Millis, Massachusetts, has a long history of acquiring parcels of land. Today, the Town owns a large array of properties ranging from undeveloped wetlands to beloved historic buildings. This report presents three frameworks to guide the Town's land use decision-making process. The first framework identifies features of conservation value on the parcels and investigates how they fit into the broader ecological landscape of the town and region. The second framework analyzes the parcels' suitability for Town-directed development. The third framework, a synthesis of the first two, identifies where both conservation and Town development potential are low, indicating that the greatest benefit may come from selling the parcel. Broadly, these frameworks are designed to help Millis make informed decisions about how and where to prioritize conservation or development throughout the town.

the **Conway** School
Graduate Program in Sustainable Landscape Planning + Design

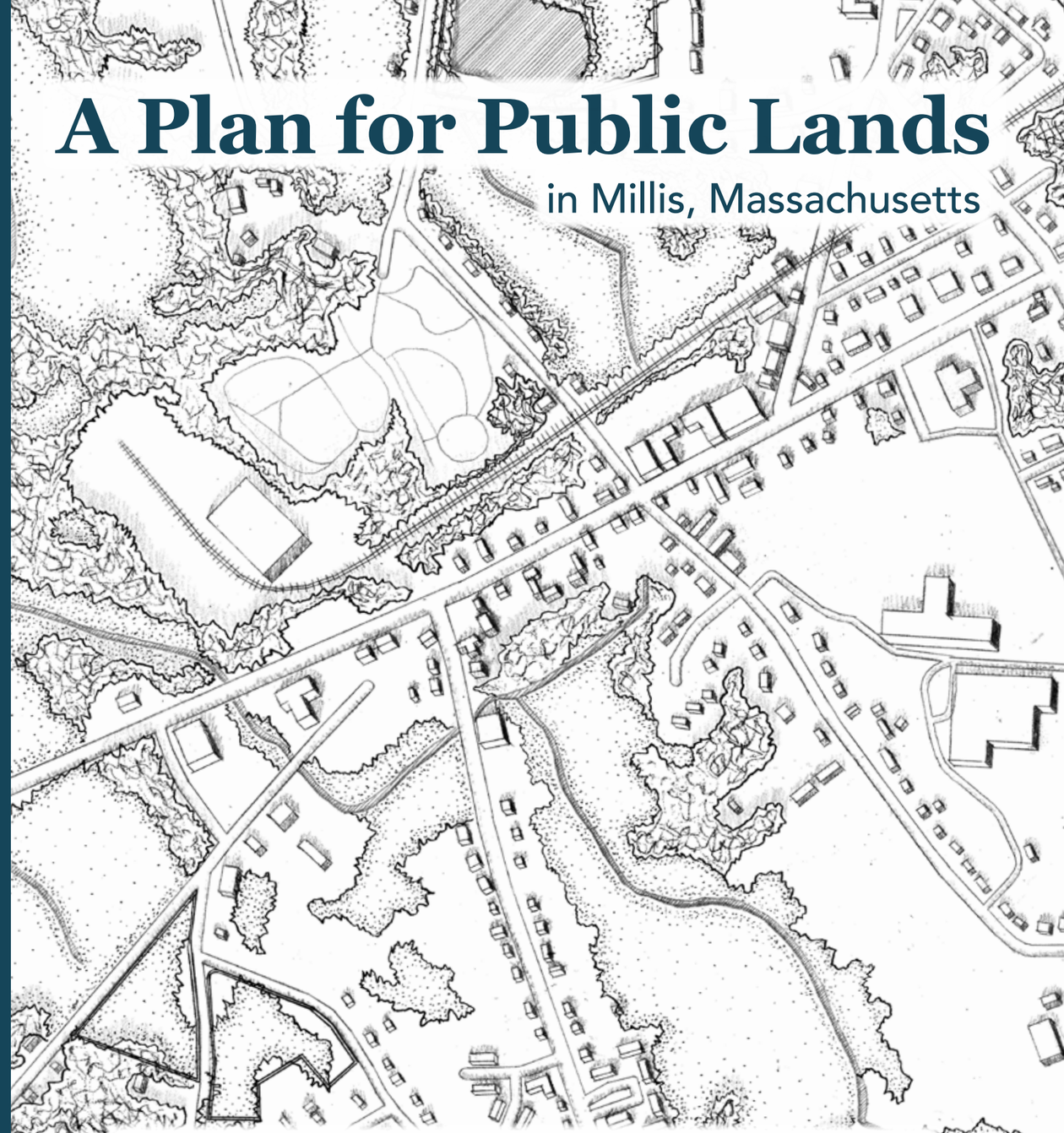
A Plan for Public Lands in Millis, Massachusetts

Bailey, Kaul & Picardi

Winter 2023

A Plan for Public Lands

in Millis, Massachusetts



Prepared for the Millis Conservation Commission

Savannah Bailey • Josie Kaul • Emma Picardi

The Conway School, Winter 2023

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Acknowledgements

Many thanks to all the members of the Core Team, including Carol Hayes, Pete Jurmain, Wayne Klocko, Jim McKay, John Steadman, and Bob Weiss for contributing their time and thoughtful insights throughout this project. We'd like to extend a special thanks to our primary contact, John Steadman, and his wife Shari for their consistent availability, support, and a wonderful tour of Millis.

We would also like to express our gratitude to our Conway faculty and staff, the Charles River Watershed Association, the Trustees of Reservations, the Millis Selectboard, and our guest critics, Ken Comia, Jesse Bellemare, and Jamie Pottern. Finally, we greatly appreciate all the valuable community input from Millis residents.

The Conway School

Savannah Bailey, Josie Kaul & Emma Picardi

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CONTENTS

EXECUTIVE SUMMARY

The Town of Millis owns a large number of properties and desires a comprehensive plan and framework to evaluate how continuing or changing the land use of these parcels can provide benefit to the environment and/or the needs of residents. This report was initiated by the Conservation Commission to produce recommendations for fourteen parcels of town-owned land based upon regional and parcel-level analyses. These recommendations are meant to guide improved town use of the parcels and clarify how these town-owned lands fit into the broader community ecologically and in terms of serving the Town's needs. This report considers three broad land use directions for the parcels: **conservation** of natural resources and ecological function, **development** for town use, and **divestiture** through sale of the parcel to another party.

The ecological value of Millis is high due to the prevalence of wetlands, habitat linkages, and aquifer recharge and flood protection areas associated with the Charles River (MassWildlife and The Nature Conservancy, "BioMap"). The people of Millis highly value the conservation of these ecologically rich areas for the benefit of humans as well as local flora and fauna. Millis's residents also point to the rural character and ample open space of the town as significant contributions to their desire to live in Millis. Conservation is key to maintaining these well-loved qualities.

As the town has grown in population, residents increasingly recognize the need for development of town infrastructure and recreation opportunities such as soccer fields or pickleball courts to meet increased demand. Additionally, Millis, as a town in the Greater Boston Area with ample open space and natural areas, has an important role to play in providing affordable housing options (Boston Foundation). Development of housing on town-owned land where appropriate is one way to address this need. Furthermore, the town wants to know if some parcels are less valuable and not suitable for conservation or town-directed development. Selling these parcels could increase the town's tax base, creating revenue for projects on the other town-owned parcels.

In order to compare the suitability of different land uses on town-owned parcels, a framework was created for each land use direction to create a system for evaluation at the parcel-scale. The conservation framework uses spatial data on hydrology, habitat biodiversity, and habitat linkage to compare the ecological value of each parcel. The development framework proposes a list of important considerations when determining the feasibility of development. Physical site inspection and map evaluation at the parcel level in addition to use of the frameworks examines how well individual parcels meet the conservation and development criteria. The divestiture framework synthesizes these first two to help identify parcels with little value for either conservation or town-directed development. When the first two frameworks are used for new parcel acquisitions, the divestiture framework will be less necessary.

Evaluating the fourteen study parcels with these three frameworks and analyzing parcel-specific conditions leads to recommended land uses for each parcel. A range of conservation efforts is recommended for the majority of the fourteen parcels based on the conservation framework. The development framework identifies parcels with high development potential, and these two frameworks together indicate that some parcels may support both conservation and development. A small number of parcels with both low conservation and development value present opportunities for divestiture. The parcel recommendations also address some of the limitations of the broad frameworks, exploring the distinction between conservation and restoration, and examining how the nuances of each parcel may support multiple land use designations.

A recommended next step to build off this report is thorough site analysis and the creation of detailed plans and cost estimates for the fourteen properties.

The analyses and parcel-level recommendations determined from the frameworks also reveal important town needs not able to be addressed on the fourteen study parcels. Therefore, this report also includes some town-wide suggestions to help support the recommendations made for each parcel. The town-wide recommendations include development of affordable housing units and universally accessible trails, expansion of Town wetland protections, creation of an Open Space Management Plan to address maintenance on town-owned properties, and a centralized system of town wayfinding and signage to provide consistency and legibility across town recreational areas. These actions taken at the town scale as opposed to the parcel scale will provide systematic support for the parcel recommendations and assist in the Town's future decisions regarding development and conservation.

Grove Street parcel wetland.

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1 INTRODUCTION

PROJECT SCOPE & GOALS

For over one hundred years, land in Millis, Massachusetts, has been gifted to the town, deeded to the town, purchased by the town, and acquired by the town in lieu of taxes. Often, no plan exists for the future of these parcels, causing them to exist in a state of limbo where they do not provide direct function for residents or any tax revenue. Even when parcels were deeded explicitly for use as public parks, like the Pleasant Street Park parcel included in this report, some remain largely unmanaged and unknown by Millis residents. The disconnect between an extensive portfolio of town-owned open space coupled with the limited extent to which the parcels are currently used and maintained was the inspiration for this report. To address this problem, the Conservation Commission engaged the Conway School to undertake a comprehensive evaluation of the Millis public land holdings to inform recommendations for future land use and management decisions. Of the total 181 town-owned parcels of land, the Millis Conservation Commission identified fourteen parcels for evaluation in this report. The Town's Open Space and Recreation Plan (OSRP) was updated recently in 2019, and though many of the fourteen town-owned lands have public access and are intended by the Town for recreational use, they were not included in the updated OSRP. These omissions led to the selection of ten of the study parcels. Four of the study parcels were included in the OSRP but are considered important enough to the Town and with enough untapped potential to warrant a second, more in-depth consideration through inclusion in this report.

The Core Team guiding this project, comprising members from Millis's Conservation Commission and current and former Town Government officials, initiated this project to learn how to improve town use of the study parcels, to give the Town context for where land should be developed, and receive recommendations for how to reach the full potential of each parcel, in the context of town use (Core Team). This project was brought to the Conway student team for the value of an outside assessment and a less-biased view of the parcels. Because the Town has limited time and funding, the analysis and prioritization of parcels in this study provides the Town with actionable recommendations indicating the best parcels towards which to direct future resources.

When the Core Team handed over the project to the student team, they provided possible uses for the parcels that included:

- Conservation with no public access
- Conservation with passive recreation, e.g., hiking trails
- Development of active recreation, e.g., sports fields
- Development to address public needs, e.g., affordable housing, universally accessible trails
- Sale

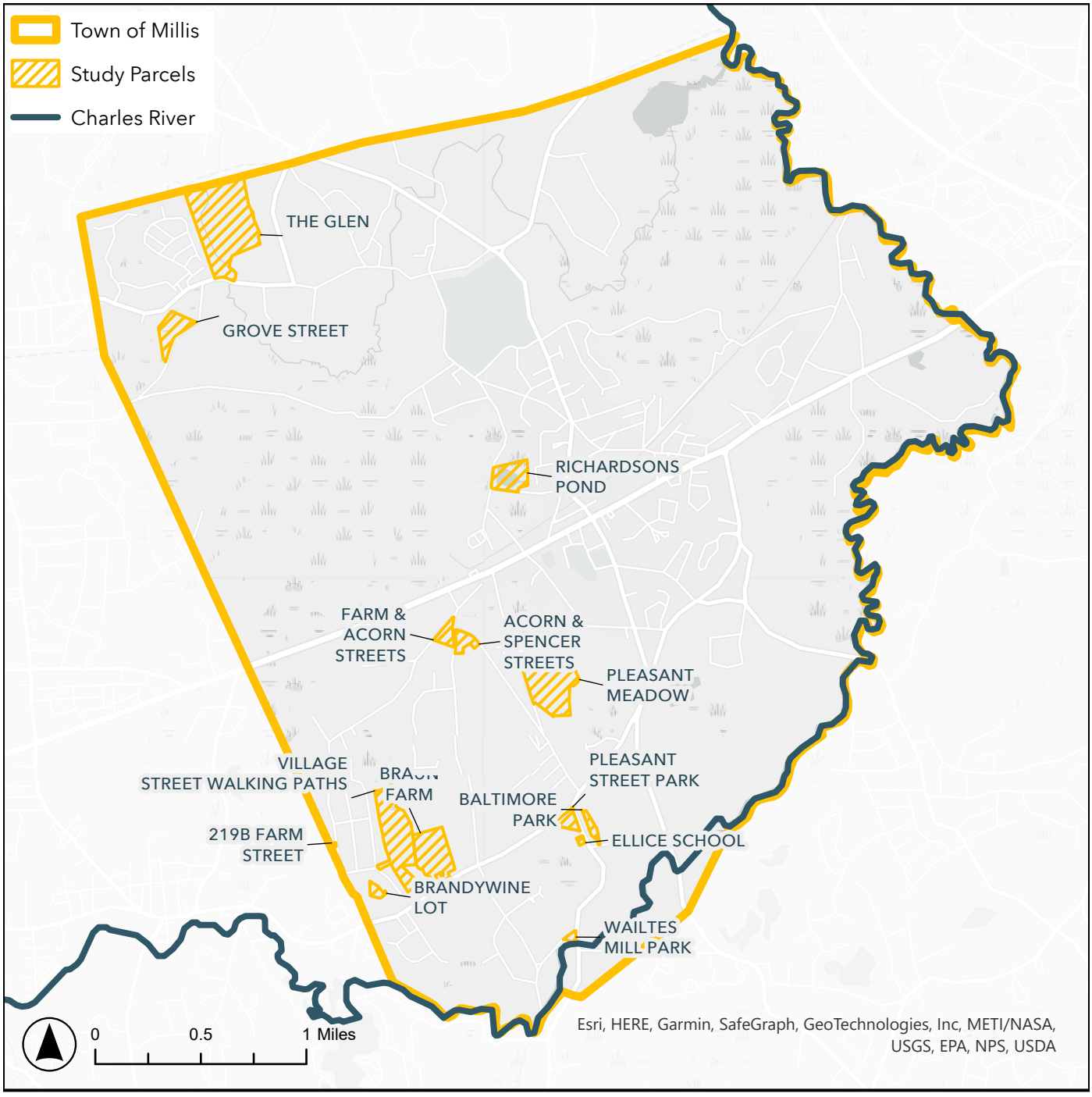
Through these possible uses, the Conservation Commission aims to make the Town's natural assets available to community members, and to make strategic use of these assets, particularly in the context of their recently updated OSRP.

In addition to parcel-level analyses and recommendations, this project incorporates town-wide and regional analyses to better understand how the parcels fit into the broader landscape. Input from the Millis community also greatly informs which land uses are desired in town and which resident needs are not currently being met. For this project, input was gathered through a community engagement session, public survey, and personal communications with Millis residents (see page 12). Other important factors to understand in relation to the study parcels include the hydrology of the region (and how it is influenced by underlying geology), habitat connectivity, land use through open space and outdoor recreation options, and recent developments and the need for more affordable housing. These analyses inform the creation of frameworks used in this study to determine land use recommendations at the parcel level. They also influence some of the specific parcel recommendations and inform town-wide recommendations included at the end of this document.

The criteria and frameworks used in the process of determining suitable land uses for the fourteen study parcels have been created for the town to use when acquiring or being gifted land in the future.

The fourteen town-owned parcels being evaluated range from a quarter-acre to 78 acres and fall across the western half of Millis. All fourteen parcels have no or limited current public use and do not connect

to the town's utilities or water supply. Some parcels have Conservation Restrictions (CR), and many are covered by a 1977 CR covering inland wetlands in Millis. A handful of the parcels are specified for public use in their deeds, and some have no restrictions of any kind. They also range in degree of public access, from a large parking lot off a well-trafficked road to a lot completely surrounded by residential parcels. This variation of parcel-level characteristics implies a wide range of possible land use directions across the parcels. Overall, this document attempts to determine the best parcel-specific land use direction using the created frameworks and taking into consideration each parcel's unique history, current use, and physical conditions.



WELCOME TO MILLIS

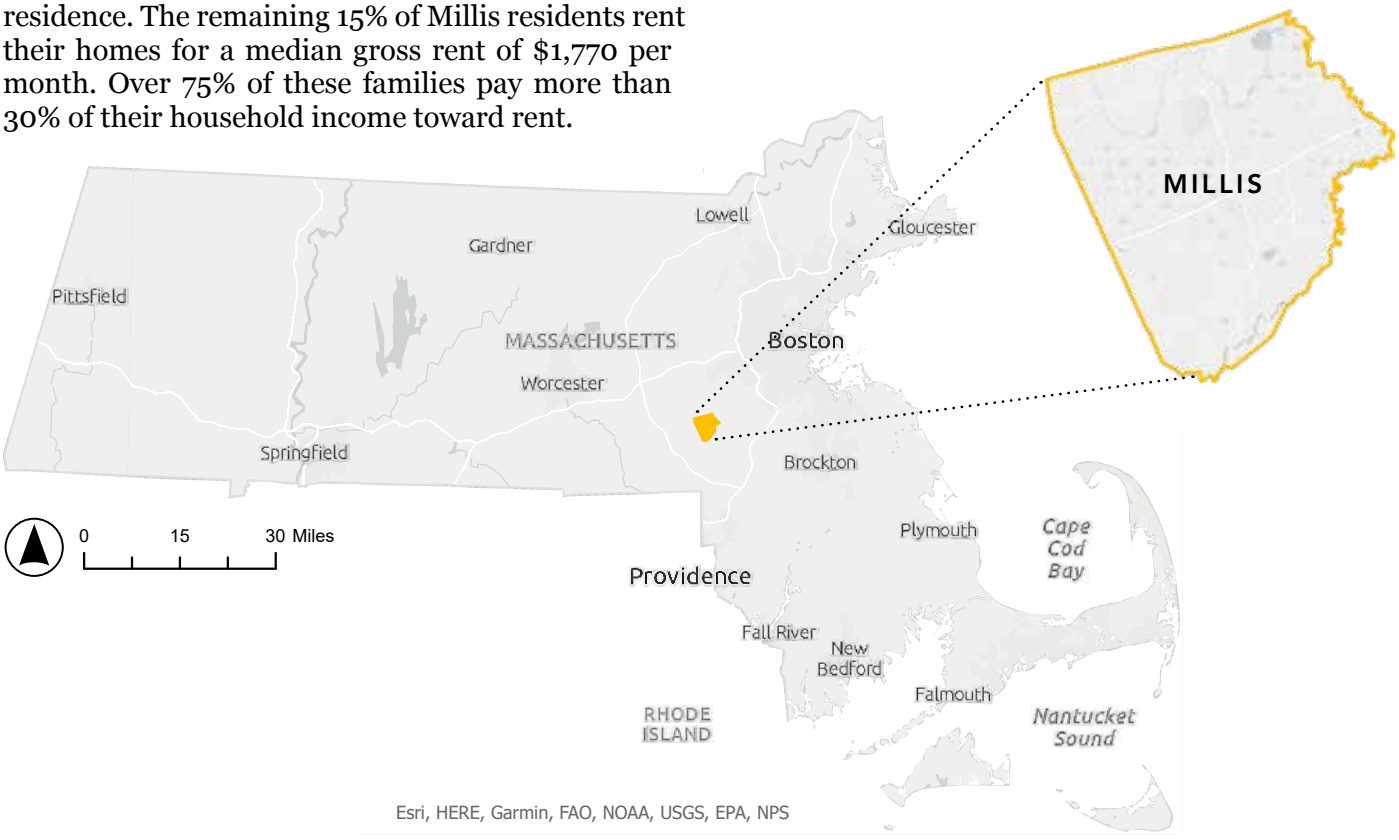
The town of Millis is situated in Southern New England, located in Norfolk County, approximately equidistant from the cities of Boston, Providence, and Worcester. Less than twenty miles from the Massachusetts coastline, the town lies roughly 150 feet above sea level. Throughout the nineteenth and early twentieth centuries, Millis was a bustling hub of industry outside of Boston, but today has evolved into an increasingly suburban residential community with its neighborhoods dispersed among many wetlands and small water bodies. The town's entire eastern border is formed by the Charles River, which runs its meandering course from the southernmost tip of town to the northernmost.

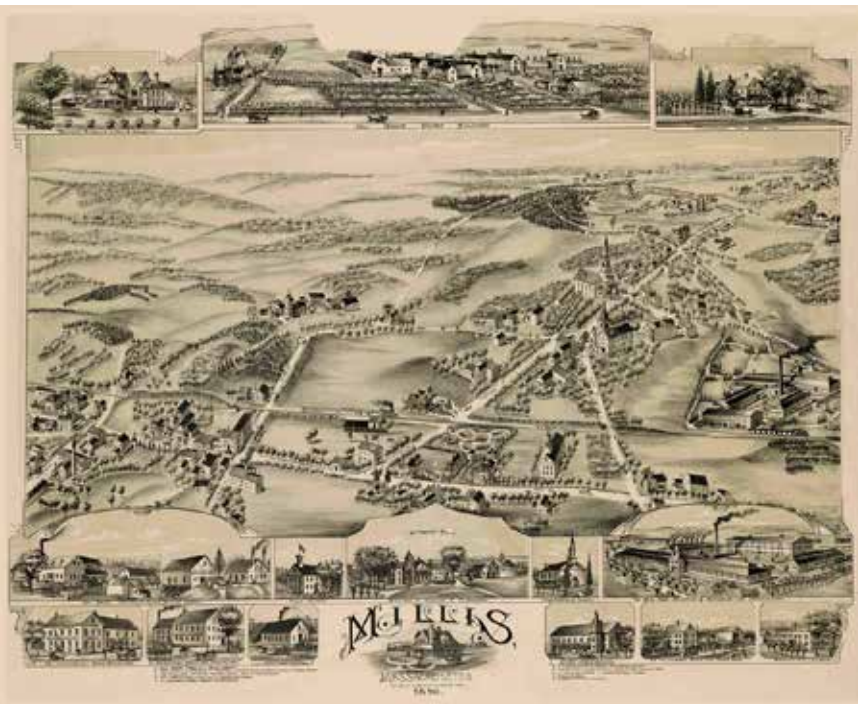
Cedariver conservation area along the Charles River in Millis, MA (Phelan).

Millis is home to just under 8,500 residents according to the 2020 census (U.S. Census Bureau). Many of these residents have shared that they value their town for its ample open spaces, small-town feel, proximity to major metropolitan areas, and high-quality schools according to the student team's online survey data (see Resident Voices on page 12). The population of Millis is nearly 90% white and has a median household income of $131,000. With a median home value of $460,000, 85% of residents own their own residence. The remaining 15% of Millis residents rent their homes for a median gross rent of $1,770 per month. Over 75% of these families pay more than 30% of their household income toward rent.

Approximately 35% of the population is over the age of fifty-five, and the senior population in Millis is only growing (U.S. Census Bureau).

Before the onslaught of European colonization in 1657, this area was home to peoples of the Massachusett, the Nipmuc, and the Wampanoag Nations ("Native Land Digital"). What is today known as the Charles River was then called Quinobequin, or "meandering," by the Massachusett and





Map of Millis, 1890 (Bailey).

was a primary means of travel and trade between tribal communities for generations (Mattakeeset Tribe). The indigenous people stewarded and cultivated the lands around the river, hunting and fishing, quarrying stone for tools and weapons, and planting and harvesting expansive fields of corn, squash, beans, and grain ("The History of the Neponset Band"). In the words of Moonanum James, member of the Wampanoag Tribe of Aquinnah and co-leader of United American Indians of New England, "The Massachusett and thousands of others from this region–Nipmuc, Wampanoag, many others–traveled on footpaths here for thousands of years and on the Quinobequin [Quinn-AH-buh-quinn] River.... Our people had names for places, for the rivers, for the coves and villages. When the English came, they dispossessed the Massachusett and everyone else of nearly all their lands" ("Indigenous Peoples History Hub"). This history is not unique to eastern Massachusetts, but its familiar storyline makes it no less egregious.

Post-English settlement, the land that today makes up the town of Millis was previously part of the town of Dedham, then Medfield, then Medway, and finally consolidated into today's 12.16-square-mile municipality in 1885. Like much of New England, this area was utilized heavily for agriculture, as both cultivated land and pasture, and for extensive timber harvesting throughout the eighteenth and nineteenth centuries by European settlers. These practices dramatically reduced tree cover until an economic transition to industrial production allowed forests to regenerate throughout the twentieth century (O'Keefe). Specifically, just a few years before the town's incorporation a manufacturing giant was born in Millis. Cliquot Club was one of the United States' largest soft-drink producers for over a century until it shut its doors in 1980. Its twenty-acre facility is still located in a section of town known today as Millis-Cliquot. From 1910 to 1940, Cliquot Club was the largest producer of ginger ale, its signature product, in the world, using ginger grown right in town. Between its use of local produce and need for able hands, Cliquot Club was a vital employer of town residents in addition to the Herman Shoe Co., another manufacturing business.

These two major companies, along with gravel mining operations and brickyards, defined much of Millis's economy through the early twentieth century. Since that time, the town has lost much of its industry, catering to families and older adults who appreciate easy accessibility to the nearby cities paired with the tight-knit community characteristic of small New England towns.

1914 Cliquot Club ginger ale bottle ("Clicquot Ginger Ale").

RESIDENT VOICES

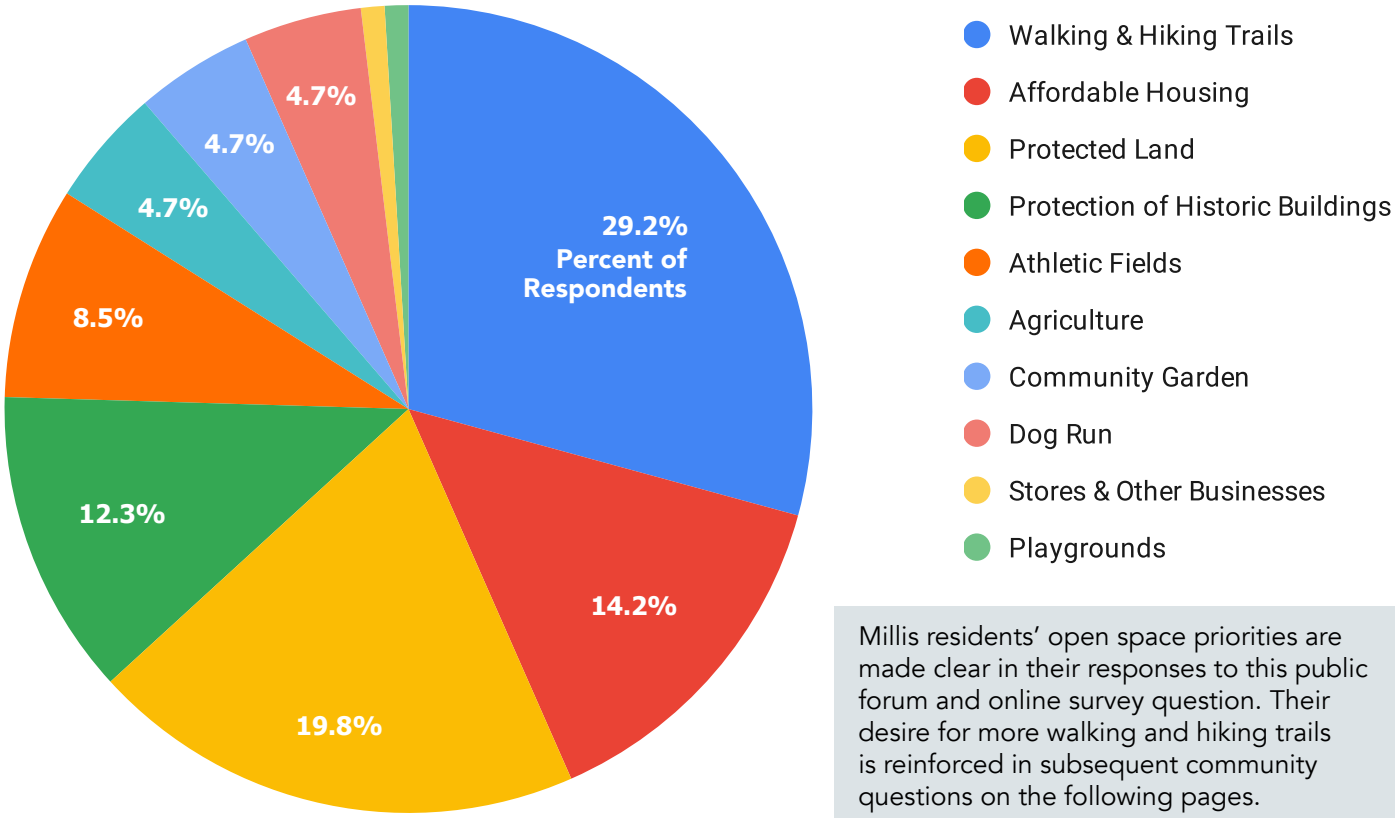
In order to hear from today's Millis residents directly, the Conway student team, in collaboration with the project Core Team, hosted a public forum at the Millis Public Library on January 31, 2023. Nearly fifty town residents attended and took part in a number of activities and discussions to share their desires, ideas, and opinions about the best uses for Millis's Town-owned properties. In addition, the student team created a questionnaire, the Millis Open Space Land Use Survey, for residents who could not attend the forum in person. See Appendix A for specific details about the Public Forum.

Forty-eight Millis residents signed in at the January 31 Public Forum.

The Core Team selected seven of the fourteen project parcels to examine during the forum and in the survey, and the student team posed specific questions to participants regarding future land use. Residents' eagerness for more walking and hiking trails far outstripped any other desires or concerns, as illustrated by Chart A (opposite), prompting a wider discussion about trail creation, maintenance, and budget. Protected land and affordable housing also ranked high on participants' priority lists for their town. Discussion of these items was overshadowed, however, by concerns about protection of local historic buildings, including the Ellice School located on one of the project parcels. This community engagement

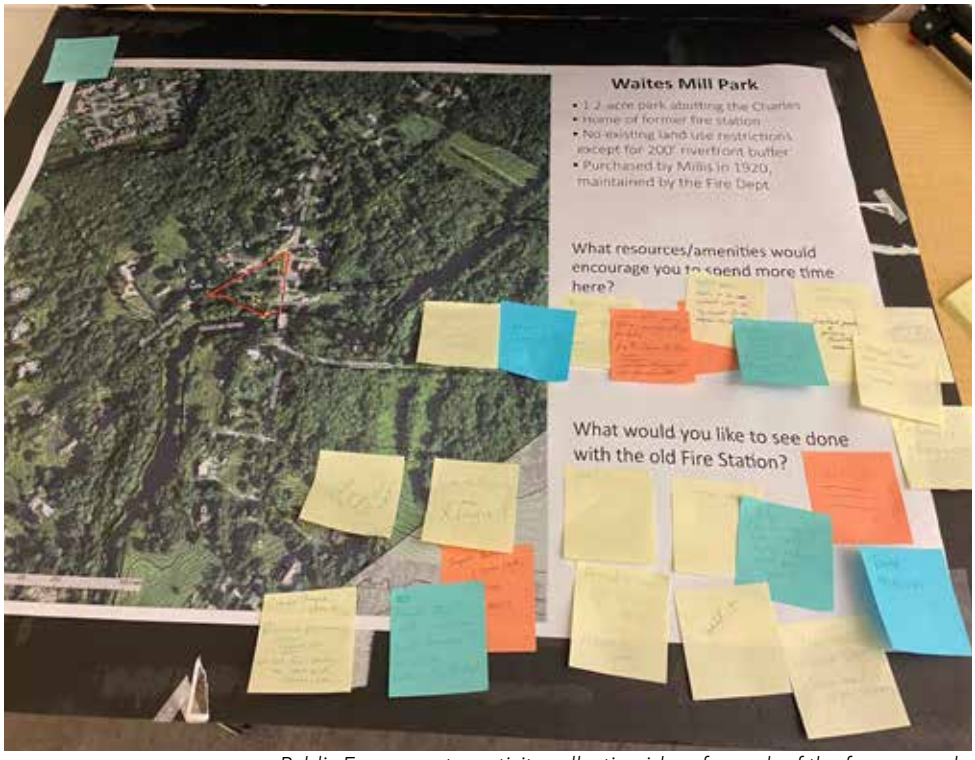
Welcome activities at the January 31 Public Forum held at the Millis Public Library.

Chart A: What do you want to see more of in Millis?



Millis residents' open space priorities are made clear in their responses to this public forum and online survey question. Their desire for more walking and hiking trails is reinforced in subsequent community questions on the following pages.

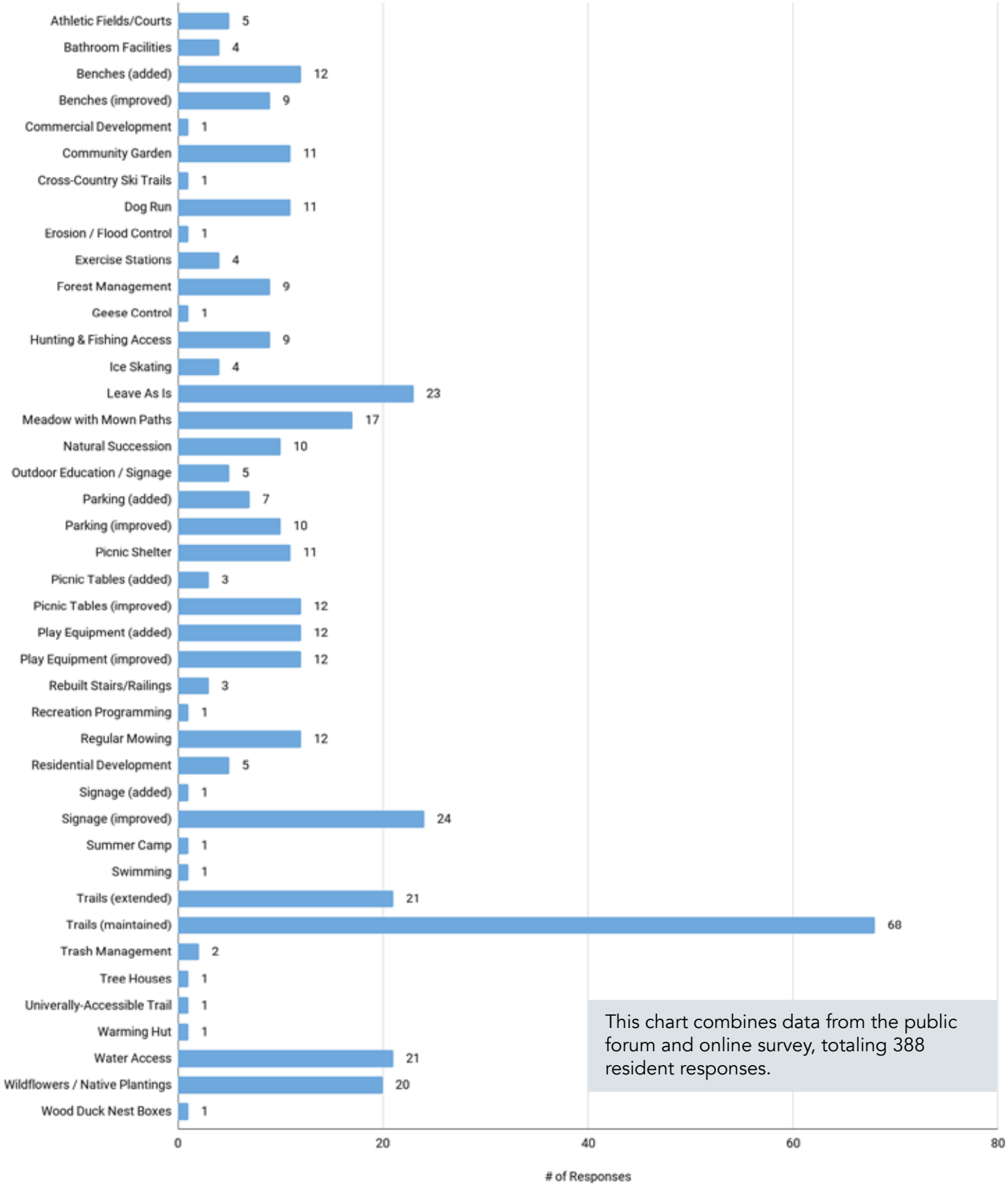
session, augmented by data collected in an online survey, provided the Conway team with the knowledge needed to kick start the process of developing recommendations for each of the project parcels. Although the forum attendees were likely a self-selecting group of open space supporters, Millis residents clearly care deeply about the future of their town and its public lands, and the opportunity to meet with them in person added another dimension to the team's understanding of the Town's needs and its limitations.



Public Forum poster activity collecting ideas for each of the focus parcels.

Public Forum & Survey Data

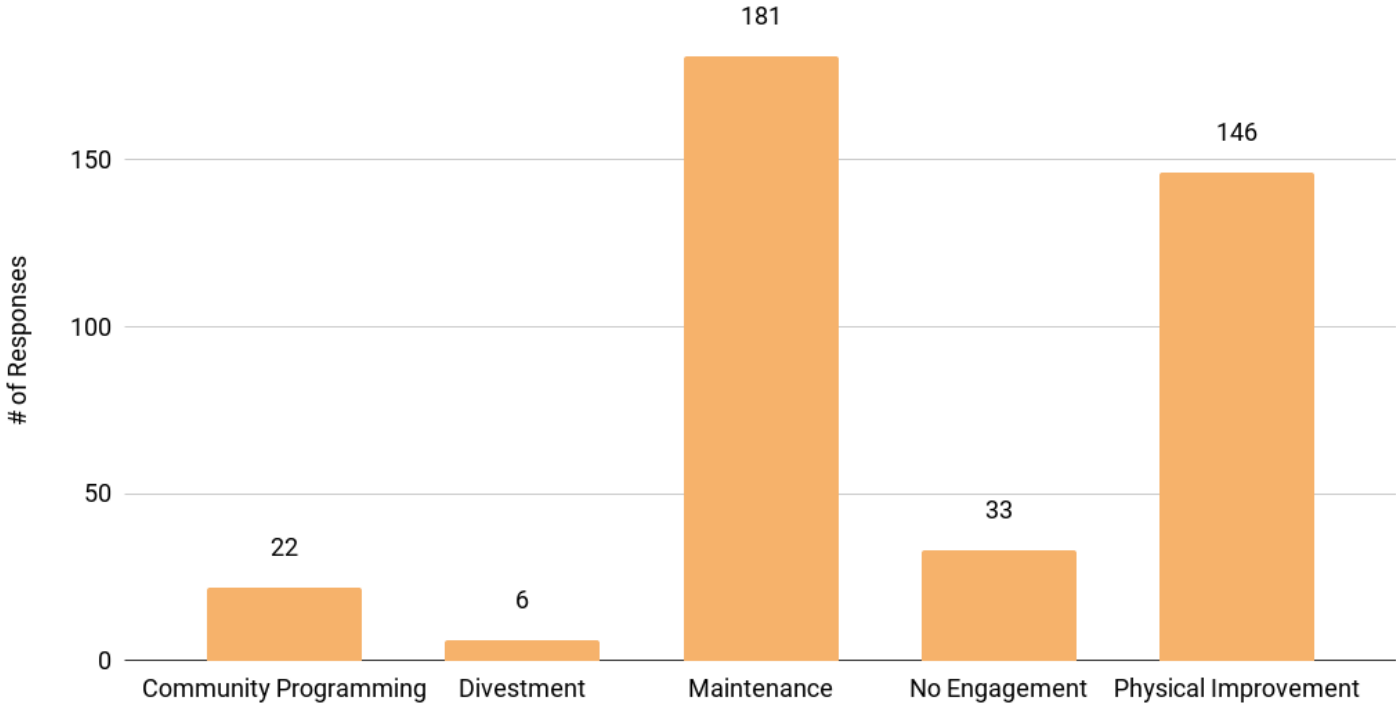
Chart C: Residents' Town-Owned Land Requests



This chart combines data from the public forum and online survey, totaling 388 resident responses.

Millis residents' desire for improved town trails is clearly evident from Chart C (opposite) where trail maintenance was far and away the most popular ask. See Appendices A and B for parcel-specific community responses. When the data collected in Chart C is categorized into five broad request types (see Chart D below), however, it becomes even clearer that, in order to fulfill this desire, the Town would need to dramatically increase its capacity for regular maintenance of its open spaces. Currently, a small group of volunteers maintains nearly all of Millis's trails with limited support from the Department of Public Works and local farmers and without the aid of a Conservation Agent or Officer, a dedicated, full-time municipal position in many neighboring communities. Similarly, Millis allocates very little budget for open space and outdoor recreation upkeep, which may significantly limit their options for expansion of these public lands (Town of Millis). See Appendix C for more information about these datasets.

Chart D: Residents' Town-Owned Land Requests
(data from Chart C arranged into broader categories)



Public library conference space ready to receive Millis residents.

Students excited to see engaged responses from community members.

Adobe Stock

2

TOWN & REGIONAL ANALYSIS

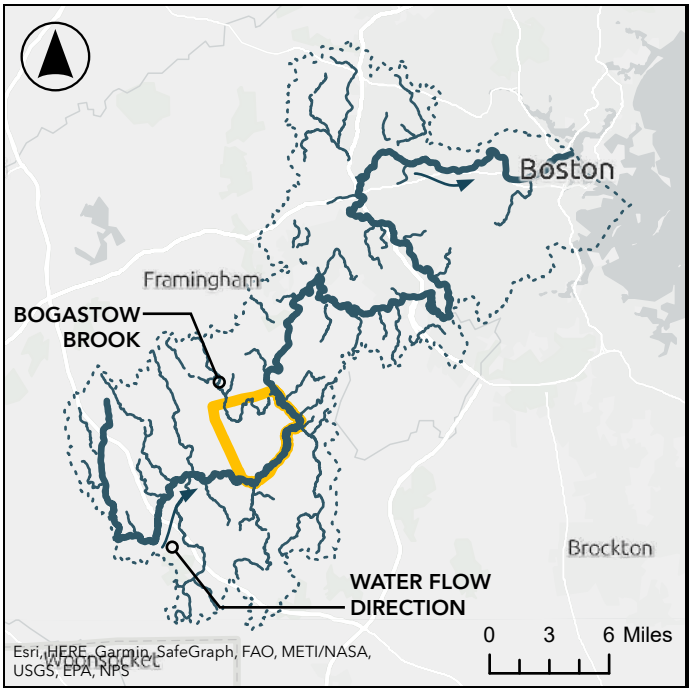
The following is an exploration and analysis of existing conditions in and around the town of Millis. Scope and scale extend across space, including the Greater Boston Area with a focus on the Charles River watershed; and across time, exploring the geologic, glacial, and colonial landscape. This analysis leads invariably back to the contemporary and the local, and of particular note are the connections across scales; this is exemplified in the sections exploring habitat connectivity and land use.

Some analyses have direct implications for parcel-level recommendations, such as the presence of small streams that ultimately impact larger water bodies; others are less straightforward, such as the relationship between glacial deposition, gravel quarries, agriculture, and conservation. Ultimately this section provides context, allowing readers to orient themselves in relation to the particularities of Millis and paving the way for the more nuanced analyses present in the parcel-level recommendations.

HYDROLOGY

Located upstream within the Charles River watershed, the Town of Millis is largely defined, both physically and ecologically, by its hydrology. The Charles marks the town's eastern and southern boundaries, and Millis's many wetlands, water bodies, and waterways that feed the Charles cover nearly one-third of the town's land area. These hydrological features play a large role in the health of the watershed as a whole and tie directly into the hydrology of Boston just a few dozen miles downstream where many neighborhoods are protected from flooding by the storage capacity provided by Millis's wetlands ("Charles River"). Consequently, the land use of each of the study parcels, the majority of which contain a hydrological feature, has a direct impact on the water quality of the region.

Within the Charles River watershed are many smaller sub-watersheds or "basins" defined by topography that shape the direction and flow of water as it makes its way toward the Charles. The land area of Millis is broken up into six sub-basins, and Bogastow Brook, major river tributary to the Charles running south from neighboring Holliston, runs through four of them on its way to meet the river. Smaller tributaries crisscross Millis as well, all of which eventually flow out through Boston Harbor into the Atlantic Ocean via the Charles River (MassGIS).



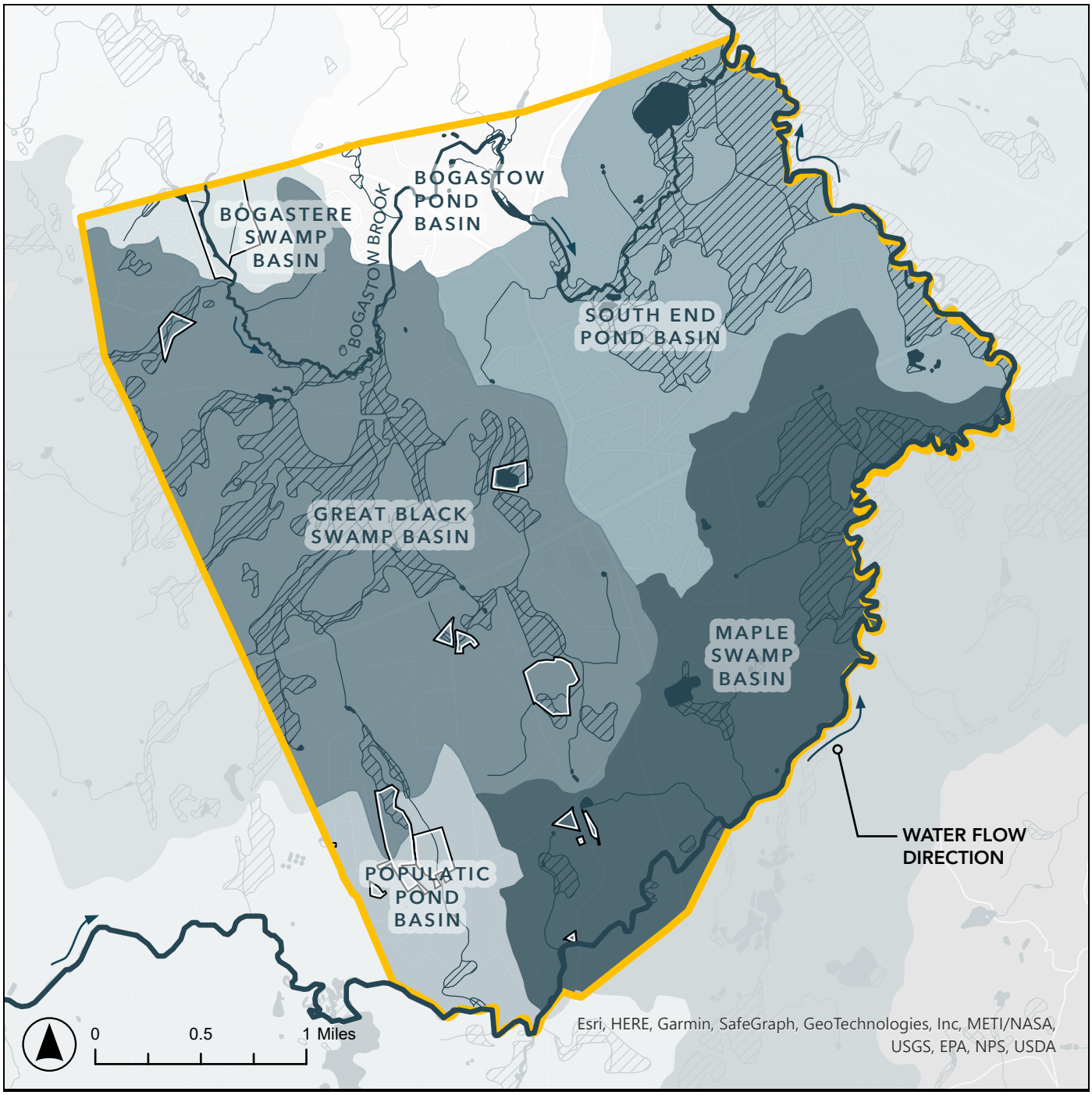
The ecosystems in each of these sub-basins play a role in the overall health of and habitat for a wide variety of wetland and aquatic species which rely on the connectivity of Millis's waterbodies and adjacent wetlands throughout their life cycles. Paired with the human residents' deep appreciation for the local natural beauty, the outdoor recreation opportunities, and the critical ecosystem services of their region, there is widespread recognition of the invaluable role that these areas play in Millis and the importance of protecting them.

Bogastow Brook running through the Glen Ellen study parcel.

Millis is located in the southwestern, upstream half of the Charles River watershed where its wetlands, water bodies and waterways feed the Charles and impact the hydrology of Boston a few dozen miles downstream.

- Town of Millis
- Charles River Watershed
- Charles River
- Major Charles River Tributaries

Charles River Watershed, Subbasins & Waterways



Town of Millis

Charles River

Charles River Tributaries

Study Parcels

Ponds & Lakes

Wetlands

There are six sub-basins of the Charles River watershed within Millis, each of which contain wetlands, water bodies, and waterways, which all eventually flow into the Charles. The study parcels primarily drain into the Great Black Swamp Basin, directly affecting the water quality of this critical wetland area.

