

SECTION 7

NEEDS ANALYSIS

I. INTRODUCTION

Since the last revision of Brookline's Open Space and Recreation Plan, climate change has become an increasingly important public policy concern. It has begun to affect many aspects of life in the community, and its relationship to open space is particularly complex. On one hand, climate change—with rising temperatures; changing habitat for plants, animals, and insects; and increasingly severe storm events—threatens our open space. While at the same time, open space is vital in responding to climate change, both because the trees and other plants that grow in our open space store carbon dioxide, offsetting greenhouse gas emissions, and also because open space reduces the effects of climate change, such as the well-known heat-island effect in urban areas. In addition, secondary concerns regarding both climate change and open space often interact in positive ways. For instance, open space goals such as providing green corridors accessible to pedestrians and bicyclists support the climate goals of reducing automobile use, and improved stormwater management not only protects natural resources, but also reduces flooding.

Although climate change by definition is a global issue, local conservation efforts are imperative both to mitigate climate change and to adapt to it. Brookline was one of the first communities in Massachusetts to address climate change when it adopted a Climate Action Plan in February 2002, which was substantially revised and adopted by the Select Board on December 11, 2012. That plan not only contained “Open Space Protection” as one of its actions to reduce carbon dioxide emissions (p. 80), but also made specific reference to the Town's 2010 Open Space and Recreation Plan, noting that “[w]hile many of the environmental issues addressed in that plan are broader than specific concerns about climate change, most of the resource protection goals and actions identified in the plan have a positive effect on climate, and several of them address climate concerns directly” (p. 11). Similarly, the introduction to the 2010 Open Space and Recreation Plan noted that the “plan recognize[d] the growing threats posed by climate change and the links between open space and public health,” and references to climate change appear throughout the document, e.g., in Section 7, Needs Analysis, Figure 6: Climate Change and Open Space (p. 137).

The Town also published a Climate Vulnerability Assessment and Action Plan in December 2017. This report seeks to identify future climate vulnerabilities and suggests strategies that can reduce the risk of harm to people and properties, and improve Brookline's resilience to future storms.

The primary purpose of this Open Space and Recreation Plan, as it describes needs and defines goals and objectives, is to protect Brookline's invaluable open space. Trees and other vegetation cool the air through evapotranspiration, shading, and reflection and absorption of sunlight; intercept stormwater runoff; and decrease air pollution. They are also carbon sinks—in using carbon dioxide in photosynthesis and incorporating carbon in their tissue, they keep significant amounts of this greenhouse gas out of the atmosphere. In fact, open space represents one of Brookline's more effective assets in terms of helping to reduce greenhouse gas emissions and to adapt to the effects of climate change, and makes the community more resilient. Open space provides habitat, refuge, and food for wildlife and habitat for plants, which is particularly important as species migrate, ranges shift and habitat is lost due to changing climate. Open space also limits the effects of drought and reduces flooding.

II. RESOURCE PROTECTION NEEDS

A. Unprotected Open Space

Definition of Open Space

Discussions during the community forums and committee meetings for this Open Space and Recreation Plan emphasized the need for Brookline to act proactively to protect and/or acquire open space in Town. Given the increase in school population and heavy use of current sizable open spaces, this need is increasingly pressing. In addition to larger open spaces, there is great interest in protecting smaller spaces in developed areas that contribute to a sense of open space or green features that give respite or serve conservation values as a part of the built environment.

For this Plan, the definition of open space draws on the new Brookline Conservation Restriction Policy. Open space is land that is substantially in a natural state or landscaped in such a manner that it provides some or all of the following open space values:

- Provides
 - a. habitat for native plants and animals
 - b. "green features" or environmental services in built or urbanized spaces
 - c. a myriad of public benefits
- Protects
 - a. water bodies or wetland resources
 - b. water quality or contributes to stormwater control
 - c. significant trees
- Can be sustained for conservation purposes in an undisturbed or minimally managed condition
- Can be utilized for farming, forestry, or recreational use
- Preserves a scenic or historic view
- Is adjacent to land with open space value

The benefits of open space are discussed throughout this Plan. In addition to conservation and recreation values, open space is increasingly important to Brookline as the climate changes. Vegetation, especially trees, helps cool the air through shading as well as evaporation, which can also decrease the urban heat-island effect. Plants filter and clean the air, and also help capture storm-water runoff, which allows for water recharge and flood and erosion control. Open space can also increase habitat for migratory and breeding birds and other wildlife impacted by climate change. Preserving open space, both larger and smaller spaces, is an important element in Brookline's efforts to mitigate and adapt to climate change.

Publicly-accessible open space is also important for public health, as it encourages walking and outdoor activities, provides space for exercise and recreational activities, and can aid in mental health and well-being. Open space also mitigates air pollution and other potential environmental stressors to health.

Acquisition of Open Space

Open space has a significant public benefit and acquisition of additional open space is necessary in Brookline. A national standard developed by Roger Lancaster in 1983 suggests that park systems should have 10 acres of open space per 1,000 residents. Based on this guideline, the Town of Brookline should acquire approximately 36 more acres.

Throughout the public meetings for this Plan it was clear there was a strong desire from the public for Brookline to develop a proactive planning pro-

cess to enable the Town to act quickly should a parcel with significant open space potential become available for purchase or be at imminent risk of loss to development. There was also strong support for creating new open space when there are opportunities to do so, such as during redevelopment of private property or street improvements. Even small open spaces such as pocket parks, vegetated traffic islands and linear tree lawns can play a valuable role in the Town's overall mix of open spaces. These small open spaces are particularly important for residential areas which do not have parks and gathering places near homes, such as in parts of South Brookline and in dense developments. These pocket parks provide significant benefits to residents, and are typically used heavily by neighbors in particular. In addition, they may have value to wildlife for habitat and foraging, or resting during migration.

Next steps for further developing the Town's network of open space include:

- Establishing criteria and priorities for open space acquisition;
- Planning for a range of funding sources;
- Establishing agreements with owners of significant open spaces regarding potential protection of these open spaces;
- Proactively planning to promote protection of open spaces that are not feasible for Town acquisition;
- Creating new open space, especially in areas where there is little existing open space such as dense neighborhoods.

Establishing Open Space criteria and priorities will likely be most successful if they are taken into consideration and integrated into the Town's comprehensive long range planning efforts.

Balancing different types of open spaces requires special attention. The Town needs to have an agreed-upon procedure for deciding which features make any given property of particular value for Town needs. There should also be agreement on the use of the acquired open space as permanently restricted open space or land that could be available for the Town's subsequent needs, after being used temporarily for open space.

No Net Loss of Open Space

Brookline's 2005-2015 Comprehensive Plan set a goal of "no net loss" of open space Town-wide. This goal has also been stated in previous Open Space and Recreation Plans, and in the Parks,

NEEDS ANALYSIS

Open Space and Recreation Strategic Master Plan. This concept should be discussed and defined in order for the Town to make decisions as to how it should be applied.

Significant Parcels Without Open Space Protection

The 2010 Open Space and Recreation Plan specified eleven large and significant parcels that should have priority for open space protection, whether through outright acquisition, conservation restrictions, or agreements for protection by other means. All of these parcels are still available for open space protection (Table 5).

