Richmond Furnace

Preliminary Ecological Review and Rationale for an Ecological Survey

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For consideration by:

Richmond Town Selectmen and the Residents of Richmond



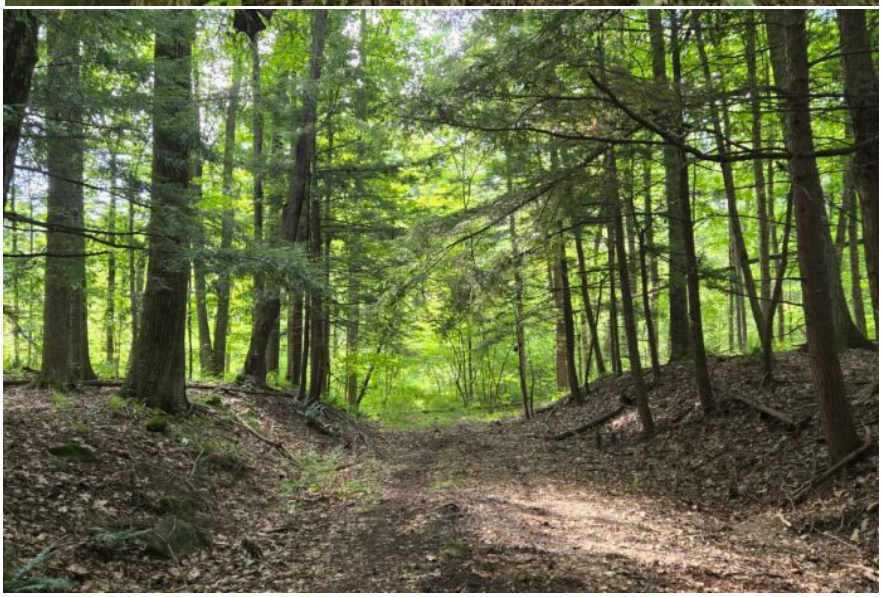


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1 Introduction

The Richmond Furnace and tangential property located at 0 Furnace Road (Assessor Parcel ID 105-22, henceforth referred to as "the property"), under a purchase and sale agreement with intention to develop 15-18 single family homes, has been found ecologically significant thanks to data from the State of Massachusetts in conjunction with the Nature Conservancy.

According to MassWildlife's BioMap, the property contains ecologically significant ecosystems supporting rare and endangered species and critical New England habitat. Due to the significant number of endangered or threatened species found in both Richmond and West Stockbridge, it is reasonable to assume that the property may in fact harbor key critical species requiring protection under the Massachusetts's Endangered Species Act (MESA). MassWildlife's Natural Heritage and Endangered Species Program (NHESP), already designates Mud Ponds and Shaker Mill Pond directly south of the intended development area as a "Priority Habitat" with the specific designation: PH 1300. The areas around PH 1300 are considered "buffers to core habitat" that are necessary to the long-term survival of protected habitat and encapsulate the entire Furnace Road Property.

This document provides detailed explanations and information related to the above ecological considerations, habitat importance, and evidence to support the necessity to conduct an ecological/environmental survey of the land, if not outright justify the immediate protection of critical habitat. Furthermore, the below sections will entail the potential impacts of development of this property, the benefits of protecting the property from development, and the key components required in an ecological survey to determine the ecological significance of the area.

Additionally, this document serves as the desk review portion of an ecological survey and has found the site to be ecologically significant based on remote evaluation.

2 Ecological Significance

Richmond is abundant with natural ecosystems, biologically diverse habitats, and priority species that represent New England wildlife. Its arboreal forests, networks of waterways, and critical wetlands support diverse ecosystems that not only provide habitat for a wide variety of plants and animals but also offer vital ecological benefits to its residents. These natural systems filter the air, clean the water, mitigate the detrimental effects of climate change, and provide recreation opportunities, all of which enrich the quality of life for residents while providing the idyllic Richmond experience.