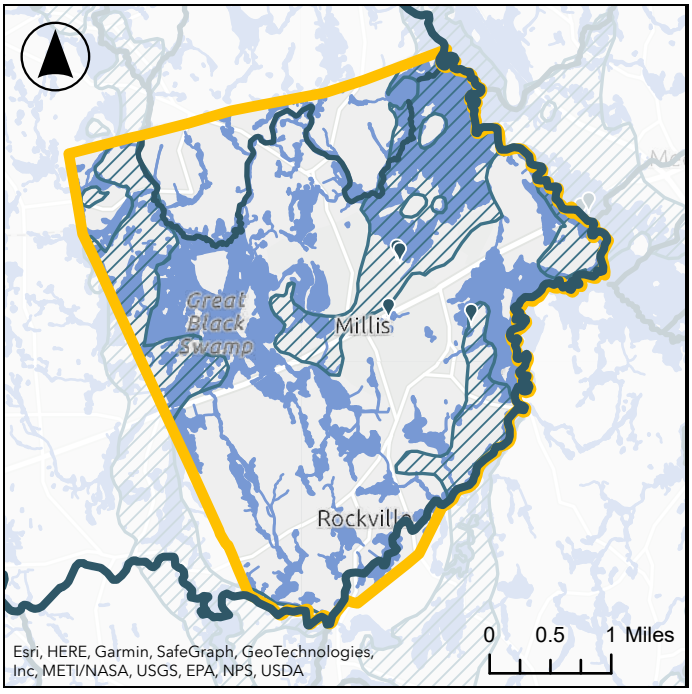
Millis Aquifer Recharge, Drinking Water & Wetlands

A number of high- and medium-yield aquifers, underground storehouses for water in porous rock formations, lie beneath Millis, particularly below major wetlands. The town's two major aquifers are made up of many feet of stratified sedimentary glacial deposits which filter surface water as it seeps underground. Protecting the quality of the groundwater in these areas is especially important for maintaining the health of the town's drinking water and that of its downstream neighbors. Two of the study parcels—Glen Ellen and Grove Street—lie above aquifers, further underscoring the importance of protecting the ecological health of these properties.

Aquifers are replenished, or "recharged," by surface water that seeps below ground. In areas of town where the land has become impermeable to water penetration, e.g., roads, parking lots, and roofs, precipitation that would otherwise slowly permeate the soil to recharge these hydrological storage areas is typically redirected into stormwater drains. If not captured in this way, water that runs off these impervious surfaces or other developed areas in Millis often becomes contaminated by pollution from sources such as vehicles or agriculture. Because most of Millis's polluted runoff finds its way directly into surface water bodies and eventually back into the groundwater, it compromises the health of the aquifers, the watershed as a whole and, most immediately, the town's public drinking water. To mitigate this, Millis created Groundwater Protection Districts in 1986 which correspond with the aquifer locations (Metropolitan Area Planning Council). In addition, Millis has also established DEP-approved Wellhead Protection Areas, developed to keep contaminants out of the public water system (EPA). These two measures work to protect the town's public wells and provide residents with high-quality drinking water by regulating land uses in these areas.

Above these aquifers lie Millis's extensive wetland areas which provide critical habitat for local wildlife, filter contaminated runoff, and provide some protection for the town and the lower watershed from major flood events ("Charles River"). Millis's unvaried topography and areas of poorly drained, wet soil have contributed to the formation of the many wetlands that extend across large swaths of town. There are three major wetland bodies in Millis: the Great Black Swamp, the Maple Swamp, and the wetland area around South End Pond, along with many smaller marshes and ponds. All together, they account for several thousand acres of intact wetland ecosystems, approximately 65% of which are under permanent protection via conservation restriction or other open space directive (MassGIS).

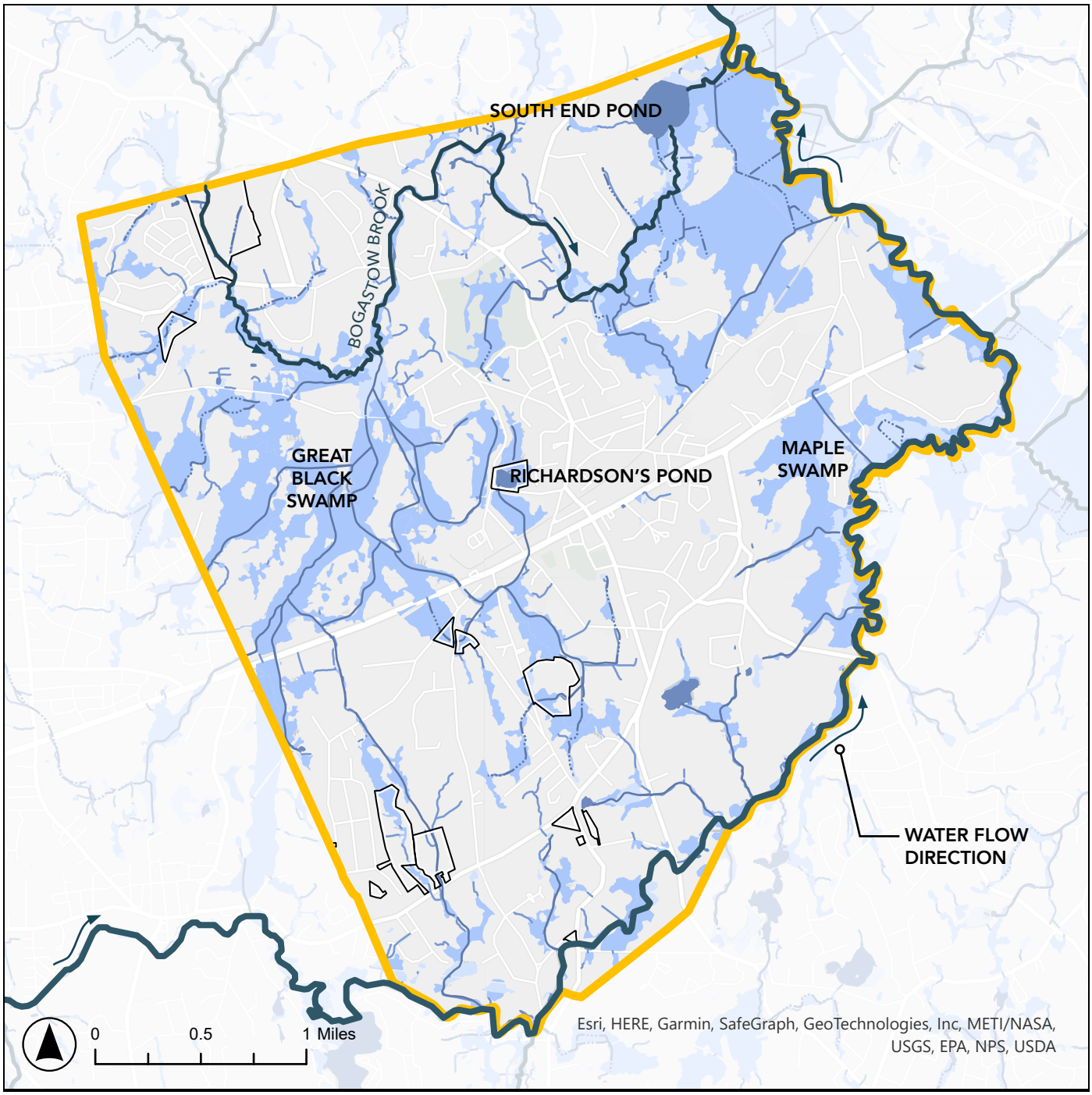
The unprotected areas, however, remain at risk of development. State and local wetland regulations require developers to acquire permits, but this process does not always result in wetland preservation. This leaves Millis exposed to the possibility of decreased stormwater storage capacity during future flood events in addition to impaired water quality and reduction in biodiversity. These risks highlight the critical importance of maintaining the integrity of these wetland areas.



While maintaining the quality of Millis's water is important throughout town, protecting the integrity of the aquifers that lie below ground is particularly critical for the health of Millis residents and their neighbors downstream.

Town of Millis
Charles River
Major Charles River Tributaries
Public Water Supply Well
Wetlands & Water Bodies
Aquifers

Millis Aquifer Recharge, Drinking Water & Wetlands



- Town of Millis
- Study Parcels
- Charles River
- Major Charles River Tributaries
- Bogs & Marshes
- Swamps
- Ponds & Lakes
- Perennial Stream
- Intermittent Stream

Millis's many wetlands provide critical habitat for local wildlife, filter contaminated runoff, and protect the town and the lower watershed from major flood events. Nearly all of the study parcels contain an area of surface water.

Charles River Natural Valley Storage Area

In August 1955, Boston was struck by Hurricanes Connie and Diane over the course of just two days, receiving a total of twenty inches of rain over a forty-eight-hour period. The flooding that followed resulted in citywide damages and was the first natural disaster in Massachusetts to cost the state over $1 billion (Desrosiers).

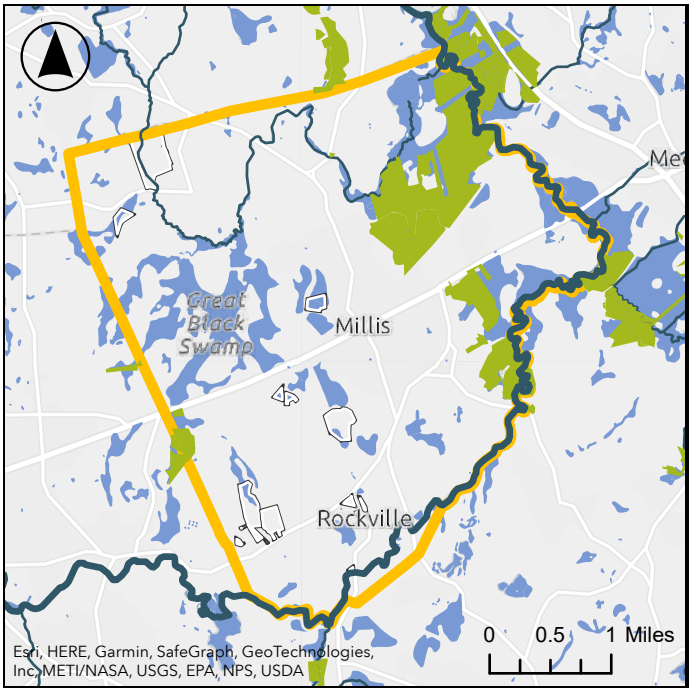
In response to the storms, the Army Corp of Engineers (ACOE) proposed to build a system of dams across the Charles River upstream of Boston which would have significantly harmed the area's ecological connectivity (Desrosiers). Before they could begin construction, however, the executive directer of the Charles River Watershed Association, Rita Barron, proposed an alternative solution: protect the city of Boston from future flood events by protecting the watershed's wetlands, which can naturally store stormwater during heavy precipitation events. This proposal formed the foundation of the Charles River Natural Valley Storage Area (NVSA) which was approved in 1974 (Desrosiers).

Over the course of the next nine years, the ACOE, in collaboration with the federal government, purchased 8,100 acres of wetlands within the Charles River watershed, over 1,300 of which are located within Millis. These lands are managed and permanently protected by the ACOE and the Massachusetts Division of Fisheries and Wildlife. This project, implemented almost five decades ago, has saved the state millions of dollars while protecting the ecological integrity of thousands of acres of habitat (Army Corps of Engineers).

During severe or frequent storms, Millis is still prone to flooding, however, particularly on roads in and around the wetland areas and along the banks of the Charles (Metropolitan Area Planning Council). This only further highlights the importance of continuing to conserve land around these natural flood storage areas as climate change increases the regularity and intensity of precipitation events. While none of the study parcels are part of the NVSA, many play a critical supporting role in the slowing and detention of stormwater within Millis.

Rita Barron, CRWA Executive Director from '73 to '88 (CRWA Archives).

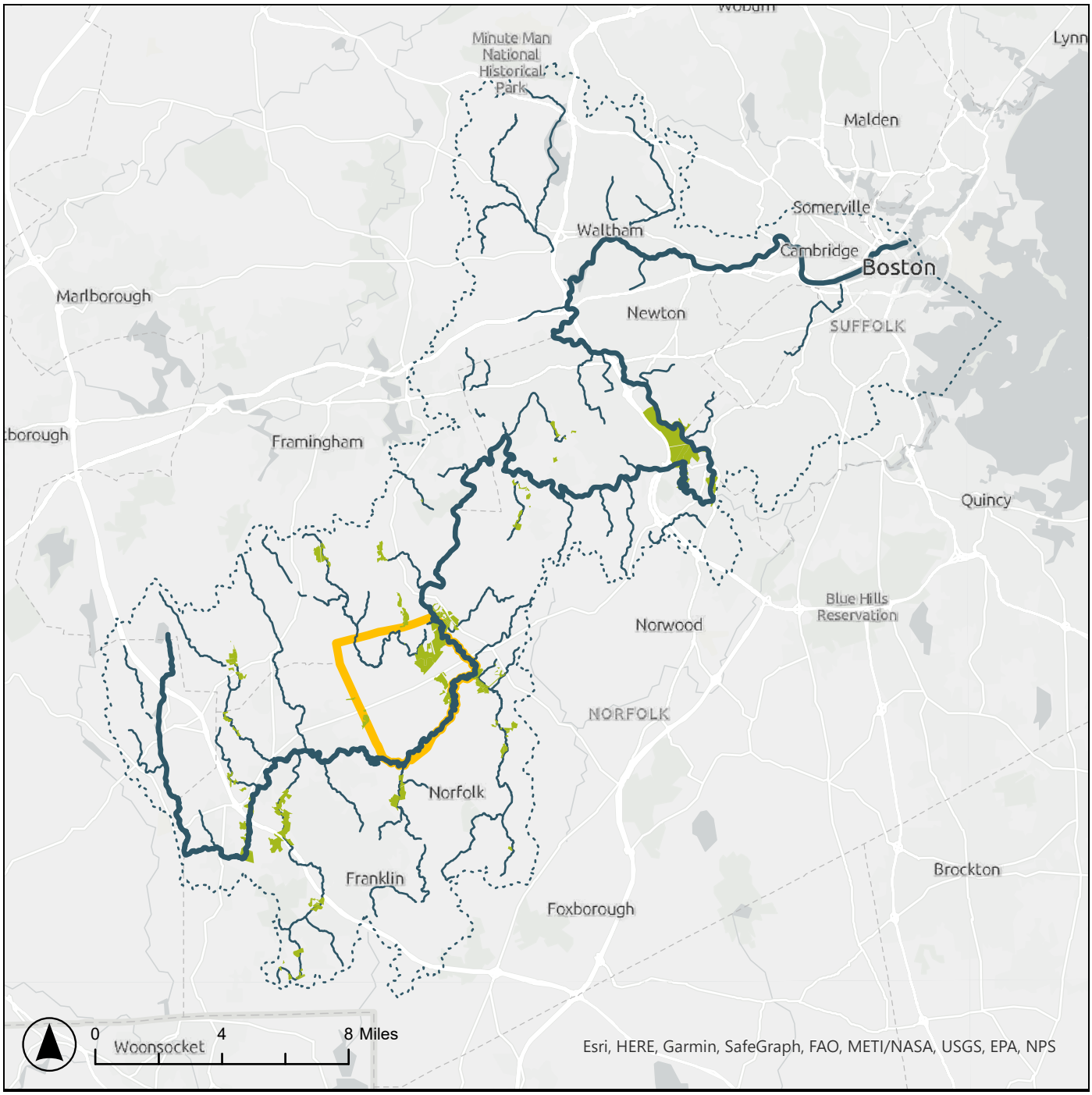
Charles River and surrounding wetlands in Millis (Belanger).



Millis's Natural Valley Storage Area lands, in green at left, lie along the Charles River and just south of the Great Black Swamp, owned predominantly by the Army Corps of Engineers.

- Town of Millis
- Charles River
- Major Charles River Tributaries
- Study Parcels
- Natural Valley Storage Area
- Water Bodies

Charles River Natural Valley Storage Area



Town of Millis

Charles River Watershed

Charles River

Major Charles River Tributaries

Natural Valley Storage Area

The Charles River NVSA lands extend throughout the watershed but are particularly concentrated in and around Millis which contains over 20% of these flood protection areas.

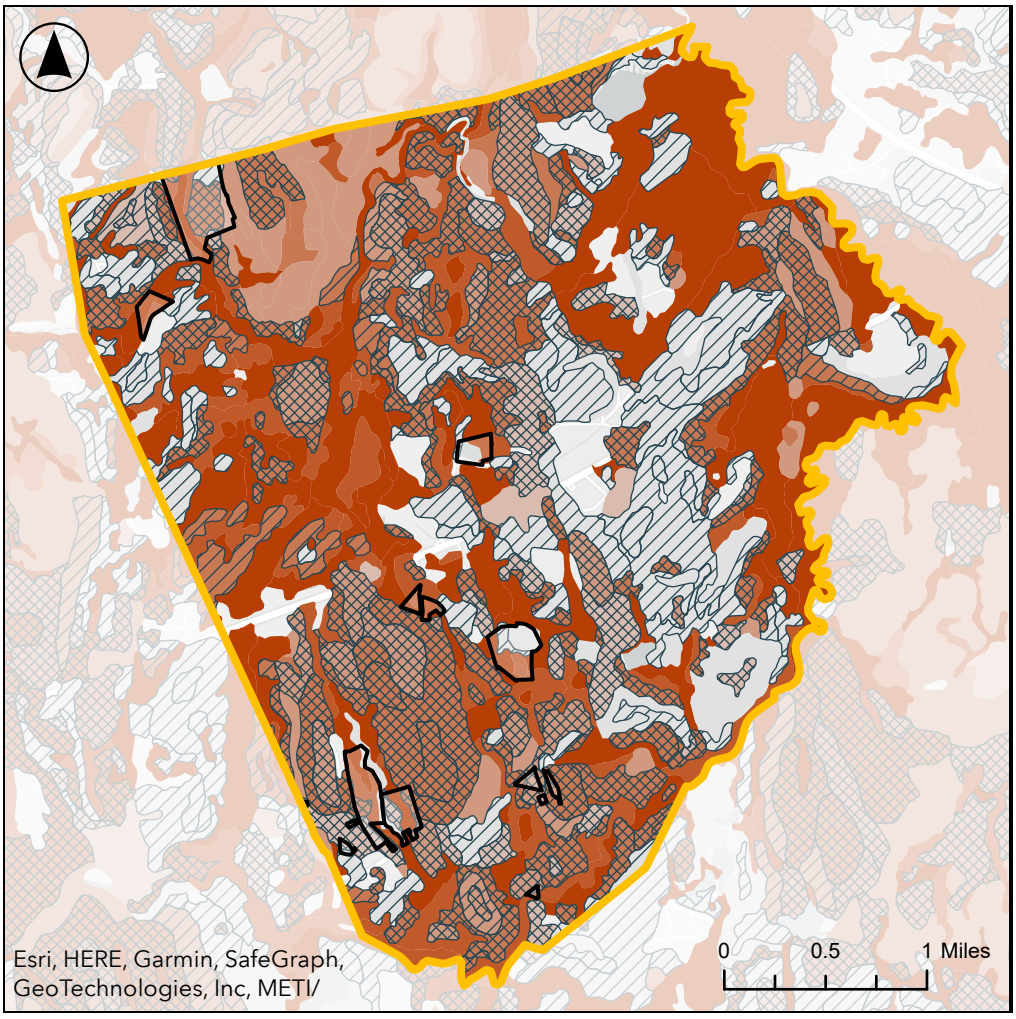
GEOLOGY & SOILS

With less than 100 feet of topographic change throughout town, the relatively flat land of Millis is underlain by layers of soil and stone that explain much about the town's landforms and land uses today. While Precambrian granite sits below much of Millis, the town's ecological features are primarily influenced by its surficial geology—sandy material deposited more recently by glaciers—rather than by the ancient bedrock below (MassGIS). The glacial sediments that make up this surficial geology are predominantly layers of sorted stratified deposits, in addition to the more recent swamp deposits underlaying most of the wetland areas (MassGIS).

These surficial geology layers play a significant role in determining the conditions for plant communities, hydrological features, and past and present land uses. For example, the correlation between wetlands and swamp deposits indicate the long-term presence of these wetland bodies. Relatedly, the "footprints" of the town's aquifers clearly correspond with the presence of coarse glacial deposits, which likely underlie the more recent swamp deposits in the northeast corner of town. These coarse glacial deposits also contain all currently or previously operational gravel pits, many of which made up esker land formations prior to mining operations.

In addition, the town's soils tell a story about past and future land use patterns. While the poorly drained wetlands are not prime agricultural land, those areas with more well-draining soils underlain particularly by thick glacial till, as well as by stratified deposits, contain many tracts of valuable farmland.

Clearly, the location of both farmlands and wetlands is a direct result of the geologic history of the region which provides vital context for this project's recommendations when it comes to preserving land uses and maintaining existing conservation areas. As for development, it is ideal to focus on areas that are neither part of a wetland system nor underlain by superior agricultural soils.



Both wetland and prime farmland areas correlate directly with the drainage class of the soil below, illustrating the important role that soil, and the surficial geology that helps shape it, plays when it comes to land use.

Town of Millis

Study Parcels

Prime Farmland

Farmland of Statewide Importance

Soil Drainage Class

Excessively Drained

Somewhat Excessively Drained

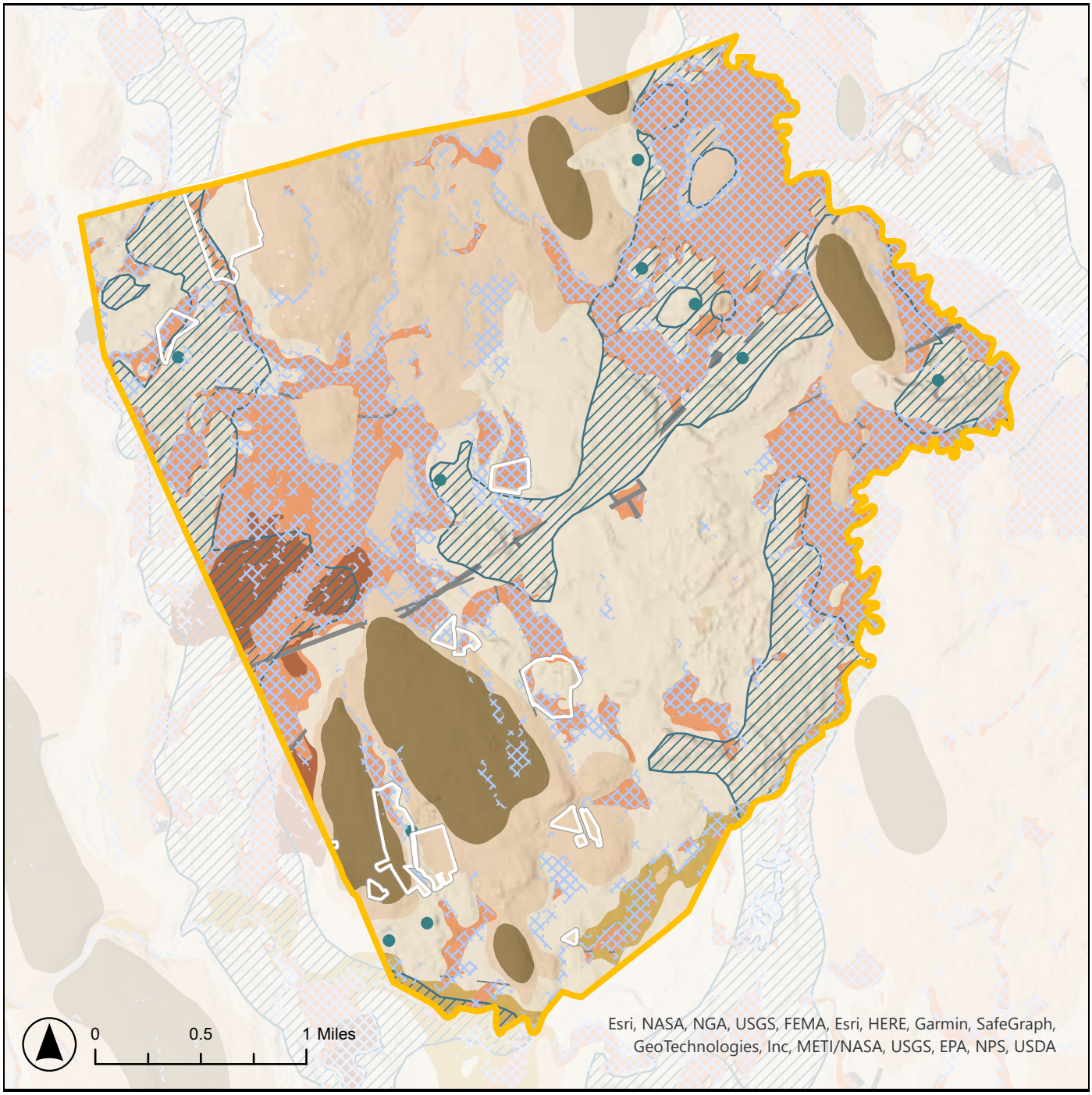
Well-Drained

Moderately Well-Drained

Poorly Drained

Very Poorly Drained

Surficial Geology, Soil Drainage & Land Use



- Town of Millis
- Study Parcels
- Wetlands
- Gravel Pits
- Aquifers
- Artificial Till
- Floodplain Alluvium
- Coarse Glacial Stratified Deposits
- Swamp Deposits
- Fine Glacial Stratified Deposits
- Thick Till
- Thin Till

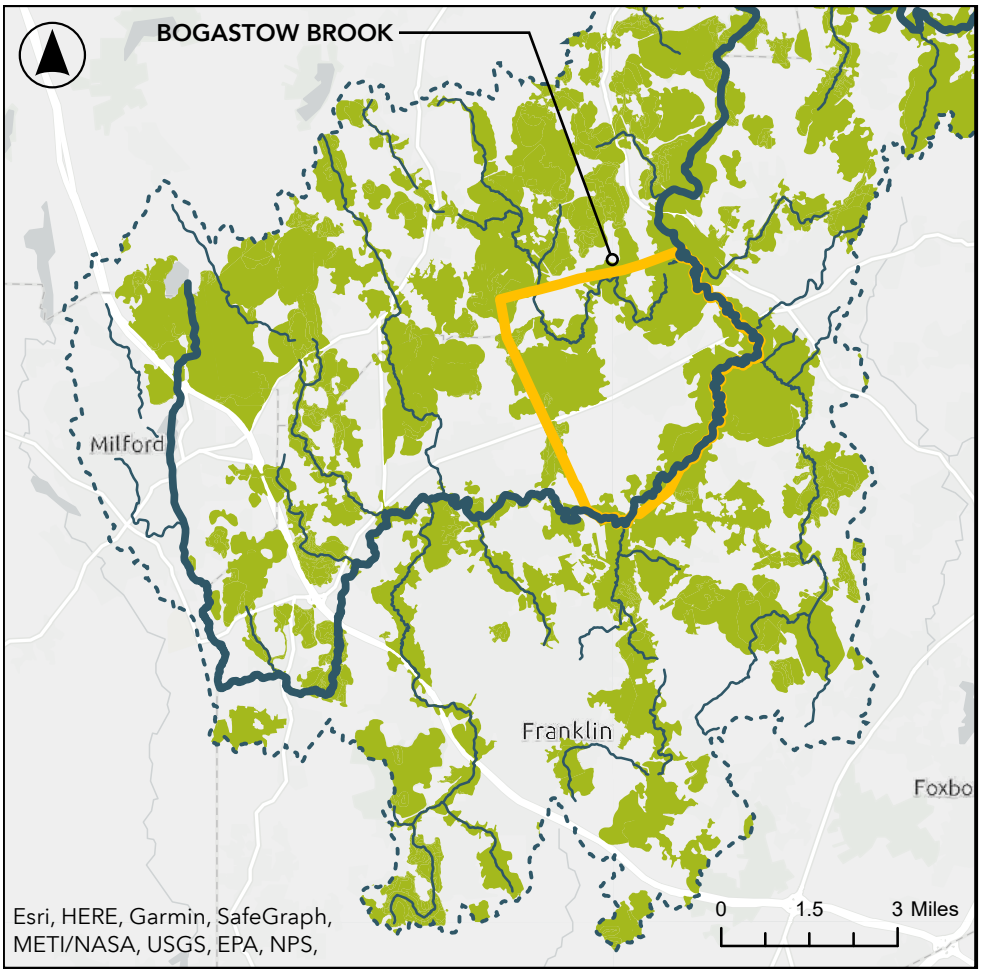
HABITAT CONNECTIVITY

Millis's central location within the Charles River watershed positions it as a kind of ecological linchpin in the region. The town's impacts on both a large section of the Charles itself and its major tributary, Bogastow Brook, endows Millis with significant control over the fate of the habitat connectivity of these central hydrological features and the landscapes around them. These habitats support a wide variety of plant and animal life in addition to providing the human community with extensive natural beauty, recreation opportunities, improved air and water quality, flood protection, and innumerable other benefits.

The green areas on the map below indicate important habitat areas as designated by BioMap. Created by MassWildlife and The Nature Conservancy, BioMap is a tool to strategically guide efforts to protect and steward Massachusetts lands and waters that are most critical for conserving biodiversity in the state (MassWildlife). These areas are particularly concentrated along the town's eastern boundary marked by the Charles River, as well as around the northern half of Millis where Bogastow Brook ties together three major wetland bodies before it meets the Charles in the northern corner of town.

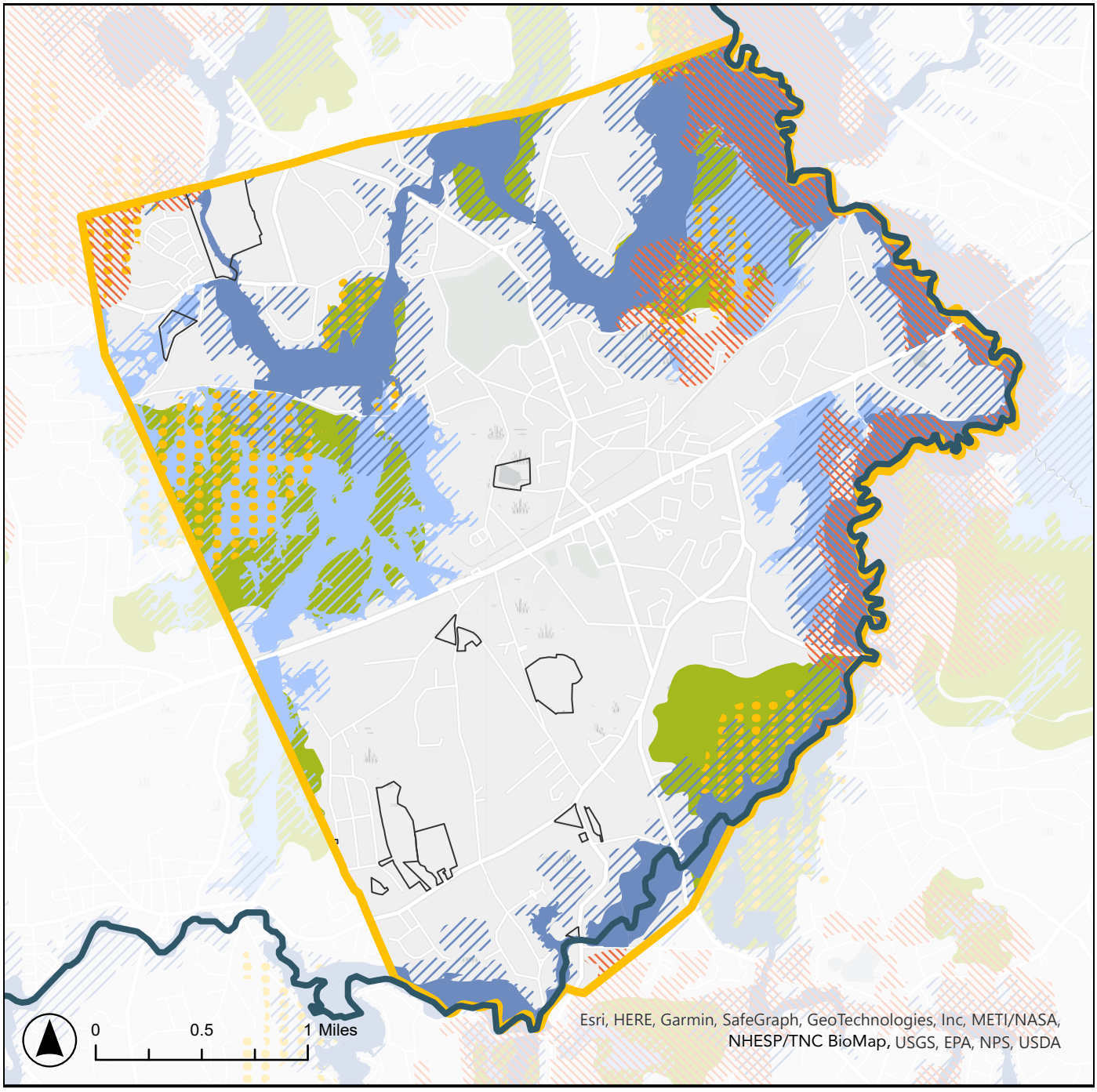
These important habitat areas are broken down into categories in the adjacent map, illustrating the intersections and overlap between different habitat types and conservation priorities. When it comes to conserving or restoring open space in Millis, concentrating on these areas of important habitat and the potential for creating linkages between them helps to prioritize land use decisions.

While this dataset is an extremely valuable tool, it contains its own biases and limitations. For example, it prioritizes large, unbroken habitat with little human influence over smaller, segmented areas. While this is critical for many animal species, other open spaces not identified by BioMap are also important for green stormwater infrastructure and air quality, etc. Therefore, it is used in combination with other data sources and metrics for the purpose of generating land use recommendations in this document.



BioMap illustrates areas of important habitat throughout Massachusetts, indicating the critical role played by Millis's wetland areas and its lands adjacent to the Charles River and Bogastow Brook, both of which tie together wide swaths of connected habitat within the watershed.

BioMap Habitat Areas



Town of Millis
Study Parcels
Charles River
Rare Species
Aquatic Core
Wetland Core
Forest Core
Vernal Pool Core
Aquatic Core Buffer
Wetland Core Buffer

The many BioMap overlays show the relationships of different habitat types to one another and highlight areas with significant overlapping priorities. Only three of the study parcels include BioMap habitat.

LAND USE

Millis's many open spaces—land that is minimally developed for residential, commercial, industrial or institutional use—fall under a wide variety of ownership types and carry an array of protective measures. Over one-third of the town's land area is designated as open space, totaling just over 2,500 acres, of which the town owns about 15% (MassGIS). The federal government and private landowners hold most of the remaining open space acreage (approximately 33% and 48% respectively), and the Trustees of Reservations own the final 4% of Millis's open space lands. Just over one quarter of these lands are permanently protected under a Conservation Restriction (CR), Agricultural Preservation Restriction (APR), and/or by Article 97 ("How Is Land Protected?").

As land conservation measures, the CR and APR programs, along with the protections granted by Article 97, are mechanisms for protecting open spaces from future development or uses not in alignment with the provisions of the established restriction. A CR is a legal agreement between a landowner and an oversight organization, typically a land trust or government agency, limiting future uses while allowing the property to remain under private ownership ("How Is Land Protected?"). Once a CR is put in place, the trust or agency has the authority to monitor the land and enforce the terms of the restriction. In addition, the CR itself becomes a permanent part of the associated property's deed, limiting the development rights of the parcel(s) and reducing the land's market value ("How Is Land Protected?"). If the property changes ownership, the provisions of the agreement remain in place. Millis has nearly thirty parcels protected by a CR, totaling approximately 600 acres.

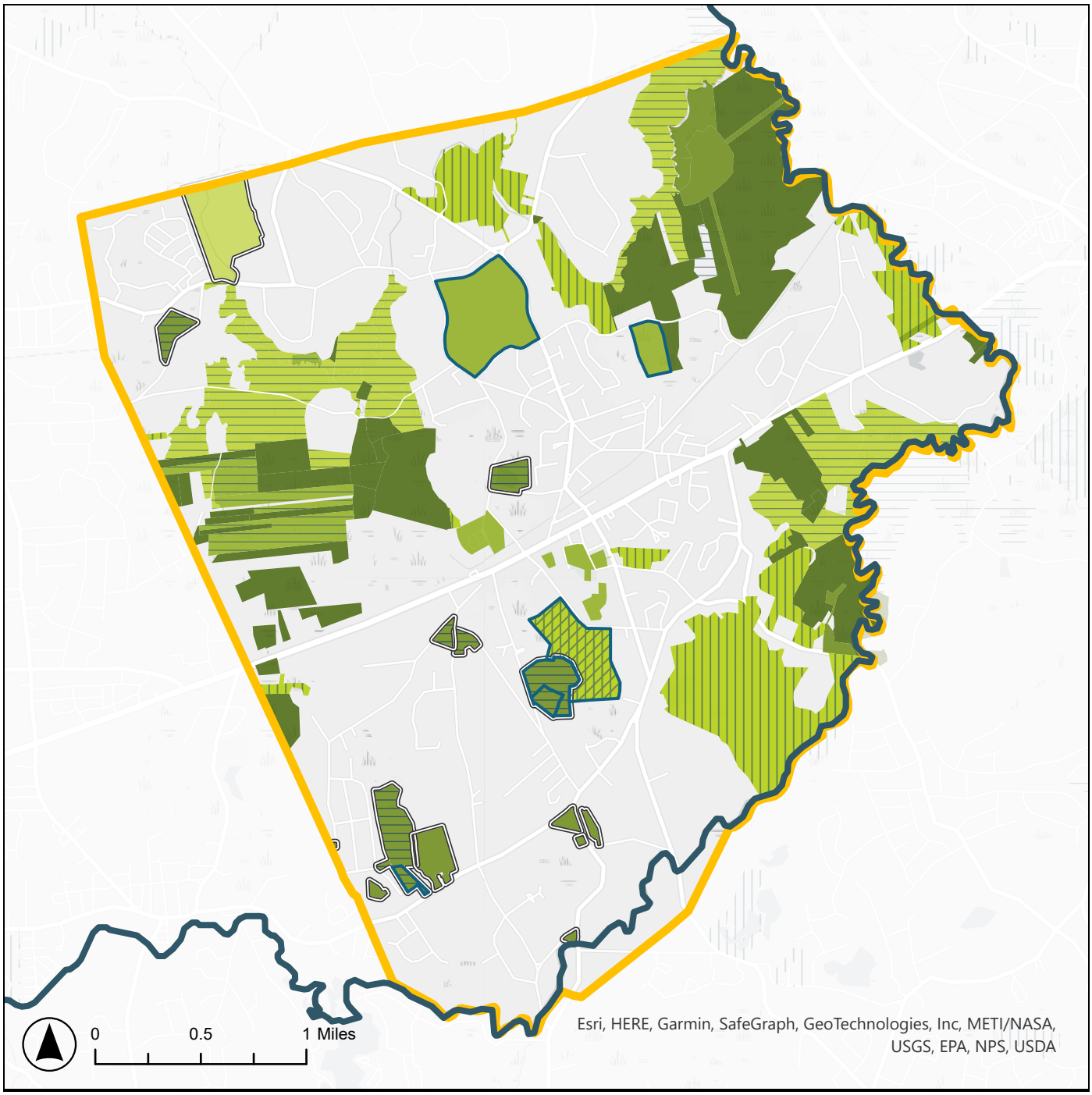
An APR is particular type of CR established to preserve productive agricultural lands and make that land, and by extension farming operations, more affordable to Massachusetts farmers ("Agricultural Preservation Restriction"). The program operates by offering to pay owners of farmland the difference between the market (i.e., development) value and the agricultural value of their land in exchange for a permanent deed restriction requiring that the land be maintained as working farmland or as land that is viable for agricultural use in the future ("Agricultural Preservation Restriction"). Millis has at least one parcel, Tangerini's Farm, which is protected by both an APR and a separate CR (MassGIS).

A final method for permanently protecting land in Massachusetts, Article 97 is a state constitutional amendment and applies to state- or town-owned properties. If a parcel is acquired by the state or a municipality for the purpose of providing open space for the public, it cannot be developed or used for other purposes without a two-thirds majority vote of the state legislature ("Article 97"). With a "no net loss" policy regarding the preservation of public open spaces, it is extremely rare for a parcel protected under Article 97 to be converted to any other use. There are six parcels protected in this way in Millis, totaling nearly 240 acres, three of which are included in the study parcels.

In contrast to the nearby urbanized metropolitan core of Boston, tree canopy covers nearly 60% of the land area of Millis. These trees reduce the temperature in summer, provide beautiful natural landscape and habitat, clean pollutants from the air, and absorb stormwater runoff. According to the 2019 OSRP, the town's trees sequester 3,700 tons of carbon, remove 360,000 pounds of pollutants from the air, and absorb thirty million gallons of stormwater runoff per year, services worth approximately $1.5 million annually.

Adobe Stock

Open Space



Town of Millis
Study Parcels
Charles River

Conservation Restriction
CR/APR Combination
Other Legal Interest
Article 97 Protection

Federal
Land Trust
Municipal
Private

The study parcels have a variety of protective measures including Article 97 and are subject to other less permanent actions such as groundwater protection zoning. "Other Legal Interest" here includes easements and rights of way or parcels held in fee simple.

Outdoor Recreation

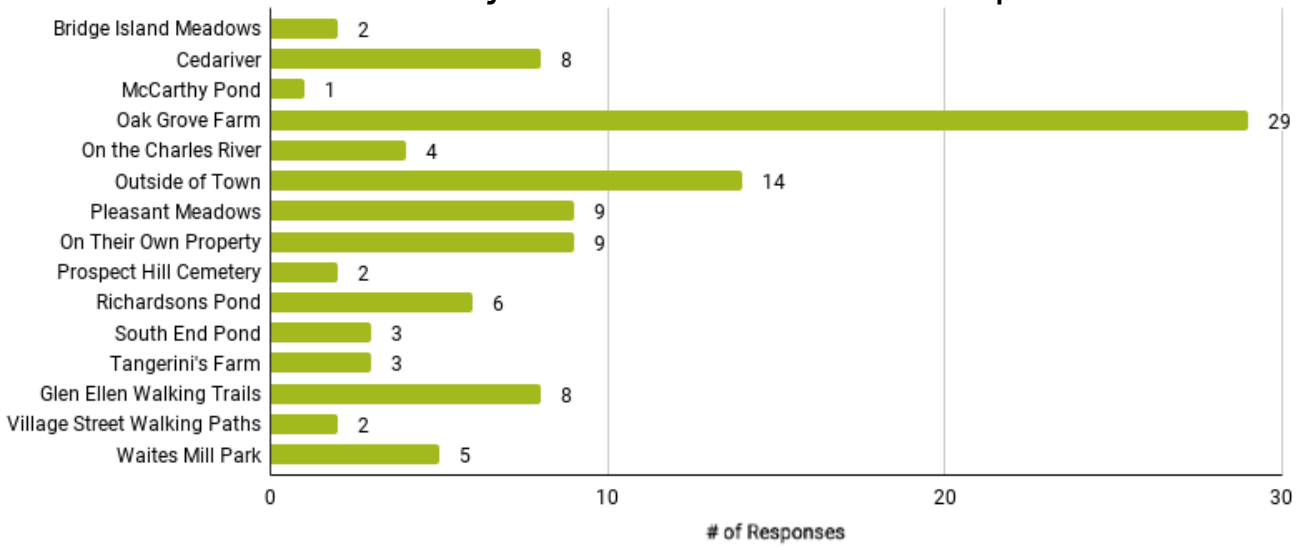
Of Millis's many open spaces, a handful are frequented by town residents for outdoor recreation. Resident responses to the question "What are your favorite outdoor recreation spots?" from the Public Forum held on January 31, 2023, and an online survey are pictured in the map (opposite) and in Chart B below, including 105 total responses. The number of residents indicating their preference for a location is represented by the number in the center of the parcel on the map. This map also illustrates the residential development patterns based on census and land use data.

The clear favorite among these properties, Oak Grove Farm is a town-owned open space, providing residents with athletic fields, playgrounds, walking paths, and mountain biking trails all within walking distance of downtown. Its vital role in the community as a place for those of all ages and interests to gather cannot be overstated. Oak Grove is maintained by a private commission, and its popularity seems due in part to its well-maintained facilities.

Earning the second-place spot for favorite outdoor recreation destinations are those outside of Millis entirely, indicating that many residents seek locations or opportunities not provided by their town when they look to spend time in nature. The town-owned walking trails at Pleasant Meadows and individuals' private properties are the third most popular choices with the walking trails at the former Glen Ellen golf course and the Trustees-of-Reservations-owned Cedariver both close behind. Overall, Millis provides its residents with a wide variety of outdoor recreation destinations and facilities, ranging from athletic fields to wooded trails to canoe launches. The town's residents, however, are hungry for more opportunities to get outdoors. Relatedly, one opportunity as yet unfulfilled is the option for anyone with limited mobility to access Millis's open spaces. The town has no universally accessible trails, and given Millis's aging population (see demographic data on page 10), this is a recreation gap well worth filling.

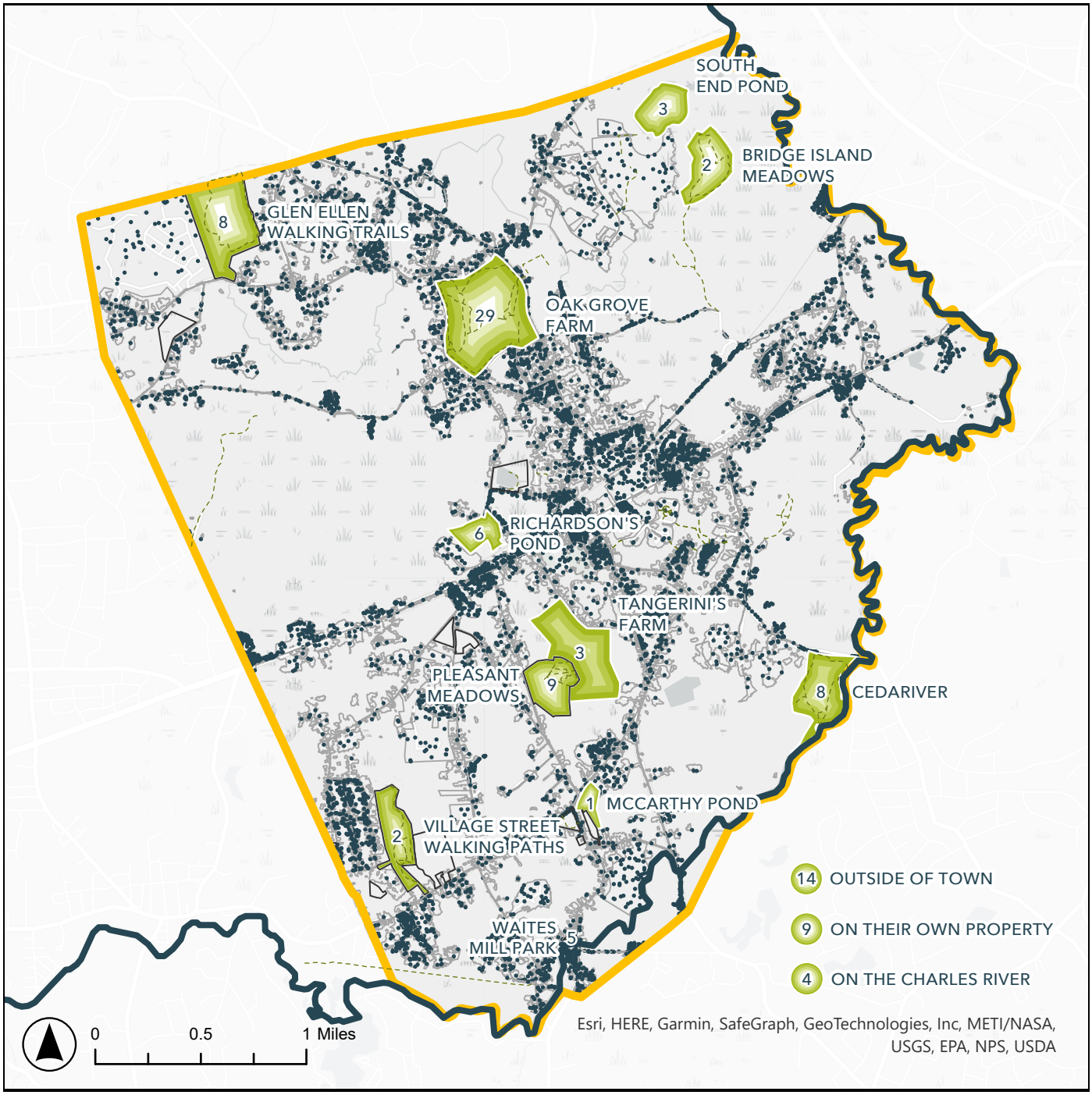
Oak Grove Farm (Town of Millis).

Chart B: What are your favorite outdoor recreation spots?



The January 31st public forum and online survey resulted in a clear favorite outdoor recreation destination: Oak Grove Farm.

Outdoor Recreation



Town of Millis

Study Parcels

Charles River

1 Community Member Votes

Millis Outdoor Recreation Destinations

Established Trails

One Resident

Opportunities for outdoor recreation abound in Millis with open space locations spread across town and throughout residential areas. Several of the most popular destinations are included in the project study parcels, highlighting the importance of their existing uses.

