

FORMER ABBOT WORSTED COMPANY MILL #1  
12 North Main Street, Graniteville, Westford, MA

PROGRESS MEETING  
September 24, 2015

**Bargmann Hendrie + Archetype, Inc.**  
**Structures North Consulting Engineers, Inc.**

FORMER ABBOT WORSTED COMPANY MILL #1  
12 North Main Street, Graniteville, Westford

HAND-BOOK OF ITS BUSINESS. 185

THE ABBOT  
Worsted Company,

Having located themselves  
IN GRANITEVILLE, MASS.,  
Are prepared to Manufacture

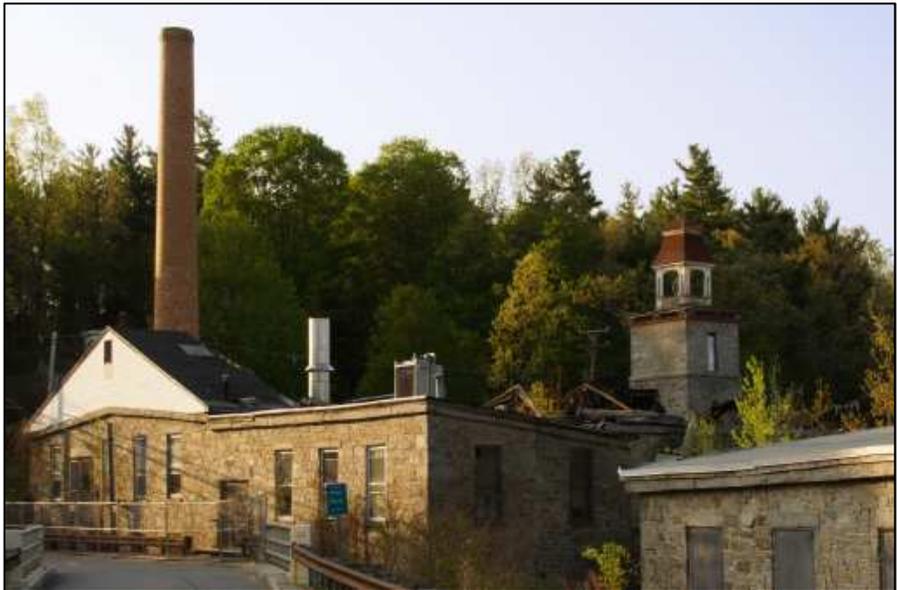
**CREWELS,  
CROCHETS, TASSELS,  
COACH LACE,**

AND  
Fine Worsted Yarn

GENERALLY.

Manufactory and Post-office Address,  
Graniteville, Mass.

1855 advertisement (reprinted in June W. Kennedy, Westford Recollections, 1729-1979 (Westford: 1979), J.V. Fletcher Library collection.



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❖ HISTORICAL NARRATIVE

Charles G. Sargent

Arriving in Westford from Lowell in 1854, **Charles G. Sargent** formed a partnership with Francis Calvert and began the manufacture of woolen mill machinery in an 18<sup>th</sup>-century farmhouse and shop approximately 1/8-mile upstream from the existing mill complex. After the buildings burned in **1855** (actually 1858?), **Calvert & Sargent** excavated the Mill Pond, rebuilt the dam and erected the existing stone Mill #1 in 1858 (or 1859?). The pond was enlarged in conjunction with the addition of Mill #2 in 1877.

Abbot Worsted Company

An important customer of Calvert & Sargent, Abbot Worsted Company rented the Graniteville factory and purchased their machinery from Mr. Sargent. However, a 20-th-century Abbot Company employee handbook states that the company was established in Graniteville in 1855, for the manufacture of fine worsted braid and upholstery yarn. By 1858, "**Abbot and Company**" manufactured carded woolen and, later, carpet woolen and worsted yarn. Although the business was incorporated under the name "**Abbot Worsted Company**" in 1900, an 1875 map of Graniteville shows "Abbot Worsted Co." adjacent to the C.G. Sargent & Son complex, at the corner of North Main Street and River Street. Presumably, the company relocated into the stone mill complex at the beginning of 1878.

Sources:

- Westford Preservation Plan, "Graniteville Historic District," pp. 31, 37;
- "Welcome to Abbot," Abbot Worsted Company, 1950.



Inset from 1855 map.

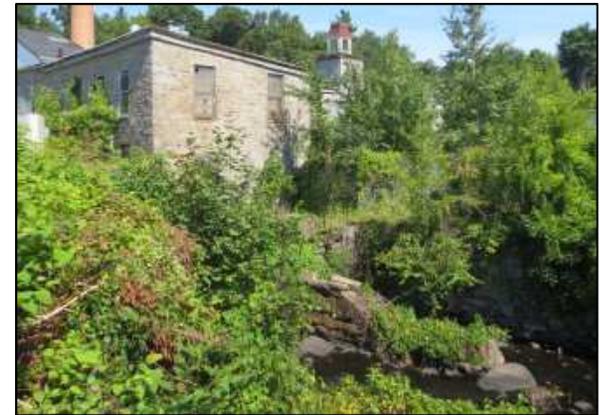
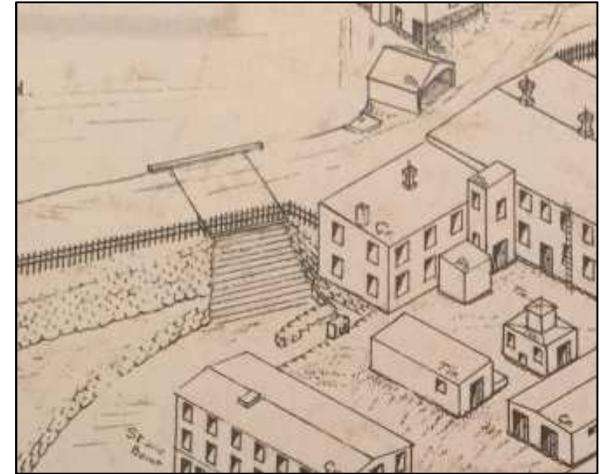
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Original Buildings on Site

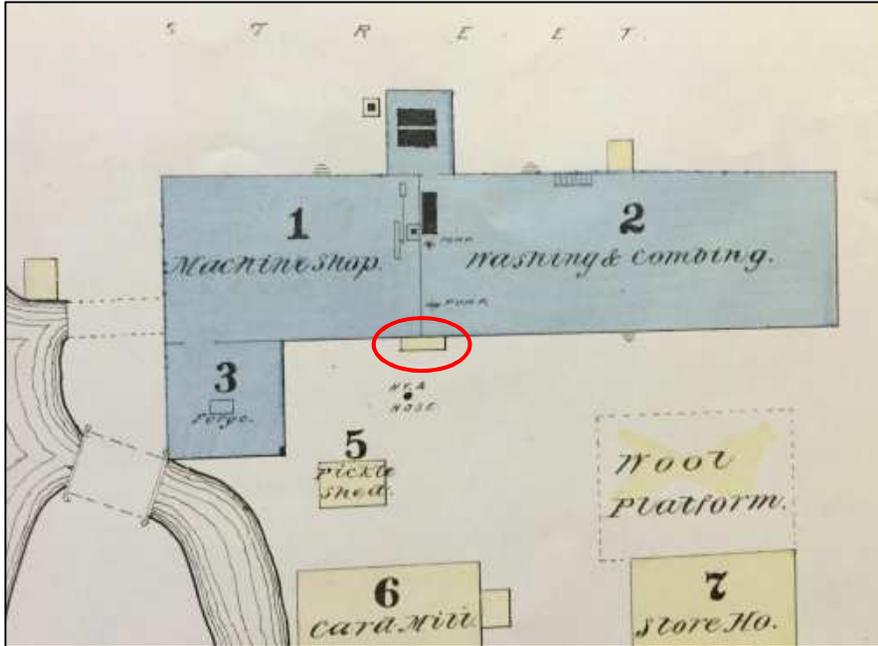
According to MHC's MACRIS inventory form WSR-1 prepared in 1970, Mill #1 was erected in **1856**, Mill #2 was added in **1857** and Mill #3 followed in **1865**. However, several other accounts reference destruction of the entire complex by fire in 1858 and construction of replacements in **1859 and/or 1860**.

The Historic American Buildings Record (HAER) inventory form (Peter M. Molloy, 12/8/75) describes an **1878 extension** "identical in style to the 1860 mill," 150' x 50' in size.

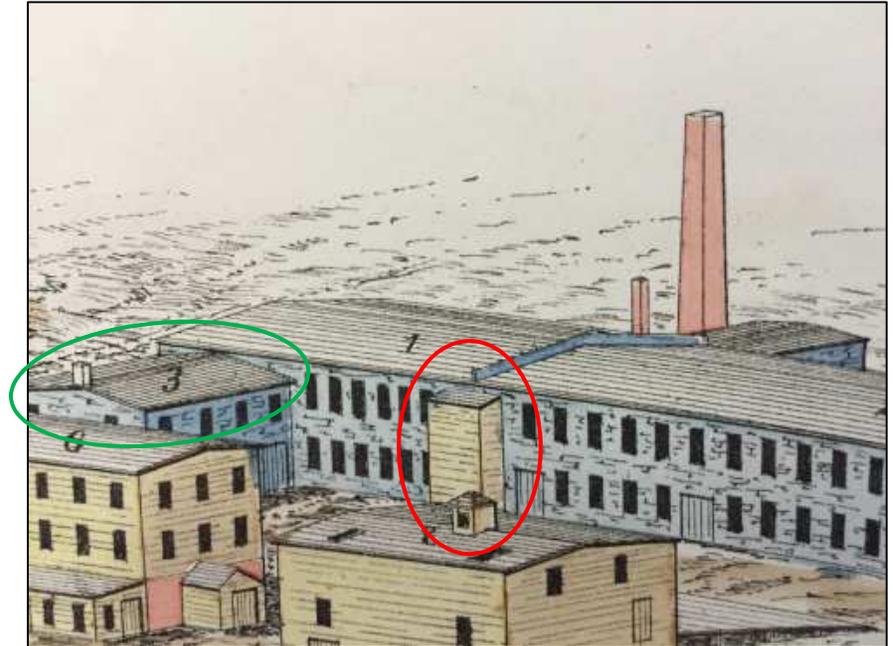
The mills were originally powered by a 75-horsepower water turbine. After 1877, a steam engine of approximately 100 horsepower was also employed.



