Conditions Assessment: Beaver Brook Farm, 761 Mammoth Road, Dracut, Massachusetts

BUILDING NAME: Justus Richardson Homestead (Richardson House)

DATE(S): 1736, ca. 1800, ca. 1850-70, ca. 1900-20, ca. 1940

SIZE: main block – 31' x 44'
rear ell – 33'- 6" x 22'
approximately 3,300 square feet in main block (excluding cellar); approximately 1,200 square feet in the rear ell (excluding the cellar)

TYPE OF CONSTRUCTION: timber-frame set on a fieldstone foundation with some poured concrete footings under additions and north wall of the main block of the house

HISTORY:

The Justus Richardson House is a timber-frame house that is the product of at least four periods of construction and several additional campaigns of renovation.

The original portion of the house, believed to have been constructed in 1736 for Abraham Varnum (1710-60), is contained within the front rooms of the southern half of the house's main block. As initially constructed, the house was two storeys high and one room deep with a central chimney that is probably encased within the present chimney. The large dimensions of rooms flanking the chimney (18' x 18' at the east room and 16' x 18' at the west room) are characteristic of ambitious, well-built houses of Massachusetts's First Period (1630-1700) and first half of the eighteenth century, as is the slight asymmetry of the rooms. Few original

finishes remain visible due to later additions and alterations; however, several of the raised panel doors may date from the house's initial construction and it seems likely that original fireboxes remain within the chimney. Framing elements are massive and boxed, but the depth of boxed corner posts at the southwest chamber suggest they conceal original flared posts. The width of the summer beams in the southeast parlor (13 ½" cased; 12" uncased probable) and in other rooms indicates that the house's original frame may survive substantially intact.

At an unknown date, probably around the turn of the eighteenth century, the original house was enlarged northward by the addition of a second range of rooms. Paired sills between the northwest and southwest rooms of the first storey are visible in the cellar and suggest that a portion of the addition may have been moved to the site and attached to the existing structure. Finishes in the southeast chamber, such as the splayed window embrasures with double architraves and a mantelpiece with paneled pilasters and central tablet are stylistically consistent with a date of ca. 1790-1820, and may date from this period of expansion. The northeast corner of the house does not have the same framing details as the northwest and may either have been built at a slightly different time, or may have been constructed at the same time that the northwest corner was moved here, if it was moved to the site. The rear slope of the main roof was lifted slightly from a lower, lean-to form to create its present pitch, either at this time or in the 1840s-50s. To change the pitch of the roof, existing rafters were re-set, leaving their tenons largely exposed above the rear plate. Despite this alteration, the main roof remains asymmetrical with a slightly longer, lower-pitched rear slope.

Local sources report that the house was sold in the eighteenth century by Jonathan Varnum – either the son (1743-1801) or grandson (1771-1843) of Abraham Varnum to Elisha Ford, a surveyor, probably Captain Elisha Ford (1779-deceased prior to 1816) or a son of the same name whose birth was not recorded in Dracut. In 1841, descendants of Elisha Ford are reported to have sold the house to Justus Richardson (b. 1814) whose descendants have occupied the house from 1841 until the present.

It is likely that the one and one-half storey rear ell was constructed for Justus Richardson in the 1840s or early 1850s to contain a new kitchen, work & storage areas and a chamber for farm laborers or domestic helpers at the rear of the ell's upper floor. The rear ell is probably of braced-frame construction, but of built of timbers with smaller dimensions than those found in the main house, reflecting nineteenth-century practice. As originally constructed, the ell had an entry on its west side facing Mammoth Road in the position now occupied by a small window. Subsequent modifications of the house have not been as large. The rear ell was expanded eastward (ca. 1890-1910) at its south end to create a pantry that is now used as a kitchen. A one-storey shed addition was built on the north wall of the main house (ca. 1900-30) to contain a bathroom. The east porch of the rear ell was enclosed with glazing prior to 1939, and a poured concrete cistern was installed on the north wall of the main house beneath the pantry and bathroom additions (ca. 1920-30), probably at the same time the north foundation was partially rebuilt with poured concrete.

Figure 1 - west elevation of rear ell (left) and main house (right)

Around 1940, a final round of modifications was made with the installation of Colonial Revival style doorways at the façade and west (Mammoth Road) elevations of the main house. At the façade, the existing one-bay entry porch was surrounded by a semi-circular portico set on a brick stoop. A simpler entry with a gabled porch was installed at the west entry where pre-existing granite steps with a wrought-iron boot scraper were re-set in front of a new brick stoop.

Interiors retain features from all the house's periods of construction and alteration. At the first storey, the front two rooms retain layouts that seem likely to date from the eighteenth century; however decorative finishes, especially at the fireplaces and fireplace walls are Colonial Revival in style and may date from 1900-20 or as late as 1940. North rooms at the first storey have been modified by the removal of a partition that once separated a northeast corner room from the central room (original kitchen). The corridor on the west side of the first storey may have been in place by the early nineteenth century; however, the rear staircase was probably added at the turn of the nineteenth to twentieth century.

At the second storey, room layouts in the main house remain largely intact with the insertion of a bathroom, staircase and narrow corridor near the center of the north wall. The southeast chamber preserves late Federal style finishes (ca. 1810-30) and an apparent late Federal period firebox; splayed window embrasures with double architraves and the large size of the room suggest it was renovated during this period as the best chamber set a storey above the best parlor. The southwest chamber retains raised-panel eighteenth-century doors and boxed framing members; its firebox has been rebuilt (ca. 1900-20), and its mantel appears to be assembled from pieces from at least two different periods of construction. Rear rooms retain simpler finishes.

The attic contains two chambers and a central stair landing with a closet on its north side. All plaster is applied to sawn lath and appears to date from the late nineteenth century, as does the decorative oak graining on batten doors and flat-stock trim.

The ell contains a single finished room that extends into the northwest room of the main house at the first storey. It is likely that this space served as a kitchen once the ell was constructed. Its north wall has a single-flue chimney and mantel shelf, an arrangement frequently found in the position of cook stoves. The north end of the ell is a store room with exposed studs. The second storey of the ell contains a southern chamber that is accessible only from the main house, and a northern chamber reached by a staircase in an enclosed well, accessible from the store room. The northern chamber is finished with lime plaster and simple trimmings. Its position in the house, access and level of finish suggest that it served to house a farm worker or workers, or domestic help.

EXISTING CONDITIONS:

- **Foundation & Stoops:** The main block of the house stands on a rubble stone foundation composed of large fieldstones with the irregular joints between stones packed out with smaller gallet-stones, a method used with lime mortar to reduce the amount of mortar needed and the shrinkage that would result from filling a wide joint entirely with mortar. At the east end of the north elevation, the original foundation has been replaced with a poured concrete foundation that was probably installed at the same time as the cistern adjacent to the rear ell. Two unusual features of the cellar are the stone dividing partition that separates the eastern third of the cellar from the rest of the cellar. In addition, the base of the central chimney is encased with massive quarried granite blocks. The large dimension of this base (12' x 13'-9") and the scale of the quarried block suggest that it is a later alteration intended to encase and buttress the unexcavated earth on which the central chimney was built. Houses of the First Period and first half of the eighteenth century frequently had half cellars with rest of the structure built over a crawl space. Such an arrangement may have existed here. If modified at the same time that the rear range of rooms was added, the granite base would have been necessary to prevent the earth footings of the chimney from moving after the cellar around them was excavated.

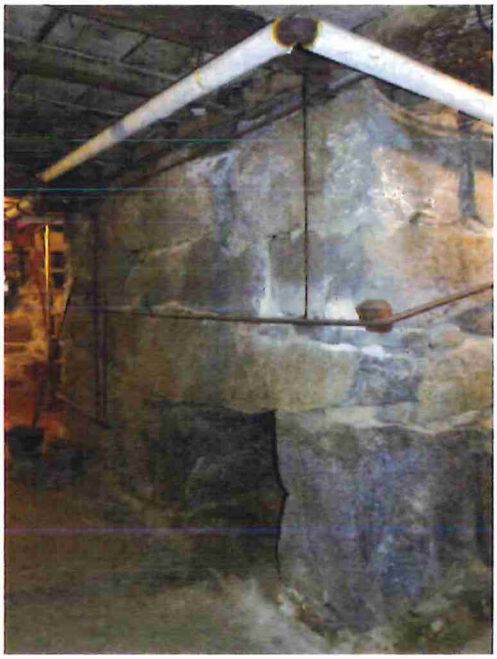


Figure 2 - granite base of central chimney & unexplained opening on west face

Figure 3 - south wall of main house foundation showing washed-out mortar joints & silt

Mortar joints along the east end of the cellar's south wall are extensively eroded, and a small delta of silt has built up on the floor due to rainwater run-off from the roof that drops next to the foundation and seeps into the cellar. Stones were probably laid dry with point-to-point contact during construction, but eliminating rainwater run-off in the cellar and re-packing eroded joints is desirable to protect the stability of the wall and seal the cellar. All surfaces bear evidence of limewash or whitewash, the historic method of brightening the cellar and sanitizing the space; whitewash and limewash also have desirable sanitizing and moisture regulating properties that help preserve timbers in this setting. Re-instating limewash should be considered as part of building maintenance.

The foundation of the rear ell is built of rubble stone with poured concrete facings added to the lower parts of the east and west walls. A heavy deposition of soil by the north door provides evidence of roof run-off flowing into this space from the downspout at the northwest corner of the ell that is directed toward the north door. The single-flue chimney also brings moisture into cellar; its bricks and mortar are soaked and wet to the touch.

- **Timber Frame:** The main block of the house is framed with massive timbers up to 12" in dimension. Most structural timbers are concealed by finishes, but sills, girts and joists visible in the cellar appear sound with surprisingly little evidence of decay or insect damage despite high moisture levels in the cellar. Similarly, timbers at the attic of the main house appear dry and sound; the rafters of the roof's rear slope have been re-set when the back slope of the roof was raised. Their tenons now stand largely exposed at the rear plate, a condition that looks unstable but which seems to have held for perhaps as long as 150 years, or more.

Figure 4 - north end of rafter at main house showing exposed tenon

The frame of the rear ell is mostly concealed by interior finishes. In general, the structure appears sound with few sags or areas of settlement. The most notable exception is the northernmost bay of the rear ell's roof where the roof plan has sagged inward on both slopes. This sagging may be the result of the rear bedroom for which ties between rafters were placed higher that is ideal. It is not clear if the sagging is stable or progressive.

- **Roof Coverings:** The pitched roofs of both the main house and rear ell, as well as their ridges, are covered with asbestos cement shingle that appears to be in sound condition. Shingles are partially covered with growths of moss and lichen. Chimneys are flashed with lead, although this detail cannot be reliably confirmed from grade-level and should be double-checked by closer examination.

- **Gutters & Drainage:** Eaves are fitted with wooden gutters, none of which function correctly. At the façade of the main house, gutter ends have been removed and downspouts are disconnected with the result that rainwater run-off is concentrated at the south foundation where it is eroding mortar joints and flowing into the cellar. The north gutter has a single downspout toward its center. This drains some water but appears to overflow during heavy rain. The gutters on the rear ell are made up of patched sections of wooden gutter with downspouts that drop near the north end of the ell and direct water into the cellar. Gutters on the west side of the ell near its south end have failed and water is entering the wall cavity and interior.

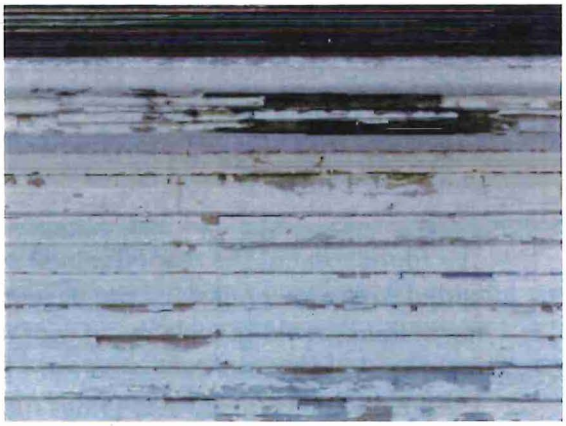


Figure 5 - west elevation of rear ell - failed gutter

Figure 6 - main house - southeast corner with open gutter end & missing downspout

- **Exterior Wall Claddings:** All elevations are covered with painted wooden (pine) clapboards. Paint has begun to fail through normal weathering. Extensive areas containing multiple paint layers have alligatored and are flaking. Wood appears to be dry, but mostly sound and firm with the notable exception of the west wall of the rear ell where the gutter leaks. Wooden trimmings are also in generally good condition, although mitered joints are opening up on cornices and column bases are breaking apart.