Development & Affordable Housing

Amidst Millis's many protected open spaces and recreation destinations, however, development also flourishes in town, where new housing units, particularly condominiums for those fifty-five and older, have been increasing rapidly. In the last five years alone, the town's housing stock has increased by over 10%, and of those new units, nearly 80% are listed as condominiums (MassGIS). The average price of a residential property in Millis built between 2017 and 2022 is nearly $600,000 (MassGIS).

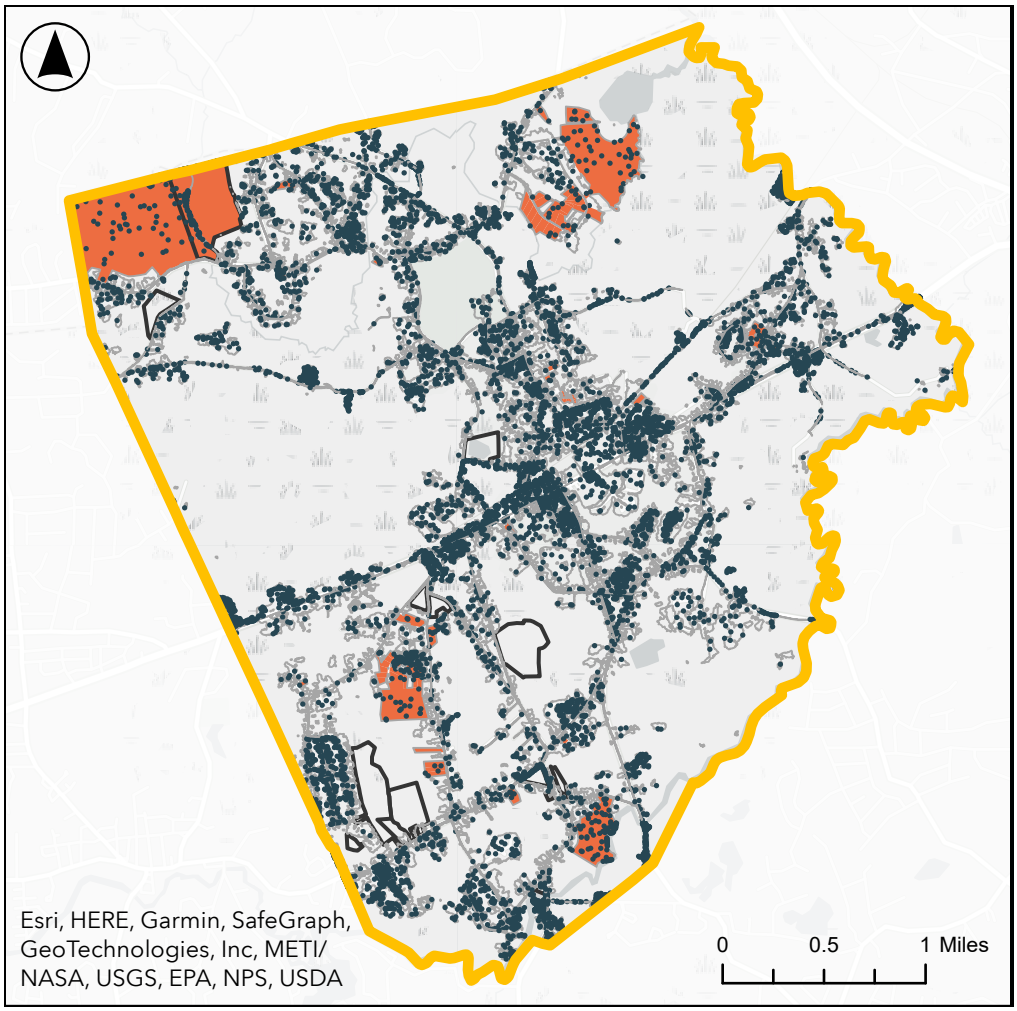
In addition to residential development, Millis has also undertaken a number of significant capital improvement projects over the past ten years, including a new public library, police station, elementary school, and fire station. While this new construction and renovation work has not come directly at the expense of the development of previously open spaces in Millis, it has left the town with a significant debt burden absorbed in part by local taxpayers whose property taxes have increased dramatically since the new library was opened in 2013 (Weiss). One way to spread out this financial responsibility and close the revenue gap has been to increase the tax base, a strategy which has helped encourage the rapid growth of higher-end housing developments in Millis since 2017 (Weiss).

For those longtime town residents, however, the higher property taxes, compounded by the COVID-19 housing market, have made it harder for families and seniors to stay in their homes (Weiss). Moreover, those looking to downsize as they age have been left in a tough spot where the vast majority of smaller, multifamily or senior developments are often outside their budgets . Instead, they must consider leaving Millis in order to afford a housing solution that fits their needs, resulting in the displacement of community members (Weiss).

The Commonwealth of Massachusetts has implemented a number of legislative efforts to counter these kinds of gentrification effects and increase the stock of affordable housing across the state. Specifically, Chapter 40B is a statute that allows developers to bypass local zoning regulations as long as at least 25% of their housing units have long-term

View from the former Glen Ellen golf course looking toward the recently developed Regency at Glen Ellen 55+ community.

Development & Affordable Housing



Millis's current development patterns are concentrated in the center of town and spread out along major roads. Housing developments have proliferated across Millis's residential zones over the past five years, predominantly in the form of high-end condominiums priced at over $500,000. All of the study parcels are located in areas zoned for residential development.

affordability restrictions and until a town has met a minimum 10% quota for affordable units. Unlike other subsidized affordable or low-income housing programs, 40B requires that the cost of the affordable units be shouldered by the developer who makes up the difference through the sale or rental of the market rate units (Housing and Community Development). Millis currently has 121 affordable housing units, making up just over 3% of the housing stock in town (Weiss). To meet their 40B affordable housing quota, the town will need approximately 250 more units.

Another state program for increasing the stock of affordable housing in Massachusetts, the Multi-Family Zoning Requirement for MBTA Communities, was recently implemented to require municipalities in and around the Boston area to create new zoning districts that encourage denser development of affordable multifamily housing. This legislation stipulates a minimum gross density of fifteen housing units per acre (Housing and Community Development). As an "adjacent" MBTA community, i.e., a community without dedicated MBTA public transit, but located next to a town with commuter rail service, Millis is required to dedicate fifty non-contiguous acres of buildable land area for denser affordable housing development, totaling 750 units (Weiss).

Both of these pieces of legislation put pressure on towns across the state to increase their stock of multi-family affordable housing. Millis now has an opportunity to use this land use study to jump start its efforts to help not only its longtime residents remain in their community, but also welcome in a new generation of families to ensure that Millis remains vibrant and also meets state-mandated housing stock requirements.

Adobe Stock

3

PROCESS & FRAMEWORKS

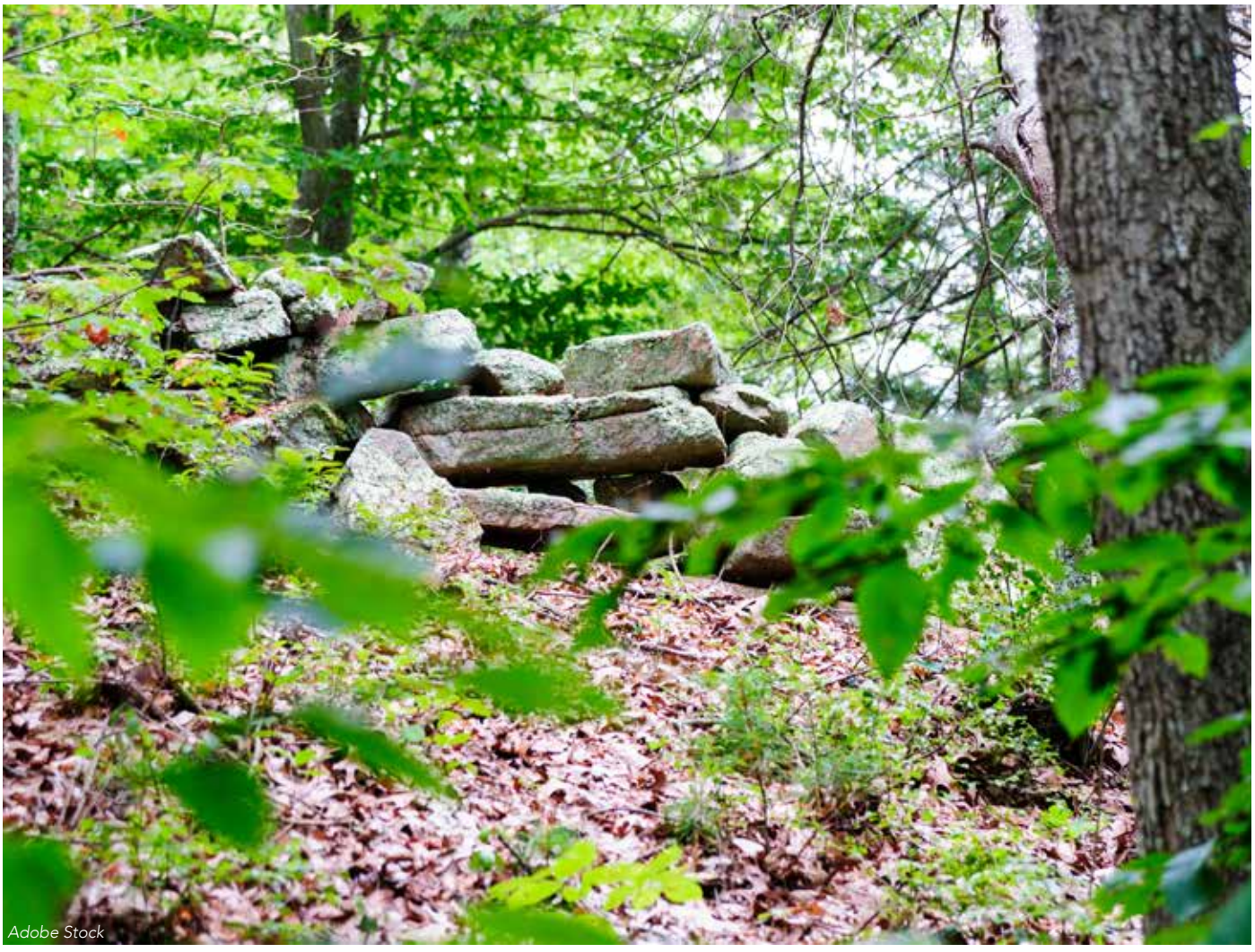
FRAMEWORK OVERVIEW

Introduction

With the goal of assigning appropriate land uses to the fourteen town-owned study parcels, a framework was created for each land use designation. For this project, the land use designations and associated frameworks are conservation, town-directed development, and divestiture. The conservation and development frameworks are each discrete processes meant to analyze the parcels through each lens separately, creating a metric for comparison. By comparing the suitability of conservation and development on each parcel, and then comparing the parcels to each other, land use recommendations can become clear. The divestiture framework is a synthesis of the conservation and development frameworks, intended to show where value is low for both of these metrics. The frameworks were also created with future application in mind to guide new town acquisition of land.

In order to create the frameworks, many of the specific land use ideas proposed by the Core Team and the public are sorted under conservation or development. For example, expansion of trail networks as a form of passive recreation is considered conservation and creation of active recreation such as sports fields or courts is considered town-directed development. Divestiture could ultimately lead to conservation or development, but with the town no longer retaining ownership of the parcel.

This section of the report presents the proposed decision-making framework and applies it to the fourteen town-owned parcels.



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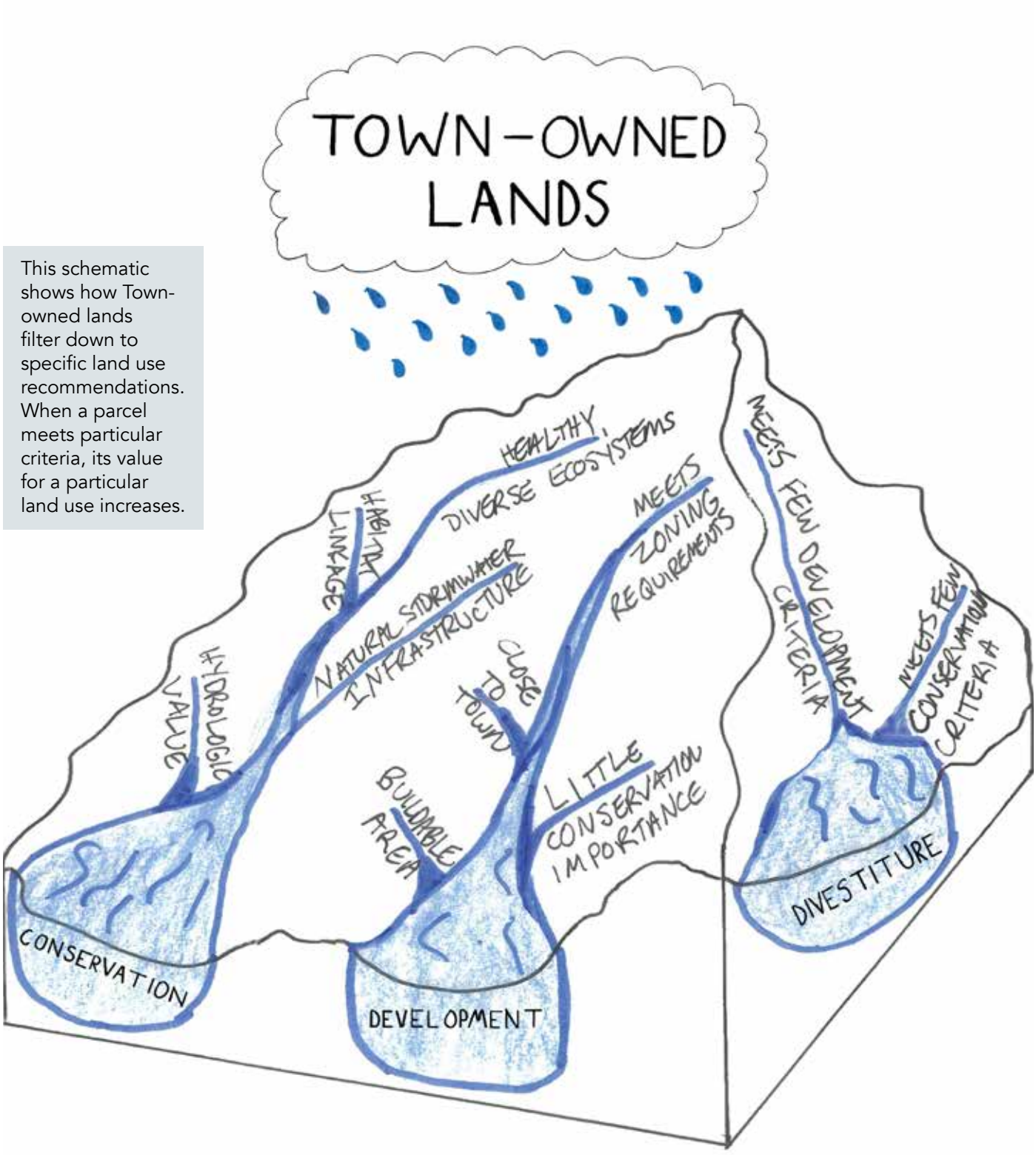
This schematic shows how Town-owned lands filter down to specific land use recommendations. When a parcel meets particular criteria, its value for a particular land use increases.



CONSERVATION FRAMEWORK

Overview

Millis's extensive wetlands and flood storage areas for the Charles River protect downstream towns and the Boston area from flood damage while simultaneously providing aquifer recharge for those same areas and stormwater management for the town. Furthermore, the habitat connectivity created by the Charles River and the wetland complexes connected to Bogastow Brook add even more ecological value to Millis (see pages 18 through 23 on Hydrology for a more detailed analysis of these processes). Smaller green spaces also serve as local green infrastructure, providing storage for stormwater runoff from impervious surfaces like roads and roofs and helping filter the water before it enters the Charles.

Though many of these ecologically valuable areas are already protected, developed areas and parcels lacking permanent protections create gaps in the linkage. Though protection does not guarantee the persistence of ecological value, it is an important first step because it recognizes the importance of preventing development in that area. Using this conservation framework reveals areas of ecological importance and identifies where linkages can be improved through new conservation efforts.

Criteria

Areas of significant conservation importance in Millis are **wildlife habitat areas, flood storage areas, and green spaces acting as stormwater infrastructure**. The proposed conservation framework identifies the ecological value of each of the fourteen study parcels using GIS data available publicly on MassGIS and from Designing Sustainable Landscapes, through UMass. The framework also incorporates some spatial data not available as a GIS data set but that provides additional value to the analysis.

Criteria for wildlife habitat areas include unbroken tracts of habitat, forested areas, and wetlands and water bodies. GIS data layers indicating these areas include:

- Forested land (C-CAP Landcover, Massachusetts, 2016)
- Wetlands (DEP wetlands layer including hydrologic connections, 2016) The DEP wetlands with hydrologic connections layer is preferred over the wetlands polygon layer because the former includes small perennial streams that are not included in the latter.
- BioMap regional and local elements (diversity and natural ecosystems data layer, 2022) BioMap identifies areas of significant biological diversity importance and values large areas of habitat experiencing little human influence.
- Critical culvert habitat linkages (from the Designing Sustainable Landscapes Index of Ecological Integrity, 2021) The critical culvert habitat linkages data layer identifies culverts with impaired aquatic connectivity that need updated infrastructure, but that are ecologically healthy and provide key aquatic habitat. This means the health of these ecosystems is critically important to provide habitat for aquatic life that must already deal with the stress of outdated culverts causing poor habitat linkage.

Criteria for flood storage areas and green stormwater infrastructure include wetlands and associated buffers, aquifer recharge areas, and flood risk. GIS data layers that identify these areas are:

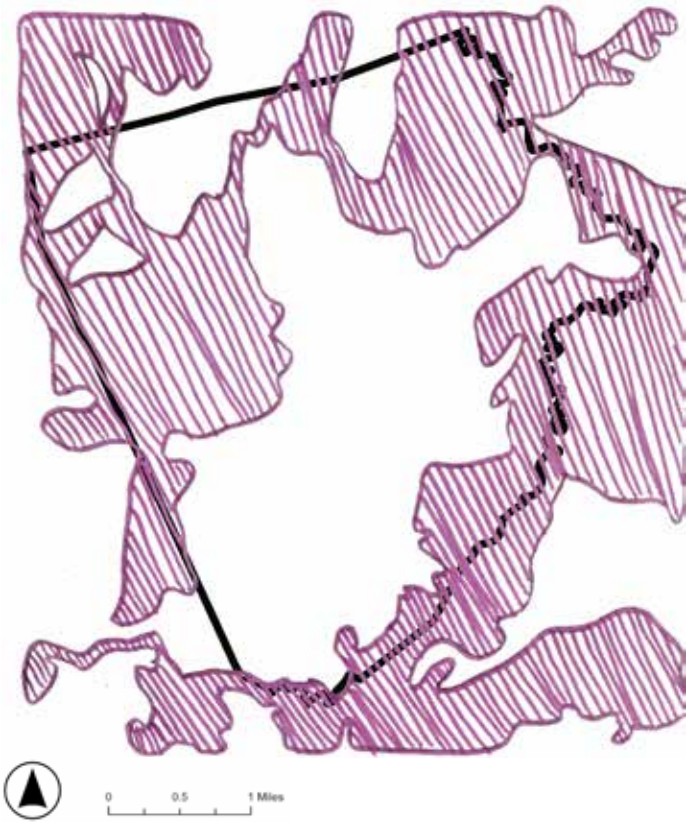
- 200-foot wetland buffer applied to the above DEP wetlands layer, showing where development should be limited to protect the wetland or water body. Though Massachusetts regulations impose a 100-foot wetland buffer and a 200-foot river buffer, this framework uses a 200-foot buffer for both. This conservation framework considers wetlands as important as rivers, especially since much of Millis's ecological significance lies in flood storage and green stormwater infrastructure. Therefore, a 200-foot buffer on all wetlands and water bodies is most effective in highlighting areas important for conservation.
- Aquifer recharge areas (Massachusetts aquifer data layer, 2017)

Some spatial data is not available as a GIS layer but is still useful for visual analysis and provides ecological

Generalized forested areas in Millis.

Generalized wetlands and water bodies in Millis.

Generalized aquifer recharge areas in Millis.



Generalized BioMap elements in Millis.

information not fully covered by the GIS layers. These data sets include:

- Flood risk data (visual parcel analysis using Risk Factor, data from 2020) Flood risk data from Risk Factor is preferred over FEMA flood data. Though the Risk Factor data is not available on GIS and requires visual inspection at the parcel-level, the available FEMA flood data is outdated and does not account for climate change. Risk Factor incorporates the most recent flood and climate data and is updated more frequently than FEMA flood maps and therefore provides more value for the framework.
- Charles River Natural Valley Storage Area (available as an interactive story map). Additional information is available through the Charles River Watershed Association and on pages 22-23.

Framework

After loading these data layers into a GIS map and overlaying parcel data, the next step is to analyze which data layers intersect with the parcel in question and assign corresponding points to the parcel. This can be done by using the GIS tool Select by Location where the data layers intersect with the parcel, or through a visual analysis. For simplicity of the framework, the parcels are awarded one point for each of these data layers they contain. The resulting value of the summed points is referred to here as the ecological value score. Due to the granularity of the data sets included in analysis, the ecological value score could be as high as 23, but setting that as the highest ecological value score is misleading since many of those granular data sets are overlapping. Considering a high score to be 20 or above, for example, would cause false devaluation of parcels with lower scores since parcels with low scores are much more common than ones with scores nearing 20. Simplifying the scale to 1 through 10 makes it easier to assign ranges to the importance of conservation in this framework and address the overlapping nature of the data sets. Parcels with an ecological value score of 7 or higher are prioritized for conservation. The remaining parcels warrant a more detailed analysis. Parcels scoring an ecological value of 4 to 6 still have high conservation value but a continued analysis with the development framework can show whether another land use could coexist with conservation. And parcels with a score of 0 to 3 are re-analyzed in more detail for development or divestiture.

Development and conservation are not necessarily at odds, but land largely undisturbed by human activity can sustain much higher levels of biodiversity (MassWildlife and The Nature Conservancy, “Critical Natural Landscapes”). This is why the parcels with the highest ecological value scores are prioritized for conservation and the rest are analyzed for development in tandem with the conservation framework. This also provides the opportunity to compare conservation value and development value, and guides next steps in determining which might be more important for the town. The conservation framework also provides a strategy to quantify and compare ecological values and can help provide evidence to support an argument for conservation. However, this framework, as with the framework for the other land use recommendations, has limitations. A visual assessment of the parcel both in GIS and on the ground, used in tandem with this framework, will provide more robust foundations for a certain land use recommendation.

Limitations

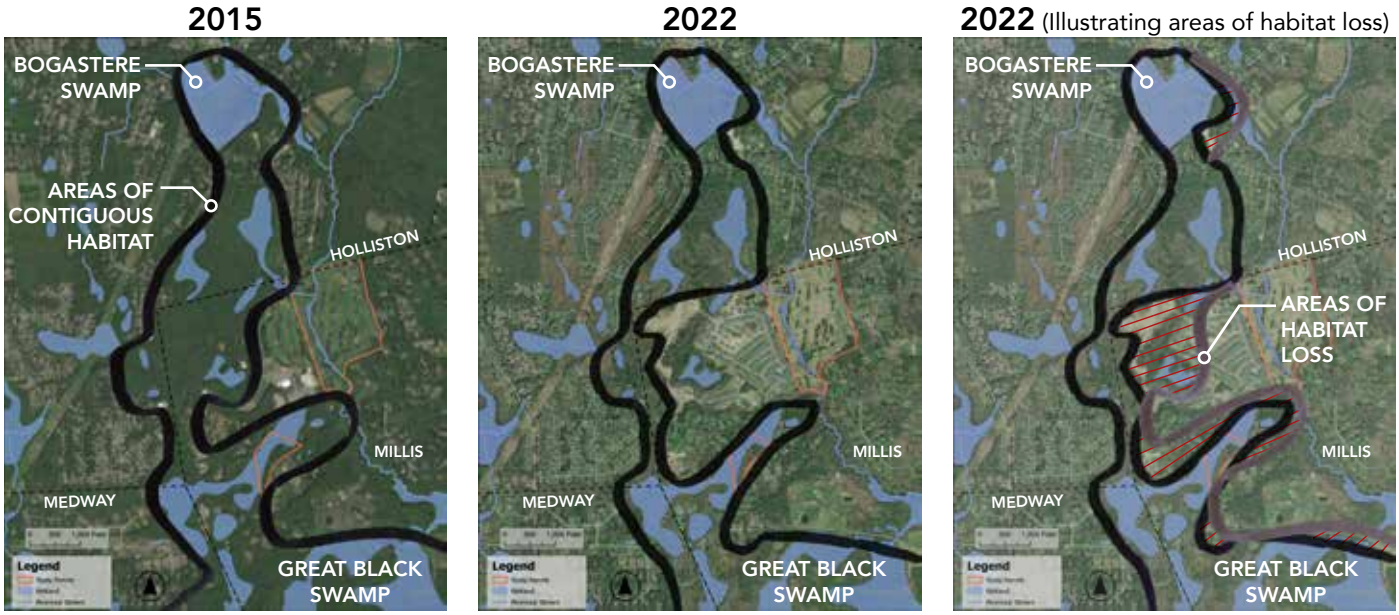
The first type of limitation of this framework concerns the data layers themselves. Some of the data hasn’t been updated in 18 years, and since Millis has seen many new developments since 2020, the data sets may no longer be accurate. Also, many of these data sets were created without ground-truthing in Millis and so may inaccurately represent the actual conditions. For example, a key habitat linkage is identified by BioMap in the northwestern corner of town, connecting the core habitats of the Great Black Swamp in Millis to the Bogastere Swamp to the north in Holliston. However, a recent 55+ community has begun development of more housing units in this area that was previously forested and intact habitat. Though this development has skirted the wetlands mapped by DEP, serious habitat fragmentation has occurred and BioMap is no longer accurate in this location, even though the most recent iteration of this data set was released just months ago. The aerial photographs to the right show the loss of this habitat corridor. This example highlights the potential importance of this conservation framework to help the Town make well-informed development decisions.

Also, these data sets themselves tend to value already legally protected areas and larger areas over smaller, segmented areas without existing legal protections. Because of this bias, the data sets fail to identify areas that may have high potential for habitat and ecosystem restoration. This bias is most pronounced in the BioMap layer, which specifically values areas of habitat with minimal impact from development. These landscapes are key for the integrity of rare and vulnerable species and for long-term conservation, but small areas of habitat also have value. For example, small green spaces play important roles in stormwater mitigation and air quality by providing storage for polluted runoff from impervious surfaces and through carbon sequestration. Because BioMap focuses on conservation of biodiversity, these factors are not valued in that data set but are still valuable for Millis.

All of these limitations point to the importance of other types of evaluation in tandem with the framework's GIS mapping. Physical site inspection provides ground-truthing not present in many of the data sets. Visual assessment of the GIS data layers shows where data layers occur proximate to parcels but do not occur within them. Even when a data layer is not included in a parcel, it may still influence the parcel or vice versa. Physical site inspection and visual assessment of GIS data play a key role in highlighting errors or gaps in the GIS data. They can also show where restoration can encourage habitat and linkage growth. The Richardson's Pond (see page 54) and Glen Ellen (see page 70) parcels included in this study show examples of how physical site inspection and visual assessment of the GIS data can provide more context leading to a more comprehensive and nuanced land use recommendation.

The second type of limitation concerns how the framework is applied. The framework concludes that parcels with a high ecological value should be prioritized for conservation, parcels with a middling score are likely suitable for conservation and another land use, and parcels with a low ecological value are not of conservation importance. This application of the framework is suitable in Millis because it is home to many intact ecosystems. If this framework were to be applied in another town, a different conclusion could be drawn. For example, in a highly urban area devoid of green space, parcels with a low score might be most important for conservation since they provide green space where there is little, and may be under high development pressure.

Overall, this framework is meant as a guide to help identify features of conservation importance on a parcel, but should not exclusively determine the best land use. Combining this process with physical site inspection and visual assessment of GIS data will address the limitations of the framework and help consider restoration potential.



Habitat connection between Holliston's Bogastere Swamp and Millis's Great Black Swamp slowly eaten away by housing development (Google Earth).

ECOLOGICAL VALUE SCORE

This table shows the results of the conservation framework applied to the fourteen study parcels and their resulting ecological value scores. Only data sets occurring within the study parcels are included in this table, though there are more data sets listed in the conservation framework criteria. The table also includes the parcels' existing legal protections to provide comparison with the ecological value score.

The framework concludes parcels with a score of 7 or above should be designated for conservation, parcels scoring 4 to 6 should be analyzed with the development framework to determine if both land uses could be suitable, and parcels scoring 3 or below should be analyzed for development or possible divestiture.

				BioMap Regional Elements		
PARCEL	**LEVEL OF PROTECTION**	**DEP WETLANDS**	**DEP WETLANDS** 200' BUFFER	**CORE HABITAT** RARE SPECIES	**CORE HABITAT** AQUATIC CORE	**CNL*** AQUATIC CORE BUFFER
219B Farm Street	NONE		X			
Acorn & Spencer Streets	PERMANENT	X	X			
Baltimore Park	ARTICLE 97		X			
Brandywine Lot	NONE					
Braun Farm	NONE	X	X			
Ellice School	NONE					
Farm & Acorn Streets	PERMANENT	X	X			
Grove Street	PERMANENT	X	X			
Glen Ellen	PERMANENT	X	X		X	X
Pleasant Meadows	PERMANENT	X	X			
Pleasant Street Park	DEEDED AS PUBLIC PARK		X			
Richardson's Pond	PERMANENT	X	X		X	
Village Street	PERMANENT	X	X			
Waites Mill Park	NONE	X	X	X	X	X

**Critical Natural Landscapes*

BioMap Local Elements							
RARE SPECIES	WETLAND	WETLAND BUFFER	FOREST COVER	FLOOD RISK	AQUIFER RECHARGE	CRITICAL CULVERT LINKAGES	SCORE
			X				2
			X	X		X	5
			X				2
			X				1
			X	X		X	5
							2
			X	X			4
	X	X	X	X			7
X			X	X	X	X	9
			X	X	X		4
			X				2
			X				2
				X			4
			X	X		X	7

DEVELOPMENT FRAMEWORK

Overview

The Core Team has identified town need for more or improved town amenities. From a land use perspective, the development of these different town amenities has many of the same criteria. For example, development of affordable housing or pickleball courts is easiest in a flat area, and if the area is already cleared then both types of development will have less ecological impact. The framework for determining development suitability considers these town improvements, including active recreation and affordable housing development, among others. This generalization allows for the creation of an overarching development framework that, though not highly precise, can be used for evaluation of development suitability even when development specifics like square footage differ. The development framework also assumes continued Town ownership of the parcel, with residents as the intended patrons of the parcel. For example, this could include development of affordable housing in partnership with a housing development firm where the Town retains ownership of the land. Conversely, if the Town were to sell the parcel to the developer for affordable housing, this would be considered divestment since the Town would no longer hold the deed to the land. Many of the criteria for development do not exist already as GIS data sets so this land use assessment relies more heavily upon visual spatial analysis of how well parcels meet the criteria than the conservation framework.

Criteria

Many of the criteria for development are the inverse of the criteria for conservation. In other words, parcels with low-scoring ecological values, identified through the process explained in the previous section, have higher development value. Some parcels can sustain multiple land uses and therefore parcels with a middling ecological value are considered in this development analysis. This framework and criteria are intended to be a guideline for generalized development that more specific criteria could be added onto. The more general development criteria a parcel meets, the more suitable it is for development.

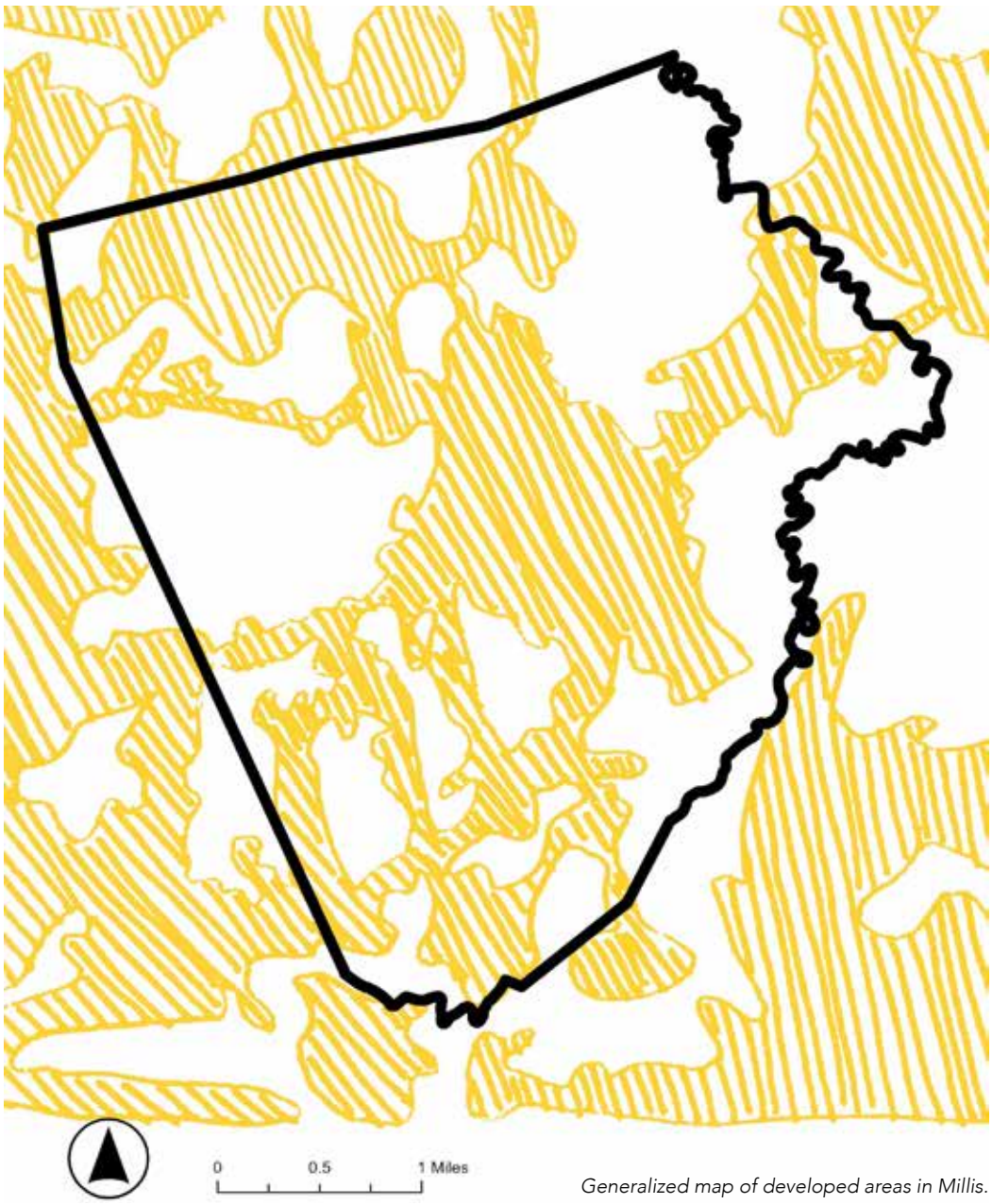
General development criteria include:

- Developable area
  - Slopes not exceeding 10% across a contiguous area large enough for development
  - Already cleared area to lessen ecological impact
  - Access to a road from this area
- Ability to meet zoning requirements
  - Parcel has sufficient road frontage
  - If a building is desired, ability to comply with zoning requirements for lot coverage and setbacks
  - Or, a special permit or other exemption, such as through Chapter 40B discussed on pages 32 and 33, is available to work around zoning requirements
- Connection to town
  - Within a reasonable distance of downtown, ¼ mile for a 5- to 10-minute walk, ½ mile for a 10- to 20-minute walk
  - In an already developed area
  - Easy access to utilities
- Not within an area of conservation importance
  - Parcel does not contain BioMap elements, wetland and wetland buffers, significant aquifer recharge areas, or areas designated for habitat connectivity
  - Parcel is not at risk of flooding even with increased climate change flood levels, as identified by Risk Factor

Considerations

A parcel need not meet every one of these criteria to be designated for development. Siting new developments proximate to existing developments decreases ecological disturbance and can decrease cost of utilities and roads. Use of this development framework can help the town identify areas that may be better for concentrated development in the coming years.

Taking both the conservation and development frameworks together, some parcels emerge as clearly suitable for designation to one or the other land use. However, parcels with mid-range scores for both land uses require more in-depth consideration. Parcels with a middling ecological value at the outskirts of town, for example, could be designated as either conservation, to strengthen habitat areas, or development, to build on the recent growth Millis has experienced. Millis's Master Plan is from 2000, now 23 years old, and much has changed in Millis over the last five years. In order to have a clear vision about what to do with parcels that fall in the gray area between development and conservation, more explicit community discussion of Millis's future and priorities is necessary.



Generalized map of developed areas in Millis.

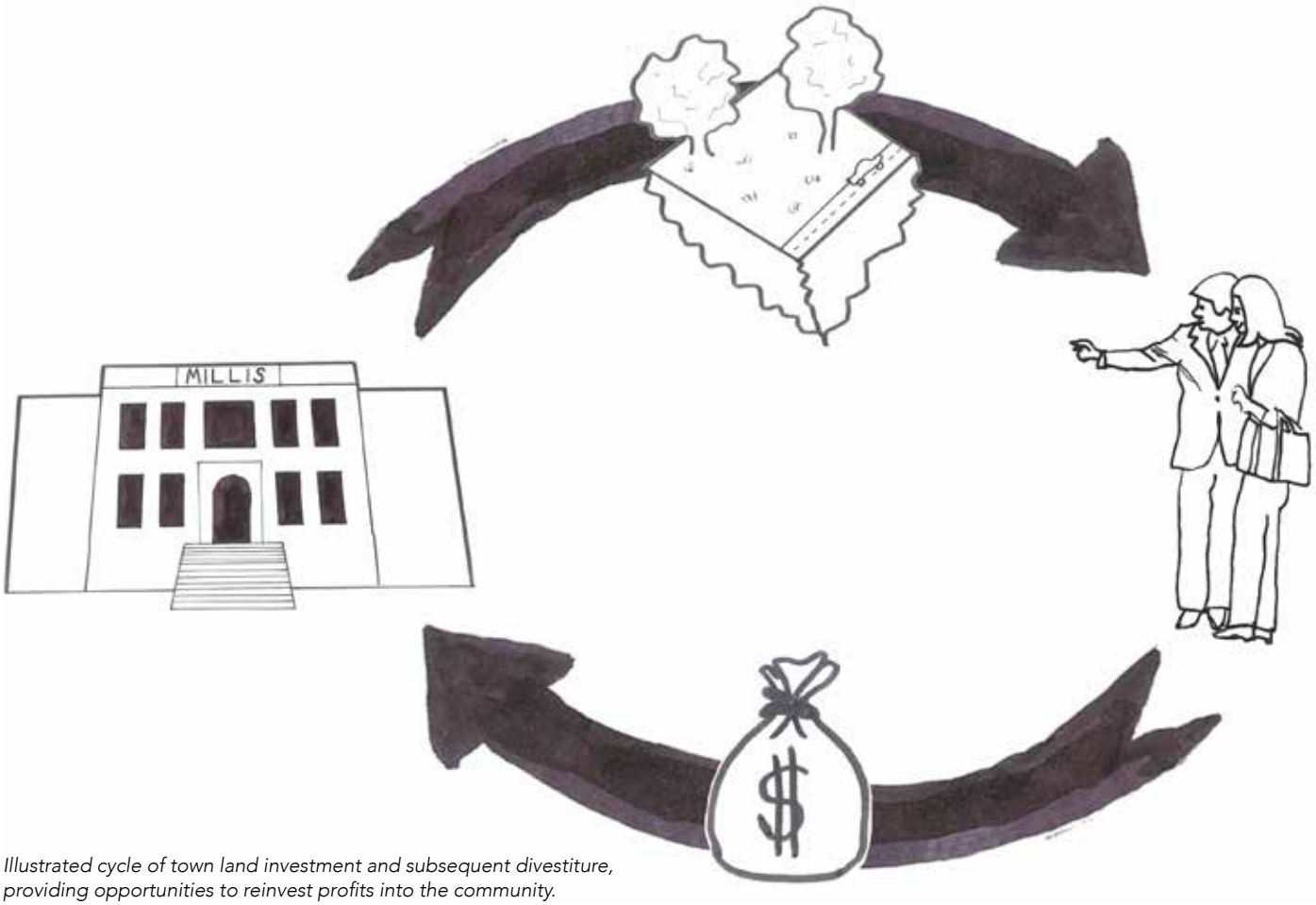
DIVESTITURE FRAMEWORK

Overview

The last land use direction considered in this study is divestiture, which constitutes sale of the parcel by the Town. If a parcel plays little conservation role in the ecologically valuable areas of Millis and has low potential for development, this means Town ownership of the parcel does not directly contribute to the Town's priorities for land use. Therefore, the parcel might have more purpose if sold. The large amount of publicly owned land in Millis decreases the potential tax base for the town, so divesting from land not contributing to the Town's priorities could help increase the tax base if associated costs of traffic and utility provision are not high.

Framework & Criteria

The parcels most appropriate to be considered for divestiture are those that have low ecological value and meet few of the development criteria. Using the conservation and development frameworks when considering future acquisition of land by the town may decrease the need for subsequent divestiture. These frameworks can suggest that a parcel has low value for the town and help argue against its acquisition by the town.



Illustrated cycle of town land investment and subsequent divestiture, providing opportunities to reinvest profits into the community.

Adobe Stock

Adobe Stock

4

RECOMMENDATIONS

The following are recommendations for the fourteen parcels, selected for their exclusion from the 2019 OSRP or their general significance as public-facing town-owned lands. These recommendations use the frameworks elaborated on in the previous section as foundational elements; these are bolstered by site-specific analyses, regional context, and community sentiment. In addition to providing actionable recommendations, this section also serves as a template of sorts, showcasing a process that can be applied to future town-owned parcels or potential acquisitions.

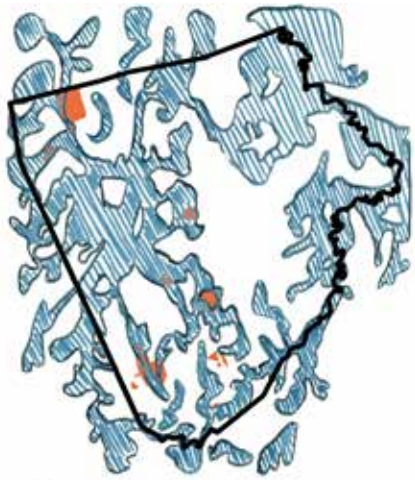
There are many cases where multiple and even mutually exclusive land uses are possible for a single parcel; in that case, the final recommendation is often decided by the values and needs of not only the Millis community but also that of the Greater Boston Area.

PARCEL SUMMARY

With the combined use of the conservation, development, and divestiture frameworks and visual parcel analysis in both GIS and on the ground, a range of conservation efforts is recommended for the majority of the fourteen parcels. The development framework identifies parcels with high development potential, and this along with the conservation framework indicates that some parcels may support both conservation and development. A small number of parcels with both low conservation and development value present opportunities for divestiture. The study parcels, however, only include fourteen out of the total 181 parcels of town-owned land. Millis has a mismatch between increased town needs due to recent development and a large number of currently unused town-owned lands. Additionally, the town has a high proportion of conserved land, and the frameworks suggest that most of the parcels in this study also be conserved, leaving some of the other town needs still unfulfilled. This all implies that town needs like more affordable housing developments and active recreation options may be better met on other town-owned parcels or through collaboration with private landowners.

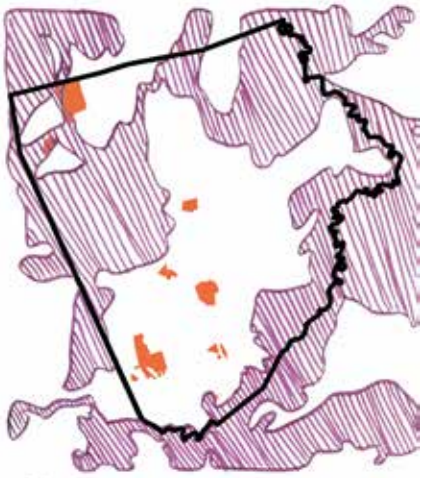
Applying these frameworks to all 181 town-owned lands may suggest that development is most suitable on parcels not included in this study. Focusing on a specific type of development to further inform the criteria in the development framework and their relative importance can also help narrow down parcel suitability for specific development goals. The recommendations included in the following parcel-level section are inherently limited by which parcels are included in this report, and a future assessment of all town-owned parcels using this framework can help the Town create a more comprehensive plan for where to concentrate conservation and development in Millis.

Study parcels overlaid by generalized forested areas in Millis.

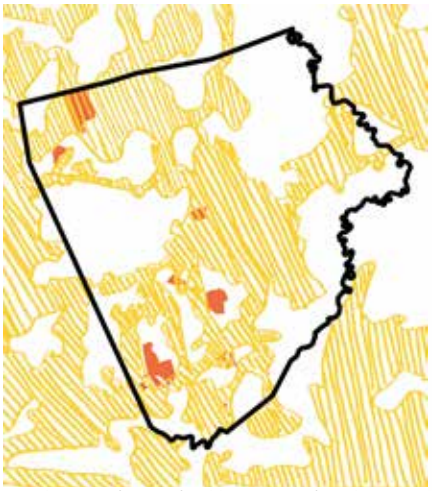


Study parcels overlaid by generalized wetlands and water bodies in Millis.

Study parcels overlaid by generalized aquifer recharge areas in Millis.



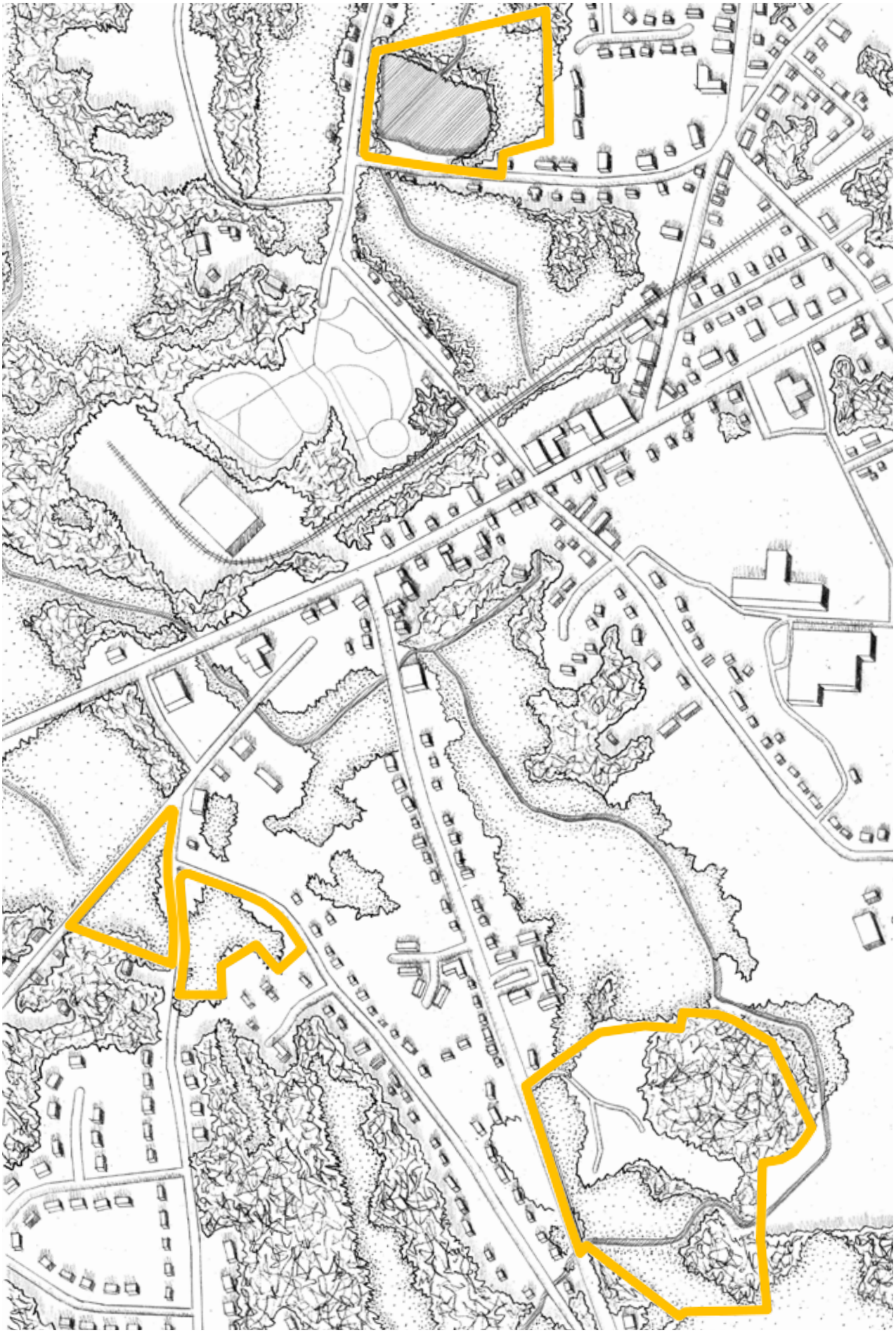
Study parcels overlaid by generalized BioMap elements in Millis.