The people of Richmond have spent decades protecting these spaces to ensure that all life (plants, animals, and people) can continue to thrive. Significant progress has been made protecting ecologically significant lands and waters from development and restoring vulnerable habitats and wildlife populations. Despite conservation successes, biodiversity is still in crisis, across the Town, the State, and globally. Land development destroys and fragments habitat while polluting the air, soil, rivers, and wetlands, causing degradation of ecosystems and affecting the animals and plants that rely on them for survival.

As a result of these impacts, and the ever-present threat of climate change, these habitats, and the diverse and abundant species that live within them, are in decline. Immediate action is essential to strategically protect, restore, and manage these invaluable treasures and the biodiversity of animals, plants, and habitats that currently reside in the area south of the property slated for development.

Multiple organizations and efforts including State of MA's BioMap, MESA, NHESP, and the Massachusetts's State Wildlife Action Plan, have already designated the area south of furnace road as ecologically significant and a priority habitat for rare species. Each of these designations further bolster the argument for immediate conservation of the area to avoid impact to Richmond's rich natural heritage of animals, plants, and habitats.

2.1 MassWildlife and The Nature Conservancy's BioMap

MassWildlife and The Nature Conservancy released the newly-updated BioMap tool in November 2022. The BioMap web portal delivers the latest scientific data and resources to help state and local governments, land trusts, non-government organizations, and other conservation partners strategically plan projects to conserve wildlife and their habitats. The latest version of BioMap combines more than 40 years of rigorously documented rare species and natural community records from MassWildlife with cutting-edge climate resilience data from The Nature Conservancy and spatial data identifying intact fish and wildlife communities, habitats, and ecosystems that are the focus of the Massachusetts State Wildlife Action Plan.

Below, a screenshot of MassWildlife's BioMap Geographic Information System (GIS) shows that the area south of Furnace Rd. contains multiple diverse ecosystems necessary to support rare species and core habitats, as well as buffers required to maintain the health of these ecosystems. These areas extend directly up to Furnace Rd. and down to Mud Ponds and Shaker Mill Pond. They are further connected to Cranberry Pond, Crane Lake, and the large riparian systems that run along Swamp Road.

