

Baseline Assessment
for the
Benfield Conservation Land

May 2022



Prepared by the
Land Stewardship Committee

A subcommittee of the
Carlisle Conservation Commission

Foreword

This Baseline Assessment has been prepared by the Land Stewardship Committee (LSC), a subcommittee of the Carlisle Conservation Commission. The LSC, which was formed in January 2006, has a number of core tasks. Two key core tasks are to:

1. Conduct Baseline Assessments of Town-owned conservation properties; and
2. Develop a Management Plan for each of these properties.

The Baseline Assessment involves the collection, evaluation and presentation of information on several topics including:

- The acquisition of the property, including reasons for purchase, costs, funding sources, and associated land use restrictions;
- A detailed description of the property (using maps and figures, where appropriate) covering such topics as: boundaries (and abutters), major features (e.g., fields, woods, ponds, wetlands), topography, agricultural use and soil quality, trails, parking, and signs and displays;
- Historic and current uses of the property;
- A description of previous planning documents or other studies of the property;
- Maintenance activities and current condition of the property; and
- A list of issues to be addressed in the formulation of a Management Plan.

If you have any comments on the content of this document, please send them to the author, Warren Lyman, at lymanwj42@hotmail.com.

Land Stewardship Committee (2022)

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Cover art: Artist rendering of a blue spotted salamander (artist unknown).

DEDICATION



A.E. “Ben” Benfield, 1911 – 2010
(Photo courtesy of Michael Benfield)

DEDICATION (cont'd.)

Besides being the prior owner and steward of the land that, in 2004, was purchased by the Town of Carlisle and led to the creation of the Benfield Conservation Land, Ben Benfield contributed enormously to the initiation and establishment of the conservation movement in Carlisle. He deservedly can be called the “father of town conservation” in Carlisle. Some notable conservation events from the 64 years he lived in Carlisle include the following:

1960 – One of the founders and initial supporters of the Carlisle Conservation Foundation

1960 – Donated 31 acres for the creation of the Spencer Brook Reservation

1968 – One of the original members of the Carlisle Conservation Commission

1968 – 1980 – Had twelve-year tenure on the Conservation Commission, including seven years as chair. During this time, with his leadership and hard work, the Town was able to make important conservation/recreation land purchases including the Towle Land (1968-1971), Foss Farm (1971), the Greenough Land (1973), the Davis Corridor (1974-1978), and Fox Hill (1980) at costs, after State and Federal help, of only \$200 to \$500 per acre.

1987 – Awarded, at Old Home Day, the 1987 Oscar Pederson Outstanding Citizen Award

1988 – Received Carlisle’s first Conservationist of the Year Award

2001 – Shared, with six other West St. residents, the Conservationist of the Year Award

2001 – Granted 71 acres of undeveloped woodland, bounded by Pope Road and West Street, to the Carlisle Conservation Foundation

2004 – With assistance from the Carlisle Conservation Foundation, the disposition of an additional five parcels of Benfield’s land holdings, totaling about 178 acres, is arranged so all parcels have some permanent restrictions, and most of the land is provided significant environmental protection. Two parcels are allowed limited residential development, and one is devoted to affordable senior housing. (See Section 2 for details.)

Acknowledgments

Special thanks to Daniel Lenthall, Natural Resources Conservation Service (Amherst, MA) for providing many of the diagrams used in this report, and to Sylvia Willard, Carlisle's Conservation Administrator, for helping me find the necessary files in Town Office. The following also were very helpful in providing background information and data: Judy Asarkof, Tom Brownrigg, Alan Ankers, Kay Hurley, David Freedman, Steve Tobin, Carlisle's Principal Assessor, Brian Macdonald, and Michael Benfield. I also want to acknowledge the significant help provided by the archived editions of the *Carlisle Mosquito*; the excellent reporting on the events related to the Benfield lands made it easy to retrieve or verify many facts used in this report. And finally, thanks to all of the Land Stewards who reviewed drafts of this report.

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1. GENERAL DESCRIPTION OF THE PROPERTY

Overview

The 25.68-acre Benfield Conservation Land, acquired in 2004, is located on the south side of South Street in the southwest corner of Carlisle (**Figure 1-1**). Although this parcel has no direct frontage on a public road, public access is guaranteed by a Town-owned easement for a road entering from South Street and serving Benfield Farms, a senior housing complex located at 575 South Street. Approximately six, brick-paved parking spaces for people wishing to use the Benfield Conservation Land are provided along this road adjacent to Benfield Farms; handicapped parking is not currently available. A cart path, recently covered with a layer of crushed stone, leads from the parking area to the Benfield Conservation Land. In the future, there could be a second pedestrian access which followed an easement connecting the Hartwell Road circle with the Benfield Conservation Land; such an access would require the construction of a new trail along the easement and the construction of a bridge to cross Spencer Brook and the associated wetlands. The easement is protected by a Conservation Restriction (CR #27).

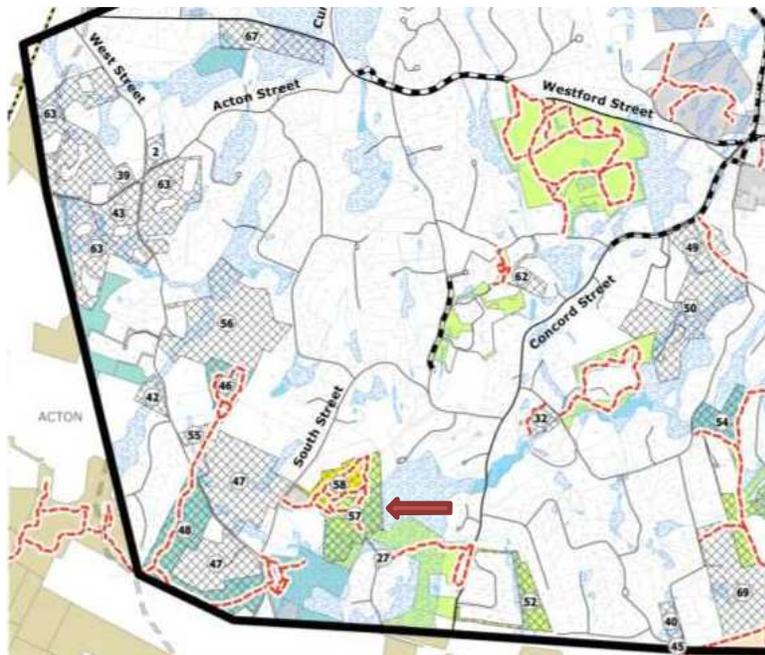


Figure 1-1. Location of Benfield Conservation Land (#57).
Source: Adapted from Map 7 in Carlisle’s Open Space and Recreation Plan – 2020/2021.

The northern portion of the property, most bounded by a stone wall, is a former agricultural field currently maintained by mowing. Most of the southern portion is vegetated wetlands with Spencer Brook, a perennial stream, forming the southernmost boundary. In addition to the field and wetlands, a small portion of the property is wooded, and a number of solitary pine trees occupy one field section. The land slopes gently from the northern boundary down to Spencer

Brook on the southern boundary. There is also Land Subject to Flooding extending into the field area. Subsequent to the purchase of the property, the Town allowed (in 2013) the installation of a leach field and a water supply well on separate portions of the fields, both to serve Benfield Farms.* According to a conservation restriction on the property (see Section 3), the original contours of the land were to be retained following such installations. Underground pipelines connect the leach field and well to Benfield Farms.

Water features on the property include both Spencer Brook (a boundary) and a certified vernal pool (NHESP** # 3764) that is situated between the two sections of the field. Nearby, midway between the property and Benfield Farms is another certified vernal pool (NHESP # 7048); this vernal pool is on Town land set aside for recreation. And a third vernal pool, not certified, is on private property just outside the northeastern border of the property.

Other special features of the property include: (a) hiking trails (see Section 5); (b) an observation platform overlooking Spencer Brook, installed by the Trails Committee and the Carlisle Conservation Foundation (CCF) in 2010-2011 (**Figure 1-2**); and (c) three bat houses constructed and installed as part of an Eagle Scout project in 2020 (**Figure 1-3*****); and (d) a number of bluebird houses (currently 12) in the main field. Some of the bluebird houses mark the location of the leach field and related structures.



Figure 1-2. Observation platform at Spencer Brook. (Photo by Warren Lyman)



Figure 1-3. Bat house installation in 2020 by Thomas Coloian, prospective Eagle Scout, and parents. (Photo by Warren Lyman)

The planning for, and construction of, the observation platform was a complex, expensive and labor-intensive adventure. Steve Tobin of the Carlisle Trails Committee provided the following description:

*In 2019, the original leach field failed and was eventually replaced in 2021 by a new one in the reserved area adjacent to the original location. The failure included break-out seepage in the leach field.

**NHESP: Massachusetts Natural Heritage and Endangered Species Program

***Three more bat houses were installed on the adjacent Spencer Brook Reservation at the same time.

“Steve Hinton and Wayne Davis of the Carlisle Conservation Foundation (CCF) came to a Trails Committee meeting in Nov. 2009 proposing a boardwalk from Benfield Conservation to Bisbee as a big project to celebrate CCF’s 50th anniversary in 2010. The Trails Committee signed on. After doing some investigation, it was decided to start with the Benfield platform and build the bridge over Spencer Brook and the rest of the 500-foot boardwalk later. Steve Hinton engineered and managed the project and obtained the wetland permit. During the public hearing, Native American representatives requested the platform shape be changed from a rectangle to an ellipse and this was done. CCF hired Solid Earth Technologies to install the steel helical pier supports some of which had to go down 30 feet to hit refusal; this was the major expense of the project (about \$23,000). CCF bought the rest of the materials for the platform, and Steve Hinton and Trails Committee volunteers provided the 370 hours of needed construction labor. The total cost was about \$27,000. Construction was done during the very snowy winter of 2010-2011 while Spencer Brook was frozen allowing workers to stand on the ice while working. The platform was the centerpiece of CCF’s annual fund drive in 2010, with large donors getting their names on a plaque.”

Figure 1-4 (next page) shows the location of some of the above-mentioned features. **Figure 1-5** shows the location of the well and the original septic field (darker green area), both serving Benfield Farms. The replacement leach field installed in 2021 is immediately to the west (left) of the original area.

Detailed engineering drawings for the well and leach field are available in the Conservation Commission files in the Town Office.

Abutters and Nearby Conservation Lands

Abutters to the Benfield Conservation Land are shown in **Figure 1-6**. The map also shows the location of the wellhead protection area for the well supplying Benfield Farms; land use restrictions associated with this area are described in Section 5. A list of all abutters with property lines within 100 feet of the Benfield Conservation Land is provided in **Appendix A**.

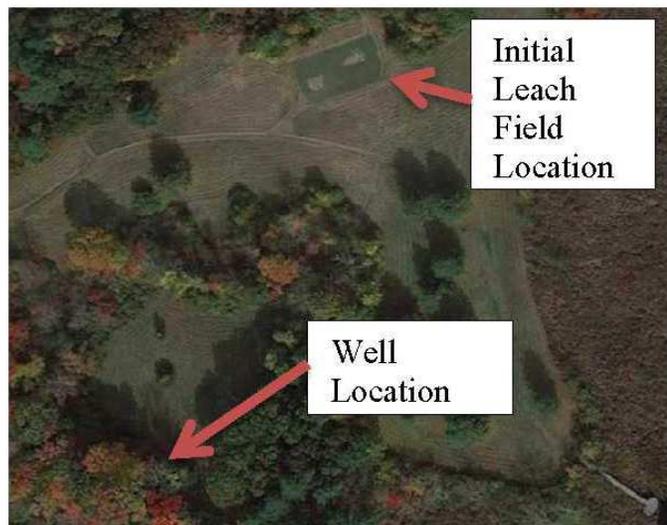


Figure 1-5. Location of Benfield Farm’s Well and Initial Leach Field (2020 image)

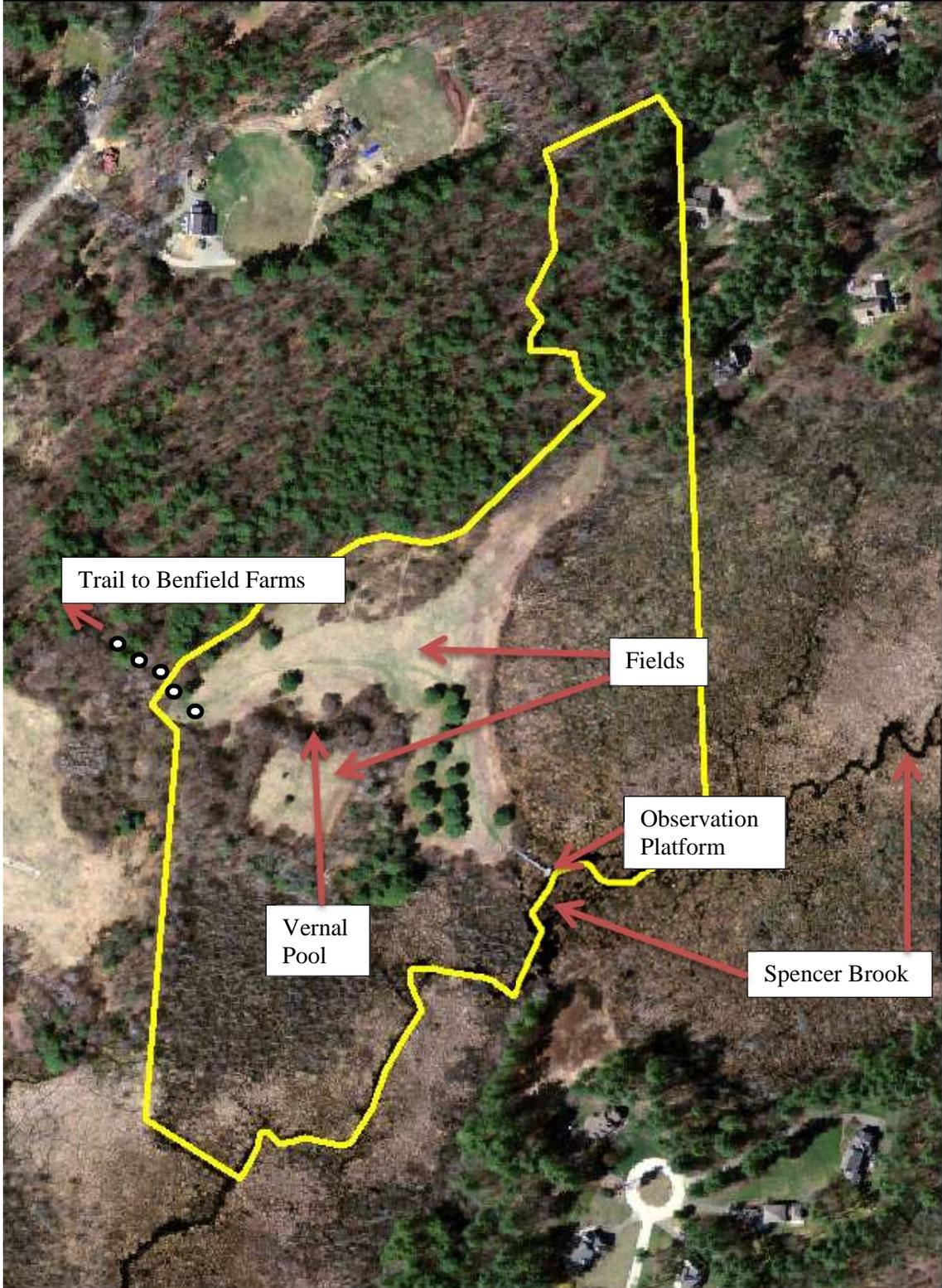


Figure 1-4. Benfield Conservation Land: Property Line and Key Features
Image Source: Dan Lenthall, Natural Resources Conservation Service (2013 aerial image)