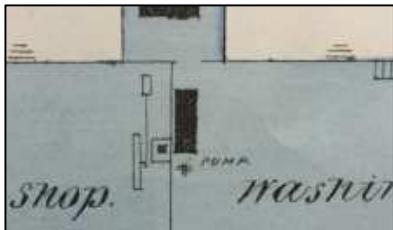
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Prior to full occupancy by Abbot Worsted Company, Mill #1 was used by Charles G. Sargent & Sons as a machine shop. A wood-framed lean-to (shown circled) straddling both sides of the fire wall between Mills 1 and 2 housed privies; the addition survives in poor condition.

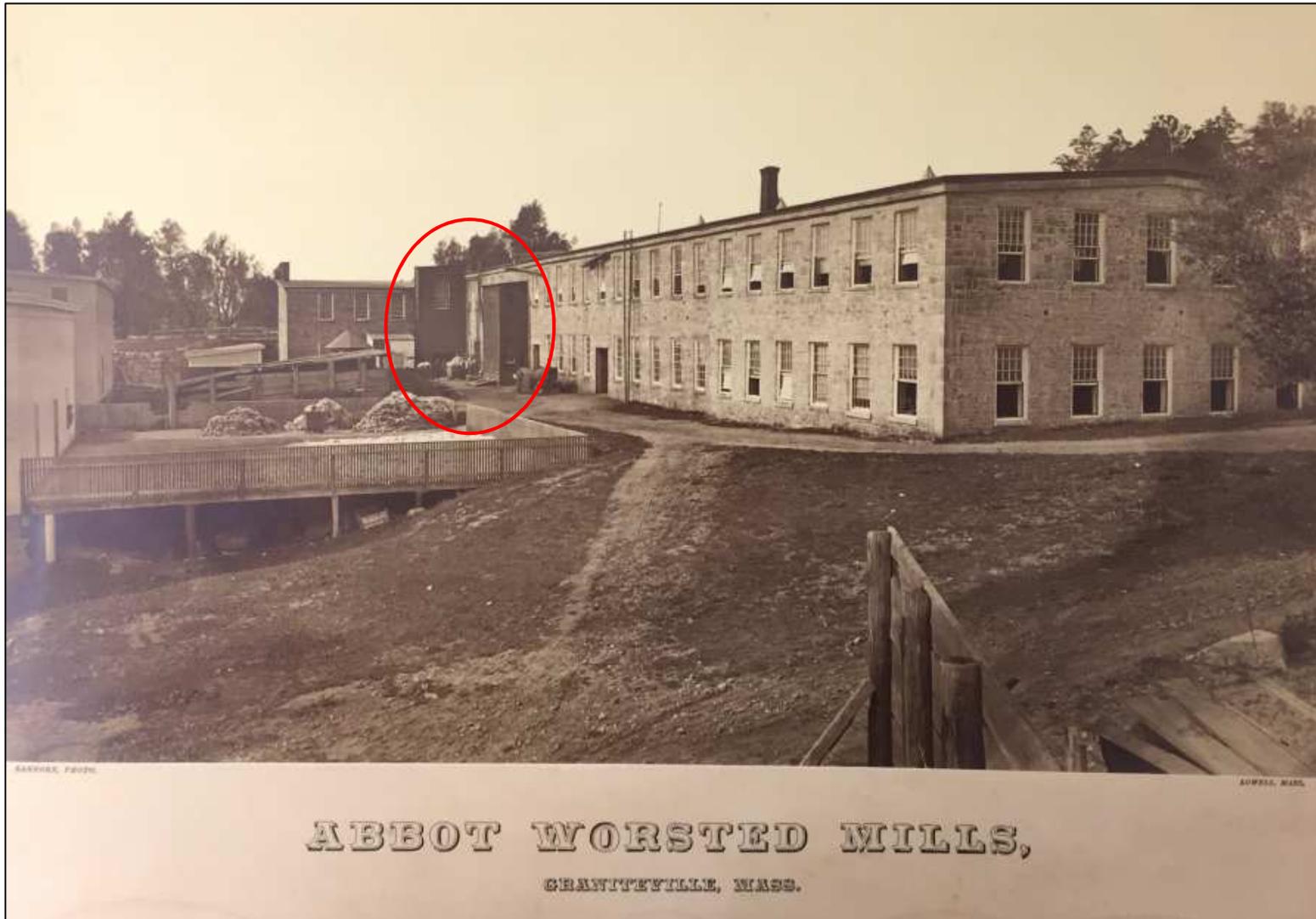


Crop from G.G. Sargent's Sons 1877 Survey #5011 (Barlow), which includes the wood-framed privy lean-to (circled in red). The Mill #3 "Forge" ell is illustrated with a shallow-pitch gable roof (circled in green) rather than the extant shed roof ; this may have been a drafting error. Color plan and bird's eye view courtesy of ATHM.



The C.G. Sargent's & Sons operation required a steam-powered water pump. Barlow survey #5012 identified the power source as "water, and steam in dry times."

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Undated (probably ca. 1878) photo from J.V. Fletcher Library collection; note privy and stair tower.

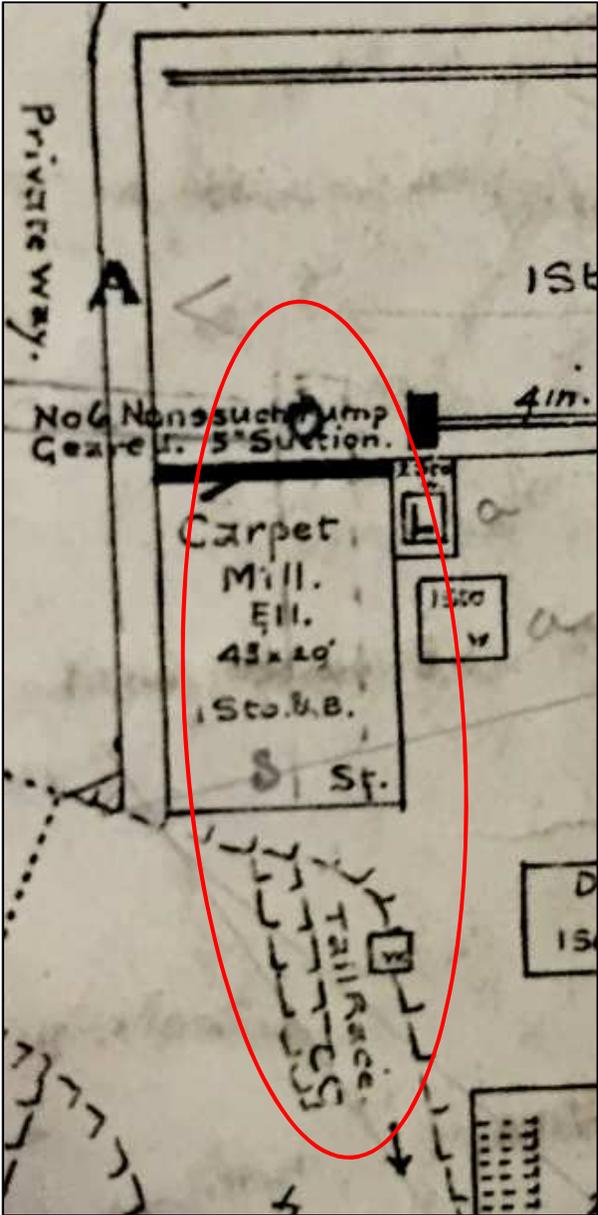
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Pulleys, shaft, valve and penstock pipe, 2015.



Bill Kenison photo, 2015.

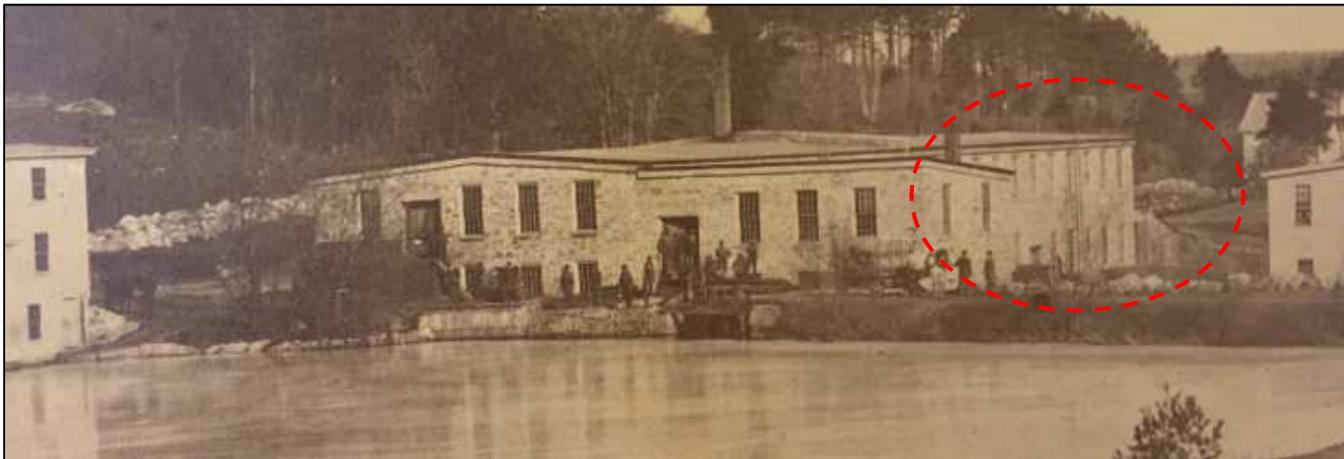


Crop from 1890 Insurance Map (ATHM); note penciled-in sluiceway.

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Early, undated winter photo from J.V. Fletcher Library collection pre-dates the 1877 Sargent's Sons machine shop; the one-story building (at right) may date to 1863.



Enlarged section.

Photo studio listed as "C.+ G.H. Drew, 72 Tremont Street, under Boston Museum" [1868-1876].

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1875 Graniteville Map.

Additions and Alterations for Abbot Worsted Company:

Barlow insurance surveys No. 5012, Charles G. Sargent & Sons' Machine Shop and Hosiery" and "No. 5011. Abbott [sic] Worsted Company" both included supplements.