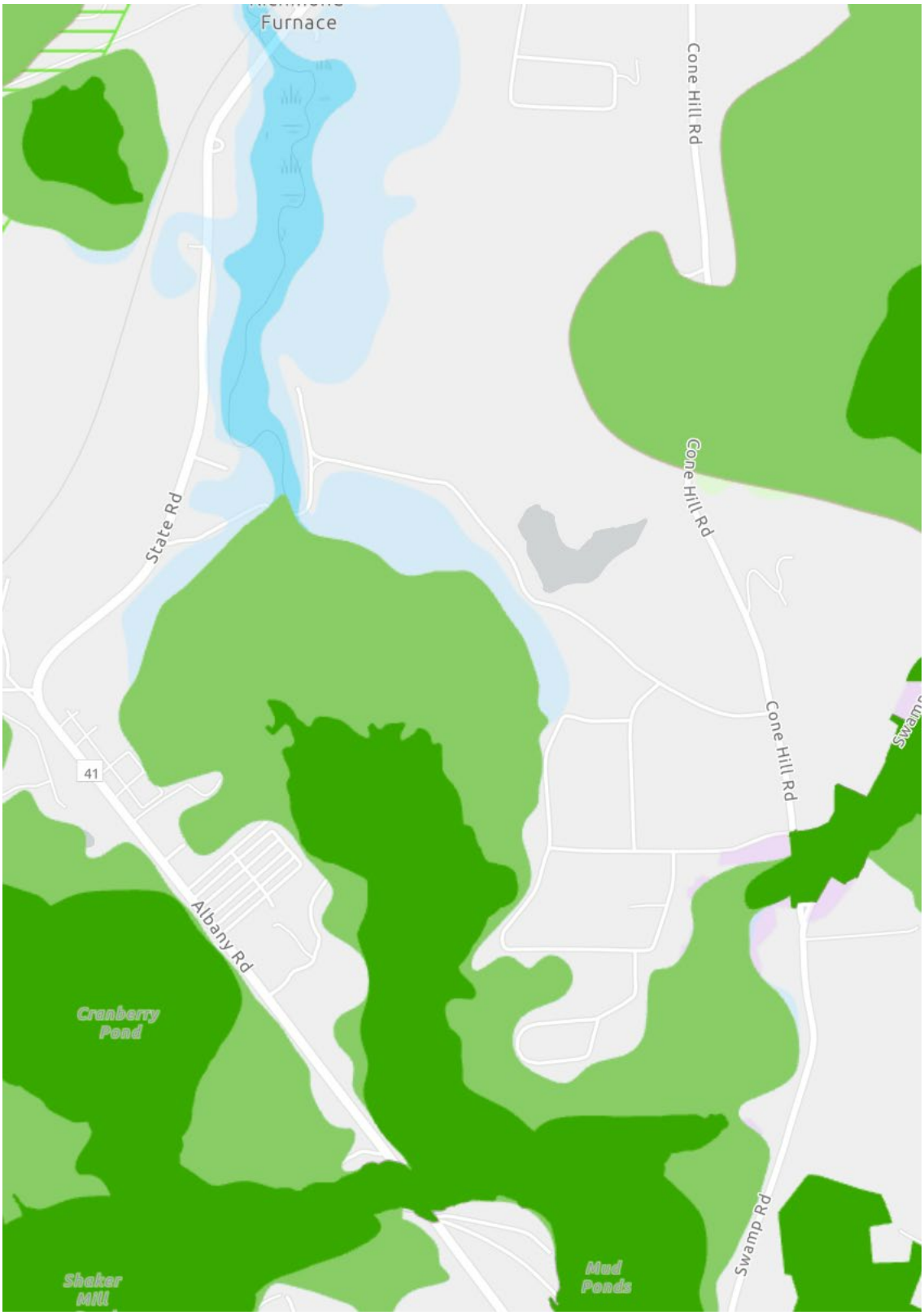


Figure 1: BioMap of the Property

BioMap uses the terminology "Core Habitat" and "Critical Natural Landscape" as the two main overarching elements to designate habitat. Each Element contains several Components of biodiversity conservation. MassWildlife states that: "Protection and stewardship of these Elements are essential to safeguard the diversity and abundance of species and their habitats, as well as resilient natural landscapes across Massachusetts." These two elements are defined as the following:

Core Habitat: identifies areas that are critical for the long-term persistence of rare species, exemplary natural communities, and resilient ecosystems across the Commonwealth.

Critical Natural Landscape (CNL): identifies large landscape blocks that are minimally impacted by development, as well as buffers to core habitats and coastal areas, both of which enhance connectivity and resilience.

Both of these elements are found in the planned development area on the property. These elements are further broken down into several components to designate geographic regions into biodiverse conservation areas required to support species and ecosystems, often including local and regional additions. As ecological systems are not restricted to town borders, both Richmond and West Stockbridge habitats are included below as they are critically and significantly connected. **The components relevant to and found on the property are:**

1. **Core Habitat:** Defined above.
    a. Core Habitat ID: 1926
    b. Entire Core Habitat Acreage: 517.38
2. **Rare Species Core:** Areas critical to the long-term conservation of MA's most vulnerable species and their habitat.
    a. Rare Species ID: 1290
    b. Entire Rare Species Core Acreage: 366.87
    c. Number of Species in the Rare Species Core: 6
3. **Critical Natural Landscape:** Defined above.
    a. CNL ID: 923
    b. Entire CNL Acres: 13,277
    c. Acreage in Richmond: 2,892.35
4. **Aquatic Core:** Intact Aquatic Habitats (rivers, streams, lakes, and ponds) supporting a diversity of aquatic species and important physical and ecological processes.
    a. Aquatic Core ID: 573
    b. Entire Aquatic Acreage: 465.10
    c. Rare Species found: Yes

It is imperative to highlight that all the designations listed here will be directly impacted by development on the Furnace Road property, reducing the acreages and habitats listed, direct reduction in these ecosystem's size, ability to provide critical habitat, and directly threatens endangered and threatened local species.