Protection of Privately-Owned Properties with Open Space Values

Scattered across Brookline are undeveloped private properties that serve open space values. If an owner were to express an interest in selling such a property to Brookline, the Town cannot currently act quickly. The Town also does not have any protocol for reaching out to owners of property with open space value, to negotiate or encourage lasting conservation enhancements such as easements, bequeathals, or rights of first refusal.

Brookline should establish a process and protocol for reaching out to property owners who may be interested in protecting their land or selling it to the Town as open space. When the Town is unable to purchase land, the Town should work with the landowner to facilitate a conservation restriction. The Town should also try to establish first right of refusal if the landowner chooses to sell in the future.

Placing a conservation restriction on part of a privately owned parcel is one means of protecting land with natural resource values. Owners are taxed at a lower rate for the land under restriction than for unrestricted land. Public access is not required, but if access is permitted, there is greater tax relief. The need for a conservation restriction policy was raised in several past Open Space and Recreation Plans. In December of 2008, the Select Board adopted a Conservation Restriction Policy, following approval by the Conservation Commission and the Board of Assessors. The Conservation Restriction Policy has set up a definitive framework for the acquisition of, and tax relief issues associated with, conservation restrictions.

Survey results discussed in the 2017

Table 4 **PRIORITY UNPROTECTED OPEN SPACE Parcels of 5+ acres**

Allandale Farm
Beaver Country Day School
Bournewood
Chestnut Hill Benevolent Association
Dexter School
Hancock Village
Hellenic College
Holy Transfiguration
Northeastern University (Parson's Field)
Pine Manor
The Country Club

Massachusetts Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicated that the highest recreational resource priority statewide, as well as in Metropolitan Boston, is for new walking and biking trails. Brookline needs more conservation restrictions on land with open space value, particularly parcels for which public access would meet the need for trails, walking paths, and greenways. For parcels where a conservation restriction is not possible or desirable, the Town could work with owners to protect the land using a variety of other conservation tools, for example purchase of development rights, bargain sale, limited development, family limited partnership, charitable remainder trust, or land donation.

Protection of Privately-Owned Open Space

Article 97 of the Articles of Amendment to the Massachusetts Constitution establishes the right of the people to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic and esthetic qualities of their environment. Land, easements or interests taken or acquired for such public purposes are not to be disposed of or used for other purposes without a two-thirds vote of Town Meeting and a two-thirds roll call vote of both the Massachusetts Senate and House of Representatives.

Recent changes in case law regarding Article 97 call into question the protected status of many of Brookline's parks and open spaces. Town owned properties which are not specifically protected by some other legal means such as a conservation restriction or deed, are no longer presumed protected under Article 97 as they once were. The

Town has begun an effort to closely examine all publicly owned open space in order to determine which parcels are explicitly protected and which are not. This is a significant undertaking because not all contiguous Town owned parcels are governed by the same documents, having been acquired from different owners over time.

Some of the land under control of the Park and Recreation Commission or the Conservation Commission is protected by Article 97 even if not explicitly protected in property documents, by having benefited from receipt of grant monies from the Massachusetts Executive Office of Environmental Affairs (EOEA). The EOEA and affiliate funding organizations have either implicitly or explicitly required Article 97 status as a condition of funding. Known unprotected public lands include many of our school yards and school playgrounds, and some small open lands, squares, medians and traffic circles (see Inventory in Section 5).

Conservation Lands

Although all of our conservation areas have legal protection, they also require the protection of ongoing maintenance to ensure the preservation of their ecological services. Trail maintenance, removal of hazards, repair of kiosks, and ongoing care to counteract the wear and tear of heavy use and the potential impact of more extreme weather events in a changing climate, require the Town to make a commitment of sufficient funds.

Outreach to residents who may not know about or visit the Town's conservation sanctuaries is needed. In addition, there is a need for opportunities for residents and other visitors to share their appreciation and stewardship of these places. For example, this could happen through involvement with advocacy groups such as the Friends of Hall's Pond, and through engagement of non-traditional allies sharing similar concerns for community values. Additionally, collaboration with schools could help educate children about the benefits of open space at a younger age and encourage stewardship of these spaces.

Park Lands

Brookline's parks for passive recreation and sections of our parks for active recreation include features which serve conservation values. These values are not granted specific conservation protection within those parks. Brookline should develop ways to specifically protect those parts of our parks that have habitat and conservation values. Brookline

parks are heavily used, and in order to protect them, there is a continuing need to support and adequately fund their maintenance.

School Yards

The school yards, school playgrounds, and parks used by Brookline schools for recess are not consistently protected. The Pierce School Playground and Longwood Playground, which is used by the Lawrence School, have Article 97 protection. The new Lincoln School is on the National Register of Historic Places and the Massachusetts Register, which affords some protection. However, the playgrounds used by students at the Baker, Devotion, Driscoll, Heath, and Runkle schools have no open space protections.

Given the importance of active play for children, and in conjunction with the Town's goal of no net-loss of open space land, it is necessary that the Town maintains and, wherever possible, acquires additional open space related to school yards, school playgrounds, and parks.

Traffic Islands, Median Strips, and Other Small Open Spaces

Traffic islands, median strips, and other small open spaces that are currently either landscaped or left in a naturalized condition contribute to the sense of green space in Brookline. Many small urban open spaces and green features do not have Article 97 protection, and the Town should consider this level of protection. Several of these small and obscure open spaces serve as habitat and provide conservation values. The Clark Road and MBTA Land, the Clinton Road Waterworks Land, and the Reservoir Road Land serve habitat needs, but do not have any open space protections. The Town should seek to protect the open space value of such lands. For those with conservation value, a conservation restriction could be considered. The small open spaces that are adjacent to streets and roads could be afforded further protection as they collectively provide great value, including potentially serving the needs of greenways, stormwater management, or for offsetting climate change.

Green Features and Small Open Spaces in Developed Areas

The sense of green, open space has been diminished in many of Brookline's residential neighborhoods, by expanding the home's footprint, tear-downs, subdivision and infill housing, and replacing plantings with hardscapes. While the undeveloped portion of some large residential properties could be

NEEDS ANALYSIS

protected by a conservation restriction, a more likely procedure for protecting the small green spaces in residential neighborhoods would be through comprehensive “green” zoning changes. Brookline’s zoning currently has some limited protections for small green spaces in neighborhoods; however the Town should identify ways to increase their protection. A network of vegetated open spaces throughout the Town could play a significant role in reducing urban heat-islands and managing stormwater, both of which will be increasingly important in the context of climate change.

The Zoning By-Law could also play a major role in supporting green features and open, publicly-accessible spaces, particularly in new multi-unit developments. In addition, “green” features, such as vegetated roofs, light colored pavement, pervious pavement, and vegetated areas with shade trees, that improve stormwater management and/or reduce urban heat-islands should be integrated into such development.

Zoning for Open Space

The comprehensive plan recommends consideration of zoning tools for protecting open space. There is considerable interest in Town in using such tools for protecting the smaller open spaces and green features that are part of the built environment, such as shared open space in developments.