- 1877: "...to be occupied by the Abbott Worsted Co. after January 1."
- 1877: "Part of No. 2 is new, not wholly finished... About the first of January, they are to occupy Nos. 1 & 3."
- 1881: "Intend to build an addition to No. 2."



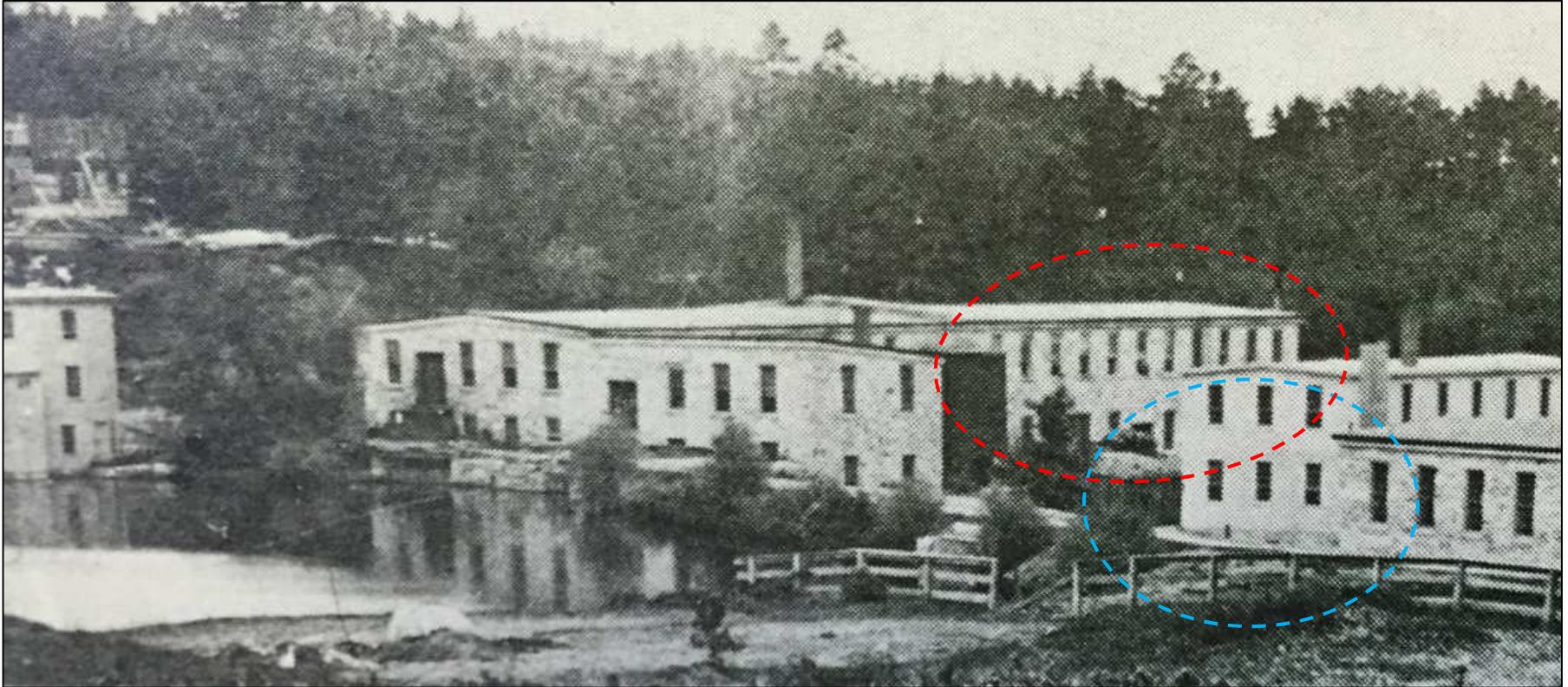
1889 Graniteville Map (Geo. Walker Atlas); note the additions along North Main Street.

**Was 1878 a big year for Abbot Worsted Company?**

- 1875 Abdiel J. Abbot admitted as partner; firm name is changed to "Abbot and Company"
- 1879 Abbot and Company purchases buildings and water rights of Forge Village Horse Nail Company and converts the buildings and machinery...

Source: "Welcome to Abbot," ca. 1946 (J.V. Fletcher Library collection)

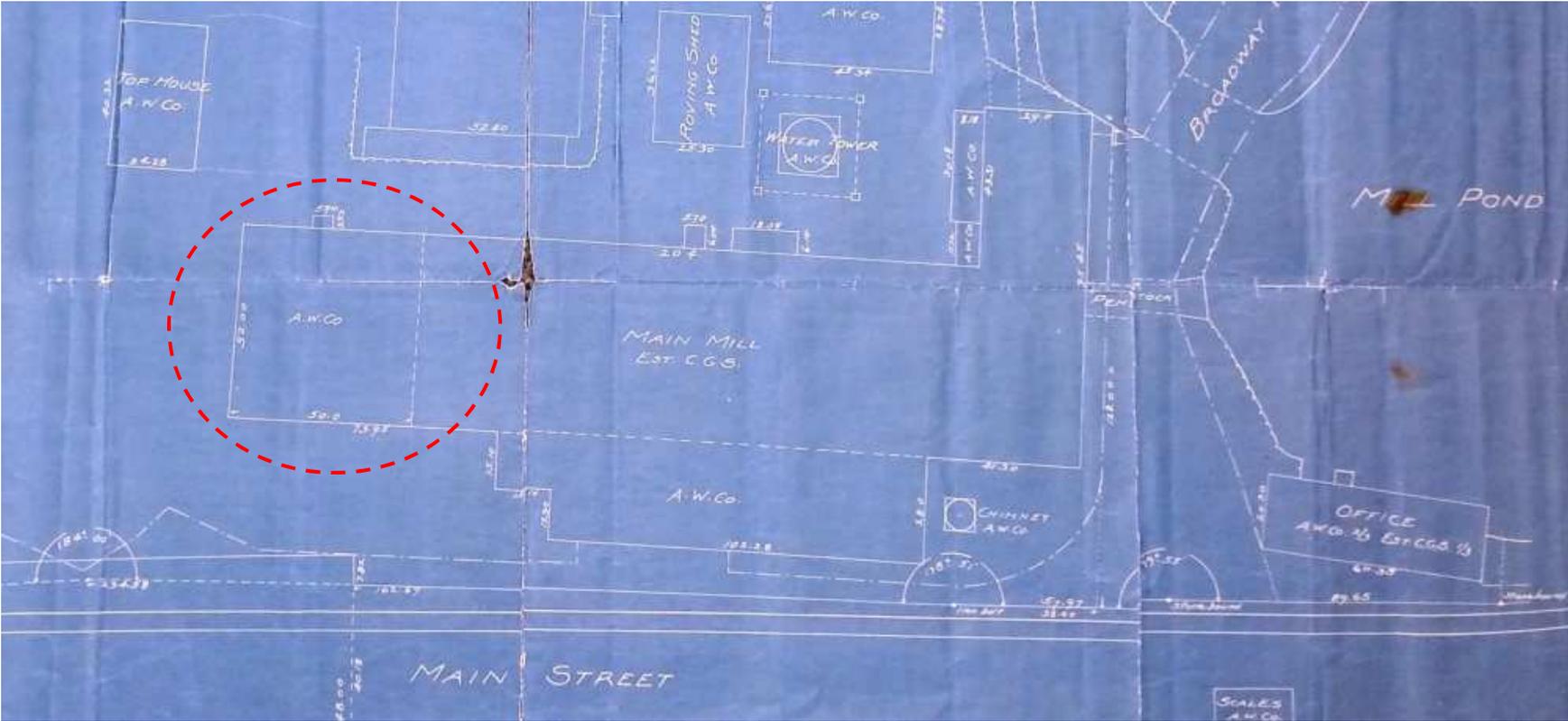
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This photograph from the J.V. Fletcher Library collection appears to predate 1880 – well before the bell tower was constructed. The building is shown extended 6 additional window bays!

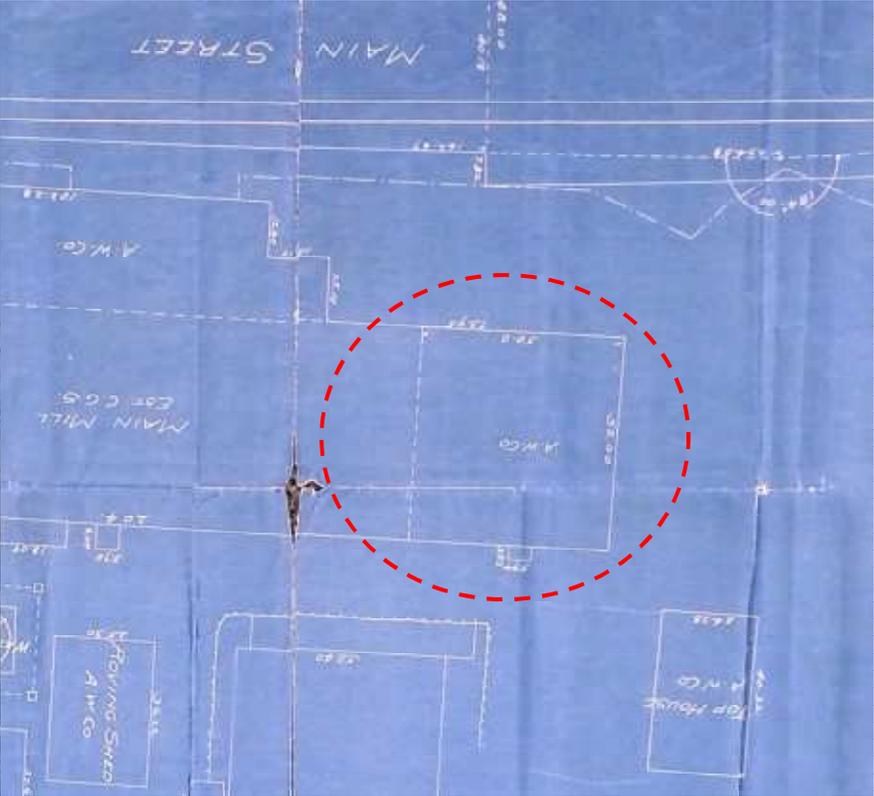
The privy lean-to (center of photo) clad in flush wood siding is painted black at this juncture. The extant Sargent's Sons building north addition does not yet appear. Curiously, the original smokestack does not appear here, nor does the wood picket fence at Broadway.