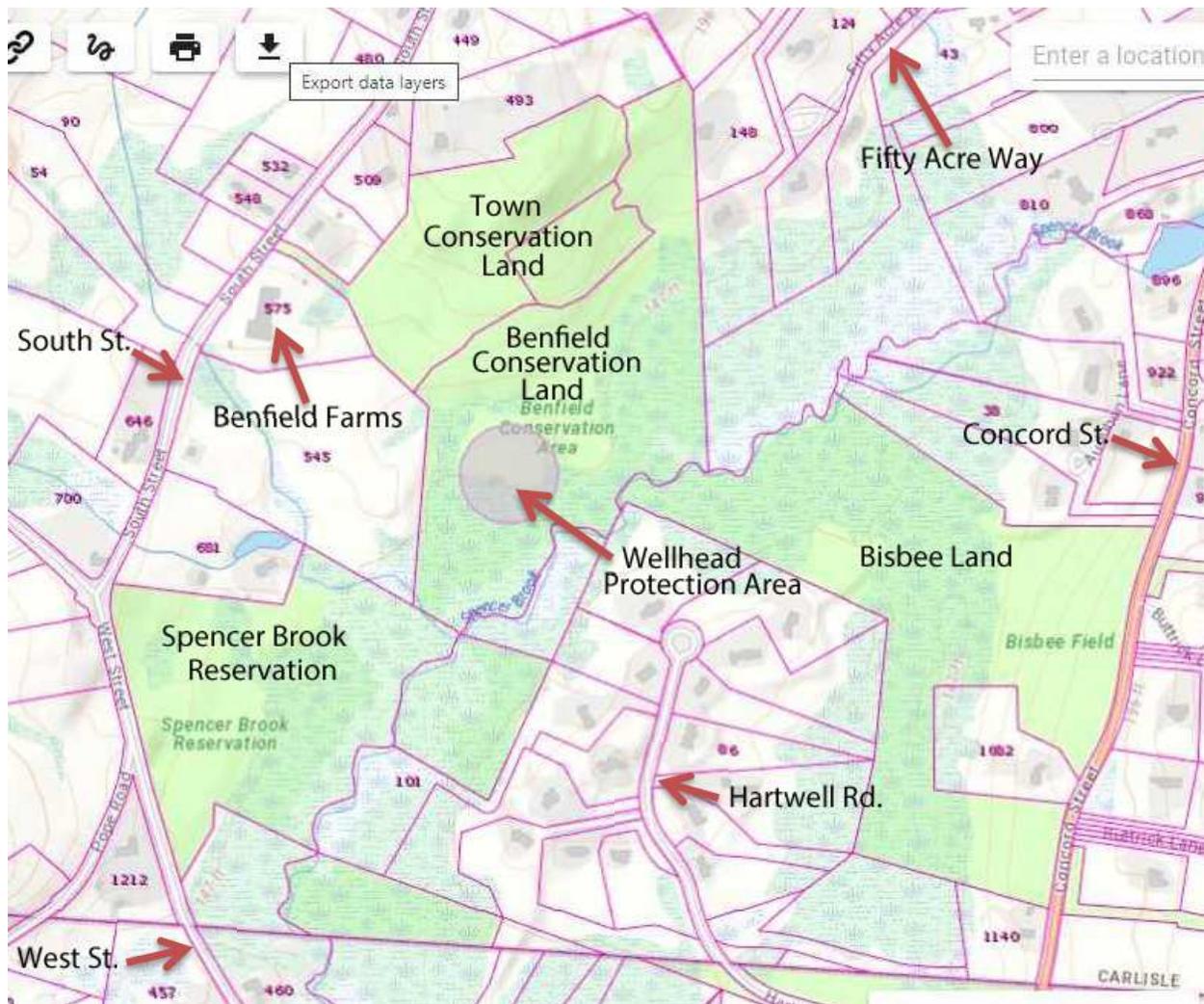


Figure 1-6. Abutters to the Benfield Conservation Land

Map source: MassMapper (MA Executive Office of Technology and Security Services)

Abutting Conservation Lands

The Benfield Conservation Land has three abutting parcels that are also protected open space or conservation lands:

- Spencer Brook reservation (31.5 ac.), owned by the Carlisle Conservation Foundation;
- Bisbee Land (34 ac.), a Town-owned conservation parcel; and
- A Town-owned conservation parcel (15.23 ac., un-named) with a conservation restriction (CR 58) which designates the Carlisle Recreation Trust as the grantee. The land is currently wooded, but future land improvements for limited recreational purposes are allowed. Details of the allowed uses and restrictions are in the CR 58 legal document (“Conservation Restriction with Recreation Uses”) dated September 25, 2007 and available in Town Office.

These three abutters plus the Benfield Conservation Land (25.68 ac.) form a contiguous conservation cluster of 106.4 acres.

Abutting Private Property

There are eight, direct, private property abutters, including three with South St. addresses, three with Fifty Acre Way addresses, and two with Hartwell Road addresses. (See Appendix A.)

Nearby Conservation Lands

Aside from abutters, within three quarters of a mile of the Benfield Conservation land are a number of additional conservation lands or parcels with conservation restrictions (see Figure 1-1). In Carlisle, this includes parcels with CR #s 42, 46, 47, 48, 56, 52, 55 and 56. Included in this list are two Carlisle Conservation Foundation (CCF) properties: Benfield Hill (CR 46) and Ben's Woods (CR 48). Also within the $\frac{3}{4}$ -mile distance are conservation lands in Acton and Concord.

2. PURCHASE OF THE LAND*

Pre-Purchase Facilitation by the Carlisle Conservation Foundation**

Prior to the 2004 purchase of the Benfield Conservation Land, the Carlisle Conservation Foundation (CCF) engaged in two years of planning and negotiations with the Benfield family regarding the family's planned disposition of several parcels of land owned by Ben Benfield in the southwest corner of Town. The Benfield lands in question consisted of five parcels - labeled A, B, C, D and E - totaling about 178 acres. The eventual Benfield Conservation Land was a part of Parcel A. In the end, two parcels (B and C) were allowed to be developed with four lots each (lots ranging from 4 to over 12 acres in size), 61 acres are owned outright by CCF, and Parcels B, C, D and E (133 acres) are subject to a perpetual conservation restriction. Parcel A also ended up with restrictions as detailed in the following subsection and also in Section 4.

CCF's negotiations also resulted in the Town being given an opportunity to purchase Parcel A at fair market price. The goals of the agreement were to: (a) preserve wildlife corridors; (b) allow for trail easements; (c) protect rural vistas; and (d) provide a multi-use parcel that could support the needs for conservation, recreation and affordable housing. To further assist in the process required for Town acquisition of Parcel A, CCF borrowed the required 10% down payment (just under \$200,000) to exercise an option to buy the property; this gave the Town time to hold a Town Meeting to vote on a Town purchase. Based on Town records, it appears that one Carlisle resident provided the funds needed for the down payment.

Town Meeting Approval and Direction

The Benfield Conservation Land is a 25.68-acre portion of a 45.23-acre parcel of land, referred to as Benfield "Parcel A," that was purchased from the estate of the late Adalbert E. ("Ben") Benfield on April 6, 2004. **Figure 2-1** shows a plan of Parcel A which was subdivided into four lots. The purchase price was \$1,925,000, although additional funds, around \$76,000, were required to cover associated expenses.*** The purchase was facilitated by the Carlisle Conservation Foundation and a trust set up by Benfield's estate, the South Street Nominee Trust.

*Except as noted, essentially all of the information in this Section 2 comes from a collection of documents entitled "Benfield Parcel A, Carlisle, MA, Purchase and Allocation," prepared by Deutsch Williams Brooks DeRensis & Holland, P.C., attorneys at law, and received and date stamped April 30, 2008 by the Carlisle Conservation Commission. A copy is available in the Conservation Commission files in Town Office.

**Information in this subsection is based on the article "Town has opportunity to buy 45 acres off West Street," by Seba Gaines, in the January 16, 2004 edition of the *Carlisle Mosquito*. This article, plus one written by Sally Swift the following year ("133 acres of Benfield farm now permanently protected," *Carlisle Mosquito*, April 29, 2005), provide a good overview of the efforts of the Carlisle Conservation Foundation in preserving many parts of the Benfield land.

***Additional funds were needed to cover such items as legal, engineering and recording fees, insurance, appraisals, administrative fees, and taxes.

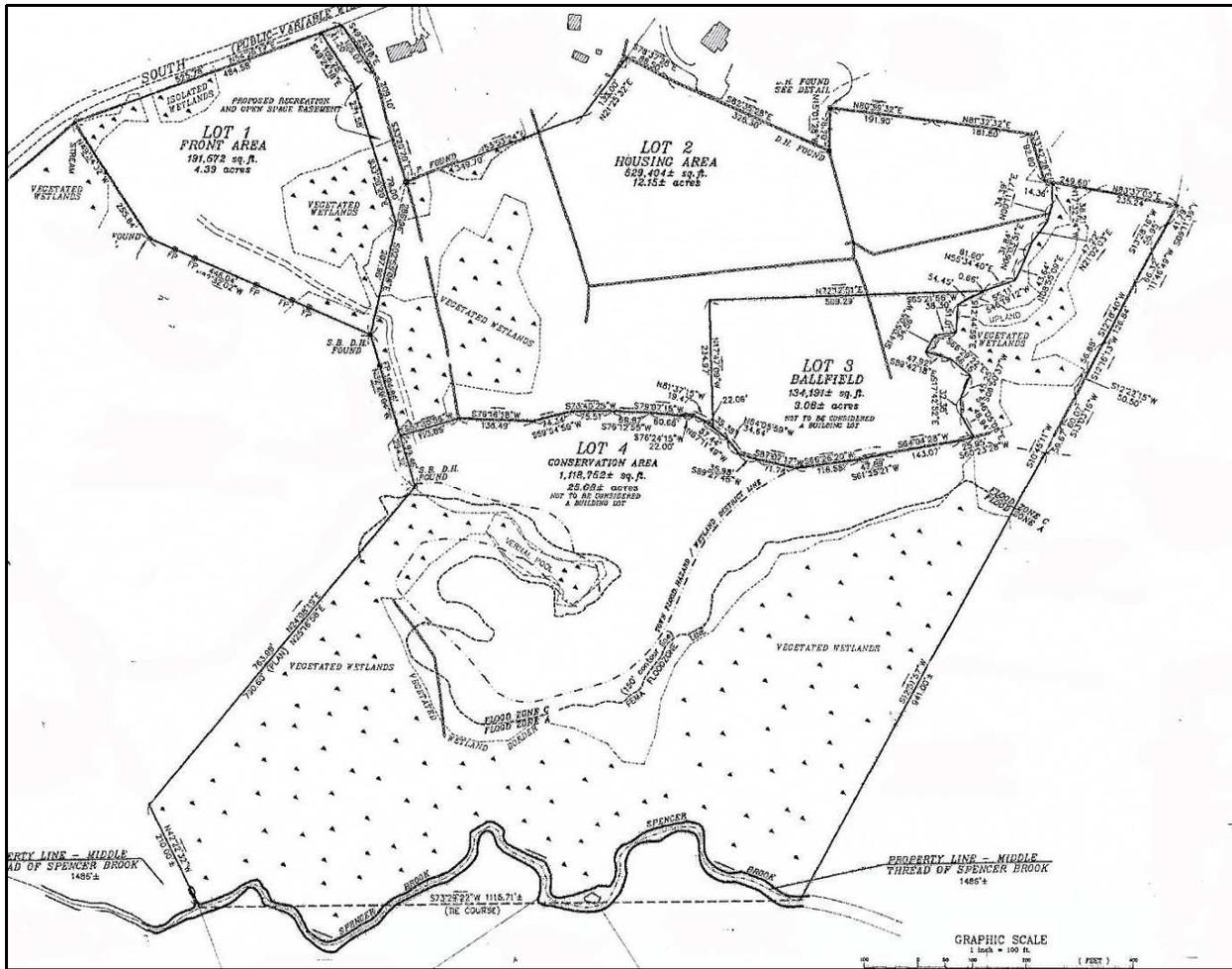


Figure 2-1. Benfield “Parcel A” and its Four Lots.