- **Doors & Doorways:** There are three exterior doors and porticos; these are:

  - The main (south) entry stands in a projecting one-bay porch that was encased within a semi-circular Colonial Revival style portico (ca. 1940). The portico rests on a masonry base faced with tapestry bricks which have come loose and are falling off. Above the base, the portico is supported by fluted columns that rise to an entablature surmounted by a low railing. The front door is a Colonial Revival style door with six recessed panels. The door is flanked by fluted pilasters and by arched sidelights etched glass set above recessed panels.

Figure 7 - damaged brickwork at front entry

  - The west (side) entry stands in a position that has probably been a side door since at least the early nineteenth century. Rebuilt in 1940, this doorway now consists of a rectangular masonry stoop clad with tapestry brick above which plain Tuscan columns rise to a gabled portico with a barrel-vaulted ceiling. The doorway is composed of a single six-panel door with recessed panels, flanked by leaded sidelights set over recessed panels, and surmounted by a wooden fan. Two apparently early or original granite door steps have been re-set in front of the portico; the stone closer to the portico preserves a wrought-iron boot scraper. Except for normally weathered paint that should be replaced in the next two years, this doorway and portico are in good condition.

Figure 8 - west entry - granite steps re-set at ca. 1940 portico

  - The rear (east) entry is near the north end of the rear ell and is sheltered from weather and view by a glazed sunporch. The doorway consists of a Victorian four-panel door (ca. 1850-70) set in a flat stock case.

- **Windows:** The majority of windows in the main house contain single-glazed 6/6 wooden sash protected from the weather by triple-track storm sash; those in the rear ell are mostly 2/2 also protected by triple-track storm sash. Windows date from several periods of installation, the earliest of which appears to be ca. 1840-50. Window cases are composed of flat stock with 2" sills, details which suggest windows and their cases were replaced after ca. 1820-40. There are additional oddly sized windows on the north elevation and rear additions that appear to date from the turn of the nineteenth to twentieth centuries. Sash appears to remain in generally good condition needing only routine maintenance and, perhaps, repair to storm sash. All windows are fitted with exterior louvered blinds that remain in moderately good condition, although several are breaking apart due to the separation of dry joints between bottom rails and stiles.

- **Chimneys:** The house contains two chimneys:

    - The central chimney of the main house is a massive structure that rises from a base of quarried granite blocks which may serve as retaining walls to hold unexcavated earth on which the chimney was originally constructed. The west wall of the chimney's base in the cellar contains an unusual recessed opening that is roughly shaped like a firebox and has a flue-like opening that rises above it to the base of the first storey were it has been blocked. The origin and purpose of this opening are unknown. At the first floor, the chimney has two fireboxes on its east and west faces, both of which have been rebuilt in the early twentieth century, perhaps reducing the size of original openings that remain behind modern masonry finishes. At the rear (north) of the chimney in the position that would typically contain a cooking hearth, a built-in sideboard prevents access. It is not known whether the cooking fireplace remains in position or has been removed. At the second storey, the chimney has two fireplaces (east and west) of which the east fireplace preserves its pre-1850 firebox and mantel. Above the roofline, the chimney has several cracks and open joints on its north face.

Figure 9 - north elevation of central chimney showing cracks & patches

- The rear ell's chimney possesses a single flue constructed for a kitchen stove. The chimney rises from the cellar to the roof in a single straight stack. All sections of this chimney exhibit excessive moisture in the bricks and mortar. The source of moisture is the open flue and lack of burning on the flue which would have served to keep it dry as long as a stove was connected to it.

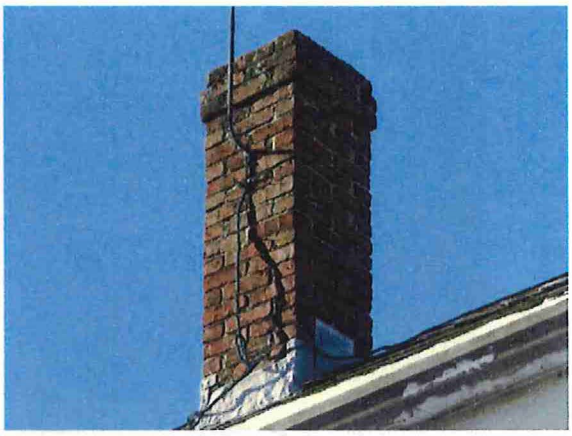


Figure 10 - east & north faces of chimney at rear ell

- **Interior Finishes:** Room finishes include elements from the late eighteenth to the mid-twentieth centuries, frequently mixed within the same room. Surfaces are faded and aged but remain in fundamentally sound condition with the exception of the south rooms of the rear ell where water damage from the failed west gutter has caused some damage to the west wall.

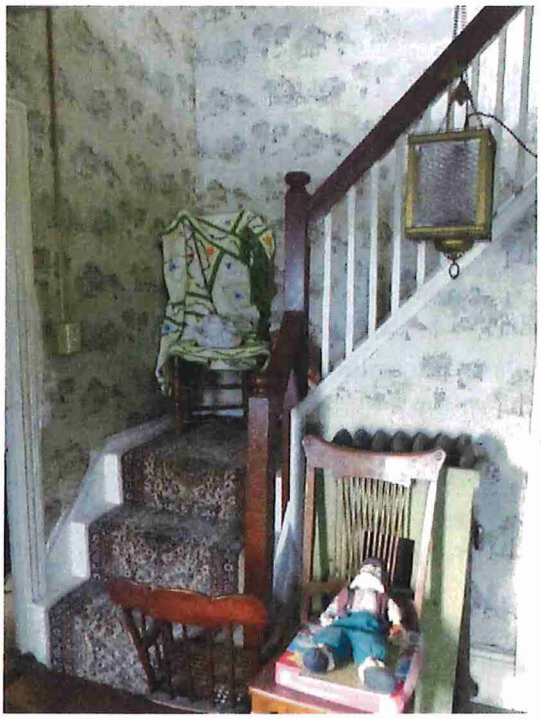


Figure 12 - front staircase ca. 1810-40

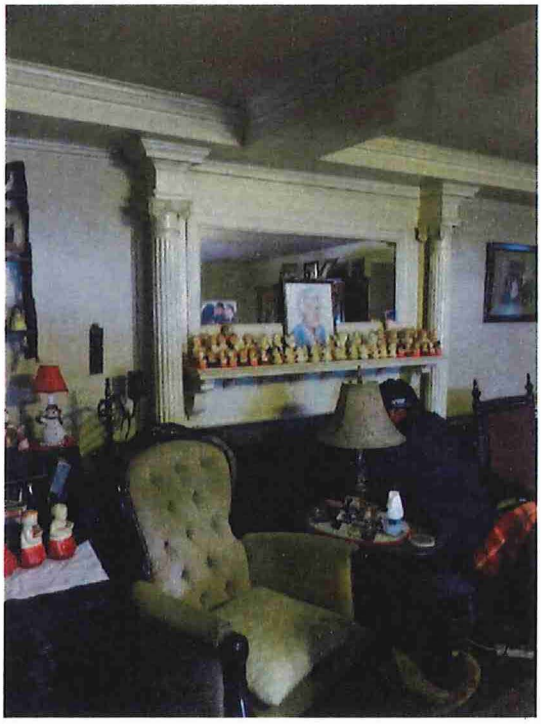


Figure 11 - southeast parlor - cased timbers & ca. 1900-20 mantel

Figure 14 - southeast chamber - Federal Period mantel & fireplace

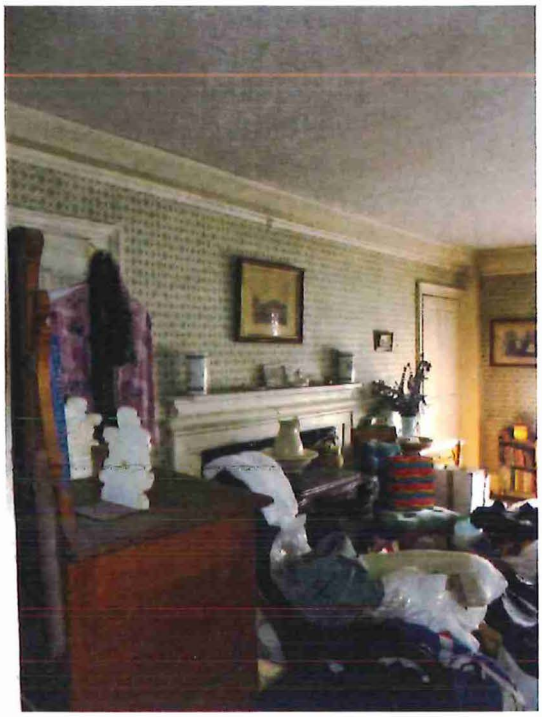


Figure 13 - southwest chamber - cased timbers, raised-panel door & modified mantel

RECOMMENDATIONS:

- **Urgent (1-2 years)**
    - Install gutters & leaders to drain rainwater minimum 5' from house to positive drainage. [If budget does not support re-installation of wooden gutters, then galvanized ½ rounds offer an inexpensive solution for a 10-year period]
    - Clear shrubbery away from south elevation and re-grade southeast corner to provide positive drainage away from structure.
    - Inspect water damage & sources at southwest corner of ell; repair at least temporarily to reduce structural damage.
    - Either re-set loose bricks from main entry portico or gather and store detached bricks for future installation.
    - Install a temporary vented cap on the chimney of the rear ell to dry the flue.
    - Conduct additional historical research to document the evolution of the building and develop an inventory of interior features, identifying their dates and value to the historic value of the house.
    - Identified a preferred re-use for the house, inspect HVAC, electrical & plumbing systems to determine whether upgrading these systems or total replacement is required which will depend, in part, upon preferred re-use.

- **Intermediate (3-5 years)**

    - Inspect attachment of rafters to plate at rear roof of main house
    - Inspect roof framing at north end of ell (east & west slopes) where bowing visible
    - Repair and re-point central chimney above roof, install new lead flashings; install top-mounted dampers, ventilated caps or shelf over top of chimney to reduce rainwater in flues
    - Repair and re-point rear chimney above the roof, install new lead flashings; permanently cap with vented cap.
    - Re-point front stoop & re-set loose bricks
    - Evaluate condition of roof-coverings & confirm that they are asbestos cement; consider treatment with preservative as originally specified by manufacturers to prolong usable life
    - Re-fasten loose clapboards and trimmings, repair balustrade at main entry portico, prepare surfaces and re-paint.
    - Repair existing sash & storm windows, prepare surfaces, re-putty as needed and re-paint.

- **Long-Term (6-10 years)**

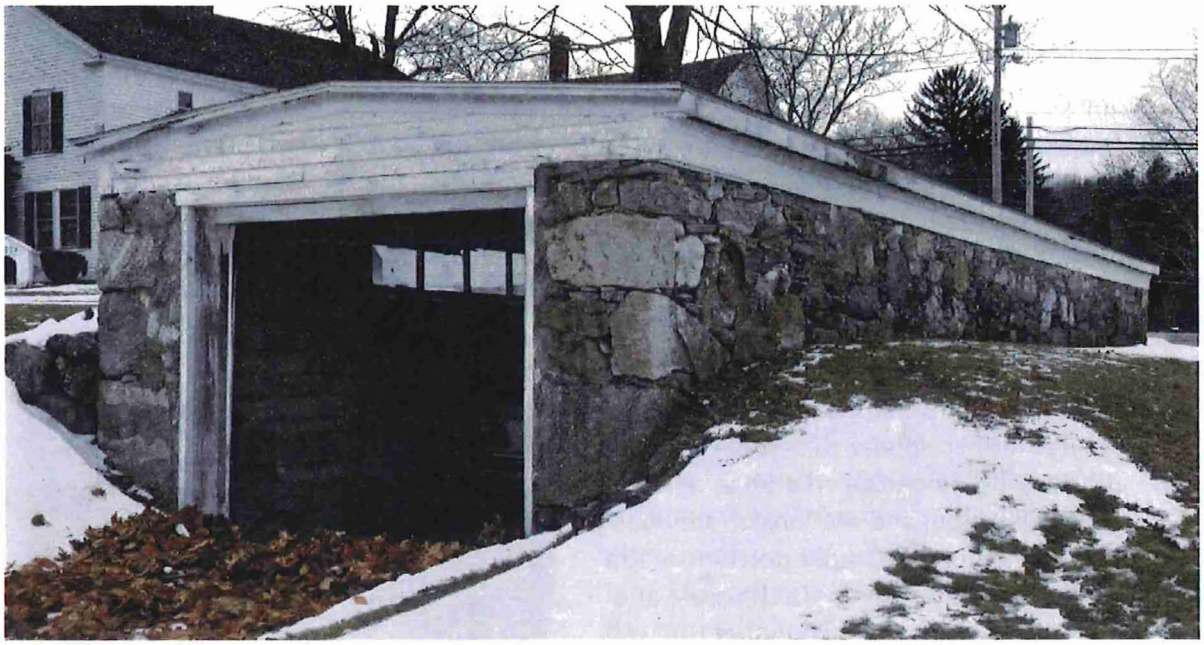
    - Develop long-term maintenance plan including:
        - cyclical inspection of gutters, downspouts and grade levels to assure positive drainage of rainwater away from the structure,
        - cyclical maintenance of exterior painted surfaces & sash,
        - a schedule for roof replacement on the main house, ell and smaller additions,
        - spot-pointing of foundation and masonry walls.