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October 1918 Survey Plan

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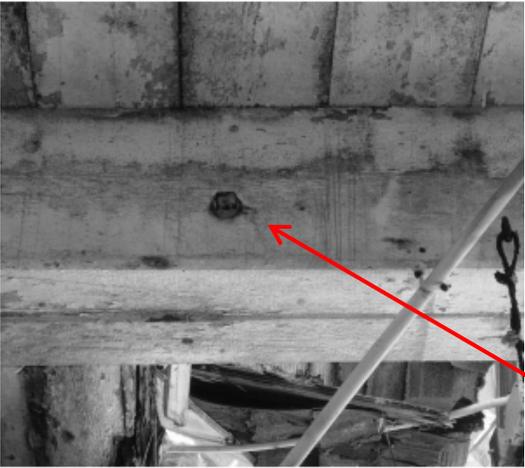


Basement level, east end, looking north.

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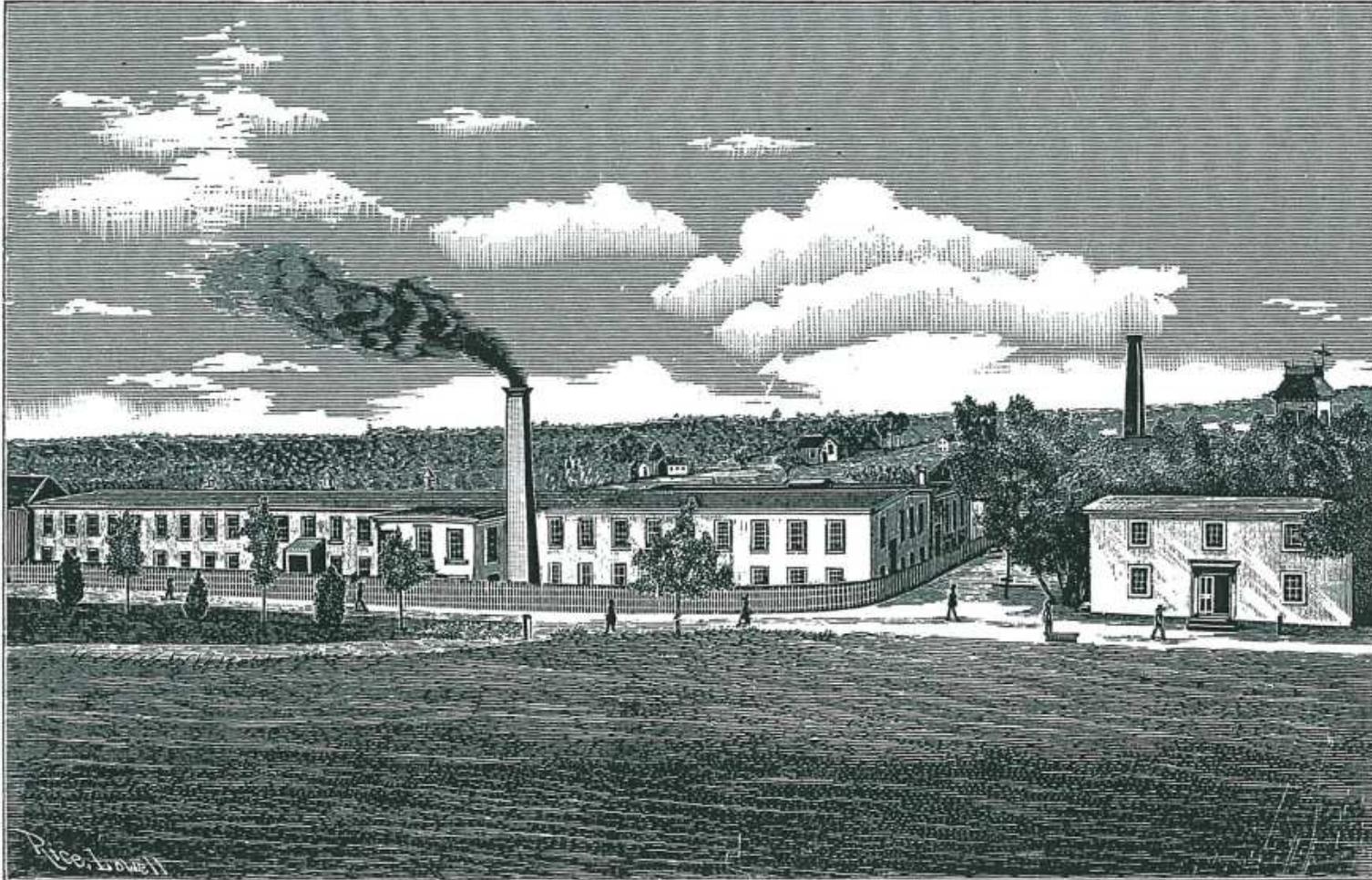


Offset beam, south wall.



Two bolts vs one

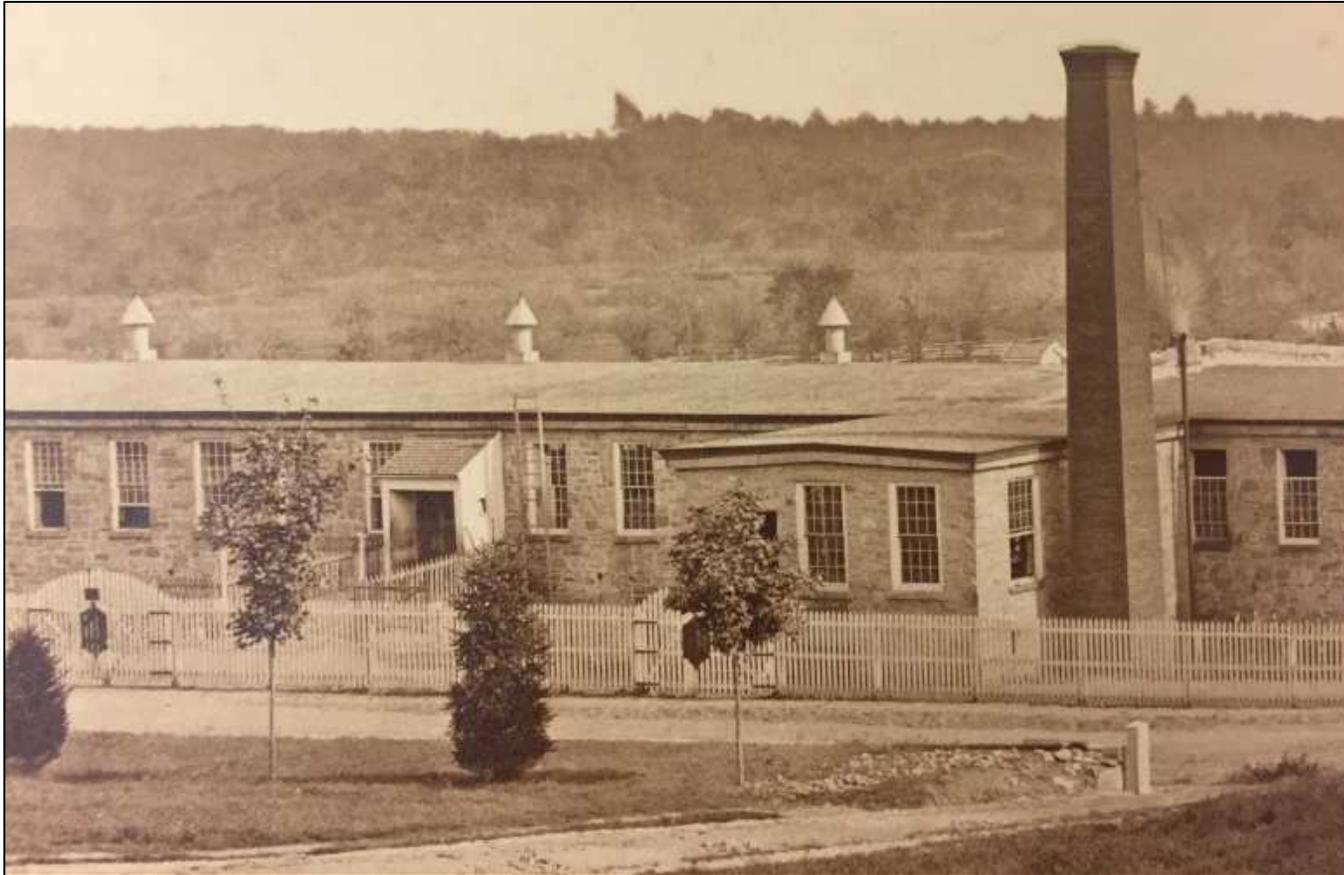
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Abbot & Co.'s Worsted Mill, Graniteville

Illustration in Rev. E.R. Hodgman, History of the Town of Westford, 1883 (J.V. Fletcher Library Collection) shows smokestack and perimeter fence; note Sargent 's Sons 1877 machine shop in background, far right.

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Enlarged portion of photo from the J.V. Fletcher Library collection illustrates the original boiler wing.