Portions of the existing Zoning By-Law were designed to protect open spaces in the context of development and ensure that public benefits from green spaces continue to be enjoyed by the community while allowing healthy growth. It has become increasingly apparent that some of these guidelines need to be re-examined. For example, landscaped open space as defined by the Zoning By-Law, includes paved walkways and terraces, up to 30% of the total open space, in calculations of required open space on a lot. Although in certain parts of Town, namely the densest areas, this guideline can lead to appropriate plaza-like open spaces, in more suburban areas of town, this particular guideline can and has been abused by developers to pave over open spaces that feature many of the values as defined above, or max out FAR (Floor Area Ratio) by building balconies, resulting in “open” areas with very little true open space or community value.

A Moderator's Committee on Zoning-FAR was created in response to Warrant Article 12 at the

November 2015 Town Meeting, which sought to modify the definition of “habitable space” in the Zoning By-Law to restrict the construction of out-sized homes. At the Fall 2016 Town Meeting, the Moderator's Committee recommended amending Section 5.22.2 of the Zoning By-Law so that a special permit be required for the construction of unfinished basement and attic space that, if finished or converted to a habitable space, would cause the space to exceed the otherwise permissible FAR for the building. With the recent increase in Town-level discussions regarding zoning, it is an opportune time to examine the Zoning By-Law and guidelines that impact open spaces, and to determine whether the current By-Law sufficiently protects open spaces and green features in the built environment. Specifically, over the next five years, aspects of the Zoning By-Law that merit discussion should include, but are not limited to: the appropriate level of parking requirements and whether parking calculations should remain de-linked from FAR calculations, whether FAR-based zoning is the most appropriate technique to protect open space, redefining open space within the Zoning By-Law to better reflect the definition found in all other Town planning documents, and re-examination of current FAR relief based on public benefit incentives focused on open space.

Zoning tools are less useful for protecting significant conservation uses or larger open spaces. However, the use of zoning overlays could potentially support some protection, perhaps for wildlife corridors or for private properties adjacent to wetlands.

B. Green Corridors

The 2018 Open Space and Recreation Plan uses the term green corridors to describe both wildlife corridors and greenways. Formerly the term greenways was used to describe both types of linear green systems. Since the 2000 Open Space and Recreation Plan introduced the idea of “greenways” as an important open space concept, public interest in identifying and protecting greenways in Brookline has remained strong. Greenways were also an important issue identified in the 2005-2015 Comprehensive Plan and the 2006 Parks, Open Space and Recreation and Master Plan, with goals for greenways establishment and protection in both plans.

Although there is consensus on the importance of greenways, the public forums on greenways and

multiple working group meetings held by the Open Space and Recreation Plan Committee over the past several years have made clear that there are distinct types of greenways, each with different critical characteristics, and each with different functions and values to the community. It became apparent that a consistent and coherent definition was needed for these types of open spaces. Open Space 2018 recognizes two major categories of linear green systems: Wildlife Corridors and Greenways, and utilizes the term Green Corridors to encompass both types of open space. The two systems provide important and distinct functions and have different needs.

Wildlife Corridors

Wildlife Corridors are one type of Green Corridor. Wildlife Corridors are bands of vegetated habitat area that allow for movement and survival of wildlife through residential and urban surroundings. Wildlife corridors are often connected to larger areas of open space, and may function as a link between two or more larger open spaces.

Wildlife corridors are a key component of a functioning urban ecosystem. Wildlife corridors may be large and diverse enough to support wildlife on their own, or they may function primarily as connections between larger areas that support wildlife. If the patches of larger habitat areas become isolated from one another as the narrow connecting wildlife corridors are lost, their ability to support wildlife may be lost.

Animals move from one area to another for a variety of reasons: to access sufficient habitat; to find a new home when the resources of current habitat are lost to development or to natural changes; and to use different kinds of habitat for seasonal changes, reproduction or differing needs of offspring. Migration may also aid population stability by maintaining genetic diversity and preventing genetic collapse due to inbreeding of small, isolated populations. The ability to migrate is particularly critical for species facing threats from development, pollution, habitat conversion, and climate change. Owls, hawks, white-tailed deer, eastern coyotes, wild turkeys, dragonflies, monarch butterflies, and migrating birds, particularly warblers, are among the more obvious animals which rely on wildlife corridors. But many less obvious migratory animals also depend on wildlife corridors. In Brookline, spotted salamanders breed in vernal pools in the wetlands of the D. Blakely Hoar Sanctuary, Lost Pond

Conservation Area, wetlands on the east side of Hammond Pond Parkway, and probably in other vernal pools and wetlands on private property. Spotted salamanders migrate annually in the spring from undisturbed upland areas, where they live underground for most of the year, to wetlands and pools in order to breed. The salamanders rely on vegetated connections between wetlands and uplands.

The sanctuaries and naturalized areas owned by Brookline are relatively small, yet support a surprising amount of biodiversity. This is partly because they are located near other sizeable parcels of land in relatively natural condition and are connected to them through some form of wildlife corridor. Most of these properties are located in the central and southern sections of Town. Protecting land with significant habitat value and maintaining physical connections between them is the key to maintaining current wildlife diversity in Brookline.

Many of the existing habitat corridors in Brookline have not been identified, and are unprotected from development. These corridors may not be obvious from the ground, and may need to be identified using orthophotography and other aerial mapping techniques that can highlight continuous swaths of undeveloped open space. These corridors can include land on both public and private property. Brookline should identify wildlife corridors, especially corridors that connect larger habitat areas, and develop a set of strategies and tools to protect them.

Greenways

Greenways are another type of Green Corridor. Greenways are routes that generally follow a street, roadway, or path and are characterized by their vegetation and scenic value as well as their amenity for non-motorized travel, such as pedestrians and bicycles. Greenways have sufficient buffers of trees and vegetation to provide shade, cooling, stormwater management, air and water quality improvement, and visual and sensory pleasure and safe travel for all users. Greenways help to reduce greenhouse gas emissions that contribute to climate change by providing enhanced accessibility between town amenities, and encouraging walking or cycling as favorable alternatives to driving. As such, they can also reduce traffic congestion and conflicts related to insufficient parking.

Some of Brookline's greenways, such as the

NEEDS ANALYSIS

Emerald Necklace, are large unified systems that include vehicular parkways, bicycle and pedestrian paths, and wide belts of trees and landscaped areas. Others follow smaller roads, connecting parks to schools or serving as major bicycle commuter routes. Brookline's smallest greenways follow pedestrian pathways, and wind through narrow passages in dense residential neighborhoods.

Table 5. Potential Greenways in Brookline

Lee and Clyde Streets
Hammond Street
Hammond Pond Parkway
Newton Street
Grove Street
Washington Street
Route 9 (owned/managed by the State)

The lack of protection for greenways, and the need to create more of them, has been widely recognized. The Town's Historic Preservation Plan and previous Open Space and Recreation Plans have proposed several streets for designation under the Scenic Roads Act. In addition, the 2005-2015 Comprehensive Plan recommends the creation of a greenway buffer zone on specific roads that are part of a suggested Brookline Heritage Greenway Trail.