Source: Adapted from a plan entitled “Town Subdivision Plan of Land for Parcel “A” in Carlisle, Mass. Prepared by Metrowest Engineering, Inc., Framingham, Mass. Dated August 10, 2005. (An earlier Plan of Land by Metrowest Engineering, Inc., dated September 10, 2003, showed five potential building lots plus an “Open Space Parcel-A” comprising the southern wetlands.)

Town authorization of this land purchase was given at a special Town Meeting on March 23, 2004. The vote was 395 to 185 in favor of the purchase; this affirmative vote (68.1%) was just above the 2/3 majority needed. Motion 1 of the approved Article 1 specified that a roughly 26-acre portion of the Benfield “Parcel A”, the so-called “Designated Open Space Parcel” (Lot 4 in Figure 2-1), shall be used as Open Space. This Open Space Parcel is now called the Benfield Conservation Land, and is managed by the Carlisle Conservation Commission.

Paragraphs C and D of Motion 1 specifically stipulated:

“(C) that the area marked on the attached Plan as the Designated Open Space Parcel, consisting of approximately 26 contiguous acres including the entire 24-acre interior meadow and wetlands complex located between Spencer Brook and the east-west running stone wall that bisects Parcel A and including an approximately two (2)-acre

buffer strip along the easterly boundary of Parcel A north of such stone wall, shall be used as Open Space, as that term is used and defined in Chapter 44B,* excluding developed athletic fields, but including without limitation passive recreational use such as community gardens, trails, picnicking, walking, jogging, dog walking, cross-country skiing, snowshoeing, bicycling, horseback riding, kite flying, wildlife viewing and outdoor education, and also including well fields, aquifers and recharge areas, agricultural land, grasslands, fields, marshes and other wetlands, streams, lands to protect scenic vistas, and land for wildlife or nature preserves, and including wastewater disposal fields used for housing developed on other areas of Parcel A if such fields do not substantially change the existing contours of the land;”

“(D) that the remaining 19.23 acres, more or less, of Parcel A shall be used only (i) for Recreational Use purposes as defined in Chapter 44B consisting of athletic fields and associated parking areas, roads, infrastructure and related amenities not inconsistent with Recreational Use purposes under Chapter 44B, and (ii) for Community Housing purposes as defined in Chapter 44B which contributes to the Town of Carlisle’s obligations under Chapter 40B, and associated parking areas, roads, infrastructure and related amenities not inconsistent with Community Housing purposes under Chapter 44B, such Recreational Use and Community Housing acreage, location and boundaries to be further delineated upon completion of the public master plan site planning process described in Motion 2 below, or subject to the fallback plan described in Motion 2 below, as the case may be; provided that in any case there shall be no more than one (1) developed athletic field and no more than 26 housing units on Parcel A, and provided further that the Parcel A Planning Task Force identified in Motion 2 below may recommend that after housing and recreational uses have been sited and adequate provision has been made for future phases of development for the maximum usage set forth above, unused portions of the 19.23 acres may be designated as Open Space as defined in paragraph (C) above.”

Motion 1 at the special Town Meeting called for the approval of \$2,000,000 for the Parcel A acquisition, with \$400,000 to come from existing funds in Carlisle’s Community Preservation Fund, and the remaining \$1,600,000 to be borrowed, as general obligation bonds of the Town, with the intent that the principal of and interest thereon is to be repaid from the Community Preservation Fund.

Subsequent motions of the special Town Meeting:

- [Motion 2] - Authorized the Board of Selectmen to create a Parcel A Planning Task Force to conduct a “public master site planning process” with a focus on finding a site for the Community Housing.

*Section 2 of MGL Chapter 44B (Community Preservation) contains the following definition: "Open space", shall include, but not be limited to, land to protect existing and future well fields, aquifers and recharge areas, watershed land, agricultural land, grasslands, fields, forest land, fresh and salt water marshes and other wetlands, ocean, river, stream, lake and pond frontage, beaches, dunes and other coastal lands, lands to protect scenic vistas, land for wildlife or nature preserve and land for recreational use.

- [Motion 3] – Authorized the Board of Selectmen to grant: (i) “a permanent restriction in favor of the Carlisle Conservation Foundation, Inc.” on the Designated Open Space Parcel; (ii) “a permanent restriction in favor of a nonprofit, charitable corporation or foundation” for the designated Recreational Parcels; and (iii) “a permanent restriction in favor of a nonprofit, charitable corporation or foundation” on the portions of Parcel A designated for Community Housing. (Note: In 2007, Carlisle Conservation Restriction #s 57 and 58 were signed taking care of the obligations in items “i” and “ii” above. Details on CR #57 are provided in Section 3 below.)
- [Motion 3] – Asked that the Town accept the recommendations of the Community Preservation Committee that the “care, custody and management” of the Designated Open Space Parcel be transferred to the Conservation Commission. Similarly, the care, custody and management of the recreational parcel was to be transferred to the Recreation Commission, and the care, custody and management of the Community Housing parcel was to be transferred to the Housing Authority.
- [Motion 4] – Authorized the Conservation Commission to seek partial reimbursement, from the Commonwealth of Massachusetts or other entities, for the cost of purchasing the Open Space Parcel.

In reference to the last bullet above, the current Conservation Administrator, Sylvia Willard, reports that reimbursement from the State was requested but not approved on the grounds that the State reimbursement program was only for land not yet acquired.

Starting in the summer of 2004, the Parcel A Planning Task Force initiated its work to recommend the best locations for an affordable housing complex and an athletic field. Complications arose related to a number of factors including:

- The finding of two vernal pools, one in the middle of Parcel A and a second on the eastern border;
- The protected blue-spotted salamander was found on the site; this species is considered of Special Concern pursuant to the MA Endangered Species Act (MESA).
- A claim by Native Americans that certain stone piles or stone arrangements on the site were of ceremonial significance; and
- Pressure from abutters to keep any development at least 100 feet from lot lines.

The Task Force developed and evaluated different plans, and finally – in October 2006 – Town Meeting accepted a plan that placed the affordable housing on Lot 1 (close to South St.) and designated Lots 2 and 3 for potential future recreational use. Providing a safe habitat and buffer zone for the blue-spotted salamanders – as required by the state Natural Heritage and Endangered Species Program (NHESP) – was the primary determining factor in the decision to keep development off Lots 2 and 3.

The Purchase

On April 6, 2004 trustees of the South Street Nominee Trust (Marjorie Getchell and John M. Cornish) signed a quitclaim deed which granted the Benfield “Parcel A” to the Town of Carlisle. The deed was recorded in the Middlesex North Registry of Deeds at Book 17113, Page 52 (Page 1 of 7) on April 8, 2004. A Settlement Statement between the Trust and the Town, which shows

the purchase price of \$1,925,000, is dated April 7, 2004. On April 8, 2004, the Town received from Stewart Guarantee Title Company (Houston, TX) an Owner's Policy of Title Insurance for the acquisition of the Benfield "Parcel A." The amount of the insurance was \$1,925,000.

Declaration of Easements

On September 25, 2007, based on the authority granted in Town Meetings in 2004, 2005 and 2006, the Town issued a Declaration of Easements for Benfield "Parcel A" covering a single access road and related parking to serve all the municipal purposes anticipated for the Parcel. The Board of Selectmen would retain control over all aspects of design, construction, repair, replacement and maintenance. An easement was also granted for access to Lot 4 (now the Benfield Conservation Land) via the existing cart path crossing Lots 2 and 3.

Naming the Land

It was not until 2009 that Lot 4 of the Benfield "Parcel A" was officially named the Benfield Conservation Land by the Conservation Commission.

3. THE CONSERVATION RESTRICTION

Introduction

On September 25, 2007 the Board of Selectmen executed a Conservation Restriction and Public Access Easement (Carlisle CR #57) for the Benfield Conservation Land. In this document, the Town (the “Grantor”) assigned to the Carlisle Conservation Foundation, Inc. (CCF) (“Grantee”), “in perpetuity and exclusively for conservation purposes,” the Conservation Restriction summarized below. The granting of the CR was in fulfillment of the requirements of Massachusetts General Laws (Chapter 44B – Community Preservation) which required the Town to permanently restrict land acquired with Community Preservation Funds for “open space.” The CR was officially accepted by CCF on September 6, 2007, approved by the Massachusetts Secretary of Energy and Environmental Affairs on October 4, 2007, and recorded by the North Middlesex Registry of Deeds on October 26, 2007 at Book 21698, Page 247 (17 pages). A full copy of CR #57 is available in The Conservation Commission offices in Town Office. The official CR includes a Premises Description (Exhibit A) and a “Sketch Plan – Conservation Restriction and Public Access Easement” prepared by Metrowest Engineering Inc., (Framingham, MA), dated May 2, 2007 (Exhibit B).

Purpose of the Conservation Restriction

Quoting the CR: “The purpose of this Conservation Restriction is to assure that the Premises will be retained in perpetuity predominantly in their natural, scenic, and open condition, including land to protect existing and future well fields, aquifers and recharge areas, watershed land, agricultural land, grasslands, fields, forest land, river and stream frontage; lands to protect scenic vistas; land for wildlife and nature preserve; land for passive recreational use; to protect any Blue Spotted Salamander or Blue Spotted Salamander habitat as may exist on the Premises; and to prevent any use of the Premises that will significantly impair or interfere with the conservation values of the Premises.”

Terms and Provisions of the Conservation Restriction

Prohibited Uses [Paragraph A of CR - Direct quote]

- 1) Constructing, placing or allowing to remain any temporary or permanent building, tennis court, developed athletic field, landing strip, indoor or outdoor horse riding ring, mobile home, swimming pool, asphalt or concrete pavement, sign, fence, billboard or other advertising display, antenna, utility pole, tower, conduit, line or other temporary or permanent structure or facility on, above or under the Premises;
- 2) Mining, excavating, dredging or removing soil, loam, peat, gravel, sand, rock or other mineral resource or natural deposit;
- 3) Placing, filling, storing or dumping of soil, refuse, trash, vehicle bodies or parts, rubbish, debris, junk, waste or other substance or material whatsoever or the installation of underground storage tanks;
- 4) Cutting, removing or otherwise destroying trees, grasses or other vegetation;

- 5) Activities detrimental to drainage, flood control, water conservation, water quality, erosion control, soil conservation, or archaeological conservation;
- 6) The use of motorcycles, motorized trail bikes, snowmobiles and all other motor vehicles, except as required by the police, firemen or other governmental agents in carrying out their lawful duties;
- 7) The use for more than a de minimus commercial recreational activity;
- 8) Hunting or trapping;
- 9) (a) Conveyance of a part or portion of the Premises (as compared to conveyance of the entire Premises, which shall be permitted), of the division or subdivision of the Premises, (b) the use of any portion of the Premises for access for development purposes to any other land now or hereafter developed or (c) except as authorized in Paragraph B of this restriction, the use of any portion of the Premises toward building requirements on this or any other parcel.
- 10) Any other use or activity thereon which is inconsistent with the purpose of this Conservation Restriction or which would materially impair significant conservation interests that are the subject of this Conservation Restriction.

Reserved Rights [Paragraph B of CR - Direct quote]

All acts and uses not prohibited on the Premises according to Paragraph A are permissible provided that they do not materially impair the purpose of this Conservation Restriction or other significant conservation interests. Notwithstanding the provisions of Paragraph A, the following acts and uses are also permitted but only if such uses and activities do not materially impair the purpose of this Conservation Restriction or other significant conservation interests and provided all applicable permits are obtained:

- 1) Installation, use and maintenance of water wells and wastewater disposal fields and associated below grade equipment and structures constituting a wastewater (“septic”) disposal system and associated utilities and lines; provided, however, that (a) such septic system and associated grading shall not be above existing elevations; (b) such septic and wells shall be located to the maximum extent feasible so as to reduce any impact on the conservation interests protected by this conservation restriction; and (c) upon installation of such septic system and wells, the existing contours, elevations and vegetation shall be restored to the maximum extent feasible to their present condition. Said wells and septic system shall be solely for the purpose of serving (i) the residential improvements to be made on Lot 1 described on the plan entitled “Benfield Parcel ‘A’ Confirmation Plan in Carlisle, Mass.” recorded in Middlesex North Registry of Deeds herewith (the “Plan”), (ii) the recreational improvements to be made on Lot 3 and/or Lot 2 described on the Plan, and/or (iii) the agricultural, horticultural or community gardens uses which are permitted on the Premises, Lot 2 and Lot 3.
- 2) Excavation and removal from the Premises of soil, gravel or other mineral resources or natural deposit as may be incidental to the installation or maintenance or removal of the wells and septic systems and associated utilities and lines permitted under Paragraph B(1) above or to the maintenance of good drainage, soil conservation practices or to other permissible use of the Premises.
- 3) Mowing and maintenance of existing meadows and fields to protect the conservation values of the Premises, including without limitation, scenic and wildlife habitat values.

