MASTER PLAN

BOROUGH OF PENNINGTON
NEW JERSEY

11. Green Buildings and Environmental Sustainability Plan Element

The Green Buildings and Environmental Sustainability Plan element draft released by the writing team was conditionally adopted by the Planning Board on November 13, 2024, and posted on the Borough website for public comment. Revisions made to address comments received and to ensure consistency with other Plan elements were endorsed by the Planning Board on October 8, 2025. Final changes were approved by the Planning Board on April 8, 2026. This element will be available for comments until April 22, 2026, prior to final adoption at a public meeting of the Planning Board on May 13, 2026.

Contents

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Introduction

In 2008, the Municipal Land Use Law (MLUL) was amended to include the Green Building and Environmental Sustainability Plan Element as a permitted Master Plan Element in N.J.S.A. 40:55D-28 (16). The definition of this element was revised in 2024 and is as follows:

> "A green buildings and environmental sustainability plan element which shall provide for, encourage, and promote the efficient use of natural resources and the installation and usage of renewable energy systems; consider, encourage and promote the development of public electric vehicle charging infrastructure in locations appropriate for their development, including but not limited to, commercial districts, areas proximate to public transportation and transit facilities and transportation corridors, and public rest stops; consider the impact of buildings on the local, regional and global environment; allow ecosystems to function naturally; conserve and reuse water; treat storm water on-site; and optimize climatic conditions through site orientation and design."

Development decisions, which are guided by the Master Plan, have the potential to impact a community's local environment, resilience to natural hazards, and contribution to climate change. Incorporating sustainability into the Master Plan is a vital step in the Borough's efforts to preserve our natural resources and operate in a truly sustainable manner, ensuring a healthy and thriving environment for future generations.

This Green Building and Environmental Sustainability Plan Element (GBESE) is intended to ensure that future planning and development in Pennington Borough enhances the environmental sustainability and resilience of the community and minimizes negative effects resulting from its environmental footprint. It also encourages the reversing of negative effects from previous development. Specifically, its purpose is to guide and serve as a basis for Borough land use decisions, ordinances, and policies that are related to buildings and sustainability.

Sustainability as a concept can be interpreted in different ways. The United Nations Commission on Environment and Development defines sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." Following green building practices, reducing carbon emissions, and otherwise pursuing sustainability as addressed in this and other elements in the Master Plan will benefit current and future generations of Borough residents, and will contribute to regional, national, and global reductions in greenhouse gas emissions.

There is overlap of some topics in the MLUL description for the GBESE and in the descriptions of other elements in the Master Plan. To avoid future confusion when elements may need to be updated, the goals for a particular topic will appear on only one element in the Master Plan. Reference to these topics will be included in this element and in the text of the secondary elements, where appropriate.

Vision

The GBESE envisions a sustainable, healthy, and resilient Pennington Borough where the quality of life of both current and future residents is preserved and enhanced through:

- The protection of our natural resources.
- Dedication to sustainable development practices.
- Reduction or elimination of our impact on the local and global environments.
- The restoration of previously damaged resources, sites, and waterways.

The GBESE team of the Environmental Commission has developed this element with an overarching aspiration to be a community that thrives socially and economically, while minimizing any detrimental impact on the environment, and recognizing that human health and safety depends on improvements to the health of the environment.

Core Topics

This GBESE addresses sustainability in five main areas:

A. Climate Change and Greenhouse Gas Emissions
B. Renewable Energy and Energy Conservation
C. Green Building and Design
D. On-Site Water Management
E. Land Use, Mobility and Waste Management

After an introduction to each topic, goals are presented. Sustainability considerations should be incorporated into all of the Borough's planning and zoning decision-making.

A. Climate Change and Greenhouse Gas Emissions

According to NJDEP's 2020 Scientific Report on Climate Change, New Jersey will experience significant direct and indirect changes in its environment due to climate change, which is caused largely by human activities in the form of greenhouse gas emissions. The impacts that New Jersey has experienced and will continue to experience include more severe storm events, higher temperatures and heatwaves, more frequent precipitation and flooding, and others. To minimize the effects of climate change on our ecological systems, natural resources, human health, and economy, we must pursue strategies that will improve our resilience to, and reduce our contribution to, climate change.