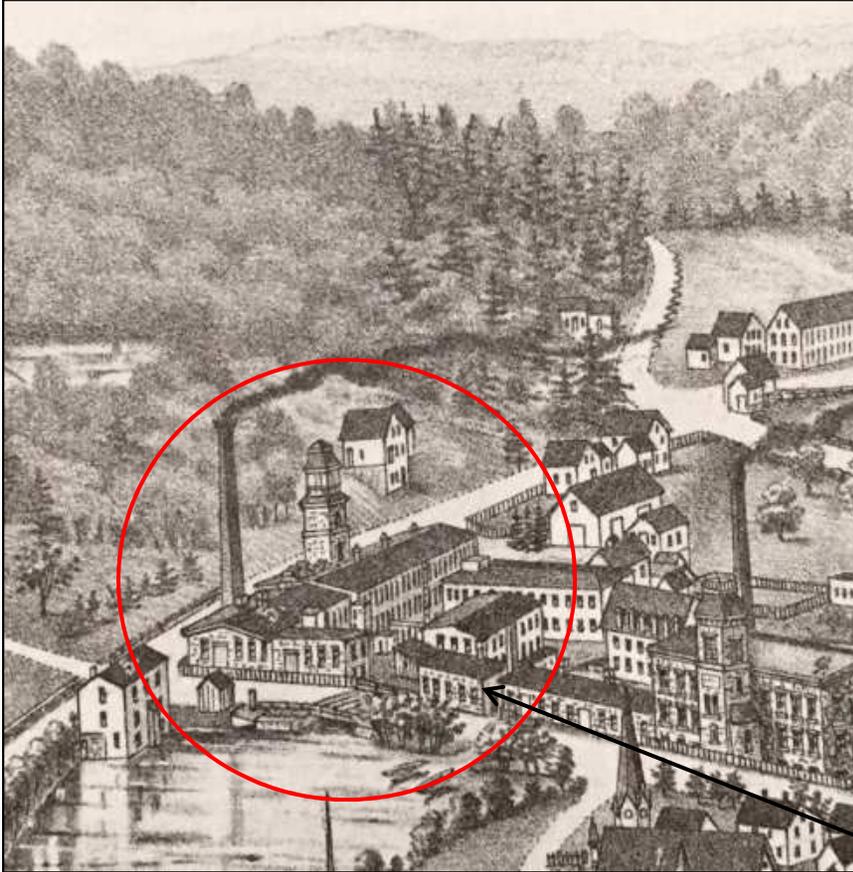
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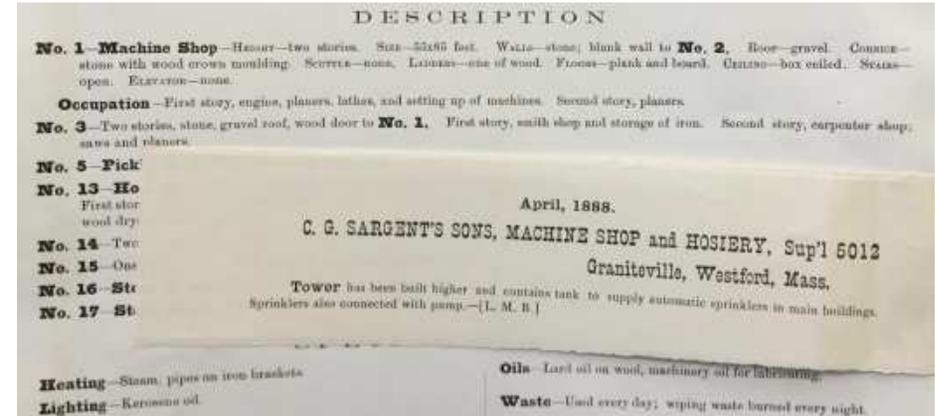
Undated photo (J.V. Fletcher Library collection).



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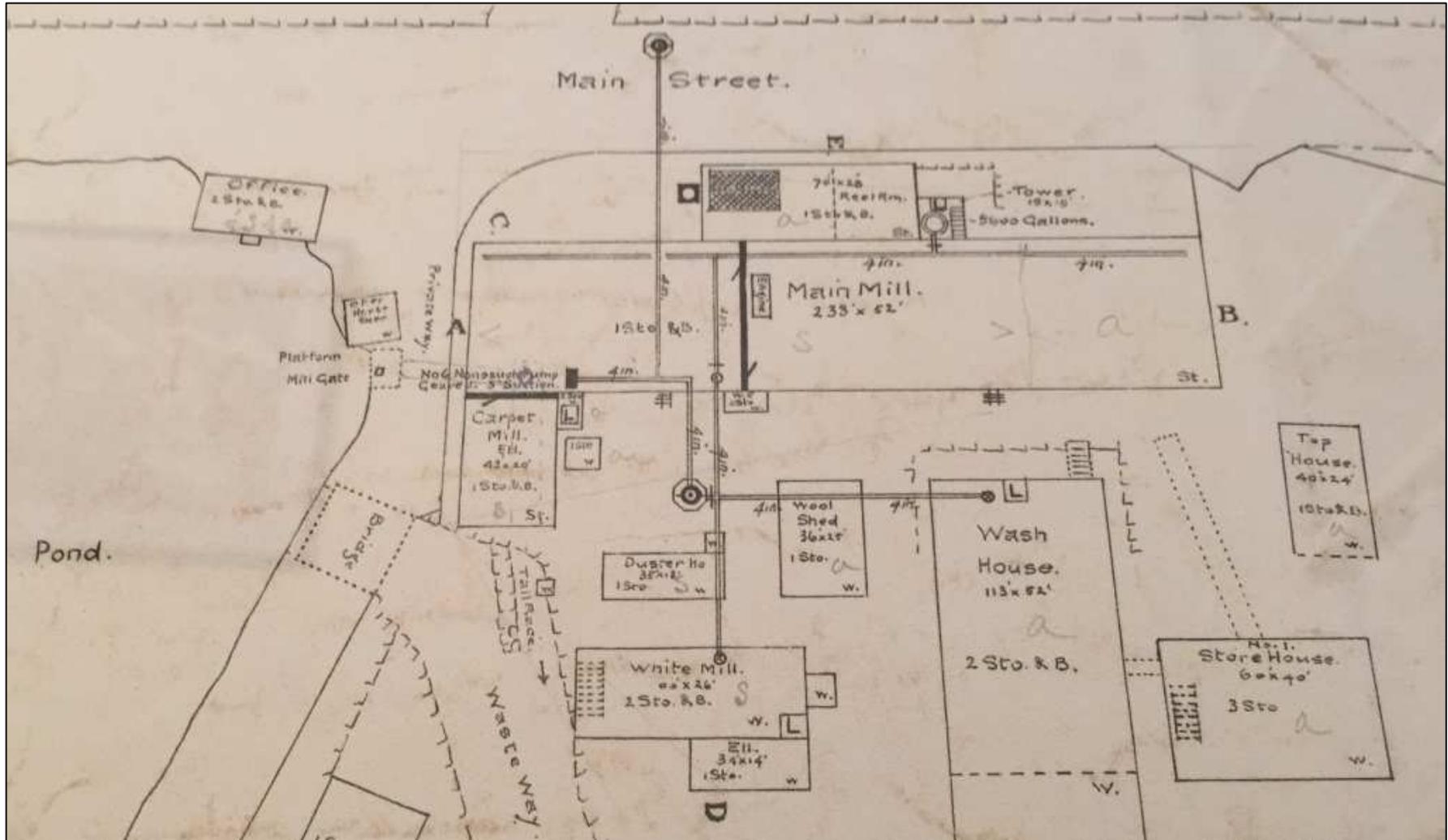
Inset from 1886 L.R. Burleigh bird's eye view of Graniteville; note the apparently exaggerated height of the bell tower. The original, square smokestack is indicated, as are the privy lean-to and what appears to be a stair tower between Mill #1 and the Mill #3 ell.



From C.G. Sargent's Sons Survey No. 5011 "Abbott Worsted Company"; Mill No. 2 was described in a separate Survey #5012. An April, 1888 supplement indicated an increase in tower height in order to accommodate a water tank for an automatic sprinkler system.

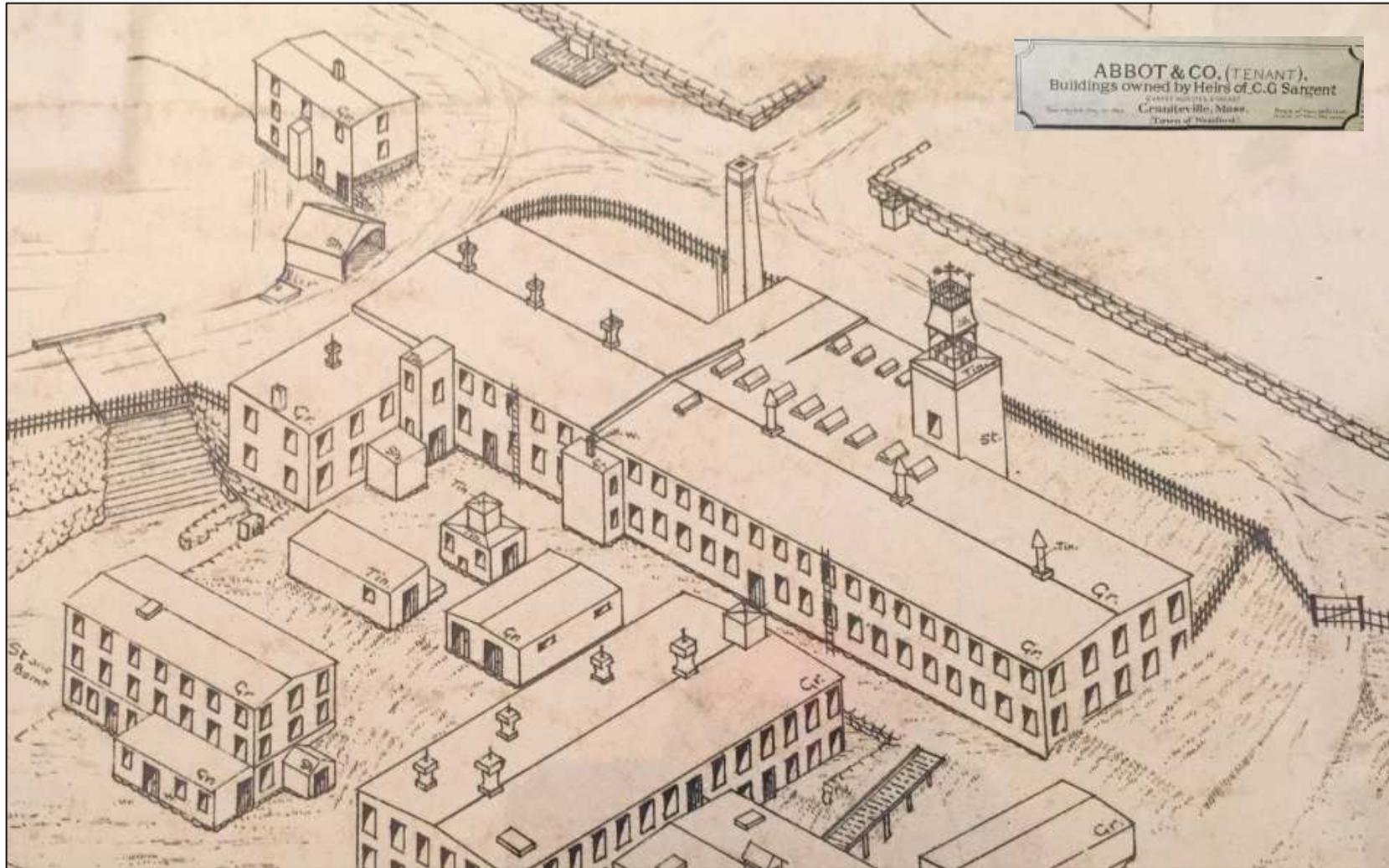
*Note: the northwest addition to C.G. Sargent's Sons building shown here does not yet appear in the photo above that was taken from across the pond.*

