

FARMINGTON RIVER WATERSHED ASSOCIATION

749 HOPMEADOW STREET
SIMSBURY, CT
FRWA.ORG



A GUIDE TO THE ECOLOGICAL IMPROVEMENTS AT EDGEWOOD SCHOOL

TABLE OF CONTENTS

About FRWA	3
Acknowledgements	3
Wetlands & Floodplains	4
The Pequabuck River Watershed	5

Watershed Based Plans	6
The Pequabuck River Watershed Based Plan	7
Bristols Edgewood Neighborhood	8
A Note on Stormwater	9

The Edgewood Bioswale	10
The Edgewood Tree Wells	11
Importance of Trees	12
Importance of Pollinators	13

Native Plant Care Guide	15
Trees & Shrubs	16
Herbaceous Perennials	18
Grasses	20

Appendix	22
Partner Acknowledgement	22
References	23

ABOUT FRWA

The Farmington River Watershed Association (FRWA) is a 501(c)(3) non-profit organization founded in 1953. Our mission is to preserve, protect, and restore the Farmington River and its watershed lands through research, water monitoring, habitat restoration projects, education, and advocacy.



Our water monitoring program informs our work and provides reliable data to the Connecticut Department of Energy and Environmental Protection (CT DEEP) and the Massachusetts Department of Environmental Protection (MassDEP). As opportunities arise, we work to restore streambanks and aquatic habitats for fish and wildlife, for example by removing dams or restoring native plant communities. We also help towns with river management and stormwater pollution reduction education. FRWA has been conducting water monitoring in the Connecticut portion of the watershed since 2004, and in Massachusetts since 2019. More information can be found on our website, frwa.org.

In our education mode, we provide classroom visits, field trips, and student seasonal employment. We host presentations and workshops on river history, water conservation, pollution prevention, and managing stormwater runoff. We organize river cleanups and other outreach events including canoe trips, paddling events, and watershed tours. As advocates, we speak up for watershed protection and river-friendly practices and policies at the local, state, and national level.

The Farmington River is the longest tributary to the Connecticut River, coursing 81 miles from Massachusetts headwaters to its confluence with the Connecticut River. There are 33 towns in the watershed covering 609 square miles of land in Massachusetts and Connecticut. Approximately 100,000 acres of the watershed lies within MA, with the remaining 285,000 acres in Connecticut.

ACKNOWLEDGEMENTS

FRWA would like to acknowledge and express our gratitude to all of our partners involved in creating the Pequabuck River Watershed Based Plan as well as all who were involved with the installation, planting, and maintenance of the BMP 10 bioswale and tree wells.

Special thanks to the City of Bristol Public Works Department, Connecticut Department of Energy and Environmental Protection, the Pequabuck River Watershed Association, Suzanne Sayers of Gardens By Design, Princeton Hydro, and local community volunteers for their efforts related to this project.

IMPORTANCE OF WETLANDS & FLOODPLAINS

A wetland is an area in which water covers the soil, or is present at or near the soils surface all year, or during varying periods of the year. The hydrology, or water saturation, of an area largely determines the types of plant and animal communities living in and on the soil, allowing wetlands to support both aquatic and terrestrial organisms. Many wetlands are seasonal, and may only be wet for part of the year. Even if they are dry, they still provide critical habitat for wildlife.

WHERE TO FIND WETLANDS:

- **Floodplains along rivers & streams**
- **Margins of ponds & lakes**
- **Depressions surrounded by dry land**
- **Vernal pools & bogs**
- **Marshes dominated by herbaceous plants**
- **Swamps dominated by shrubs**
- **Wooded swamps dominated by trees**

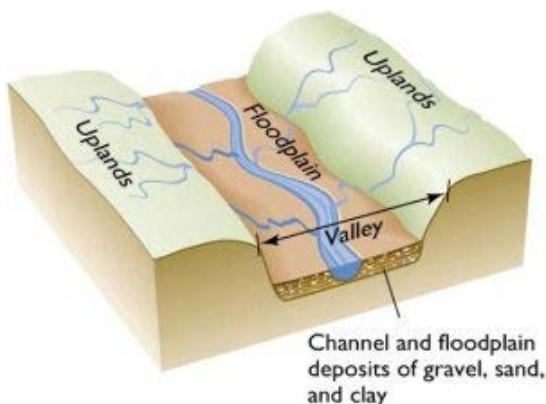


Wetlands act as a natural sponge, trapping and slowly releasing surface water, rain, snowmelt, groundwater, and floodwaters. Trees, root mats, and other vegetation help to slow the speed of floodwaters and distribute them more slowly over a floodplain area. These actions lower flood heights and reduce erosion. Wetlands located within and downstream of urban areas are extremely valuable, working to counteract the high volume and rate of stormwater runoff from impervious surfaces. The holding capacity of wetlands also helps to control flooding and prevent waterlogging of any nearby agriculture.

A floodplain is a relatively flat area of land alongside a river or stream, and stretches from the river bank to the base of the valley. They are prone to flooding when water levels rise due to rainfall or snowmelt.

Floodplains provide flood risk reduction benefits from their unique functions. Rivers and streams shape floodplains overtime and will influence riverine ecosystems, which are primarily wetlands. Some of these benefits include; excess water storage, erosion reduction, regulating flow during non-flood periods, and slowing runoff.