Goals aimed at increasing the resilience of individual buildings and sites against the effect of hazards due to climate change will be in this GBESE. Assessing the hazards to the whole

community will be in the Land Use Plan element in a new section mandated by the MLUL, the Climate Change-Related Hazard Vulnerability Assessment (CCRHVA).

In 2021, the Borough resolved that municipal operations would become carbon neutral by 2035 (Resolution 2021-3.4). This resolution also states that the Environmental Commission will report to the Council on an annual basis the amount of CO_2e released and offset by the Borough and assist the Borough in developing strategies to migrate away from carbon energy sources. Finally, the resolution asks the Environmental Commission to educate and encourage residents to become carbon neutral. The goals associated with advancing this resolution are in this Plan element.

Climate Change and Greenhouse Gas Emissions Goals

Goal 1: Achieve zero CO_2e emissions in municipal operations by 2035.

a) The Environmental Commission will conduct an annual analysis of municipal CO_2e emissions.
b) Develop a plan to reduce CO_2e emissions in municipal operations, which may include strategies related to buildings, vehicle fleets, lighting, and water use.
c) CO_2e offset opportunities should be explored since CO2e emissions from grid electricity generation are beyond the Borough's control.

Goal 2: Stimulate a reduction in CO_2e emissions by borough residences and businesses.

a) Encourage Borough residents and businesses to reduce their emissions through energy choices, energy conservation measures, and green design practices.
b) Support the purchase and production of renewable energy.
c) Adopt ordinances that facilitate the production of renewable energy within the municipality.
d) Increase housing density, support the establishment of downtown businesses, and encourage residents to shop locally to reduce the need for vehicle travel. Make visiting the town center more inviting for pedestrians, bicyclists and personal mobility vehicle riders with better sidewalks and road markings, and other incentives.
e) Support the use of electric vehicles and residential battery energy storage.
f) Continue to coordinate sustainability efforts with neighboring municipalities.
g) Pursue regulation and electrification of yard maintenance equipment such as lawn mowers, trimmers, leaf blowers and chain saws, to eliminate GHG and other air polluting emissions and to reduce noise.

Goal 3: Improve resilience and response of sites and building to the impacts of climate change.

a) Use best practices when adapting buildings to withstand the hazardous impacts of climate change, such as wind, hail, ice storms and heavy rain.
b) Improve stormwater management on individual sites to reduce the contribution towards municipal flooding related to extreme storm events.
c) Manage stormwater using green infrastructure best management practices and by educating residents about their role in stormwater management.

d) Update building and infrastructure design standards to account for projected increase in flooding due to climate change.

B. Renewable Energy and Energy Conservation

Transitioning to renewable energy sources and conserving energy are two ways that the Borough can reduce carbon emissions and become more sustainable. In addition, pursuing renewable energy and energy conservation has the potential to improve resilience over traditional energy systems, such as centralized electricity generation and fossil fuels.

The Borough can support the sustainability of the energy system by promoting strategies such as the use of renewable energy sources with domestic battery energy storage, local energy production, energy conservation practices, and electric vehicles. This core topic is closely linked to the Climate Change and Greenhouse Gas Emissions and the Green Building and Design core topics. Strategies for installing Level 1 and 2 charging in buildings and small developments will be in this GBESE. Commercial Level 2 and 3 charging installations at strategic locations in the Borough will be covered in the Mobility Plan element.

Renewable Energy and Energy Conservation Goals

Goal 1: Improve the overall energy efficiency of the Borough.

a) The Environmental Commission will develop and maintain a Community Energy Plan for the Borough.
b) Continuously improve the energy efficiency of Borough operations.
c) Improve the efficiency of municipal buildings through green building practices and energy conservation measures.
d) Employ residential and commercial building and site design practices that reduce total energy usage.
e) All appliance replacements or new installations should meet Energy Star standards. See: https://www.energystar.gov
f) Encourage and support the efforts of residents and businesses to conserve energy by being a resource for information on new technology and products and on government and private financial incentives.
g) Support the use of smart grid technologies such as smart meters with the opportunity for interactive supply and pricing decisions.