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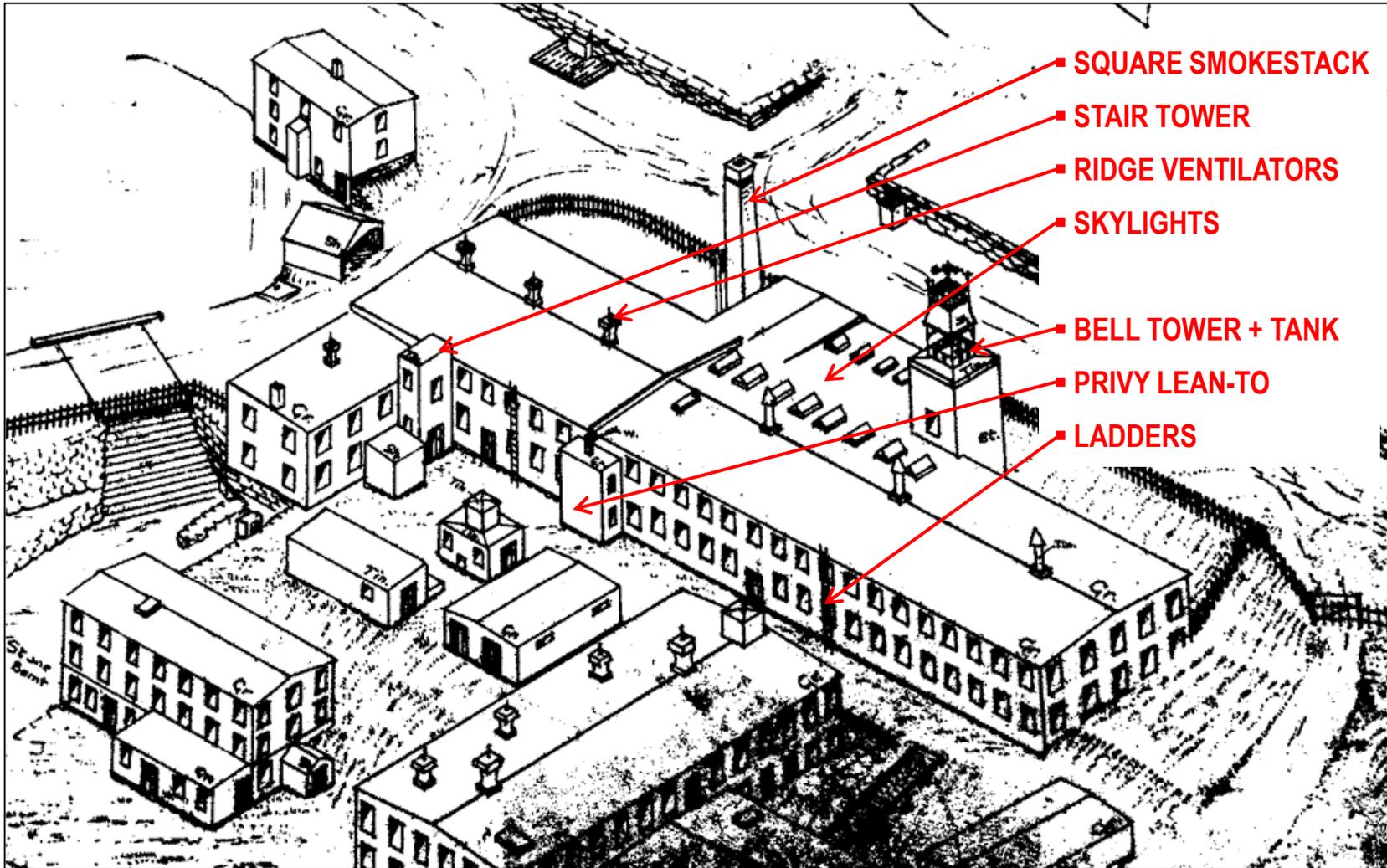
1890 Associated Mutual Insurance Co. map (courtesy ATHM) illustrates **fire suppression system** (hydrants and pipes) and 5,600-gallon **water tank in bell tower**. A stone retaining wall encloses a portion of the tower area.

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1890 Associated Mutual Insurance Co. survey bird's-eye view; the boiler wing and adjacent square-plan chimney are still intact, but have been expanded and joined by the bell tower. Note various features and amenities.

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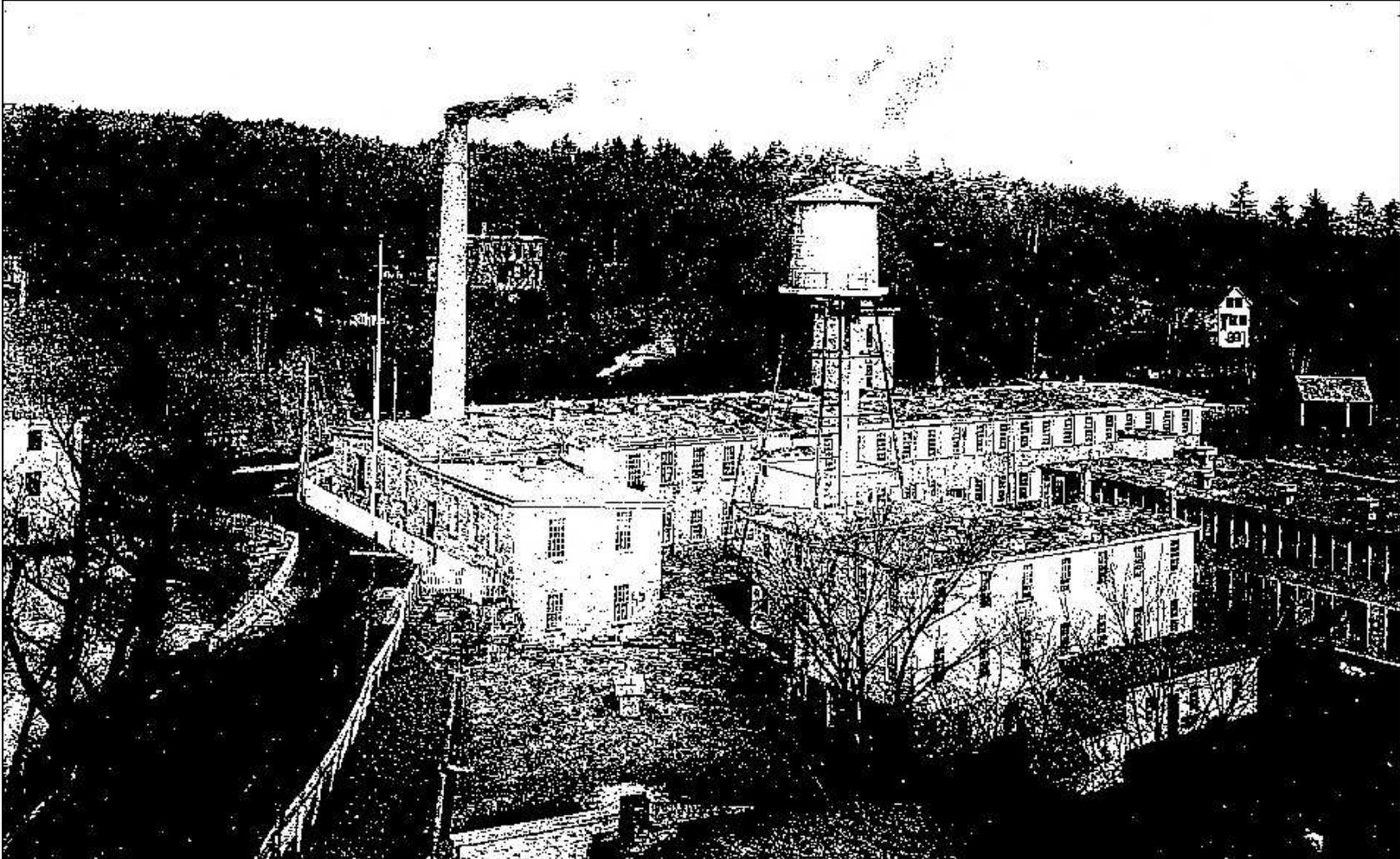
1890 Associated Mutual Insurance Co. survey bird's-eye view; the boiler wing and adjacent square-plan chimney are still intact, but have been expanded and joined by the bell tower . Note various features and amenities.

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In this Quincy W. Day photograph shot in 1900, the square smokestack remains. The roof access and/or fire escape ladders have been removed and the Mill #2 windows have been protected with shutters.. (Source: WHM and HS)

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In this undated photograph, the extant hollow-cored radial brick chimney and a new staved-wood cistern elevated on steel pylons appear.

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According to the Graniteville Historic District nomination form, the extant cylindrical smokestack constructed of radial brick (see brick photo below) was erected ca. 1880, but insurance drawings and Quincy Day photographs show that the original smokestack survived until at least 1900.

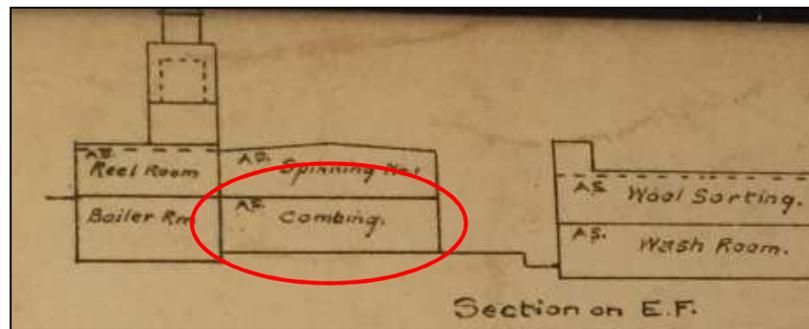
The extant smokestack was probably erected just after the turn of the century.