Greenways and other open spaces also serve a health benefit, by encouraging physical activity and providing convenient options for walking, biking and other similar activities. The Town encourages increased physical activity and improved fitness by offering a variety of recreational programs, holding fitness fairs and other educational activities, and sponsoring related events such as bike parades and walk to school/work days. These programs are generally undertaken collaboratively by various departments. New greenways and enhancements of existing greenways can provide appropriate, appealing settings for many of these activities and events.

Although Brookline has continued to plant street trees, and to add bicycle lanes to some streets, there are no formally designated greenways, and the critical greenway characteristics of paths, streets and roadways are generally unprotected. There is a need to identify and protect important existing greenways in Town, and to identify key transportation corridors that can be developed into greenways through improvements to pedestrian and bicycle amenities, and increased vegetation.

C. Wetlands

Wetlands and similar resource areas benefit the community significantly and need continued protection and appropriate management by the Town. These areas provide protection for water supplies, flood control, storm damage prevention, pollution prevention, and wildlife and fisheries habitat.

The Conservation Commission protects wetlands, rivers, streams, and floodplains by administering and enforcing the Massachusetts Wetlands Protection Act, as well as the Town's Wetlands Protection By-Law. The Wetlands Protection By-Law was passed in 2006 to provide protection for water and wetland resources in Brookline that lacked protection or were not adequately protected by existing state law. The By-Law provides protection for isolated wetlands larger than 2500 square feet, vernal pools, and intermittent streams. In addition, the By-Law increased the buffer zone around wetlands to 150 feet. Alterations proposed within the buffer zone require review by the Conservation Commission to ensure that they will not adversely impact wetland resource areas. In 2010, a minor amendment was made to the By-Law to ensure that isolated land subject to flooding was listed as a resource area, where it had been inadvertently omitted. In 2009, the Conservation Commission promulgated and approved Wetlands Regulations to support the Wetlands Protection By-Law. The regulations do not alter or modify the By-Law in any way, but are intended to provide additional guidance regarding a variety of topics, including definitions, exemptions and exceptions to the By-Law, performance standards for areas subject to jurisdiction, and procedures for filings, hearings, enforcement, and appeals. The By-Law and Regulations have aided in protecting valuable wetland resource areas in Brookline, a community where these areas are scarce and often at risk. Additional needs for wetlands protection in Brookline include consideration of ways to strengthen the protection of buffers around sensitive wetland areas.

Surface water bodies, such as rivers, brooks, ponds and lagoons, are also protected under the state Wetlands Protection Act and the local Wetlands Protection By-Law. The Muddy River, which forms the Brookline-Boston border in the Emerald Necklace Park system, is a very prominent local waterbody that Brookline is obligated to protect. Brookline continues to actively participate in plans to dredge and rehabilitate the River and its parks as part of the ongoing Muddy River Restoration Project,

Town of Brookline, Massachusetts

Existing Bicycle Accommodations

LEGEND

-  Off-road path
-  Lane
-  Lane / sharrows
-  Sharrows
-  Contraflow
-  Intersection
-  Intersection (future)
-  Future
-  Connector¹

0 0.5 1 Mile

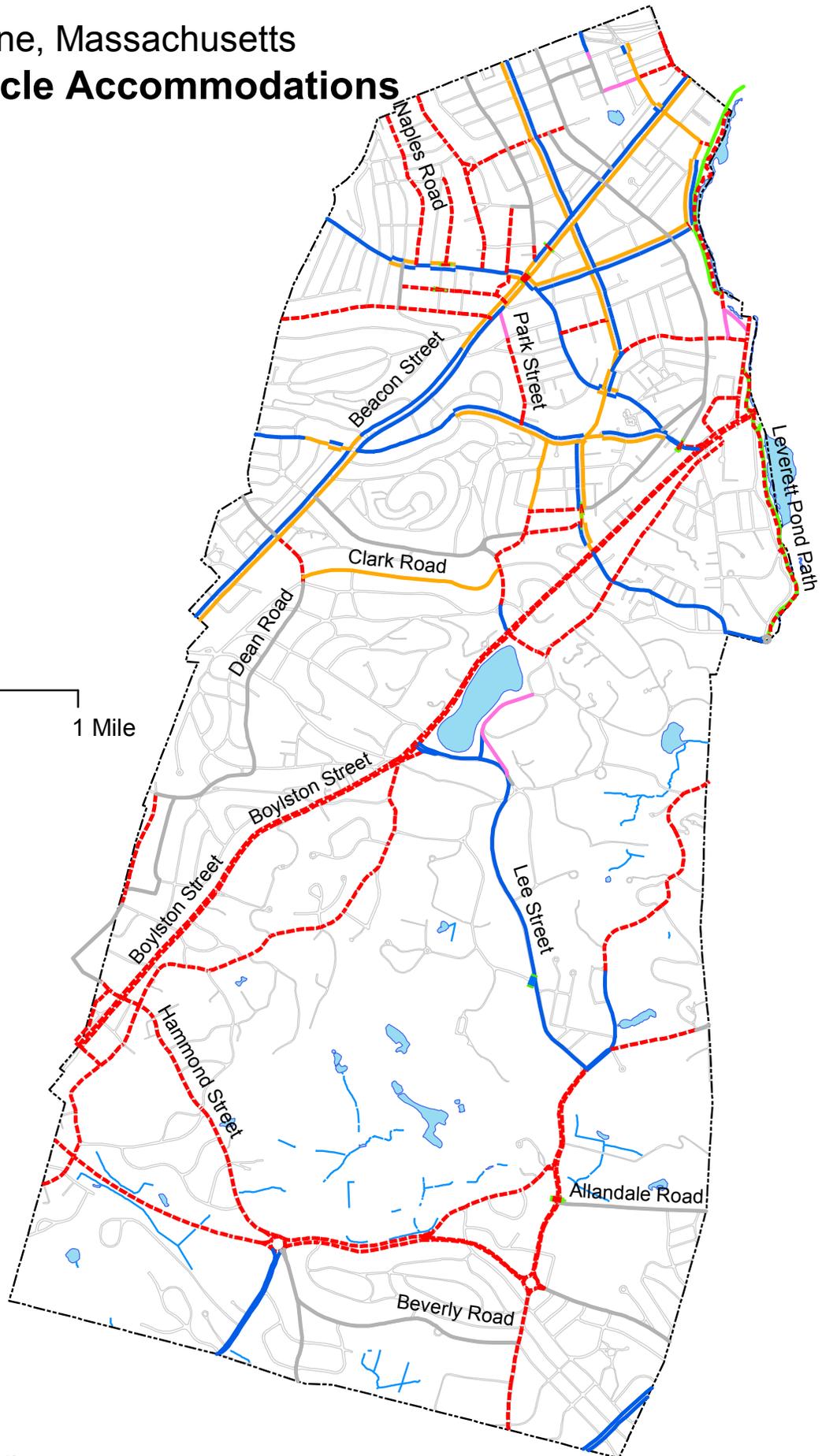


Table 6. **Bicycle Accommodations**

Buffered Bike Lanes

Beacon Street
 Centre Street
 Newton Street
 Pearl Street

Bike Lanes

Aspinwall Avenue
 Babcock Street (Approved to be built 2018)
 Beacon Street
 Brookline Avenue (Approved to be built 2018)
 Carlton Street
 Chapel Street
 Clyde Street
 Cypress Street
 Essex Street
 Goddard Avenue
 Green Street
 Harvard Street
 Lee Street
 Longwood Avenue
 Naples Road (Approved to be built 2018)
 St. Paul Street
 Sumner Road
 VFW Parkway
 Washington Street
 Winchester Street (Approved to be built 2018)