5. **Regional Rare Species:** These areas identify habitats within the state that support highly vulnerable and imperiled species which are at high risk regionally, nationally, or globally due to factors such as restricted ranges, few populations or occurrences, history of decline, and high threat levels.
    a. Regional Rare Species ID: 773
    b. Entire Regional Rare Species Acreage: 260.69
    c. Total Number of Regional Rare Species found: 2
6. **Aquatic Core Buffer:** Aquatic Core Buffers are intact upland areas surrounding Aquatic Cores which support habitat function and enable species to move between habitat types.
    a. Aquatic Core Buffer ID: 687
    b. Total Aquatic Core Buffer Acreage: 1,387.33
7. **Local Aquatic Habitat Buffers:** Local Aquatic Habitat Buffers are intact upland habitat surrounding Aquatic Habitats that supports aquatic functions and connectivity between habitats.
    a. Aquatic Habitat Buffer ID: 738
    b. Total Local Aquatic Habitat Buffer Acreage: 668.36
8. **Local Aquatic Habitat:** Local Aquatic Habitats are areas in each municipality with above average fish and freshwater mussel native species diversity.
    a. Local Aquatic Habitat ID: 560
    b. Total Local Aquatic Habitat Acres: 208.44

For clarity of these habitat designations and the potential impacts development may have, please see the chart below:

Potential Impacts	**Habitat Designation to be Impacted**
Directly built upon and destroyed by the proposed development, impacting downstream/downland habitats:	- Local Aquatic Habitat Buffers - Local Aquatic Habitats - Critical Natural Landscape - Aquatic Core Buffer
Habitats directly impacted by upland development, resulting in reduced support to continue functioning as critical habitat:	- Aquatic Core - Regional Rare Species - Critical natural Landscape - Rare Species Core - Core Habitat

2.2 MassWildlife's Natural Heritage and Endangered Species Program (NHESP)

The Natural Heritage & Endangered Species Program is responsible for the conservation and protection of hundreds of species that are not hunted, fished, trapped, or commercially harvested in the state, as well as the protection of the natural communities that make up their habitats. The program is responsible for protecting the state's wide range of native biological diversity.

The NHESP has designated "Priority Habitat" across the State of MA to ensure current and future protection of habitat related to threatened species. Priority Habitat is based on the known geographical extent of habitat for all state-listed rare species, both plants and animals, and is codified under the Massachusetts Endangered Species Act (MESA). Habitat alteration within Priority Habitats may result in a take of a state-listed species, and is subject to regulatory review by the Natural Heritage & Endangered Species Program.

Figure 2 shows the area directly south of Furnace Rd. has been designated a Priority Habitat (PH 1300) and an interconnected region to multiple watersheds protecting rare species.