Study parcels overlaid by generalized developed areas in Millis.

Study parcels overlaid by areas that are currently undeveloped but not of conservation importance.

PARCEL	ECOLOGICAL VALUE SCORE	RECOMMENDATIONS SUMMARY	EXISTING PROTECTIONS	CURRENT LAND USE
219B Farm Street	**2**	Divestiture	None	Forested lot
Acorn & Spencer	**5**	Conservation, maintain right-of-way, assess health of ecosystem	1977 CR on Interior Wetlands	Wetland
Baltimore Park	**2**	Conservation, development of trail system to connect with Pleasant Street Park trails	Deed Restriction: protection of watershed resources, conservation of open space	Forested lot
Brandywine Lot	**1**	Divestiture/Conservation	None	Forested lot
Braun Farm	**5**	Conservation of western portion along esker, APR restriction for continued agriculture with ecologically friendly practices, development of affordable housing on southeastern portion	None	Fallow fields and forest, haying of one portion of fields
Ellice School	**1**	Development for affordable housing, either in the renovated Ellice School or in place of relocated school	None	Location of historic Ellice School in need of major repairs
Farm & Acorn	**4**	Conservation, maintain right-of-way, assess health of ecosystem	1977 CR on Interior Wetlands	Wetland
Grove Street	**7**	Conservation, maintain right-of-way, assess health of ecosystem, research hunting regulations	1977 CR on Interior Wetlands	Forested wetland, deer blind
Glen Ellen	**9**	Active restoration of forested wetland habitat outside of trails, update lower trails to meet universal accessibility standards	1977 CR on Interior Wetlands	Trail system, meadow management, and areas of natural succession
Pleasant Meadows	**4**	Allow meadow regeneration in northern field, create new mown paths through meadow to connect with forest paths, add educational signs	1977 Env. Restriction on Interior Wetlands	Trail system, southern portion leased for agriculture, northern meadow mown
Pleasant Street Park	**2**	Conservation, develop passive recreation with new trail system, other public park amenities, provide street parking on Dyer Street	Deed Restriction: use as public park	Forested lot, past trails no longer passable, WWI memorial location unknown
Richardson's Pond	**2**	Active restoration of pond ecosystem, update trail to meet universal accessibility standards and recreate full loop around pond, update gathering spaces, address flooding of parking lot	1977 CR on Interior Wetlands, Deed Restriction: use as free public park	Large parking area, some benches, trail along eastern half of pond
Village Street	**4**	Active forest restoration in hayfield with a portion maintained as a public-facing meadow, update trails through hayfield to meet universal accessibility standards, and update parking	1977 CR on Interior Wetlands	Haying of southern parcel, small parking area for trail access, hiking trails
Waites Mill Park	**7**	Expand play options, create gathering space, increase water access, work with Fire Department to revitalize building	None	Fire dept. storage in old station, swing set, grills, benches, steps to water in disrepair



DOWNTOWN MILLIS

The following are parcel-level recommendations for Downtown Millis; this area includes the study parcels of Richardson's Pond, Pleasant Meadows Park, and the two parcels on either side of Acorn Street. Richardson's Pond is a man-made pond with a small trail and ample public parking, located within walking distance of downtown. Pleasant Meadows Park is a wooded hill with a developed trail system, some agricultural fields and a smaller mowed hill to the west. The Acorn Street properties are wetlands with no public access, though are visible to those driving to and from the town center.

Downtown Millis is largely developed in comparison to the town at large; Main Street, which bisects downtown, provides access to neighboring towns and their amenities. Areas of interest include Millis High School, Town Hall, the Millis Library, and a handful of stores and restaurants. The Prospect Hill Cemetery, Oak Grove Park, and Tangerini Farm are three green spaces not included in the project scope but are very much part of Downtown Millis.

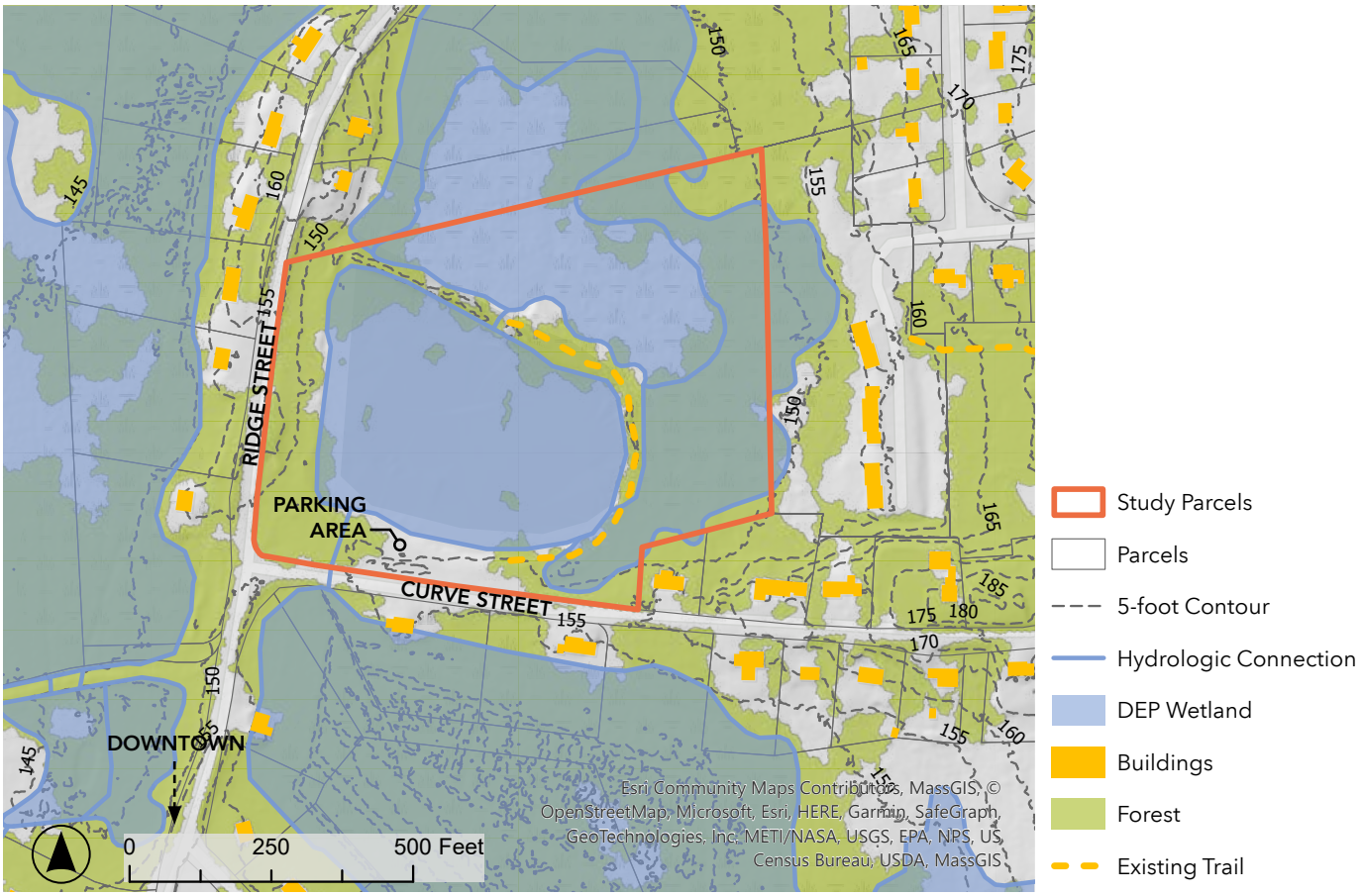
RICHARDSON'S POND

Overview & Analysis

The Richardsons gifted this 13-acre parcel, including the man-made pond, to the town in 1939. The family stipulated that the land be free for Millis residents for park and recreation purposes. This parcel is the closest of the study parcels to downtown, just a quarter-mile away. The Millis Conservation Commission manages the parcel, and the state of the pond and its trails is an example of how parcels have suffered from the town's lack of maintenance capabilities. The parcel has a large gravel parking area along the southern edge of the pond and off of Curve Street, but it is prone to flooding (see photos on opposite page). To the west of the parking area stand a handful of mature trees, under which there are three granite benches and a granite table with a bench. Over time and due to weathering, the benches and table are no longer straight and are unstable and in danger of toppling. In front of the parking on the eastern half of the pond are three raised beds, not currently tended.

At one time a trail was cut encircling the pond with a bridge fording the pond's inlet to the north. However, time (i.e., water and a lack of maintenance) has washed away the bridge and the eastern portion of the trail. The eastern section is passable, though parts are wet and need maintenance. An old signpost proclaiming "Picnic Trail" marks the beginning of the trail. The trail ends at a high, flat area just to the west of the pond's inlet. This area shows signs of use with a letterbox and logbook as well as a well-constructed nature fort.

This park seems to get high visitor traffic, though anecdotally it seems the vast majority of visitors enjoy this place by parking and sitting in their cars in the parking lot, looking at the pond. From the Public Forum and survey data, Richardson's Pond ranked in the middle for respondents' favorite places for recreation. This can be interpreted to reflect the high-visibility and public access of the parcel, but also the park's lack of upkeep and public engagement.



Richardson's Pond was one of the focus parcels for the Public Forum and responses overwhelmingly were in favor of updated and improved trails and seating areas. The public would like to see access improved at this site through maintenance of the parking lot, bathroom facilities, and improved gathering areas, and one person asked for an accessible trail here. People also expressed interest in more interaction with the pond, through fishing, skating, boating, or wood duck nesting boxes.

The bridge that once forded this inlet is long gone and the path cannot continue around the pond.

The parking lot is prone to puddling.

Flooding occurs in the gathering area to the southeast.

The raised beds are not tended.

The path is often wet.

Part of the path is at higher elevation and stays dry.

The nature structure at the end of the path.

Ecology

Richardson's Pond received a low ecological value score of 2 in the conservation framework, and is not considered core wetland habitat by BioMap; this is likely due to the pond and surrounding wetlands being in a densely populated and developed area. Additionally, Richardson's Pond suffers from eutrophication; it is over-enriched with nutrients and minerals, leading to excessive algal growth This not only vastly decreases the health and function of the aquatic ecosystem, but it also makes the water body much less appealing for recreation. The water is weedy and dirty, the opposite of inviting, and likely could not support fish for recreational fishing, were it to be stocked.

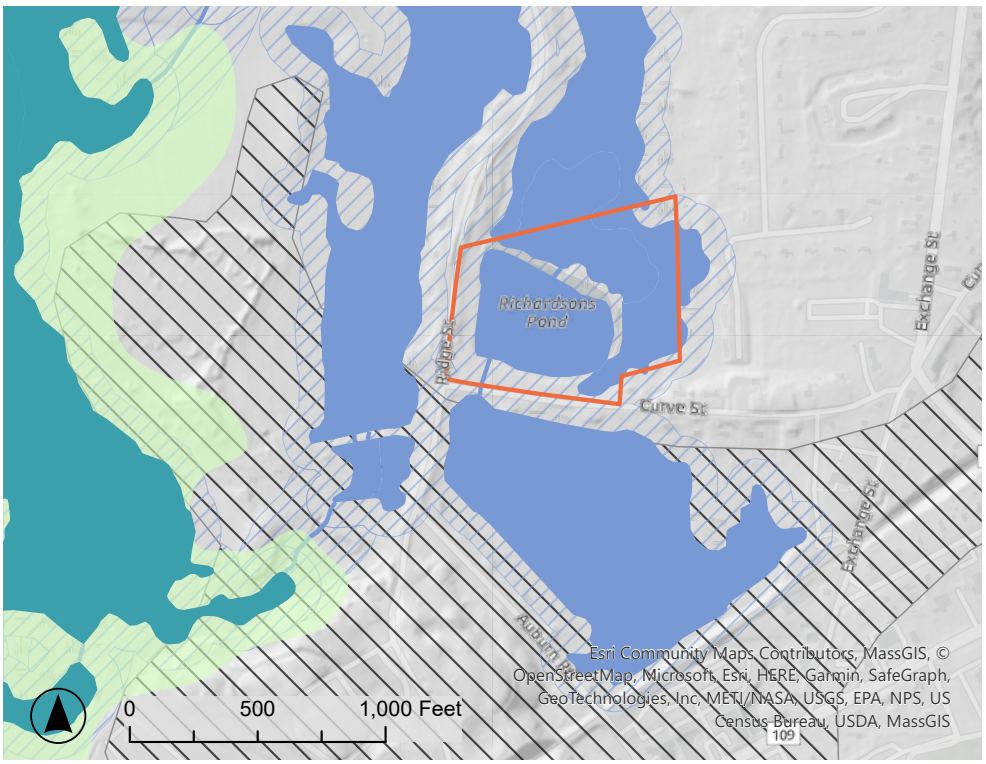
Given that, Richardson's Pond flows directly into the Great Black Swamp (designated as core wetland habitat by BioMap). Furthermore, just fifty yards to the south of the pond, the area is mapped as an aquifer recharge area, meaning the water quality of the pond may effect the drinking water of Millis and surrounding towns.

Aerial image of Richardson's Pond from June 2019 showing extensive algal blooms, which indicate eutrophication (Google Earth).

All of this implies that the health of Richardson's Pond has a greater effect on the ecological health of the area than its ecological value score of 2 suggests, and more attention and care should be paid to the health of this water body.

Topography

Generally, the area around Richardson's Pond is flat, with a steeper bank leading into the pond. But the flat areas, especially in the parking lot, likely contribute to the tendency of the areas to flood, due to insufficient slopes for drainage (A). Moreover,



Richardson's Pond is located one-third of a mile from a BioMap-designated core wetland, and its water flows into an aquifer recharge area less than fifty yards away from its banks.

- Study Parcels
- Hydrologic Connection
- Aquifer Recharge Areas
- Combined Wetland and River Buffers
- DEP Wetlands
- Regional BioMap Wetland Core
- Regional BioMap Wetland Core Buffer

the parts of the trail that are prone to flooding and puddling are located in a low point between two local ridges, leading to water collecting along the trail (B). However, as the trail continues, it climbs out of this miniature valley and onto a higher, flat piece of land that makes for a satisfying destination for the trail, especially as it is surrounded on all sides by wetlands (C). Overall, this site has a total topographic change of only 8 feet, most of which is concentrated in the southeastern corner.

Recommendations

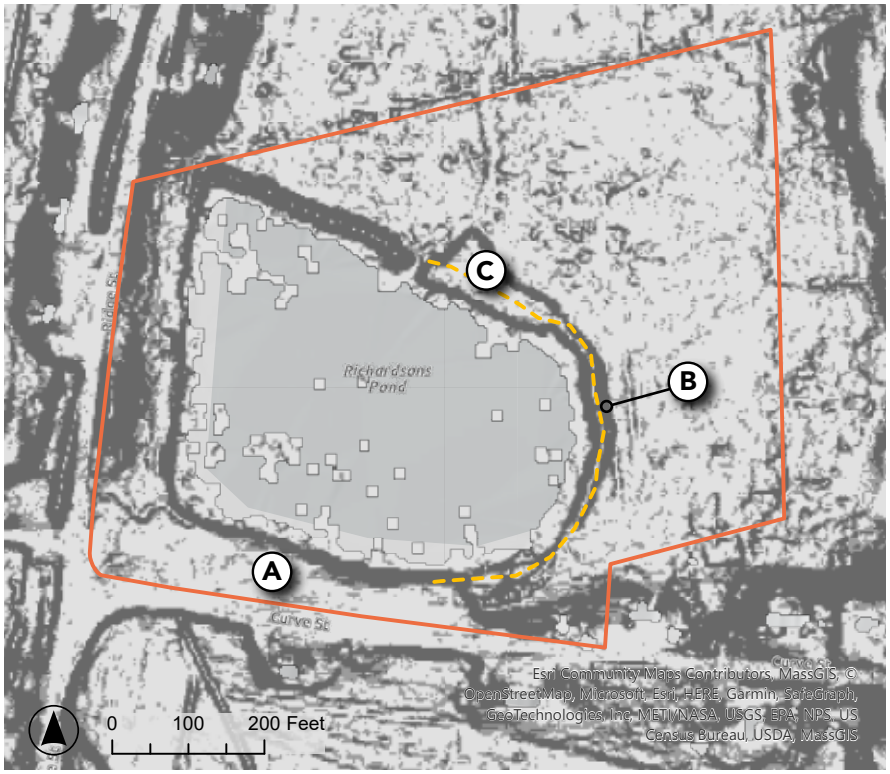
Expanding and updating paths and access:

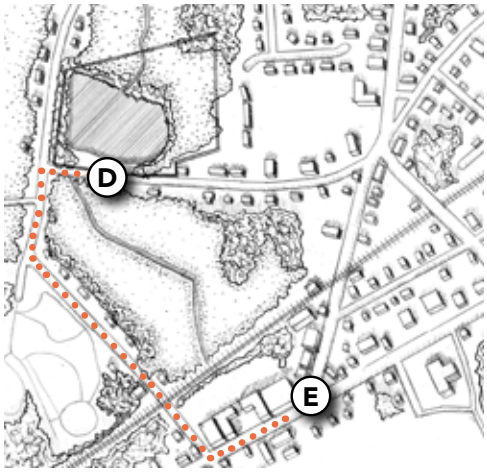
Since this site (D) is so close to downtown (E) and other areas that residents already frequent for recreation, like Prospect Hill Cemetery, and since it is already known by the public, **it is recommended this parcel be updated for recreation use**. The ample parking on this site is a real asset, and with maintenance attention can be less prone to puddling. The space to the west of the parking is also perfect for an updated gathering or picnic area due to its accessibility from the parking lot and cleared understory with large trees providing shade.

It is recommended that the trail be updated with boardwalks and other materials such as decomposed granite to meet ADA accessibility standards. This site is a strong candidate for a universally accessible trail with its large flat areas, ample parking, and proximity to downtown. The boardwalks would also mitigate trail flooding and puddling. Incorporating a dock or stilted gathering space into the boardwalk would also increase the public's interaction with the pond and associated wetlands, aiding in their understanding of Millis's hydrologic systems and their health. Having a relationship with the landscape is an important step in cultivating the care needed to protect it.

Bioremediation to clean up the pond:

Eutrophication is addressed by either reducing the source of nutrients to the water body or reducing the availability of nutrients already present in the water body. For Richardson's pond, this could take the form of a dual approach of conducting a study to determine the source and type of nutrient inputs, in addition to a biological remediation strategy.





Richardson's Pond (D) is located half a mile from Millis's downtown (E).

Study Parcels
Existing Trail
0 - 5% Slope
5 - 8% Slope
>8% Slope

One example of a bioremediation strategy (exemplified in a 2019 International Institute for Sustainable Development case study) is through the use of floating treatment wetlands, which are floating mats planted with native wetland species that are able to take up extra nutrients in the water body; this makes excess nutrients less available to algae and other organisms that reproduce to excess and choke out other life. This method can be cheaper and is more ecologically friendly than other methods of de-eutrophication. More research should be conducted into de-eutrophication processes and how they might be successful at Richardson's Pond and potentially other eutrophied water bodies in Millis.

Precedent for a floating treatment wetland addressing eutrophication (IISD-ELA)

Universally accessible trail precedents at the Silvio O. Conte trail in Hadley, MA, are pictured above and on the opposite page. These trails use a combination of two accessible trail materials, boardwalks and decomposed granite, and much of the trail meanders through a wetland. The trail has multiple gathering spaces built into it, providing destinations and rest areas.

Location of former bridge connecting the east and west halves of the Richardson's Pond trail.

The bridge that once forded the inlet river is long gone, so there is no longer easy access to the western half of the pond. An accessible boardwalk would not only reform this broken link, but also make the entire path around the pond universally accessible and reduce flooding concerns. Accessible gathering spaces can also be constructed along the route, creating appealing destinations for all.

PLEASANT MEADOWS

Overview & Analysis

Pleasant Meadows is 31 acres abutting the Tangerini Farm, and is located less than a mile from downtown Millis. A system of trails runs through the forested hill that makes up the northeast of the parcel, with a small parking area allowing for modest foot traffic.

Land Use

The two current land uses at Pleasant Meadows are passive recreation and agriculture. Passive recreation takes place on the wooded hill (A), while agriculture takes place in an approximately one-acre cleared area directly to the south of the hill (B). The trails, especially in comparison to the other sites under study, are well maintained, with a trail map by the parking area. To the west of the trails is a smaller hill (C), which is generally mowed and open.

Agriculture at Pleasant Meadows is done by the farmers at Tangerini, who own the land surrounding the site to the east (D). In exchange for the land lease the farmers do trail maintenance and mow the other open areas on the land. According to the USDA SSURGO the areas to the south and east of the hill are considered Farmland of Statewide Importance (MassGIS).

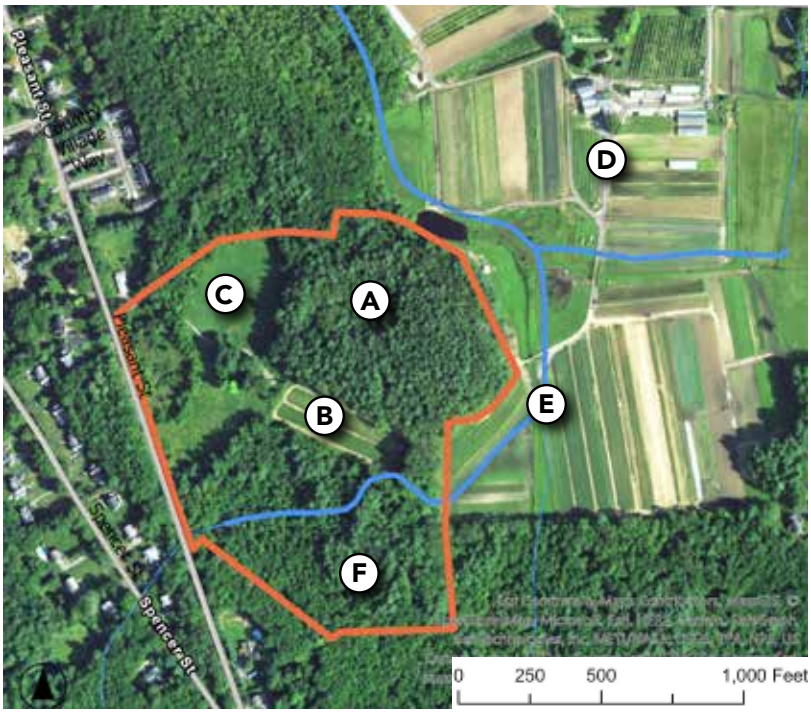
Pleasant Meadows comprises two parcels with different protections. The northern parcel, funded through a Self Help grant from the state, must be used for "conservation and passive recreation purposes." The smaller parcel to the south, including the agricultural land (B), is included in the 1977 CR.

Ecology & Topography

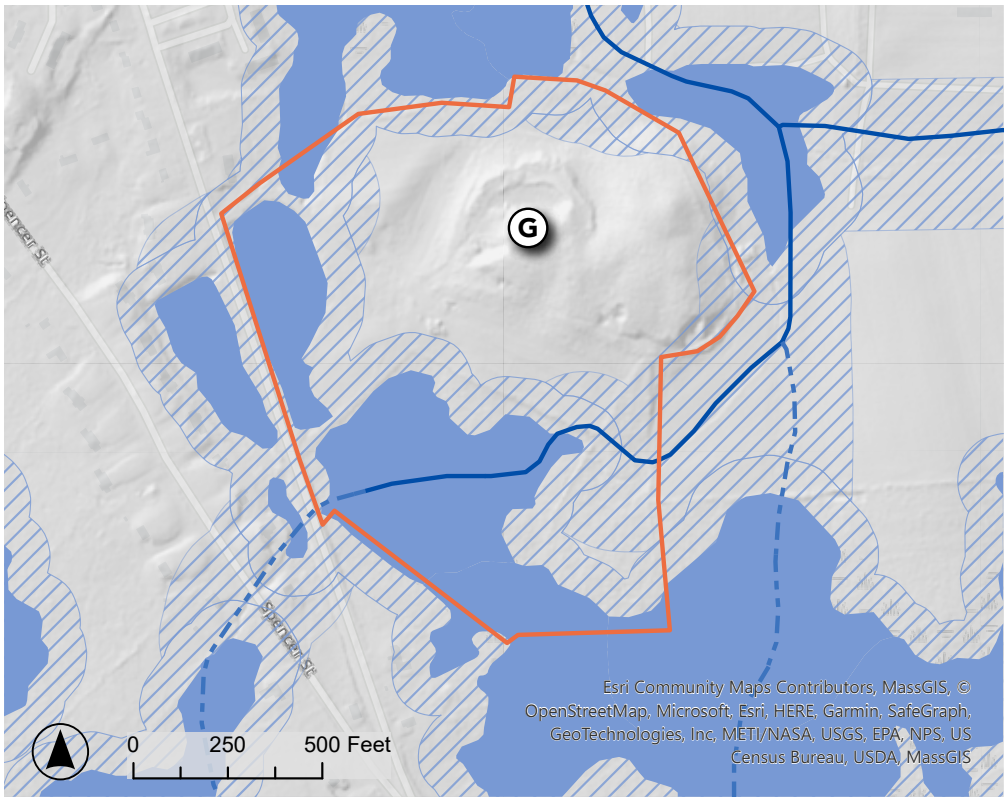
Pleasant Meadows is mostly forested, and part of a larger contiguous forest to the immediate north and south, with good connectivity stretching as far as western Medway. The areas surrounding the hill on all sides are considered wetlands, and a stream (E) circles much of the hill. This stream flows from the southern wetlands (F) to Tangerini Farm. The hill, relative to the wetlands and much of the town in general, is rather dry, which is very much an asset in regards to year-round trail access and ease of maintenance; this is reflected in the sentiments of those that use the trails frequently.

A. Forested Hill & Walking Trails C. Mowed Hill E. Stream

B. Leased Farm Field D. Tangerini Farm F. Wetland Forest



Study Parcels
Perennial Stream
Intermittent Stream
Trails



Wetlands surround the Pleasant Meadows hilltop (G).

- Study Parcels
- Perennial Stream
- Intermittent Stream
- Combined Wetland and River Buffers
- DEP Wetlands

View from (C) mowed hill looking towards (A) forested hill and walking trails (see labeled map on opposite page).

Recommendations

Selective mowing to allow meadow habitat to proliferate:

The current practice of mowing down the hill several times a year is actively detrimental to the wildlife that typically shelters, feeds, and mates in meadow landscapes. While there are human recreation benefits to having mowed space, many of these can be achieved in ways that promote the well-being of the ecosystem. **It is recommended mowing be selective and infrequent to encourage meadow growth and not disrupt the local wildlife; more localized mowing can be done to carve paths and create smaller gathering spaces on the hill.** In this way, Millis residents can explore the hill as an extension of the existing paths, and still enjoy the views and open skies from the clearing.

One ecologically sound maintenance strategy is to mow once a year, in the early springtime (ground-nesting birds begin breeding in May); this ensures that all the plants have released their seeds from the previous season, while maintaining important habitat and food resources for local wildlife that stay put in the wintertime. It's also recommended that the mowing be staggered, to not disrupt the entire landscape at once. Finally, in supporting education of the public and providing important cues to care, signs explaining the benefits of meadow landscapes could be placed by the parking area, or along the meadow paths (Atwood).

Stipulations added to the farm lease to encourage sustainable practices:

Given the problems Millis faces in regards to maintenance of public parks, the arrangement of leasing agricultural land in exchange for park care makes quite a bit of sense. Tangerini Farm, given its proximity to Pleasant Meadows, will continue having a relationship with the park whether the lease continues or not; wildlife, water, and people will continue to move between the parcels. Additionally, the areas around the hill are considered Agricultural Land of Statewide Importance.

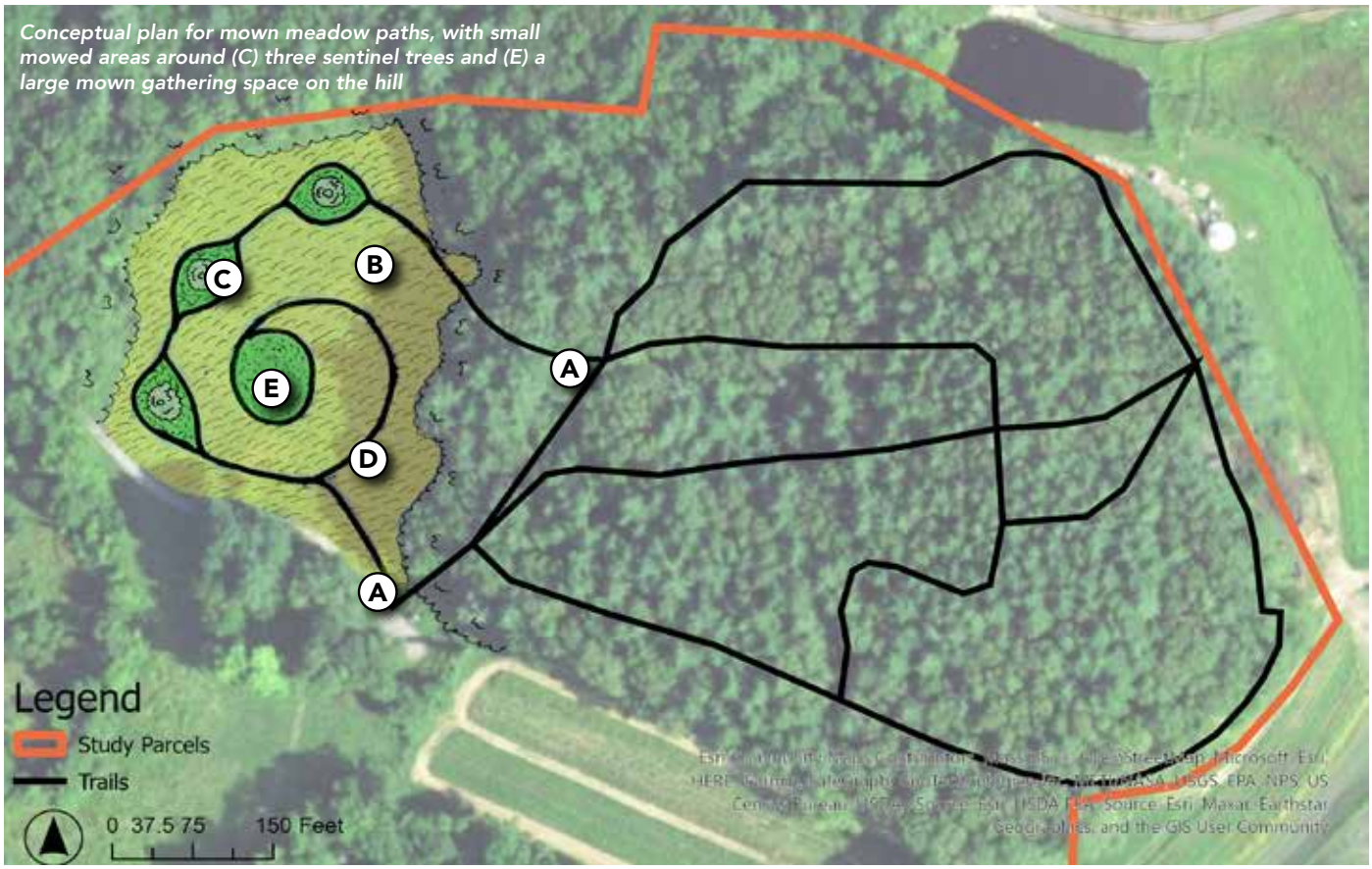
Further, Pleasant Meadows (like most of Millis) is within very close proximity to a number of wetlands, ecosystems particularly sensitive to excess nutrient inputs. **For that reason, it is recommended that future leases include language prohibiting destructive agricultural practices, and encouraging restorative and sustainable ones.** This is especially important as this is a highly visible and well traveled site; this could provide further opportunities for public education.

Diverse ecology vs. contiguous landscape:

There is no right way to have a healthy and symbiotic relationship with the landscape; beneficial land practices may be directly at odds with one another. This is particularly apparent when exploring the juxtaposition of large, contiguous landscapes (e.g., uninterrupted swathes of forest) and the sorts of productive patchworks advocated for at Pleasant Meadows.

Contiguous forest provides important resources for specialized species that otherwise struggle to meet their particular needs; it also provides corridors for wildlife movement, and has benefits for humans (and all life) in the form of carbon sequestration and air filtration. Meanwhile, a mosaic of different land uses (meadow, forest, agriculture) provides a different suite of plant diversity, as well as the benefits unique to an ecotone (the border between different ecosystems). Smaller patchwork ecosystems, however, are vulnerable to non-native species proliferation, and with fewer corridors it can be harder for species to travel between areas (Motzkin).

Changing the scale of analysis from the site to the region may reveal the relative values of these different landscape patterns. For example, examining the larger forest system that Pleasant Meadows connects to, the mowed area does not appear particularly vital in regards to broader connection; furthermore, forest regeneration is preferred over meadow establishment in a number of other properties in this report (Glen Ellen, Pleasant Street); for this reason (and in keeping with the existing desires of those that visit the site), it is recommended that a meadow landscape be encouraged at Pleasant Meadows.



Conceptual plan for mown meadow paths, with small mowed areas around (C) three sentinel trees and (E) a large mown gathering space on the hill

Above:

A. Start of new trails

B. Unmown meadow

C. Mowed area around sentinel trees

D. Mowed paths

E. Mowed gathering area on hill

Mockup of family enjoying the meadow.

FARM & ACORN STREETS

Overview and Analysis

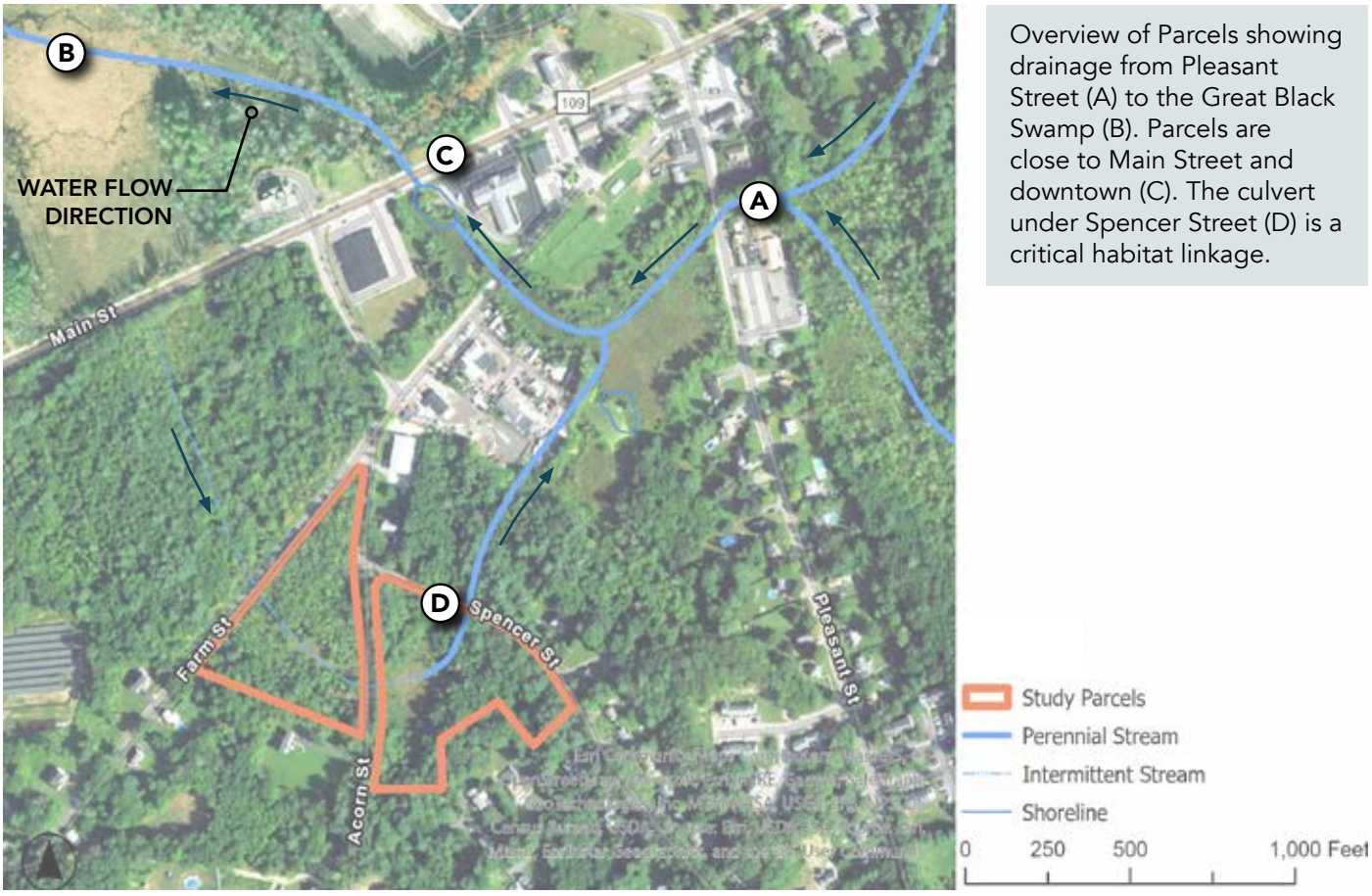
The triangular parcels at the intersection of Farm Street and Acorn Street and at Acorn Street and Pleasant Street, each around 4.5 acres and with similar existing conditions, receive the same recommendations. Both parcels are flat, low-lying interior wetlands; they have similar ecological value scores and function as natural stormwater management.

Land Use

Just a quarter-mile off Main Street, these parcels mark a quick transition from dense business development to residential development. The Acorn and Spencer parcel was deeded to the town of Millis in 1975 "to be managed and controlled by the Conservation Commission of the Town of Millis for the promotion and development of the natural resources and for the protection of the watershed resources of said Town." Both parcels were included in a 1977 Conservation Restriction that placed restrictions on a large group of parcels that contain inland wetlands. The Town of Millis did not come to acquire the Farm and Acorn parcel until 2011, though activities on the parcel were already regulated by the EPA.

Ecology

These parcels form important hydrologic and drainage connections from the uplands off Pleasant Street to the east to the Great Black Swamp to the northwest. Forest almost completely covers the entirety of the two parcels, and the areas without significant tree cover are too wet to host large trees. The Acorn and Spencer parcel has an intermittent stream flowing south from Main Street, becoming a perennial stream in the parcels and then meeting the output from Richardson's Pond before making its way to the Great Black Swamp.



Overview of Parcels showing drainage from Pleasant Street (A) to the Great Black Swamp (B). Parcels are close to Main Street and downtown (C). The culvert under Spencer Street (D) is a critical habitat linkage.

ACORN & SPENCER STREETS

An important ecological function of wetlands is their ability to filter contaminants; the wetlands that run through these project parcels intercept runoff from the developed and impermeable areas around downtown, decreasing the amount of contaminants that ultimately make it to the Great Black Swamp (a wetland core habitat according to BioMap). In this way, though these parcels are not rated as core habitat, they are integral to the ultimate hydrologic health of those wetlands in Millis that are.

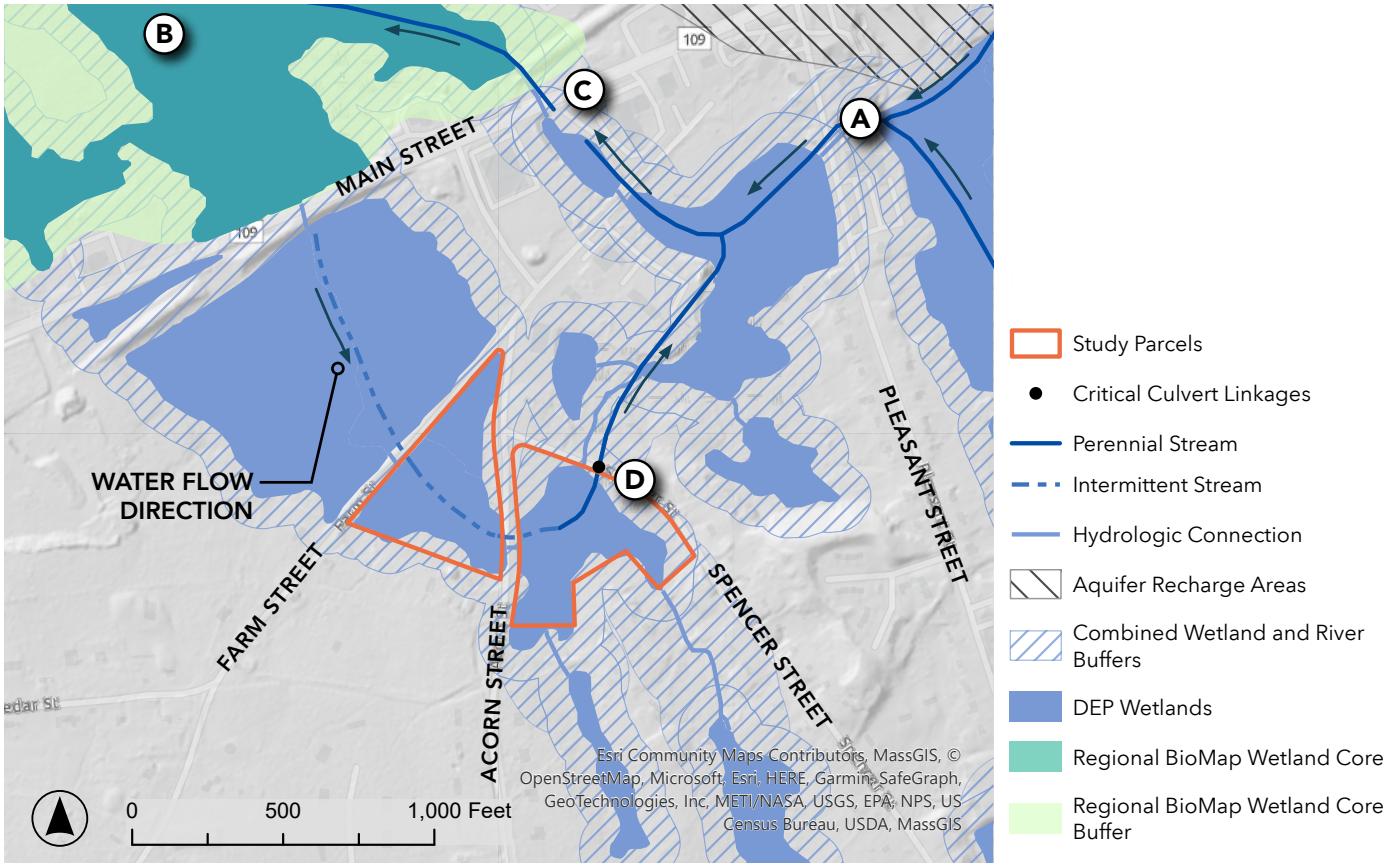
Both parcels gain points in the Conservation Framework for containing wetlands and wetland buffers, being forested, and being at flood risk. The UMass Designing Sustainable Landscapes Project identified the culvert draining under Spencer Street (D) and into the Acorn and Spencer parcel as a critical aquatic habitat linkage point, increasing the ecological value of this parcel.

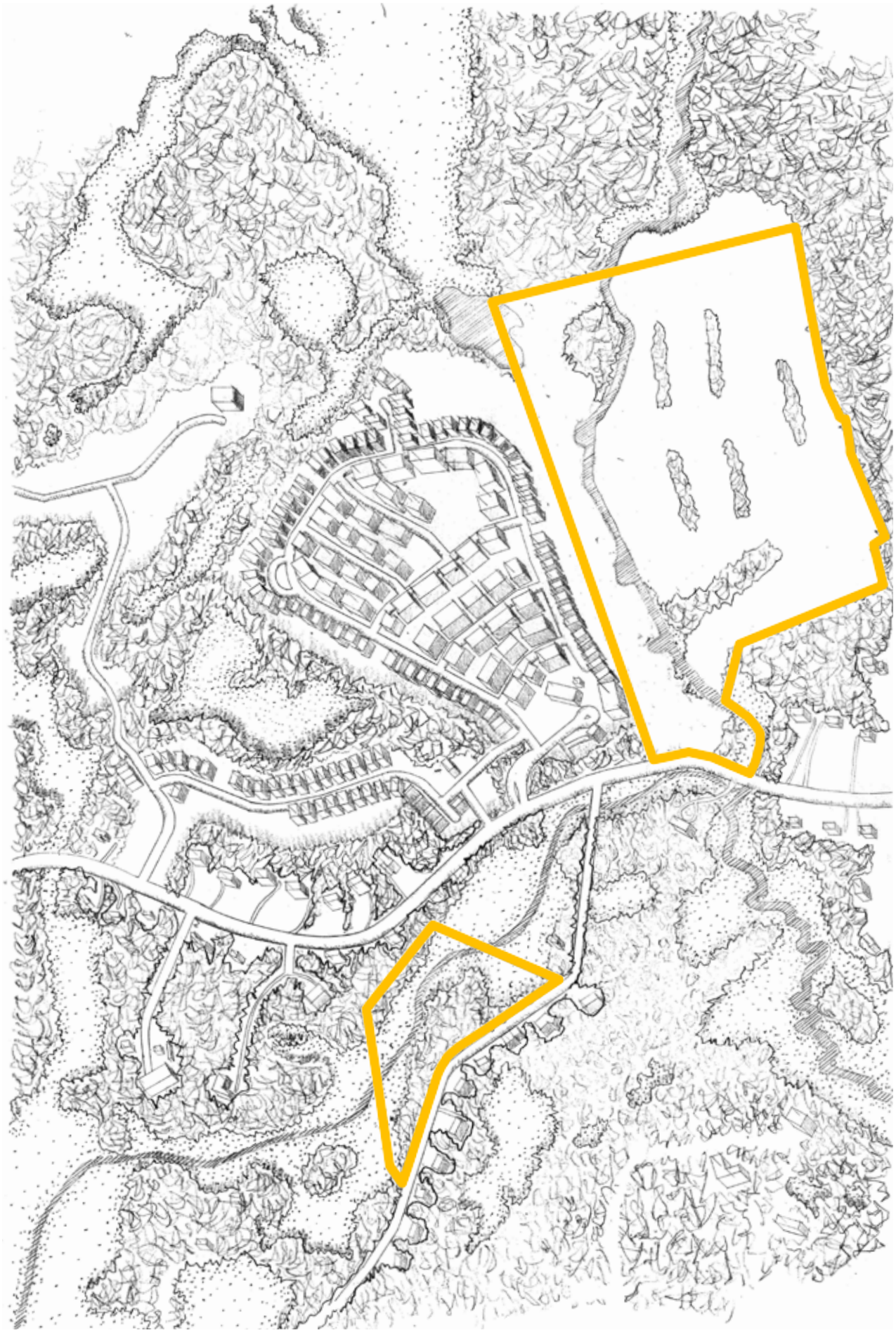
Recommendations

Continued conservation and better upkeep:

Due to the ecological importance and hydrologic connectivity of these parcels, they should be considered for continued conservation with no public access. To increase public awareness of these lands, it is recommend signs be placed; to ensure these signs are visible from the road, mowing should be routine along vehicle sight lines.

Further analysis of the health of these ecosystems and investigation into potential stress from invasive species or other sources may reveal management and/or restoration needs. Overall, continued town ownership and conservation is recommended for their value as stormwater infrastructure.





NORTHWEST MILLIS

The following are parcel-level recommendations for Northwest Millis; included in this area are the Glen Ellen and Grove Street study parcels. Glen Ellen is a former golf course which now provides passive recreation to Millis and the adjacent 55+ Community (The Regency at Glen Ellen); the land is, according to the Orders of Conditions provided by the Millis Conservation Commission, required to replicate the ecosystem functions of the now-developed wetlands immediately to the west. Grove Street is an ecologically rich parcel, which includes wetlands, a stream, and vernal pools; it is hemmed in by two residential streets.

Northwest Millis is a section of important riparian connection, abutting wetlands in both neighboring Holliston and Millis itself. Areas of interest include the Regency at Glen Ellen and the Holliston Senior Center right across the town line; this area also provides access to the Great Black Swamp, with particularly beautiful views from Causeway Street, which runs through Windy Knob, a historic farm.

Recommendations for this area are strongly centered around preserving the ecological integrity of both the individual parcels and the area at large.

GLEN ELLEN

Overview

Glen Ellen is not only the largest of the study parcels but also the only one not owned by the Town. Along with the land immediately to the west, this parcel was once a golf course, which five years ago began transitioning to a new 55+ community. As part of the approval process for this new construction, the eastern section of the parcel (what is now one of the parcels under study in this report) was placed under conservation, with an agreement that the Condominium Association must oversee maintenance of public walking trails.

The golf course covered the entirety of the study parcel, and though mowing and maintenance of the course have ceased, the area still retains its golf course characteristics, as is seen through the aerial photos on the next page. Though the new development to the west is age-restricted to 55+, there is a parking area for the public on the south edge of the parcel, off Orchard Street. The agreement with the Condominium mandates that this parking area be maintained and open to the public at all times.