    - Maintain perimeter of structure free of scrub growth, trees and debris.

- **Limitations on Re-use**

    - Interpreting the house for its historical value would need to take an untraditional approach for several reasons. Historic house museums have low visitation depend upon collections of historic objects/furnishings that are lacking in the Richardson House. Operational costs to create educational and other public programs and to staff the building can easily exceed $150,000 annually.
    - Residential scale of building and width of passages and doorways limit the house's potential to be used for office or public-assembly space as they make barrier-free access unachievable if historic building fabric is to be preserved.
    - Lead paint must be assumed; the interior could not be offered for rent without expensive and potentially destructive lead abatement.

- The easiest and least destructive re-use of an historic building is for its original use, if the need for such use continues. Consideration might be given to the sale or long-term lease of the house and a small parcel for private residential use subject to preservation and conservation restrictions that allow the Town of Dracut to protect the historic features of the building and its setting under private ownership.



BUILDING NAME: Stone Garage

DATE(S): 1870-90 (?); ca. 1920-30 (?)

SIZE: 13' x 47'
approximately 600 square feet on one level below grade

TYPE OF CONSTRUCTION: rubble masonry (ca. 1870-90) lined with poured concrete walls & floor (ca. 1920-30)

HISTORY:

The origin of this structure is unknown. It is situated near an earlier complex of barns that stood near Mammoth Road, north of the Main House, although it appears always to have been a stand-alone structure. The rubble stone masonry appears laid in lime mortar and resembles masonry seen at the corners of the Workshop Complex and beneath the Corn Crib, suggesting nineteenth-century origins. Oral tradition states that the structure was made into a garage for the Richardson Family's automobiles in the 1920s or 1930s. The presence of iron piping at the west end of the garage's interior appears to have been connected to a radiator fed by the house's furnace to heat the space, a common feature of early automobile garages. The width of the garage is barely sufficient to house contemporary automobiles and seems barely sufficient to contain larger, vehicles from the 1930s.

EXISTING CONDITIONS:

The Stone Garage has a simple rectangular floor plan with the majority of its structure set below grade level. Rubble stone walls rise at all elevations between 1' and 4' above grade to a low-pitched roof set on a wooden frame. The interior of the garage has been lined with poured concrete at all walls and the floor, perhaps as part of its conversion to a garage. At the east end of the north wall, a blocked terracotta drainpipe has been blocked; its original function has not been identified. A smaller pipe (iron) has been blocked toward the west end of the south elevation. Specific conditions are:

- **Masonry**: Rubble stone walls appear sound. Stones appear to be bedded in lime mortar with moderate erosion at on the south elevation, and sections of previously patched joints. The upper portions of the wall are slightly different in the scale and setting of stones, suggesting that the wall head was re-build when the present roof was added to the structure. On the interior, rubble stone walls have been entirely concealed by poured concrete (approximately 8" thick) that lines the floor and walls. Salt staining exists along an uneven line to a height of 2'-3' indicating the periodic presence of moisture; however, there is little apparent concrete damage from this condition.

Figure 1 - north wall showing blocked terracotta pipe

- **Roof:** The low pitched roof is supported on joists set on the concrete wall head. Roof surfaces are covered by rolled roofing that is in good condition.

- **Gutters & Drainage:** There are no gutters. Given the small size of the structure and the closeness of eaves to the ground, it is unlikely that the structure ever had gutters. There is little evidence of water damage, except possibly, salt staining on the concrete walls which may be the result of roof run-off seeping into the foundation.

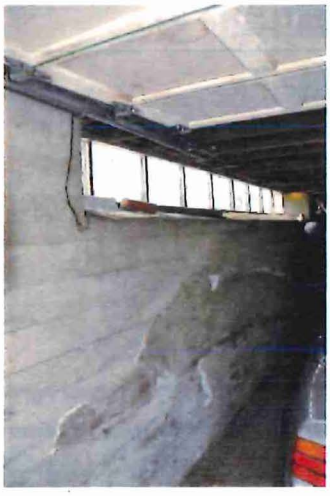


Figure 2 – south wall showing salt stains on concrete

- **Claddings:** Two small areas of clapboard exist in the structure's east and west gable ends. Clapboards are covered with paint that is beginning to peel, but appear sound and dry. Undecorated fasciae cover the edges of the roof structure and are clad with painted flat stock that is in good condition although its paint is also beginning to peel as the result of normal weathering.

- **Windows:** Strip windows resembling those found in the Central Section of the Workshop Complex exist on the south elevation. These windows are set in wooden frames with oversized panes. Frames and surrounding trim are in condition, needing only re-painting due to normal weathering.

- **Door**: A overhead paneled garage door (ca. 1950-70) exists at the east elevation. It is in sound condition needing only minor repair/lubricating to facilitate it sliding mechanism and repainting due to normal weathering.

- **Framing**: Roof joists near the windows on the south wall appear to have frass held in cobwebs. There is little evidence of insect infestation and wood elements appear to be sound and in good condition.

Figure 3 - roof framing showing possible frass caught in cobwebs

RECOMMENDATIONS:

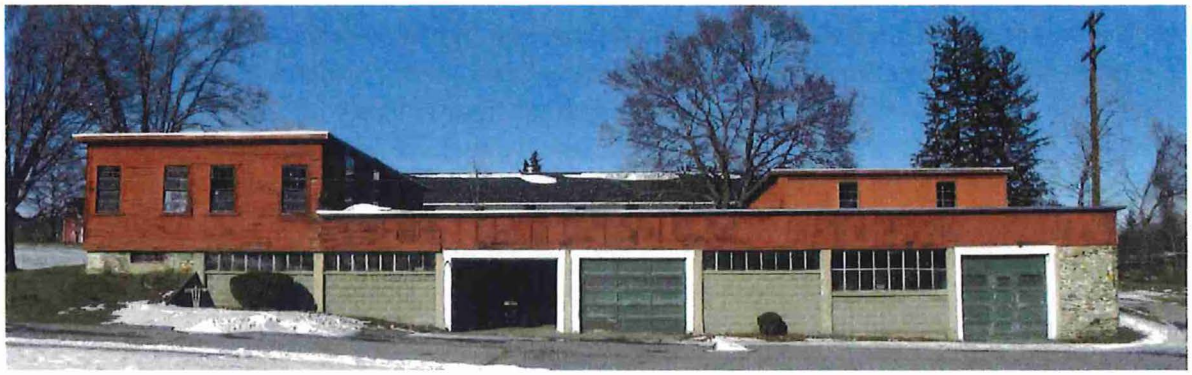
- **Urgent (1-2 years)**
    - Monitor the structure for possible insect infestation by cleaning all cobwebs and possible frass. Monitor regularly for the appearance of frass.
    - Conduct repairs to garage door to make it easily operable.

- **Intermediate (3-5 years)**
    - Prepare exterior surfaces and re-paint.
    - Repair window glazing as needed & re-paint.
    - Inspect rolled roofing and replace when needed (rolled asphalt roofing's life expectancy is approximately 10 years).
    - Consider whether installation of gutters would reduce moisture in the garage if evidence of insect infestation re-appears.

- **Long-Term (6-10 years)**
    - Develop long-term maintenance plan including:
        - cyclical inspection of rolled roofing and drainage,
        - cyclical maintenance of windows and exterior painted surfaces,
        - cyclical inspection of mortar joints at rubble foundation,
        - cyclical inspection of interior for presence of wood-eating insects.
    - Maintain perimeter of building free of brush, weeds and trees.

- **Limitations on Re-use**

The small scale of the Stone Garage limits its possibilities for re-use. The structure appears to be in very good condition and requires little maintenance. Its periodic maintenance is likely to be inexpensive. Storage, studio and small-scale workshop uses are feasible uses for the structure. Its position largely below grade and with a slight southerly orientation suggests that supplementary heating could be accomplished with space heaters to extend the seasonal use of the building; however, without plumbing and without the space in which to add plumbing, the structure is not suitable for more intensive use.



BUILDING NAME: Workshop Complex

DATE(S): ca. 1870-90; ca. 1900-30; 1942; 1972

SIZE:
East Section – 29' x 35'
Central Section – 77' x 29'
West Section – 24' x 44'
approximately 1,000 square feet at the first floor of the East Section and 1,050 square feet at the first floor of the West Section; approximately 2,250 square feet at ground level in the Central Section

TYPE OF CONSTRUCTION: mixed wood frame, rubble foundations (southeast & southwest corners), poured concrete elsewhere
East Section: poured concrete foundation with wood-frame structure above
Central Section: rubble stone foundation at east end, concrete piers & concrete block infill; poured concrete at rear walls
West Section: rubble stone foundation (south & west) & concrete (north) with wood-frame structure above

HISTORY:

The Workshop Complex consists of several different structures and connected foundations that represent fragments of a much larger structure that was mostly destroyed by fire in 1972. As shown on the 1939 Aerial view of the farm, the building on this site was a large rectangular structure with a flat roof that sloped downward at a low angle from south to north. The simple rectangular plan of the building indicates that it was built out over concrete footing walls that remain north of the central and west portions of the surviving building.

The foundation suggests that the structure grew out at least two or three initial periods of construction. Rubble-stone foundations at the southeast corner and at the west elevation and

southwest corner of the west section appear to date from the late nineteenth century and could represent either the fragments of foundations of two smaller structures or the corners of a single, larger foundation, as they align at their south faces. Concrete foundations at the north side of the Central Section, beneath the eastern section and north of the structure appear to date from a major expansion, perhaps carried out between 1900 and 1930 when the farm seems to have been at the height of its prosperity and business. The complex was subject to fire in 1942 after which it was repaired. It burned again in 1972, after which the Central Section was decked over with a new roof to enclose the cellar, and the East and West Sections were lightly rebuilt for continued use as workshops.

EXISTING CONDITIONS:

Figure 1 - East Section - north & west elevations

East Section: A one-storey structure with a partial cellar beneath its south end, the East Section is lightly framed with widely spaced studs clad with corrugated iron set directly on studs at its west and north elevations. South and west elevations are sheathed with wood that is clad with corrugated iron (south) and rolled asphalt (east). Fenestration is limited to two windows (6/6) on the south elevation; a loading door exists on the west elevation and a narrower door provides access at the north end of the east elevation. The interior contains a single open room, which retains equipment and a belt/pulley system for motive power that may relate to the farm's major period of operations and which may be of value if the Town of Dracut should decide to interpret aspects of the farm's history. Specific conditions are:

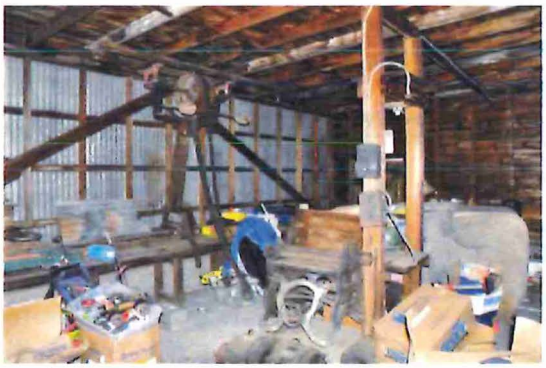


Figure 2 - East Section - north end of interior with equipment

- **Concrete structure**: The north end of the structure is set on a raised concrete slab that serves as floor level, while the south end has a concrete slab and cellar walls that enclose a space accessible only from the Central Section of the building. Access is provided from a poured concrete stoop at the north end of the east elevation. Concrete exhibits minor cracking except at the northwest corner where a wide crack separates the north and west sides of the foundation.