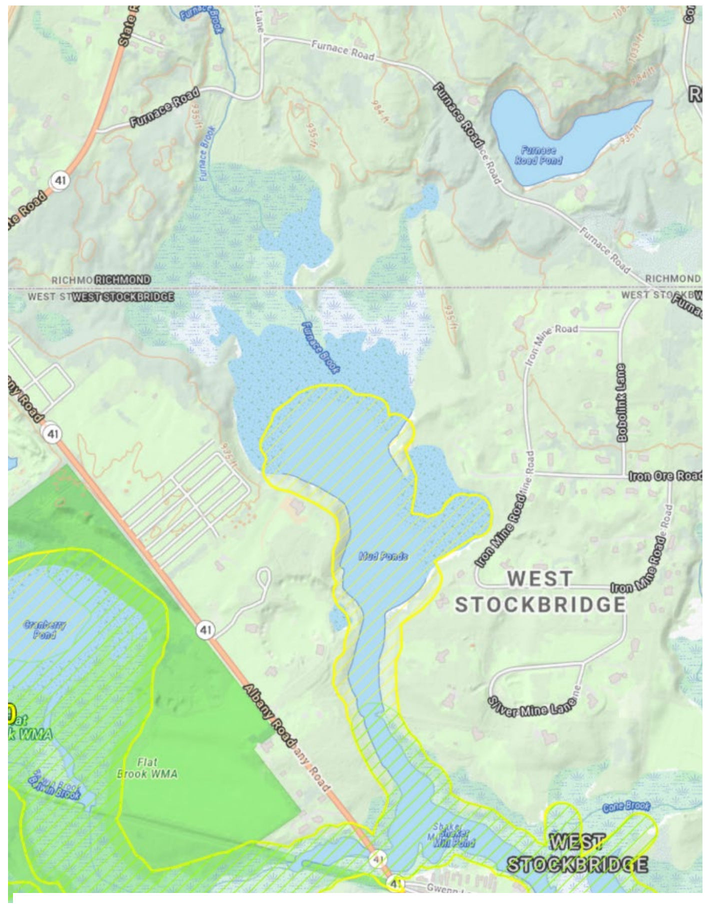


Figure 2 - PH 1300

While the proposed alteration is not directly within the designated priority habitat, it may still be subject to review due to the upland riparian systems that support these critical ecosystems.

2.3 Habitat Buffers and the Interconnection Between Critical Ecosystems and Upland Riparian Habitats

While the Priority Habitat above does not extend directly into the property, the importance of upland habitats cannot be discredited. The main feeder system for the Priority Habitat (as shown by MassWildlife's BioMap above) is the Furnace Brook watershed. Any impacts to this upland system and the buffers that protect the Rare

Species and Habitat Cores will significantly influence the habitats they nurture and shield from damage.

Habitat buffers create safeguards for water quality, air quality, biodiversity, migration/movement corridors, supporting species, and ecosystems that protect and stabilize aquatic and rare species cores. **Any development within these buffers, causes potential collapse of related ecosystems due to removing the interconnected habitats that support core habitats.**

Core habitats are only able to exist due to the connection they have with the greater biological and ecological communities. Habitats are not isolated and functioning only due to the biological community within the ecological boundaries of the system, they rely on the larger biosphere they function within. Wiping out or developing within upland riparian systems and buffer habitats can lead to total collapse of connected systems due to the degradation and fragmentation of habitat.

The greatest biodiversity loss in river, cold-water stream systems, and wetlands (the primary ecosystems surrounding and within the property) is due to lack of forest buffers and habitat fragmentation. Lack of intact streamside forest buffers leads to higher water temperatures and severe bank erosion, directly impacting the rare species living in the current watershed adjacent to the property. Additionally, development of single family homes and property will create physical barriers that restrict the natural movement of aquatic supporting life and directly impacting their life-cycle.

Many species within the habitat outlined above and to be impacted by development on Furnace Rd. have **hybrid life-cycles**. These species, move into and between forest buffers, streams, and larger waterways to breed, raise their young, and complete their full lifecycle. Development in this region, may prevent them from doing so.

2.4 Massachusetts' Wetland Protection Act

The Wetlands Protection Act (WPA)(M.G.L. c.131, s.40) and its implementing regulations (310 CMR 10.00) protect state-listed rare wetland wildlife species by prohibiting alterations that would have short or long term adverse effects to their wetland habitats of rare resource area habitats. The regulations state that the NHESP need to review proposed alterations to wetland resource area habitats of rare wildlife.

While the proposed region is not technically within the PH 1300 boundary outlined above, there is a strong case that the upland riparian and buffer habitats are necessary to supporting PH 1300 and therefore may be subject to the WPA.

2.5 Endangered Species Historical Precedence

Endangered, threatened, and rare species have been found in Richmond, going back to 1901, that require the habitat identified as part of the property slated for development for survival.