Priority Shared Lane Markings

Longwood Avenue

Shared Lane Markings

Aspinwall Avenue
 Babcock Street (Approved to be built 2018)
 Beacon Street
 Brookline Avenue (Approved to be built 2018)
 Carlton Street
 Centre Street
 Chapel Street
 Cypress Street
 Dudley Street
 Essex Street
 Goddard Avenue
 Harvard Street
 Naples Road (Approved to be built 2018)
 Netherlands Road
 Parkway Road
 St. Paul Street
 School Street
 Sumner Road
 Washington Street

Winchester Street (Approved to be built 2018)

Left Turn Queue Box

Aspinwall Avenue
 Beacon Street
 St. Paul Street

Bike Box

Aspinwall Avenue
 Babcock Street (Approved to be built 2018)
 Beacon Street
 Brookline Avenue (Approved to be built 2018)
 Chapel Street
 St. Paul Street

Off-Road Shared Use Path

Brookline Avenue
 Muddy River
 River Road

Contraflow Bike Lane

Essex Street
 Ivy Street
 Netherlands Road
 Parkway Road

Buffered Contraflow Bike Lane

Dudley Street

Seasonal Protected Bike Lane

Newton Street

Actuated Traffic Signal Crossing

Washington Street

Protected Cycle Track

Pearl Street (Approved to be built 2018)

which also involves the United States Army Corps, Commonwealth of Massachusetts, City of Boston and a number of private organizations. The goals of this project are to provide flood control, improve water quality and fisheries and wildlife habitat, and preserve the historical character of Olmsted and Riverway Parks along the Muddy River in Brookline. This project has experienced numerous delays in recent years, and there is a need to keep the momentum going so project benefits can be realized, and to prevent continued deterioration of this valuable resource.

Local surface water bodies include Hall's Pond, Lost Pond and Larz Anderson lagoon, as well as the privately-owned Sargent Pond. All of these waterbodies experience environmental pressures such as contaminated stormwater drainage and surface water runoff containing fertilizer and herbicides. The Town needs to continue to carefully monitor and ensure the health of these water bodies, undertaking dredging or other treatments as needed. For Lost Pond, coordination with property owners of adjacent lands, including the City of Newton and the state Department of Conservation and Recreation, is critical to ensure protection of the pond, and identification of any unusual changes in water quality or character.

A number of local brooks still run at surface level. These include the Saw Mill Brook, branches of which pass through the D. Blakely Hoar Sanctuary and the former Newton Street landfill site. The Town Engineering Department has successfully identified illicit connections to the Brook which were contaminating the water, and should continue to monitor this Brook and others in Town. Other local brooks and streams must be protected from damage from nearby development or property management practices. Better hydrological characterization, mapping and naming of smaller streams will help further their protection under existing laws.

Town departments have improved their communication and coordination of municipal decisions regarding permitting and development in and near wetland areas, particularly by including a conservation "check-off" on Building Department permits. Continued enforcement of these requirements is necessary to ensure these measures are successful.

The Town and the Conservation Commission need to carefully consider current environmental challenges, including climate change and the spread

of invasive species, in their management and protection strategies for wetlands, including waterbodies. There is a need for education for wetlands permit applicants, the general public and staff on these issues and their implications for Brookline's wetland resource areas.

D. Watersheds and Infrastructure

Brookline is a densely developed community, and most of its original natural drainage systems, including small creeks and streams, have been paved over. Drainage today is provided mainly through a large interconnected system of underground pipes, or storm drains, which carry rainwater runoff and snowmelt from streets and sidewalks out to the Muddy River or the Charles River. There are fifteen major drainage areas, or watersheds, created by these storm drain systems. Brookline's drainage system functions entirely through gravity, without pumping, and runoff tends to collect first in small channels or in pipes, which in turn flow down into larger collector drains and ultimately into very large conduits that discharge at fifteen locations, or outfalls. Seven of these locations connect into a neighboring city's drainage system – either Newton or Boston – and eight of them discharge directly into the Muddy River. The Watersheds in Brookline map (page 32) shows Brookline's watersheds and outfalls.

The impacts of this storm drain infrastructure on Brookline's water resources are significant. As rainwater and snowmelt wash over our paved landscape, they carry pollutants including sediments, nutrients and pathogens into our ponds, wetlands and streams. Stormwater reaches our rivers at a much more rapid rate than in natural drainage systems, contributing to flooding. Groundwater recharge is reduced, causing water tables to drop in the summer.

Brookline has been working to reduce the impacts of stormwater runoff. The Town performs regular streets sweeping throughout the spring, summer and fall seasons. Catch basins are inspected and cleaned on a regular basis. The Town has passed a stormwater By-Law that requires new construction and reconstruction projects to manage their stormwater on site to the maximum extent possible. An amendment to this stormwater By-Law was passed in 2018 at Brookline's Town Meeting as a first step towards providing protection against the removal of mature trees on private property, as they serve important functions such as mitigating erosion

NEEDS ANALYSIS

and sediment run-off. Yet the impacts of development and piped infrastructure remain significant.

Over time, Brookline will need to reduce the impacts of stormwater runoff. This can be done by reducing the total amount of “impervious cover” - land that rain cannot sink into - in the Town, by using small treatment systems to capture rainfall and let it soak into the ground, and by increasing our open space and tree canopy, which are natural stormwater treatment systems.

Stormwater Runoff

Most stormwater runoff comes from “impervious” areas, land that has been paved over to create streets, sidewalks, driveways, parking lots and buildings. Runoff from these impervious surfaces generally collects in Brookline’s roads and streets, where it flows down the gutter until it enters a catch basin. Here some large pollutants such as litter and heavy sand may be trapped. The water flows out of the catch basin into a storm drain (usually a concrete pipe) that follows the street system downhill until it is discharged into a wetland, a pond or a stream.

New Approaches to Infrastructure

There is an increasing interest across the country in managing runoff, even in urban areas, using more natural, vegetated systems. In some regions, natural drainage infrastructure, sometimes called “green infrastructure,” has proven an effective complement or alternative to conventional curb-and-gutter drainage. Green infrastructure may include large landscape-scale elements such as open channels with vegetated banks, or small street-scale structures such as stormwater planters. In addition to potentially providing better ways to manage runoff and reduce impacts to water resources, these systems can add to Brookline’s open space, and could become a component of new green corridors.

One approach to helping manage stormwater and improve the public realm is with the creation of so-called “green streets,” streets which minimize paved surfaces, and use vegetated systems to collect and carry rainwater wherever possible. The first widespread use of green streets has been in Portland, Oregon, and Seattle, Washington, where they have been successfully integrated into the cit-

ies’ infrastructure programs and are well liked by residents. While it is likely that some green street designs would offer benefits to Brookline, there are few local examples to learn from. More information is needed about what plant types will thrive in this environment, especially under conditions of climate change, and what designs are feasible with higher intensity rain storms.