Goal 2: Electrify buildings and the transportation sector.

a) Support the electrification of residential and commercial buildings (e.g., installation of electric appliances and heat pumps) through education and outreach regarding technology and rebates.
b) Move towards using electricity as the sole energy source for public facilities and operations and continue to improve energy efficiency.

c) Facilitate the installation of Level 2 (220V) or Level 3 (440V) electric vehicle charging stations at central locations for residents without a suitable private location, such as a garage or driveway, for charging.
d) Encourage all new development to install Level 2 (220V) electric vehicle charging.
e) Support the installation of Level 2 (220V) electric vehicle charging in existing homes.
f) When Borough Public Works vehicles, Police vehicles and other mobile utility equipment need replacing, prioritize the purchase of electric or hybrid alternatives.

Goal 3: Encourage the use of renewable energy sources.

a) Install solar photovoltaic panels on municipal buildings and parking lots and seek opportunities to leverage any agreements to benefit community-wide solar installations.
b) Encourage residents to enroll in community solar programs.
c) Support the use of solar panels on private structures and land through solar friendly zoning, permitting and exclusion from value addition for real estate taxes.
d) Explore the potential to use geothermal energy for heating and cooling.
e) Apply for incentive grants through New Jersey's Clean Energy Program.
f) The Environmental Commission should act as an information resource for other grants and incentives that can accelerate the transition to renewable energy sources in the public and private sector.

C. Green Building and Design

Improving the sustainability of our buildings will be essential to achieving overall sustainability. In the US, buildings account for 41% of total energy consumption, 72% of electricity consumption, 39% of carbon dioxide emissions, and 14% of potable water usage (US Green Building Council, Benefits of Green Building). In terms of total energy consumption, buildings out-consume the industrial and transportation sectors. Green design not only makes buildings more efficient but also reduces the impact of buildings on the surrounding environment.

Requiring the use of green building practices for the construction and renovation of municipal buildings would improve the Borough's sustainability across all the core topics. Green building and design should also be encouraged for private development. The US Green Building Council's Leadership in Energy and Environmental Design (LEED) certification program is the industry standard for green buildings (https://www.usgbc.org/leed). Building to meet LEED certification standards is an effective way to ensure that buildings are green and sustainable and should be strongly encouraged in the Borough. Other green building certifications and frameworks should also be considered and encouraged. It is recognized that these programs may be modified, or new ones developed, during the life of this element. It is understood that the most current versions would be recommended.

The US Green Building Council provides extensive libraries of green building strategies. For example, to make its buildings sustainable, the Borough and its residents can: design building

envelopes to reduce heating, cooling, lighting, and ventilation loads; set performance targets for energy, water, and waste; use passive and active renewable energy to meet energy loads; select water-efficient plumbing fixtures and appliances; design infrastructure to support non-fossil fuel transportation; eliminate the use of potable water for irrigation; reduce and recycle demolition and construction waste, and other strategies.

Pennington Borough's current Building and Construction Requirements consist of NJ State Uniform Construction Code https://www.nj.gov/dca/codes/codreg/ucc.shtml and its adopted model codes:

1. 2021 International Building Code New Jersey Edition (effective 3/1/23) https://codes.iccsafe.org/content/NJBC2021P1
2. 2021 International Energy Conservation Code (IECC) https://codes.iccsafe.org/content/IECC2021P2
3. 2021 International Residential Code New Jersey Edition https://codes.iccsafe.org/content/NJRC2021P1

These codes do not include Green Building requirements that align with USGBC, or similar, Green Building standards. Additionally, LEED and/or other similar certification programs are not currently a requirement for construction in Pennington Borough. However, ordinances can be written and approved, and codes can be adopted, to provide Green Building requirements for building and construction to conform with the recommendations in the Master Plan.