- 4) The maintenance of piles of limbs, brush, leaves and similar biodegradable material originating on the Premises provided such piles are not conspicuous from abutting properties.
- 5) The placing, removal, maintenance, repair and reconstruction of sight-pervious fences, including without limitation historic stone walls. As used herein, “sight-pervious fencing” shall not include so-called “cyclone” or “chain-link” or “snow” fencing.
- 6) Agricultural, horticultural and animal husbandry operations carried on in accordance with sound agricultural management practices (including without limitation the cultivation and mowing of existing fields, the mowing and grazing of existing meadows).
- 7) In accordance with generally accepted forest management practices, (a) selective pruning and cutting to prevent, control or remove hazards, disease or insect damage, fire, or to preserve the present condition of the Premises, including existing fields and meadows and unpaved woods roads and trails; and (b) following notice to Grantee, the cutting of trees in accordance with a plan, prepared by a professional forester and approved by the Grantee, that is designed to protect the conservation value of the Premises, including without limitation, scenic and wildlife habitat values.
- 8) With the prior written permission of the Grantee, the expansion of existing fields for agricultural, animal husbandry, or horticultural use or non-commercial recreational uses otherwise permitted herein.
- 9) Passive recreational use such as community gardens, trails, picnicking, walking, jogging, dog walking, cross-country skiing, snowshoeing, bicycling, horseback riding, kite flying, wildlife viewing and outdoor education, fishing, hiking, sledding and other non-motorized outdoor recreational activities that do not materially alter the landscape nor degrade environmental quality.
- 10) The construction, maintenance, repair, replacement, reconstruction, reasonable enlargement and marking of trails, wetland crossings, farm ponds, boardwalks and bridges and wildlife viewing platforms for pedestrian use, non-motorized outdoor recreational activities and/or horseback riding, as well as the maintenance of presently existing trails and woods roads substantially in their present condition, or as otherwise reasonably necessary for the uses permitted by this Conservation Restriction.
- 11) With the prior written permission of the Grantee, measures (including tree cutting) designed to restore native biotic communities, or to maintain, enhance, restore or otherwise manage wildlife, wildlife habitat or rare or endangered species.
- 12) The erection, maintenance and replacement of reasonably-sized signs with respect to trespass, access and the use of the Premises, and/or the Grantee’s interest in the premises and/or the protected conservation values.
- 13) The conduct of archaeological activities, including without limitation surveys, excavation and artifact retrieval, following submission of an archaeological field investigation plan and its approval in writing by Grantee and the State Archaeologist of the Massachusetts Historic Commission (or appropriate successor official).

Details for Paragraphs C thru N of this CR are not provided in this Baseline Assessment. The headings of those paragraphs are as follows: C – Notice of Approval; D – Extinguishment; E – Proceeds; F – Condemnation; G – Access; H – Legal Remedies of Grantee; I – Acts Beyond Grantor’s Control; J – Duration and Assignability; K – Subsequent Transfers; L – Termination of Rights and Obligations; M – Estoppel Certificates; and N – Miscellaneous. Copies of the full CR are available in the Conservation Commission files in Town Office.

4. PREVIOUS PLANNING OR OTHER STUDY DOCUMENTS

There have been no significant plans or site studies directed solely towards an evaluation of the natural environment on the Benfield Conservation Land. There were significant plans and site studies related to the purchase of the Benfield Parcel A, to the subsequent evaluation of the Parcel with regard to the location and needs of the proposed senior housing, and to the following construction. Most of the resulting documents are available in Town Office files, including those of the Conservation Commission.

According to a February 2004 Purchase and Sale Agreement for Parcel A, prior to the Town's purchase of the land - besides such items as legal services, title searches and appraisals - studies or plans included: (a) planning and engineering services by Stamsky & McNary (cost: \$9,259); and (b) a Phase I Environmental Site Assessment by Rizzo Associates (cost: \$2,000). No copy of the Rizzo report was found in the Conservation Commission files.

After the purchase of Parcel A, there were a number of other plans or studies associated with determining the location of the senior housing, and the location of the water supply well and leach field (septic system) that would serve the housing. Most of the plans are in the form of engineering drawings ('plans of land') prepared by Metrowest Engineering (Framingham, MA). These are valuable as, in addition to showing lot lines and buildings, they commonly show wetlands, flood hazard contours, streams, stone walls, easements and elevation contours. Figure 2-1 (Section 2) is an edited version of one of Metrowest Engineering's plans. Metrowest's early site evaluations resulted in the identification and certification (in February 2006) of the vernal pool in the middle of the Benfield Conservation Land. Other engineering plans found in the Conservation Commission files in Town Office included: (i) a Utility and Roadway Plan – Benfield Farms Senior Housing Development, prepared by Meridian Associates (Westborough, MA), dated October 2012; (ii) a Meridian Associates plan for the wellhead protection area (2012); and (iii) a GeoHydroCycle, Inc. (Newton, MA) Well Plan for Benfield Farms (2012).

Archaeological Survey*

In 2005, following reports that there might be Native American ceremonial structures on Benfield Parcel A, the Benfield Task Force consulted with the Massachusetts Historical Commission (MHC) which noted both pre-contact Native American and post-contact areas of concern near Parcel A. To prevent the Benfield project from potentially impacting as yet undiscovered cultural resources, the MHC requested an "intensive (locational) archaeological survey" within the Benfield Parcel A project area. The Benfield Task Force requested that PAL(Pawtucket, RI), a cultural resource management firm, undertake this work. The field work for this project, done under a permit from the Massachusetts State Archaeologist, was completed in May 2005, and a report (*op. cit.*) was delivered to the Town in July 2005.

*"Intensive (Locational) Archaeological Survey: Benfield Parcel A Project Area," submitted by Alan Leveillee and Joseph N. Walker, Jr. (PAL, Pawtucket, RI), June 2005 (53 pages + attachments). Copies are available in Carlisle Town Office.

The main findings and conclusions from this survey are described by PAL in the report's Management Abstract as follows:

“Ninety-one 50-x-50-centimeter shovel test pits were excavated within “Design Alternative A” proposed for the project. Test pits were organized in five 30-x-30-meter (m) sampling blocks, four linear test pit transects, and two 5-m sampling arrays. Archaeological testing resulted in the recovery of three pre-contact Native American flakes from two distinct sections of the project area. Collected Native American cultural materials are interpreted as the result of small, limited-duration occupations by Native Americans who traversed the property in the past. Subsurface archaeological testing also resulted in the recovery of low densities of nineteenth- and twentieth-century cultural materials from across the survey area. These materials represent incidental discard of cultural materials into the plow zone by farmers who worked the land. The cultural material record from Design Alternative A at the Benfield Parcel A project area lacks meaningful contexts and is therefore not considered to represent a potentially significant cultural resource. Consequently, PAL recommends no additional archaeological testing within Design Alternative A within the project area. If project proponents decide to pursue an engineering design other than Design Alternative A, then supplemental intensive testing may be warranted in the areas that have not yet been satisfactorily surveyed.

Stone piles on the property continue to be the subject of debate. PAL interprets these remains as remnants of eighteenth- through twentieth-century agricultural activities by colonial farmers, while the Wampanoag and Narragansett Indians maintain the stone features are part of an extensive ceremonial place and landscape....”

Further on in the PAL report, the authors cite a 2005 study on the stone piles and other stone features on the Benfield Land.* PAL stated that: “This report concluded that the stone piles present on the parcel ‘reflect the spiritual values and practices’ of ancient southern New England Algonquian peoples and that these features ‘are still important to their descendants.’” The PAL report contains one photograph each of the three types of stone piles found on the Parcel A.

The locations of the test pits evaluated by PAL are shown in Figure 5-4 of their report. If this figure (with a scale of 1 inch = 80 feet) is put under a Benfield Parcel A site plan (of the same scale) on a light table, it will be seen that none of the subsurface archaeological testing done by PAL was on the Benfield Conservation Land (Lot 4 of Parcel A).

Additional information on the issue of Native American ceremonial structures on Parcel A can be found in the June 3, 2005 issue of the *Carlisle Mosquito* in the articles by Ellen Miller and Cecile Sandwen.

*“Survey Report of Indian Structures on Benfield Parcel ‘A’ Property in Carlisle, Massachusetts,” by Doug Harris, Curtiss Hoffman, Peter Waksman, and Timothy Fohl. 2005. Report on file at PAL, Pawtucket, RI. 2005.

2010 Site Photos

The Carlisle Conservation Commission files contain a CD disc, dated July 2010, containing 82 photos, mostly of the field areas of the Benfield Conservation Land. There are no dates, titles or descriptive text for individual photos. The photos do show healthy grasses and other vegetation in the fields, including a few wildflowers.

5. ENVIRONMENTAL DESCRIPTION OF THE LAND

Photographic Documentation

Photographic documentation of the condition of the Benfield Conservation Land at, or before, the time of purchase in 2004 is essentially non-existent except for limited private files. Google Earth has a few aerial photos showing the site in 1995, 2001 and 2003; these photos show no significant differences from post-purchase aerial photos, except those showing the constructed leach field and observation platform. MassMapper* also has an aerial from the 1990s.

A few post-purchase photos (from 2005 and 2008) are contained in an unpublished initial effort by Timothy Fohl to prepare a Baseline Assessment in 2009.** The photos (two of the field, one of the vernal pool and one of the large boulder on the cart path) show no unusual features. As mentioned in Section 4, the Carlisle Conservation Commission files contain a CD disc, dated July 2010, containing 82 photos, mostly of the field areas of the Benfield Conservation Land with no dates, titles or descriptive text for individual photos. The photos do show healthy grasses and other vegetation in the fields, including a few wildflowers.

In April and November of 2021, a series of photographs of the land were taken for baseline documentation purposes. A selection of these photos is provided in **Appendix B**.

Wetland, Field and Forest Habitats

Three habitat types dominate the Benfield Conservation Land: wetlands, fields and forests. The extent of the wetlands, mostly on the southern portion of the parcel, was shown in Figure 2-1. The extent of the fields is best seen in Figure 1-4. Forest land constitutes the smallest fraction of habitat type; included is some of the land between the fields and on the western edge of the property.

Topography

A section of a USGS 7.5 min topographic map covering the area around the Benfield Parcel A property is shown in **Figure 5-1**; contour intervals are every five meters. The figure shows the land gently sloping to the south towards Spencer Brook. Engineering drawings in Town Office associated with construction activities have plans with one foot contour intervals.

The topography of the main field of the Benfield Conservation Land was significantly disturbed during the original construction of the leach field, and also during the construction of the replacement leach field in 2021. However, the Conservation Restriction on the parcel (see Section 3) required that “existing contours, elevations and vegetation shall be restored to the

*MassMapper: <https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html>.

**“Baseline Assessment: Benfield Conservation Land, Bisbee Land,” draft dated October 2009, prepared by Timothy Fohl for the Land Stewardship Committee. Available in the Conservation Commission files in Town Office.

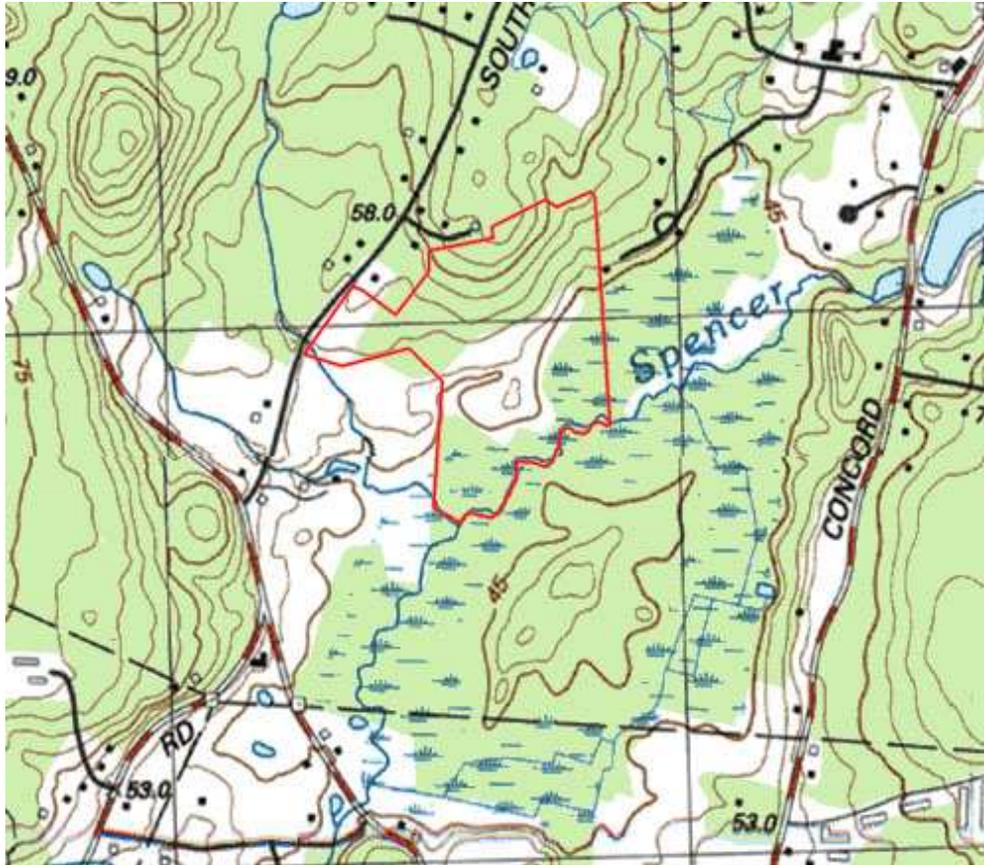


Figure 5-1. Topography in the area around the Benfield Parcel A (red border).

Source: USGS 7.5 min series adapted by Timothy Fohl. (Note the contours are marked in meters. The 45 m contour line closest to Spencer Brook is ~ 148 feet.)

maximum extent feasible to their present condition.” A similar restoration requirement holds for the water supply well in the smaller field.

Site Soils

A map of the soil types present on the Benfield Conservation Land is provided in **Figure 5-2**.

The soil types identified (by number) in the figure are defined by the USDA as follows:

- 6A - Scarborough mucky fine sandy loam, 0 to 3 percent slopes
- 52A - Freetown muck, 0 to 1 percent slopes
- 103D - Charlton-Hollis-Rock outcrop complex, 15 to 25 percent slopes
- 253B – -Hinckley loamy sand, 3 to 8 percent slopes
- 262B – Quonset sandy loam, 3 to 8 percent slopes
- 262C - Quonset sandy loam, 8 to 15 percent slopes

The area designated 262B is considered “farmland of statewide importance” for the production of food, feed, fiber, forage and oil seed by the USDA. The area designated 52A is considered “hydric soil with unique importance” by the USDA.



Figure 5-2. Soil Map for the Benfield Conservation Land
 Source: Prepared with assistance from USDA-Natural Resources Conservation Service.