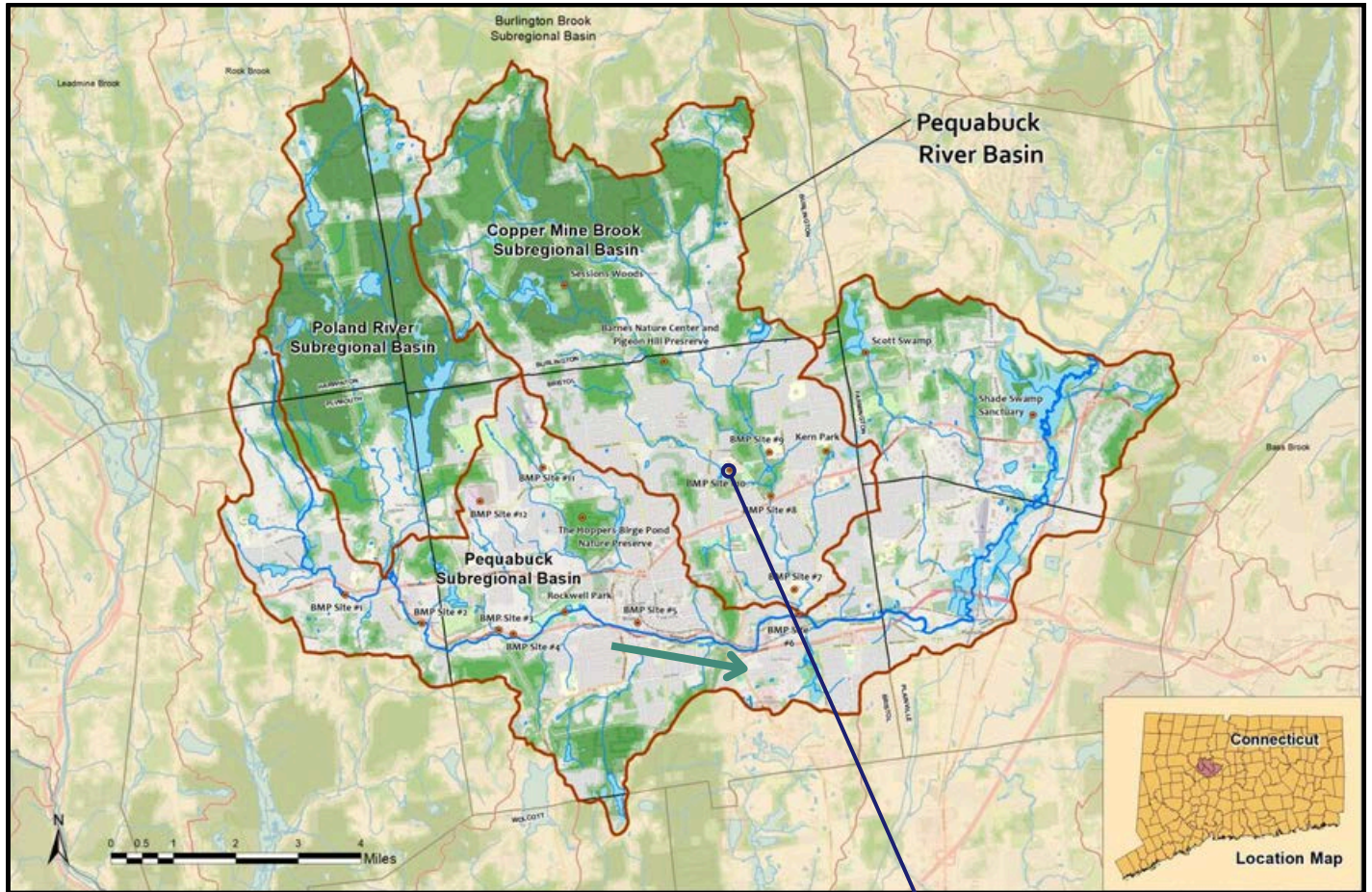
Floodplains allow for water to spread out and can store excess water temporarily. They can also slow down the rate of runoff, giving more time for that water to infiltrate into the soil. During non-flood periods, they can redirect excess water into the groundwater system if space is available.



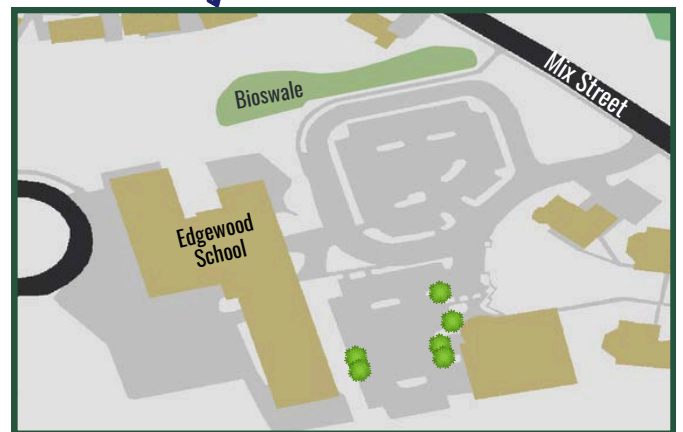
BENEFITS OF FLOODPLAINS:

- **Fish and wildlife habitat protection**
- **Natural flood and erosion control**
- **Surface water quality maintenance**
- **Groundwater recharge**
- **Biological productivity**
- **Higher quality recreational opportunities**
 - **Fishing, boating, bird watching, etc.**

THE PEQUABUCK RIVER WATERSHED



The Pequabuck River originates in Litchfield County and flows for approximately 19 miles before draining into the Farmington River in Farmington, Connecticut. It has a 58 square mile watershed, made up of three subregional basins: the 10.2 square mile Poland River subregional basin, the 18.6 square mile Coppermine Brook subregional basin, and the 29.1 square mile Pequabuck River subregional basin.



The Coppermine Brook subregional watershed has a mix of land usage throughout. It has 50% deciduous forest cover and 38% developed areas, which takes up most of the space. Developed open space covers 13%, while low intensity developments contributes 15%. Medium and high intensity development cover 9% and 1% of the total basin area, respectively. Pasture and woody wetland each cover roughly 500 acres, or 4% cover. Open water, barren land, evergreen and mixed forests, scrub, cropland, and emergent herbaceous wetlands account for the remaining 492 acres of the watershed.

WATERSHED BASED PLANS

Development of a Watershed Based Plan is a key step in Watershed Management, leading to restoration of a polluted or otherwise impaired waterbody. Development and implementation of these plans to focus on addressing a specific nonpoint source impairment identified on CT DEEP's Integrated Water Quality Report to Congress qualifies them as Watershed Based Plans, with the ultimate goal of reducing or removing the impairment, so the waterbody can meet Water Quality Standards, and be removed from the list.