According to the U.S. Green Building Council, "*LEED-certified homes are designed to provide clean indoor air and ample natural light and to use safe building materials to ensure our comfort and good health. They help us reduce our energy and water consumption, thereby lowering utility bills each month, among other financial benefits. Using the strategies outlined in LEED, homeowners are having a net-positive impact on their communities. LEED homes are also designed, constructed and operated to be resilient in adverse conditions and are developed with proactive design planning for potential impacts of catastrophic weather*."
https://www.usgbc.org/leed/rating-systems/residential
This is clearly aligned with the MLUL definition for the GBESE.

The U.S. Green Building Council uses six rating methods for LEED certification:

1. Building Design and Construction (BD+C)
2. Interior Design and Construction (ID+C)
3. Building Operations and Maintenance (O+M)
4. Neighborhood Development (ND)
5. Residential
6. Cities

Certification comes in four categories, Platinum, Gold, Silver and Certified, which allows the certification process to be introduced in a graduated manner. https://www.usgbc.org/leed

Many of the goals set forth in other elements in the Master Plan align to LEED standards. LEED isn't necessarily restricted to buildings - it extends to site, resource allocation, infrastructure, etc.

Zoning that takes a sustainable approach will inherently end-up creating beneficial conditions for LEED buildings, sometimes making it more economically feasible to achieve LEED or other certification. The rating system is in part designed to incentivize sustainability through mutually beneficial development.

Green Building and Design Goals

Goal 1: Implement and incentivize green building and sustainable site design practices and conduct energy modeling to evaluate and optimize building design for energy efficiency.

a) Strongly encourage the use of certification programs such as LEED, or a comparable rating from another program, for new construction, renovations, additions, development and redevelopment projects, and for landscaping.
b) Encourage municipal building renovations, and new municipal buildings, to meet LEED Certified and/or comparable standards.
c) Improve local ordinances and zoning regulations to reflect and support sustainable building practices.
d) Incentivize green building practices in the permitting process by expediting permits and green-relevant variances, and other strategies.
e) Encourage sustainable innovation in new construction and in existing buildings.
f) Encourage new construction design to include building thermal performance, on-site renewables, commissioning of building systems and energy efficiency strategies.
g) Encourage collaboration between new construction and renovation design teams and the Environmental Commission early in the design process.

Goal 2: Reduce environmental impacts during new construction and renovation.

a) Create construction site management policies to encourage low noise and low emission equipment, manage stormwater and reduce water use.
b) Reduce dependency on fossil fuels during construction and renovation.
c) Encourage the development and use of a construction waste management plan that incentivizes recycling and reduces construction waste.

Goal 3: Reduce the environmental impact of existing buildings.

a) Encourage sustainability audits of existing municipal buildings and, when feasible, identify opportunities for improvement.
b) Explore opportunities to educate and engage property owners on strategies for resiliency in climate change, e.g. rainwater management, heat island reduction.
c) Encourage a reduction in dependency on fossil fuels for building construction and operation.
d) Encourage the collection and reuse of stormwater, and the use of grey water systems.
e) Enhance lighting ordinances to satisfy concerns of sky shine at night.

Goal 4: Encourage adaptive reuse, historic preservation, energy retrofits, and upgrades to existing buildings instead of demolition and replacement.

a) Encourage the calculation of the energy embodied in new construction and new material manufacturing, to demonstrate the energy, greenhouse gas and natural resources savings possible from adaptive reuse and retrofits.
b) Identify and abate lead hazards and risks in buildings and infrastructure built before 1978, as recommended by the EPA.

D. On-Site Water Management

Sustainability measures that protect the Borough's water quality and quantity can help ensure that residents have reliable access to clean water. The Borough should actively work to protect its bodies of water and related infrastructure, including the four active wells that supply all the Borough's water. The health of the watershed and the natural water cycle is essential to the quality of a water utility (including recharge, natural filtration and aquifer protection).