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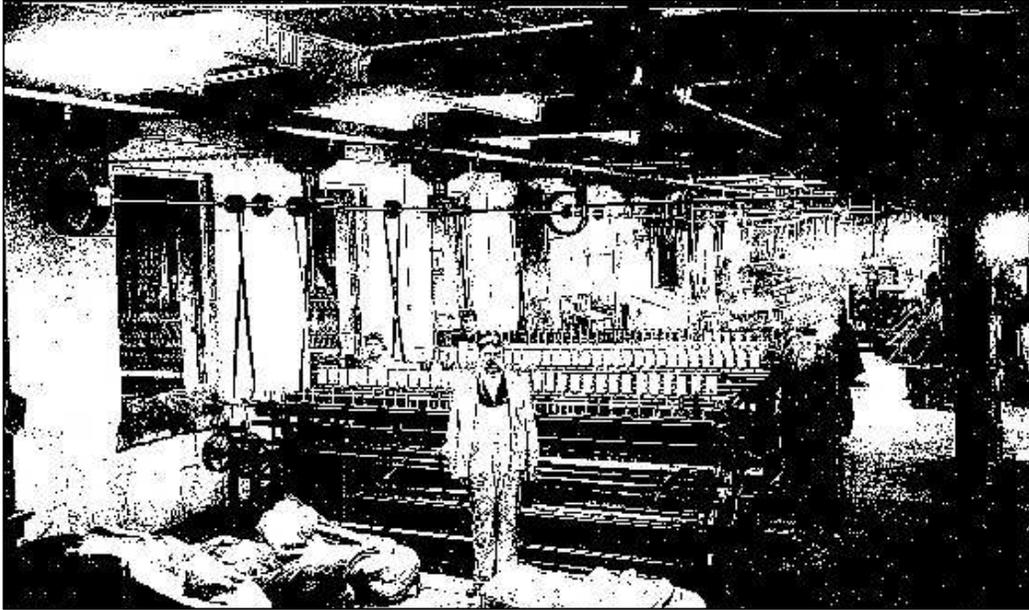


Undated photo of **Wool Combing Room** at Graniteville facility (from J.V. Fletcher Library Collection).



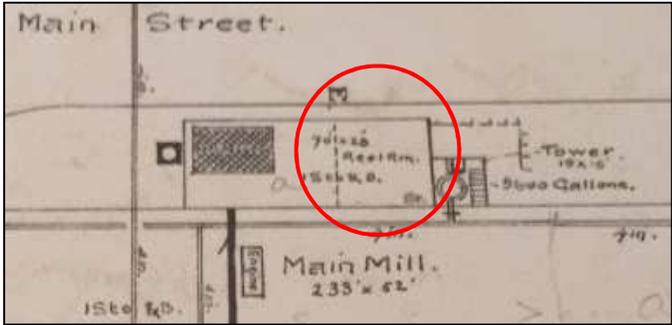
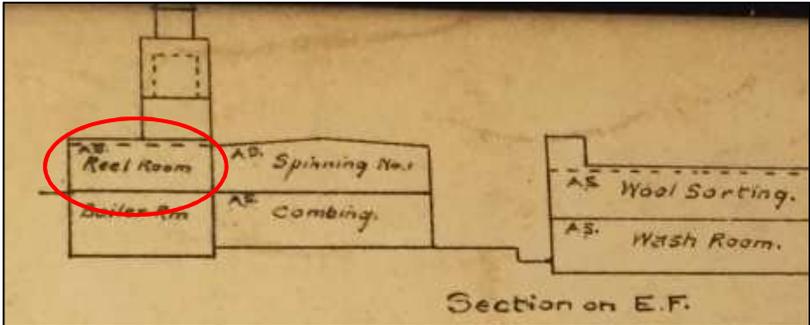
Cross-section from 1890 Associated Mutual Insurance Co. map (courtesy ATHM).

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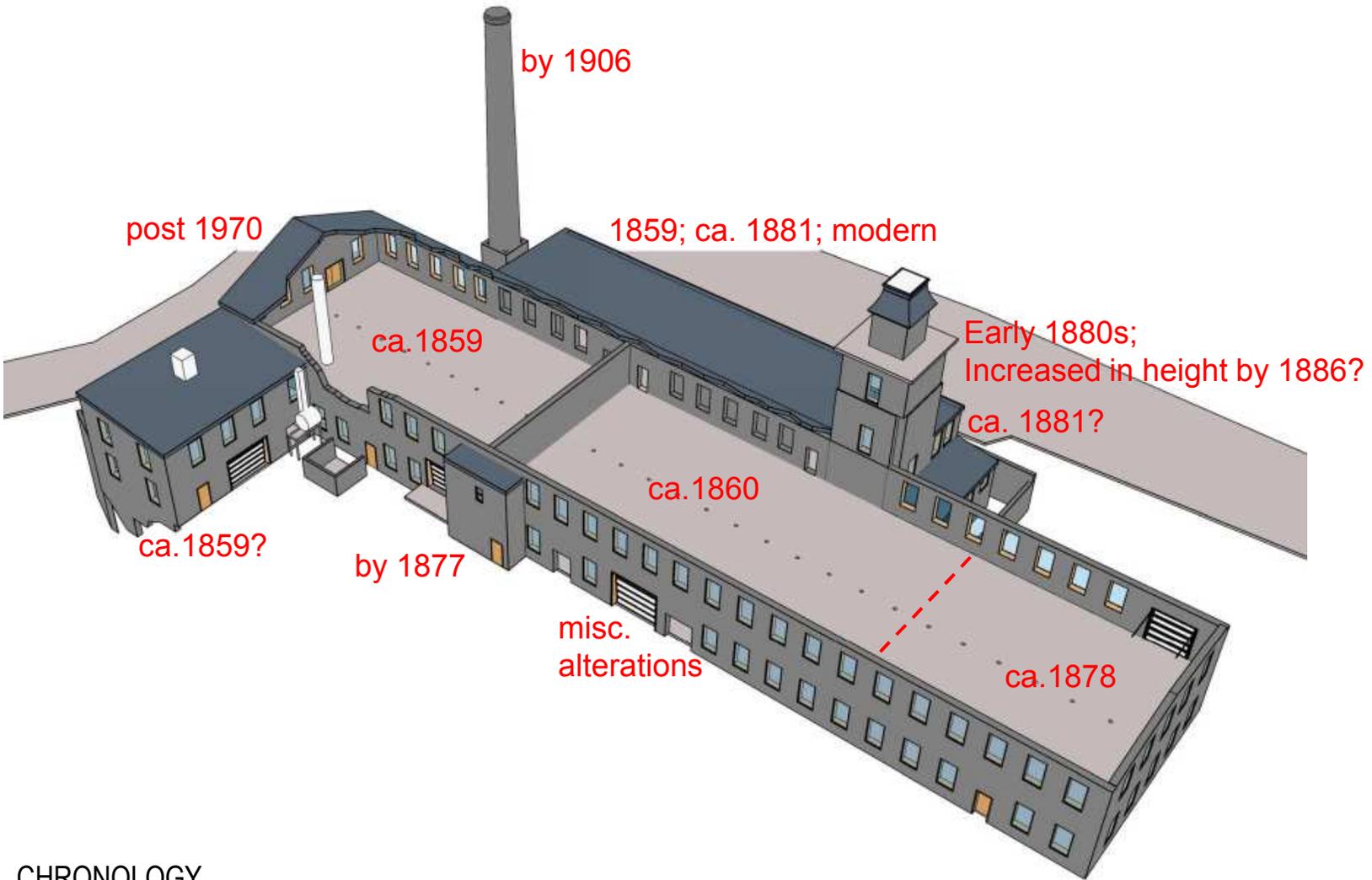
Boarded-over skylight opening.

Undated photo of **Reeling Room** at Graniteville facility (from J.V. Fletcher Library Collection); note **skylights**.



Cross-section and plan from 1890 Associated Mutual Insurance Co. map (courtesy ATHM).