The list of endangered species found in Richmond and West Stockbridge, whether the habitat at Furnace Rd. could support them, most recent observation, MESA status, and if they have a hybrid-life cycle supported by multiple habitat types can be found below:

Species	Taxonomic Group	Town	Furnace Rd. Habitat and Buffer Supportive	Most Recent Observation	MESA Status	Hybrid-Life Cycle
American Bittern	Bird	Richmond	Yes	2025	Endangered	Yes, migratory
Arborvitae	Vascular Plant	Richmond	Yes	2020	Endangered	No
Bald Eagle	Bird	Richmond	Yes	2025	Threatened	No
Barren Strawberry	Vascular Plant	Richmond	Yes	2016	Special Concern	No
Bridle Shiner	Fish	Richmond	Yes	2016	Special Concern	No
Common Gallinule	Bird	Richmond	Yes	2021	Special Concern	No
Creeping Sedge	Vascular Plant	Richmond	Yes	2017	Endangered	No

Dion Skipper	Butterfly/Moth	Richmond	Yes	2008	Threatened	Yes
Drooping Speargrass	Vascular Plant	Richmond	Yes	1901	Endangered	No
Fen Sedge	Vascular Plant	Richmond	Yes	1988	Special Concern	No
Foxtail Sedge	Vascular Plant	Richmond	Yes	1997	Threatened	No
Frank's Lovegrass	Vascular Plant	Richmond	Yes	1990	Special Concern	No
Great Laurel	Vascular Plant	Richmond	Yes	2024	Threatened	No
Hemlock-parsley	Vascular Plant	Richmond	Yes	2001	Special Concern	No
Hill's Pondweed	Vascular Plant	Richmond	Yes	2002	Special Concern	No
Hitchcock's Sedge	Vascular Plant	Richmond	Yes	1988	Special Concern	No
Jefferson's Salamander	Amphibian	Richmond	Yes	2021	Special Concern	Yes
Labrador Bedstraw	Vascular Plant	Richmond	Yes	2010	Threatened	No
Least Bittern	Bird	Richmond	Yes	2021	Endangered	No

Matted Spike-sedge	Vascular Plant	Richmond	Yes	1988	Threatened	No
Parnassia Miner Bee	Bee	Richmond	Yes	2023	Threatened	Yes, dependent on bog flowers and shelters in soil
Sedge Wren	Bird	Richmond	Yes	1988	Endangered	No
Slender Blue-eyed Grass	Vascular Plant	Richmond	Yes	2005	Endangered	No
Slender Cottongrass	Vascular Plant	Richmond	Yes	2010	Threatened	No
Wood Turtle	Reptile	Richmond	Yes	2010	Special Concern	Yes, hibernatory
Woodland Millet	Vascular Plant	Richmond	Yes	1999	Threatened	No

As can be seen by the table above, every endangered, rare, or threatened species that has been found in Richmond could be supported by the habitat directly on and surrounding the property on Furnace Rd. This list does not contain the rare species found in West Stockbridge that could also potentially be supported by the land being considered for development and may migrate to the site or surrounding area in question.

The rare species that have not been found in Richmond but have the potential to migrate or increase their distribution due to the favorable habitat found on the property include:

- Appalachian Bristle-fern
- Autumn Coral-root
- Bristly Black Currant
- Bristly Buttercup

- Bur Oak
- Climbing Fumitory
- Clustered Sanicle
- Creeper Mussel
- Downy Arrow-wood
- Downy Wood-mint
- Fen Cuckoo-flower
- Frie's Pondweed
- Gattinger's Panic-grass
- Hairy Beard-tongue
- Hairy-Wood-mint
- Harpoon Clubtail
- Little Brown Bat
- Long-leaved Bluet
- Longnose Sucker
- Lyre-leaved Rock-cress
- Nodding Chickweed
- Northern Long-eared Bat
- Pied-billed Grebe
- Purple Clematis
- Round-leaved Shadbush
- Schweinitz's Sedge
- Smooth Rock-cress
- Tricolored Bat
- Wild Senna

While these species have not been identified in Richmond, as described above, species do not remain beholden to town boundaries. **Due to the similar ecology of Richmond and West Stockbridge, the interconnected nature of ecosystems spanning town boundaries, and the close geographical proximity of these habitats, these species could potentially expand their territories to Richmond without being immediately identified.**

As stated above, these rare species largest threat is loss of habitat and habitat fragmentation. Another development within range of these species may result in both the above threats coming to fruition. **The only way avoid more species being added to the list and give these species the opportunity to rebound/increase their populations is to provide them with intact habitat where they can migrate to, remain protected within, and be allowed to flourish.**

2.6 Previous Environmental Degradation

This area was previously clear-cut and destroyed for the purposes of the Richmond Furnace. Restoration of this ecological area took over a century to become biologically sound again. Any more damage to this space will act as a detriment to the health of this in-progress restoration.