Nonpoint source (NPS) pollution is a complex problem. Many of Connecticut's waterbodies are classified as impaired, due to exceedance of a specific water quality parameter, such as indicator bacteria or nutrients. Management Practices can address a wide spectrum of NPS pollutants to maximize their value to water quality and the environment as a whole.

One of the most important goals of the CT DEEP Watershed Management Program is to assist in the development of comprehensive watershed management plans, to protect and restore water quality and conserve and manage water resources, by guiding local land use decision making, and enhancing pollution prevention programs.

There are Nine Elements that must be included in an EPA-approved Watershed Based Plan:

IMPAIRMENT	An identification of the causes and sources of pollution
LOAD REDUCTION	An estimate of the load reductions expected for the management measures described
MANAGEMENT MEASURES	A description of the NPS management measures that will need to be implemented to achieve the estimated load reductions.
MILESTONES	A description of interim, measurable milestones for determining whether NPS management measures or other controls are being implemented
MONITORING	To evaluate the effectiveness of the implementation efforts
PERFORMANCE	To evaluate the effectiveness of the implementation efforts
PUBLIC INFORMATION & EDUCATION	An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation.
SCHEDULE	An expedited schedule for implementing NPS management measures identified
TECHNICAL & FINANCIAL ASSISTANCE	An estimate of the assistance needed, and/or the sources and authorities that will be relied on, to implement this plan

PEQUABUCK RIVER WATERSHED BASED PLAN

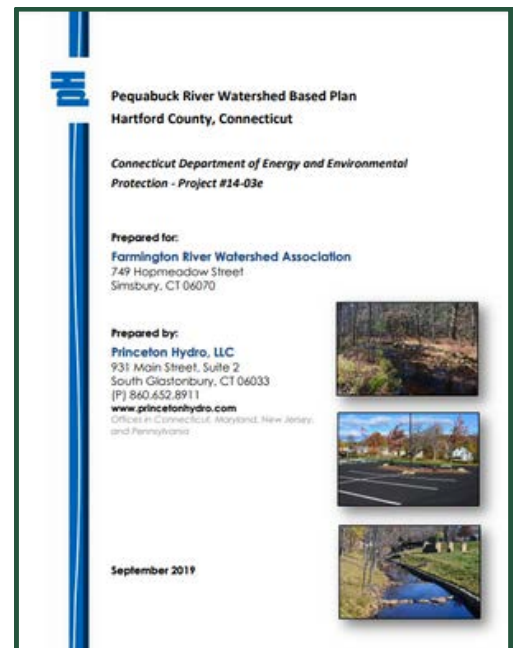
The Pequabuck River Watershed Based Plan (WBP) is primarily intended to provide a path to improve water quality throughout the watershed, including the river itself and the tributary network of various streams and brooks found within its watershed. The Connecticut Integrated Water Quality Report to Congress indicates that water quality in the Pequabuck River and segments of its two major tributaries – the Poland River and Coppermine Brook – are “not supporting” for recreational uses due to indicator bacteria. The Pequabuck River and the lower section of Coppermine Brook are also “not supporting” for aquatic life, primarily due to unknown causes from a variety of potential sources.

Pollutant modeling has shown the majority of bacteria to be derived from stormwater-based sources in the Coppermine and Pequabuck subregional basins. Prioritization of local basins was conducted in order to recommend twelve (12) specific best management practices (BMPs) to address areas of concern. These BMPs include the utilization of pervious pavement, stormwater wetlands, bioinfiltration basins, vegetated filters, tree wells, and other secondary BMPs. These recommendations aim to reduce non point source loading of bacteria, nutrients, and sediments.

The goals of the Pequabuck River Watershed Based Plan are to:

- Identify and quantify the river’s primary source of nutrient, sediment, and bacteria loading
- Incorporate stakeholder involvement, education and identification of funding sources
- Use this data to develop a comprehensive Watershed Based Plan (WBP) that identifies specific actions and pollutant load reduction Best Management Practices (BMP) needed to decrease the water quality impairments of the Pequabuck River and its tributaries

If you are interested in learning more about the WBP, it can be viewed at <https://portal.ct.gov/DEEP/Water/Watershed-Management/Watershed-Management-Plans-and-Documents>



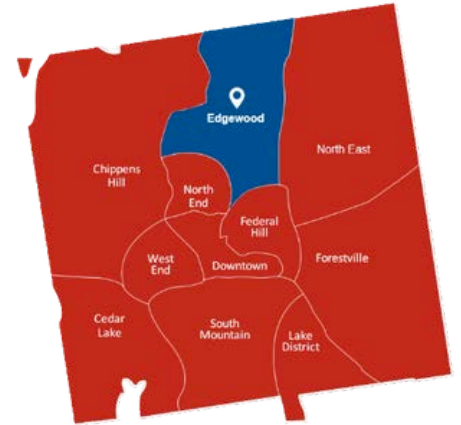
PEQUABUCK RIVER WATERSHED BASED PLAN PROJECT PARTNERS

- **Municipalities of; Bristol, Burlington, Harwinton, Farmington, Plymouth, Plainville, and Wolcott**
- **Farmington River Watershed Association (FRWA)**
- **Pequabuck River Watershed Association (PRWA)**
- **Connecticut Department of Energy and Environmental Protection (CT DEEP)**
- **Connecticut River Conservancy (CRC)**
- **Naugatuck Valley Council of Governments (NVCOG)**
- **Capitol Region Council of Governments (CRCOG)**

BRISTOLS' EDGEWOOD NEIGHBORHOOD

Bristol is situated in Hartford County in Central Connecticut, 20 miles southwest of Hartford. It incorporated as a city in 1911, and is known as a manufacturing hub. Bristol has a current population of 61,537.