Soils where the original and replacement leach fields have been constructed would be different from the 262B native soils; they would contain more sand although the surface soils might be similar. Furthermore, the original leach field and associated tubing and monitoring wells were “abandoned in place.”*

In June 2014, Carlisle’s Conservation Administrator discovered a problem related to the site soils in the area of the constructed leach field, and in the other disturbed areas including where soil stockpiles and a screener were located. While a condition of the Comprehensive Permit (under which the construction was authorized) required the disturbed areas on the land to be loamed and seeded, the Administrator found, on the soil surfaces, pieces of asphalt (some large), stones (of

*“Benfield Farms Senior Housing, Subsurface Sewage Disposal System Upgrade,” Plan dated January 31, 2022, and revised as of March 23, 2022, prepared by Meridian Associates (Beverly, MA) for Benfield Farms LP. A callout on the plan states “Existing subsurface sewage disposal system shall be abandoned in place.”

various sizes) and sand. **Figure 5-3** shows a photo of some of the smaller asphalt pieces. The cover soil applied by the contractor was clearly of poor quality. The area affected was flagged by the Conservation Administrator. After discussion by Town officials, the contractor was ordered to mechanically rake (with a York rake) and hand rake all affected areas. A crew was then to search for and remove asphalt pieces from the soil surface. It was further required that two inches of good loam be added to the disturbed areas and seeded.*



Figure 5-3. Asphalt pieces found on the Benfield Land in June 2014.
(Photo by Sylvia Willard)

Water Features

Spencer Brook

As was shown in Figures 1-4 and 2-1, the perennial Spencer Brook forms the meandering southern boundary of the Benfield Conservation Land. No information could be found on the flows in the brook, nor on the flora and fauna therein. A Carlisle Trails Committee publication** gives the following description:

“The Spencer Brook watershed is rich in wildlife such as deer, muskrat, raccoon, fox, coyote, and beaver. Resident and migratory birds include warblers, vireos, hawks, partridge, pheasants, wild turkeys, and ducks, which thrive in this wetland habitat. The sandy banks of Spencer Brook provide nesting for several species of turtles. The woods are pine and mixed hardwood and the vegetation bordering the wetlands includes willow, fern, high bush blueberry and sweet pepper bush.”

Visual observation of the brook from the observation platform indicates the brook should be modestly easy to navigate with a small boat (e.g., canoe or kayak).

The FEMA flood hazard zone associated with Spencer Brook is shown both in Figure 2-1 (Section 2) as well as in **Figure 5-4** below. Areas within flood zone 3 have been shown to be at a 1% or greater probability of flooding.

Vernal Pools

One vernal pool is present in the middle of the Benfield Conservation Land, hidden in a wooded section between two field sections (see Figure 1-4). It was identified by Metrowest Engineering and certified by the State’s Natural Heritage and Endangered Species Program (NHESP) in 2006. The NHESP certification number is 3764. Metrowest’s initial observations of this pool had been in 2003 and 2004. The pool dimensions were estimated as: length 220 ft., width 50 ft., and depth 24 inches. The certification was based on the finding of egg masses of two obligate species (wood frog and spotted salamander) and one facultative species (caddisfly larvae).

Two other vernal pools are in close proximity to the Benfield Conservation Land. A second

*This problem is documented in a June 20, 2014 Memo from Sylvia Willard, Conservation Administrator, to the Chairman of the Carlisle Board of Health. The Memo subject is: Benfield Conservation Land Asphalt problem.

**<http://carlisletrails.pbworks.com/w/page/15173773/Bisbee%2C%20Benfield%2C%20and%20Spencer%20Brook>



Figure 5-4. FEMA Q3 Flood Zone.
Source: Prepared by the USDA-Natural Resources Conservation Service (2022).

NHESP-certified vernal pool (NHESP # 7048, certified in 2013) is located on Lot 2 of Benfield Parcel A, apparently in close proximity to the large boulder on the cart path leading to the Benfield Conservation Land. The obligate species is Wood frog. An uncertified vernal pool, the so-called Hidden Pond, is located on an abutter property near the end of the Hidden Pond Trail in the northeast corner of the Benfield Conservation Land (see Figure 6-1, Section 6).

Wetland Resource Areas

Associated with Spencer Brook are Bordering Vegetated Wetlands and its 100' Buffer Zone, Bordering Land Subject to Flooding and the 200-foot Riverfront Resource Area.

Identified Plants and Animals

Blue-spotted Salamander

A Blue-spotted salamander (**Figure 5-5**) was found on the Benfield Conservation Land in September 2005 by the dog of an abutter who was walking the property; she contacted former resident Kathleen Coyle who contacted former Conservation Commissioner Tom Brownrigg for



Figure 5-5. Photo of Blue-spotted Salamander found on the site.

Source: Photo by Tom Brownrigg

help in identifying the animal which is protected as a species of “special concern” under the Massachusetts Endangered Species Act.** NHESP confirms that the species was documented again on the property in 2010.*** NHESP has designated a Core Habitat (a protected area) around the areas where the salamander has been seen (see later subsection).

Birds

Both Tom Brownrigg and Alan Ankers, Carlisle residents and birders, have lists of birds they have seen on the Benfield Conservation Land. The lists are provided in **Appendices C and D**, respectively. Brownrigg’s list (116 bird species, covering 39 Families) includes birds seen on the Benfield Conservation Land during the years 2004-2017. Anker’s list has 123 species. No attempt has been made to determine the overlap in the two lists.

Non-Avian Species

Starting in 2020, there have been significant efforts by citizen naturalists in Carlisle (with some help from outsiders) to document the biodiversity in Carlisle, especially on conservation lands. Species level data are being entered into data bases that will facilitate future assessments of biodiversity and the impacts of stress events such as climate change. The amount of data that will be available is expected to increase significantly in the coming years. An initial compilation, prepared by Land Steward Judy Asarkof, is presented in **Appendix E**. A photo gallery showing a few of the species found on the site is provided in **Appendix F**.

*“Benfield Land shelters rare species,” by Betsy Fell, *Carlisle Mosquito*, September 30, 2005.

**“Biodiversity Conner – Blue-spotted salamander,” by Betsy Fell, *Carlisle Mosquito*, October 15, 2004.

***Personal communication from Jacob E. Kubel, NHESP, Westborough, MA, to Warren Lyman, 2-17-22.

Alan Ankers also reports seeing the following butterflies on the Benfield Conservation Land:

- Eastern Tiger Swallowtail
- Black Swallowtail
- American Copper
- Bronze Copper (photo by Alan Ankers →)
- Pearl Crescent
- Common Wood-nymph
- Common Ringlet



Data for the Abutting Spencer Brook Reservation

Future evaluations of the Benfield Conservation Land may benefit from the studies and reports done on the abutting Spencer Brook Reservation which include extensive lists of identified plant and animal species. The reports include the following:

- “Spencer Brook Reservation – Botanical Inventory and Management Plan,” prepared for the Carlisle Conservation Foundation by Frances Clark, Carex Associates, 2001. (69 pages)
- “A Baseline Assessment of the Spencer Brook Reservation,” prepared for the Carlisle Conservation Foundation by Jeffrey Collins, Mass Audubon Ecological Extension Service, Lincoln, MA, 2016. (43 pages)
- Two related reports prepared for the Carlisle Conservation Foundation dated February 2022: (1) “Spencer Brook Conservation Area – 2021 Report and Next Steps,” by Judy Asarkof, and (2) “Spencer Brook Conservation Area 2021 season report addendums (A-D),” by Judy Asarkof and Walter Kittredge. The latter report includes the plant and insect observations recorded during 2021 by Walter Kittredge, Judy Asarkof and any iNaturalist observers.

Bats

Although three bat houses were installed on the Benfield Conservation Land in 2020 (see Section 1), no monitoring of the use of the houses has apparently been undertaken and there have been no reported sightings.

Natural Heritage and Endangered Species Program – Core Habitat

A segment of land including and surrounding the Benfield Conservation Land is considered Core Habitat by the Natural Heritage and Endangered Species Program (NHESP) which is under the direction of the Massachusetts Division of Fisheries and Wildlife. According to NHESP*:
“Core Habitat identifies key areas that are critical for the long-term persistence of rare species and other Species of Conservation Concern, as well as a wide diversity of natural communities and intact ecosystems across the Commonwealth. Protection of Core Habitats will contribute to the conservation of specific elements of biodiversity.” While BioMap2 is a planning tool with no regulatory function, all state-listed species enjoy legal protection under the Massachusetts

*“BioMap2 – Conserving the Biodiversity of Massachusetts in a Changing World – Carlisle,” 2012. Available at: http://maps.massgis.state.ma.us/dfg/biomap/pdf/town_core/Carlisle.pdf.

Endangered Species Act (M.G.L. c.131A) and its implementing regulations (321 CMR 10.00). The specific area including the Benfield Conservation Land is the one numbered 2266 in **Figure 5-6**. The species of conservation concern in this area is the Blue-spotted Salamander. NHESP’s description of Core Habitat 2266 is as follows: “A 176-acre Core Habitat featuring a Species of Conservation Concern. Adult and juvenile Blue-spotted Salamanders inhabit upland forests during most of the year, where they reside in small-mammal burrows and other subsurface retreats. Adults migrate during late winter or early spring to breed in vernal pools and fish-free areas of swamps, marshes, or similar wetlands. Larvae metamorphose in late summer or early fall, whereupon they disperse into upland forest.”

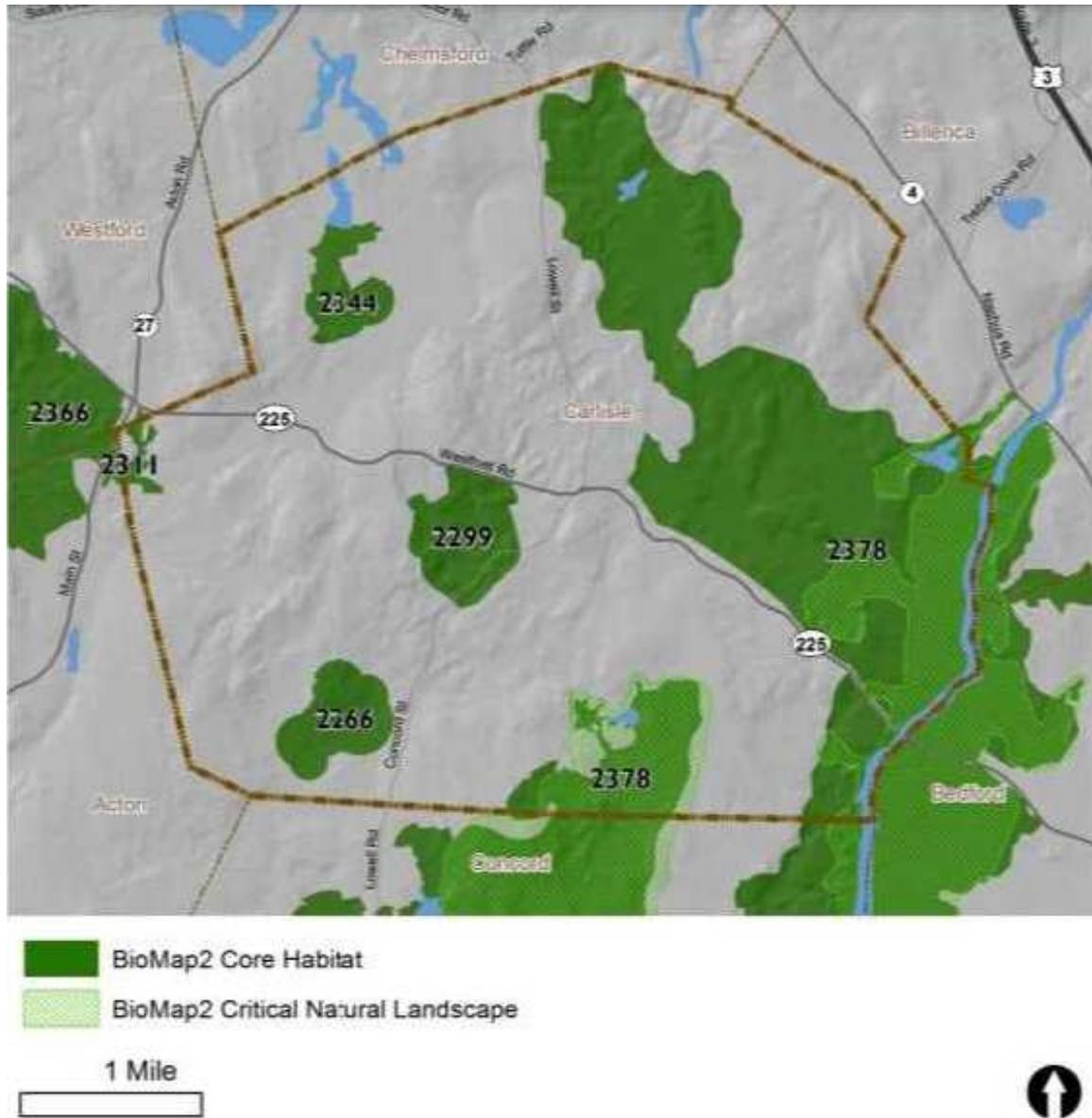


Figure 5-6. NHESP’s BioMap2 Areas for Carlisle

Source: “BioMap2 – Conserving the Biodiversity of Massachusetts in a Changing World – Carlisle,” 2012. Available at:

http://maps.massgis.state.ma.us/dfg/biomap/pdf/town_core/Carlisle.pdf.