- **Roof:** The roof is flat with projecting open eaves; it slopes on a shallow angle downward from west to east. Its deck is lightly framed with widely spaced joists stiffened by a single timber supported by 2" stock running the center line of the structure (east-to-west). Roof surfaces are not readily visible from grade but appear to be covered with rolled asphalt that is in failure. Active leaks exist across the entire length of the roof.

- **Gutters & Drainage:** There are no gutters. The slope of the roof makes gutters unnecessary at most elevations except the east where rainwater run-off is concentrated. Because of the height of the foundation on the east elevation and the depth of the overhanging eave, there is little apparent damage from rainwater run-off.

- **Claddings:** The east elevation is clad with rolled roofing/asphalt that has been painted and is now peeling. Other elevations are clad with corrugated sheet iron that is loosely attached but appears to be functional.

- **Windows:** Two single-glazed windows (6/6) exist at the south elevation. Both are contemporary and in poor condition.

- **Doors**: A batten door of beaded tongue-and-groove boarding exists at the north end of the east elevation; its base is decayed and it has sagged from its hinges. A sliding loading door made of beaded tongue-and-groove boarding exists on the west elevation; the bottoms of its boards are decayed from water absorption; surfaces are dry and covered with peeling paint.

Central Section: Reduced to its present height by the burning of its upper storey in 1972, the Central Section is essentially a cellar with a two-layer deck consisting of former framing for a first storey and a lightly framed roof structure above it. On its north side, the structure is below grade and has only a concrete foundation wall. The east elevation consists of a poured concrete foundation and the fragment of an early rubble stone foundation. The east end of the structure extends beneath the West Section and terminates in a poured concrete wall. The south wall consists of the fragments of two rubble stone foundations (east & west ends) between which poured concrete piers with beveled corners (matching those of the Squash Barn – 1924) with infill panels of rock-faced concrete blocks and strip windows. The interior is divided into several different rooms by concrete walls. At the east end, beneath the West Section is a room with an insulated door that appears to have been used for cool storage. A concrete wall frames a small windowless storage room on the north side of the Central Section. Specific conditions are:

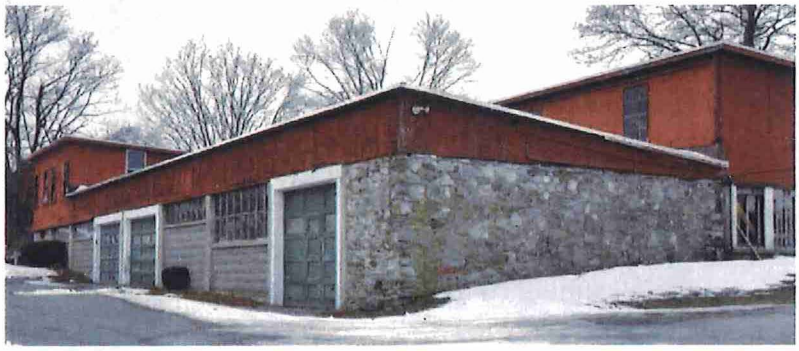


Figure 3 - Central Section south & east elevations

- **Rubble Stone foundations:** The end sections of the foundation appear in sound condition excepting cracks at the east end of the south elevation and near the mid-point of the east elevation.

Figure 4 - crack near mid-point of east elevation

- **Concrete structure**: Concrete posts bear some signs of cracking and previous patching (3rd pier from east end) but appear sound; infill panels of concrete block appear sound. Other sections of the concrete foundation appear sound with some minor cracking.

- **Roof:** The roof structure is cobbled together in a haphazard way, but seems to function. The roof is flat pitched at a shallow angle from south to north. Internally, the roof consists of a lower deck at the level of the building's former first floor. Joists toward the center of north side of the deck have rotted and been gusseted in several locations in addition to being partially re-supported with a post. The upper deck has joists running north to south supported by iron drainage pipes running east to west set on wooden blocks. The exterior surface is covered with rolled roofing in good condition.

Figure 5 – roof structure & iron pipe on wooden blocks to stiffen roof

Figure 6 - north wall of cellar showing decayed joists & gussets & added post (photo right)

- **Gutters & Drainage:** There are no gutters. The slope of the roof makes gutters unnecessary at most elevations except possibly the north where run-off concentrated next to the foundation.

- **Claddings:** The south elevation above the concrete base is a low, wood-frame wall clad with rolled asphalt fastened with battens. Although paint on this section is peeling and the material does not have a long life, it appears to be protecting the framing from weather.

- **Windows:** Strips of wood-frame windows exist at the heads of bays on the south elevation; they remain in sound condition, but in need of puttying and painting. At the east end, a triple window contains wooden frames and glazing that appear to have been salvaged from a greenhouse; panes are missing and remaining glass needs puttying.

- **Doors**: Three paneled wood garage doors (ca. 1972) remain in wooden surrounds on the south face; lower panels and rails exhibit some deterioration; however, all appear repairable.

West Section: A one-storey structure with a partial cellar beneath its south end and a grade-level work area surrounded by a frost wall at its north end. The structure is lightly framed with deeply charred timbers at its southwest corner. Walls are framed with studs covered with sheathing and clapboards (south and west), and with corrugated iron set directly on studs (east and north). A clapboard-covered flare resembling that of The Squash Barn's second storey has been added to the base of the south elevation. The roof is flat with an open overhang and a low pitch that descends from south to north. Roof surfaces are not easily seen from grade level but appear to be rolled asphalt roofing. Fenestration consists of 7 windows (6/6) on the south and west elevations and 2 metal replacement windows (1/1) on the east elevation. A single batten door of beaded tongue-and-groove boarding exists on the west elevation. The interior contains a single open room, the north end of which has a lower floor level of dirt and wooden racks for the storage of pipes and wood. The south end has a raised, wood floor and work bench. Specific conditions are:

Figure 7 - West Section - north & west elevations

- **Foundation**: Stone and concrete elements of the foundation appear in sound condition with minor joint erosion.

- **Framing:** The structure is lightly framed, and the southwest corner of the frame has been extensively damaged by fire and charring, although repairs were made in 1972 leaving these damaged elements in place. The southwest corner has

Figure 8 - southwest corner - charred framing

many cracks open to the weather; prolonged roof leaks raise questions about the strength of remaining charred timbers.

- **Roof:** Roof surfaces are not easily inspected from grade but appear to be covered with rolled asphalt roofing that is in failure. Leaks are widespread with the greatest concentration at the north and south ends of the building.

- **Gutters & Drainage:** There are no gutters. The slope of the roof makes gutters unnecessary at most elevations except possibly the north where run-off concentrated next to the foundation.

- **Claddings:** Clapboard siding is dry, covered with peeling paint and cupping off the wall; individual boards do not appear rotted but may be too brittle to re-nail. Corrugated sheet iron is loosely attached but appears to be functional.

- **Windows:** 6/6 wooden sash dates from the mid-twentieth century and is in fair-to-poor condition with some missing panes and several rotted bottom rails; many sashes are not properly secured in their frames by stops, leaving openings for wind-driven rain.

- **Door**: A single batten door of beaded tongue-and-groove boarding exists on the west elevation. It is in sound condition, although its wood is dry and board ends have decayed from water absorption.

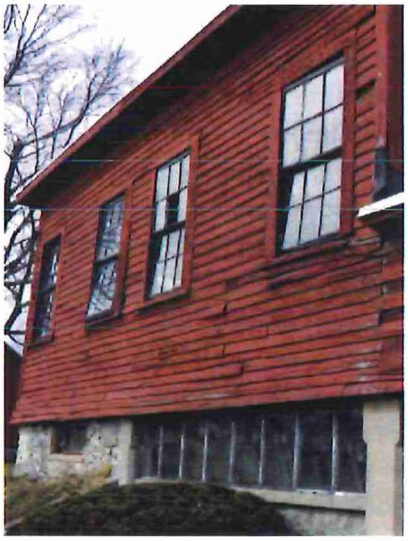


Figure 9 - south elevation showing loose windows & deteriorated siding

RECOMMENDATIONS:

- **Urgent (1-2 years)**
    - Conduct additional historical research (primarily oral history research) to determine the use of the Workshop Complex, the historical value or equipment that remains in the space and the Complex's importance to the history of Beaver Brook Farm in order to make historically reasoned decisions about the repair, reconstruction or removal of this group of buildings.
    - Re-cover the East and West Sections with rolled roof or other inexpensive roofing to stop leaks; framing in both locations may already be compromised by the combination of fire damage to some timbers and rot.
    - Re-set all loose windows and either re-glaze or provide temporary blocking for missing panes.

- Repair the existing batten door, or, at a minimum, treat its end grains with a mixture of oil and turpentine to reduce water absorption and rot while long-term plans are being developed.
- Commission an engineering evaluation of framing at the Central Section to determine the extent of rotted joists and the capacity of existing framing and roof structure; evaluate the extent of charring and compromised strength of fire-damaged joists and studs in the West Section.
- Clear brush and undergrowth from north side of the building's perimeter.

- **Intermediate (3-5 years)**

  - Develop a plan for re-use, repair or removal of deteriorated portions of the structure.
  - Selectively re-nail/replace clapboards.
  - Re-build window cases, selectively repair/replace, putty and paint single-glazed wooden sash, including re-used greenhouse windows at east elevation.
  - Re-paint exterior woodwork.
  - Install gutters and drainage along the north walls of the Central Section and West Section to move rainwater away from the back of the building to a location that has positive drainage away from the structure and its foundation.

- **Long-Term (6-10 years)**

  - Develop long-term maintenance plan including:
    - cyclical inspection of roofs and drainage,
    - cyclical maintenance of windows and exterior painted surfaces,
    - cyclical inspection of concrete foundation and mortar joints at rubble foundation.

  - Maintain perimeter of structure free of scrub growth, trees and debris.

- **Limitations on Re-use**

Re-use of the Workshop Complex will be limited by the light framing of the existing structure, the extensive charring of timbers in the West Section, the haphazardly framed roof of the Central Section and interiors that are insufficiently closed from the exterior to permit heat. If the space is to be retained and re-used, adaptation for seasonal workshop, studio or storage space would provide the least expensive alternatives. Heated space for office, public assembly, or residential use seem likely to be both prohibitively expensive and to require the complete rebuilding of the structure.

Re-constructing the Workshop Complex for reasons of historical interpretation would seem a poor idea. Unless all other space at the farm is occupied and self-sustaining, such an effort would withdraw money needed to repair and maintain buildings which

retain substantial amounts of their historic fabric and appearances. Reconstruction would create a fundamentally new building that would not add to the age or authenticity of the property's historic character. The most defensible treatment of the structure may be a strict conservation treatment, namely, to retain and repair the existing structures, making only minimal improvements for functional reasons and not seeking to restore historic sidings, sash or other fittings that have disappeared.

Conditions Assessment: Beaver Brook Farm, 761 Mammoth Road, Dracut, Massachusetts

BUILDING NAME: Squash Barn

DATE(S): 1924

SIZE: 40' x 150'
12,000 square feet of interior space on two floors

TYPE OF CONSTRUCTION: steel frame & re-inforced concrete with terracotta infill between concrete piers at first storey; concrete floor at second storey with wood-frame walls & roof framing above

HISTORY:

The Squash Barn may have been designed by the grandfather of the property's last private owner using elements taken from standard construction details of the period as promoted in publications and constructed with day labor and materials assembled by him, perhaps with the assistance of an outside contractor or engineer. Problems with the cracks between concrete piers and lintels appear to arise from a two-pour system for these elements that was common during the period; it is not clear what re-inforcements may or may not have been used to tie these elements together.

The lower portion of the structure was built for storage of vehicles and to provide access for delivery and retrieval of squashes that were stored at the upper floor, access to which is provided by two loading doors on the south elevation and two hatches in the floor. The upper floor is an open loft with wooden planks laid loose on the concrete floor and a system of posts that supported shelving on which the farm's major agricultural product, Blue Hubbard Squashes, were stored. A boiler room in a partial cellar under the building's west end provided heat to control the temperature of the loft.