Green Streets

A Green Street is a street that uses vegetated facilities to manage stormwater runoff at its source by slowing the flow of water, filtering pollutants, and facilitating water recharge, to protect watershed health (Portland Green Street Program).

Some of the main elements incorporated into Green Streets include:

- **Vegetation:** *usually landscaped and located in curb extensions, integrated street planters, rain gardens, swales, tree lawns, etc.*
- **Pervious surfaces:** *soil/sand, permeable/porous pavement, paving stones, bricks, etc.*

Brookline needs more information about, and experience with, natural drainage systems, and needs to understand the feasibility, costs and benefits of adding green elements to its infrastructure. The Town needs to understand the potential benefits, as well as costs, of these types of systems. Since some of these approaches, such as reducing the amount of paved area or “impervious cover” in Town, may involve activities on private property, there should be public outreach and education about infrastructure.

Brookline also needs to understand the long term operation and maintenance costs of green infrastructure and green street systems.

Development, Transportation and Open Space

New development, redevelopment and modifications to existing development have incremental and cumulative impacts on Brookline’s open space, especially the impacts of parking, driveways and roadway alterations. Brookline has few tools to control these impacts and needs to explore the oppor-

tunities that may be available using zoning, transportation and stormwater By-Laws to support open space protection.

Depaving Initiatives

Depaving, or removal of unnecessary pavement, is one strategy for improving the quality of open space, adding green features, and managing stormwater runoff. The group Depave, based in Portland, Oregon, provides assistance to people wishing to remove concrete and asphalt, and provides education and advocacy on the benefits of depaving. As of March, 2019, they have depaved approximately 165,000 square feet of asphalt (www.depave.org). Depaving efforts are now underway in Massachusetts as well, with recent projects in Somerville and Boston.

E. Habitat and Wildlife

Wetland wildlife species (plants and animals that live within wetland resources and buffer zones) often require habitat which is not part of a wetland for part of their lives. For example, wood frogs and yellow-spotted salamanders must breed in wetlands, but spend most of their lives in upland wooded areas. Those habitats – required by the species but often not part of jurisdictional, wetland resource areas – are not protected by the Wetland Protection Act and the Brookline Wetlands Protection By-Law. When open space is protected for its value as wildlife habitat, these protections do not necessarily extend to the animals and plants themselves. While certain species are given protection by state or federal regulations, many native plants and animals are not given any legal protection.

Even when animals have legal protections, the food they need, for example plants or animals, is not protected. Animals that people particularly favor may depend on food that is not a valued part of Brookline’s landscape. For example, Monarch butterfly caterpillars must eat milkweed, but milkweed is regularly removed from unprotected land. The wildlife that still survives in Brookline often depends not only on locally native species but also on the non-native species that have replaced the native ones.

In order to protect wildlife, Brookline needs to protect undisturbed land that serves as wildlife

habitat. In addition, that land should be kept in the condition that makes it possible for wildlife to continue to survive. Replanting or landscaping an undisturbed wildlife habitat can degrade or destroy the land’s habitat value for desirable wildlife even when the intention is to improve that open space.

In order to protect open space that supports wildlife habitat, Brookline could explore strategies for extending protection of land that supports wildlife habitats. This would include: greater protection of wildlife habitat that extends beyond that protected by the Wetlands Protection By-Law; protection of land which is adjacent to sanctuaries, properties with conservation restrictions, and unprotected properties that serve the habitat needs of local wildlife; and protection of areas that support biodiversity and serve as wildlife corridors for the movement of individuals and species. Second, Brookline could also explore regulations and promote resident support, for specifically protecting the wildlife habitat, rather than merely protecting land but allowing the wildlife habitat to be degraded or destroyed. Third, Brookline could educate the public and generate stewardship and understanding that protection of wildlife habitat enhances Brookline; helps buffer certain effects of global climate change, and; is of particular importance in an urbanized area, for the survival of migratory birds and diverse animal and plant species. Finally, Brookline could inventory and monitor native wildlife populations within Brookline and explore means to better protect them.

F. Parks and Recreation Lands

Brookline needs to continue its commitment to careful stewardship of park lands, including renovation and maintenance of parks. Substantial parkland goals are described under the Recreation Section of Community Needs below. In the past five years Brookline has been able to add significant new open spaces to its inventory of parks. However, it remains clear Brookline must pursue opportunities to add to the park system, including any pocket park opportunities that may arise.

G. Urban Forest

Tree Maintenance and Care

Brookline maintains approximately 11,500 street trees as well as the trees in parks, sanctuaries and other public spaces, for a total of over 50,000 trees. Besides their habitat, erosion control,

NEEDS ANALYSIS

air quality, and aesthetic value, urban trees provide important shading that reduces the heat-island effect in our built environment and reduces the energy needed for cooling homes, schools, and commercial buildings. In order to manage their planting, routine care, replacement and emergency situations involving Town trees, Brookline needs to ensure sufficient funding for the urban forest, including adequate funding within the Parks and Open Space Budget and through the Capital Improvements Program.

Significant trees on private property contribute considerably as “green features” in developed areas and as important resources in the less-developed areas of Town. An amendment to the Stormwater By-Law was passed in 2018 as a first step towards protecting mature trees against removal. However, they need further protection from unnecessary destruction, and there needs to be some way to provide the level of maintenance and care needed to preserve larger and older trees.

Protection from Destructive, Non-Native Invasive Species

A recent influx of non-native invasive insects that destroy trees have put stress on our local environment. The most recent, the Asian longhorned beetle, following the invasion of the Hemlock woolly adelgid, illustrates that considerable resources are required to combat these species. In addition, climate change has the potential to increase the spread of some of these invasive insects and/or the susceptibility of local trees to damage by these insects.

Certain non-native plants are very invasive and are threatening native plants, and need to be kept under control. Non-native invasive plants already in Brookline include Japanese knotweed, buckthorn, and Phragmites (common reed), among others.

Besides the nuisance factor and loss of habitat when invasives spread, stopping outbreaks and reclaiming land can have significant economic cost if invasive species are allowed to establish themselves and spread. Local, native species that are under threat from non-native invasive species should be given protection.

III. COMMUNITY NEEDS

A. Recreation

In June of 2006, the Town completed a Parks, Open Space and Recreation Strategic Master Plan. The Plan, a ten year vision for the Town, is a detailed planning guide specifically focused on parks and recreation that discusses existing community resources; recreation and open space goals; needs concerning parks, recreation and conservation lands; recreation facilities and services, parks maintenance strategies, and provides a menu of recommendations with an action plan for implementation. To provide the foundation for understanding Brookline’s specific park and recreation needs, the Master Plan utilized a variety of methods and tools including a statistically valid citizen survey and data maps to determine the existing and desired level of service related to parks, open space and both passive and active recreation in Brookline. The citizen survey conducted as a component of the Plan revealed that Brookline residents strongly support more parks and open space.