6. HISTORIC AND CURRENT USES OF THE PARCEL

Historic Maps

Two early maps of Carlisle, an 1873 map by F.W. Beers and an earlier undated map sketch by D.A. Lapham, provide no information on the uses of the land in the area of the Benfield parcel; these maps are shown in an earlier draft Baseline Assessment prepared by Tim Fohl.* **Figure 6-1** shows a 1937 map by Erwin Raisz and Walter Webster prepared using a mosaic of aerial photographs taken by Bradford Washburn.** This map appears to show a more extensive and connected portion of open fields, north of Spencer Brook, and extending all the way from the intersection of South and Concord Streets to near the intersection of South and West Streets. The field areas include those of the current Benfield parcel and were likely used for pasture or other forms of agriculture; an orchard is shown to the west of the current Benfield parcel.

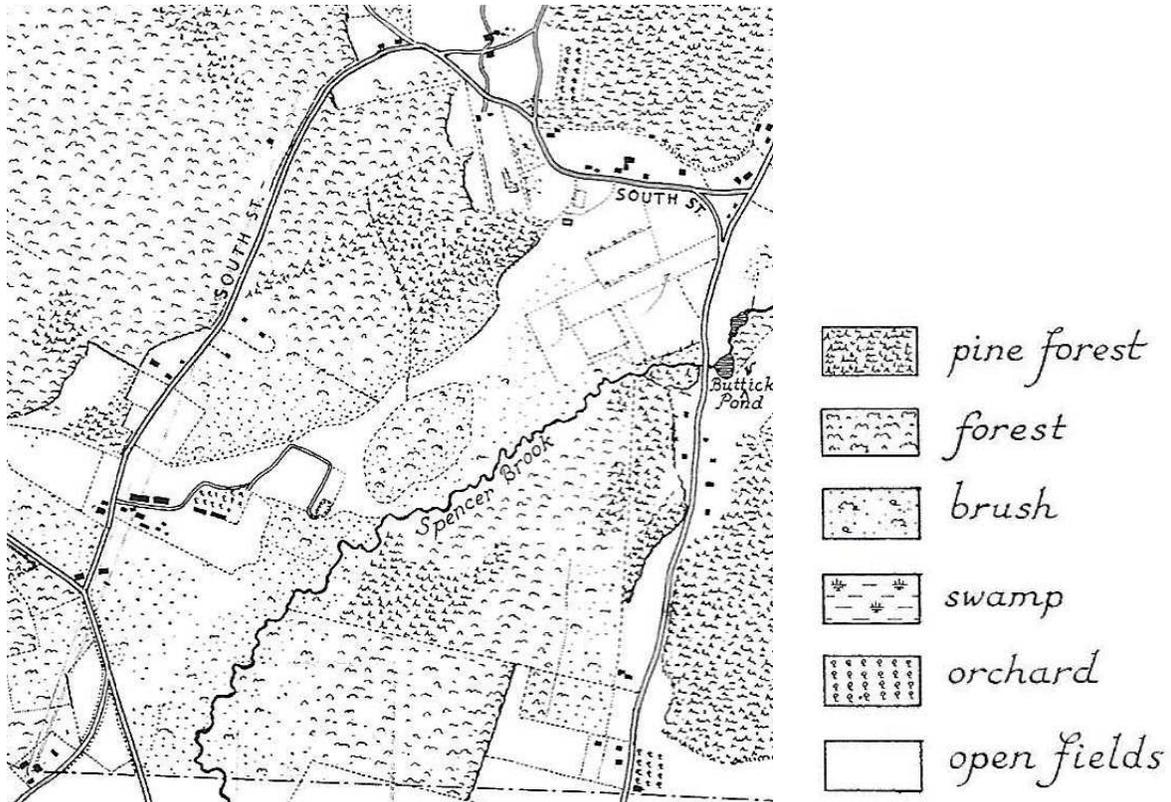


Figure 6-1. Section of a 1937 Map of Carlisle Based on Aerial Photographs
Source: "Map of Carlisle, Mass.," prepared by E. Raisz and W. Webster, Institute of Geographical Exploration, Harvard University, 1937.

*"Baseline Assessment: Benfield Conservation Land, Bisbee Land," draft dated October 2009, prepared by Timothy Fohl for the Land Stewardship Committee. Available in the Conservation Commission files in Town Office.

**"Map of Carlisle, Mass.," prepared by E. Raisz and W. Webster, Institute of Geographical Exploration, Harvard University, 1937.

Historic Uses

According to the PAL archaeological survey of the Benfield Parcel A in 2005 (*op. cit.*, Sect. 4), there is some evidence of past use of the Benfield Conservation Land by both Native Americans and early colonial farmers. Their report to Carlisle stated: “Collected Native American cultural materials are interpreted as the result of small, limited-duration occupations by Native Americans who traversed the property in the past. Subsurface archaeological testing also resulted in the recovery of low densities of nineteenth- and twentieth-century cultural materials from across the survey area. These materials represent incidental discard of cultural materials into the plow zone by farmers who worked the land.” All of the test pits used in PAL’s survey that led to the above conclusion were on Lots 1, 2 or 3 of the Benfield Parcel A; none were on Lot 4 (the Benfield Conservation Land). Stone piles found on Lots 1, 2 or 3 are claimed by some to have ceremonial significance for Native Americans (see Section 4).

No information is available on the nineteenth- and twentieth-century farming that was apparently conducted on the Benfield Conservation Land.

Current Conservation and Recreation Uses

The Benfield Conservation Land is protected conservation land providing habitat for upland, field, forest, and aquatic (including vernal pool) dwelling plants and animals. It is often visited by hikers as it provides a diversity of vistas - open fields, woods and wetlands – with a bonus of having an observation platform overlooking Spencer Brook and its associated wetlands. **Figure 6-2** provides a map of the available trails on the parcel and adjacent conservation lands: Spencer Brook Reservation and the Bisbee Land. While there are at present no trails that connect these three conservation parcels, the Benfield and Bisbee lands could be connected in the future using the “Spencer Brook Passage” easement shown on the trail map. The easement is protected by a conservation restriction (CR #27). The creation of such a connection, involving the crossing of several hundred feet of wetlands and Spencer Brook, would be expensive.

Although the field on the Benfield Land is mowed (see Section 7 for details), organized recreational activities, beyond wildlife viewing, is not encouraged. As stated in Section 3, the Conservation Restriction on this land specifically allows the following recreational use:

“Passive recreational use such as community gardens, trails, picnicking, walking, jogging, dog walking, cross-country skiing, snowshoeing, bicycling, horseback riding, kite flying, wildlife viewing and outdoor education, fishing, hiking, sledding and other non-motorized outdoor recreational activities that do not materially alter the landscape nor degrade environmental quality.”

However, a subsequent subsection (of this Section 6) describes significant land use limitations in the areas around the well and leach field serving Benfield Farms.

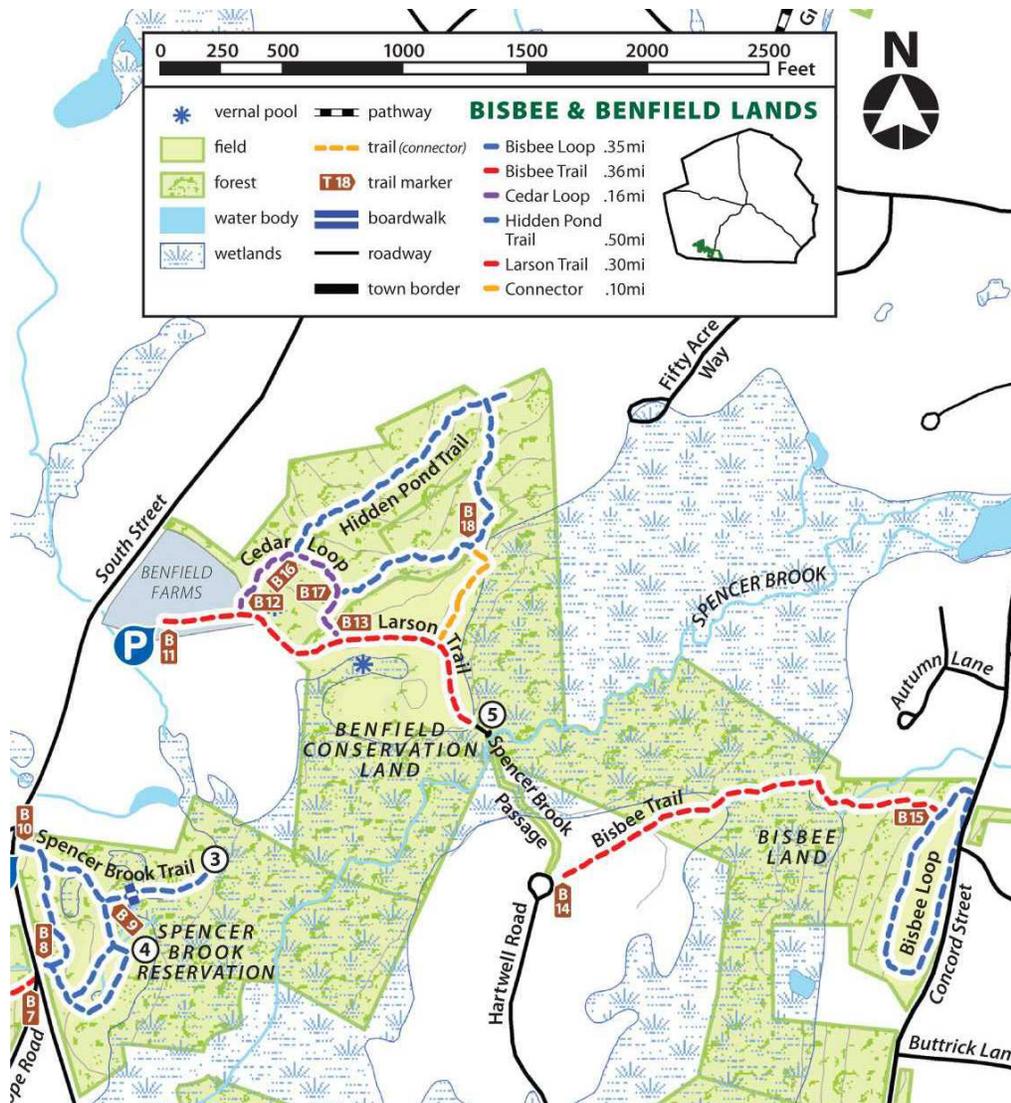


Figure 6-2. Trail Map for the Benfield Conservation Land and Abutting Conservation Properties.

Source: Adapted from the “Trails in Carlisle,” 2018 edition. © Carlisle Trails Committee. Note: The circled #s on the map refer to benches (#s 3 & 4) and to an observation platform overlooking Spencer Brook (#5).

Water Supply and Wastewater Disposal for Benfield Farms

As allowed by the Conservation Restriction on the Benfield Conservation Land (CR # 57, see Section 3), the Town created a Reserved Right for the “Installation, use and maintenance of water wells and wastewater disposal fields and associated below grade equipment and structures constituting a wastewater (“septic”) disposal system and associated utilities and lines” to serve the future Benfield Farms senior housing complex. The location of the existing well and wastewater disposal fields were shown in Figure 1-5 (Section 1). The location of the subsurface pipes and utilities serving the well and leach field are not shown in this document; they are shown on engineering maps available in Town Office.

Use Restrictions Related to Well and Leach Field

Wellhead Protection

Based on MA Department of Environmental Protection (DEP) Rules in 310 CMR 22, the Benfield Farms well has both a Zone I wellhead protection area with a radius of 189 feet (blue circle), and an Interim Wellhead Protection Area with a radius of ~489 feet (purple circle) as shown in **Figure 6-3**.

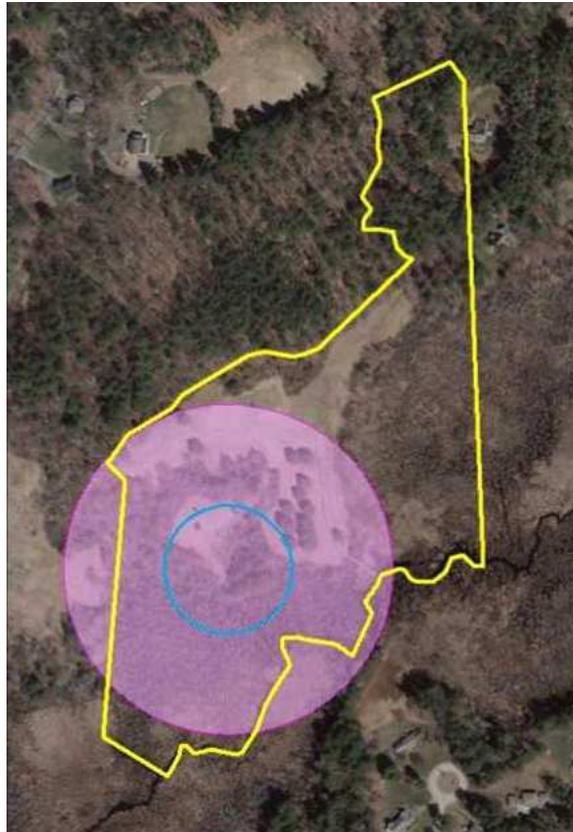


Figure 6-3. Wellhead Protection Areas for the Benfield Farms Well

Source: Prepared with assistance from USDA-Natural Resources Conservation Service.

The regulations in 310 CMR 22 require that current and future land uses within the Zone I shall be limited to those land uses directly related to the provision of the public water system or to other land uses which the public water system has demonstrated have no significant impact on water quality. No underground storage tanks for petroleum products are allowed, nor are pipelines carrying liquid petroleum products. The owner of the water supply system has monitoring and notification requirements. Under some circumstances, the DEP may require a perpetual easement prohibiting the use of fertilizers, pesticides, herbicides and other non-mechanical means of vegetation control.

The larger Interim Wellhead Protection Area is applied by DEP to sites that lack a DEP-approved Zone II wellhead protection area. A Zone II encompasses that area of an aquifer that

contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). It is bounded by the groundwater divides that result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries.

Due to the presence of the water supply well and the monitoring wells for the septic field the fields cannot be used for agriculture, for camping or for use of herbicides for control of invasive plants and poison ivy.