A trail follows the perimeter of the parcel, creating a loop just under one-and-a-half miles. This trail follows portions of old paved path left over from the golf course that is patchy and cracking. Connecting these discrete patches of pavement is a 10-foot-wide mown path (mown when the grass exceeds 6 inches). Private trails connect in the woods to the north, heading into Holliston, and in the northwest corner, leading to the condominium developments.

A portion of the golf course adjacent to the path has been designated for meadow habitat, and the rest of the parcel, comprising mostly the interior section, has been left to natural succession. The succession process is slow, however, and though it's been five years, the landscape still resembles a golf course more than it does its original forested wetland ecology.

The parcel consists of an abandoned golf course (A). A new 55+ development has been built to the west (B). Public parking and trail access is off Orchard Street (C).

April 2018
Google Earth Image

In April 2018, the golf course and clubhouse are still visible from satellite imagery (D).

June 2019
Google Earth Image

Fourteen months later, development has begun for the Glen Ellen (E). The eastern portion of the parcel is put under conservation (F).

October 2021
Google Earth Image

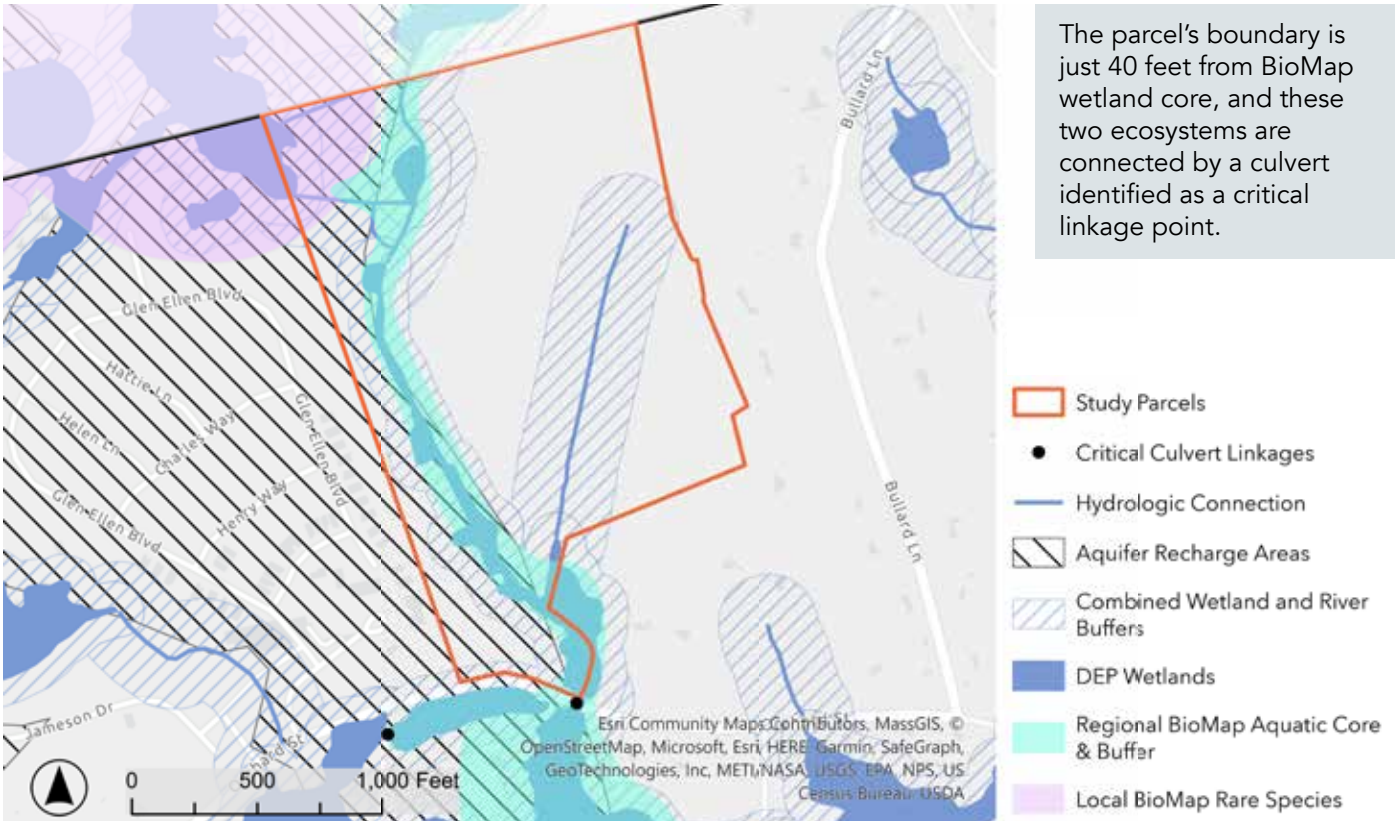
The most recent satellite imagery shows the extensive Glen Ellen development as it continues to push west (G). The eastern portion shows little change (F).

Ecology

The western border of Glen Ellen follows Bogastow Brook as it flows from the north in Holliston through the parcel to the south. Bogastow Brook is a key tributary to the Charles River, flowing from the Bogastere Swamp to the northwest of Millis, in Holliston, through Millis from west to east generally, connecting to Millis's Great Black Swamp, and eventually flowing into the Charles in the northeast corner of Millis, through the Bridge Island Meadows area.

Glen Ellen received the highest ecological value score of the study parcels, with a 9. In addition to the presence of wetlands, the portion of the parcel from Bogastow Brook to the west is within an aquifer recharge area. Bogastow Brook is also considered an aquatic core habitat area in the BioMap Critical Natural Landscapes and Core Habitat areas. This parcel is also the only one of the study to include BioMap rare species habitat, in the northwestern corner of the parcel. Identified species of conservation concern include the spatterdock darner dragonfly, blue-spotted salamander, and the eastern ribbon snake, among others. As with Richardson's Pond, wetland core habitat exists close to the parcel, just 40 feet to the south, across Orchard Street. This is also where the critical culvert habitat linkage exists. Therefore, though Glen Ellen does not contain wetland core as designated by the BioMap data layer, it clearly creates an integral linkage through Bogastow Brook.

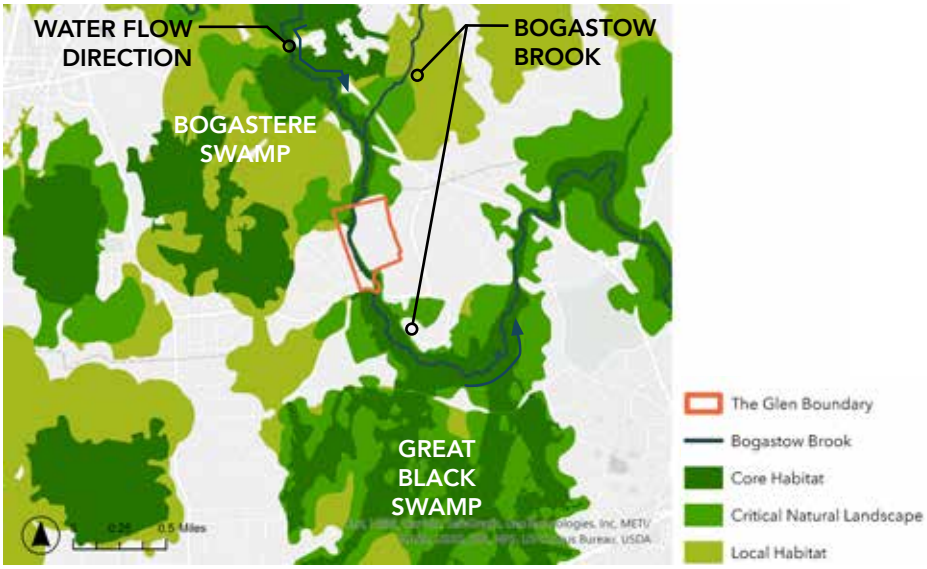
Expanding the ecology lens to include the entire former golf course parcel, the story of critical habitat linkage at this location becomes even more complex. The BioMap layers identify the western edge of the former parcel as critical natural landscape and core habitat, showing a habitat linkage area much larger than the Bogastow Brook area to the east. But as the 55+ development continues to expand to the west, these critical habitat areas are slowly being encroached upon and the integrity of this link is weakening. This implies that the habitat linkage along Bogastow Brook is even more integral to maintaining a healthy connection between the Bogastere Swamp and the Great Black Swamp.



The parcel's boundary is just 40 feet from BioMap wetland core, and these two ecosystems are connected by a culvert identified as a critical linkage point.

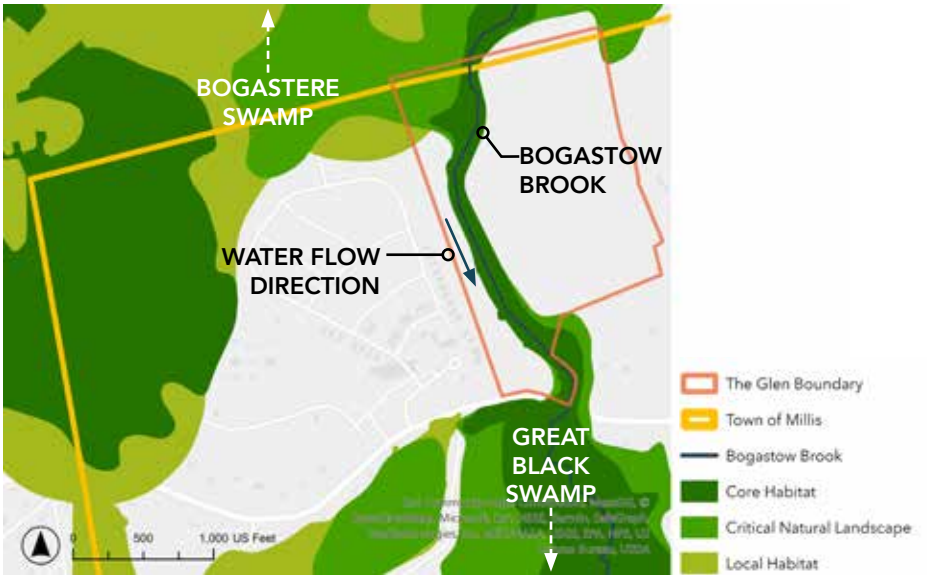
Wetland Linkages

A zoomed-out view of this parcel shows the prevalence of BioMap elements in this area, especially around the Bogastere Swamp in Holliston to the north, the Great Black Swamp to the south, and along Bogastow Brook which connects them all to the Charles River along the northeast border of Millis.



Bogastow Brook

BioMap areas of Core Habitat and Local Habitat cover the northwest section of the old golf course parcel linked by Bogastow Brook.



Glen Ellen Development

Recent developments associated with the 55+ community have eaten away at this linkage, leaving the Bogastow Brook as the remaining habitat link in this area.

Topography

The topography of Glen Ellen still reflects the alteration of the landscape involved with creation of the golf course, with unique and unnatural areas of pits and ridges. Most of the central part of the parcel is flat with a ridge forming the eastern parcel boundary. The banks of Bogastow Brook form localized steep areas but because the area surrounding the brook is mostly flat, these areas are prone to flooding. Since the path follows the river closely, the path can become submerged at certain times of year, as it was in January 2023. Most of the existing trail is on slopes of less than 8%, except for the section where the trail climbs and follows the eastern ridge (A).

A photo from January 2023 shows the mown path and areas of meadow in the foreground with natural succession in the background. However, this landscape remains broadly open.

Flooding along the paved portion of the path.

Flooding along the unpaved portion of the path.

Study Parcels

Existing Trail

0 - 5% Slope

5 - 8% Slope

>8% Slope

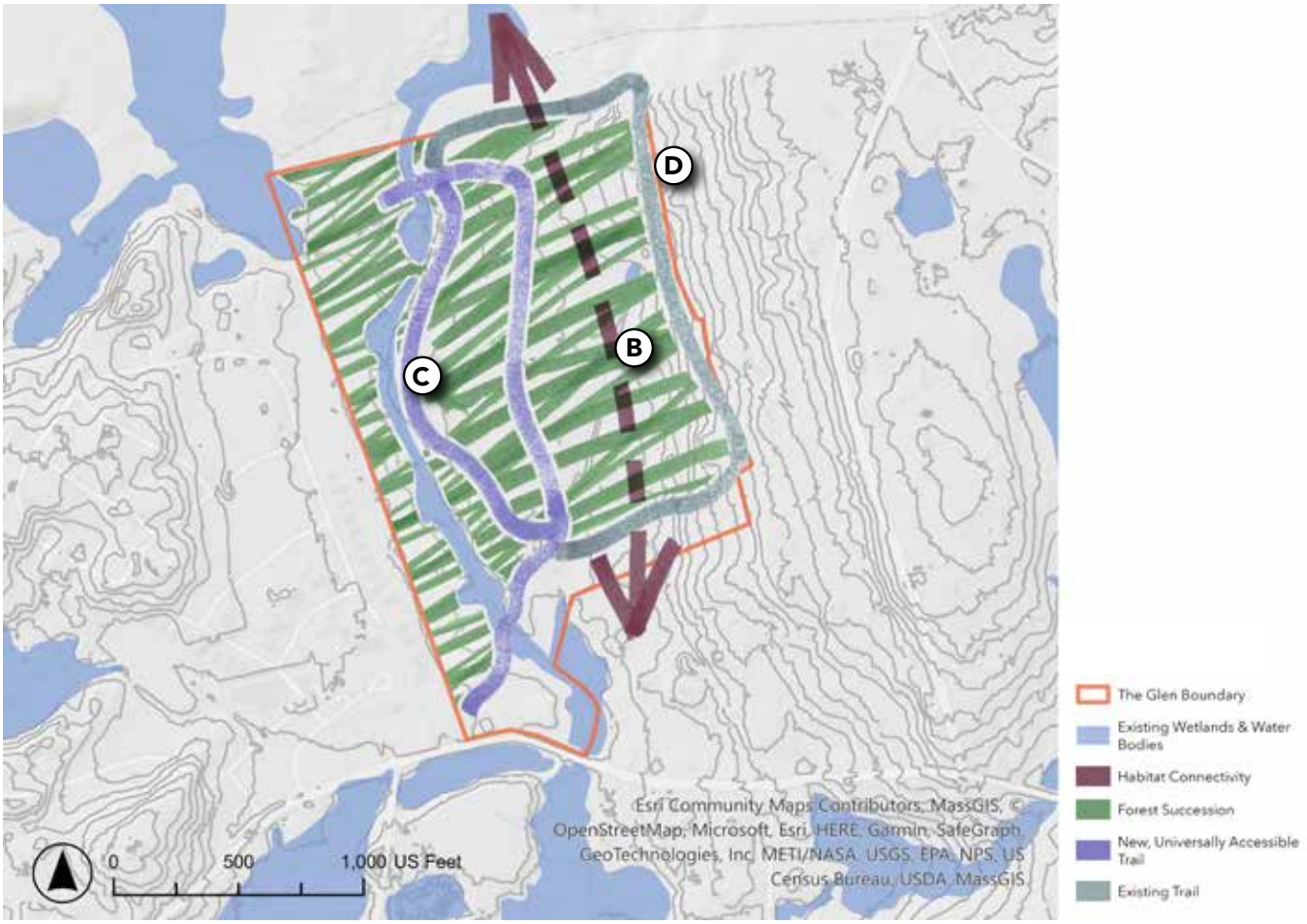
Recommendations

Actively implement a restoration plan:

This parcel scored very high for ecological value in the framework; through further analysis, its value for conservation becomes even more apparent. Since much of the BioMap habitat integrity and linkage located to the west of the parcel has been developed for the 55+ community, encouraging the enhancement of the Bogastow Brook link in the Glen Ellen parcel can over time rebuild habitat connectivity. One piece of land, however, cannot immediately fill the ecological void that another piece has left behind. Health, persistence, and significant area of an ecosystem are all factors in designating core habitat (according to criteria laid out by BioMap). Attempting to transfer ecological value directly from one parcel to another after the former has been developed is not a simple or straightforward task. Therefore, in order for the Glen Ellen section of Bogastow Brook to become as ecologically valuable as what has been lost to the west, more analysis and intervention is needed. Allowing the golf course to undergo natural succession is a first step, but it is only one step. **Therefore, it is recommended a concerted restoration plan be implemented at Glen Ellen, which includes new plantings and maintenance in favor of local species health and diversity (B).**

Improve trails for universal access:

The immediate connection to a 55+ community also makes this parcel a strong candidate for universally accessible trails. And since the middle section of the parcel is largely flat, **it is recommended this area of the trails to be updated to meet universally accessible standards (C)**, including the private trails that connect to the community, and continued maintenance of the non-accessible eastern ridge trail (D).



Existing trail conditions at Glen Ellen as of January, 2023.

Conceptual rendering of universally accessible path along the flat section of Glen Ellen with increased biodiversity through plantings and natural succession.

GROVE STREET

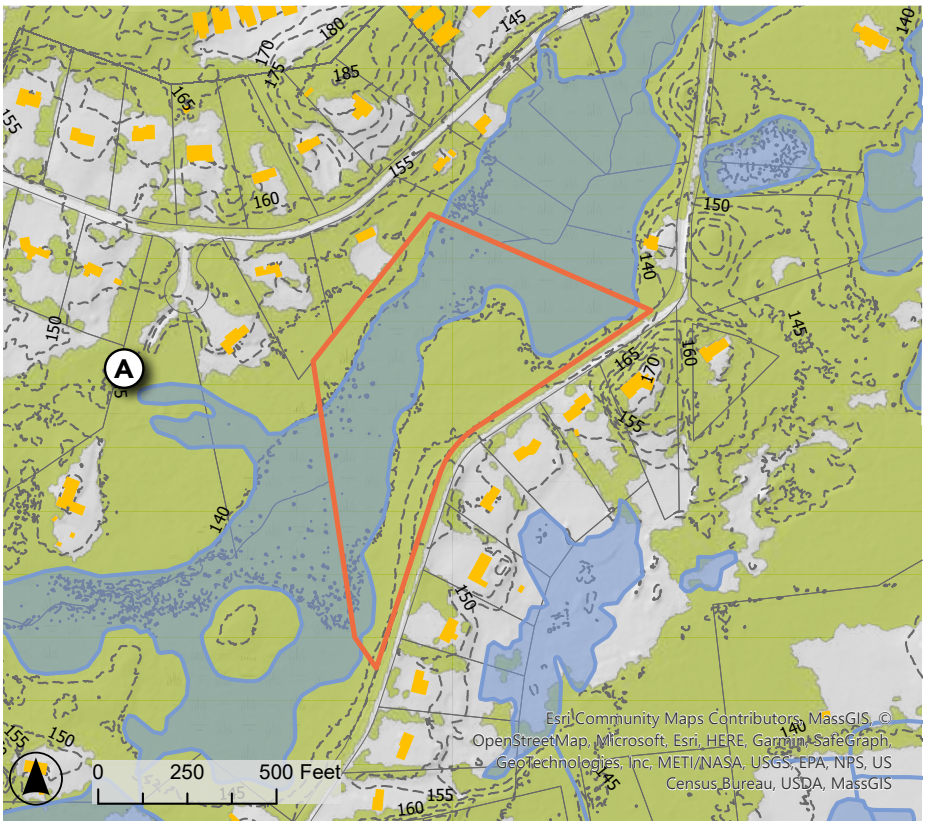
Overview

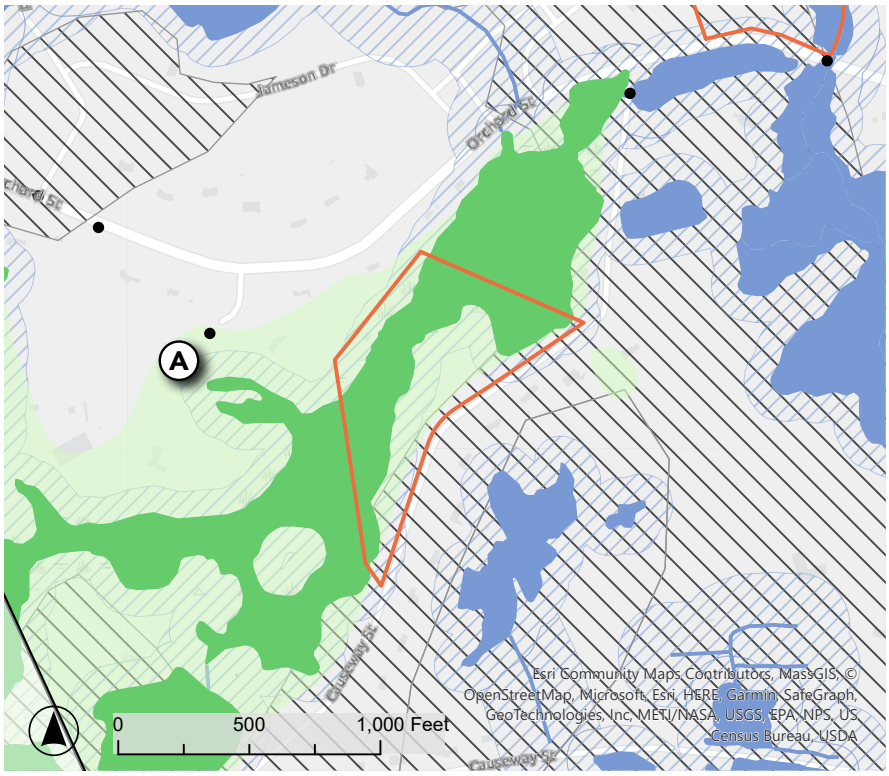
Just over 11 acres, this parcel to the northwest of Grove Street is completely forested and bisected by a small stream flowing northeast to southwest. Residential parcels with homes abut the parcel to the northwest and just beyond them is Orchard Street. The Grove Street parcel is a quarter-mile southwest of the Glen Ellen parcel. Wooded wetlands buffer the stream running through the property. This stream and associated forested wetland provide key habitat and connectivity through this residential area. The parcel was seized in lieu of taxes in 1956 and was included in the 1977 Conservation Restriction on inland wetlands. There is no evidence of buildings or roads on the parcel. As of January 2023, there was a hunting blind present on this property. It is unclear who constructed it or frequents it and when.

Ecology

The Grove Street earned an ecological value score of 7, second only to Glen Ellen. While Glen Ellen received points for BioMap Critical Natural Landscape and Core Habitat, the wetlands at Grove Street are considered significant for local BioMap elements. BioMap is created to never overlap regional and local elements. The Critical Natural Landscape and Core Habitat areas are considered significant on a regional level, and the local habitat components are considered significant on a town-wide scale. However, this does not mean that regional habitat is more important than local habitat, or vice versa. They each play different roles in species and ecosystem health. In fact, because all of Grove Street is covered by local wetland core and wetland buffers, that means none of the parcel can be covered by regional BioMap elements since they cannot overlap. And therefore, Grove Street should not lose points for not containing regional BioMap elements.

The Grove Street parcel did not receive a point for a critical culvert linkage; however, these culverts are represented on GIS as a discrete point occurring only at one very specific location. In reality, that is not how culverts work since they run under roads and have specific input and output locations that are not represented on GIS. Grove Street is just under 500 feet from a critical linkage culvert at the end of Glen Pines Way (A), west of the parcel. Though the culvert's output location is not shown, the contour data suggests that this culvert connects to the Grove Street parcel. Therefore, the ecological health of Grove Street is tied to the success of that culvert as a habitat link.





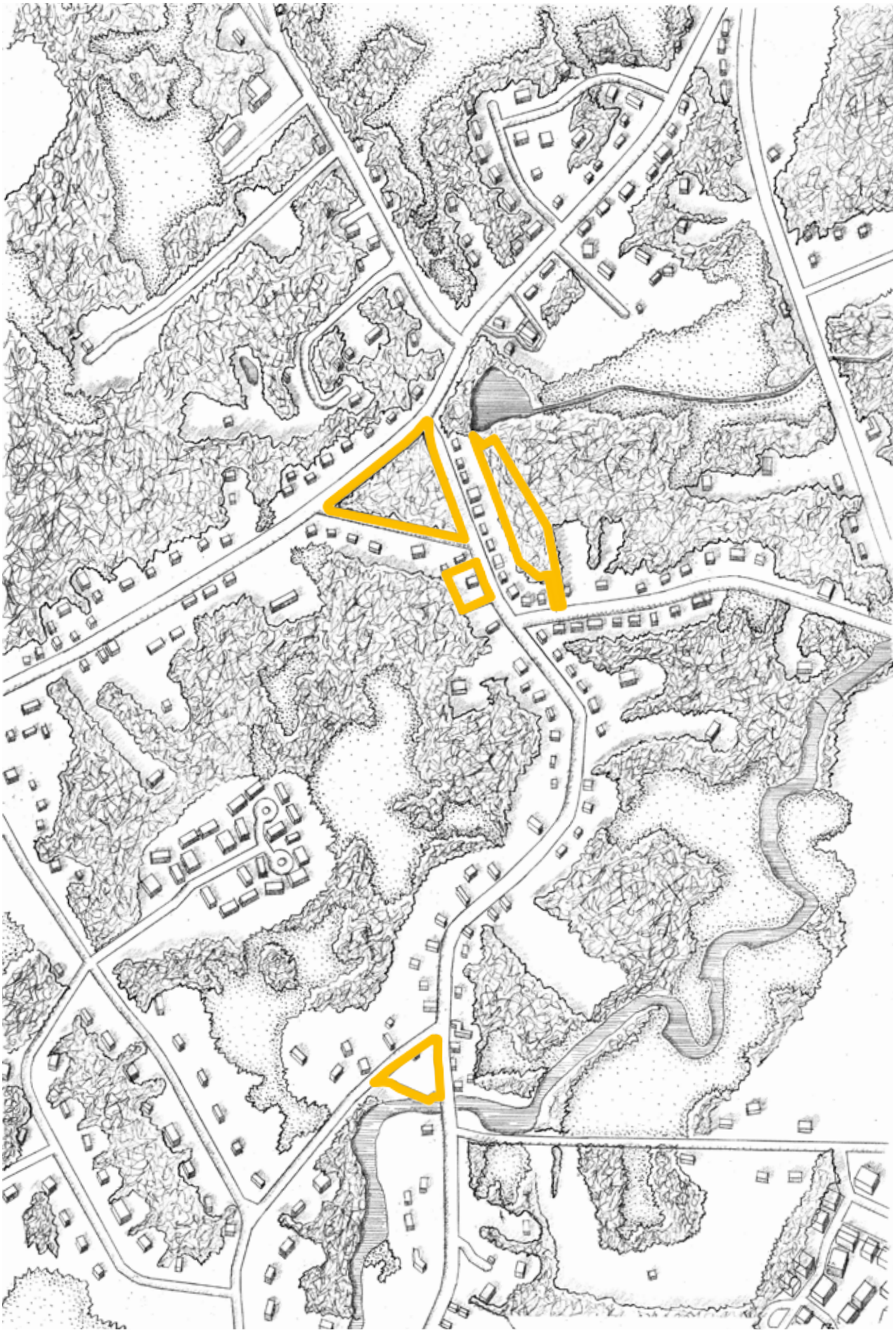
Hunting blind near the stream bisecting the Grove Street parcel, with Conway students for scale.

Recommendations

Signs and maintenance to keep people away and informed:

The Grove Street parcel has some significance for all the data layers included in the ecological criteria framework (except for the Charles River Natural Storage Area, not present in or near any of the study parcels). Therefore, its importance as an integral piece of the puzzle of wetland and habitat conservation in Millis is clear. The biggest problem this parcel faces is encroachment from neighbors and dumping of yard waste introducing invasive or disruptive species. Due to the wetness of the parcel, the residential context, and large wildlife importance, this parcel is not ideal for passive recreation and should be reserved as a wildlife corridor. However, wildlife value is not something that is immediately visible to most people, which is what leads to the issues of dumping and encroachment.

Overall, Millis could engage in public education measures to help the town's residents understand the unique importance of conservation and having areas without human presence in Millis. A sign along Grove Street and regular maintenance of the right-of-way might help provide cues-to-care, decreasing the likelihood of people thinking of the parcel as a forgotten plot of land. It is also important to ensure that this ecosystem maintains its health, especially as climate changes, invasive species pressure increases, and development continues in town. Therefore, a plan should be made for a routine assessment of the health of this parcel and potential actions needed. Part of this plan could also address the evidence of hunting on this parcel and investigate what regulations this hunting should follow, or even whether it is advisable to have hunting on this property so close to residential homes.



SOUTHEAST MILLIS

The following are parcel-level recommendations for Southeast Millis, which include the derelict Ellice School, the undeveloped Pleasant Street Park, the largely unknown Baltimore Street Park, and finally Waites Mill Park and the old Firehouse along the Charles to the south. Pleasant Street Park and Baltimore Park are functionally wooded lots without trails; Waites Mill is relatively well trafficked and has some basic amenities. The Ellice School is recognized as an important building by the Millis Historical Society, but is in disrepair and is not currently used for any particular purpose.

South Millis is broadly a residential area, and ecologically speaking it is dominated by the Charles River which forms the southern border of Millis. The forest along the river continues across town lines to conserved lands in both Norfolk and Medfield.

Recommendations in this area focus on the needs and cohesion of this small neighborhood as a whole; this is reflected in the grouping of parcels, which help to form a connected land use plan.

PLEASANT STREET PARCELS

Overview & Analysis

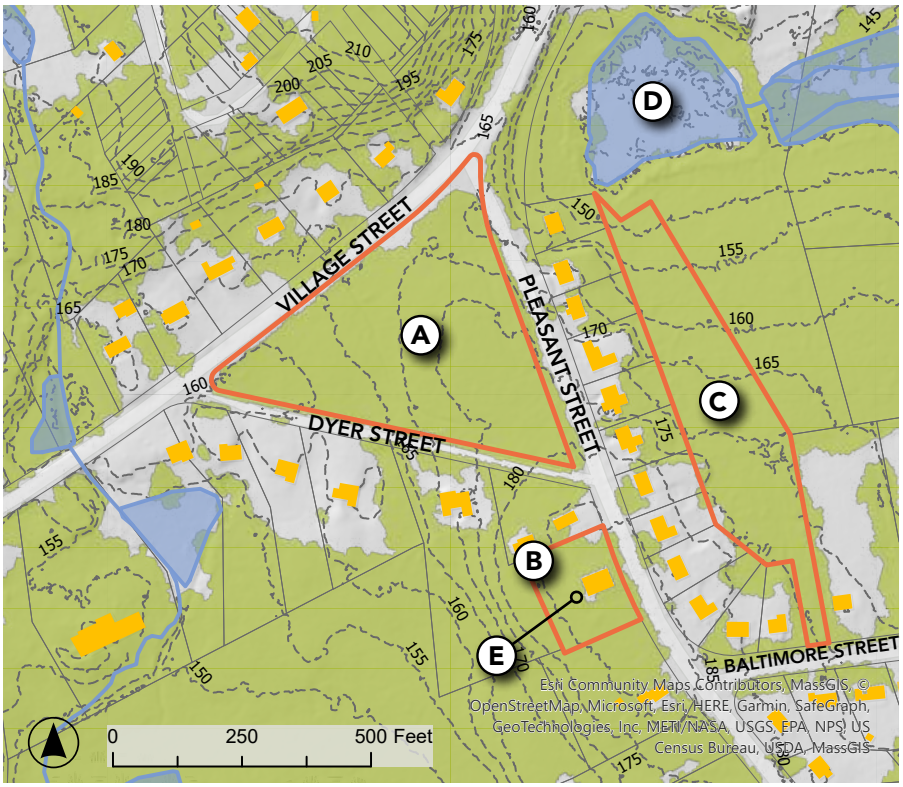
The following is a set of recommendations that includes three parcels: **Pleasant Street Park (A)**, a 4-acre wooded parcel deeded to the town as a public park in 1923; **the Ellice School (B)**, a 0.75-acre parcel that is mostly cleared and contains a historic but dilapidated schoolhouse; and the **Baltimore Street Parcel (C)**, a 2.8-acre wooded lot with limited street access (and encroachment by the western neighbor). The reasoning behind the grouping of these parcel recommendations is their close proximity, similar assessment of ecological value, and complementary land use potential.

Land Use & Zoning

All three parcels, and the surrounding mapped area, are zoned as Residential Suburban, which speaks to the character of this particular area; it is overwhelmingly residential homes with minimum lot sizes of 1.37 acres. Village Street and Pleasant Street are major roads (for Millis), while Dyer Street and Baltimore Street are less so. McCarthy Pond (D) is located on private property, but received recognition as a recreation destination in the community engagement activities. Pleasant Street Park (which in practice is a vacant wooded lot) was deeded to the town with the specific purpose of being a public park. The Baltimore Street parcel, which is used only as a gathering space for abutting neighbors, has more general restrictions, being deeded to the Conservation Commission for "the promotion and protection of natural and watershed resources... and for the conservation of open spaces...for the use and enjoyment of present and future generations." It is worth noting that neither parcel has a CR that explicitly states land uses that are and are not permitted. The Ellice School does not have specific restrictions on the land itself, however the old schoolhouse is considered historically significant. The land and building are not currently used in any capacity.

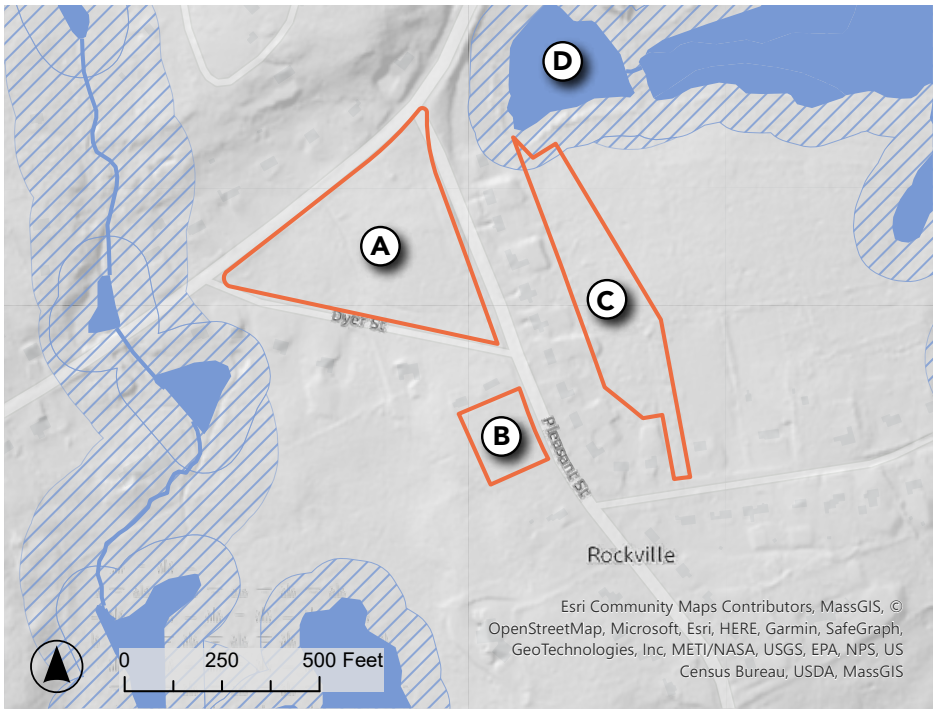
Ecology

The area surrounding the three parcels contains a number of wetlands which are not considered Core Habitat by BioMap. McCarthy Pond and the small pond south of Pleasant Street Park both flow directly into the Charles River. In regards to wetland regulations, only the northern tip of the Baltimore Street Parcel and the western tip of Pleasant Street Park fall within the 200-foot wetland buffer, and none of the parcels appear to contain wetlands based on DEP maps.



Overview of Pleasant Street Park (A), the Ellice School (B), and the Baltimore Street Parcel (C). To the north is McCarthy Pond (D).

- Study Parcels
- Parcels
- 5-foot Contour
- Hydrologic Connection
- DEP Wetland
- Buildings
- Forest



Wetlands, water bodies, stream systems, and their buffers

Study Parcels

Hydrologic Connection

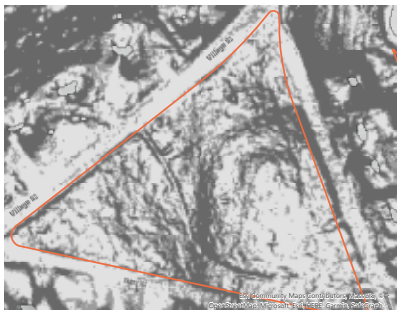
Combined Wetland and River Buffers

DEP Wetlands

Pleasant Street Park and the Baltimore Street Parcel are almost entirely forested, with a mix of hardwoods and conifers, while the Ellice School is a relatively cleared lot, though thickly vegetated relative to the residential lots surrounding it. In terms of forest continuity, Pleasant Street Park is surrounded on all three sides by streets, two of which are relatively busy; this inhibits the movement of wildlife to and from the parcel. The forest that runs through the Baltimore Street parcel (around 80 acres), meanwhile, is separated from a large forested wetland system and the Charles River by Norfolk Road to the east and Baltimore Street to the south; stretches of Norfolk Road have relatively sparse development, meaning wildlife could potentially cross. Beyond Norfolk Road is the Charles and more contiguous forest in Medfield and Norfolk, with the Medfield portion in particular containing the Rhododendron Reservation, Noon Hill Reservation, and Shattuck Reservation.

Topography & Drainage

The Ellice School parcel is relatively flat, with a maximum elevation change of less than five feet on the entire parcel; the schoolhouse itself (see (E) on opposite page) is situated on a high point on the property, drawing drainage away from the building. Pleasant Street Park contains a high flat area to the southeast and a low flat area to the west; drainage tends to move to the eastern corner. The Baltimore parcel drains from the high ground to the south towards McCarthy Pond to the north, at a relatively gentle grade.



Pleasant Street Park slopes

Ellice School and Baltimore Street slopes

Study Parcels

0 - 5% Slope

5 - 8% Slope

>8% Slope

Recommendations

Affordable housing at the Ellice School:

With a low ecological value of 1, in addition to proximity to downtown and surrounding development, both the Ellice School and Pleasant Street Park were considered strong candidates for affordable housing. However, they both have complications related to their unique histories. Individuals in the Millis community, including those in the Historical Society, feel strongly about the preservation of the old schoolhouse. Pleasant Street Park has written into its deed a requirement to serve as a public park; further research is required to determine the permissibility of a portion of the property being developed for housing, and the rest being developed as park. Regardless, Pleasant Street Park is an entirely forested lot; despite the low connectivity of this forest system it is still undesirable to clear the lot, as it provides local benefits to wildlife and humans (in the form of stormwater control, cooling, aesthetic value, etc.).

It is recommended that the Ellice School parcel be strongly considered for affordable housing (A). Although the zoning of this area does not allow multi-family units, under Chapter 40B towns and developers are able to circumvent zoning ordinances to provide housing. In regards to the old schoolhouse itself, relocation of the building has been proposed by the Historical Society, and in its absence the vacant lot would be well suited for development, given its relatively flat grade, lack of vegetation, proximity to town, and the surrounding development. These are similar criteria to those laid out for active recreation development; this possibility is explored on the next page.

A. Relocation and/or restoration of Ellice schoolhouse and parcel development as affordable housing

B. Development of universally accessibly trail system at Pleasant Street Park

C. Creation of on-street parking off of Dyer Street

D. Creation of easement allowing access to McCarthy Pond and the Baltimore Park parcel via Pleasant Street

Study Parcels
Parcels
Pond, Lake
Wetland
Shoreline
Perennial Stream

Development of trails at Pleasant Street Park and beyond:

Pleasant Street Park is a public asset 100 years in the making. Though the formal trails are no longer maintained, there are clear expressions of community care through tended beds along the right-of-way and a Bigfoot statue. **It is therefore recommended that Pleasant Street Park remain forested, and a low-impact universally accessible trail system added throughout (B).** Forest is a critical component of the stormwater infrastructure of Millis, and as storm events become more severe it is important that the swaths of forest that exist be protected, especially those surrounding areas that are developed and impervious. Conveniently, the slope of Pleasant Street Park is such that universally accessible trails could be developed without major regrading (i.e., grade is largely less than eight percent).

Pleasant Street Park is a relatively small parcel (the proposed trail on the previous page is approximately 0.35 miles). Another candidate for trail development is the Baltimore Street parcel, which is similarly forested and little utilized. Furthermore, immediately to the north of the parcel is McCarthy Pond, which is currently inaccessible. **One option is to investigate the benefits and feasibility of establishing a trail easement (D).** In addition to the ecological interest of the pond, the easement would allow for the two proposed trail systems to form a large loop, creating a continuous experience that promotes exploration of the neighborhood (around 0.75 miles of trails). With the development of parking along Dyer Street, this new trail system could benefit those that live nearby as well as elsewhere in town.

Active recreation:

One more option, in the scenario where the Ellice School is moved elsewhere, is to assess the Ellice School parcel for development as sports courts (e.g., basketball, tennis, pickleball). Public sentiment, based on the Public Forum and OSRP, suggests that town priorities are focused more on athletic fields than courts, but given the small size of the parcel, fiels are impractical in this setting. **In the event that the schoolhouse is moved, the parcel could be a candidate for active recreation courts.**

Another option, in lieu of moving and restoring the schoolhouse elsewhere, is adaptive reuse; the schoolhouse could form the skeleton of a new housing structure, keeping the beloved form in place while meeting housing needs.

WAITES MILL PARK

Overview & Analysis

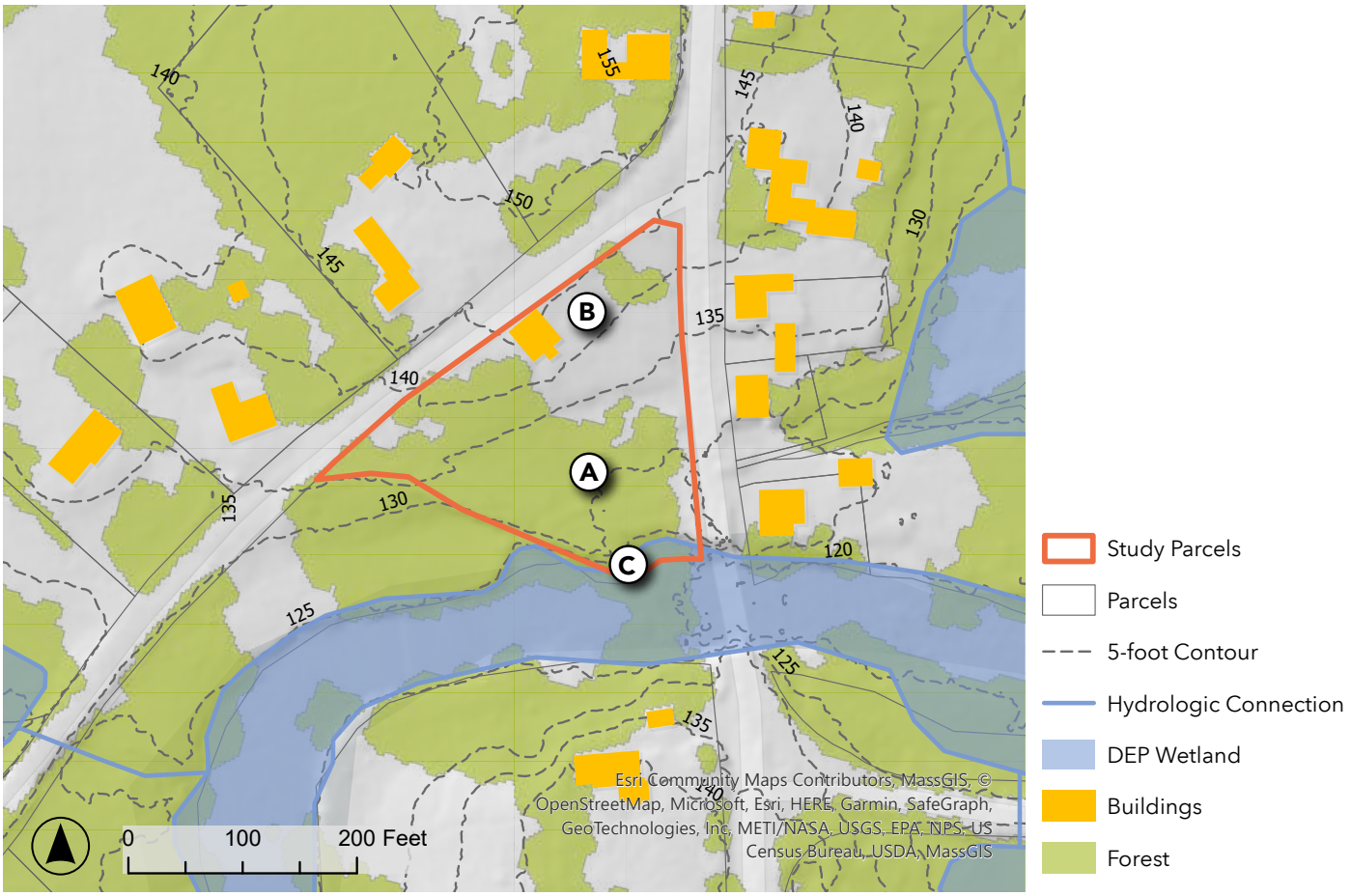
Waites Mill Park is a 1.2-acre parcel on the northern bank of the Charles River. On the northwestern portion of the property is the old Firehouse, which is currently used for storage by the Fire Department. For public use is a swing set, three benches, and outdoor grills; additionally, there are steps leading into the water in the southeast corner.

Land Use & Topography

Waites Mill and the surrounding land is primarily zoned as Residential Suburban; in addition, the land lining the Charles (including the southern half of Waites Mill) has a zoning overlay of Special Flood Hazard, while the small tributary to the west has an overlay of Watershed Protection.

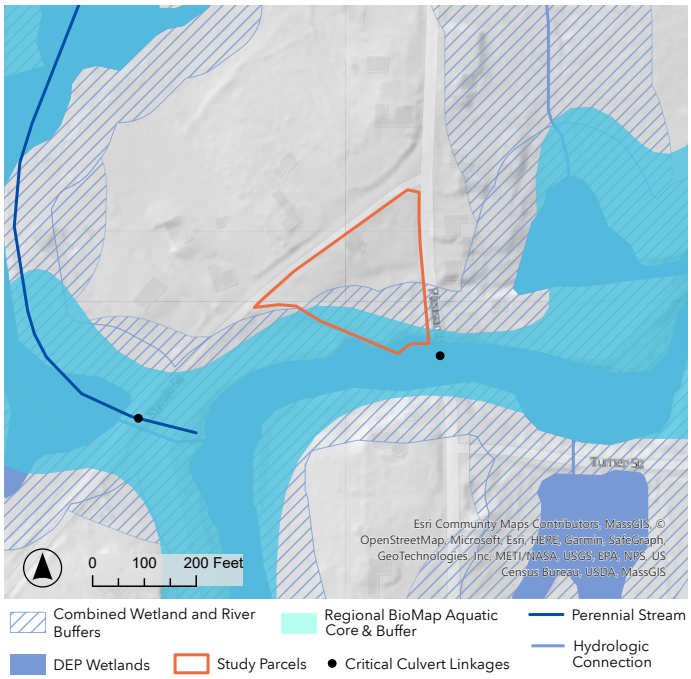
Waites Mill (relative to the size of Millis) is far from downtown and is located just across the river from the town of Norfolk. The property is generally steep, sloping towards the Charles often at grades greater than 8%; however, the existing gathering area is flatter with shade trees and a soft, mossy groundcover (A). The swingset (the only play structure at the park) is east of the Firehouse and likely not in compliance with contemporary safety standards, which could pose a liability to the Town (B). Water access to the river at the south of the property (C) is facilitated by a set of wooden steps, going down another steep portion of the property; the steps are in moderate disrepair, and could also be a potential liability.

According to the Fire Chief, although the Fire Department had new facilities built somewhat recently, their storage needs are not met by the new station; the old Firehouse currently stores an unused historical engine as well as other fire department equipment (Barrett).



Ecology

Waites Mill sits at the edge of a contiguous ecological system bordering the Charles River. This system extends from the southeast of Millis into neighboring Medfield and Norfolk, and contains a number of conserved lands. More locally, the Waites Mill ecology is dominated by the presence of the Charles; given the topography of the parcel, all stormwater moves rapidly across the landscape and into the river. Almost the entirety of the parcel lies within the 200-foot riparian buffer, and is additionally neighbored by three wetlands to the east and west.



Recommendations

Restoring and expanding park facilities:

While several recommendations focus on expanding recreation opportunities for the 55+ community in Millis, Waites Mill Park presents an opportunity to create a vibrant space for children and families; this is particularly pertinent as existing facilities (Oak Grove and the school) are located close to the town center to the north, leaving a gap for families living in south Millis. **Therefore it is recommended that Waites Mill Park receive updates and additions to its current park facilities.** At the very least the swing set should be investigated to ensure it meets minimum safety requirements. Meeting this may, for example, require mulching the surrounding area. Given that the land is already cleared, additional play facilities (A) could be created as well (making sure that installation methods avoid sediment runoff into the Charles).

The gathering area (B), meanwhile, is a little used area with potential. Its proximity to the water, and its prominent canopy, make it an asset to the town, especially given increasingly hot summers (both in average temperature and more frequent heatwaves). However, there are only three benches scattered through the park. Installing a few picnic benches, specifically in the shady area by the grills, could go a long way toward promoting use of the space.

Finally, repairing and expanding water access would increase both safety and use of the waterway (C). This would again require consideration of erosion; however, having a more structurally sound access point would ultimately promote the vegetation around the slope and contribute positively to the longterm health of the waterway.