As previously discussed, based on national standards, a target goal for Brookline should be 10 acres per 1,000 residents. In 2006, the Town established a goal that the additional land required to meet this standard (36 acres) should be split evenly between active and passive recreation land. This is consistent with findings in the Massachusetts Statewide Comprehensive Outdoor Recreation Plan (SCORP) in both 2000, 2006, and most recently in 2017 that the overall highest new recreational resource priority statewide, as well as in Metropolitan Boston, is for new walking and biking trails followed by the need for new parks and playgrounds for field-based activities.

Beyond the additional land required to meet national averages per capita, the Town of Brookline is seeking to acquire additional land to address some of the other deficiencies of our open space resources, including the lack of available athletic fields and community centers. Over the past decade, Brookline has improved numerous fields, in addition to constructing two new multi-purpose athletic fields in locations where athletic facilities were not previously present (one at Skyline Park and the other at Fisher Hill Reservoir Park). However, despite these recent additions, Brookline still has a deficit of multi-use turf fields.

The Town has also ascertained that a large por-

tion of the Brookline population is unaware of existing park, open space and recreation programs and facilities. In order to increase awareness, the Town needs a comprehensive marketing and public engagement strategy related to parks, facilities and programs.

Brookline has been recently designated an Age-Friendly City and has established an Age Friendly Cities Committee made up of representatives of the Select Board, the Council on Aging, and the Brookline Community Aging Network (a citizen's organization affiliated with the Council on Aging). The Parks and Open Space Division recently collaborated with the Brookline Age-Friendly City Program to create a brochure that highlights Brookline's "Age-Friendly Parks", defined as open spaces which are handicap accessible and offer safe and comfortable walking paths, attractive views, and ample seating. Additional work should be done to make this information readily accessible to Brookline residents. Additionally, the Division wishes to further work with the Age-Friendly City Program to survey older residents about their park preferences, analyze age-friendly features of parks near large concentrations of older residents, and use this information to develop an action plan.

Since teenagers make up approximately 10% of Brookline's population, the Parks and Open Space Division seeks to provide opportunities for outdoor activities aimed towards teenage participation. Playground design decisions often aim to include facilities that can be used by teenagers for active play opportunities, such as sporting events. The Brookline Recreation Department has developed a year-round club called "RAFT" (Recreation Activities for Teens), which serves teenagers from grades six through eight, and offers members safe, quality trips and special events at little or no cost.

Since the 2010 Open Space and Recreation Plan, Brookline, like other communities across the Commonwealth, has been faced with challenging economic times. Brookline has been trying to find a means to provide the additional facilities, programs and lands described above. Creative use of existing facilities, acquisition, partnership and alternative funding mechanisms may be required to meet the Town's park and recreation needs. Additional public process and guidance from the Select Board will be necessary in order for Brookline to move forward with this vision.

B. Education, Outreach and Advocacy

Environmental Education

Brookline organizations have considerably increased the number, type, and quality of environmental education programs and activities for children, families, and adults. Collaboration among these groups is now needed to reach more residents more efficiently, and to present a broader and more consistent overall message.

There are many residents who do not know the extent of Brookline's environmental resources, including parks, other open spaces, and environmental education programs and organizations. Many residents also do not understand the fragility of many of the open spaces or the links between open space, environmental services, and societal needs. Uninformed citizens generally do not and will not support budget expenditures sufficient to meet needs. New creative initiatives and partnerships to supplement existing high quality programs would boost interest, utilization, appreciation, and support for these resources.

The Town's commitment to open space is paired with a requirement for care and maintenance. Increased public support and investments in funding open space would serve the community in multiple ways.

Access to Open Space

Statewide analysis in the 2017 Massachusetts Statewide Comprehensive Outdoor Recreation Plan (SCORP) showed that improving access to recreational opportunities and open space for people with disabilities was a high priority for new funding initiatives among those citizens polled. In 2017, surveys again showed a high level of support for improving access.

The Town of Brookline does not discriminate in its programs or activities on the basis of disability or handicap or any other characteristic protected under applicable federal, state or local law. Brookline's parks have been evaluated for accessibility. Restoration and new construction of parks is done in compliance with the Americans with Disability Act (ADA), a comprehensive federal civil rights law, passed in 1990, that prohibits discrimination on the basis of disability.

While most parts of Brookline's parks are

NEEDS ANALYSIS

accessible, there are sections in our sanctuaries and naturalized areas that have rough terrain or long trails that are challenging to people with disabilities, as well as to people with health issues, people who are not comfortable walking longer distances on rough terrain, and parents of children in strollers.

Brookline should make the public aware of those sections of open spaces which are accessible to all and encourage their use by all, especially as experiences in open space have been linked to physical, mental and emotional health. Brookline Avenue Playground, for example, was renovated to serve as Brookline's first fully accessible open space and was reopened to the public in the summer of 2018. The Playground is handicap accessible, and includes specialized safety surfacing and equipment with ramps or at grade entry. Additionally, there are sensory, auditory, physical, imaginative and environmental elements within the Playground for group or solitary play as self-selected by each child. The Town should continue to work to add and maintain features in its open spaces that contribute to accessibility. Amenities that make open spaces more accessible and useful for all include sufficient parking reserved for people with disabilities, accessible restrooms that are well-maintained, as at Skyline Park, and accessible paths and park furniture.

In some sanctuaries with accessible trails, parking or maintenance can challenge visitors with disabilities. For example, Dane Park's trail improvements include a fine accessible trail leading directly from the gate on Hammond St, but parking and access from the car to the gate are problematic for people who need space and safety to unload and transfer into a wheelchair. While the trails at Hall's Pond Sanctuary are accessible, when the gates are not working properly, they are difficult or impossible for some people with disabilities to use.

The Town needs to educate and inform the public about accessible open spaces and recreational opportunities in Brookline's parks and open spaces. In addition to accessible paths, trails and seating at many parks and sanctuaries, some playgrounds have play equipment designed for persons with disabilities, such as the new play equipment at Driscoll School, which can accommodate younger children with mobility impairments.

Green Corridors

There is a fairly low level of awareness in the community of the function and importance of green corridors. Because many of these natural corridors do not follow roads or pathways, they are not easily recognized. If Brookline hopes to identify and protect green corridors, there will need to be public outreach and education about where they are, the values they provide, and how to protect them. This is especially true since many green corridors cross private property. There may be opportunities to protect these corridors through tools such as conservation restrictions, zoning overlays, or additional measures, all of which would require significant awareness, involvement and support by the Town and the community.

The community also needs education about greenways and the walking and bicycling opportunities they can provide, along with their other environmental benefits. As greenways are developed, better signage and maps will be necessary to connect the community with these areas, and encourage and facilitate their use and stewardship.

Infrastructure and Stormwater

Open space, including wetlands and buffer zones, riparian areas, greenways, and green streets, will play an important role in helping Brookline manage stormwater in the future. This will be especially important as climate change brings larger, more intense rainfall events with the potential to create more frequent flooding. Brookline will likely need to expand and modify its stormwater infrastructure and management in the coming years. The Town needs an expanded education program to ensure that residents understand the challenges and opportunities stormwater management present. Because there are many uncertainties about new approaches and new technologies for using open space and vegetated areas for stormwater management, the Town needs to develop pilot projects to help educate Town staff, Boards and Commissions, as well as residents.