The Edgewood neighborhood of Bristol is located in the Coppermine Brook subregional drainage basin. It features a strong mixture of residential neighborhoods as well as the Route 6 commercial shopping corridor. The Sensitive Population in this census tract is 8.50 out of 10



The Bristol Water and Sewer Department has supplied the City of Bristol with high-quality drinking water since the early 1900s. Reservoirs in the towns of Burlington, Harwinton, Plymouth, and Bristol are channeled through the Poland River to the water treatment plant, where the water is treated and sent into the distribution system and storage facilities. Along with the reservoir system, five gravel-packed wells provide water to the distribution system's low-service area and an interconnection with the New Britain Water Department to supplement the Stevens Street area. In 2023 the Bristol Water and Sewer Department produced a total of 2.12 billion gallons of water, or approximately 5.81 million gallons per day.

WHY WAS EDGEWOOD SCHOOL CHOSEN?

The sites presented in the Pequabuck River WBP were selected as sites where stormwater management could have a high probability of implementation and success. They were first identified through use of information from field assessments, then they were further selected through the consideration of the pollutant data with effort placed on selecting sites along the most impacted portion of the river. The Pequabuck River WBP outlined Edgewood School in Bristol as BMP-10. The local drainage basin that contains this site is ranked #1 for cumulative pollutant loading in the Pequabuck River WBP.

Annual Pollutant Load

Nitrogen (Kg) 3.69
Phosphorus (Kg) 0.87
Solids (Kg) 377.84
Bacteria 3.81E+10

Estimated Load Reductions

Nitrogen (Kg) 1.85 - 50%
Phosphorus (Kg) 0.26 - 30%
Solids (Kg) 340.06 - 90%
Bacteria 2.67E+10 - 70%



This large piece of property has extensive impervious area associated with the buildings and parking infrastructure. Originally, a turf grass basin ran along the west edge of the property, and it was identified that the large size of the area may allow for some significant treatment of runoff prior to entering the Coppermine Brook if converted into a wetland type basin.

A NOTE ON STORMWATER

Stormwater runoff is the number one source of water pollution in the nation. It can lead to increased flooding, erosion, pollution, and decreased groundwater recharge during dry periods. Stormwater can contain pollutants such as sediment, nutrients, pathogens such as viruses and bacteria, and chemicals that can threaten aquatic health and contribute to the loss of water dependent recreational activities.

As we develop land and increase the amount of paved surfaces and buildings, also known as **impervious surfaces**, more water flows rapidly into our lakes, rivers, and estuaries. The water picks up heat, sediments, chemicals, and pathogens along its way, and brings them into our streams and rivers.

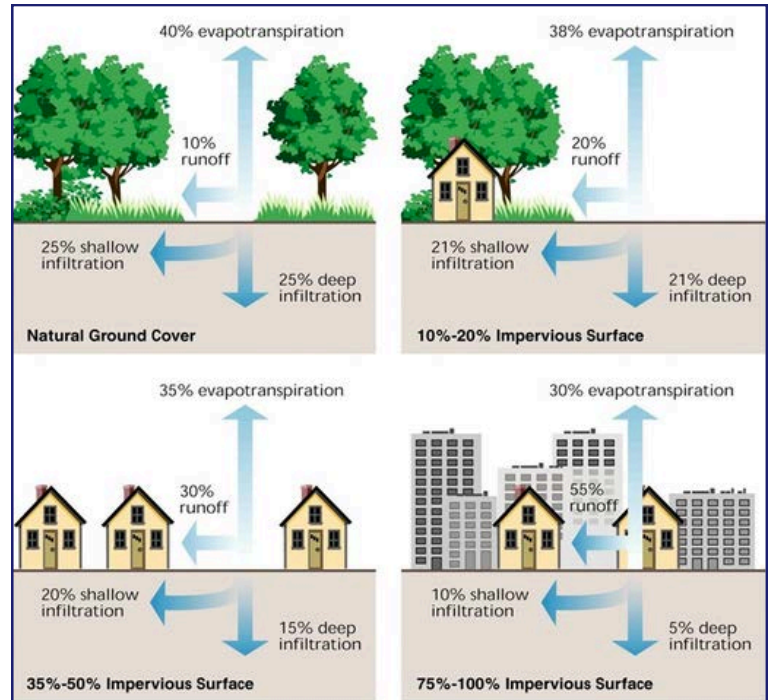
This type of pollution is referred to as **non point source**, or **NPS**, since it cannot be tracked to a single source like a discharge or effluent pipe. NPS is a challenge to regulate and manage, because its source is the entire landscape.

Fortunately, there are ways to help reduce NPS through the use of **Best Management Practices**, or **BMPs**. A variety of BMPs exist that reduce the speed and volume of water entering our streams and rivers, allowing stormwater to slowly infiltrate soil and be treated naturally through physical and biological processes.

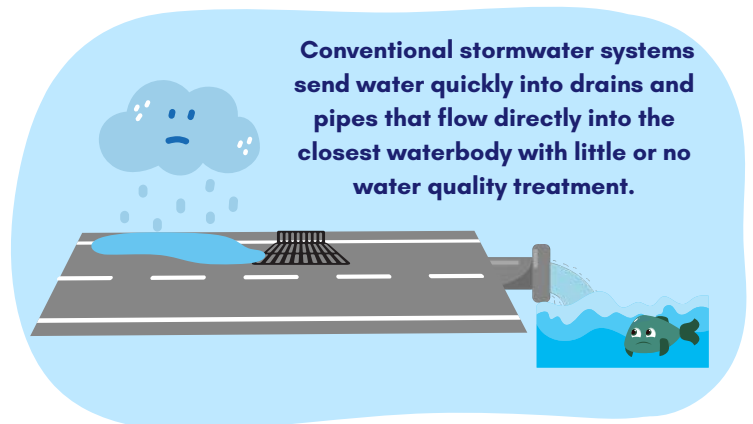
There are many different types of stormwater BMP's, including:

- Tree wells
- Bioswales
- Rain gardens
- Rain barrels/cisterns
- Permeable pavement
- Retention ponds

If you are interesting in learning more about BMP's and how you can reduce stormwater runoff at home with a few simple changes, head to www.riversmartct.org.



