identification, risks, and remediation of hazardous materials in buildings, including but not limited to radon, asbestos, and volatile organic compounds.
ACTION NE2.2.5	Develop integrated pest management and nutrient management plans.
ACTION NE2.2.6	Promote alternative landscape management and maintenance practices that are less dependent on pesticides and fertilizers.
ACTION NE2.2.7	Take measures to strengthen and enforce the City's littering and illegal dumping regulations and ensure the cleanliness of properties, roadsides, public spaces, and city-owned lands.
ACTION NE2.2.8	Anticipate and respond to the potential hazards of underground and above ground storage tanks and pipelines.

Sustainability Initiatives

Guiding Principle:

In 2035, Fairfax is a city with…
sustainable practices that preserve, conserve, reuse and recycle resources.

Sustainability can be defined in many ways. In relation to urban planning, sustainability is often defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). The City has a responsibility to future generations to develop sustainably. In 2013, the City executed an energy performance contract to implement energy retrofits at fourteen City-owned buildings. The City is projected to fully recover the costs of retrofits in energy savings in 2030.

Sustainability issues extend well beyond City boundaries, so local decisions can impact the region and beyond. The City collaborates with regional partners, such as the Metropolitan Washington Council of Covernments (MWCOG) and the Northern Virginia Regional Commission (NVRC) in formulating solutions to sustainability challenges and taking actions to achieve regional goals. In 2010, the Mayor and City Council adopted a resolution endorsing the voluntary Greater Washington 2050 Compact in which the City committed to following the principles and goals set within The Region Forward report, a vision for a more accessible, sustainable, prosperous, and livable metropolitan Washington.

Sustainability Initiatives Goal 1

Increase the use of sustainable practices, technology, design, and materials.

This City should seize the opportunity to promote energy efficient and sustainable redevelopments and retrofits of aging buildings while also encouraging designs that fit within the context of the existing community. This can involve incentives for privately-owned buildings as well as City investment in public facilities. Education about financing options (such as the Fairfax Renaissance Housing Corporation projects) should be provided to property owners. By improving energy efficiency and sustainable design of civic operations and in the greater community, the City will harmonize resources, investments and technology, help reduce utility costs, support "green collar" jobs, and institutionalize change. Additionally, the City should invest in infrastructure for electric vehicles as the market demand continues to grow.

OUTCOME SI1.1:	Energy demand is minimized with the application of energy efficient design features, technologies, and best practices.
ACTION SI1.1.1	Implement and continually improve the green building policy to acheive the goals outlined in the policy.
ACTION SI1.1.2	Promote the efficient use of energy by residents, business owners and government facilities and operations to achieve a 30% reduction in energy use from 2018 baseline levels by 2035; a 40% reduction from 2018 baseline levels by 2040; and a 55% reduction from 2018 baseline levels by 2050.
SI1.1.2.1	Use a data-driven assessment process to deploy energy efficiency technologies throughout all government facilities and operations, and promote energy efficiency best practices among government employees.
SI1.1.2.2	Support incentives, provide education, and partner with public and private groups to promote energy efficiency and sustainability improvements by private property owners.
SI1.1.2.3	Promote voluntary benchmarking for commercial buildings.
SI1.1.2.4	Implement programs that offer clean energy financing solutions for residential and commercial sectors, such as the Solarize Virginia campaign, Property Assessed Clean Energy (PACE) program, and Fairfax Renaissance Housing Corporation (FRHC) projects.
ACTION SI1.1.3	Implement programs to reduce energy costs for lower-income households.
OUTCOME SI1.2:	The use of renewable energy sources and advanced sustainable technologies is increased.
ACTION SI1.2.1	Conduct feasibility studies and subsequent plans for government operations to achieve 100% renewable electricity by 2035 and community-wide 100% renewable electricity by 2050.
ACTION SI1.2.2	Revise applicable codes, zoning regulations, policies, and design guidelines to help facilitate local renewable energy deployment and adoption of sustainable technologies.

Sustainability Initiatives Goal 1

ACTION SI1.2.3 Provide education and incentives for residents and businesses to install renewable energy systems and sustainable technologies.

ACTION SI1.2.4 Partner with other local governments, organizations, and individuals on renewable energy planning and implementation.

OUTCOME SI1.3: Waste is reduced and reuse and recycling of materials is increased.

ACTION SI1.3.1 Implement the Solid Waste Management Plan, which establishes waste reduction goals and outlines how the City manages solid waste, recycling, and composting.