Utilizing the firehouse:

The firehouse provides a lot of potential for Waites Mill, though the extent of use depends on the ability of the Town and Fire Department to find adequate

A. New and Improved Playground Equipment

B. Picnic Tables and Bench Repair Around Gathering Space

C. Repaired and Expanded Water Access

D. Relocating Firehouse Storage and Utilizing Space for the Public

storage elsewhere. **Assuming that is possible, it is recommended that the firehouse be utilized to further promote recreation at Waites Mill (D).** Using a small amount of space, the Firehouse could provide basic bathroom facilities and necessities such as water and medical equipment. This might require consolidation of equipment, and barriers to ensure children are kept out of harm's way; removal of the historical fire engine could also free up some space.

If storage for the majority or all of the Fire Department equipment could be found elsewhere, further opportunities would be opened up. One such example is use of the space on a rental basis, allowing for events like birthday parties or workshops to be hosted, bringing in additional revenue to the town. Another possibility is a more long-term lease for a childcare facility. See Appendices A and B for a list of residents' ideas about future uses for the firehouse.

Concept of Waites Mill playground, displaying equipment designs by Keita Takahashi and Isamu Noguchi; play structures mirror the Millis landscape, with a slide built in to the ground like a river, and a traversable "forest" of foam pillars.

SOUTHWEST MILLIS

The following are parcel-level recommendations for Southwest Millis, which includes the Braun property, Village Street, and two wooded parcels surrounded by development. The Braun property has a history of agriculture, a stream running through the property, and a contentious reputation surrounding its purchase by the town in 2021; the Village Street parcels contain a wooded wetland with ill-maintained paths and hay cultivation to the south. The Brandywine parcel is situated in the backyard of thirteen different properties and has never been developed; 219B Farm Street rests on the Millis town line and is so small as to not meet zoning requirements for development.

Southwest Millis is an important ecological corridor, featuring the drainage of the Great Black Swamp to the north into the Charles River to the south. The cluster of residents to the east of the Village Street parcels bisects an otherwise contiguous swath of forest, that follows the stream to the east and continues into Medway to the west. Southwest Millis forms a small neighborhood and features cultural centers separate from Downtown Millis, two religious centers (the Guru Ram Das Ashram and the Ael Chunon Congregation) and Woodside Montessori Academy.

These recommendations are informed by the ecological integrity of the area, and aim to balance the needs of all Millis residents, human or otherwise.

BRAUN FARM

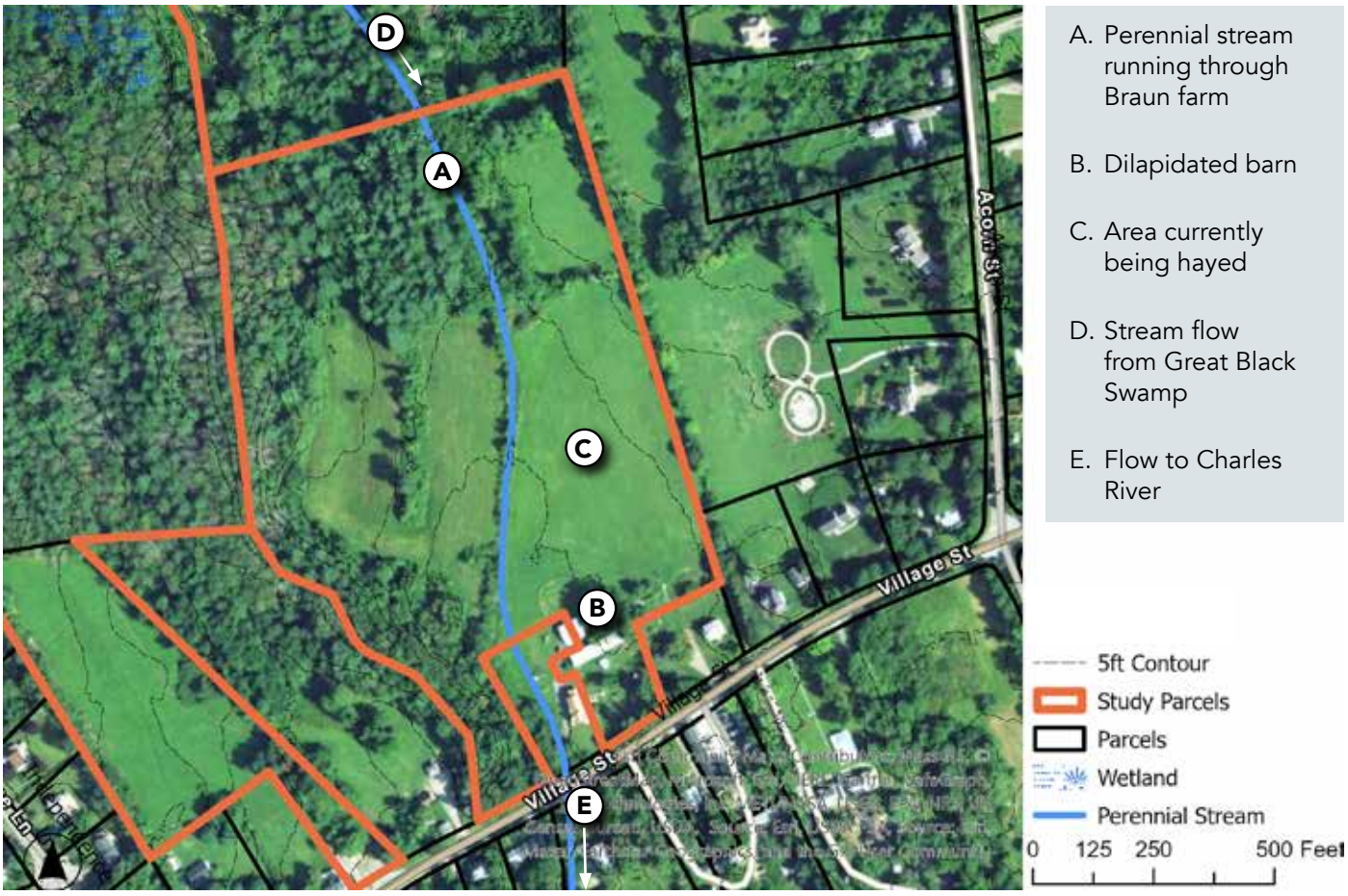
Overview & Analysis

The Braun property, named for the family that historically farmed the land, is a 23-acre parcel purchased in 2021 for roughly one million dollars; the land was under Chapter 61 and being eyed by developers (of the future Acorn Place 55+ community just to the north), and so the Town used its right of first refusal to prevent the development and add the land to its portfolio.

Land Use

The Braun property and the surrounding area are zoned Residential Suburban; surrounding the stream (A) on the Braun property is a Watershed Protection Overlay District, meaning the stream cannot be altered without a special permit, even for agricultural use. This area of Millis is relatively far from downtown but serves as a little neighborhood, featuring a private school and two religious institutions. Although the land was under Chapter 61 prior to its acquisition it does not currently have any conservation restrictions. A dilapidated barn (B) blocks the southeastern right-of-way and currently houses some farm equipment. This building may be a liability for the town.

Currently, the land is being cultivated for hay in the eastern section of the property (C). This haying is part of an agreement with a local farmer wherein the land is available for use free of charge, as a means of keeping the area clear of tree cover while the town decides what should be done with the property. The soils on this property are classified as Prime Farmland Soils according to USGS SSURGO; this along with the decades of small-scale prior (and current) agricultural use, access to irrigation (A), and the land being cleared indicate that the land is suitable for agriculture (MassGIS).



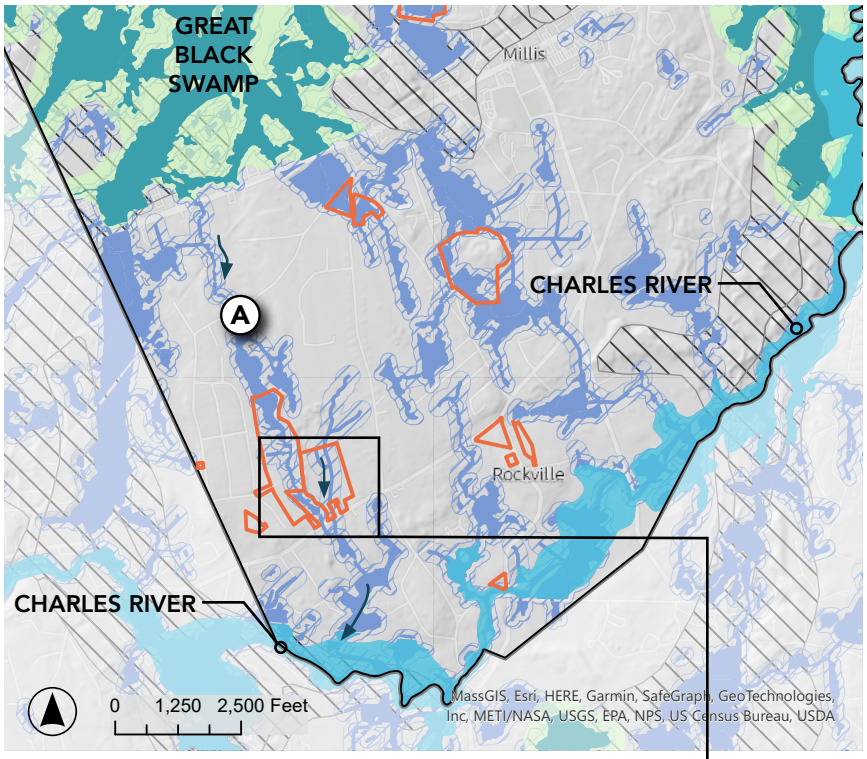
A. Perennial stream running through Braun farm

B. Dilapidated barn

C. Area currently being hayed

D. Stream flow from Great Black Swamp

E. Flow to Charles River



A. Perennial stream running through Braun farm

Study Parcels
Hydrologic Connection
Aquifer Recharge Areas
Combined Wetland and River Buffers
DEP Wetlands
Regional BioMap Wetland Core
Regional BioMap Aquatic Core & Buffer
Regional BioMap Wetland Core Buffer

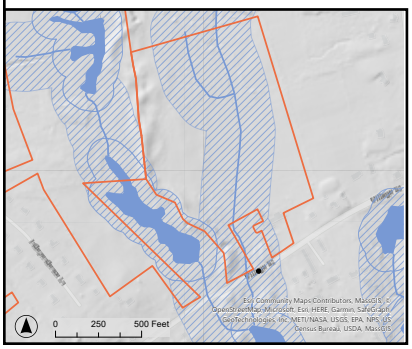
Ecology

The stream running through the Braun property (A) is important in regards to both wildlife connectivity and stormwater management. This stream flows south from the Great Black Swamp, considered Core Habitat by BioMap, through several smaller wetlands, before draining into the Charles River. The northern and eastern portions of the property are part of a large wooded wetland complex, discussed in more detail in the ecological analysis of the Village Street parcels (see pages 96 and 97).

Topography

The Braun property has two topographic characters; the western edge of the property is dominated by an esker, while the rest of the property is relatively flat, mostly at or below 5% grade. Eskers (the sediment deposits of sub-glacial streams) are an increasingly rare landform, as they are composed of sand and gravel and conspicuously at surface level, making them ideal for mining; most eskers in this particular region of Massachusetts were mined for large projects in the Boston area, such as filling the Back Bay.

Utilizing up-to-date data from Risk Factor (a flood model that incorporates up-to-date climate change data), most of the Braun property that is not the esker is increasingly at risk of flooding, due to the property's elevation relative to the stream, the low grade, and the lack of strongly established vegetation (e.g., trees and shrubs).



Study Parcels
Critical Culvert Linkages
Hydrologic Connection
Combined Wetland and River Buffers
DEP Wetlands

Study Parcels
Existing Trail
0 - 5% Slope
5 - 8% Slope
>8% Slope

Recommendations

Placing the land under APR:

Conservation has to do not only with the ecological history of place, but also cultural land use and economic contribution. Between a rapidly aging population of farmers, economic threat from a centralized and industrialized agricultural industry, and our increasingly severe and unpredictable climate, New England's culture of small farms is very much threatened. **With that in mind, it is recommended that the Braun property be strongly considered for an APR (A).** This status would provide economic and cultural benefit.

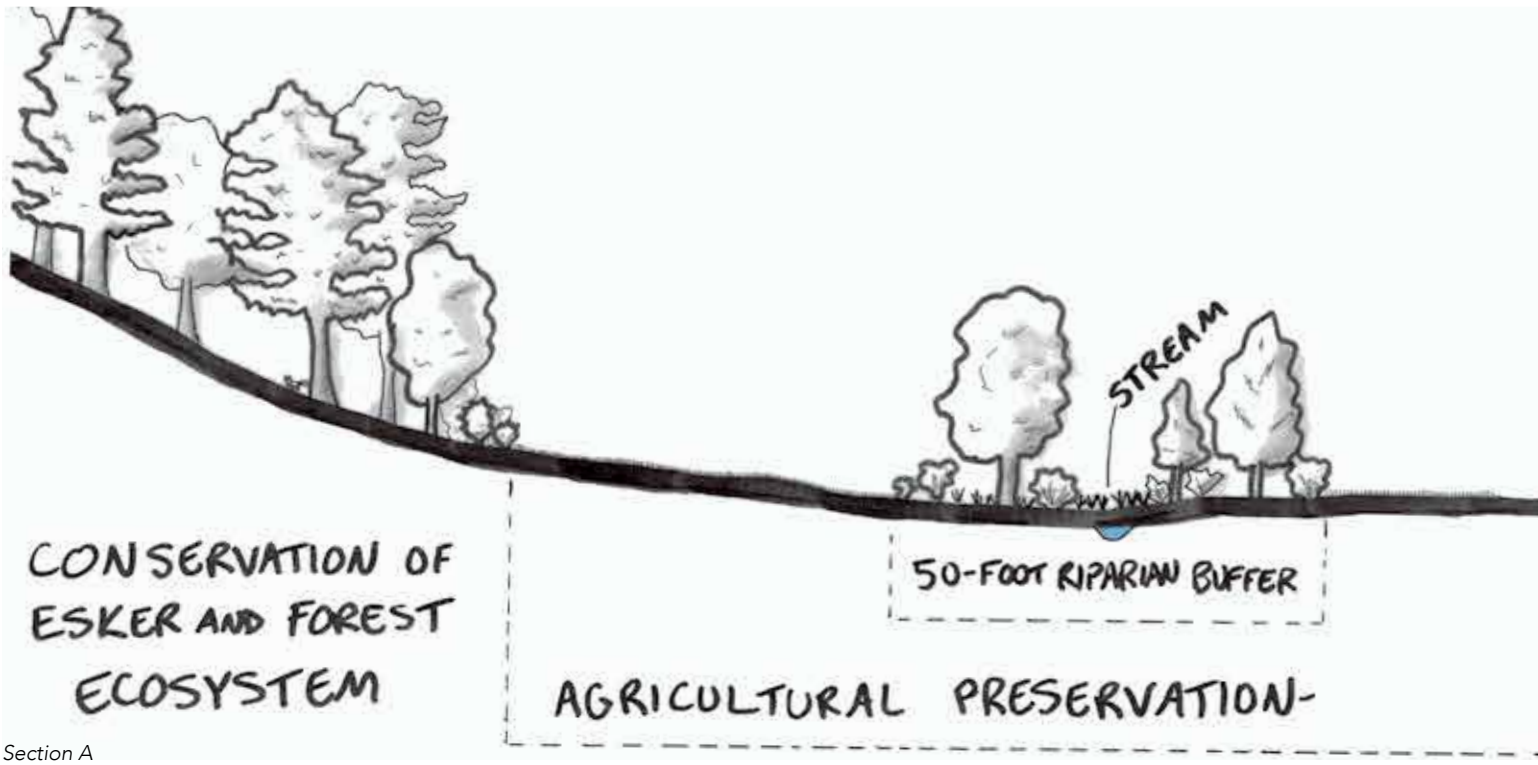
The acquisition of the Braun property, and its lack of use, has been a point of contention amongst Millis residents. An APR designation would provide an immediate return on the town's investment (the difference between the market value and the agricultural value of the land). Furthermore, it would provide a clear path forward in regards to land use, as the designation would necessitate cultivation of the land and prevent development.

Agriculture on suitable town-owned land could provide not only economic return (in the form of a lease) but a myriad of other benefits as well. An inspiring precedent is Just Roots, a non-profit community organization in Greenfield, MA (Just Roots). This is an organization that farms on land owned by the city, with the produce going towards its CSA, local restaurants, and donation to food access organizations. Additionally, control of the lease would allow for certain restrictions on agricultural practices, important as runoff from the farm would go south towards wetlands and eventually the Charles (stormwater flow pictured on the previous page).

The interface of housing and agriculture:

Given that the Braun property has a middling ecological score of 5, is already cleared, and large portions of that land fall outside of the 200 foot riparian buffer, **it is recommended that a portion of the Braun property be considered for affordable housing (B).**

The southeastern corner would be the most suitable both ecologically and infrastructurally. Excluding the 200ft stream buffer (to account for both wetland protections and flooding), the resulting area would



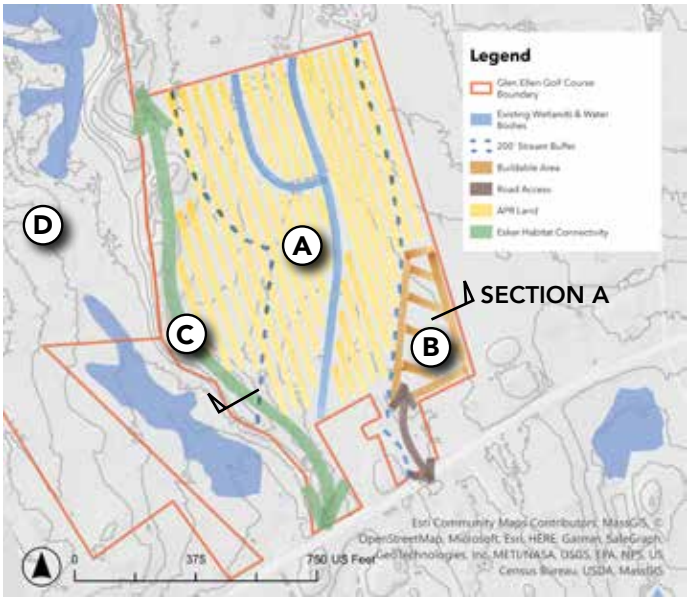
Section A

be more than an acre. Additionally this building area would have access to the eastern right-of-way (the stream flows through the western road access to the parcel, making it unsuitable for development).

The integration of housing and farming could vary in degrees depending on the needs of Millis residents; it could provide housing explicitly for farm workers, or residents could work with the farm on more of a volunteer basis. Additionally, residents could benefit from the farm through a CSA or other subsidized program. A number of exchanges could be worked out, for example, weeding and harvesting by renters in exchange for produce and maintenance.

Extending conservation and access:

The western edge of the Braun property (the esker and the lower elevation areas beneath) is forested and a continuation of the larger contiguous forest wetland of the bordering Village Street parcels (D); current cultivation is restricted to the areas outside this corridor. **It is recommended that this practice continue, with the forested esker protected and excluded from agriculture or development (C).** Related to the connectedness of this western corridor is the opportunity for an extension of trails from the Village Street complex; residents could walk along the esker and make their way down to the farmland beneath.



VILLAGE STREET

Overview & Analysis

The following is a set of recommendations for the Village Street parcels; however, given the adjacency and similarities to the Braun property (abutting to the east), there will be overlap in analysis as well as juxtaposition, the nuances of which will hopefully aid in future land use decision making processes. Village Street is a 34-acre set of three parcels, the two smaller parcels (to the south (A) and west (B) providing street access to the large wooded wetland complex (C) that makes up the third.

Land Use

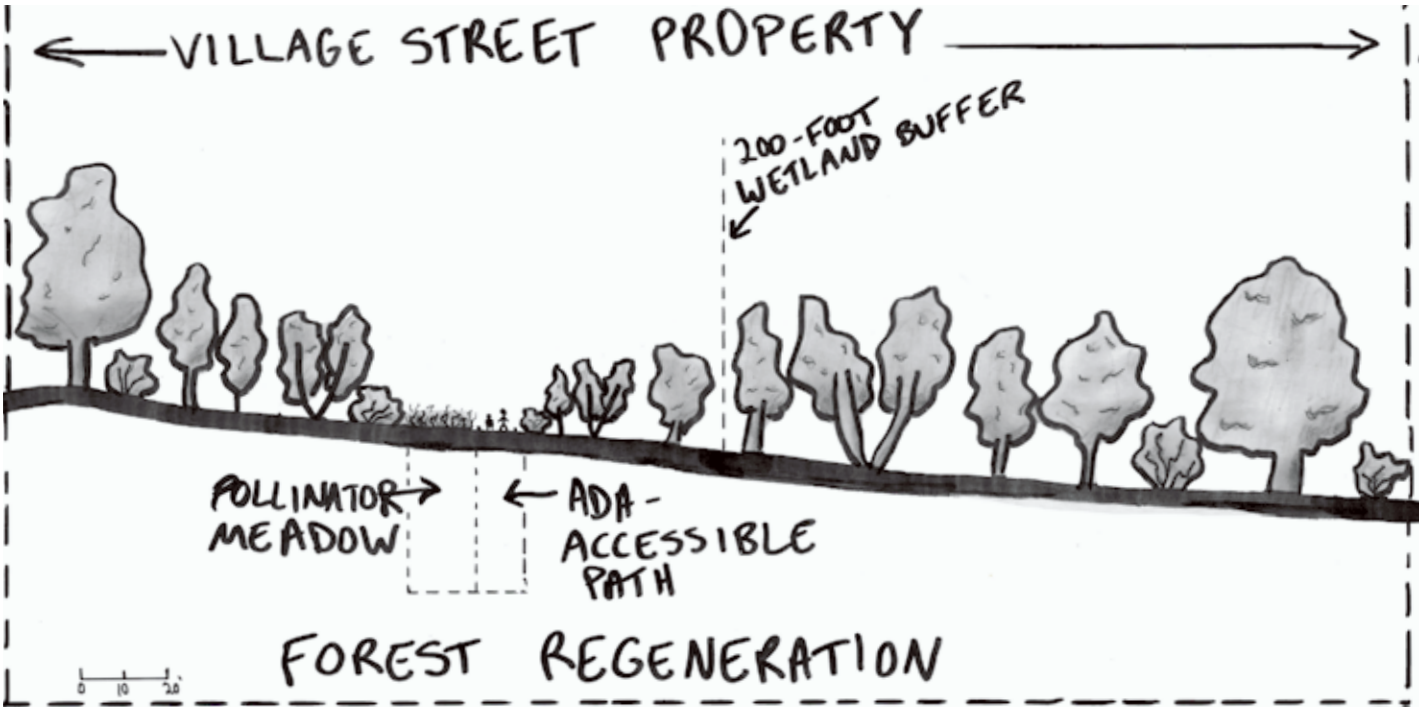
Village Street has two distinctive land use patterns. The southern section (A) is being hayed (part of the same arrangement as the Braun property) and is therefore quite open. As part of this agricultural practice fertilizer in the form of manure is routinely spread on the property. The portion that provides street access leads to a small parking area (E). The primary function of this area is to provide access to the trails running through the wetland forest (C), but there is no defined pathway leading from the parking area to the trails.

The northern section (C) is a large forested wetland complex, with a trail system (D) that traverses the property north to south, in addition to traveling a portion of the esker that separates Village Street from the Braun property. The trails, like many of those in Millis, are not well maintained nor do they have consistent signage.

All three parcels are under conservation, but they do not have explicit conservation restrictions. According to the deeds, the smaller parcels (A and B) are "managed and controlled by the Conservation Commission of the Town of Millis for the promotion and development of natural resources and for the protection of water-shed resources of said Town," meaning land use is ultimately up to the discretion of the Conservation Commission. The larger parcel (C) is very generally to be used for "conservation purposes," though a large portion of this parcel falls under the Watershed Protection zoning overlay.

Ecology

Village Street and Braun are both part of the same wetland drainage system, leading from the BioMap-identified Wetland Core of the Great Black Swamp to



Section B

A. Southern parcel

B. Western parcel

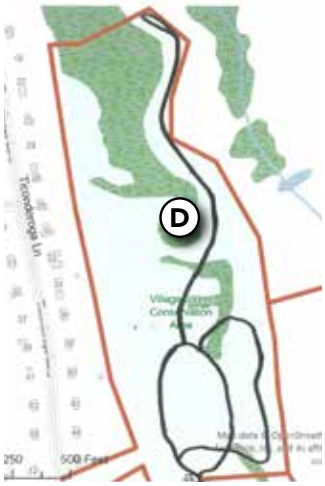
C. Northern parcel

D. Extended trails

E. Parking area

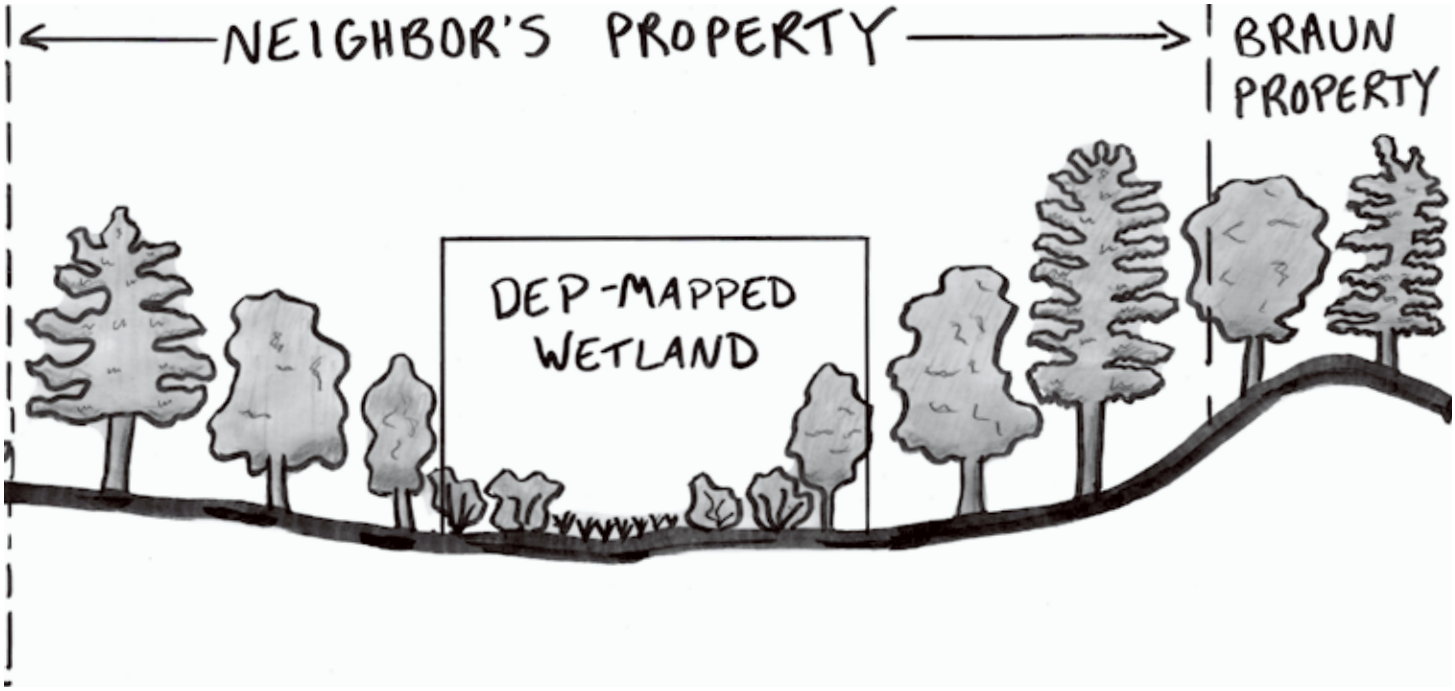
F. Braun stream

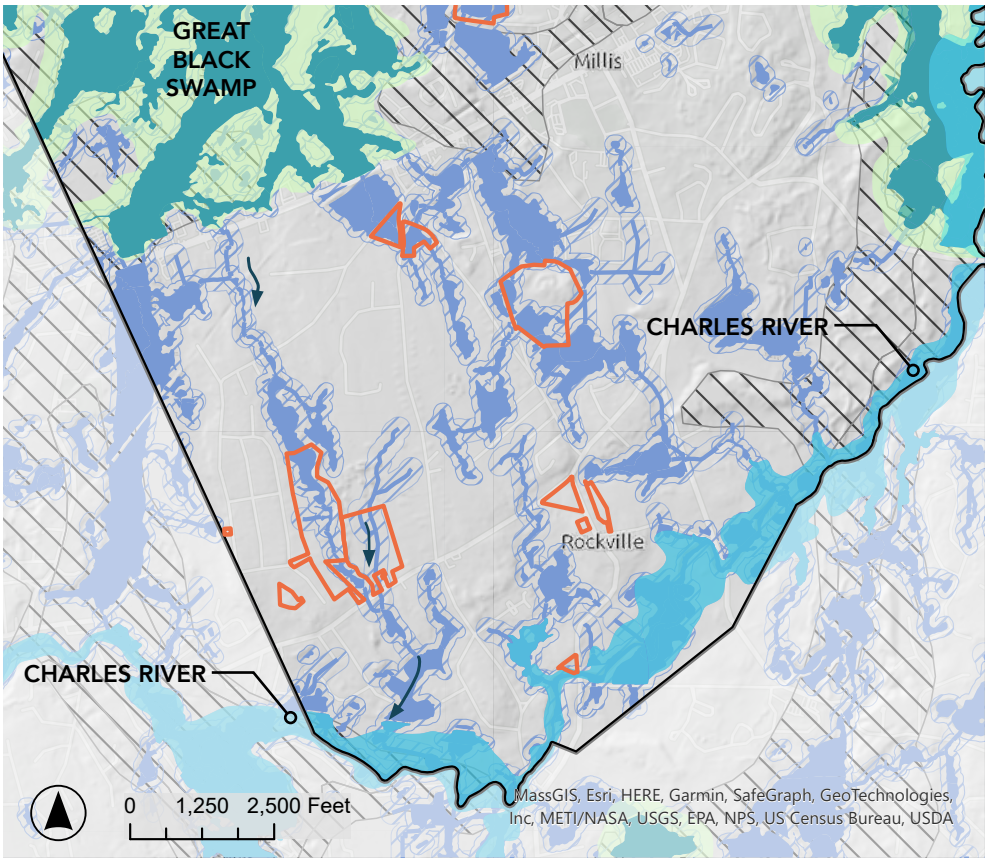
G. Neighbor's wetland



the Charles River along the town border. While the Braun property has the stream (F) that connects these water bodies, Village Street has the forested wetland that stores water from the north and drains slowly back into the stream and continued wetland system immediately to the south. All this to say, Braun and Village Street serve different but complementary functions for the same system, movement and storage of water respectively.

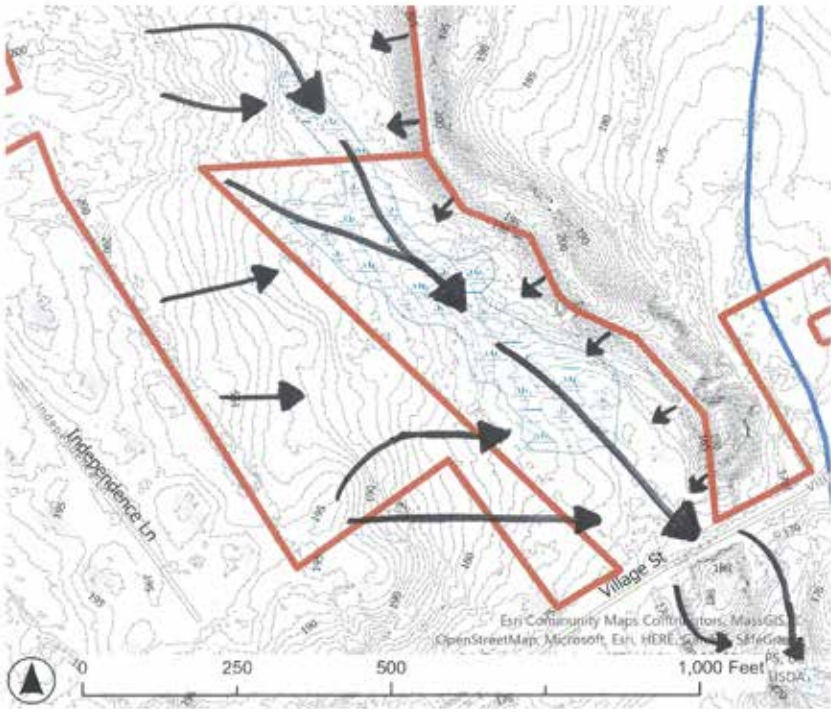
While the southern portion (A) is similar to Braun in its being a cleared wetland area, the northern portion (C) is heavily forested and part of a contiguous forest patch that stretches north to Main Street and west to Oakland Street in the neighboring town of Medway.





Topography & Drainage

The eastern portion of the Village Street property is an esker, which serves as the property boundary for Braun (the significance of eskers as a landform was discussed on page 93). Other than the narrow ridge that is the esker, most of the property is at or below 5% grade. In regards to drainage, the esker acts a micro-watershed divide, meaning that none of the water on Village Street drains directly to the stream that runs through Braun; rather, water mostly moves into and through the wetland on the parcel between Village Street and Braun (see G on previous page), or flows across the open field, parking lot, and street, before making its way to the Braun stream and wetland directly to the south.



Micro-watershed illustrated with drainage arrows showing the direction of water flow through the landscape.

Mown hayfield at the Village Street parcels.

Saturated trail with poorly maintained plank walkway on the Village Street parcels.

Recommendations

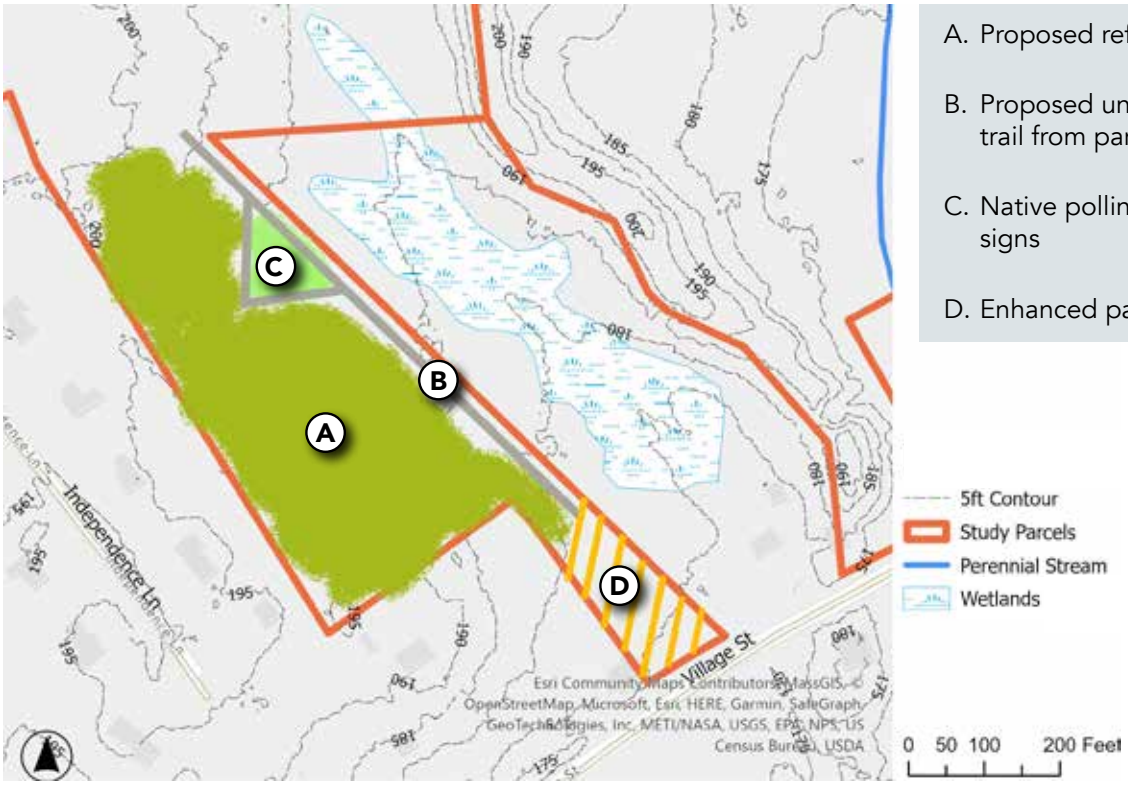
Allowing forest succession on the southern parcel:

The process of land use planning is one of weighing values; the most ecologically sound decision is not necessarily the most feasible or desirable. In the case of Village Street and the Braun property, recreation and agriculture, with high cultural value in the Millis community, are at odds with the ecological health of the Millis waterways. That's not to say that these uses are mutually exclusive; but it is important to make land use decisions with informed intention, in order to ensure the needs of all communities (human and otherwise) are considered.

Village Street and Braun are part of the same wetland system, and so it is pertinent to evaluate their impact (together and separately) on that waterway, and ensure decisions are made with waterway health in mind. With Braun, the cultural value of agriculture was considered as a primary driver in recommendations, and though as public land the Town can make decisions encouraging sustainable practices on that land, agriculture can easily be a strain on local watersheds.

Recommendations for the Braun property focus on agriculture; recommendations for Village Street will prioritize the integrity of the wetland system. **This plan recommends that large portions of the southern parcel are allowed to return to forest (A).** Given the topography of the parcel, stormwater drains southeast across the landscape and into the neighboring wetland, before hitting the road subsequently joining the Braun stream to the south (see drainage map on previous page). The current landcover (mowed hay) is not particularly conducive to keeping water on site; this encourages the displacement of fertilizer into the wetland and stream system (ultimately draining to the Charles).

Allowing the fields to become forest through succession would eventually create a landscape with more diverse species and structure; this would increase the amount of water that stays on site, minimizing stormwater interactions with roadside contaminants; additionally, foregoing the fertilizing



A. Proposed reforestation

B. Proposed universally accessible trail from parking area to forest

C. Native pollinator garden and signs

D. Enhanced parking

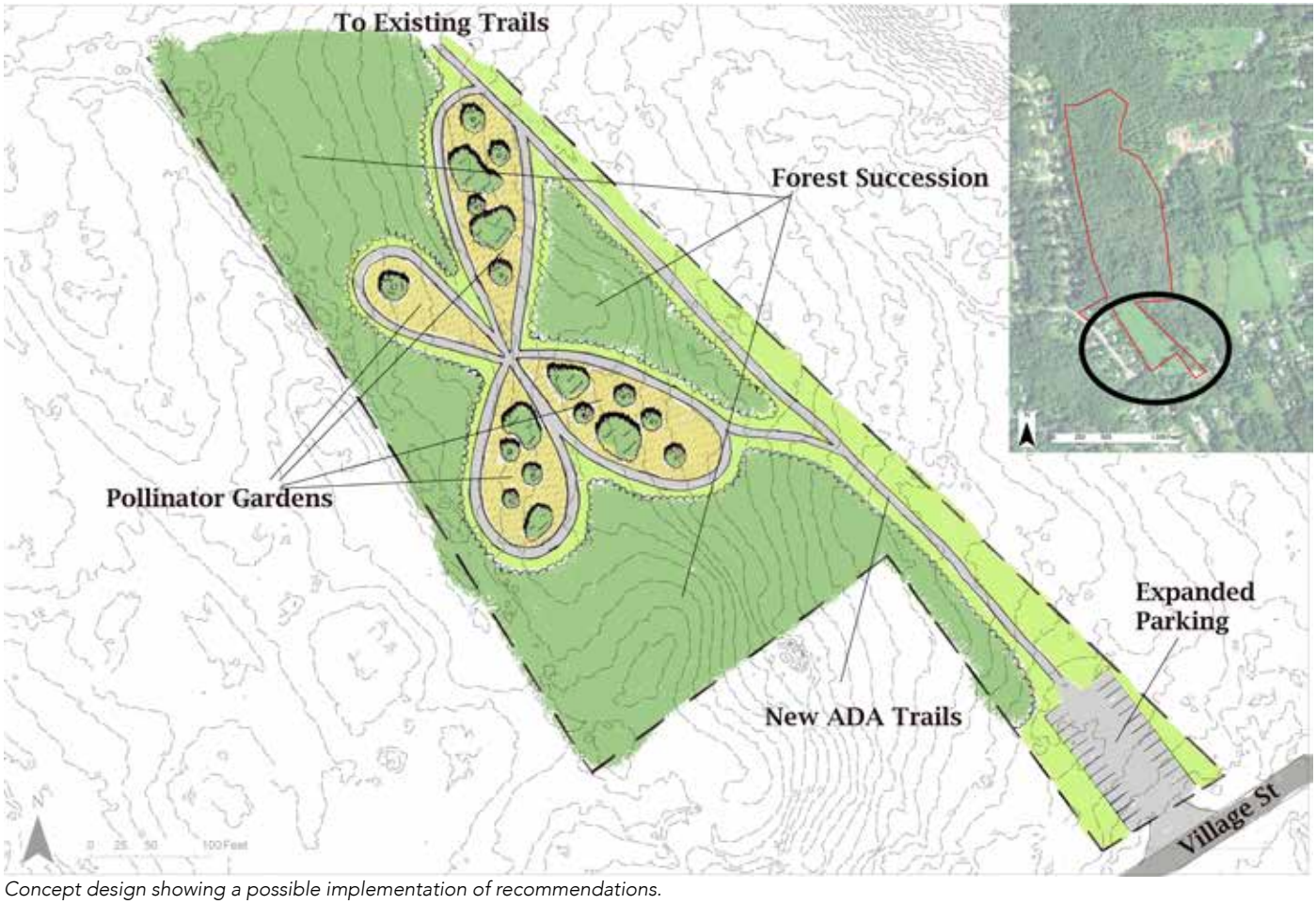
practice would immediately minimize nutrient runoff into the stream system. Finally, the new forest would act as an extension to the already established forest in the northern portion of the parcel, which in turn is part of a larger forest system extending through much of Millis and neighboring Medway.

Defining access from street to forest:

Reforestation generally requires that the public not heavily interact with the newly establishing areas, given the vulnerability of seedlings and pressures from non-natives species. However, there is no defined path from the parking area to the existing paths to the north. **In order to protect forest succession, it is recommended a path be formally established from the parking area to the trails (B).** This could serve as an opportunity to create more universally accessible trails, identified earlier as a priority for Millis. The gentle slopes of this area, and the fact that it is at present cleared of vegetation, makes Village Street suitable for this sort of development.

A landscape in succession does not necessarily read as intentional or cared for; creating cues to care can help make that clear to the public. **Native plant gardens and educational signage can guide the public towards support of these projects, in addition to providing beauty and wildlife benefit in the form pollinator gardens (C).**

Additionally, rebuilding and defining the parking area could both allow more engagement by the public, and decrease runoff depending on materials used. **It is recommended that the parking area be expanded and constructed with permeable materials (D).**



Concept design showing a possible implementation of recommendations.

BRANDYWINE LOT

Overview & Analysis

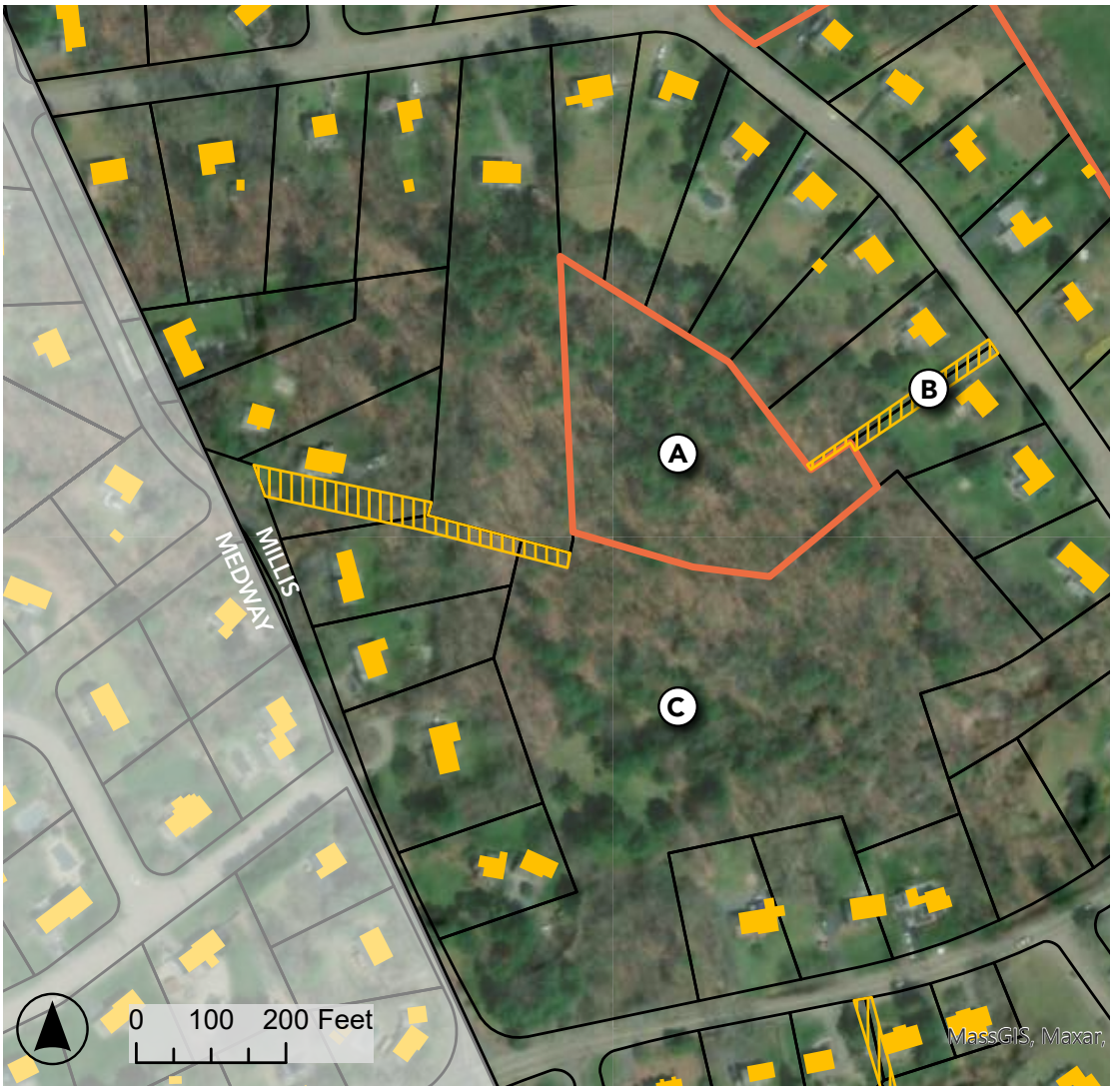
The Brandywine lot (A) is a 2.25-acre parcel that is surrounded on all sides by residential properties; access to the road is by an easement (B). It is heavily forested, and has never been built on.

Land Use

The Brandywine Lot and surrounding area are zoned as Residential Suburban; to the west of the parcel is the town line with Medway. The area is largely residential, and the lot abuts the backyards of 13 neighboring developed parcels. Directly to the south of the Brandywine Lot is another undeveloped and wooded parcel (C); this parcel has road frontage, in addition to an easement connecting to Farm Street. Although far from downtown Millis, this area is one mile from downtown Medway as well as the smaller center of southern Millis.

Ecology

In terms of town-wide ecological value, the Brandywine Parcel scored among the lowest, earning a 1. Although entirely wooded, it is part of a mosaic of development that extends north for some distance (D); for this reason it does not appear to be vital in regards to habitat connectivity, with other corridors and connections existing around this developed area (E). Furthermore it does not fall within the buffer zones of any nearby wetlands.