The east end of the building suffered a fire in its loft and roof structure in 1942 when an arsonist set several fires in buildings at the farm. Damage was repaired at that time and remains visible only in the charred timbers at the east end of the roof.

The Squash Barn is the largest and least altered building on the property that illustrates the scale of farming on the property at its height.

EXISTING CONDITIONS:

The Squash Barn is a two-storey structure with a partial cellar at its west end in which is located a boiler room. The building's first storey is framed by poured concrete piers and lintels with terracotta-block infill and steel-frame industrial windows at the exterior wall. Internally, the ground floor is poured concrete to allow for vehicle storage. The second storey floor is poured concrete set atop a system of steel "I" beams that are partially encased in concrete. From the second-storey floor to the roof, walls are wood-framed with evenly spaced 6/6 wooden sash set in wood cases. Surfaces are covered with clapboards and eaves are trimmed with undecorated fascia boards that seem likely once to have had gutters. The structure is enclosed by a slate-covered hip roof in generally good condition but with some missing slates.

At each storey, the interior is divided by internal fire walls of terracotta into three spaces, namely, a large central space occupying the central eight bays of the structure and two smaller spaces set within the wide bays at the structure's east and west ends. Specific building conditions are:

- **Concrete structure**: The foundation appears sound as do the bases of all piers; however, every pier has a horizontal crack extending across the full dimension of its head at the base of the concrete lintel. These cracks align with the bottom flanges of steel "I" beams that run north-south between the outside walls. These beams are cased with concrete that bevels outward from the top of their bottom flanges to the base of the poured concrete second storey. Fully exposed "I" beam run from east to west in staggered locations between the concrete-cased beams. Cracks at the head of exterior piers may be the result of rust expansion at the bottom flanges or merely of two separate pours of concrete that are inadequately bonded. It is unknown what (if any) re-inforcement materials may anchor the "I" beams to the

Figure 1 - typical crack at head of pier - northeast corner

piers, or if there is any iron in the poured concrete lintel that extends around the exterior or the building at the level of the second floor plate. If these elements are not tied, then gravity is the primary mechanism by which they remain in place. On the north side of the building is an open pit, believed to have been a manure pit that may hold moisture near the foundation; however, it seems likely that undirected roof run-off is a more important source of moisture near the building.

Figure 2 - detail of typical head of pier and steel beam at interior

- **Wood claddings:** The second storey is entirely covered with wooden clapboards that appear to be pine. In general, they are in good condition with some loose nails and alligatored paint that is flaking. There is little evidence of decay.

- **Wood Framing:** Framing of the upper floor and roof appears sound and with little decay, excepting the eastern bay where a fire (1942) charred roof timbers and sheathing boards. These timbers were deemed sufficiently strong to be retained in the re-building of the roof, and they have supported a slate roof for more than 70 years; however, they should be assessed for strength.

Figure 3 - southeast corner - fire damage from 1942

- **Roof:** The structure is enclosed by a hip roof covered entirely with slate that appears to be in excellent condition with the exception of a small number (3% - 34 slates out of a sample of 1,232 counted) of missing, slipped or chipped slates, many of which may remain functionally sound despite a chipped corner or crack. The ridge of the roof is penetrated by three galvanized iron ventilators that are partially rusted. The main ridge is capped with a galvanized ridge cap that is heavily rusted, while the corner ridges of the hip are closed with slate.

Figure 4 - roof showing typical condition of slate in area sampled

- **Boiler Room:** Located beneath the west end of the building, the boiler room retains an asbestos wrapped boiler and oil storage tank, both of which will require handling as hazardous materials if removed. The boiler is not currently in use, and its functionality is not known. [Information provided by E. Ware, Town of Dracut]

- **Gutters & Drainage:** There are no gutters on the building, although the fascia at each elevation is flat and appears to have been designed to hold gutters. At the south elevation, rainwater appears to drain away over the paved parking area without damage to the structure. At the north elevation, rainwater falls on soil where it has hollowed out a trench near the building. In addition, the presence of evergreen trees presumably planted as a wind-break hold moisture near the building. Large sections of the north elevation are overgrown with vines, bringing moisture onto the structure. Materials are sound at the north elevation, but moisture levels are too high for the long-term preservation of architectural finishes.

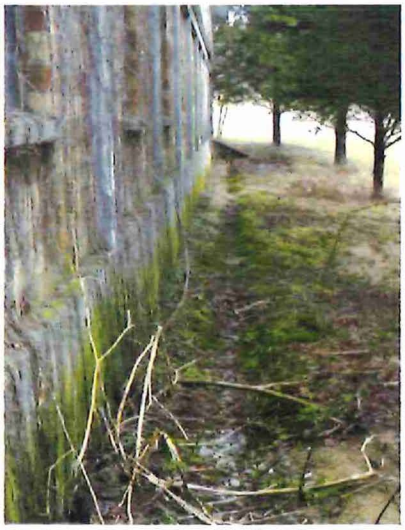


Figure 5 - trench at north elevation – from rainwater run-off

- **Windows:** The ground floor is fitted with steel-frame industrial windows set between iron mullions bedded into the terracotta walls. All windows exhibit rust from lack of

maintenance, although all appear to be repairable if re-painted. Mullions on the south elevation have rusted sufficiently to expand pushing concrete window sills away from the building. This situation is exacerbated by the way in which window sills have been built on the south wall, and probably on the other elevations as well. Terracotta blocks are laid up to the base of the window frame where a concrete/mortar bevel has been applied from the window base to the edge of the terracotta. Beneath this bevel a facing has been applied to the terracotta block to complete the appearance of a sill, but it is not tied to the wall except by the grab of its concrete onto the ridged faces of the terracotta blocks. In at least two locations, the sill facing has split away from the terracotta and is likely to fall off.

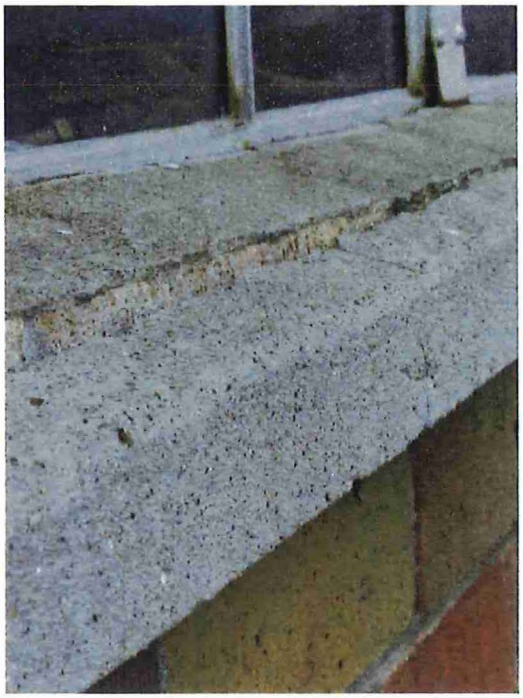


Figure 6 - south elevation - typical detached window sill & rusting mullion (background)

Second-storey windows are traditional double-hung wood sash set in wooden cases without counterweights. While some panes have been broken by birds and a couple windows are stuck open, all sash is in sound condition and is repairable.

- **Doors**: Original wood doors remain in the eastern and westernmost bays of the façade (south elevation), at center of the east elevation's second storey and at the east end of the north elevation. Constructed of beaded tongue-and-groove board, these doors bear varying degrees of damage from wear and some weather damage to their bases, but all remain fundamentally sound and repairable. Modern overhead garage doors have been added to the 4th, 6th & 8th bays from the southwest corner of the façade's southwest corner; these doors remain functional and sound.

Figure 7 - typical condition of original door

RECOMMENDATIONS:

- **Urgent (1-2 years)**

  - Remove all vines and scrub for a distance of 8'-10' from the north elevation; if evergreens are to remain, prune them back to promote air circulation and light adjacent to structure.
  - Install gutters at the north elevation and drain rainwater away from structure to reduce moisture against the building
  - Conduct selective repairs to the slate roof; repairs now will be minor and protect the interior from decay; deferral will result in exponentially increasing damage.
  - Block broken windows at the second storey to keep birds and vermin out.
  - Secure or remove two window sills that are splitting from the south face of the building.
  - Engage an engineer who specializes in concrete repair to evaluate the condition of concrete piers and lintels, and to determine the structural method by which piers and "I" beams are tied together. Seek recommendations for mortar composition to re-point damaged joints at terracotta blocks.

- **Intermediate (3-5 years)**

  - Conduct repairs to cracks a heads of piers, as may be recommended by an engineer to assure that the structural elements are securely tied together.
  - De-rust, repair & re-paint all steel sash and mullions.
  - Re-putty and repair all wood windows as needed, re-paint and re-hang with counterweights; repair window cases as needed.
  - Begin program of re-painting the second storey's wood finishes; if painting the entire structure in one year is not financially possible, then divide the work to be accomplished over two or, at most, three seasons.
  - Inspect terracotta wall infill panels and selectively repoint open joints and cracks.
  - Develop and maintain a system of drainage for rainwater runoff that protects the north elevation from excessive moisture; observe open concrete-lined pit on north side of building to determine if it holds water after gutters have been added; if so, construct a drain to promote the flow of water out of the pit.

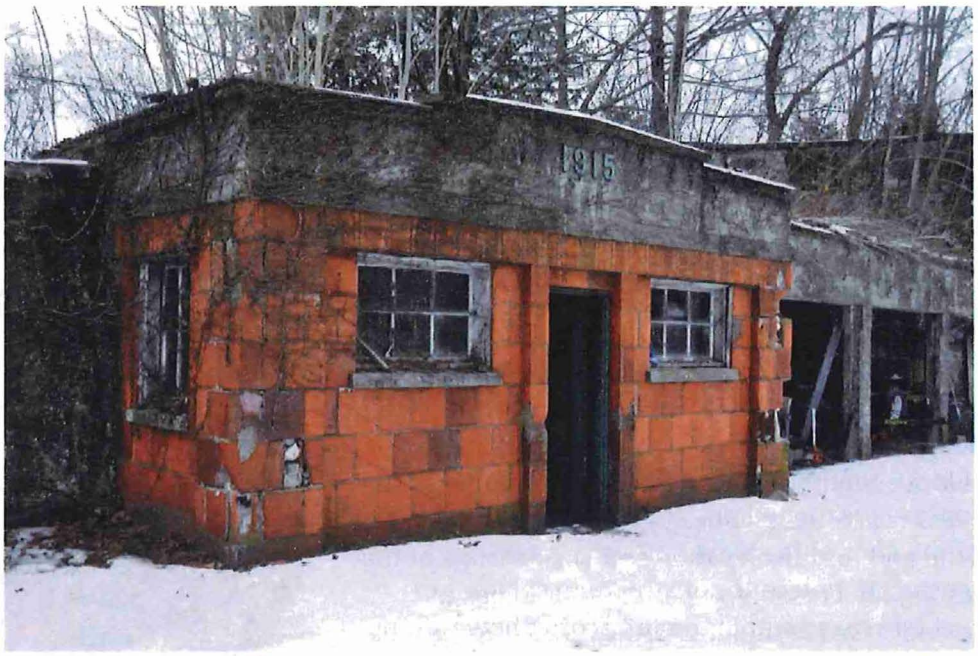
- **Long-Term (6-10 years)**

  - Develop long-term maintenance plan including:
    - cyclical inspection of slate roof to repair damage as it occurs,
    - cyclical inspection of terracotta blocks for cracking & spalling,
    - cyclical inspection of concrete piers for evidence of expanding cracks at pier heads,
    - cyclical inspection and repair of site drainage.
  - Maintain perimeter of structure free of scrub growth, trees and debris.

- **Limitations on Re-use**

The large scale of the Squash Barn, its large open floor plate and its concrete structure with steel beams offer much more flexibility for re-use than other structures on the property. The building's cellar boiler room and existing heating lines offers more options for establishing heat in the structure to permit year-round use; however, heating to comfort will require insulation and some form of storm window. Broad doorways and an open interior can accommodate barrier-free access without loss of historic building fabric, and plentiful natural light can support a variety of uses from offices to workshop, meeting or storage.