The water supply can be stressed during droughts, which are predicted to occur more frequently due to climate change. In addition, intense rainfall and storm events, which will also increase in frequency, can cause flooding that may negatively impact water quality. Water quality is a known issue in New Jersey, where most streams, lakes, and rivers are classified as impaired (NJ DEP, 2022 Integrated Water Quality Assessment Report). Total Maximum Daily Load (TMDL) studies have also been published to set goals for pollutant load reductions for Pennington Borough's watersheds.

To protect our water resources, the Borough should pursue strategies that reduce water usage, protect water quality and quantity, manage stormwater, and reduce flooding. Strategies for managing stormwater on site will be in this GBESE. Goals for managing stormwater at the municipal level will be found in the Utility Services Plan element.

<u>On-Site Water Management Goals</u>

Goal 1: Encourage the conservation of water by Borough residents and businesses.
a) Conserve water in municipal buildings and encourage water conservation practices among residents and businesses.
b) Install water-efficient appliances and fixtures.
c) Harvest rainwater and reuse grey water for landscape watering and irrigation.
d) Use native plants that require little to no irrigation for landscaping.

Goal 2: Minimize site-specific impacts on storm water pollution throughout the Borough.
a) Determine if existing buildings have inflow or infiltration into the wastewater exit pipe.
b) Direct development away from riparian areas, wetlands, wetland buffers, and flood hazard areas.
c) Conduct education and outreach programs to encourage behavior that reduces water pollution.

Goal 3: Reduce flooding and pollution through improved on-site stormwater management.

a) Reduce or eliminate disturbance to natural stormwater systems on site and use green infrastructure.
b) Require site designs to limit impervious surfaces and set infiltration rates.
c) Update design standards to account for a projected increase in flooding and precipitation.
d) Support the full or partial replacement of lawns with meadows to support biodiversity, absorb stormwater and reduce emissions and noise from lawn mowing and leaf blowing.

Goal 4. Take every opportunity to restore developed sites and address the impact of past development on current storm water problems and other environmental issues.

a) Establish guidelines for redevelopment that encourage restorative design, aiming to enhance the resilience of previously developed sites.
b) Treat the redevelopment and investment in previously developed land as an opportunity to repair/restore the sites through enhanced stormwater ordinances.
c) Retrofit municipal facilities with green infrastructure to retain stormwater on site and encourage the same for private development; potential green infrastructure tools include rain gardens, bioswales, green streets, green and blue roofs, and vegetated islands.

E. Land Use, Mobility and Waste Management

The Land Use Plan element of the Master Plan should follow the 10 "Smart Growth" principles developed by the Smart Growth Network with the support of the Environmental Protection Agency (EPA). See: https://www.epa.gov/smartgrowth/about-smart-growth . The principles aim to improve community resilience, health, diversity, and sustainability and are listed here:

1. Mix land uses such that residential, commercial, and recreational are in close proximity.
2. Take advantage of compact building design.
3. Create a range of housing opportunities and choices.
4. Create walkable neighborhoods.
5. Foster distinctive, attractive communities with a distinct sense of place.
6. Preserve open space, farmland, natural beauty, and critical environmental areas.
7. Strengthen and direct development to existing communities.
8. Support the provision of a variety of public transportation choices.
9. Make development decisions predictable, fair, and cost-effective.
10. Encourage community and stakeholder collaboration in development decisions.

Land use is often a key determinant of whether alternative transportation options and electric vehicles are feasible for residents. Increasing town density, mixing land uses, offering a variety of transportation choices, providing the appropriate infrastructure for walking, biking, and electric vehicle charging, and other strategies consistent with the smart growth principles encourage more sustainable travel within and through the Borough.

Vehicles powered by gasoline, diesel and natural gas are major emitters of greenhouse gases. Reductions in emissions can be achieved by encouraging alternative modes of transportation, such as shared or public transportation, walking, and biking, with the goal of reducing the total vehicles miles traveled (VMT) by Borough residents.

Electric vehicles are a promising alternative to fossil fuel-powered cars. Rather than filling up on fuel at a gas station, electric vehicles need to be plugged into a power source to charge. Therefore, building electric vehicle charging stations at central locations and supporting the installation of charging stations in homes can help encourage electric vehicle uptake by making charging more convenient.