A. Brandywine lot

B. Easement to Independence Lane

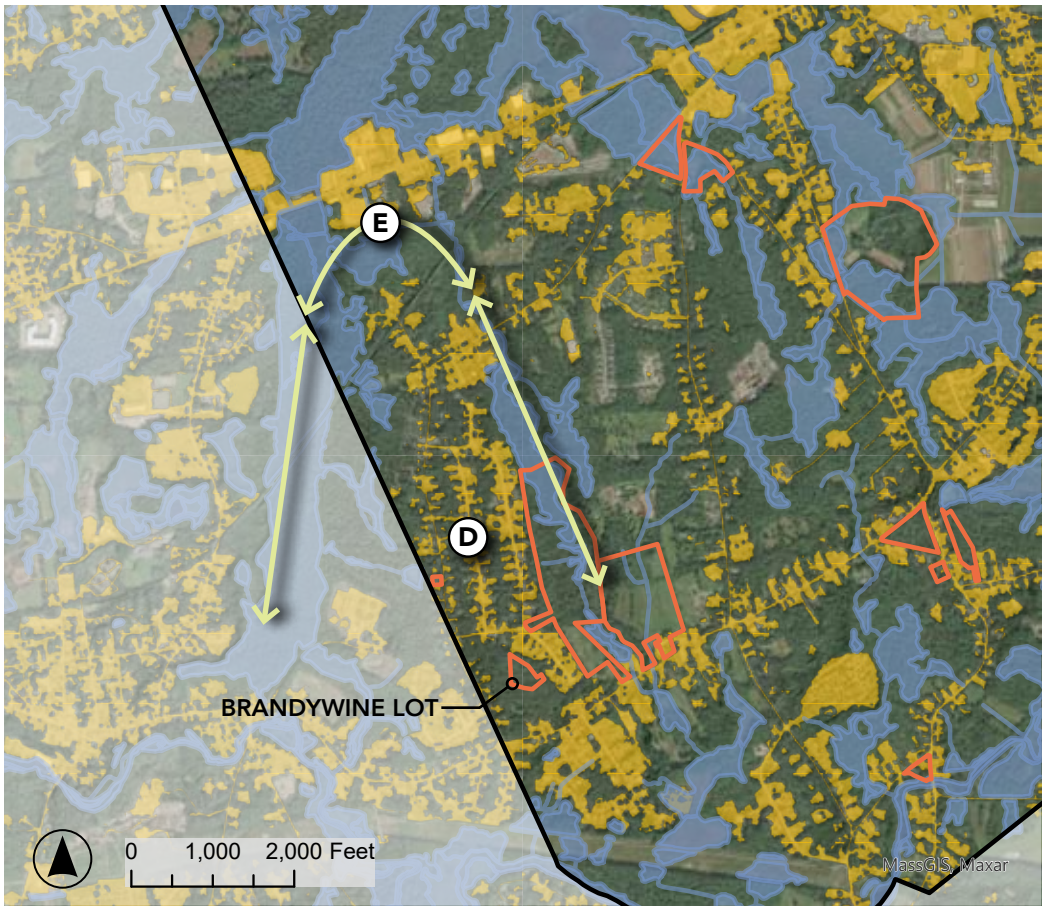
C. Adjacent undeveloped lot with street frontage

Study Parcels

Parcels

Easements

Buildings



D. Developed corridor

E. Contiguous forest and connections

Study Parcels

DEP Wetland

Hydrologic Connection

Developed Areas

That's not to say that the forest is devoid of ecological value; it's likely any number of local species make their home in the forest, and though residential development makes travel more difficult for some species, many others can travel given the tree cover running between homes. Furthermore, the tree canopy has myriad benefits to those living in the community surrounding the Brandywine Lot. Canopy cover keeps residents cool during the summer, and creates privacy.

Recommendations

Gather information from neighbors:

The Brandywine Lot may be valued by the residents whose backyards encircle the parcel. **For this reason, it is recommended that surveys and other information gathering efforts be made to better understand the values and desires of residents off of Farm, Independence, Brandywine, and Village Streets.** This is especially important as the two alternative recommendations for this property, based on the framework and analysis, are rather different in regards to privacy and ownership.

Divestment and presumed development:

The first possibility is divestment, which would provide the immediate benefit of increased Town funds (which in turn could go towards any number of previously explored needs). The basis for this recommendation is a lack of ecological or cultural value associated with the land, though given that it is likely in the shared interest of the neighbors (and the whole town) that as much canopy cover be preserved as possible; **if selling the land, it is recommended that stipulations be made regarding the amount of clearing that can be done on the property.**

Development would likely occur immediately west of the easement (see (B) on page 102), given the desire for convenient street access. This would put development in a somewhat prominent location of three neighbors on Independence Street. It should be noted that this property does not conform to zoning requirements in regards to lot frontage, so it is unclear how desirable purchase would be; surrounding neighbors with frontage on Independence Lane could be potential candidates for purchase.

Creation of passive recreation space:

The second possibility is retaining the land for the public and creating amenities and infrastructure for passive recreation. The eastern easement (see (B) on page 102) and the western easement off Farm Street (see (C) on page 102) could potentially be used for access; additionally, all of the surrounding neighbors would have easy access from their backyards (and it could be that some trails have already been unofficially established).

With this option, acquisition of the vacant parcel directly to the south (C) becomes desirable. This would provide more direct access via the street and more than double the amount of land available to the public.

Pros and cons of alternatives:

The merits of these two options are relative to the sentiments of the neighborhood, and how they perceive their relationship to this land. In general, residents tend to value privacy; this could be at odds, however, with notions of communal ownership. Specifically, residents might not appreciate neighbors walking around their backyards. They also might not appreciate what they had for years considered an extension of their yard suddenly becoming private and inaccessible.

For those who already consider the land public, an acknowledgment and formalization of trails could be appreciated (though even then, an increase in traffic by “strangers” might not be). For those who value privacy, it could be that neither of these options are desirable; development of a home and more permanent occupancy of “backyard land” might be as equally undesirable as increased use by “strangers.”

Privacy advocates could suggest conservation as a means of keeping the land free of people, and while that does have ecological benefit, it is not as supported by the conservation framework as other uses. The next step in determining future use of this parcel involves a more thorough public process and investigation of alternatives.

(A) Corner of Farm and Village Street (Google Street View).

219B FARM STREET

Overview and Analysis

219B Farm Street is a 0.25-acre tract of wooded land that has never been developed (A). Behind this lot is a 0.2-acre parcel with no street access (B), west of which sits the town line between Millis and Medway.

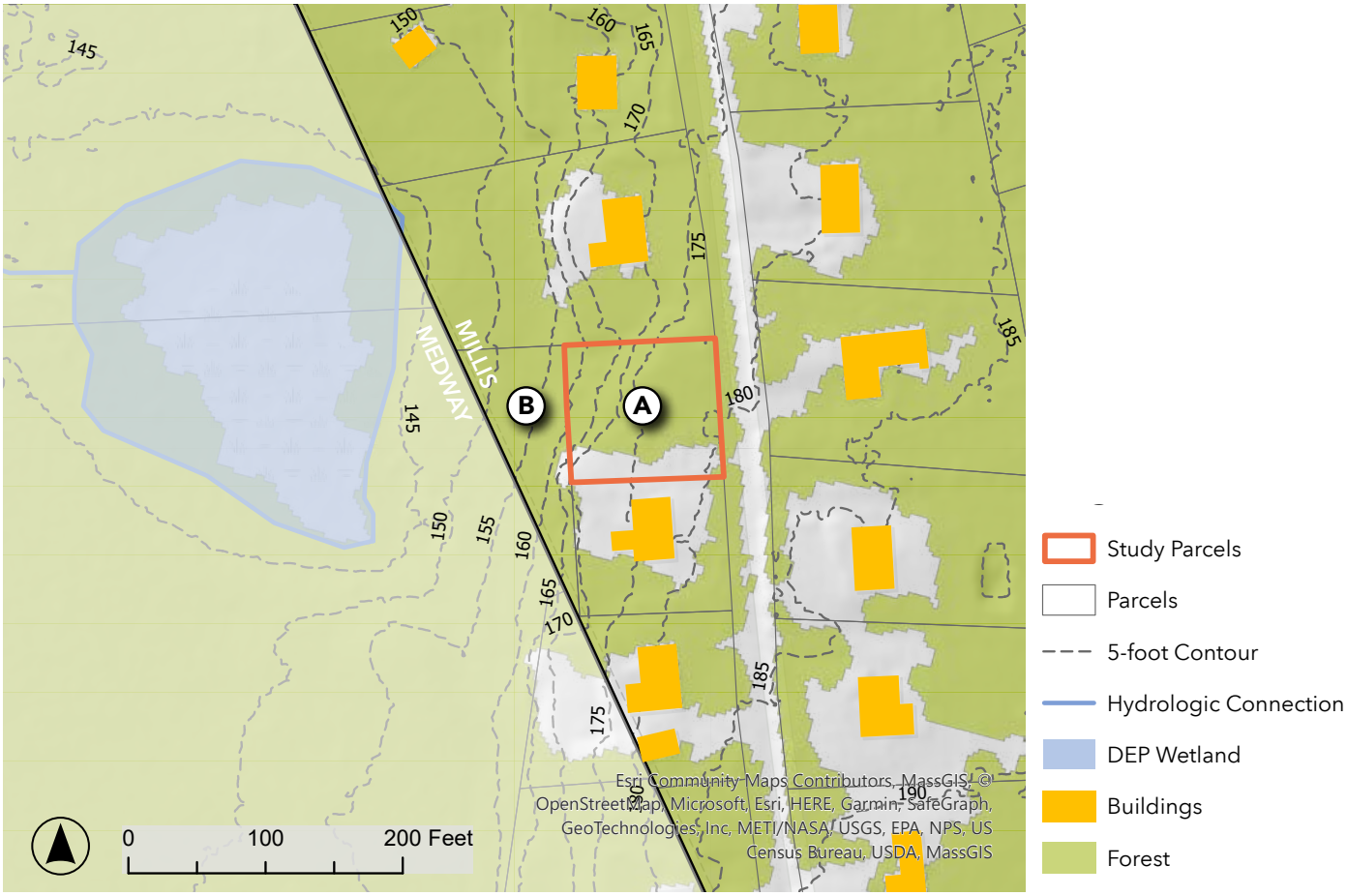
Land Use

219B and the surrounding area are zoned as Residential Suburban; this is of particular note as the minimum lot requirements for principal structure and use are 25,000 sq ft, i.e., 0.57-acres, which is not met by 219B. The surrounding area is consistently developed but with good retention of forest cover, and is adjacent to a large swath of contiguous forest to the west in Medway (visualized in the Brandywine Lot analysis). The area is largely residential, and is located closer to downtown Medway than downtown Millis. 219B sits close to the Millis/Medway town line; across the line are public lands, with a water treatment plant to the south and conservation land to the north.

Ecology and Topography

219B is almost entirely greater than 8% grade, with a small section in the northeast that is relatively flat (C). The western half of the property falls within the 200-foot buffer of a wetland and pond in Medway (D); given the steep topography, that makes stormwater runoff and erosion a concern on the property, should it be developed.

In regards to wildlife habitat, 219B is wooded and at the eastern extent of a long wildlife corridor in Medway stretching north to south. Although wildlife would be less likely to continue to the east given residential development, the close proximity to a water source and continuity of woodlands up to the lot means that 219B is still of ecological value, despite its score of 2.



Recommendations

Establish dialogue with Medway regarding their adjacent conserved land:

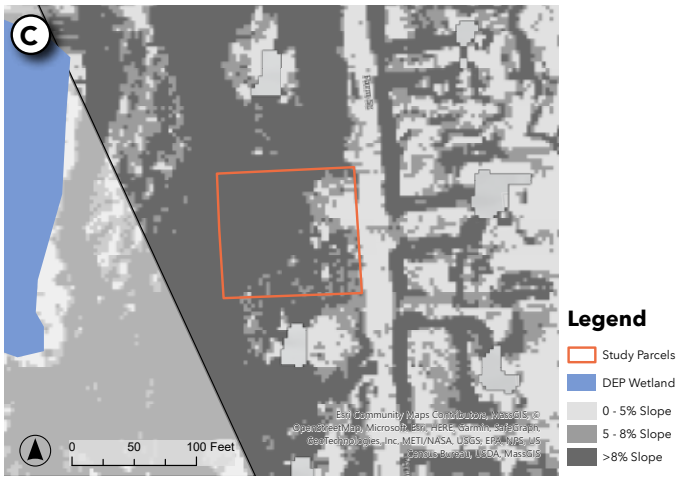
219B and the adjacent vacant lot hug the Millis/Medway border; on the other side is a large swath of conserved land (E) identified for potential passive recreational use in the Medway 2019 OSRP (Conservation Words). This land directly abuts the Medway Rail Trail. **It is recommended that Millis reach out to Medway and clarify any plans for trail development that may exist.** The proximity to the town line and the town-owned property of 219B provides an excellent opportunity for collaboration between the two towns; costs of development for trail extension could be shared and a large trail system established at reduced price to both towns, with shared access.

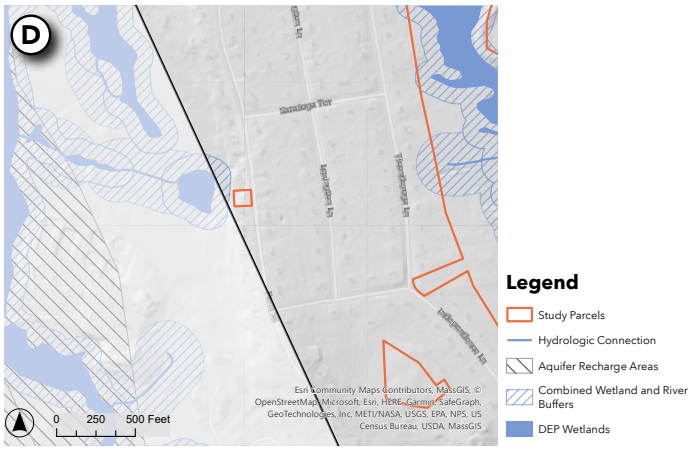
Using 219B as a point of access could be potentially difficult, given the steep slope; however, if done in conjunction with vegetation establishment, trail development could provide longterm stability to the sensitive area. This plan would likely necessitate either the acquisition of the neighboring parcel (B) or at the least an easement through; a small easement would also be necessary through the property south of the conservation land, however this is also municipal Medway property.

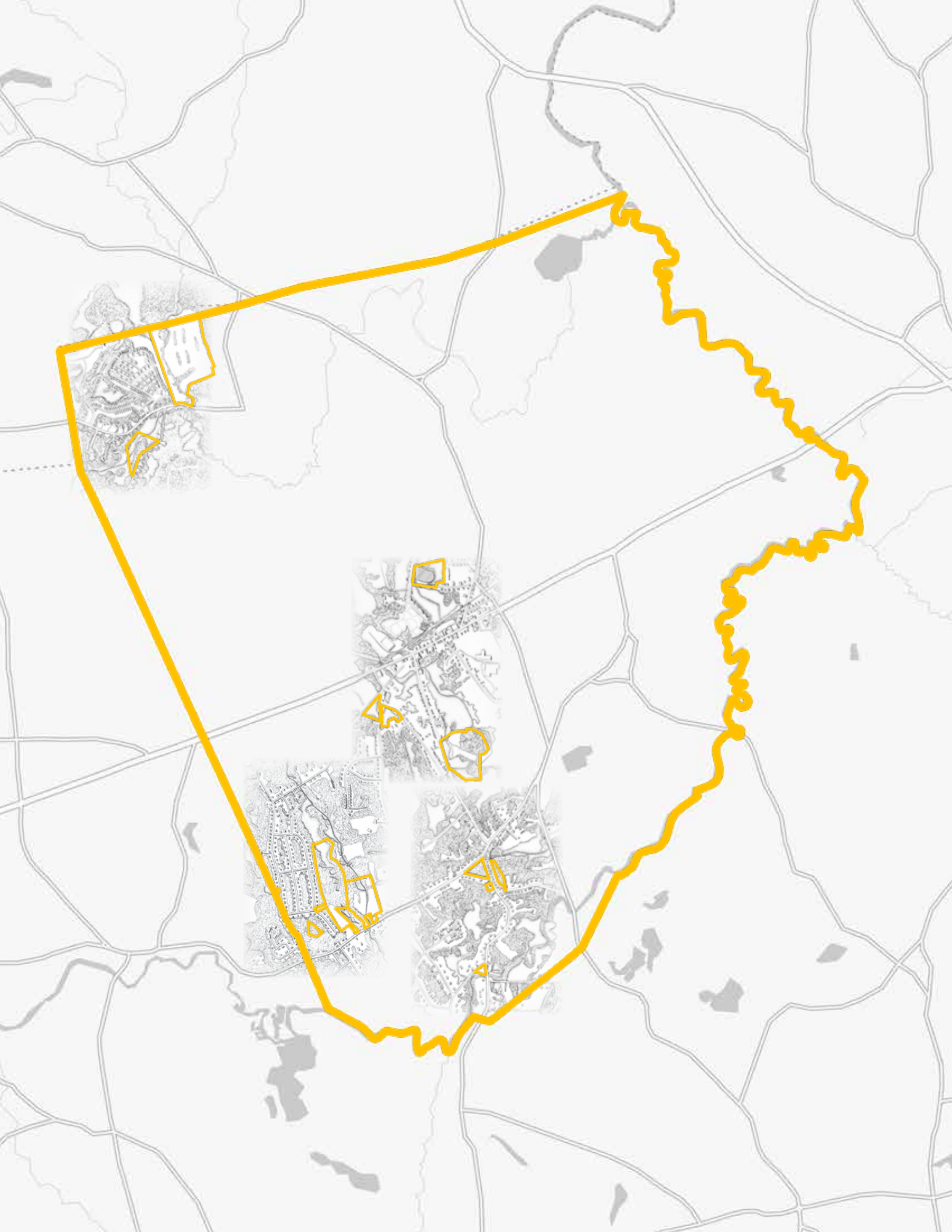
Gauge interest in acquisition of the parcel:

Given the proximity to wetlands (D) and very steep slope (C), it is recommended that any development be done with caution; furthermore, the parcel is not large enough to meet the minimum lot requirements for the zoning district (and even acquisition of neighboring parcel (B) would fall under the minimum); however, regardless of acquisition of said parcel, zoning could be bypassed via 40B if development were for affordable housing. And though the parcel is near a wetland, 219B received a very low ecological value score.

Another option is divestment, which could lead to development of affordable housing or acquisition of the parcel by a neighbor. The former should be done with oversight by the Millis Conservation Commission; the latter, given current zoning, would mean only auxiliary structures could be built, which would be relatively low impact.







Phelan

TOWN-WIDE

In order to provide systematic support for the parcel recommendations and assist in the Town's future decisions regarding development and conservation, the following are suggested town-wide actions:

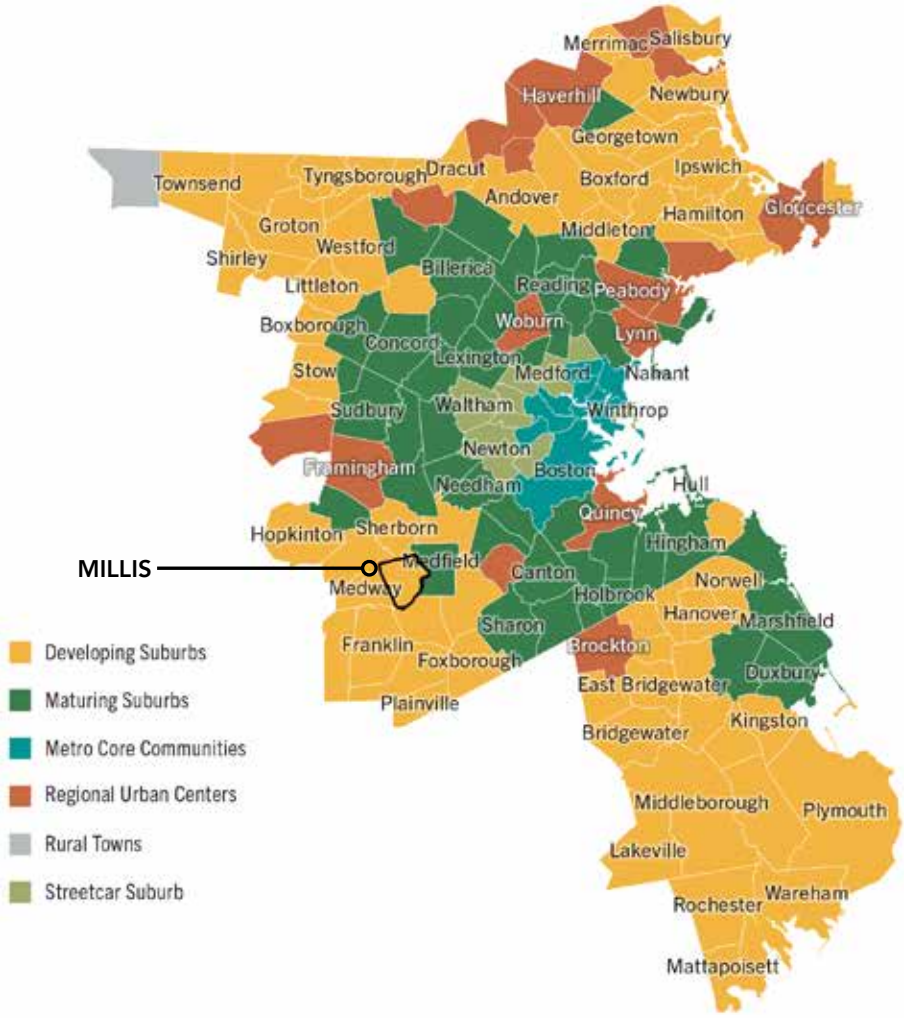
1. Develop Affordable Housing
2. Construct Universally Accessible Trails
3. Expand Town Wetland Protections
4. Create an Open Space Management Plan
5. Implement Centralized Town Wayfinding

TOWN-WIDE

1. Affordable Housing

According to the 2022 Greater Boston Housing Report Card, a study conducted by the Boston Foundation and Boston University, "our region [Greater Boston including Millis] has failed to build sufficient housing for a couple of decades running" (19). Some stark metrics that indicate this are homeowner and rental vacancy rates, which, in the Greater Boston Area (GBA), are among the lowest of major metropolitan areas in the country. Along with this insufficient housing supply is the dramatic change in affordability since the pandemic; "almost half of Greater Boston renters are housing cost burdened" (41). Additionally, "housing costs have increased faster than incomes for the poorest third of families, exacerbating local inequality" (41).

Millis, considered a developing suburb in this report, has an important role to play in addressing this regional (and nationwide) issue. Although recent housing developments (like new 55+ communities) have helped in increasing the housing stock, they largely cater to a small subset of the regional population; poorer individuals in Millis, especially older folks looking to downsize (and may be on a fixed income), are not having their needs addressed. Young families looking to own their first homes are excluded entirely.



Graphic from the Greater Boston Housing Report Card 2022, showing towns in the Greater Boston area and their community type designation (Boston Foundation).

Millis (and other developing suburbs) can help solve this housing crisis without compromising the character of the town that current residents have grown to love, specifically the abundant open space. This requires planning. Therefore, it is vital that Millis develop plans that allow for affordable housing in ways that do not compromise the ecological integrity and cultural character of the town. Recent trends in development (low density, high cost) are not conducive to the preservation of these characteristics.

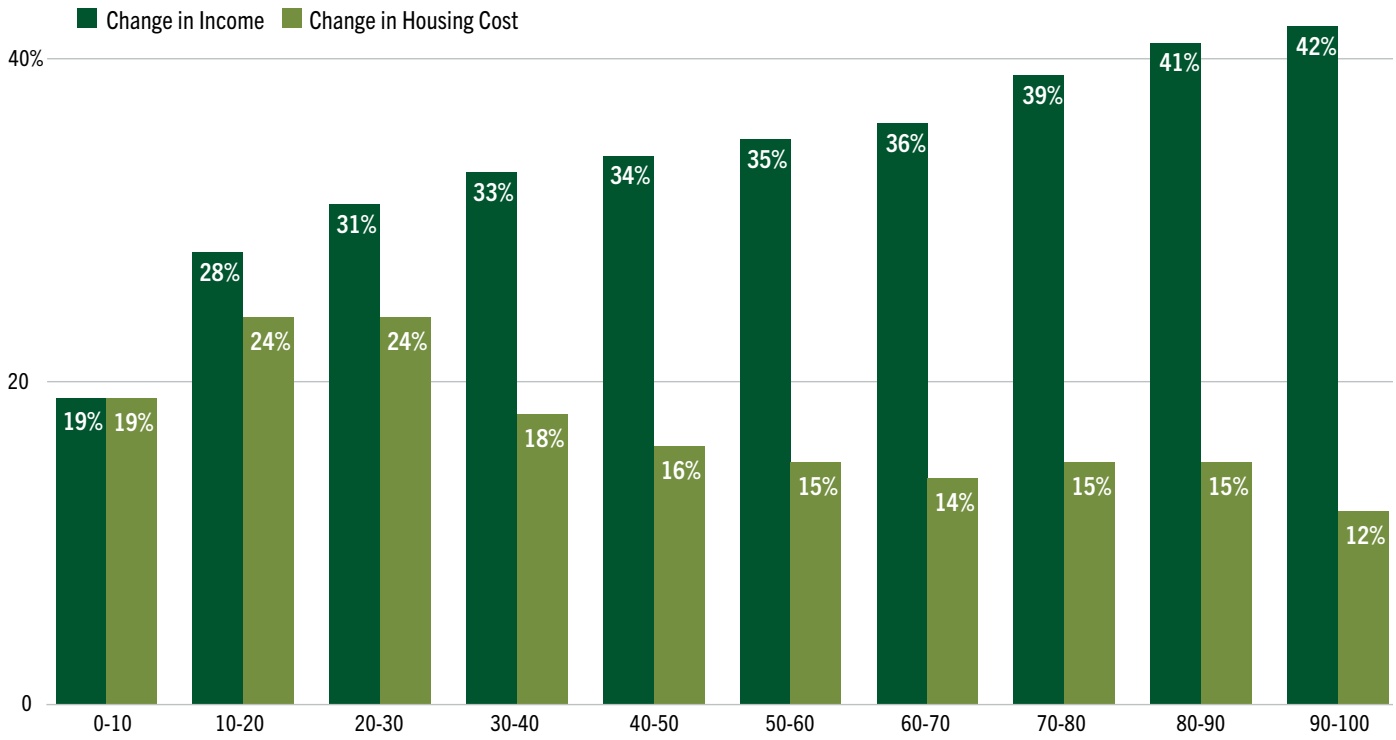
It is recommended that Millis prioritize new high-density affordable housing as well as the conversion of existing housing stock into affordable housing via deed restrictions. Current zoning in Millis is not conducive to this kind of development. Opportunities to change this include form-based zoning and the creation of Smarth Growth Overlay Zoning Districts, both of which help to preserve the

character of the town (Executive Office of Energy and Environmental Affairs "Case Studies"; Housing and Community Development "Chapter 40R"). Transfer of Development Rights is another regulatory strategy that aims to increase permanent protections of open space and focuses energy on revitalizing other areas like town centers (Executive Office of Energy and Environmental Affairs "Smart Growth"). And while changing of zoning bylaws is a lengthy process, 40B allows for this sort of development to continue in the meantime.

Given the housing crisis in the Greater Boston Area, it is worthwhile to address the shortage at all scales of housing units from single-family to large apartment buildings. Furthermore, low-income individuals and families deserve options for housing instead of the standard affordable-housing apartment complex. Millis has the opportunity to create deed-restricted affordable housing from existing stock and can also develop new housing stock on town-owned lands. These measures can help maintain the existing character of town in terms of housing and community style while also filling the "missing middle" of affordable housing. Repurposing already existing development instead of disrupting functioning ecosystems for new developments also maintains the ecological health of Millis that contributes significantly to its rural character.

Over the last decade, housing costs have increased the most for lower-income households.

Percent change in incomes and housing costs by income decile, between 2010-2020.
The left of the graph shows lower-income households; the right shows higher-income. Greater Boston.



Note: Analysis adapted from Apartment List report, "Housing Markets and Income Inequality." Nominal dollars.
Chart: Boston Indicators • Source: 2010, 2020 5-Yr American Community Survey.

Graphic from the Greater Boston Housing Report Card 2022, showing the increasing gap between income and housing cost (Boston Foundation).

Noquochoke Village Case Study

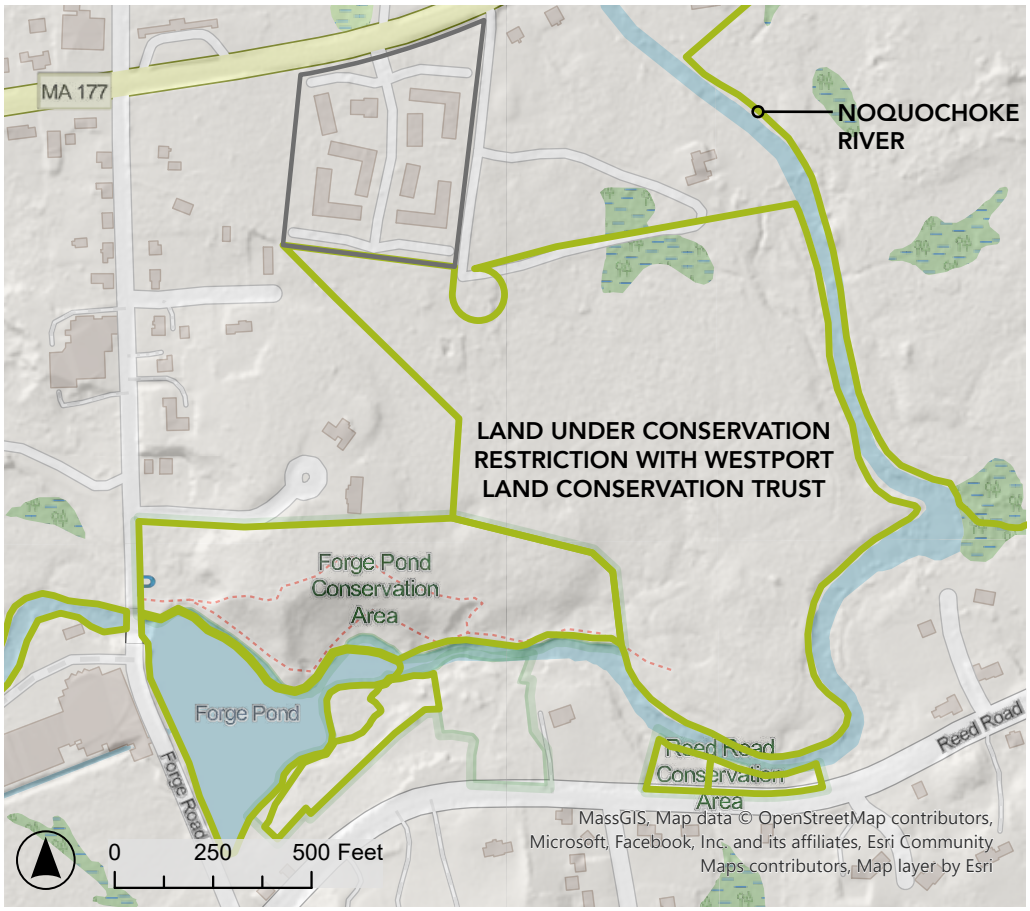
In September 2018, families, seniors, and people wanting to live alone all entered the housing lottery for a spot in the newly constructed, multi-family residential community Noquochoke Village in Westport, Massachusetts (Staff Writer). With a total of 50 units spanning seven buildings and providing a mix of one-, two-, and three-bedroom rental flats and townhouses, this development really does provide something for everyone. But it didn't come easy. The plan for this housing development, with a mix of affordable and market-rate units, began over a decade before it finally opened its doors to new residents. Originally zoned as Residential / Agriculture, multi-unit developments were not allowed by right on this parcel, so the first step for this development was taken at a town meeting in May of 2009. At this meeting, the residents of Westport voted in favor of rezoning this area to create a special overlay, allowing development of multi-unit housing. This is Westport's first affordable rental housing development available to families and individuals, adding to existing senior housing apartment buildings.

But what really makes this development special is its proximity to open space and hiking trails. Before development, this 30-plus-acre parcel of land was owned by the Town of Westport. Working with the Community Builders Inc., the Town created a plan for development of five acres of the plot, along the frontage on Route 177 (Staff Writer). The housing development included a carefully thought-out plan for the new septic system to minimize impact to the nearby Noquochoke River (DBVW Architects). Meanwhile, the Town reserved 22 acres of the parcel as open space, placing them under Conservation Restriction with the Westport Land Conservation Trust (Staff Writer). This land abuts the Forge Pond Conservation Area, another tract of protected land with hiking trails that connect to the housing development. With this development plan, the Town strove to preserve as much open space as possible while also creating much-needed affordable housing and housing-unit options for the town.

But the Town's thoughtfulness with this development didn't stop with the preservation of open space and providing hiking trails to the new residents. The new community's design was also created to emulate the vernacular of connected farm buildings common all over the South Coast region of Massachusetts (Noquochoke Village). Even the subtle paint colors chosen for the buildings are meant to blend in with the rural landscape of Westport (Staff Writer). The community's website invites potential residents to "enjoy the unique and timeless charm of Noquochoke Village with a design consistent with the historic, pastoral character of Westport" (Noquochoke Village). Noquochoke Village is an example of how thoughtful planning can lead to one parcel being able to address housing needs while fitting with the town's existing character and prioritizing continued protection of open spaces and ecologically valuable areas.

Updated Town Plan

Millis's Town Plan has not been updated since 2000, twenty-three years ago. Over the last five years, Millis has seen many new housing developments in town. These low-density developments are incongruent with Millis town residents' love of the rural character and prevalence of natural areas of the town. An updated Master Plan can help Millis be forward-thinking about the future and whether the town would rather prioritize development or conservation and in which areas of town development would best be concentrated.



Legend

- Noquochoke Village Parcel
- Protected OpenSpace

Google Street View of Noquochoke Village entrance.

2. Universally Accessible Trails

As part of the Americans with Disabilities Act (ADA), local governments are required to make reasonable modifications to policies, practices, or procedures to prevent discrimination on the basis of disability (ADA.gov). In order to ensure the continued availability of access to Millis's many open spaces and natural areas, it is in the Town's best interest to develop trails meeting accessibility standards.

Millis does not currently have any universally accessible trails; in any town this would be considered an issue, given the right for all kinds of people to enjoy nature. However, recent demographic trends and shifts within Millis make this a particularly pertinent issue within the town. The proportion of residents in Millis aged 55+ has been increasing since 1990 due to a general trend of residents aging in place; this has been accelerated by three 55+ communities being built in the past four years (Manson et al. 1990, 2000, 2010, 2016-2020). The 55+ population increased 13% from 2000 to 2010, but with the new 55+ communities, this population is projected to increase by 42% from 2010 to 2020. 35% of Millis's 2020 population is projected to be 55+, which undercounts the actual population since the new communities had just begun to open when the 2020 census was conducted (Manson et al. 2016-2020). Given this, Millis residents are increasingly likely to need accessible trails in order to enjoy the beauty of Millis.

Part of the accessible trail at Lake Wallace is surfaced with decomposed granite, and the entire trail is lined with a guide wire to provide wayfinding cues for those with visual impairments.

Accessible boardwalk at Lake Wallace Sensory Trail, Belchertown, MA.

An accessible gathering and wetland viewing area at Lake Wallace.

3. Expansion of Town Wetland Protections

As more affordable housing is functionally mandated by state laws such as Chapter 40B and the MBTA Multi-Family Zoning Requirement and demand continues to grow, vacant land in Millis may need to be developed (Housing and Community Development "Chapter 40B" and "Multi-Family Zoning"). And while high-density zoning (mentioned on page 110) could help in preventing sprawl, even these smaller-footprint developments have the potential to influence the wetlands around them.

Just under one-third of Millis is mapped by the Massachusetts DEP as wetlands; while a number of these were covered by a Conservation Restriction in 1977, a large proportion have no restrictions beyond those laid out by the state Wetlands Protection Act and the more specific criteria laid out by the Town. It is clear that conservation is a primary concern for residents of Millis (based on community data from this project as well as the 2019 OSRP). And while all wetlands are important, those within Millis fall specifically within the Charles River Natural Valley Storage Area, and in that way provide critical function in regulating water flow into Boston. Given the infrastructural, cultural, and ecological value of Millis wetlands, and the likelihood of more development in Millis' future, **it is recommended that wetlands in Millis receive greater protections through the following actions:**

Revise Wetland Protections Language Surrounding Replacement

Laid out in the Town of Millis Wetland Protections Bylaw Rules and Regulations are standards that are more specific than those mandated by the state; of particular note is the no-build zone, described in section 1.4.1: "No structures shall be placed within the inner 50-foot of the Buffer Zone(s) from the edge of a wetland resource area. A strip of continuous, undisturbed vegetative cover shall be maintained" (Town of Millis "Wetlands Protection Rules and Regulations," 4). While this provides in theory a level of protection for local wetlands, alterations (including outright development) can occur if done in conjunction with Wetland Replacement.

However, based on a conversation with Jesse Bellemare (an Associate Professor of Biological Sciences at Smith College), it seems as though these expectations set in the Rules and Regulations may not be realistic, in terms of both quality of replacement and time allotted for reestablishment. According to Jesse, it is very difficult for man-made wetlands to properly replicate the function of a naturally occurring wetland (criterion laid out in 4.2.2, Town of Millis "Wetlands Protection Rules and Regulations," 16). Furthermore, the amount of time required for establishment is likely greater than the three growing seasons expected in 4.2.7 (17).

Wetland area on Glen Ellen parcel.

Millis's Great Black Swamp.

Furthermore, a USGS report that studied a created wetland in Wisconsin over the course of eight years found that hydrology, soils, and plant species composition all remained distinct in the created wetland and did not, over time, adopt the composition of the original wetland (Hunt). Additionally, "After five years, it appears that the vegetation communities present in the created wetland are not any more similar to the natural wetlands than those observed initially after wetland construction" (Hunt, 4). This indicates the species reliant upon the original wetland's plants could not have their needs met by the replacement wetland. This report also compared cost between restoration of a wetland and construction of a new wetland and found that the restored site was significantly cheaper and was completed much more quickly than the construction. All of these findings indicate that wetland restoration is highly preferred over construction of a replacement wetland which attempts to move ecological systems from one site to another.

As it stands, the current language in Millis' Wetland Protections Rules and Regulations allows for the Performance Standards laid out in section 1.4 to be bypassed assuming the replacement of any degraded wetlands; any replacement, however, is unlikely to fulfill the ecological or infrastructural function of its predecessor.

For that reason, it is recommended that the language of Millis Wetlands Protection Rules and Regulations be changed to create a maximum area of wetland that can be developed, regardless of the degree of replacement.

Hire a Full-Time Conservation Agent

While providing stronger regulations creates a backbone by which preservation can be enacted, just as important is the means to actually enforce these regulations, and have the enforcement be justly compensated. For this reason it is recommended that Millis hire a full-time conservation agent. An agent would mean more time and expertise could be devoted to each Order of Conditions that is created regarding new developments near wetlands, and knowledge of the specifics of wetland function could ensure the intentions of the Rules and Regulations are adequately met by developers.

Stream on Braun parcel.

In tandem with a housing plan that promotes denser development, these recommendations will help Millis move responsibly into the future, addressing the needs of their community (local and regional) while retaining the character of the town that residents, old and new, will love.

4. Open Space Management Plan

The Public Forum, public survey, and personal communications with residents all highlighted that residents value Millis's hiking and recreation trails. Furthermore, many residents desire expansion of the trail systems to more fully take advantage of Millis's open space and beautiful natural areas. However, there is no agency or method for maintenance of the existing trail systems and many have fallen far behind the state they should be in (Town of Millis, "Town Budget"). Therefore, in order to successfully expand Millis's trail offerings, there must first be a clear plan and funding source for maintenance that will ensure management not only of existing trails but also of any new ones.

Maintenance funds can come from a number of different avenues. One possibility is to create a line item in the town's budget for maintenance. For example, the neighboring town of Medway allocates less money overall to their Recreation budget, yet they specify $10,000 of that to be used for trail maintenance (Town of Medway, 4). Holliston, another neighboring town, sets aside $1,000 specifically for their rail trail and they also have a robust non-profit associated with their rail trail (Town of Holliston, 19).

The creation of a Conservation Agent position can also help with the maintenance conundrum by designating one person to coordinate all maintenance activities. State grants aimed at open space may also apply, including the Parc Grant and others. Multiple routes to a successful maintenance regime exist, and it is up to the Town to decide which strategies to take. To include trail expansions in many of the parcel-specific recommendations in good faith, a recommendation for a comprehensive town lands maintenance plan is necessary. Without a comprehensive maintenance plan, the existing list of maintenance needs will likely not be addressed, and the addition of new trails will only strain any management even more. Perhaps the most important action to increase use of town lands and foster residents' continued love of Millis's rural character and open spaces is the creation of a Town Open Space Management Plan. It is recommended that this plan be developed before or in tandem with parcel-specific recommendations which will largely increase the maintenance needs of those parcels.

Waterlogged trail at Village Street.

Hikers navigate downed trees on Village Street.

Wobbly and unsound stone table and bench at Richardson's Pond.

Stairs leading to the Charles at Waites Mill Park in need of repairs.

Waterlogged and frozen path next to Bogastow Brook at Glen Ellen.

5. Centralized Town Wayfinding

In order to make the most of the town's ample open space and passive recreation options, a centralized system of town wayfinding is highly recommended. With a centralized system, all trails would use the same wayfinding system, creating consistency with blazing, trail name signs and arrows, and trailhead maps. Having a consistent system will help people more easily follow the trails and understand the trail systems. Additionally, it will help people recognize that all the trails with that wayfinding system are part of the town's trail system.

Furthermore, having a digital collection of all town trail systems on the town's website will help people learn about the trails and increase their visibility and use. These trail maps should all be made in the same style and include similar elements for ease of legibility. Since the town does have such a rich system of trails, the potential also exists for a town-wide trail to be created that connects trails through the woods with other public-use areas like sports fields. This town-wide trail could also include redevelopment of all or a portion of the railroad line through town, to increase the connection between parcels with trails. Resident enthusiasm for a rail trail was demonstrated during community engagement sessions. In addition, the designated scenic roads in town, and/or the new sidewalks installed as part of the Complete Streets program could provide connection between town parcels for pedestrians. Millis already has a valuable and rich set of trails, and creating a centralized town wayfinding system as well as promoting a cross-town connection of trails can help the town fully tap into the potential of these parcels and increase the public's knowledge of them.

Wayfinding at the Lake Wallace Sensory Trail includes signs in braille connected by a guide wire lining the entire path to provide accessible navigation for those with limited or impaired visibility.

Educational sign at the Lake Wallace Sensory Trail describing ecological processes of the lake.

Part of the neighboring town of Medway's website is designated for maps of town open spaces ("Trails & Maps").

A typical wayfinding system includes a variety of sign types that fall into four main categories: direction, confirmation, information, and regulation.

Direction
This type of sign is used to get a visitor from point A to point B, using arrows or other directional cues. Sample applications include a road sign directing a driver to make a turn or a colored blaze showing a hiker which path to take.

Confirmation
This type of sign verifies that a visitor has arrived at the correct location. Sample applications include a trailhead sign posted at the start of a path or a sign at the end of a parking spot indicating where a driver should stop. Sometimes directional signage provides sufficient clarity, rendering additional confirmation signage unnecessary, but this should be determined on a case-by-case basis.

Information
This type of sign generally includes more detail about a location or feature in the landscape for visitors. Sample applications include a kiosk at a parking area with trail map and property hours or an educational sign describing the function of a wetland or meadow species.

Regulation
This type of sign is used alone or in combination with others to make sure that visitors conduct themselves in a way that respects town property. Sample applications include a trailhead sign that lists prohibited behaviors such as littering and letting dogs off-leash or a trail sign reminding visitors to stay on the path. Regulatory signs like this can be used in combination with any of the other three sign types.

Direction sign sample (Grenadier™).

Confirmation sign sample (Grain Designs).

Information sign sample ("Rise Park").

Regulation sign sample (Adobe Stock).

Adobe Stock

5

RESOURCES & REFERENCES

APPENDIX A

The Core Team and student team hosted a Public Forum at the Millis Public Library on January 31, 2023 from 7-9pm. The agenda included the following:

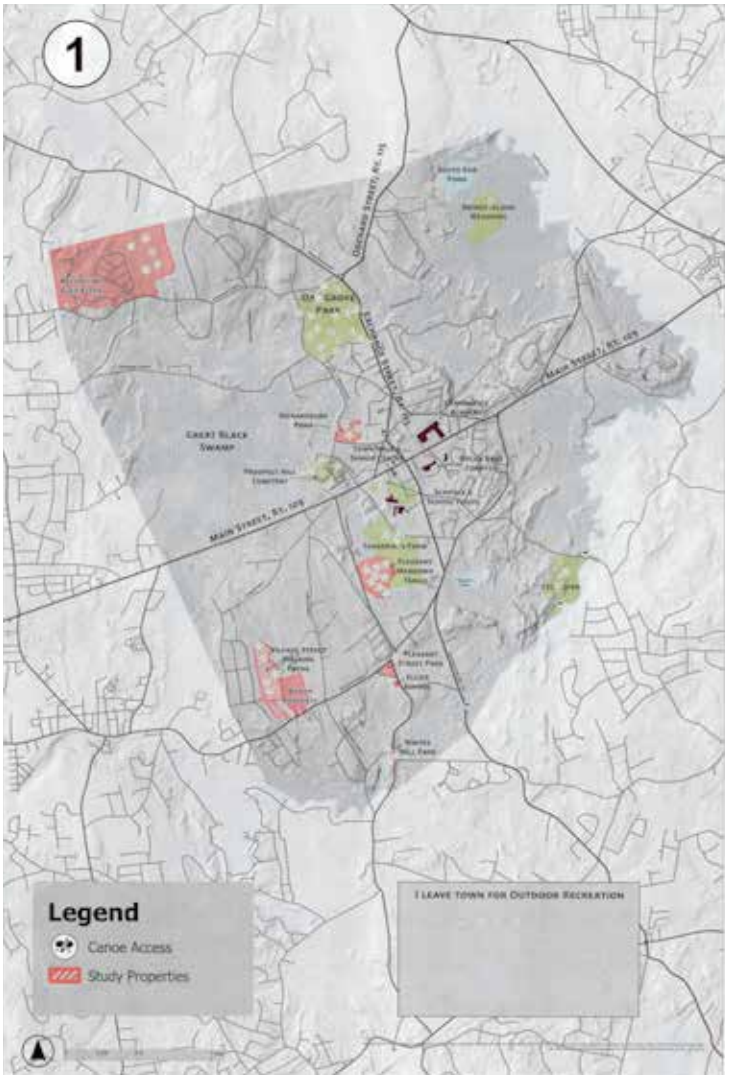
7:00 – 7:05pm	Welcome Activities: Outdoor Recreation Mapping & Land Use Priorities
7:05 – 7:15pm	Welcome & Introductions
7:15 – 7:25pm	Review & Discussion of Five Focus Properties
7:25 – 8:00pm	Focus Properties "Walking Tour"
8:00 – 8:10pm	Ellice School Discussion
8:10 – 8:50pm	Braun Property Discussion
8:50 – 9:00pm	Thanks & Wrap-Up

The Public Forum included many interactive activities to provide opportunities for data collection. As people arrived for the meeting, they signed in and had two introductory questions on posters. Each person had two stickers for each poster to record their answers.

The first welcome question asked what respondents would like to see more of in Millis. The recorded responses are below:

- Walking & Hiking Trails (22 responses)
- Athletic Fields (6)
- Affordable Housing (15)
- Agriculture (4)
- Protection of Historic Buildings (10)
- Protected Land (13)
- Other (written on a Post-It)
  - Community Garden (5)
  - Dog Run (5)
  - Rail Trail (5)
  - Geocaching (1)

The second welcome question corresponded to the map on the right. It asked respondents, where are your favorite recreation spots in town? Respondents had two star stickers to indicate their favorite recreation spots. The map on the left is from after the Public Forum, showing where respondents placed their stickers.



Map of Millis recreation areas after the Public Forum, showing where attendees like to recreate.

Public Forum Questions and Responses

The Public Forum included breakout sessions focusing on five of the fourteen study parcels. Attendees visited a station for each of the five focus properties and looked at a map of the property and answered associated questions These maps and questions, with the post-it note responses, are below.

Pleasant Meadows Park

What works well about this property? Responses with asterisks (*) list changes people want to see on this property.

- Mountain biking trails (1)
- Good local hiking (1)
- Nice overlook of Tangerini farm (1)
- Working with Tangerini (1)
- Trails (2)
- Benches on trails (1)
- Beautiful property (2)
- Never crowded (1)
- Not too large (1)
- Parking (1)
- Variety of trail lengths/difficulty levels (3)
- Variety of bird life (1)
- Picnic tables (1)
- *Need to remove barbed wire (1)
- *Educational signage/programming for waterfowl and bird life (2)
- *Wildflower garden around benches/kiosk (2)
- *Better maintenance of trails (6)
- *Better signage on Pleasant Street (1)
- *Better trail markers (1)
- *Remove poison ivy (1)
- *Road too narrow (1)
- *Cross-country skiing trails (1)
- *More varied trail layout (1)

What would you like to see in this hilly section?

- Community garden (1)
- Well-maintained paths (1)
- Trail markers / signage (2)
- Athletic fields (1)
- Regular mowing (3)
- Regular mowing of short trails (1)
- Meadow with paths (2)
- Picnic tables (1)
- Trees (2)
- Farming (1)

- Around 31 Acres
- Fields leased to Tangerini Farm, in exchange for maintanence and mowing
- Several well-developed trails, two picnic tables

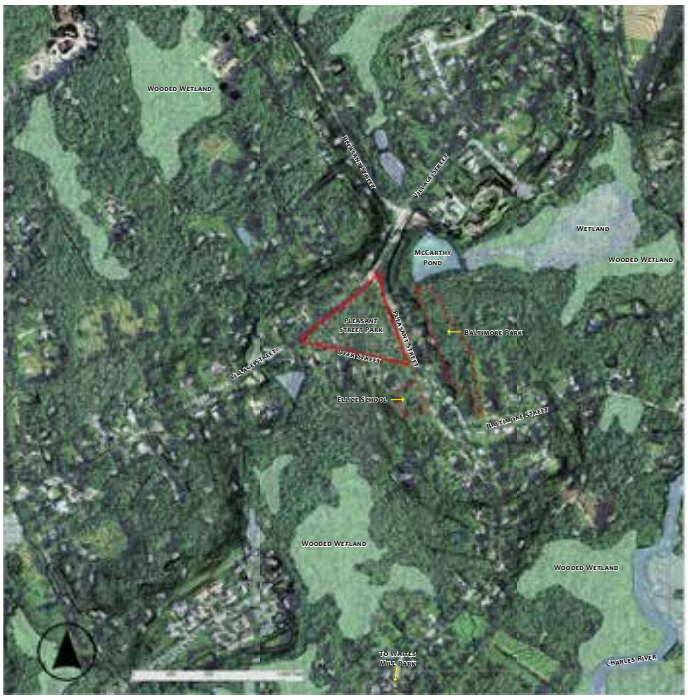
Pleasant Street Park

How important is tree cover?