Conditions Assessment: Beaver Brook Farm, 761 Mammoth Road, Dracut, Massachusetts



BUILDING NAME: Milk Building

DATE(S): 1915

SIZE: 23' x 21'
approximately 480 square feet of space on one level partly below grade on its west side

TYPE OF CONSTRUCTION: reinforced, poured concrete floor, rear walls & ceiling with steel beams; terracotta block with stones filling voids in blocks, possible steel posts encased by terracotta at east elevation (needs to be determined – no posts visible)

roof consists of poured concrete, the eastern two-thirds of which is surrounded by a low concrete footing on which sheets of corrugated asbestos roofing have been laid to pitch away (northward and southward) from a shallow ridge over the entry. The western third of the roof is blow grade and covered with soil and plants.

HISTORY:

The Milk Building was probably constructed at the same time, or within a decade of the adjacent Main Barn (now demolished) and Dairy Barn. The structure is built into the side of a hill to create a steady cool interior temperature, appears to have been purpose-built for processing milk. The interior consists of two rooms, namely, a nearly square outer room (east)

that opens onto the barnyard and an inner room (west) set below grade without windows except two on its east wall that face into the outer room. The outer room contains a set-kettle on its north while. The inner room contains a milk cooler (north end) and a trough along its west wall. The last private owner of the property reports that milk was brought by pail to the milk room rather than by pipe from the barn, and that pasteurizing was carried out off-site by a company to which milk was sold.

EXISTING CONDITIONS:

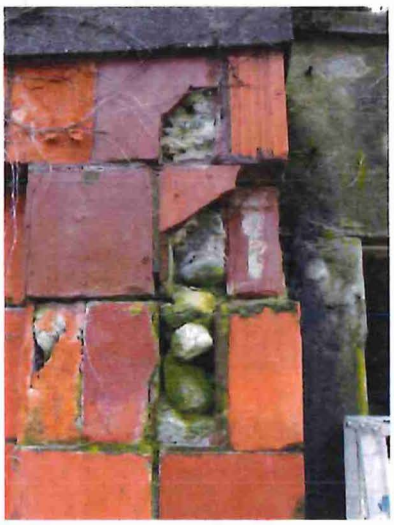


Figure 3 - rubble infill at northeast corner

The Milk Room is primarily constructed of poured, reinforced concrete set below grade, except for its eastern end which stands above grade in the barnyard and is constructed of terracotta block supporting a poured-concrete cornice/roof. The east wall is constructed entirely of terracotta block which projects at the ends of the elevation and on each side of the door, suggesting the presence of structural columns of concrete or steel cased within the terracotta; however, no such columns are visible. Extensive fracturing of the terracotta is visible at the north and south corners of the elevations where nearly half the blocks have cracked or shattered revealing voids that have been packed with loose stones. The concrete lintel above the terracotta wall has horizontal cracks above the window openings. Wooden sash is exhibits normal weathering with peeling paint and deteriorated putty; window surrounds exhibit signs of extensive fungal decay at their sills, although much of the wood appears firm.

Figure 2 - corroding iron beam at ceiling

Figure 1 - algae, mold & vines at north wall

The interior bears evidence of extensive moisture damage to iron or steel reinforcements or beams bedded in the concrete. Two such beams run north to south at distances of 10' and 14' west of the east elevation; both beams were originally encased in concrete; however, rust

expansion has split concrete from the face of each beam leaving it exposed. The north wall and central portions of the ceiling near the north wall are heavily covered with algae and mold, much of it beneath a horizontal fracture in the concrete approximately 1' beneath the ceiling. Vines have grown across parts of the ceiling, providing another source of moisture to corrode iron reinforcements.

Although subject to dampness, the rear milk room appears to be in sound condition.

RECOMMENDATIONS:

- **Urgent (1-2 years)**

    - Remove vines and weeds from the structure taking care not to pull roots that may have grown deeply into mortar joints and terracotta blocks; cut roots instead. Cut all trees from the roof but do not pull the roots until the extent of their penetration into the structure has been determined.

Figure 4 - trees growing through roof of corrugated cement asbestos

    - Inspect roof and temporarily patch all sources of leaking to reduce moisture in structure and concrete.
    - Examine north wall to determine if moisture entering through horizontal crack at the wall head can be reduced.
    - Commission a structural engineer to determine if concrete or steel posts are embedded in the terracotta block wall, to assess the condition of concrete and reinforcements, to assess the condition of terracotta blocks and to determine if temporary supports should be installed to carry the weight of the concrete ceiling/roof.
    - Repair existing sash & repaint to prevent additional damage.
    - Implement a plan to ventilate the space to reduce relative humidity.

- **Intermediate (3-5 years)**

    - Repair/protect concrete that is spalling due to rust expansion of reinforcement materials; seek engineering specification for coating or other protective agent to reduce rust on iron reinforcements.
    - Repair terracotta block walls that serve as bearing-wall masonry; determine with engineer whether original blocks stored on site can be used; investigate sources

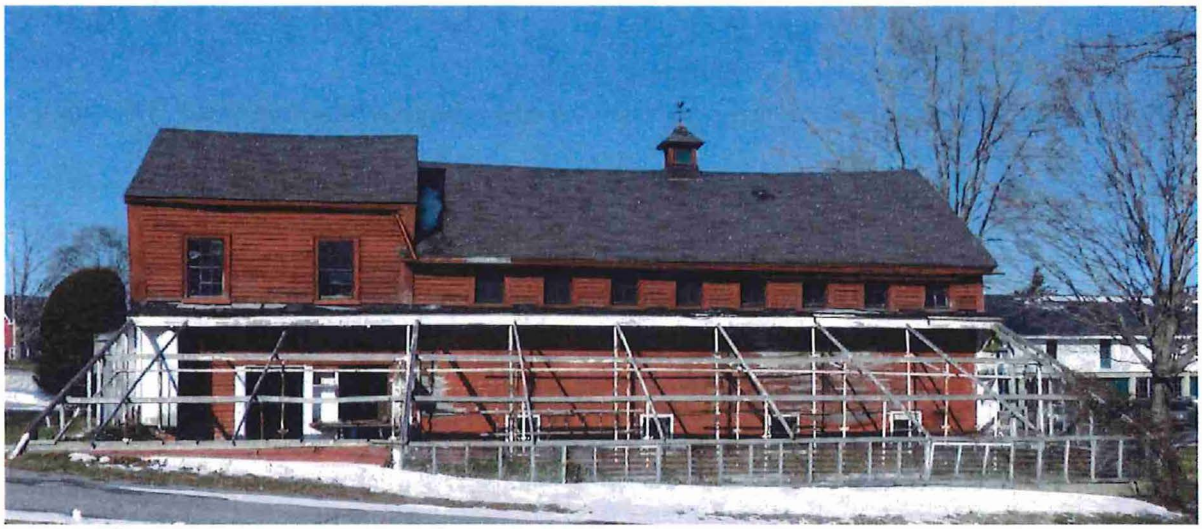
of new terracotta blocks; as a last-resort investigate a substitute masonry material for replacement of damaged blocks if terracotta is unavailable.

- **Long-Term (6-10 years)**

  - Develop long-term maintenance plan including:
    - monitoring and reducing relative humidity inside the structure,
    - cyclical inspection of concrete deck and corrugated galvanized roof covering to be replaced in-kind,
    - cyclical inspection of terracotta blocks for cracking & spalling,
    - cyclical inspection of concrete for evidence of spalling and jacking due to rust expansion of reinforcement elements,
    - cyclical inspection and repair of site drainage.
  - Maintain perimeter of structure free of scrub growth, trees and debris.

- **Limitations on Re-use**

The small size of the Milk Building and its partially below-grade construction limit re-use options for the structure. It is likely that the building will always need careful attention to monitor relative humidity levels. The extent to which the structure's concrete has been compromised by the various cracks and rusting iron elements is currently unknown and may prove a serious impediment to re-use if the concrete has lost structural capacity or if the cracks have broken the concrete into discrete pieces. Because the structure is built at grade, storage of equipment and heavy objects is feasible, although the narrow entry will impose limits on the types of equipment stored. It is likely that heating the building will prove difficult because of the disproportionate expense of installing a heating system to serve two rooms and the lack of space in which to install such a system. Seasonal use or storage seem the most likely options for re-use.



BUILDING NAME: Seed House-Greenhouse

DATE(S): ca. 1790-1820 (former Corn Crib at southwest corner of structure)
ca. 1900-1910 (Storage Barn)
ca. 1920-1935 (Lean-to Shed)
ca. 1920-1935 (?) shed Greenhouse

SIZE: 26' x 42' (wooden portion of structure)
18' x 42' (shed greenhouse)
approximately 1,100 square feet of interior space on one level in the wooden part of the structure (excluding the cellar); 750 square feet in greenhouse structure, now unenclosed and open to weather

TYPE OF CONSTRUCTION: **former Corn Crib** (southwest section 15' x 15' of wooden structure) – scribe-rule timber-frame construction set on a rubble stone foundation
Storage Barn (eastern section of structure & passage at northwest corner) – stick-built wood frame on a rubble stone foundation
north Lean-to Shed attached to north wall of corn crib
Greenhouse – concrete knee wall/footing with wooden frame above, glass removed

HISTORY:

The Seed House-Greenhouse is composed of four structures built at different times. These are:

- **The Corn Crib**: The estimated construction date of the building is based upon evidence that it was constructed by the scribe-rule method of laying out a timber frame. This method was common throughout the eighteenth century, but passed out of use in the early nineteenth century when the square rule method was introduced. By 1815-1820, the square rule had supplanted the scribe rule, although individual timber-framers may have retained conservative, older practices. The presence of hand-forged nails and a hand-wrought iron hinge on the north door (now blocked) support this range of dates.

  The building's form and type are rare in Massachusetts. Built to provide dry storage for grain, the Corn Crib has a nearly square floor plan (15' x 15') with corner posts angled to splay walls outward to an overall dimension of approximately 17' x 17' at the eaves, a design intended to throw water well away from the building. It is likely that the structure was originally set on posts or stone piers at each corner to allow ventilation beneath the floor. Walls consisted of planks set as slats with gaps of 1"-2" between them to promote ventilation; these slats are visible at the attic below the plate but are concealed by plaster at the first storey and by clapboards at the exterior. Notable early elements also include a blocked door set on hand-wrought iron hinges at the north wall.

  The Corn Crib appears to have been converted to a workshop by the mid-nineteenth century (ca. 1840-1860) based upon its walls and ceilings of lime plaster applied to sawn lath. The build was probably placed upon its present rubble-stone foundation at this time, its walls covered with clapboards and two windows (6/6) added to its south elevation, perhaps as salvage taken from another structure. The four-panel door on the west elevation also dates from this period, or slightly later (ca. 1850-70).

- **The Storage Barn** appears to date from the late nineteenth century or, more likely, the early twentieth century. It is a wood-frame structure with floor joists set 24" on center; other framing elements are concealed. The structure stands on a rubble-stone foundation and was constructed directly against the Corn Crib's east wall, leaving clapboards and trimmings in place. The interior of the storage barn's first storey is lined with horizontal boarding and posts notched to hold racks. A large pile of planks and notched posts remain stacked on the south side of the first floor, perhaps preserving the full system of storage racks that once filled this space.

- **The Lean-to Shed** is set on a poured concrete slab above which walls are framed with studs set at variable intervals. It is built directly against the north wall of the Corn Crib, leaving an early loading door and clapboards fastened with square cut-nails in position. The entry to the shed contains a wide six-panel door (ca. 1840-1850) that appears to have been taken as salvage from another structure and installed here to facilitate the movement of goods in and out of the Storage Barn.

- **The Greenhouse** was constructed by 1939 when it is shown on an aerial view of the farm. It is possible that is concrete knee wall is contemporary with the construction of the Dairy Barn and Milk Building; however, it could equally well have been constructed in the 1920s or 1930s. The glazed portion of the structure was supported by a wooden frame stiffened by metal posts supporting a longitudinal timber near the middle of the glass roof's slope. The Greenhouse was joined to the south faces of the Corn Crib and Storage Barn by a narrow wood-frame projection covered with flat roof covered with either tar and gravel or rolled roofing. Since the farm had significantly larger greenhouses constructed as early as 1903, the function of this greenhouse is unclear.