The conflict between the need for residential and commercial parking and the desire for dedicated bike and micro-mobility lanes will have to be resolved equitably.

The goals for the above topics can be found in the Land Use and Mobility Plan elements.

Reducing waste and increasing recycling are key components of environmental sustainability. It reduces consumption of new raw materials, energy use (from production of new materials), air pollution (from solid waste incineration) and water pollution (from landfills). Although waste management and recycling are of importance to residents, it is not included in the MLUL description of the GBESE. These topics are covered in detail in the Utility Services Plan element. Section C, Green Building and Design, of this GBESE includes a goal related to the disposal of construction waste created during the development of a site.

Impact on Other Elements of the Master Plan

Master Plan elements Green Buildings and Environmental Sustainability, Conservation of Natural Resources, Open Space and Recreation, and Historic Preservation set the tone for sustainability and environmental sensitivity in Pennington Borough. Each impacts the health and wellbeing of residents and the health of the environment. Other elements should follow the lead of these four elements in shaping the town through land use, housing, utilities, mobility, economic development and community facilities. Specific impacts of the GBESE on other Master Plan elements are as follows.

<u>Land Use Plan Element</u>.

The Land Use Plan Element relates to the Borough's zoning and potential redevelopment areas. It will be impacted by several topics in the GBESE.

- Section A, "Climate Change and Greenhouse Gas Emissions" and its goals and strategies will have direct application to the "Climate Change-Related Hazard Vulnerability Assessment" (CCRHVA) which will be included in the Land Use Plan element.

- The Land Use Plan element should be cognizant of the 10 "Smart Growth" principles developed by the Smart Growth Network, as listed in Section E.

Housing Plan Element

Much of the new Housing Plan element will focus on the development of affordable housing to meet the Borough's court-determined obligation.

- Section C, "Green Building and Design," should be considered in the new Housing Plan element, particularly regarding the construction of affordable housing through accessory dwelling units, individual homes or small communities.
- Goals 2 and 3 of Section B, "Renewable Energy and Energy Conservation," should be observed for the selection of energy sources and energy-efficient appliances.
- Goal 2 and 3 from Section A, "Climate Change and Greenhouse Gas Emissions," is important to consider when selecting sites for housing, as are many of the water management goals and strategies in Section D.

Mobility Plan Element

The Mobility Plan element covers the safe and efficient movement of people and goods in the Borough. It will recommend ways to reduce greenhouse gas and other pollutant emissions from transportation. It will also change the focus from cars to the accommodation of pedestrians, bicycles and users of personal micromobility vehicles, including electric. Each of these will complement the sustainability goals in the GBESE.

Utility Services Plan Element.

The Utility Services Plan element covers water supply and distribution, drainage and storm water management, sewerage, solid waste disposal, and the maintenance of borough roads and facilities. Successful implementation of many of the goals in the Utility Services Plan element have a direct impact on sustainability. GBESE goals on reducing greenhouse gas emissions and energy efficiency will impact Public Works Department operations. Green building and renewable energy goals will apply to municipal facilities.

Open Space and Recreation Plan (OSRP)

The goals of the OSRP are complementary to the sustainability aspect of the GBESE. Successful implementation of these goals will have a beneficial effect on the health and wellbeing of residents through opportunities for recreation and supported activities.

Conservation of Natural Resources and the Borough Environmental Resource Inventory (ERI)

The conservation of natural resources is a critical aspect of sustainability and is addressed in the Conservation of Natural Resources Plan element. The Environmental Resources Inventory

provides a host of valuable information about the Borough and its natural resources and is a valuable source of data of potential use in the implementation of the GBESE goals.

Economic Development Plan

Many of the goals in the GBESE apply directly to the facilities used for businesses and commercial organizations. The goals should steer the design and building of new facilities and retrofits for business use. The energy goals in the GBESE are also applicable to businesses.

Historic Preservation Plan

The preservation of historic buildings in the Borough is aligned with sustainability. The energy and green building goals in the GBESE are directly applicable to the restoration of historic buildings.