- Very important (4)
- Moderately important (1)
- Important (4)
- Somewhat important (2)
- Not important (1)

If trees were cut, what would you like to see here?

- Improve trails (2)
- Sell to build houses (1)
- Tree houses (1)
- Leave the trees (5)
- Swings/playground (2)
- Traffic on Dyer and Pleasant Streets makes it too busy to develop (1)
- Dog run (2)
- Thin the brush (2)
- Add trails from all three streets (2)
- Add signage (1)
- Maintain green space (1)
- Cut trees to make natural benches (1)
- Clean up the area (1)
- Make available for families (1)
- Parking (2)
- Community garden (1)



- 4.5-acre heavily wooded parcel
- Minimally maintained trails
- Permanently protected
- Acquired by Millis and deeded as a park in 1923, maintained by the ConComm.

Richardson's Pond

What resources / amenities would you like to see on this property?

- It floods a lot (1)
- Do nothing (2)
- Add wood duck nest boxes (1)
- Bathroom facilities (1)
- Improved/connected paths (18)
- More/improved picnic tables/seating (7)
- Ice skating (3)
- Geese control (1)
- Wildflower garden/native plants (1)
- Educational signage about bird life (1)
- Exercise stations (2)
- Swimming (1)
- Summer rec camp location (1)
- Boating (1)
- Fishing (1)
- Accessible trail (1)
- Picnic shelter/designated picnic area (2)
- Warming hut for skating (1)
- General improved maintenance (3)
- Improve parking area (1)

- Gifted to the town in 1939
- Ample parking, minimal amenities
- Trail goes around eastern side of pond

Village Street

What resources / amenities would you like to see on this property?

- Empty trash barrel (2)
- Gravel on entrance to field (1)
- Path without horse manure (1)
- Benches (4)
- Labels for trees, etc. (1)
- Combine trails with Braun (3)
- Remove fallen trees from trails (2)
- Better maintenance of trails (6)
- Plant wildflowers in meadow (1)
- Dog run (3)
- Fitness/exercise stations (1)
- Tables (1)
- Improve parking, add spaces, stop neighbors from parking there, etc. (4)
- None (1)
- Replant field (wildflower / native plantings) (1)
- Fix bridge (1)
- Better signage (2)

Would you like to see the trail system extended?

- Yes (9)
- Maybe (1)
- No (2)

- 34 acres of wooded wetland with trails
- Field by entrance is mowed twice a year, fertilized and hayed
- Directly abuts newly purchased Braun Property

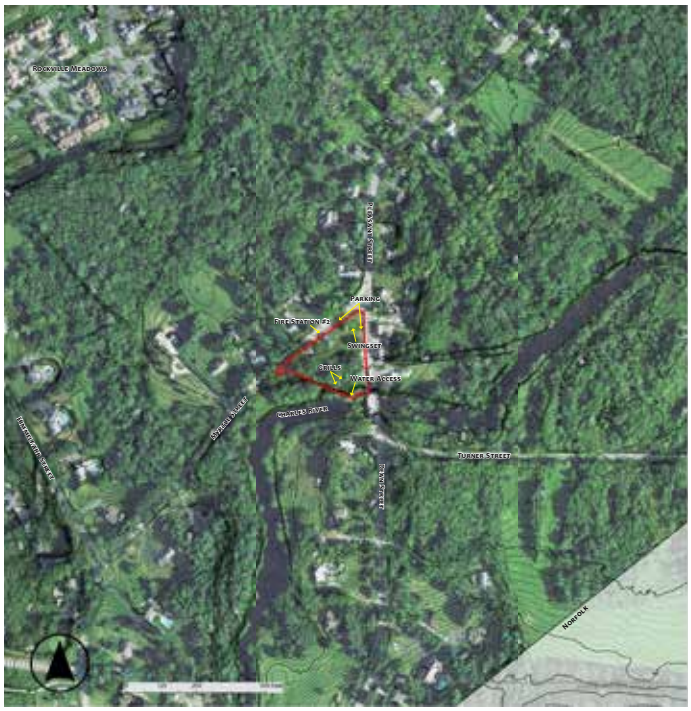
Waites Mill

What resources / amenities would you like to see on this property?

- Benches (4)
- Canoe/kayak launch (4)
- Walking trails (1)
- Exercise stations (1)
- More parking (3)
- Connect to rail trail (1)
- More and better picnic tables (3)
- More and better play equipment (6)
- Rebuilt stairs with railings (3)
- Nothing (2)
- Engage river with old fire station (1)
- Recreation programming (canoe, kayak, crew, etc.) (1)
- Fishing access (1)
- Community waterfront education (1)
- No neighbor parking (1)

What would you like to see happen with the old fire station?

- Boat, etc. storage (2)
- Restore and use like Niagara Hall (1)
- Sell it (1)
- Town museum (1)
- Better maintenance (3)
- Maintain exterior (1)
- Paint exterior (1)
- Rent it (1)
- Historical items (1)
- Fix windows (1)
- Open for activities (1)



- 1.2-acre park abutting the Charles
- Home of former fire station
- No existing land use restrictions except for 200' riverfront buffer
- Purchased by Millis in 1920, maintained by the Fire Dept.

Ellice School & Braun Properties

The Public Forum ended with a discussion of the **Ellice School** historic building and the newly acquired **Braun Farm**. The attendees' suggestions for possible uses on the Braun Property were:

- Senior housing
- APR
- Sell and put money toward other town needs
- Let it sit for future town needs
- Town develops rather than selling to outside developer
- Extend trails from Village Street
- Community garden/farm
- Biking trails

APPENDIX B

Introductory Questions

This survey, made through Google Forms, was provided to the public on 14 February 2023 through the Town of Millis website and Facebook page as well as through paper copies posted throughout town. The survey received 21 responses in all. Many of the questions from the Community Meeting were repeated in the survey in an attempt to hear responses from residents who did not attend the meeting. Questions followed by an asterisk (*) required a response. Any personal information has been removed from the responses included in this document. Questions that did not receive any answers have also been eliminated.

Do you live in Millis?*

- Yes (21 responses)
- No (0)

What brought you to Millis originally?*

- like the town
- New 55+ community with 78 acres of open space. Quiet community, yet accessible to Boston and Providence
- the ashram
- Life at the Ashram
- My boyfriend lived here
- School System
- home value
- Home affordability
- Small town feeling
- Location of an apartment
- kept going out from Boston until we could afford a home
- home prices
- affordable
- Found the perfect home; empty nester
- Quiet open space
- Wanted more space in suburban setting
- Birth
- work here for 20 years.. small town
- lack of congestion
- Needed a change
- lower housing prices and great school system

What are your favorite things about life in Millis?*

- rural, friendly
- Open spaces and peaceful, quiet town with abundant wildlife
- the ashram; also quiet, safe, some remaining open spaces
- The history and potential for the future as a town whose forests are managed.
- The small town
- Community, Schools, Sports
- small town, big family
- Small town feel, great schools, love my neighborhood
- Quiet, knowing people in community, watching children become grownups in community
- Small Town feel and wildlife, open spaces and being close to hiking trails and
- Small town
- small community, down to earth people
- neighbors
- Small town feel; everything is convenient
- Quiet
- Small town feel
- Safety
- small town
- Open space and farms
- Peace and quiet
- small community

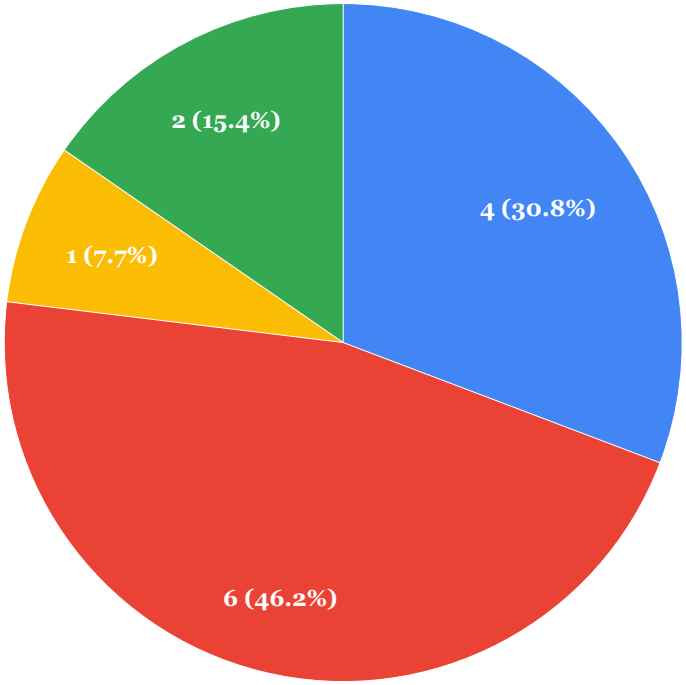
Online Survey Questions & Responses

Are you retired?*

- Yes (13)
- No (8)

If not retired, where do you work?*

- I work from home
- I work outside of Millis
- I don't work
- I work in Millis



Are you a dog owner?*

- Yes (12)
- No (9)

If yes, where do you walk your dog?*

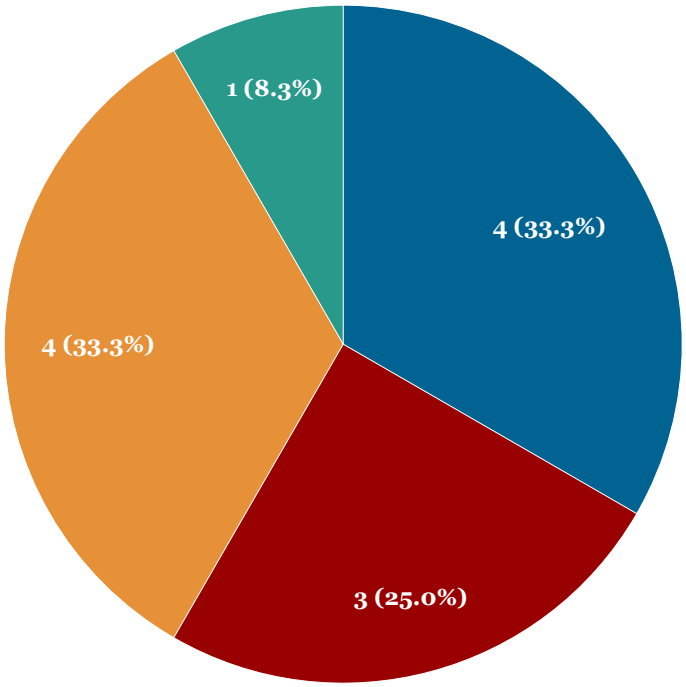
- home
- my own yard
- on privately owned land, the Millis Walking trails and State Hosp.
- The town park, around town
- Oak Grove, noon Hill, around Millis, Town Park
- On my street
- Everywhere
- Noon Hill, Oak Grove
- my community area
- My street/yard
- Charles River
- orchard st and vermont woods

Do you have a place to let your dog safely run off-leash?*

- Yes (7)
- No (4)
- I don't want one (1)

How often do you drive with your dog to take a walk?*

- Never
- Occasionally
- Every day
- Once or twice a week



Online Survey Questions & Responses

Welcome Questions

These questions correspond with the welcome questions detailed in Appendix A:

What are your favorite outdoor recreation spots?*

- Oak Grove Park (10)
- Pleasant Meadows Park (1)
- Glen Ellen Walking Trails (3)
- Village Street Walking Trails (2)
- Prospect Hill Cemetery (2)
- Richardson's Pond (2)
- Cedariver (5)
- Waites Mill Park (2)
- Bridge Island Meadows (1)
- My backyard (5)
- On the Charles (3)
- I leave Millis to spend time outdoors (7)

What would you like to see more of in Millis?*

- Walking and hiking trails (6)
- Athletic fields (5)
- Affordable housing (3)
- Agriculture (3)
- Protection of historic buildings (5)
- Protected land (10)
- Other:
  - Stores and other businesses (1)
  - Senior housing (1)
  - Kid Parks (1)

Focus Property Questions

These questions correspond with the five focus property questions detailed in Appendix A.

Waites Mill Park

What resources / amenities would you like to see on this property?*

- Improved playground equipment (6)
- Improved benches (6)
- Improved picnic tables (1)
- Improved water access (4)
- Canoe and kayak launch (5)
- Other:
  - Sustainable forest management (1)
  - Unfamiliar with property (6)
  - Use property for housing (1)

What would you like to see happen with the old fire station?*

- Provide canoe or other community equipment storage (5)
- Rent out as an event space (9)
- Create historical museum (9)
- Turn into a senior center (1)
- Other:
  - Turn into senior housing (1)

Pleasant Meadows Park

What other resources / amenities would you like to see on this property?*

- Improved signage and trail markers (11)
- Better maintained trails (8)
- Longer trails (3)
- More parking (4)

- Other:
  - Unfamiliar with property (3)
  - Sustainable forest management (1)
  - Hunting access (1)

What would you like to see done with the open meadow area specifically?*

- Community garden (5)
- Meadow with mown paths (5)
- Wildflower garden (8)
- Existing mown hayfield (6)
- Fenced dog park (2)
- Forest regrowth (1)
- Other:
  - No action (2)

Richardson's Pond

What resources / amenities would you like to see on this property?*

- Bathrooms (3)
- Universally-accessible boardwalk trail (5)
- Extension/improvement of existing trails (not universally accessible) (3)
- Covered picnic table and seating area (10)
- Educational wildlife signage (2)
- Recreational uses of pond (swimming, canoeing, fishing, etc.) (7)
- Other:
  - Sustainable forest management (1)
  - Ice skating (1)
  - Dock (1)
  - Fishing (1)

Would you have the town prioritize improving the water quality in this pond to allow for water recreation activities?*

- Yes, please! (8)
- Not important to me. (11)

Pleasant Street Park

What other resources / amenities would you like to see on this property?*

- Fenced dog park (2)
- Senior center (2)
- Affordable housing (1)
- Pickle ball/tennis courts (3)
- Playground (8)
- Better maintained trails (6)
- Other:
  - Sustainable forest management (1)
  - No action (3)
  - Unfamiliar with property (1)

If this property were to be developed as a well-maintained park, would it be within walking or biking distance of your home?*

- Yes. (8)
- No. (8)
- Yes, but I wouldn't feel safe walking or biking there. (3)

Village Street Walking Trails

What other resources / amenities would you like to see on this property?*

- Well-maintained trails (8)

- Extended trails (up to Farm Street and/or into Braun Property) (4)
- Improved signage / trail markers (7)
- Benches along trails (7)
- Picnic area (2)
- Improved/more parking (2)
- Other:
  - Sustainable forest management (1)
  - No action (2)
  - Hunting access (1)

What would you like to see done with the open meadow area specifically?*

- Community garden (3)
- Meadow with mown paths (9)
- Wildflower garden (7)
- Existing mown hayfield (4)
- Fenced dog park (1)
- Forest regrowth (4)
- Other:
  - No action (1)

Ellice School

How important is preservation of this historic building to you?*

- Very important (5)
- Somewhat important (7)
- Not important (7)

If the town were to restore this building, what would you like to see it used for?*

- no opinion
- dancing!
- Community use Space
- Senior Center or Museum
- I think there are much bigger priorities in Town
- A place for teens to go after school
- Not a good use of tax dollars
- Not sure
- Millis Historical Society (There is no parking)
- Other more important investments needed
- never been there so, ?
- Museum
- Don't know
- visitor center for surrounding trails/park
- Community use space
- demo it use land for housing or sell it
- Community events
- Not familiar with this building
- museum/one room school house

Braun Property

How do you think this property should be used?*

- open space and trails
- Forest management, planting new trees and cultivating those trees for health and corbon uptake.
- Preserved
- Shopping, Restaurant, Entertainment District
- Track and athletics fields
- Outdoor exercise/walking/hiking
- Development
- Not sure
- Affordable housing
- Athletic fields/track
- never been there
- Conservation land
- Park
- preserve this land for now
- Biking trails

- recreational and outdoor purposes
- not sure
- Agriculture
- athletic fields

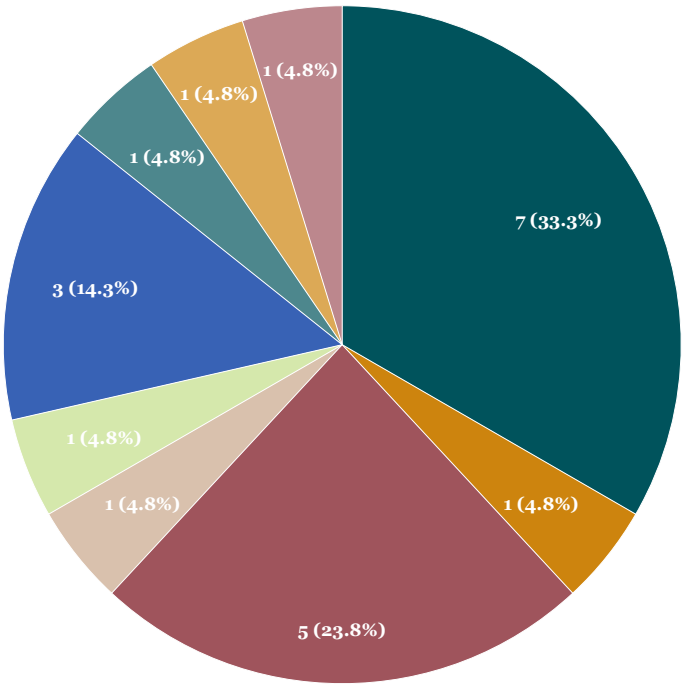
Closing Questions

When you spend time outdoors, how often do you drive to get there?*

- Always (2)
- Sometimes (18)
- Never (1)

Which would you be most excited to see in town?*

- Town-wide or inter-town walking trail (includes sidewalks as well as natural trails) (5)
- Fenced dog park (1)
- More athletic fields (3)
- Conversion of portion of the old railroad to rail trail (7)
- Community gardens (1)



Other:

- Better signage (1)
- Sustainable forest management (1)
- Bathrooms at town athletic fields (1)
- Senior housing (1)

Maintenance of the Town's open spaces and trails is not currently in the Town budget, yet there is a need for it. For comparison, Medway has a line item for trail maintenance as part of their town budget. Where do you think this money should come from?

- No need for open space maintenance to be in the budget (2)
- Create a trust fund for maintenance (5)
- Add a line item in the town budget for maintenance (8)
- Sell some town-owned properties for revenue (3)
- Other:
  - Several sources, including conservation funds, general funds, state grants, other sources (1)
  - Would need to significantly expand DPW department to maintain (1)

From where do you think we should reallocate funds?*

- New line item
- don't know
- Highway department
- Good question
- Need more research
- Places that do not directly benefit a large amount of citizens.
- Would need to take a closer look at budget/vs spend

Online Survey Questions & Responses

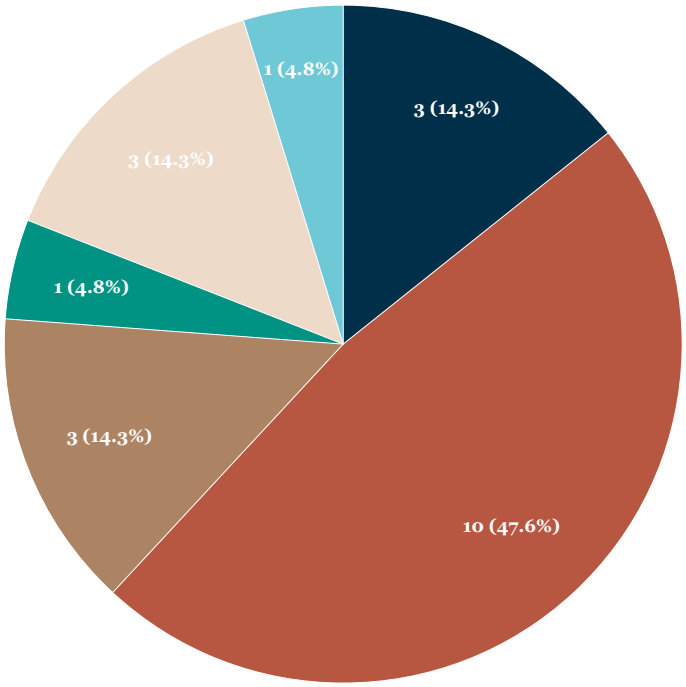
- Lease open land for farming
- senior center

Should the town acquire more parcels of land in the future, what should be done with them?

- Sell them (3)
- Protect them (10)
- Develop for housing (3)
- Develop for senior center (1)

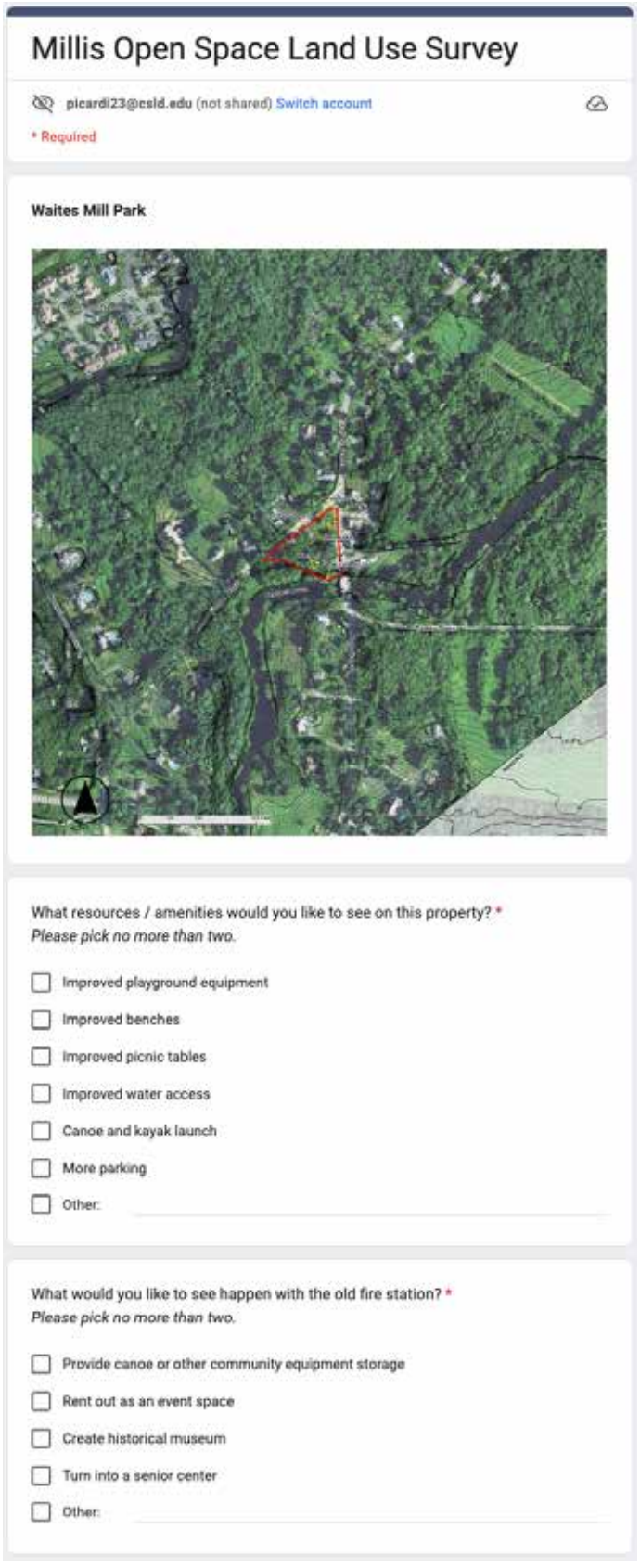
Other:

- More analysis needed (3)
- Prioritize maintenance of existing assets (1)



Anything else you'd like us to know?

- There are so many great public open spaces in adjacent towns. The Adams to Lovering trail in Medway is awesome and something for Millis to reach for.
- Thank you for your thoughtful questions, and good luck!
- Thank you for all you do!
- The athletic fields for the high school are an embarassment. We need a track that could benefit the school and community. we need to develop modernly, but moderately to fit budget and town personality. Money is tight, so we must prioritize
- We should use as much town land as possible for the required Mbta land. More tax revenue. Town should never buy land without immediate purpose.
- Modern athletic facilities are desparately needed - football, soccer, track. We don't enormous facilities, but we need modern fields that can sustain high utilization for multiple teams, overlapping sports, etc. If we increase pickleball courts, we should find a way to monetize for non-resident to help support maintenance/periodic upgrade costs. s
- Richardson pond could be a focal point for CON Com to promote conservation and outdoors just have to be creative on funding



Millis Open Space Land Use Survey

picardi23@csld.edu (not shared) Switch account

* Required

Waites Mill Park

What resources / amenities would you like to see on this property? *
Please pick no more than two.

- [ ] Improved playground equipment
- [ ] Improved benches
- [ ] Improved picnic tables
- [ ] Improved water access
- [ ] Canoe and kayak launch
- [ ] More parking
- [ ] Other:

What would you like to see happen with the old fire station? *
Please pick no more than two.

- [ ] Provide canoe or other community equipment storage
- [ ] Rent out as an event space
- [ ] Create historical museum
- [ ] Turn into a senior center
- [ ] Other:

Sample page from online survey

APPENDIX C

The data from both the January 31 Public Forum and the online survey were combined in a number of charts and tables to provide a more comprehensive picture of Millis residents' open space land use priorities. This aggregated data is explored on pages 12 through 15 and examined more closely in this appendix.

To create these composite datasets, not only was the data from both community engagement programs lumped together, but the responses to each of the study parcel questions were also consolidated into a single set of statistics. This chart (C) is included on page 14.

Further, these responses were grouped into five categories: community programming, divestment, maintenance, no engagement, and physical improvement. This chart (D) is included on page 15 and on the opposite page. A list of each response, its associated category, and the number of associated responses is included in the table at right.

Finally, a secondary consolidated chart was created to "streamline" the individual community responses into a more easily digestible format. This version eliminated community responses that received three or fewer votes and combined similar responses into a single line item. For example, "Trails (extended)" and "Trails (maintained)" were merged into a single item, "Trails." This version of the data (E) may prove more useful for public use and is displayed on the opposite page.

It is important to keep in mind, however, that the participants in both the in-person Public Forum and the online survey represent a small sample size of an already self-selecting group of residents invested in maintaining Millis's open spaces. Therefore, there is a measure of inherent bias that should be taken into account.

Categorized Community Responses

Community Programming	Community Garden (11)
	Ice Skating (4)
	Outdoor Education / Signage (5)
	Recreation Programming (1)
	Summer Camp (1)
Divestment	Commercial Development (1)
	Residential Development (5)
Maintenance	Benches (improved) (9)
	Cross-Country Ski Trails (1)
	Erosion / Flood Control (1)
	Forest Management (9)
	Geese Control (1)
	Meadow with Mown Paths (17)
	Parking (improved) (10)
	Picnic Tables (improved) (12)
	Play Equipment (improved) (12)
	Rebuilt Stairs/Railings (3)
	Regular Mowing (12)
	Signage (improved) (24)
	Trails (maintained) (68)
	Trash Management (2)
No Engagement	Leave As Is (23)
	Natural Succession (10)
Physical Improvement	Athletic Fields/Courts (5)
	Bathroom Facilities (4)
	Benches (added) (12)
	Dog Run (11)
	Exercise Stations (4)
	Hunting & Fishing Access (9)
	Parking (added) (7)
	Picnic Shelter (11)
	Picnic Tables (added) (3)
	Play Equipment (added) (12)
	Signage (added) (1)
	Swimming (1)
	Trails (extended) (21)
	Tree Houses (1)
	Univerally-Accessible Trail (1)
	Warming Hut (1)
	Water Access (21)
	Wildflowers / Native Plantings (20)
	Wood Duck Nest Boxes (1)

Chart D: Residents' Town-Owned Land Requests

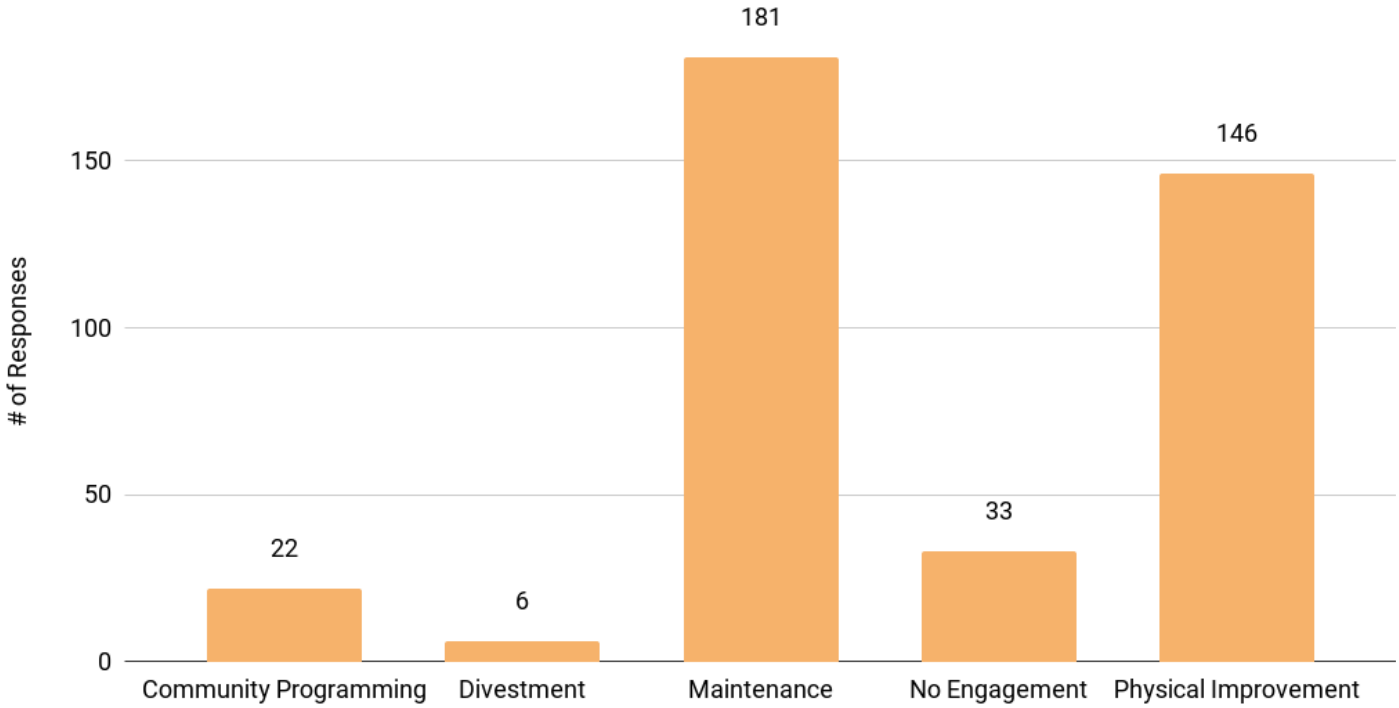
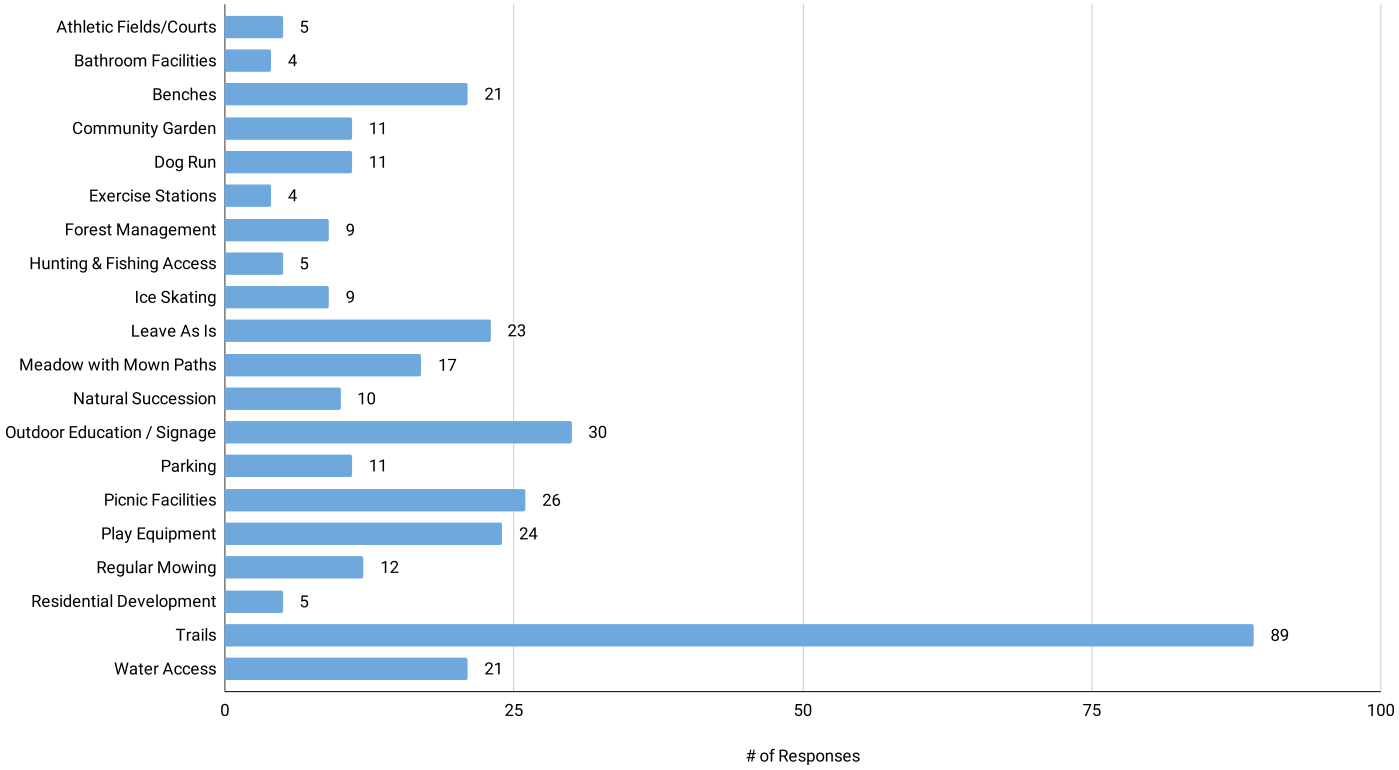


Chart E: Streamlined Community Responses



WORKS CITED

ADA.gov. "Introduction to the Americans with Disabilities Act." www.ada.gov/topics/intro-to-ada/. Accessed 9 Mar. 2023.

"Agricultural Preservation Restriction (APR) Program Details." *Mass.gov*, Massachusetts Department of Agricultural Resources, www.mass.gov/service-details/agricultural-preservation-restriction-apr-program-details.

Army Corps of Engineers, "Charles River Natural Valley Storage Area." *US Army Corps of Engineers*, 20 Mar. 2017, www.nae.usace.army.mil/Missions/Civil-Works/Flood-Risk-Management/Massachusetts/Charles-River-NVS/. Accessed 14 Feb. 2023.

"Article 97: Constitution of the Commonwealth of Massachusetts." FIC, 23 Dec. 2019, farmlandinfo.org/law/article-97-constitution-of-the-commonwealth-of-massachusetts/.

Atwood, J., J. Collins et al., "Best Management Practices for Nesting Grassland Birds." 2017, *Mass Audubon*, www.massaudubon.org/content/download/19413/274073/file/Best-Management-Practices_Grasslands_2017_web.pdf. Accessed 20 Mar. 2023.

Barrett, Richard. Personal interview. 27 Feb. 2023.

Bellemare, Jesse. Personal interview. 6 Mar. 2023.

The Boston Foundation. *The Greater Boston Housing Report Card 2022*, Boston Indicators, The Boston University Initiative on Cities, Oct. 2022. www.tbf.org/-/media/tbf/reports-and-covers/2022/october/gbhrc2022_interactive_web.pdf. Accessed 9 Mar. 2023.

"Clicquot Club Ginger Ale." 1914. commons.wikimedia.org/wiki/File:ClicquotGingerAle.png. Accessed 24 Mar. 2023.

Conservation Works. Town of Medway Open Space and Recreation Plan 2018-2025. 15 June 2020.

Core Team. "First Core Team Meeting." Zoom Meeting, 10 Jan. 2023.

DBVW Architects, "Noquochoke Village." DBVW Architects, 2023, dbvw.com/projects/westport-noquochoke-village. Accessed 20 Mar. 2023.

Desrosiers, Ashley, et al. "Charles River Natural Valley Storage Area." *Charles River Watershed Association*, 14 Sep. 2021, storymaps.arcgis.com/stories/6a2c80a73cd143d0a6eaa795bc53eace. ArcGIS StoryMaps, Accessed 17 Feb. 2023.

EPA. "What is a wellhead protection area and how can a facility determine if it is located in one?" *United States Environmental Protection Agency*, 19 Oct. 2022, www.epa.gov/oil-spills-prevention-and-preparedness-regulations/what-wellhead-protection-area-and-how-can. Accessed 20 Mar. 2023.

Executive Office of Energy and Environmental Affairs. "Case Studies - Form Based Codes." *Mass.gov*, www.mass.gov/service-details/case-studies-form-based-codes. Accessed 20 Mar. 2023.

---. "How Is Land Protected?" *Mass.gov*, www.mass.gov/service-details/how-is-land-protected. Accessed 20 Mar. 2023.

—. "Smart Growth / Smart Energy Toolkit Modules -Transfer of Development Rights (TDR)." *Mass.gov*, www.mass.gov/service-details/smart-growth-smart-energy-toolkit-modules-transfer-of-development-rights-tdr. Accessed 20 Mar. 2023.

— and Housing and Community Development. "Multi-Family Zoning Requirement for MBTA Communities." *Mass.gov*, www.mass.gov/info-details/multi-family-zoning-requirement-for-mbta-communities. Accessed 9 Mar. 2023.

Grosshans, Richard, et al. "Floating Treatment Wetlands and Plant Bioremediation: Nutrient treatment in eutrophic freshwater lakes." *International Institute for Sustainable Development*, Oct. 2019. www.iisd.org/system/files/publications/floating-treatment-wetlands.pdf. Accessed 20 Feb. 2023.

"The History of the Neponset Band of the Indigenous Massachusett Tribe." *The Massachusett Tribe at Ponkapoag*,

massachusetttribe.org/the-history-of-the-neponset. Accessed 20 Mar. 2023.

Housing and Community Development. “Chapter 40B Sale Prices and Rents.” *Mass.gov*, www.mass.gov/service-details/chapter-40b-sale-prices-and-rents. Accessed 9 Mar. 2023.

—. “Chapter 40R.” *Mass.gov*, mass.gov/service-details/chapter-40r. Accessed 20 Mar. 2023.

Hunt, Randall J. “Do Created Wetlands Replace the Wetlands that are Destroyed?” *USGS*, 1 Aug. 1997, pubs.usgs.gov/fs/1996/0246/report.pdf. Accessed 24 Mar. 2023.

“Indigenous Peoples History Hub.” *History Cambridge,* historycambridge.org/history-hubs/indigenous-peoples/. Accessed 20 Mar. 2023.

Just Roots. 2023, justroots.org. Accessed 20 Mar. 2023.

MassWildlife and The Nature Conservancy, “BioMap: the Future of Conservation in Massachusetts.” *ArcGIS Hub*, 2022. biomap-mass-eoeea.hub.arcgis.com/. Accessed 20 Mar. 2023.

—. “Critical Natural Landscapes.” *BioMap Components*, storymaps.arcgis.com/collections/ 7ced005b87864d32987c11b48a6339d7?item=2. Accessed 20 Mar. 2023.

Mattakeeset Tribal Court, “Water Shed.” *Mattakeeset Tribe*, www.mattakeeset.com/water-shed. Accessed 20 Mar. 2023.

Metropolitan Area Planning Council. *Town of Millis Open Space and Recreation Plan*. 26 June 2019.

Motzkin, Glenn. “Historical Ecology.” CSLD. Lecture.

“Native Land Digital.” *Native Land Digital*, 8 Oct. 2021, native-land.ca. Accessed 20 Mar. 2023.

Noquochoke Village. The Community Builders, Inc., 2023, www.noquochokevillage.com. Accessed 20 Mar. 2023.

O’Keefe, John. Personal interview. 21 Oct. 2022.

Risk Factor. First Street Foundation, riskfactor.com. Accessed 13 Feb. 2023.

Staff Writer. “Noquochoke Village development nears completion.” *The Standard-Times*, 28 Aug. 2018, www.southcoasttoday.com/story/news/local/chronicle/2018/08/28/noquochoke-village-development-nears-completion/10926026007/. Accessed 20 Mar. 2023.

Town of Holliston, *FY2023 Operating Budget Town Administrator Recommendation*, March 4, 2022. Holliston Town Administrator, March 4, 2022, www.townofholliston.us/sites/g/files/vyhlif706/f/uploads/fy2023_omnibus_budget_ta_level_march_4_2022_1.pdf. Accessed 14 Feb. 2023.

Town of Medway, *Article 3 - Omnibus Budget*. Millis Town Accountant, 2023, www.townofmedway.org/sites/g/files/vyhlif8006/f/uploads/fy2023_atm_omnibus_budget.pdf. Accessed 14 Feb. 2023.

Town of Millis, *Annual Budget For the Fiscal Year Beginning July 1, 2022 and Ending June 30, 2023*. Millis Finance Office, 2023, www.millisma.gov/sites/g/files/vyhlif901/f/pages/millis_final_budget_document_fy2023_04.27.2022.pdf. Accessed 14 Feb. 2023.

—. *Wetlands Protection Rules and Regulations: Promulgated Under Article XIX Wetlands Protection Bylaw*. Millis Conservation Commission, 27 Nov. 2017, www.millisma.gov/sites/g/files/vyhlif901/f/uploads/wetlandsrulesregs11-13-17.pdf. Accessed 20 Mar. 2023.

—. *Zoning By-Law*. 2 May 2022, www.millisma.gov/sites/g/files/vyhlif901/f/uploads/millis_zoning_bylaws.pdf. Accessed 13 Jan. 2023.

U.S. Census Bureau. *Explore Census Data*, data.census.gov/.

Weiss, Robert. Personal interview. 26 Jan. 2023.

IMAGES CITED

Adobe Stock. “Stock Photos, Royalty-Free Images, Graphics, Vectors & Videos.” *Adobe Stock*, https://stock.adobe.com/.

Bailey, O.H. “Millis, Massachusetts: 1890.” 1890, ark.digitalcommonwealth.org/ark:/50959/x633ff64j. Accessed 8 Mar 2023.

Belanger, Marc N. “Charles River Medfield-Millis.” *Wikimedia Commons*, 11 Jul. 2009, commons.wikimedia.org/wiki/File:Charles_River_Medfield-Millis.JPG. Accessed 3 Feb. 2023.

“Clicquot Ginger Ale.” *Wikimedia Commons*, 1914, commons.wikimedia.org/wiki/File:ClicquotGingerAle.png. Accessed 24 Mar. 2023.

CRWA Archives. “Charles River Natural Valley Storage Area.” ArcGIS StoryMaps, 14 Sept. 2021, storymaps.arcgis.com/stories/6a2c80a73cd143d0a6eaa795bc53eace.

Google Earth 7.3.6, 29 Dec. 2022. Available at earth.google.com. Accessed Jan 13, 2023.

Grain Designs. “Gate Sign, Engraved Farm Gate or Garden Gate.” Gate Sign, Engraved Farm Gate Or Garden Gate By Grain Designs, www.notonthehighstreet.com/graindesigns/product/engraved-oak-narrow-gate-sign.

“Grenadier™ Waymarking Post.” Fitzpatrick Woolmer, www.fwdp.co.uk/product/grenadier-waymarking-post/.

IISD-ELA. “Floating Treatment Wetlands and Plant Bioremediation: Nutrient treatment in eutrophic freshwater lakes.” *International Institute for Sustainable Development*, Oct. 2019. www.iisd.org/system/files/publications/floating-treatment-wetlands.pdf. Accessed 20 Feb. 2023.

Phelan, John. “Charles River, Cedariver, Millis, MA.” *Wikimedia Commons*, commons.wikimedia.org/wiki/File:Charles_River,_Cedariver,_Millis_MA.jpg.

—. “Entering Millis, MA.” *Wikimedia Commons*, commons.wikimedia.org/wiki/File:Entering_Millis,_MA.jpg.

“Rise Park · RSM Design.” RSM Design, rsmdesign.com/work/rise-park?s=2.

Town of Millis, Massachusetts. “Oak Grove Farm Commission.” *Millis.gov*, www.millisma.gov/oak-grove-farm-commission. Accessed 3 Feb. 2023.

“Trails & Maps.” Medway, MA, https://www.townofmedway.org/open-space-committee/pages/trails-maps.

Any images not credited in document are product of student work.

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GIS DATABASES

Esri, "USA Topo Maps." *National Geographic Society,* 18 Apr. 2019, www.arcgis.com/home/item.html?id=99cd5fbd98934028802b4f797c4b1732. Accessed 13 Jan. 2023.

Landscape Ecology Lab, "Critical Linkages." *Designing Sustainable Landscapes,* 14 Oct. 2021. umassdsl.org. University of Massachusetts Amherst. Accessed 13 Feb. 2023.

—. Massachusetts 1990 Census Block. *IPUMS National Historical Geographic Information System,* Version 17.0, 2022. doi.org/10.18128/D050.V17.0. Accessed 6 Feb. 2023.

—. Massachusetts 2000 Census Block. *IPUMS National Historical Geographic Information System,* Version 17.0, 2022. doi.org/10.18128/D050.V17.0. Accessed 6 Feb. 2023.

—. Massachusetts 2016-2020 American Community Survey Block Group. *IPUMS National Historical Geographic Information System,* Version 17.0, 2022. doi.org/10.18128/D050.V17.0. Accessed 6 Feb. 2023.

—. Massachusetts 2020 Census Block. *IPUMS National Historical Geographic Information System,* Version 17.0, 2022. doi.org/10.18128/D050.V17.0. Accessed 9 Mar. 2023.

MassGIS, "Aquifers." *MassGIS Data*, July 2007. www.mass.gov/info-details/massgis-data-aquifers. Mass.gov, July 2007. Accessed 9 Jan. 2023.

—. "Bedrock Lithology." *MassGIS Data*, Jan. 2004, www.mass.gov/info-details/massgis-data-bedrock-lithology. Mass.gov, USGS. Accessed 9 Jan. 2023.

—. "BioMap: The Future of Conservation." *MassGIS Data*, 2022. www.mass.gov/info-details/massgis-data-biomap-the-future-of-conservation. Mass.gov, Nov. 2022. Accessed 6 Feb. 2023.

—. "Building Structures (2-D)." *MassGIS Data*, Sept. 2022. www.mass.gov/info-details/massgis-data-building-structures-2-d. Mass.gov, Sept. 2022. Accessed 20 Jan. 2023.

—. "C-CAP Landcover, Massachusetts." *NOAA*, 2016. www.fisheries.noaa.gov/inport/item/54917. Office for Coastal Management, 9 Aug. 2022. Accessed 13 Jan. 2023.

—. "MassDEP Hydrography (1:25,000)" *MassGIS Data*, Dec. 2019. www.mass.gov/info-details/massgis-data-massdep-hydrography-125000. Mass.gov, Dec. 2019. Accessed 9 Jan. 2023.

—. "MassDEP Wetlands." *MassGIS Data,* 2005. www.mass.gov/info-details/massgis-data-massdep-wetlands-2005. Mass.gov, Dec. 2017. Accessed 9 Jan. 2023.

—. "Public Water Supplies." *MassGIS Data,* 2023. www.mass.gov/info-details/massgis-data-public-water-supplies. Mass.gov, 13 Feb. 2023. Accessed 25 Feb. 2023.

—. "Property Tax Parcels." *MassGIS Data,* Dec. 2022. www.mass.gov/info-details/massgis-data-property-tax-parcels. Mass.gov, Mar. 2023. Accessed 9 Jan. 2023.

—. "Protected and Recreational OpenSpace." *MassGIS Data*, Jan. 2023. www.mass.gov/info-details/massgis-data-protected-and-recreational-openspace. Mass.gov, Executive Office of Energy and Environmental Affairs, Jan. 2023. Accessed 9 Jan. 2023.

—. "Soils SSURGO-Certified NRCS." *MassGIS Data,* June 2020. www.mass.gov/info-details/massgis-data-soils-ssurgo-certified-nrcs. Mass.gov, Natural Resources Conservation Service, Nov. 2021. Accessed 9 Jan. 2023.

—. "Surficial Geology 1:250,000." *MassGIS Data*, Oct. 1999. www.mass.gov/info-details/massgis-data-surficial-geology-1250000. Mass.gov, USGS. Accessed 9 Jan. 2023.

OpenStreetMap Foundation, *OpenStreetMap*. 16 Mar. 2023, www.openstreetmap.org. Accessed 4 Feb. 2023.