3 Potential Ecological Damage

Based on the habitats above the potential degradation potential lies primarily in loss and disruption of habitat, fragmentation of ecosystems, and pollution. Single-family home development is always disruptive to ecosystems due to the cutting of trees, clearing of ground cover, and disruption of soil biome due to digging. Furthermore, when developers are out of state and unfamiliar with local ecology, the damage can

be compounded by poor selection of site development, infrastructure, landscaping materials, and construction materials.

The potential environmental degradation concerns are as follows:

1. **Ecological Impact Intensity**
    a. Ecological Impact Intensity measures the rate of environmental disruption or resource consumption produced per unit of a specific economic, industrial, or land use activity.
    b. Due to the intended development of 15-18 single family homes. This increases the impact per home and per buyer significantly over an affordable or multifamily housing project.
    c. **If this project is approved, this implies the Richmond Town Selectmen believes the ecological impacts of less than 20 homes/buyers is considered to outweigh the ecosystem benefits utilized by the 1,394 residents of Richmond and untold species living within the habitat.**

This creates ecological inequality, which is the unequal distribution of environmental benefits and burdens across the residents of Richmond.

2. **Development Impacts**
    a. **Habitat Destruction** – clearing forests for roads, homes, septic systems, etc… breaks natural systems into smaller islands and breaks up natural paths for species critical movement.
    b. **Pollution** – Pollution can come in many forms from home development
        i. **Sound pollution** – Heavy machinery can be detrimental to habitats and species that may be scared away by loud machinery and cause them to abandon the habitat
        ii. **Direct pollution –** Gas and oil spills from equipment, leachate of materials used in construction, and lack of care in cleaning up construction projects can leave behind and introduce foreign materials to the environment that directly impact water, air, and habitat quality. Potentially harming or even killing species.
        iii. **Watershed pollution –** The use of septic systems and the drilling into local aquifers for wells, potentially pulls usable water from the watershed and introduces contaminants that may percolate into local aquatic habitats.
        iv. **Invasive species introduction –** Landscaping teams may not be aware of what native species best fit the habitat they are working in and introduce invasive species to the habitat if they are not careful. For example, this is how Purple Loosestrife was introduced to Richmond.
3. **Poor Homeowner Stewardship**

    a. New homeowners may not be aware of the ecological impacts they create to make spaces more "livable" for themselves. This includes but is not limited to:
        i. **Mosquito fogging** – huge concern for the loss of insect biodiversity, mass, and quantity, impacting systemic food chains.
        ii. **Excessive herbicide and pesticide usage –** Often cited as the reason for the decrease in firefly's, the usage of these chemical results in chemical leaching, making their way into the watershed and ecosystem.
        iii. **Continued destruction of habitat –** Homeowners may destroy more habitat in the quest to manicure their outdoor space without bolstering native species and ecosystems.
4. **Collapse of local ecosystems –** With this land being a crucial buffer to rare species supporting habitat, destroying upland habitat may result in ecosystem collapse, resulting in a loss of biodiversity.
5. **Reduction in ecosystem services –** Ecosystem services are defined as "the direct and indirect benefits that healthy natural systems provide to human life and well-being."
    a. **Regulating Services -** The ways natural processes moderate and clean our environment, including climate regulation, flood control, water purification, and crop pollination.
    b. **Supporting Services -** The foundational ecological functions that make all other services possible, such as soil formation, nutrient cycling, and photosynthesis.
    c. **Cultural Services -** The non-material benefits that enrich human life, including recreation, aesthetic appreciation, spiritual growth, and mental well-being.

These impacts listed above only touch on the potential impacts this development may cause as ecological systems are even more complex than the current discipline is able to fully grasp, meaning these impacts will be wide-reaching and go beyond what can potentially be quantified. The ecological impact intensity potential of this projects is too large to go unstudied.