As the amount of impervious surfaces increases from driveways, roads, and roofs, more stormwater flows into catch basins and stormwater systems. This means that less water is able to infiltrate into the ground, which can intensify flood and drought effects.



INSTALLING THE EDGEWOOD SCHOOL BMP

BIOSWALE INSTALLATION PROGRESSION

CONSTRUCTION



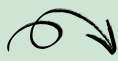
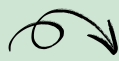
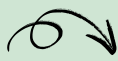
PLANTING



COMPLETE



TREE WELL INSTALLATION PROGRESSION



EDGEWOOD SCHOOL BIOSWALE

A bioswale is a linear, low-lying trough or depressed channel intended to catch stormwater runoff and filter it to reduce the movement of pollutants downstream. They are designed to receive stormwater runoff from nearby impervious surfaces, such as parking lots, and are planted with native vegetation to slow the infiltration rate and filter out pollutants such as nitrogen, phosphorus, pathogens, sediments, and other non-point source pollutants. They intercept polluted stormwater which would otherwise flow straight into storm drain systems or directly into nearby waterways. Bioswales also provide habitat for birds, pollinators, and local wildlife when planted with native vegetation, effectively improving the biodiversity of an area.



The Edgewood School Bioswale is an infiltration BMP, one of three primary treatment types considered effective for the treatment of bacteria. It is designed to collect stormwater runoff from nearby impervious surfaces and allow it to infiltrate into the ground slowly, rather than allowing the water to flow directly into the conventional stormwater system. These types of structures are effective for removing fine and coarse particulates and associated nutrients, and vegetation aids in nutrient uptake while providing substrate stability.

It was constructed on the north side of Edgewood School, converting an existing 300-foot drainage swale into a bioswale. It is intended to collect stormwater from 2 acres of parking lot and 1 acre from the roof of the school.



BENEFITS OF BIOSWALES

- Improved water quality from natural filtration of nutrients, chemicals, and pathogens
- Reduced stormwater runoff and sediment transport during storm events
- Reduced temperature pollution from stormwater heated by impervious surfaces
- Reduction of oil from paved areas entering waterways
- Protection from river and stream erosion
- Recharge of local groundwater resources
- Year-round habitat for beneficial insects, pollinators, and other wildlife
- An attractive addition to the neighborhood

EDGEWOOD SCHOOL TREEWELLS

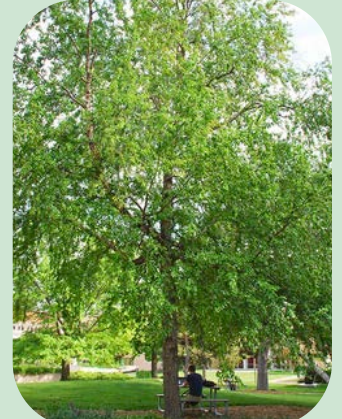
Tree wells and tree filters are designed to intercept stormwater through a curb cut or surface grate and treat stormwater using a soil or filter media in tandem with a central tree and other plantings. The area around the tree well is typically sloped to allow water to flow into it directly. They will collect runoff, usually after heavy rainfall, reducing the volume of runoff entering storm drains, preventing surface flooding, and filtering out pollutants through the soil. Tree wells are found alongside walkways, driveways, and parking lots, installed either as a standalone BMP or integrated as retrofits in an existing stormwater system.

At Edgewood School, four tree wells have been installed as catch basin retrofits throughout the parking lot. They are intended to collect 0.8 acres of water from the southern parking lot.

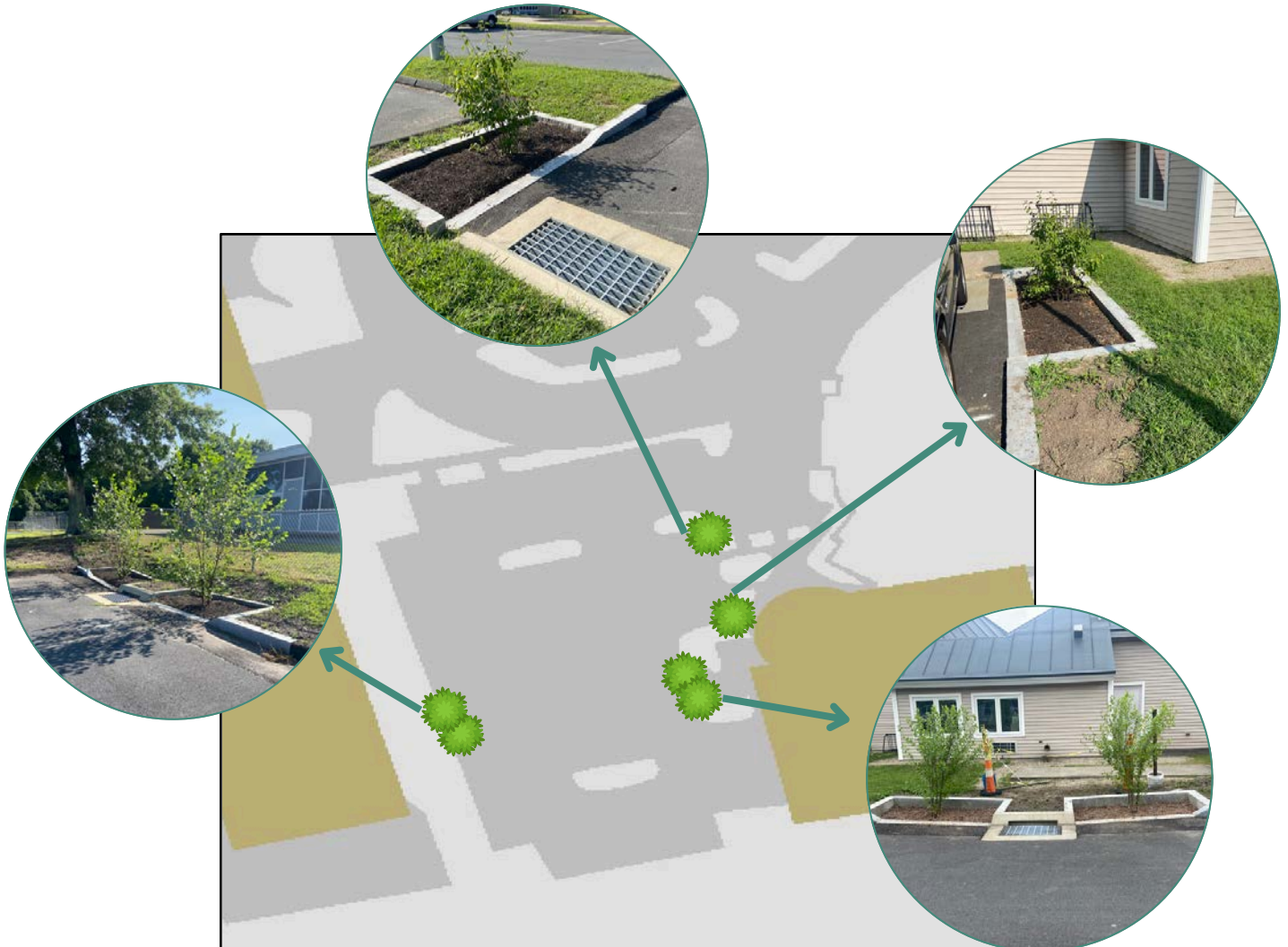
What is growing in the Edgewood School Treewells?