EXISTING CONDITIONS:

- **Corn Crib:** foundation and timber frame remain in substantially sound condition; specific conditions are:

  - **timber frame**: a cracked purlin on the south slope of the roof has sagged and been previously repaired; additional timbers added to the roof frame to create a truss near the center of the structure and lally column placed beneath suggest prior sagging of the principal north-south timber; the southeast corner post has split near its base and is exposed to the weather on the south elevation

  - **roof**: south slope asphalt shingles appear relatively new (within 10-15 years) in good condition; north slope – asphalt shingles are heavily weathered and appear near the end of useful life (estimate 2-4 years remaining)

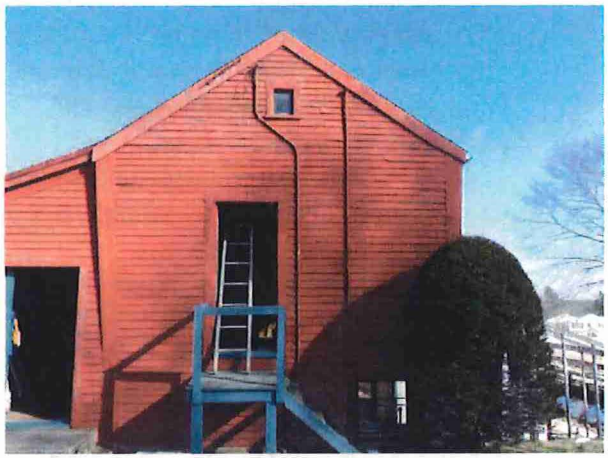


Figure 1 Corn Crib- west elevation showing canted walls

Figure 2 - timber frame at attic; former slatted wall visible in background

  - **gutters**: galvanized half-round at south is dented and poorly drained; roof slopes continuously into the Lean-to Shed at the north

- **exterior woodwork (all elevations)**: woodwork is weathered and dry with some checks and peeling paint, but there is little rot
- **east elevation**: clapboards are missing and falling from much of the east gable
- **south elevation**: window sash is nearing a state of collapse, window sills have been partially wrapped with sheet metal above which the jambs and heads of the window cases remain in sound condition
- **west elevation**: door and door sill are heavily weathered but remain serviceable and sound
- **north elevation**: concealed within the lean-to ell preserves its old clapboards and loading door

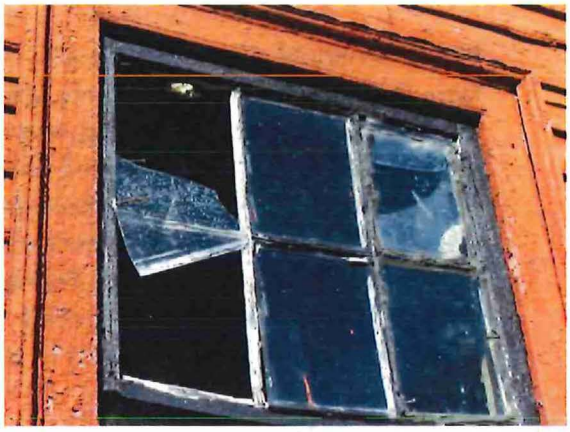


Figure 3 - window case & old sash at south elevation

Figure 5 - old loading door with hand-wrought strap hinge

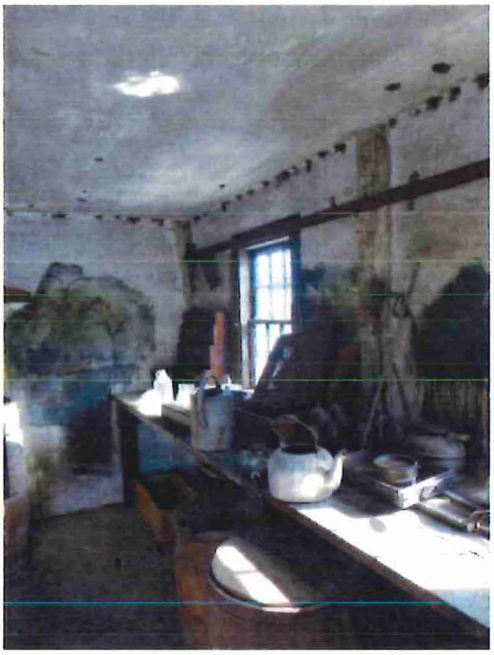


Figure 4 - lime plaster at interior

- **interior**: the cellar has a poured concrete floor with rubble masonry walls on three sides and homasote at the ceiling; at the first floor, plaster finishes and simple wooden trimmings remain in sound condition with little deterioration; decorative painting on plaster at east wall of unknown origin

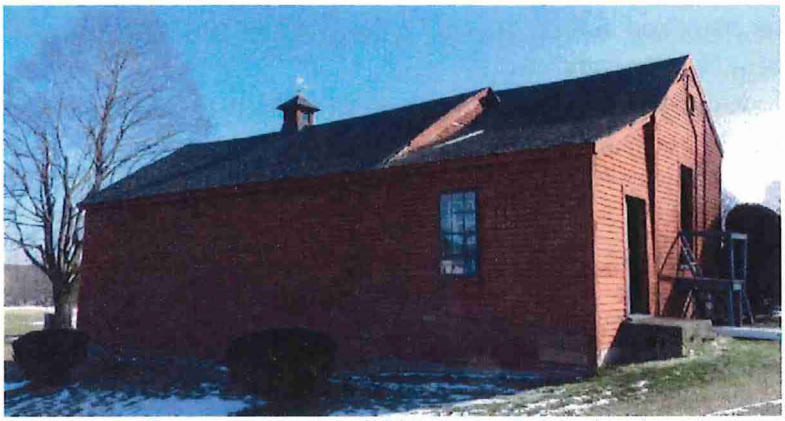


Figure 6 - Storage Barn (left) & Lean-to Addition (right)

- **Storage Barn:** foundation and frame remain in sound condition; specific conditions are:

Figure 7 - deteriorated northeast corner post

  - **wood frame:** corner posts at the northeast and southeast corners are not visible from the interior; at the exterior, extensive decay at the base of the corners and gaps between the foundation and woodwork suggest the bases of the posts have rotted; the lack of sagging in the structure suggests that the weight borne by corner posts has been supported by adjacent framing elements; the structure is secured by a single iron tie rod extending from mid-point of the north to the mid-point of the south elevations; this rod presumably counteracts the pressure from the roof to spread the walls; it is secured at each end by a nut set on block of wood on the fascia
  - **roof**: south slope asphalt shingles appear relatively new (within 10-15 years) in good condition; north slope – asphalt shingles are heavily weathered and appear near the end of useful life (estimate 2-4 years remaining); active leaks were observed along the east end of the north wall where water appears to run over as well as behind horizontal boarding, causing leaks to extend to the cellar
  - **gutters**: galvanized half-round at south is dented and poorly drained; no gutter exists at the north slope where run-off has formed a shallow trench along the building and caused splash back onto woodwork
  - **exterior woodwork (all elevations)**: dry and covered with peeling paint but appears sound except for decay at the bases of the eastern corner posts, the cornices of the eastern gable and north elevation where vermin have eaten access holes, and along the base of the north elevation where backsplash from roof run-off has caused extensive decay of claddings at the lower 2' of the wall

  - **east elevation**: batten doors at cellar and first floor of gable end appear original and in sound condition
  - **windows**: sash is set in deep reveals of windows along the south elevation; sills, cases and sash appear in sound condition
  - **interior**: the cellar is unfinished space with a dirt floor and partial ceiling of homasote; the first floor is a single storeroom lined with horizontal boards and wooden flooring, all of which appear to be in good condition; a stack of notched posts and planks stored near the southeast corner may be original shelving for agricultural storage

- **Lean-to Shed:** poured concrete slab footing and wood-frame walls with variable stud spacing appear in sound condition; specific conditions are:
  - **roof**: single slope of roof (north) is covered with asphalt shingles heavily weathered and near the end of useful life (estimate 2-4 years remaining)
  - **gutters**: no gutter exists
  - **exterior woodwork**: dry and covered with peeling paint but appears sound except for decay at the lower 2' of the wall due to splash back from roof run-off
  - **west elevation**: salvage six-panel door (ca. 1840-1850) is in sound condition
  - **north elevation**: batten hatch door has decay at the end of its vertical tongue-and-groove boards, but remains mostly sound; window (6/6) and wooden storm sash have broken panes but remain in repairable condition

- **Greenhouse:** although in a ruinous condition, the Greenhouse retains substantial elements of its original construction; its concrete foundation/footing remains in place as does the majority of its metal-and-wood frame; nearly all glass has been removed; specific conditions are:
  - **concrete footing:** a low concrete wall supports greenhouse framing; the east end of the south face has heaved and cracked in several places

Figure 8 - greenhouse frame

- **frame:** composed of 7 wide and 2 narrower bays defined by larger rafters, the roof was originally divided by smaller mullions into 43 lines of glass panes; major framing elements remain in position but the strength of the wood has not been ascertained; small mullions have been removed and examples may remain on site

Figure 9 - mullion and internal gutter of greenhouse frame

- **connector roof:** the flat roof that connects the greenhouse shed to the rest of the building is severely decayed and its roof coverings are split, bringing water into this roof frame and close to the sills of the adjacent Corn Crib and Storage Barn

Figure 10 - roof of connector between greenhouse and Storage Barn

RECOMMENDATIONS:

- **Urgent (1-2 years)**
  - Remove existing sash from corn crib (2 windows) and reserve old glass for re-installation in reproduction sash if existing sash is beyond repair; install temporary boarding or salvaged sash as temporary seal against weather.
  - Repair gutters at south elevation and direct drainage 5' (minimum) away from building with leaders
  - Install temporary or permanent gutter at north elevation and direct water 5' away from building with leaders
  - Clear all debris and plants from the former greenhouse; disassemble remaining portions of frame or oil all wood surfaces to reduce the speed of decay; gather and store all greenhouse glass
  - Install temporary roof of rolled asphalt roofing on flat roof adjacent to greenhouse to direct water away from the Corn Crib and Storage Barn

- Re-nail loose clapboards at east elevation of Storage Barn; re-nail loose clapboards and replace missing (pine) clapboards at east gable of Corn Crib
- Inspect framing repairs to Corn Crib to determine stability of repairs and whether replacement with a traditional timber-frame repair would be more durable
- Study feasibility/cost of re-establishing greenhouse to decide whether this element will be preserved, removed or stabilized as a ruin

- **Intermediate (3-5 years)**

  - Inspect corner posts at southeast and northeast corners of Storage Barn together with sill at the north elevation; splice structural elements as needed, replace lower courses of water-damaged clapboards and trim
  - Replace north slope of roofs on Corn Crib, Storage Barn and Lean-to Shed with new asphalt shingle to match existing
  - Repair, re-putty (as needed) and re-paint all sash at the Storage Barn; either splice old 6/6 window frames from Corn Crib to replace rotted rails and muntins or fabricate reproductions with mortise-and-tenon joinery to match existing; re-glaze with remaining panes of cylinder glass
  - Devise method for removing loose paint from exterior wood surfaces; if possible strengthen wood with mixture of linseed oil & turpentine before priming and re-painting
  - Make carpentry repairs by splicing well-selected local wood into damaged sections of cornice/rake at the Storage Barn; repair corner boards, window cases and door cases by splicing as needed rather than wholesale replacement
  - Inspect interior plaster of Corn Crib more closely and re-adhere any loose sections of lime plaster

- **Long-Term (6-10 years)**

  - Conduct additional historical research to narrow the dates of construction for this building and to identify its historic uses; determine whether the building will be maintained for interpretation or be re-used; evaluate proposed new uses by their effect on the historic fabric of the Corn Crib which is one of the property's rarest structures
  - Develop long-term maintenance plan including:
    - cyclical inspection of gutters and downspouts to assure positive drainage of rainwater away from the structure,
    - cyclical maintenance of exterior painted surfaces
  - Maintain perimeter of structure free of scrub growth, trees and debris.

- **Limitations on Re-use**

The building has four distinct spaces that are different in their finishes and utility; each has different limitations for re-use:

Corn Crib: As one of the oldest, rarest and smallest structures on the property, this building deserves careful conservation. Its small size (approx. 225 square feet) and raised floor level make the creation of barrier-free access difficult without compromising historic features. Even access from other parts of the building would result in damage to historic doorways that would require widening. Heating the structure may also create problems; the structure has apparently never been heated to comfort and its roof framing may not have been designed to bear snow loads that are typically increased in the form of ice when a building's roof becomes warm from interior heat. Re-use as a season workshop or studio would be the easiest adaptation of the building.

The Storage Barn: While the cellar with its dirt floor and exposed foundation walls may not be useful for occupied space, it may be adaptable to some kinds of storage and greenhouse-related functions, should the greenhouse be re-instated. The first floor of the building is a broad, open space with unfinished wood walls. It can be reached by doors and a passage that appear to meet code requirements for handicapped access turning radii. Seasonal occupancy for workshops, studio space and, perhaps, small public assemblies might allow the least expensive and least intrusive method of re-using the structure.