4 Recommended Ecological Survey

Due to the above outlined impacts, rare habitat proximity, and potential for ecological impacts, it is recommended that an ecological survey be performed. An ecological survey is the process whereby a proposed development site is assessed to establish any environmental impact the development may have.

This first stage, called a "Preliminary Ecological Appraisal" has already been conducted and is outlined in the document above, minus a walkover survey, and

has determined ecological significance of the site. The total ecological survey process is as follows:

1. Preliminary Ecological Appraisal
    a. "Rapid" survey
    b. Desk review
    c. Walkover survey
    d. This initial appraisal will identify any **ecological constraints** that exist on the site, and will also discover any potential opportunities for introducing new habitats. This initial appraisal will also build into the future plans any necessary surveys that are necessary. This will be dependent on what specific habitats are discovered.
2. If significant findings are revealed in this initial study **(which this document has determined the site possesses),** an in depth survey is necessary.
3. An in depth field study then needs to be conducted:
    a. Over multiple seasons to account for:
        i. Migratory species (such as the monarch butterfly)
        ii. Hibernation patterns (for example, certain amphibians like the threatened blue-spotted salamander and reptiles like the endangered bog turtle hibernate underground starting in September and are impossible to find traces of until they emerge)
        iii. The difficulty of identifying similar species (such as orchid species) without being in bloom and only showing identifying characteristics during specific times of the year.
        iv. Finding species that may grow from rhizome/root structures are impossible to find outside their growing season.
4. Ecological Impact Assessment
    a. A more in depth assessment needs to be conducted which includes a detailed ecological report. This report is an essential document that describes the potential effects of development on the existing habitats or species that have been found. The assessment examines the results of the preliminary ecological appraisal and takes the necessary steps based on the data findings. This will usually detail how any development could impact a specific species or habitat that was originally found in the preliminary ecological appraisal. An ecology consultant will undertake a detailed species or habitat-specific survey.
    b. This assessment consists of:
        i. Scoping and data gathering
        ii. PEA (Preliminary Ecological Appraisal)
        iii. Detailed protected species surveys
        iv. Evaluation of site's nature conservation value/habitats, species it contains
        v. Impact assessments that interpret the survey data to identify habitat loss, magnitude and significance

vi. Mitigation
vii. Residual impacts
viii. Creating a report that gives stakeholders all the relevant information they could possibly need about the ecological impact of the development

The amount of time an ecology survey takes will depend on whether any species are found. If species are found, then further ecology surveys will need to be conducted, and depending on the type of species found, the lead time for these surveys will vary. This is why it is important to conduct an ecology survey as early as possible in the planning stages of new development. Factors that impact the length of an ecological survey include: the type of survey, the time of year, and the size of the development itself.

It is imperative that if the property becomes slated for development, an ecological survey is undertaken due to its proximity to rare species habitat and direct proposed buildout on watersheds and buffer habitat critical to functioning ecosystems.

5 Conclusion

This preliminary review of the parcel located at 0 Furnace Road (Assessor Parcel ID 105-22) determined that the area of proposed development is ecologically significant and requires further study or outright protection to maintain its essential ecosystem functions and rare species habitat.

The State of Massachusetts' Core Habitat currently consists of 1,520,000 acres, of which approximately 744,800 acres (49%) are permanently protected as a result of decades of successful land protection. This sets a precedent for the need and justification to protect these Core Habitats as outlined by MassWildlife, the Nature Conservancy, and MA's Natural Heritage & Endangered Species Program.

It is the recommendation of this environmental consultant with over a decade of experience that this land be protected and the Town of Richmond exercise its statutory Chapter 61A Right of First Refusal option and assign it to a qualified conservation group. At the very least, further study must be conducted on the property to determine beyond a reasonable doubt its ecological significance. In simple terms, this area deserves a second look.

The Town of Richmond should therefore realize, based on the findings above, that protecting natural spaces is in the best interest of it's current residents and crucial to maintaining the idyllic landscape, critical habitat, and the species that reside there. Richmond is a place loved by the people who grew up there and reside there because of its deep connection to the local environment.