Leach Field Protection

While it is clear that leach fields require some degree of protection and maintenance – e.g., removal of woody vegetation and prohibition of heavy vehicle traffic on it – there are apparently no official regulations covering this topic. Compliance monitoring wells are located both up-gradient and down-gradient of the leach field, and care must be taken to insure that no activities in the area would result in hindering the operation of the wells or limiting the reliability of the data from analyses of water samples collected from the wells.

7. MAINTENANCE

Excluding trail maintenance which is conducted by the Carlisle Trails Committee, and also excluding the leach field and well serving Benfield Farms, the only routine maintenance for the Benfield Conservation Land includes mowing - including field edge clearing - of the fields, and observational monitoring by the Land Stewards and other volunteers.

Mowing

In recent years, the mowing of the fields has been done by Jack O'Connor, a Carlisle resident. The Scope of Services for his 2021 mowing contract with the Conservation Commission called for the following:

“Annual mowing of the field of the Benfield Conservation Land on two occasions. Field will be checked for the presence of ground nesting birds by a representative of the Conservation Commission prior to a mowing between May 15th and August 1st. Should such evidence exist, the field shall be left undisturbed until birds have fledged. This shall be confirmed by a representative of the Conservation Commission. *The contractor shall work with the Conservation Commission prior to mowing in order to determine any other areas that should be avoided during the mowing practices.*”

Compensation was set at for \$80.00/hour with a sum not to exceed \$1,104.00 for the season.

In addition to the twice-annual field mowing, the Benfield fields had Cook Forest Products, Inc. undertake field-edge mowing and brush cutting in fall 2020. A total of about 2,000 feet of field edges were mowed/brush cut at a cost of \$4,450. By choice, not all of the field edges were mowed. Looking north from the observation platform, and looking toward the old septic system, the edge on the right all the way back to the private land toward the north was not mowed. An extensive area of plants was removed next to the old septic field that was primarily invasive plants and poison ivy. Some trees important to birds were saved. The area along the stone wall that was cut back is to be cleared of woody debris left by the mowers, loamed and seeded with a conservation plant mix to help manage the regrowth of invasive plants.

Finally, vines climbing the pine trees in the main field should be cut every few years.

Conservation Signs

Two signs (**Figure 7-1**) near the entrance to the parcel from the cart path are maintained by the Land Stewards as necessary. The posts for the conservation sign on the right in Figure 7-1 were replaced in 2021.

Bat Houses

At the time of installation of the three existing bat houses (2020), the prospective Eagle Scout installing the houses indicated that, should future maintenance be required, the local Boy Scout troop should be contacted for the required work.



Figure 7-1. Conservation Signs at the Entrance to the Benfield Conservation Land
Source: Photo by Warren Lyman

Bluebird Houses

The bluebird houses in the main field (currently 12) need routine maintenance as well as occasional repairs. The routine maintenance typically involves an early spring and late fall cleanout. If the number of houses is considered too large for the field, the older ones - which are not markers for the leach field - could be moved to another property.

8. ISSUES TO BE ADDRESSED IN A MANAGEMENT PLAN

The following are suggestions for issues to be covered in the preparation of a Management Plan for the Benfield Conservation Land.

Monitoring for Infractions of Land Use Restrictions

The Land Stewards, the Conservation Commission, and the Conservation Administrator should insure that land uses at the site, especially new ones, are regularly reviewed to insure compliance with:

- The Conservation Restriction and Public Access Easement (Carlisle CR #57) restrictions described in Section 3. Approval of the Carlisle Conservation Foundation, the CR grantee, is required for any deviation from the restrictions.
- The Natural Heritage and Endangered Species Program for the protection of vernal pools and the Core Habitat of the Blue-spotted salamander, a species of “special concern” under the Massachusetts Endangered Species Act (see Section 5);
- The Zone I and Interim Wellhead Protection Area restrictions, issued by the MA Department of Environmental Protection, that are designed to protect the Benfield Farms water supply well (see Section 6);*
- Any rules regarding the use of land over the leach field serving Benfield Farms (see Section 6);* and
- Any other State or local rules, including the Rules and Regulations for Use of Carlisle Conservation Lands (available on the Town’s website).

Routine Maintenance

Field Mowing

The Management Plan should provide specific guidance for the regular mowing, including field edge maintenance, of the field portions of the parcel. The current mowing protocol (see Section 7) calls for two mowings a year. Consideration should be given to a modified protocol, which would involve less frequent mowing, that enhances wildlife habitat and biodiversity for the fields.**

Vines

Vines climbing the pine trees in the main field, and along the field edges, should be cut every few years.

*The responsibility for oversight in these two cases lies primarily with the Benfield Farms management and their contractors.

**See, for example, “Towle Field Mowing Protocols: Recommendations to the Carlisle Conservation Commission by the Land Stewardship Committee,” September 2021.

Conservation Signs

The Plan should call for regular inspection and, as necessary, repair of the conservation signs.

Trails and Trails Signs

The Plan will indicate this is a responsibility of the Carlisle Trails Committee.

Bluebird Houses

The committee or organization responsible for routine maintenance of the bluebird houses should be stated.

Management Plan for Invasive Plants

A survey of the nature and extent of invasive plants on the property should be undertaken. Known to be present include oriental bittersweet, garlic mustard, glossy buckthorn and autumn olive. Based on the survey results, a plan for the control or removal of the invasive plants should be prepared and implemented when resources are available.

Improved Inventory of Flora and Fauna at the Site

Section 5 presented lists of a variety of plants and animals seen on the site, collected by just a few citizen naturalists, mostly Carlisle residents. What the Management Plan should do is, after obtaining an update on ongoing efforts to record plant and animal sightings (with species identification), recommend ways to expand the effort for the coverage of the Benfield Conservation Land. More sophisticated efforts, such as ecosystem studies, should also be encouraged. A more robust database will help future Land Stewards and citizen naturalists better understand how to protect the local flora and fauna, and to assess impacts from stress such as is present with climate change.

The expanded effort should include an annual assessment of the use of the three bat houses on the site either through night viewing (summer) and/or head counts (winter).

APPENDIX A

LIST OF ABUTTERS WITHIN 100 FEET OF THE BENFIELD CONSERVATION LAND

A list of abutters whose land is within 100 feet of the Benfield Conservation Land is provided on the following page. The list was generated by Carlisle's Assessors Office (Brian Macdonald, Principal Assessor) on February 9, 2022. A map showing the parcel locations for each of the abutters is available in the Assessor's Office.

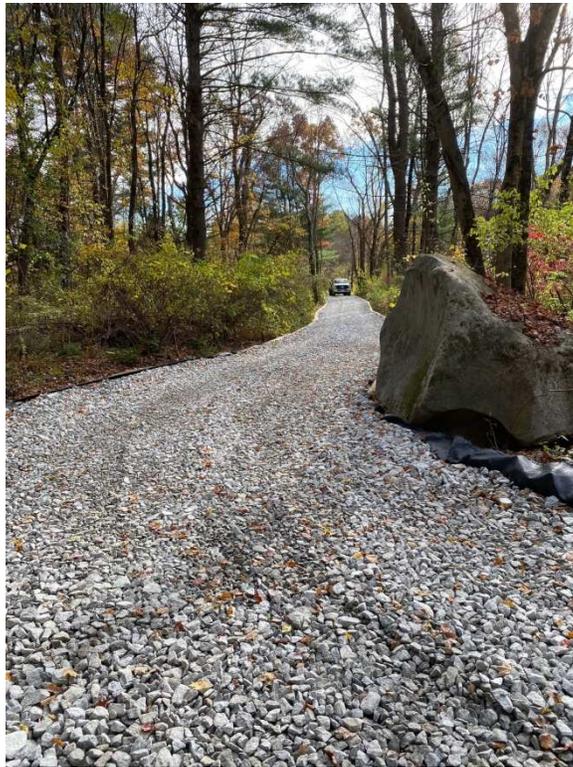
Parcel ID - Map/Block/Lot	Location	Owner/Mailing Address
4-23R-14	121 HARTWELL RD	OGNIBENE NICHOLAS C / OGNIBENE ABBYE R 121 HARTWELL ROAD CARLISLE MA 01741
4-24A-0	OFF CONCORD ST	TOWN OF CARLISLE 66 WESTFORD STREET CARLISLE MA 01741
4-40-BB	SOUTH ST	JOSS RHODA KUPFERBERG 810 CONCORD STREET / CARLISLE MA 01741
4-42-D	155 FIFTY ACRE WY	HART DAVID C / HART SARAH P 155 FIFTY ACRE WAY CARLISLE MA 01741
4-43-E	148 FIFTY ACRE WY	CONNORS DANIEL J TRUSTEE / CONNORS SANDRA 148 FIFTY ACRE WAY CARLISLE MA 01741
5-1-0	449 SOUTH ST	JOHNSON WALLACE / HOTCHKISS JANE 449 SOUTH STREET CARLISLE MA 01741
5-11-0	SOUTH ST	CARLISLE CONSERVATION FOUND PO BOX 300 CARLISLE MA 01741
5-12-0	OFF WEST ST	CARLISLE CONSERVATION FOUNDATION PO BOX 300 CARLISLE MA 01741
5-3-0	493 SOUTH ST	HYUN TOMMY Y / HYUN CATHERINE P SOLA 493 SOUTH STREET CARLISLE MA 01741
5-7-2A	OFF SOUTH ST	TOWN OF CARLISLE / CARLISLE RECREATION COM 66 WESTFORD STREET CARLISLE MA 01741
5-7-3A	OFF SOUTH ST	TOWN OF CARLISLE / CARLISLE RECREATION COM 66 WESTFORD STREET CARLISLE MA 01741
5-7-4A	OFF SOUTH ST	TOWN OF CARLISLE / CARLISLE CONSERVATION C 66 WESTFORD STREET CARLISLE MA 01741
5-8-0	OFF SOUTH ST	TOWN OF CARLISLE / 66 WESTFORD STREET / CARLISLE MA 01741
5-9-A	545 B SOUTH ST	ZANGA DEREK A / ZANGA LINDSAY M PO BOX 858 CARLISLE MA 01741
7-8A-Z	SOUTH ST	WHITE LINDA K 393 SOUTH STREET CARLISLE MA 01741

APPENDIX B

PHOTOGRAPHS OF THE BENFIELD CONSERVATION LAND

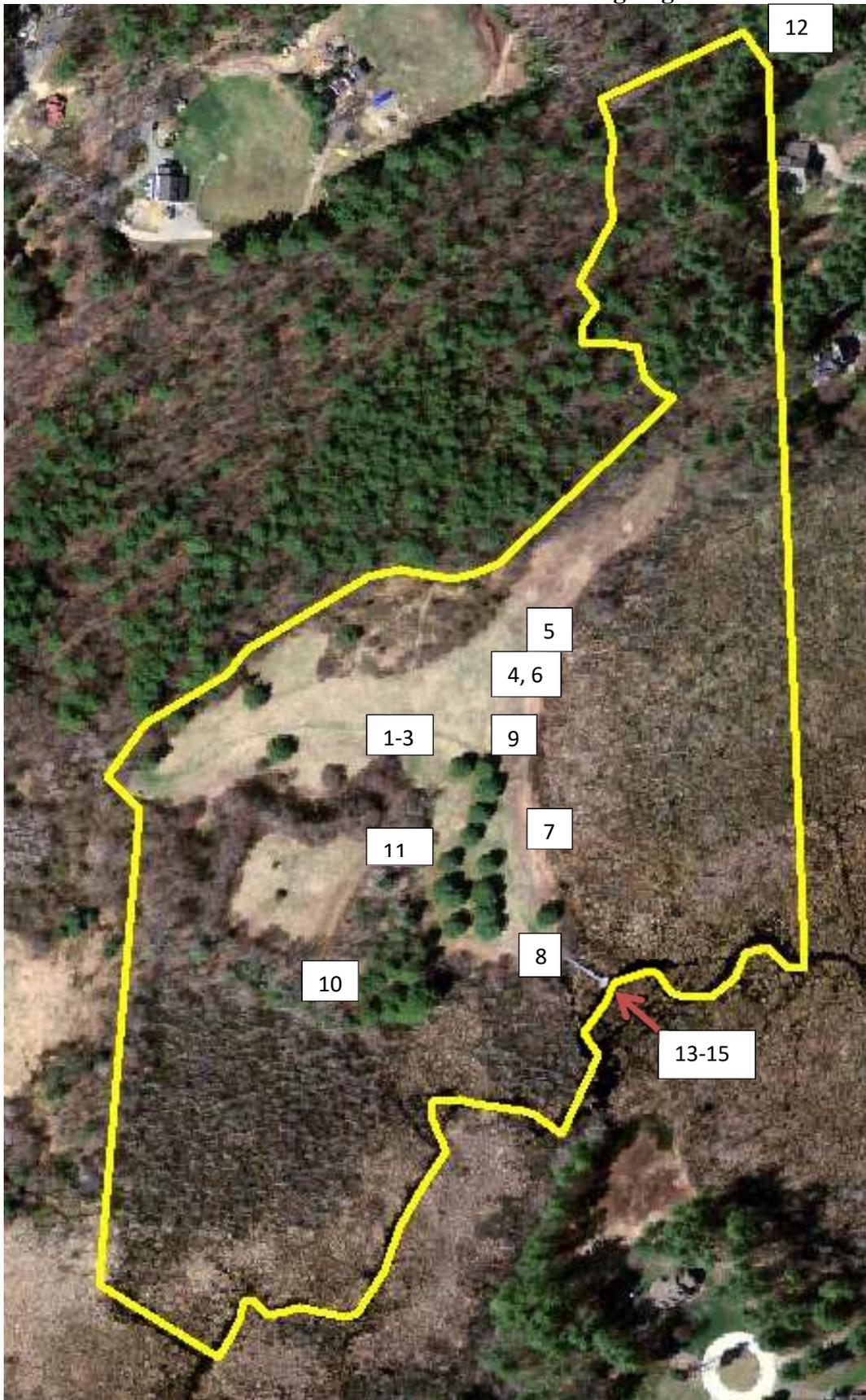
The photos shown on the following pages, and below, are the author's selection of those he took on either April 5 or November 2, 2021. The approximate location each photo was taken is shown by the photo number (1 – 15) on the site aerial photo on the next page. As mentioned in Section 4, the Carlisle Conservation Commission files contain a CD disc, dated July 2010, containing 82 photos, mostly of the field areas of the Benfield Conservation Land.