Serviceberry
Amelanchier
arborea



River Birch
Betula nigra



WHY ARE TREES IMPORTANT?

Trees play a vital role in stormwater retention by holding large amounts of water in their leaves and bark, allowing for evaporation and gradual release into the ground. A single tree can store over 100 gallons of water, and in communities, this can lead to a 2-7% reduction in annual runoff, resulting in cost savings on drainage systems. Studies show that combining trees with natural landscaping can reduce storm runoff by up to 65%, with some areas retaining 100% of rainfall on-site.

Without the benefit of trees and vegetated infrastructure, waterways are polluted as oils, heavy metal particles and other harmful substances are washed away. Fish and wildlife suffer, drinking water becomes expensive or impossible to reclaim, property values are reduced, and our living environment is degraded.



A number of trees were planted in the bioswale, including; Dogwood, Swamp Oak, River Birch, and Serviceberry.

Trees are increasingly recognized for their importance in managing runoff. Their leaf canopies help reduce erosion caused by falling rain. Some water evaporates from leaves and some seeps into the soil, while fallen leaves create a spongy layer that retains moisture and supports decomposition, reducing runoff and pollutants. Roots stabilize the soil and absorb water, contributing to groundwater recharge for over half the nation's drinking supply, and they help create conditions in the soil that promote infiltration.

BENEFITS OF TREES:

- **Promote infiltration and absorption for flood control**
- **Habitat and source of food for wildlife**
- **Shade - thermal regulation**
- **Root systems stabilize soils and help control erosion**
- **Provide aesthetics and privacy on property**
- **Reduces carbon dioxide in the atmosphere**
- **Improves soil quality**

WHO ARE THE POLLINATORS?



Pollinators are insects, birds, or small mammals that assist with plant reproduction by carrying pollen between flowers, and are crucial in supporting biodiversity. About 80% of all flowering plants rely on pollinators for reproduction, and would go extinct without them. They also support many ecosystem services, benefits that people receive from healthy ecosystems, such as pollinating over 1,200 plants that produce fruits, vegetables, and nuts.

There are over 350,000 species of pollinators worldwide, including bees, birds, butterflies, moths, beetles, wasps, bats, and small mammals. Having such a wide variety of pollinators is important because if some pollinators are absent for a period of time, there will always be others to continue the work. In some cases, plants and pollinators have co-evolved, and certain plants will require certain pollinators.

There are a number of threats that pose a risk to pollinators, such as habitat loss, pesticide use, disease, climate change, and the introduction of non-native species. In North America, some butterfly, bat, and hummingbird species are in a decline, while 25% of all bumblebee species are threatened. Habitat restoration and protection are important for supporting pollinator populations. Creating habitat in urban areas can help to increase connectivity between areas of existing habitat, such as planting a bioswale.

Butterflies and moths do not seek out pollen, rather they go to flowers to feed on their nectar and pollen will stick to their legs and bodies and transfer to other flowers as they continue to feed. While they are not the most efficient, they are incredibly effective pollinators and some plant rely exclusively on them to reproduce. Butterflies will pollinate brightly colored flowers during the day, while moths are nocturnal pollinators, and prefer light colored flowers that catch the moonlight.



Bumble bees pollinate wild flowering plants and agricultural crops. They can fly in cooler temperatures and lower light levels than other bees, making them great pollinators. They can perform “buzz pollination”, where they grab a flower in their mouth and flap their wings to loosen the pollen, and will stick to their fuzzy bodies.

Specialist bees are bees that will only visit one plant species for pollen. About one-third of all bees are specialist bees, and have developed interdependent relationships with some plants - the plants depend on the specialist for pollination. They are solitary and only active for a few weeks of the year, and will follow the bloom schedule of their plant of choice.

NATIVE PLANT CARE GUIDE

Keystone native plants are plant species that are critical to the food web and are necessary in the life cycles of many animals. They have tight relationships with wildlife, having formed over thousands of years, and providing sources of food, cover and places to raise young. Wildlife and pollinators, such as bees, birds and butterflies, would not survive or thrive without the presence of native plants.