Winter sand and salt use in Brookline has significant impacts on water resources as well as on roadside vegetation and the urban tree canopy. Research and educational outreach efforts are needed to identify the least environmentally harmful technologies and materials to maintain public safety on streets and sidewalks, and to identify best practices for application and clean-up.

C. Financing Open Space Initiatives

Brookline will continue to face challenges in identifying how to fund its open space needs. The Town needs sufficient funds to maintain its existing open spaces, to acquire new open space when appropriate opportunities exist, and even to create new open space such as green corridors and pocket parks.

The goal of obtaining additional land to meet open space and recreational needs and the goal of developing additional affordable housing run up against the very high cost of real estate in Brookline. The average estimated land acquisition cost in South Brookline is \$2.7 million per acre. At present, the Town has an Affordable Housing Trust which receives periodic contributions that have enabled it to leverage funds for the development of some affordable housing. No comparable source of funding for open space land acquisition exists. The substantial needs in both of these areas present a major financial and planning challenge.

Options for funding open space may also include earmarking existing and future revenue streams, designating a percentage of the budget, CIP funds, development fees, or fees on park use. Determining an appropriate funding source will require careful assessment by the Town.

Without serious planning and commitment, Brookline will not be able to acquire significant privately-owned parcels or commit to arrangements that protect such land with third-party collaboration. Brookline's Land Acquisition Fund needs significant and regular contributions.

Brookline needs a policy and procedure to plan for and put into action other proactive strategies to fund acquisition or arrange other protections when significant environmental features are at imminent risk.

Funding is also needed for acquisition or development of green corridors, both for wildlife corridors as well as greenways, as routes for walking, bicycling, etc. In some locations, open space may be available for green corridors, but funding will be required to enhance and modify the space to function as a green corridor.

Long-term financial planning has long been a hallmark of Brookline's government structure. There are long-term financial models utilized by the Town

in other areas of the budget, such as the model used to ensure funding for the Housing Trust Fund. This type of planning effort would be of great benefit in addressing some of the challenges associated with the purchase and acquisition of open space. This type of consistent revenue-based budgeting is crucial if there is to be any meaningful future acquisition of additional open spaces.

Stormwater Management Costs

In addition to other open space financing needs, Brookline will have growing costs associated with stormwater management over time. The Town needs to better understand what these costs will be, especially over the long-term, and needs to consider what the opportunities are for raising additional revenues to fund the work, so a stable planning and budgeting process can be developed. Revenues for stormwater management may come from general funds, from water and sewer fees, from one-time grants, or from other fees. Many municipalities around the country, and an increasing number in Massachusetts, have developed a dedicated stormwater fund, either an enterprise fund or a separate stormwater utility, which raises funds through a stormwater fee that is assessed on property owners. Stormwater management should always aim for approaches that provide multiple benefits, such as adding tree canopy, increasing vegetation and open space, providing traffic calming, and helping adapt to a changing climate, especially if large capital investments are needed. Greenways are one approach that can provide many of these benefits, though a variety of approaches will be needed to comprehensively address stormwater management.

Ongoing Maintenance Costs

Throughout the public meetings and working group meetings for the development of the Open Space and Recreation Plan 2018, numerous concerns were expressed about how Brookline can maintain adequate funds for the maintenance of our open space. Although Town finances are limited and budgetary constraints are likely to continue, the Town needs to prioritize funding for maintenance of existing open spaces, which play such an important role in maintaining the Town character, public health, habitat values, climate change adaptation and water resource protection.

Brookline also must continue to maintain the existing open spaces at the level seen over the past

NEEDS ANALYSIS

decade to ensure that the work of the past few years does not unravel. At a minimum, the Town needs to find ways to maintain the level of funding for the parks and open spaces. Over the past decade, the Parks and Open Space budget has remained level, at approximately 1% of the Town Budget. This should be continued, and if possible increased to reflect increasing costs due to inflation and additions to the park inventory.

The Parks and Open Space Division has made substantial capital investments in the last eight years, which require additional ongoing maintenance, including the addition of Fisher Hill Reservoir Park, the rehabilitation of the old landfill area by Lost Pond Sanctuary to open space, and the addition of hundreds of trees across Town. It is vital to have appropriate staffing levels to maintain Brookline's open space resources.

IV. MANAGEMENT NEEDS

A. Better Municipal Coordination

Linking the benefits of open space, increased vegetation, better public amenities and stormwater management will require improved coordination between Town departments. Of particular importance, the Department of Public Works, including the Parks and Open Space Division (and Conservation), the Engineering and Transportation Division, the Highway and Sanitation Division, and the Water and Sewer Division, as well as the Planning and Community Development Department (and Preservation), the Health Department, the Building Department, the Recreation Department, and the School Department should all work together to identify shared goals and needs.

B. Complying with Stormwater Regulations

Brookline was issued a new stormwater discharge permit from the US Environmental Protection Agency in July, 2018. The permit continues to build upon the standards discussed in previous discharge permits, specifically focusing upon public education and outreach, illicit discharge detection and eliminations, stormwater controls, and good housekeeping measures (catch basin cleaning, street sweeping, and winter de-icing operations). These measures are designed to improve the quality of stormwater discharged from the Town's drainage system. The

Town needs to work to ensure that investments in the stormwater management system maximize overall public benefits, whether through increasing the tree canopy which will provide cooling and shade as well as stormwater interception, or through creating "green streets" which can manage stormwater runoff while providing increased vegetation and plantings at the street level.

C. Public-Private Partnerships

In the area of open space protection, partnerships between public and private entities may often be the best way to secure results. Coordination between the Town and the Brookline Conservation Land Trust, the Brookline GreenSpace Alliance, and various "Friends" groups is a valuable way to conserve and steward open space. The development of a Conservation Restriction Policy, enacted as a specific goal of the 2005 Open Space and Recreation Plan, provides a much needed set of guidelines that have already proved quite useful when discussing possible partnerships with landowners. Other private entities might prove useful partners for fundraising or other specific activities and such options should be explored.

D. Regional Planning

The number of open space parcels that straddle Brookline and neighboring communities is quite striking: D. Blakely Hoar Sanctuary is located next to Boston and Newton, Lost Pond Sanctuary abuts Newton and State-owned land, the Emerald Necklace Parks lie on the Boston-Brookline boundary, and the Chestnut Hill Reservoir, with paths accessible to the public, is located just over the border from Brookline in Newton and Boston near Cleveland Circle. The successful management of all of these spaces requires cooperation between municipal entities.

A recent infusion of dollars and community input provides an exciting opportunity for significant improvements at the Town/City line near the Landmark center. This is a specific example of a regional project which would enhance the experience for the users of the Riverway Park as they exit Brookline and enter Boston. Brookline should continue to engage neighboring communities in planning and maintenance of shared open spaces.

"Humans need continuous and spontaneous affiliations with the biological world, and meaningful access to natural settings is as vital to the urban dweller as to any other."

Dr. Stephen Kellert