Access Path to Benfield Conservation Land



The so-called “cart path” entrance to the Benfield Conservation Land, showing a large boulder on the side. The crushed stone layer was added in 2021 to allow heavy equipment to travel over the road during the construction of a replacement leach field. This area is not part of the Benfield Conservation Land, but Lot 3 of the original Benfield Parcel A.

Location of Photos Shown on the Following Pages





1. Main field, view to west, overlooking area for new leach field.



2. Main field, view to north, overlooking original leach field.



3. Main field, view to northeast.



4. Main field, view to northeast.



5. Main field, view to southwest.



6. Main field, view to southwest.



7. Main field, white pine cluster, view to west.



8. Main field, white pine cluster, view to north.



9. Main field, white pine cluster, view to south.



10. Small field; cone is on well cover. Three bat houses in distance. View to north.



11. Small field; bat houses in distance. View to WSW.



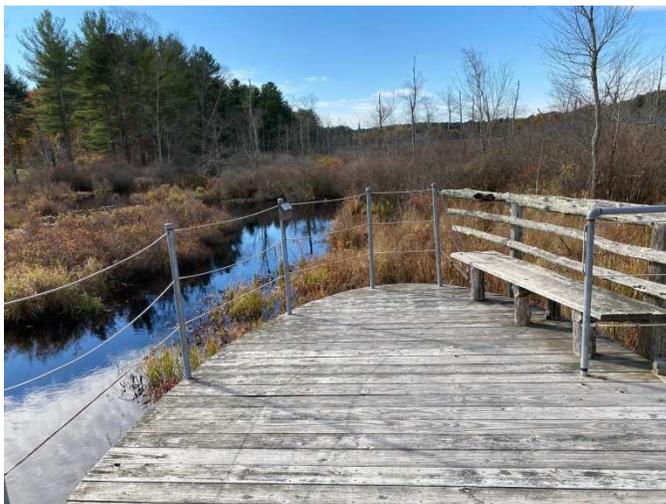
12. Vernal pool near northeast corner of Benfield Conservation Land, but on an abutter's property. Location is near end of spur of Hidden Pond Trail.



13. Access boardwalk to observation platform over Spencer Brook. View to SE.



14. Observation platform at Spencer Brook. View to NE.



15. Observation platform at Spencer Brook. View to SW.

APPENDIX C

LIST OF BIRD SPECIES SEEN ON THE BENFIELD CONSERVATION LAND BY TOM BROWNRIGG

The list of bird species seen on the Benfield A Parcel and/or Benfield Conservation Land by Land Steward Tom Brownrigg is provided on the following page. The list covers observations between 2004 and 2022.

SPECIES SEEN
All Dates ~ in Benfield A - Benfield Land ~ 116 seen

DUCKS, GEESE, AND WATERFOWL

Canada Goose
Wood Duck
American Black Duck
Mallard
Green-winged Teal
Hooded Merganser

PHEASANTS, GROUSE, AND ALLIES

Ruffed Grouse
Wild Turkey

CORMORANTS AND SHAGS

Double-crested Cormorant

HERONS, EGRETS, AND BITTERNs

Great Blue Heron
Green Heron

NEW WORLD VULTURES

Turkey Vulture

HAWKS, EAGLES, AND KITES

Sharp-shinned Hawk
Cooper's Hawk
Bald Eagle
Red-shouldered Hawk
Broad-winged Hawk
Red-tailed Hawk

RAILS, GALLINULES, AND COOTS

Virginia Rail
Sora

PLOVERS AND LAPWINGS

Killdeer

SANDPIPERS AND ALLIES

American Woodcock

GULLS, TERNS, AND SKIMMERS

Herring Gull

PIGEONS AND DOVES

Mourning Dove

CUCKOOS

Yellow-billed Cuckoo
Black-billed Cuckoo

OWLS

Great Horned Owl
Barred Owl

SWIFTS

Chimney Swift

HUMMINGBIRDS

Ruby-throated Hummingbird

KINGFISHERS

Belted Kingfisher

WOODPECKERS

Red-bellied Woodpecker
Downy Woodpecker
Hairy Woodpecker
Northern Flicker
Pileated Woodpecker

FALCONS AND

CARACARAS

American Kestrel
Merlin

TYRANT FLYCATCHERS

Olive-sided Flycatcher
Eastern Wood-Pewee
Yellow-bellied Flycatcher
Alder Flycatcher
Willow Flycatcher
Eastern Phoebe
Great Crested Flycatcher
Eastern Kingbird

SHRIKES

Northern Shrike

VIREOS, SHRIKE-BABLERS,

ERPORNIS

Blue-headed Vireo
Warbling Vireo
Red-eyed Vireo

CROWS, JAYS, AND

MAGPIES

Blue Jay
American Crow
Fish Crow
Common Raven

SWALLOWS

Northern Rough-winged Swallow
Tree Swallow
Bank Swallow
Barn Swallow

TITS, CHICKADEES, AND

TITMICE

Black-capped Chickadee
Tufted Titmouse

NUTHATCHES

Red-breasted Nuthatch
White-breasted Nuthatch

TREECREEPERS

Brown Creeper

WRENS

House Wren
Marsh Wren
Carolina Wren

GNATCATCHERS

Blue-gray Gnatcatcher

KINGLETS

Golden-crowned Kinglet
Ruby-crowned Kinglet

THRUSHES AND ALLIES

Eastern Bluebird
Veery
Swainson's Thrush
Hermit Thrush
Wood Thrush
American Robin

MOCKINGBIRDS AND THRASHERS

Gray Catbird
Northern Mockingbird

STARLINGS

European Starling

WAXWINGS

Cedar Waxwing

NEW WORLD WARBLERS

Ovenbird
Northern Waterthrush
Blue-winged Warbler
Black-and-white Warbler
Common Yellowthroat
American Redstart
Yellow Warbler
Chestnut-sided Warbler
Blackpoll Warbler
Palm Warbler
Pine Warbler
Yellow-rumped Warbler
Black-throated Green Warbler
Canada Warbler
Wilson's Warbler

BUNTINGS AND NEW WORLD

SPARROWS

Eastern Towhee
American Tree Sparrow
Chipping Sparrow
Field Sparrow
Savannah Sparrow
Fox Sparrow
Song Sparrow
Swamp Sparrow
White-throated Sparrow
Dark-eyed Junco

CARDINALS AND

ALLIES

Scarlet Tanager
Northern Cardinal
Rose-breasted Grosbeak
Indigo Bunting

TROUPIALS AND

ALLIES

Red-winged Blackbird
Common Grackle
Brown-headed Cowbird
Baltimore Oriole

SPECIES SEEN
All Dates ~ in Benfield A - Benfield Land ~ 116 seen

***FINCHES, EUPHONIAS,
AND ALLIES***

House Finch

American Goldfinch

Evening Grosbeak

OLD WORLD SPARROWS

House Sparrow

----- STATISTICS -----

Species seen - 116

Families w/seen species - 39

APPENDIX D

LIST OF BIRD SPECIES SEEN ON THE BENFIELD CONSERVATION LAND BY ALAN ANKERS

The list of bird species seen on the Benfield A Parcel and/or Benfield Conservation Land by Alan Ankers is provided on the following page.

Bird Species Seen by Alan Ankers on the Benfield Conservation Land

Canada Goose	Eastern Phoebe	Field Sparrow
Wood Duck	Great Crested Flycatcher	American Tree Sparrow
Mallard	Eastern Kingbird	Fox Sparrow
American Black Duck	Blue-headed Vireo	Dark-eyed Junco
Green-winged Teal	Warbling Vireo	White-throated Sparrow
Hooded Merganser	Red-eyed Vireo	Savannah Sparrow
Wild Turkey	Northern Shrike	Song Sparrow
Mourning Dove	Blue Jay	Lincoln's Sparrow
Black-billed Cuckoo	American Crow	Swamp Sparrow
Chimney Swift	Fish Crow	Eastern Towhee
Ruby-throated Hummingbird	Common Raven	Bobolink
Virginia Rail	Black-capped Chickadee	Orchard Oriole
Sora	Tufted Titmouse	Baltimore Oriole
Killdeer	Northern Rough-winged Swallow	Red-winged Blackbird
Herring Gull	Tree Swallow	Brown-headed Cowbird
Great Black-backed Gull	Barn Swallow	Rusty Blackbird
Double-crested Cormorant	Ruby-crowned Kinglet	Common Grackle
Great Blue Heron	Golden-crowned Kinglet	Ovenbird
Green Heron	Red-breasted Nuthatch	Northern Waterthrush
Turkey Vulture	White-breasted Nuthatch	Blue-winged Warbler
Osprey	Brown Creeper	Black-and-white Warbler
Northern Harrier	Blue-gray Gnatcatcher	Nashville Warbler
Sharp-shinned Hawk	House Wren	Common Yellowthroat
Cooper's Hawk	Winter Wren	American Redstart
Broad-winged Hawk	Marsh Wren	Northern Parula
Red-tailed Hawk	Carolina Wren	Magnolia Warbler
Great Horned Owl	European Starling	Yellow Warbler
Barred Owl	Gray Catbird	Chestnut-sided Warbler
Belted Kingfisher	Northern Mockingbird	Blackpoll Warbler
Yellow-bellied Sapsucker	Eastern Bluebird	Palm Warbler
Red-bellied Woodpecker	Veery	Pine Warbler
Downy Woodpecker	Swainson's Thrush	Yellow-rumped Warbler
Hairy Woodpecker	Hermit Thrush	Black-throated Green Warbler
Pileated Woodpecker	Wood Thrush	Canada Warbler
Northern Flicker	American Robin	Wilson's Warbler
American Kestrel	Cedar Waxwing	Scarlet Tanager
Merlin	House Sparrow	Northern Cardinal
Olive-sided Flycatcher	House Finch	Rose-breasted Grosbeak
Eastern Wood-Pewee	Purple Finch	Indigo Bunting
Yellow-bellied Flycatcher	Pine Siskin	
Alder Flycatcher	American Goldfinch	
Willow Flycatcher	Chipping Sparrow	

APPENDIX E

LIST OF NON-AVIAN SPECIES SEEN ON THE BENFIELD CONSERVATION LAND

The list of non-avian species seen on the Benfield Conservation Land , compiled by Land Steward Judy Asarkof, is provided on the following page. The list covers observations that were all in 2020 or 2021, except one 2019 observation. The list is expected to expand significantly in the near future.

Benfield Land Species List Compiled by Judy Asarkof

(Data available as of February 2022)

Common Name	Scientific Name	Taxon - Class
Spined Micrathena	Micrathena gracilis	Arachnida
Tiger Swallowtails and Allies	Pterourus	Insecta
Common Ringlet	Coenonympha californica	Insecta
Plain Plume Moth	Hellinsia homodactylus	Insecta
Long Dash	Polites mystic	Insecta
Eastern Pondhawk	Erythemis simplicicollis	Insecta
nodding trillium	Trillium cernuum	Liliopsida
Canada lily	Lilium canadense	Liliopsida
flatsedges	Cyperus	Liliopsida
nodding trillium	Trillium cernuum	Liliopsida
meadow buttercup	Ranunculus acris	Magnoliopsida
lesser stitchwort	Stellaria graminea	Magnoliopsida
red clover	Trifolium pratense	Magnoliopsida
wild geranium	Geranium maculatum	Magnoliopsida
autumn olive	Elaeagnus umbellata	Magnoliopsida
oxeye daisy	Leucanthemum vulgare	Magnoliopsida
golden ragwort	Packera aurea	Magnoliopsida
ragged-robin	Silene flos-cuculi	Magnoliopsida
golden ragwort	Packera aurea	Magnoliopsida
Wall Lettuce	Mycelis muralis	Magnoliopsida
chickweeds	Stellaria	Magnoliopsida
Salsifies	Tragopogon	Magnoliopsida
swamp rose	Rosa palustris	Magnoliopsida
Marsh Skullcap	Scutellaria galericulata	Magnoliopsida
dogwoods	Cornus	Magnoliopsida
Southern Arrowwood	Viburnum recognitum	Magnoliopsida
	Clematis	Magnoliopsida
arrow-leaved tearthumb	Persicaria sagittata	Magnoliopsida
false sunflower	Heliopsis helianthoides	Magnoliopsida
tufted vetch	Vicia cracca	Magnoliopsida
large hop clover	Trifolium aureum	Magnoliopsida
meadow hawkweed	Pilosella caespitosa	Magnoliopsida
American Beaver	Castor canadensis	Mammalia
cinnamon fern	Osmundastrum cinnamomeum	Polypodiopsida
Painted Turtle	Chrysemys picta	Reptilia
Eastern American alder tongue gall fungus	Taphrina robinsoniana	Taphrinomycetes
Fungi Including Lichens	Fungi	

APPENDIX F

SELECT PHOTOS OF NON-AVIAN SPECIES SEEN ON THE BENFIELD CONSERVATION LAND

The photos shown on the following page are the author's selection of some of the plants and animals recently documented on the Benfield Conservation Land. One photo (the spider, bottom center) is from a web source. All other photos are by the citizen naturalists who found the species on the site. Permission has been given to use the photos via the website (iNaturalist) on which they were placed. Information provided by Judy Asarkof.



Eastern tiger swallowtail



Ash Bolete



Beaver



Canada Lily



Cinnamon Fern



Eastern Pondhawk



Flatsedges



Golden Ragwort



Large Hop Clover



Ragged Robin



Spined Micranthena



Spirea Alba