TREES/SHRUBS

Winterberry	<i>Ilex verticillata</i>	15
Serviceberry	<i>Amelanchier arborea</i>	15
Swamp Oak	<i>Quercus bicolor</i>	16
Red Osier Dogwood	<i>Cornus sericea</i>	16

PERENNIALS

Swamp Milkweed	<i>Asclepias incarnata</i>	17
New England Aster	<i>Symphyotricum novae-angliae</i>	17
Joe Pye Weed	<i>Eupatorium fistulosum</i>	18
Cardinal Flower	<i>Lobelia cardinalis</i>	18

GRASSES

Pennsylvania Sedge	<i>Carex pennsylvanica</i>	19
Purple Love Grass	<i>Eragrostis spectabilis</i>	19
Switchgrass	<i>Panicum virgatum</i>	20
Little Bluestem	<i>Schizachyrium scoparium</i>	20

GROWTH HABITS

- Can grow 3 – 15 feet tall
- Oval shaped
- Need male and female plants to produce fruit
- Flowers are small, yellow-whitish, bloom between April and July
- Berries grow in summer, last through mid-winter

CARE & NEEDS

- Prefers full sun to partial shade
- Likes wet to moist, well-drained acidic soils
 - Will tolerate poorly-drained soils
- Low drought tolerance
- No trimming needed, unless branches are dead

WILDLIFE VALUE

- Larval host for Henry's Elvin butterfly
- A source of food for butterflies, specialist bees, songbirds, and small mammals

Berries and leaves are toxic to humans if consumed

Winterberry

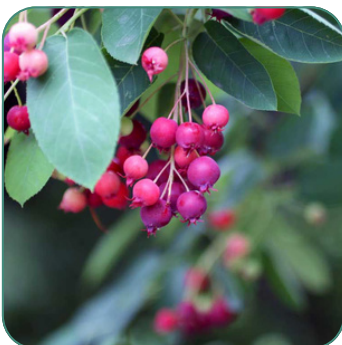
Ilex verticillata



TREES & SHRUBS

Serviceberry

Amelanchier arborea



GROWTH HABITS

- Can grow 15–25 feet tall
- Has a rounded growth pattern
- Blooms in March and April
 - Flowers are white with 5 petals and fragrant
- Grows a red/purple berry in late summer to fall

CARE & NEEDS

- Grows in a wide variety of conditions
- Likes full sun to partial shade
- Prefers acidic to neutral soil that is moist and well-drained
 - Can tolerate wet or dry soils

WILDLIFE VALUE

- Pollen source for native bees and other pollinators
- Larval host for redspotted purple butterfly
- Berries eaten by songbirds and mammals

GROWTH HABITS

- Grows 50 – 60 feet tall
- Grows wild in low-lying and swampy areas – often moist bottomlands or river banks
 - Can grow in urban/suburban setting
- Flowers in the spring in the form of catkins
- Brown acorns grow in the fall
- Can live up to 300 years

CARE & NEEDS

- Prefers full sun
- Prefers moist to wet soils, adaptable to drier soils
- Can tolerate occasional flooding and drought
- Sensitive to salt, compaction, and air pollution
- May need pruning of lower branches

WILDLIFE VALUE

- Acorns provide food to mammals and some birds
- Larval host for numerous butterflies and moths

Acorns and leaves are toxic to humans if consumed

Swamp Oak *Quercus bicolor*



TREES & SHRUBS

Red Osier Dogwood *Cornus sericea*



GROWTH HABITS

- Can grow 6 – 9 feet tall
- Has a rounded shape
- Blooms from June to August
- Grows small white flowers, in 2 –3 inch clusters
- White berries grow from summer into the fall
- Red twigs provide an attractive color in winter

CARE & NEEDS

- Prefers full sun to partial shade
- Prefers rich, consistently moist soils
- Prune the plant in early spring to stimulate more growth

WILDLIFE VALUE

- Larval host for the Spring Azure butterfly
- A source of nectar and pollen for bees and butterflies
- Fruits are a great food source for birds and mammals

GROWTH HABITS

- Can grow up to 5 feet tall, 2-3 feet spread
- Flowers are pink/purple, bloom from mid spring to early fall
- Seed pods will split open to disperse

CARE & NEEDS

- Likes full sun to partial shade
- Prefers soils with neutral to acidic pH
- Prefers wet soils, can adapt to moist clay/loam soil

WILDLIFE VALUE

- Important food source for Monarch butterfly larva
- Provides nectar to butterflies and hummingbirds
- Deer resistant

Toxic to humans, dogs, cats, and horses if consumed

Swamp Milkweed

Asclepias incarnata



HERBACEOUS PERENNIALS

New England Aster

Symphyotricum novae-angliae



GROWTH HABITS

- Grows 3 - 6 feet tall
- Blooms from late summer until frost
- Flowers are pink/purple and daisy-like, with yellow centers
- Can self-seed if growing in ideal conditions

CARE & NEEDS

- Likes full sun
- Prefer moist and rich soils
 - Can do well with well-drained soils
- Pinch back stems to produce more flowers, promote bushiness, and control the height
- Cutting back after flowering will prevent self-seeding

WILDLIFE VALUE

- Great source of nectar for butterflies, bumblebees, and honeybees
- Provides food for butterfly and moth caterpillars
- Larval host for Pearl Crescent butterfly
- Seeds feed birds and small mammals

GROWTH HABITS

- Grows 2-4 feet tall, 1 - 2 feet wide
- Flowers from midsummer to early fall with bright red blooms
- Can self-seed in ideal conditions

CARE & NEEDS

- Likes full sun to partial shade
- Prefers rich, moist to wet soils
- Can tolerate damp soils and poor drainage
- Deadhead for a neater appearance
- Pinch back for more compact, bushier plant

WILDLIFE VALUE

- Food source for hummingbirds, butterflies, and bees
- Provides for beneficial insects
- Deer and rabbit resistant

Toxic to humans, dogs, cats, and horses if consumed

Cardinal Flower

Lobelia cardinalis



HERBACEOUS PERENNIALS

Joe-Pye Weed

Eutrochium purpureum



GROWTH HABITS

- Grows 4 - 7 feet tall
- Flowers are small, pinkish/lavender and bloom from mid-summer to early fall
- Seed heads form from flowers and last well into winter