Sustainability Initiatives Goal 1

OUTCOME SI1.4:	Potable water demand in the community is minimized.
ACTION SI1.4.1	Develop and provide education and outreach for water conservation policies and practices.
ACTION SI1.4.2	Support incentives and revise applicable codes, policies, and design guidelines to encourage water efficiency in new construction and landscaping.
OUTCOME SI1.5:	Use of electric and alternative fuel vehicles and infrastructure is expanded.
ACTION SI1.5.1	Develop and implement an Electric Vehicle Readiness Plan.
ACTION SI1.5.1	Support incentives, provide education, and partner with public and private groups to promote electric vehicle charging infrastructure by private property owners.

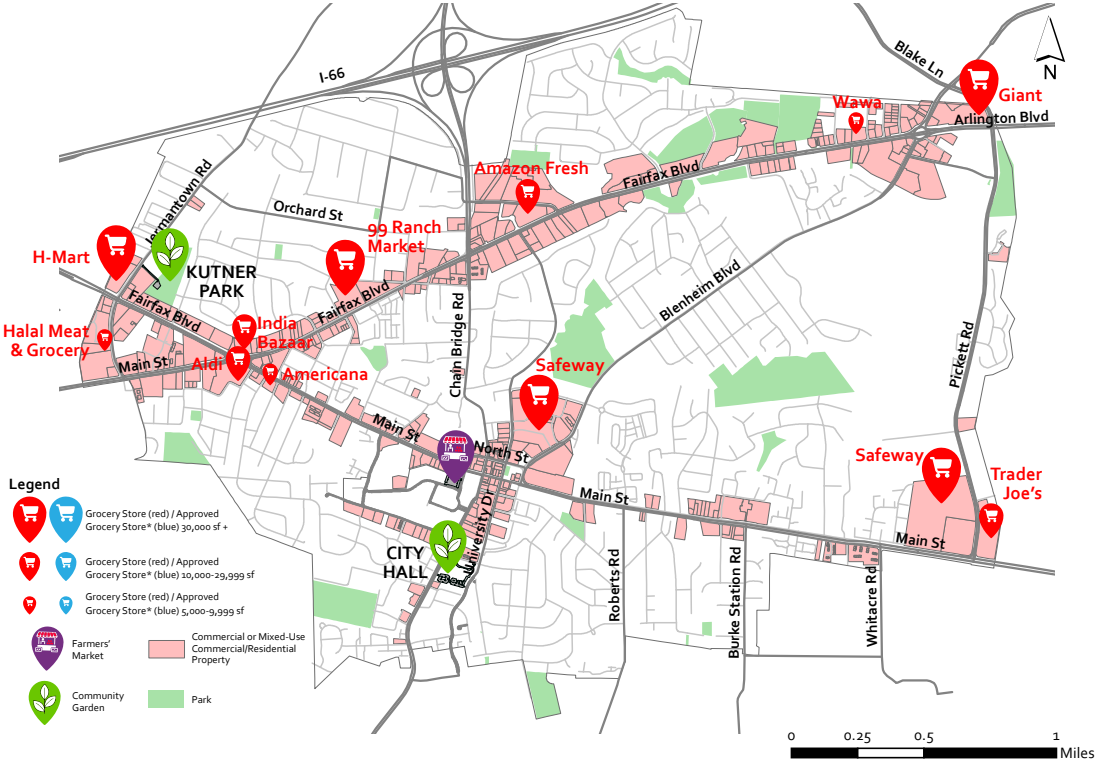
Sustainability Initiatives
Goal 2

Support healthy lifestyles and regionally-grown food.

Since the City is mostly built out and infrastructure is already in place, it is an ideal location to provide access to healthy food, community facilities, and recreational opportunities. Through practices like urban agriculture and community gardens, the City strives to improve access to healthy, affordable, and regionally-grown foods to promote public health, reduce environmental impacts, and support economic development (Figure 35).

OUTCOME SI2.1:	Healthy, affordable, regionally-grown foods are accessible to all.
ACTION SI2.1.1	Encourage and support the development of community gardens and educational growing spaces on public and private land.
ACTION SI2.1.2	Evaluate regulations that permit urban agriculture.
ACTION SI2.1.3	Work with Fairfax County to develop a healthy and affordable food access plan and programs for vulnerable populations.

FIGURE 35 FULL SERVICE GROCERY STORES, FARMERS MARKETS, AND COMMUNITY GARDENS



Source: Fairfax City GIS Parcels 2024, Department of Community Development and Planning 2024