The Lean-to Shed: This space is too small for use except as a passage/vestibule. Its primary value is to provide access to the Storage Barn and to preserve early exterior finishes on the north wall of the Corn Crib. Its two doorways appear to meet code requirements for handicapped access, and its concrete stoop may be able to serve as the upper landing of an access ramp, should the building be adapted to a use that requires barrier-free access.

The Greenhouse: This structure is now a ruin; however, many of its elements remain in place. The light framing and glazed walls would not be as expense to restore as a fully framed and finished structure; however, if it were restored, it imposes the requirement for more active daily management if placed in service as a greenhouse.

Conditions Assessment: Beaver Brook Farm, 761 Mammoth Road, Dracut, Massachusetts

BUILDING NAME: Dairy Barn & ruins of Main Barn

DATE(S): ca. 1915, 1942, 1972

SIZE: south section – 39' (south) x 57' (east) x 43' (internal north) x 32' (west)
north section – 38' x 43' (former east end of the Main Barn)
silo – 12' diameter
approximately 3,300 square feet at the first floor and 1,735 square feet at the loft, excluding the cellar

TYPE OF CONSTRUCTION: **Former Main Barn (west – now demolished)**: poured concrete foundation; a fragment of the Main Barn's east end remains as the north end of the Dairy Barn set at an angle to the body of the Dairy Barn. This section has been capped with a flat roof pitched at a low angle descending northward and covered with rolled asphalt roofing.

Former Basement of the Main Barn: poured concrete piers that once supported the first floor of the barn; poured concrete piers with mixture of concrete and iron lintels at perimeter wall; infill panels of terracotta block, primarily at

north and south walls; upper structure destroyed by fire 1972.

Dairy Barn: poured concrete foundation; ground floor built of terracotta blocks (12" x 12" x 6"); upper floor (loft) built of wood-frame construction with joists set 24" on center and supported by two 9½" x 5¼" timbers supported by 4¾" iron posts; wall studs set 24" on center at gable walls (south & north); studs on side walls & roof rafters set 30" on center; walls clad with single layer of wood sheathing & asphalt siding at exterior; roof of corrugated metal set directly on rafters with no sheathing. The pitched roof of the barn and parts of the loft floor post-date 1942 when the original loft and roof were burned; the north end of the roof (flat roof) dates from 1972 and was constructed to enclose a surviving fragment of the original Main Barn

Silo: terracotta block (12" x 12" x 6") laid as bearing-wall masonry; conical roof with wood frame; extensive spalling of terracotta blocks

HISTORY:

The Dairy Barn is a fragment of a much larger barn complex that was constructed prior to 1939 when it is clearly visible in aerial views of the farm. It is likely that the complex was built in or around 1915, the date cast into the lintel of the Milk House. The Main Barn and Dairy Barn suffered a fire in 1942 that destroyed the majority of the two buildings' wooden structures, leaving their concrete and terracotta bases. The two barns were re-built and remained in position until 1972 when another fire destroyed nearly the entire Main Barn, leaving only its east end basement which has been incorporated into the current Dairy Barn as the north end of its ground floor. A granite dates stone inscribed "1876" remains on the ramp that previously led to the Main Barn; this stone was taken as salvage during the 1950s-1960s from the demolition of the Richardson Hotel in Lowell by the father of the property's last private owner; it bears no relationship to any building on site.

As it stood in 1939, the barn complex consisted of a broad earthen ramp that led to the Main Barn which was the same width as the ramp. The Main Barn was a wood-frame structure set on a concrete piers and foundation which remain in position on site. The structure contained a ground floor, a loft enclosed with a gambrel roof and a lower level milking parlor that is now part of the Dairy Barn; the silo was attached to the north side of the Main Barn's east end. Of this structure only its foundation and fragments of its east end remain attached to the north end of the Dairy Barn.

The Dairy Barn appears to have been identical in style to the Main Barn but of a lower height. It was enclosed by a gambrel roof that burned in 1942 and was replaced with the present gable roof which may have undergone additional repair and modification following the 1972 fire that destroyed the Main Barn. In addition, it possessed a concrete structure at its east wall with a sluice gate on its east face that seems likely to have served to store manure and hay waste for composting.

EXISTING CONDITIONS:

The Dairy Barn, Silo and attached fragments of the Main Barn remain in poor condition with several areas of structural failure, specifically:

- **Concrete**: All concrete columns and walls in the former connector as well as most of the concrete base of the Dairy Barn exhibit signs of rust expansion of reinforcement bars, lintels and other iron that may be embedded in the concrete.

Figure 1 - typical cracked concrete at pier at Main Barn cellar

- **Terracotta**: Terracotta blocks in all walls exhibit extensive deterioration with shattered faces and fractures. In areas such as the connector where terracotta serves as an infill between concrete piers, these failures are more cosmetic than structural; however, the first floor walls of the Dairy Barn appear to be built of terracotta laid as bearing-wall masonry without additional steel or concrete piers; if so, the deterioration of terracotta blocks in these locations has structural implications. The small angled one-storey room on the west side of the Dairy Barn has cracked terracotta tiles that reveal mortar poured into their cavities. It is not clear if the blocks of the Dairy Barn were also filled with mortar, nor is it clear if there are any vertical steel posts or other stiffening/tying elements embedded in the walls.

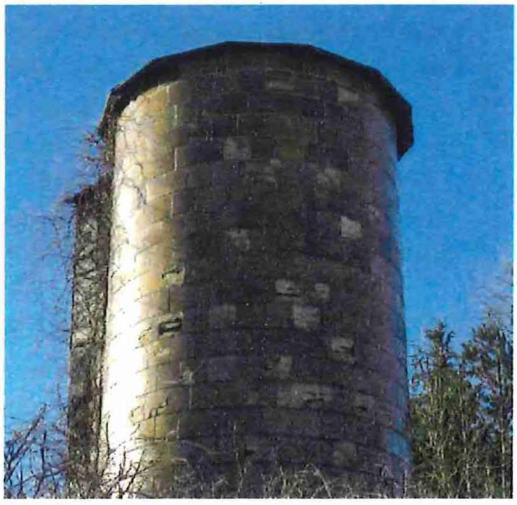


Figure 2 - west elevation of silo showing fractured terracotta

- **Silo Terracotta**: Terracotta blocks at the Silo exhibit extensive spalling and cracking, although they are not easily examined to determine the severity of the decay and its effect on structural stability.

- **Wood Framing**: the first floor of the Dairy Barn, its second-floor loft, second-floor sidewalls and roof are all framed with wood dating from 1942 and, perhaps partially

renewed in 1972 following the fire that destroyed the Main Barn. The remaining fragment of the Main Barn that stands at the north end of the Barn has been closed with a flat roof covered with rolled roofing which has failed due to age; water leaks through all sections of the roof and has caused joists on the west side to rot and collapsed; joists on the east side of this section of the barn also exhibit extensive decay and may be approaching collapse.

Figure 3 - northwest corner - collapsed joists

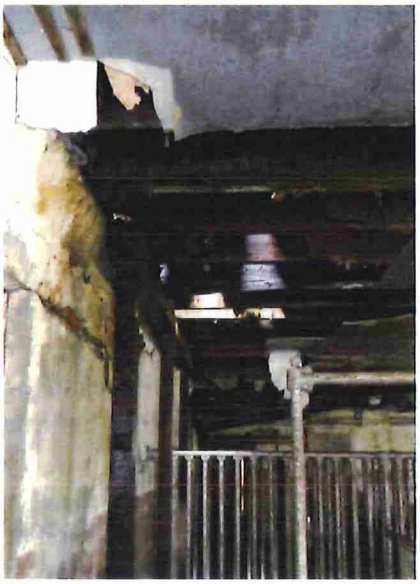


Figure 4 - collapsing joists at west wall

Siding & Trimmings: The upper floor of the barn is covered with asphalt siding in an imitation brick pattern; siding is weathered and deteriorating but still serviceable. Wooden doors and window cases are weathered but repairable.

- **Roofing**: The pitched roof is covered with corrugated galvanized iron which appears to be in sound condition but with minor leaks from nail holes and gaps between metal sheets. The north roof is a low-pitched shed covered with rolled roofing that has failed completely due to age causing leaks in all portions of the building's north end.

- **Windows**: Wooden sash remains in mostly good condition, needing re-puttying and re-painting. Window cases appear mostly sound but in need of paint.

Figure 5 - rolled roofing at former base of Main Barn

RECOMMENDATIONS:

- **Urgent (1-2 years)**

  - Remove brush, scrub trees and debris from the perimeter of the structure to reduce moisture damage & to facilitate inspection of the structure.
  - If the north end of the Dairy Barn (surviving fragment of the Main Barn) is to be retained, it must be immediately re-roofed; it is unclear if the joists are strong enough for re-roofing without re-support; these conditions force the question of whether the building can or should be saved.
  - Patch nail holes and small openings in the corrugated metal roof to reduce leaks.
  - Install temporary supports to carry collapsed joists at the northwest end of the structure and in other locations where water damaged may have compromised the strength of joists.
  - Inspect terracotta blocks at first-floor walls and silo to determine degree of fracturing and structural compromise.
  - Commission a structural assessment to confirm condition and to determine bearing capacity of the floors which will determine the range of uses which the building may be able to accommodate.
  - Determine construction method of ground-floor terracotta block wall & prepare annotated drawings of severely damaged and cracked blocks; conduct a similar inventory of terracotta blocks at the silo.
  - Gather, store and conduct an inventory of all remaining unused terracotta blocks on site.
  - Patch deteriorated sections of asphalt siding if leaking.
  - Install gutters on the west side with leaders to drain run-off way from the barnyard and/or extend drip trench along west side of Dairy Barn to drain rainwater run-off away from the barnyard.

- **Intermediate (3-5 years)**

  - Repair collapsed joists, the adjacent wall head & roof framing, if north section is to be preserved; if not, demolish wooden sections of the north end, retain masonry elements and construct new exterior wall at the north end of the Dairy Barn.
  - Repair/protect concrete that is spalling due to rust expansion of reinforcement materials.
  - Repair terracotta block walls that serve as bearing-wall masonry; determine with engineer whether original blocks stored on site can be used; investigate sources of new terracotta blocks; as a last-resort investigate a substitute masonry material for replacement of damaged blocks if terracotta is unavailable.
  - Repair wooden & re-paint wooden sash starting with sash at the south elevation of the Dairy Barn where deterioration is the most severe.

- Replace asphalt siding if replacement sheets are unavailable; if asphalt siding remains available, repair in-kind as an inexpensive alternative to re-siding.

- **Long-Term (6-10 years)**

  - Develop long-term maintenance plan including:
    - cyclical inspection of corrugated galvanized roof to be replaced in-kind,
    - cyclical inspection of terracotta blocks for cracking & spalling,
    - cyclical inspection of concrete for evidence of spalling and jacking due to rust expansion of reinforcement elements,
    - cyclical inspection and repair of site drainage.
  - Maintain perimeter of structure free of scrub growth, trees and debris.

- **Limitations on Re-use**

Re-use of the Dairy Barn will be limited by the lightness of its structural framing, its low stud height at the ground floor, and by the need for extensive repair & monitoring of its terracotta block walls and concrete foundation/columns, all of which will continue to be subject to damage from freeze-thaw cycles that both penetrate cracks into re-inforcement materials and that jack the cracks open to admit more water. Careful maintenance can slow or minimize this damage, but unfailing, cyclical maintenance will be required. The large size of the interior and lack of natural light combined with the structure's light framing are not easily adapted to active use or the creation of heated spaces. It is likely that the structure's best re-use would be as storage for light-weight items and/or use for season activities that do not require heated interior space.

The north end of the structure, which is a fragment of the east end of the Main Barn, may have decayed beyond repair. Its framing has been replaced twice, once in 1942 following the fire that destroyed the Main Barn and, again, in 1972 when another fire destroyed the Main Barn. The roof appears to be a make-shift arrangement set above former floor joists and covered with rolled roofing that has completely failed due to normal weathering. (Rolled roofing has an expectable useful life of approximately ten years.) The collapse of flooring and joists at the northwest side of the structure would require immediate shoring and stabilization if the roof were to be repaired; joists on the northeast side of the structure are also soaked and show signs of extensive decay due to the failure of the roof over this portion of the building.