CARE & NEEDS

- Prefers full sun to partial shade
- Likes moist to wet, well-drained soils
- Plants should be cut back in late winter
- Divide plants in fall as they go dormant, or in spring as the first shoots appear if needed

WILDLIFE VALUE

- Attractive to bees and butterflies as a food source
- Supports Pearl Crescent butterfly larvae
- Seeds are eaten by songbirds in the fall
- Moderately deer resistant

GROWTH HABITS

- Spreads to form large colonies from rhizomes underground
- Can grow 6 - 12 inches tall
- Flowers bloom from April to May
- Seeds from late spring to early summer
- Semi-evergreen, dies back in very cold temps

CARE & NEEDS

- Prefers partial to heavy shade
- Likes wet soils
- Propagate by diving mature plants in the spring

WILDLIFE VALUE

- Provides nesting, food, and cover for birds, small mammals, and insects
- Attracts songbirds and butterflies
- Deer resistant

Pennsylvania Sedge

Carex pennsylvanica



GRASSES

Purple Love Grass

Eragrostis spectabilis



GROWTH HABITS

- Can grow 1 - 2 feet tall, spreads up to 2 feet
- Blooms from late summer to mid-fall with small red-purple flowers
- Seeds mature and detach in winter to disperse

CARE & NEEDS

- Prefers full sun
- Dry to moist, well-drained soils
- Tolerates poor, infertile soils
 - Intolerant of heavy, wet soils
- Good drought tolerance
- Cut back old stems to the ground in early spring

WILDLIFE VALUE

- Seeds provide food for birds and small mammals
- Foliage provides cover for ground-nesting birds
- Deer tolerant

GROWTH HABITS

- Grows 3–4 feet tall, up to 7 feet with flowers
- Blooms in late summer into fall, with reddish-purple flowers
- Flowers will turn to seed, which last well into winter

CARE & NEEDS

- Prefers full sun, can tolerate partial shade but will not grow as strong
- Likes well-drained, moist soils
- Drought and wet soil tolerant
- Cut back in late winter or early spring

WILDLIFE VALUE

- Seeds provide food for songbirds and game birds
- Provides cover, nesting material, and landing space for birds
- Larval host for Skipper butterflies and the Common Wood-Nymph butterfly
- Deer tolerant

Switchgrass

Panicum virgatum



GRASSES

Little Bluestem

Schizachyrium scoparium



GROWTH HABITS

- Grows 2–4 feet tall, spreads up to 2 feet
- Blooms from late summer to early autumn, growing delicate purple-bronze flowers
- The flowers turn to fluffy seed heads, which remain into the early winter

CARE & NEEDS

- Prefers full sun to partial shade
- Does well in dry to medium-moist, well drained soils
 - Can tolerate a range of soil conditions
- Drought resistant, once established

WILDLIFE VALUE

- Provides nesting to queen bumblebees until spring emergence
- Larval host to 9 skipper butterfly species, including the Dakota skipper and the Common Wood-Nymph
- Seeds provide food for birds and small mammals
- Deer and rabbit resistant

APPENDIX

FULL BIOSWALE PLANT LIST

PERENNIALS

Anise Hyssop - *Agastache*
Beardtongues - *Penstemon*
Blue Cardinal Flower - *Lobelia siphilitica*
Blue Flag Iris - *Iris versicolor*
Butterfly Weed - *Asclepias tuberosa*
Cardinal Flower - *Lobelia cardinalis*
Coneflower - *Echinacea*
Eastern Bee Balm - *Monarda bradburiana*
Fireworks Goldenrod - *Solidago rugosa*
Green Coneflower - *Rudbeckia laciniata*
Jacob Cline Bee Balm - *Monarda didyma*
Joe Pye Weed - *Eutrochium purpureum*
Marsh Marigold - *Caltha palustris*
Mountain Mint - *Pycnanthemum*
New England Aster - *Symphyotrichum novae-anglicae*
Purple Coneflower - *Echinacea purpurea*
Ragwort - *Jacobaea vulgaris*
Sneezeweed - *Helenium autumnale*
Spotted Bee Balm - *Monarda punctata*
Swamp Milkweed - *asclepias incarnata*
Tickseed - *Coreopsis lanceolata*
White Aster - *Symphyotrichum ericoides*
False Indigo - *Baptisia australis*
Zig Zag Goldenrod - *Solidago flexicaulis*

SHRUBS

High Bush Blueberry - *Vaccinium corymbosum*
Low Bush Blueberry - *Vaccinium angustifolium*
Low Bush Cranberry - *Viburnum trilobum*
Sweetspire - *Itea*
Red Osier Dogwood - *Cornus sericea*
Witch Hazel - *Hamamelis virginiana*
Winterberry - *Ilex verticillata*

GRASSES

Big Blue Stem - *Andropogon gerardii*
Little Blue Stem - *Schizachyrium scoparium*
Pennsylvania Sedge - *Carex pensylvanica*
Purple Lovegrass - *Eragrostis pectinacea*
Rush Grass - *Juncus effusus*
Switch Grass - *Panicum virgatum*

TREES

Dogwood - *Cornus sanguinea*
River Birch - *Betula nigra*
Serviceberry - *Amelanchier arborea*
Swamp Oak - *Quercus bicolor*

RESOURCES

City of Bristol

<https://www.bristolct.gov>

Pequabuck River Watershed Based Plan

https://portal.ct.gov/-/media/deep/water/watershed_management/wm_plans/pequabuck/pequabuckwbppdf.pdf

River Smart

<https://www.riversmartct.org>

Arbor Day Foundation

<https://www.arborday.org>

The National Gardening Association Plant Database

<https://garden.org>

UCONN CLEAR Watershed Assessment Tool

<https://experience.arcgis.com/template/68b1ebdd244a4f1a800a15af0e600307/page/CCI-Dashboard/>

Why Are Wetlands Important?

<https://www.epa.gov/wetlands/why-are-wetlands-important>

Farmington River Watershed Association Resources

<https://www.frwa.org/resources>