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CHRONOLOGY

❖ AREAS OF CONCERN



Copings and tops of walls now exposed to the weather



Belfry millwork, iron cresting; bell



Rotted timber floor assembly



Stone masonry – outside and inside



Wood, masonry, moisture



Interior plaster exposed to weather

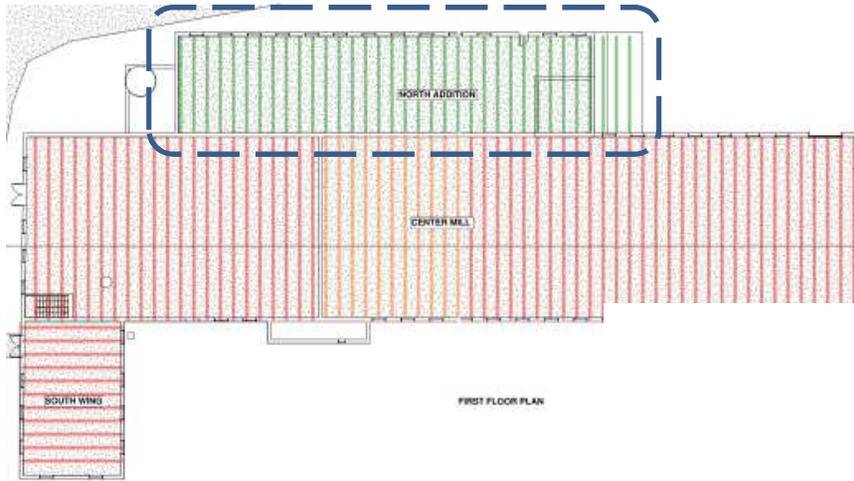
❖ STRUCTURAL ASSESSMENT



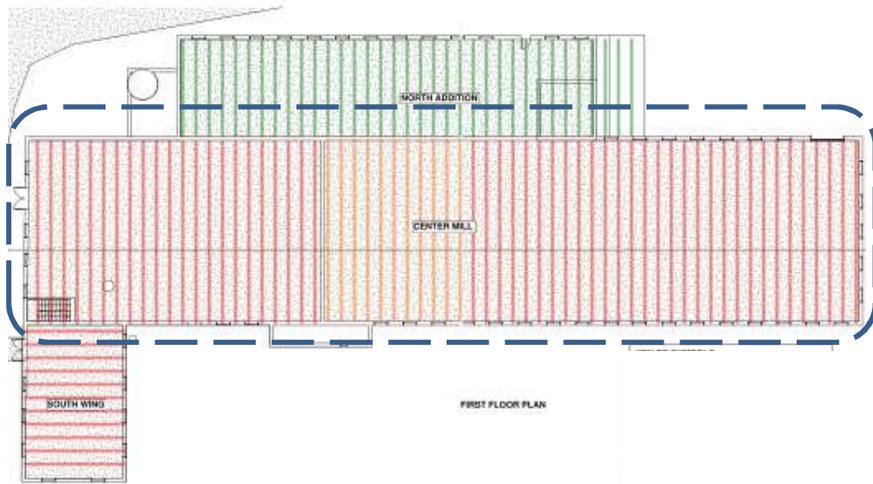
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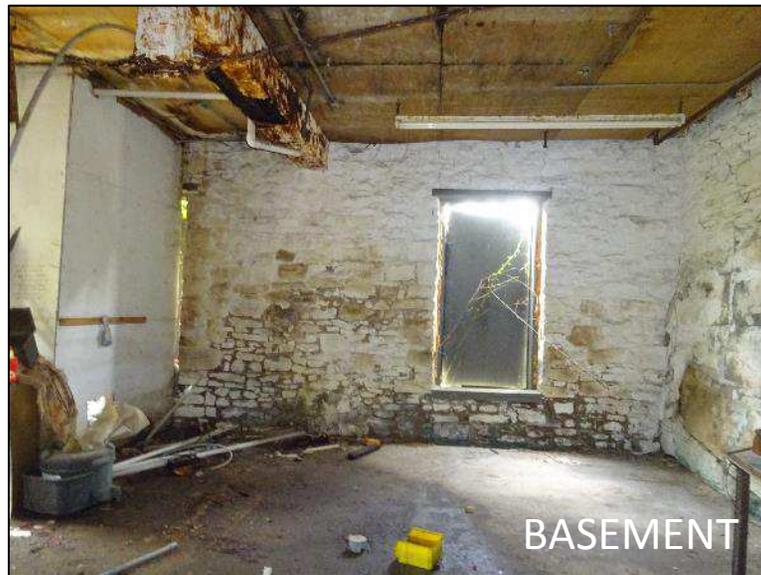
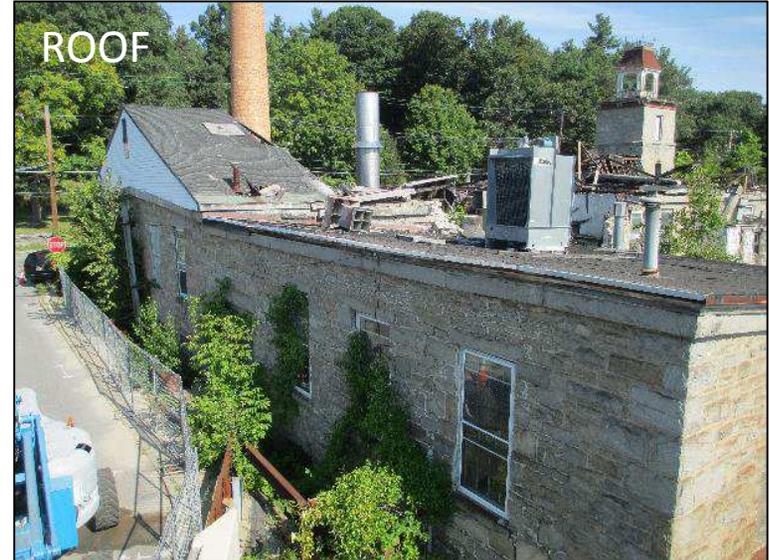
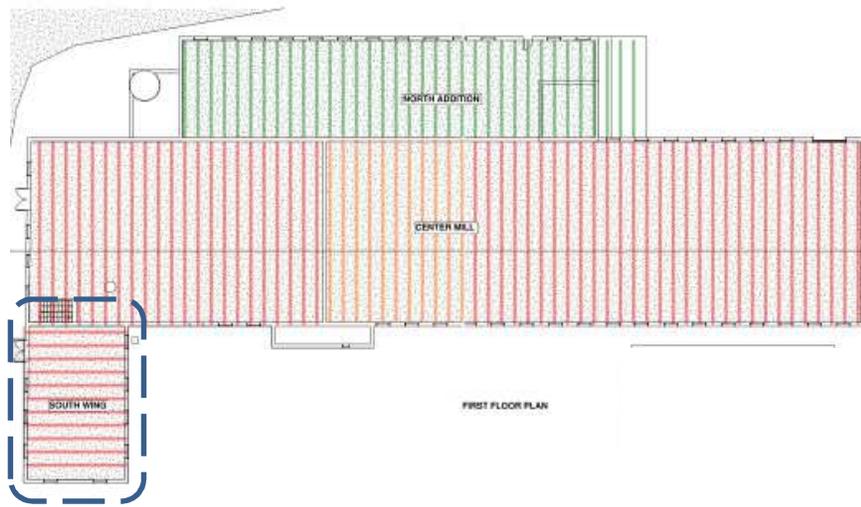
## ❖ STRUCTURAL ASSESSMENT: NORTH WING



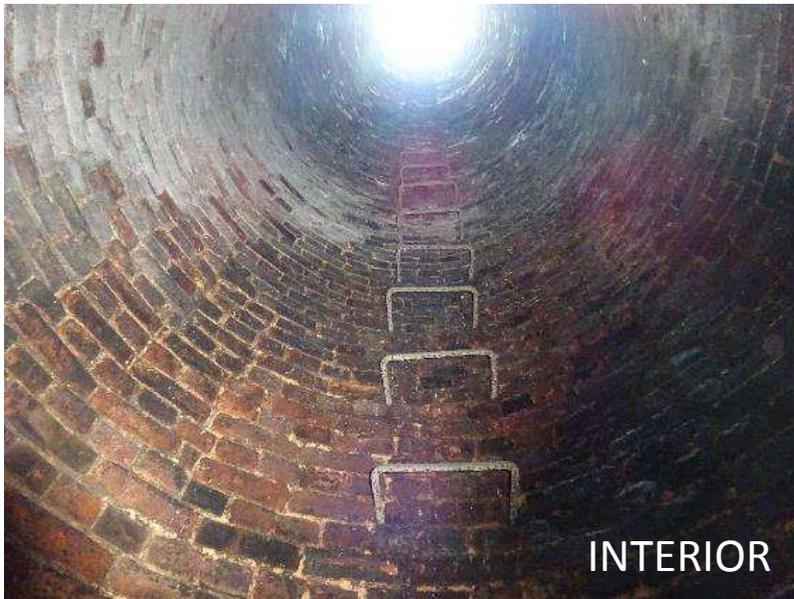
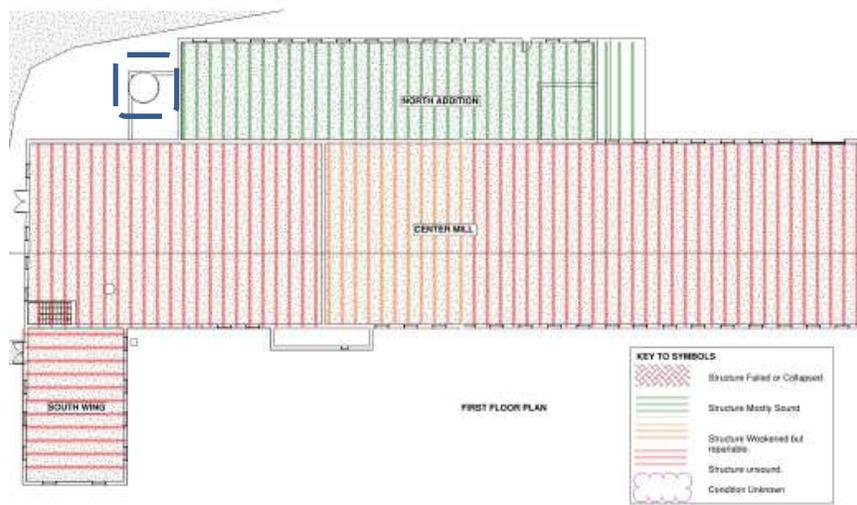
# ❖ STRUCTURAL ASSESSMENT: MILLS #1 & #2

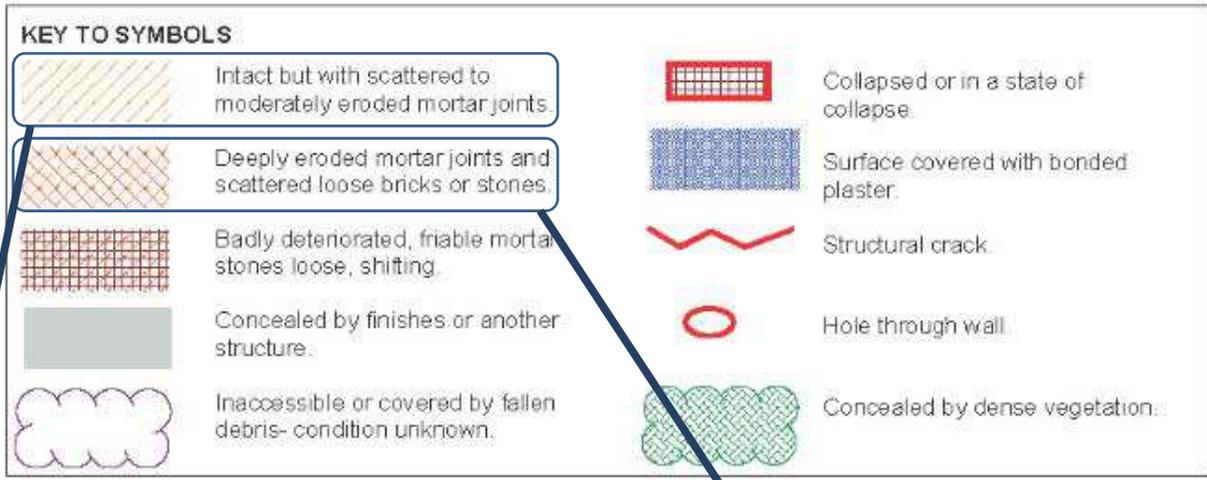


❖ STRUCTURAL ASSESSMENT: #3 (SOUTH ELL)

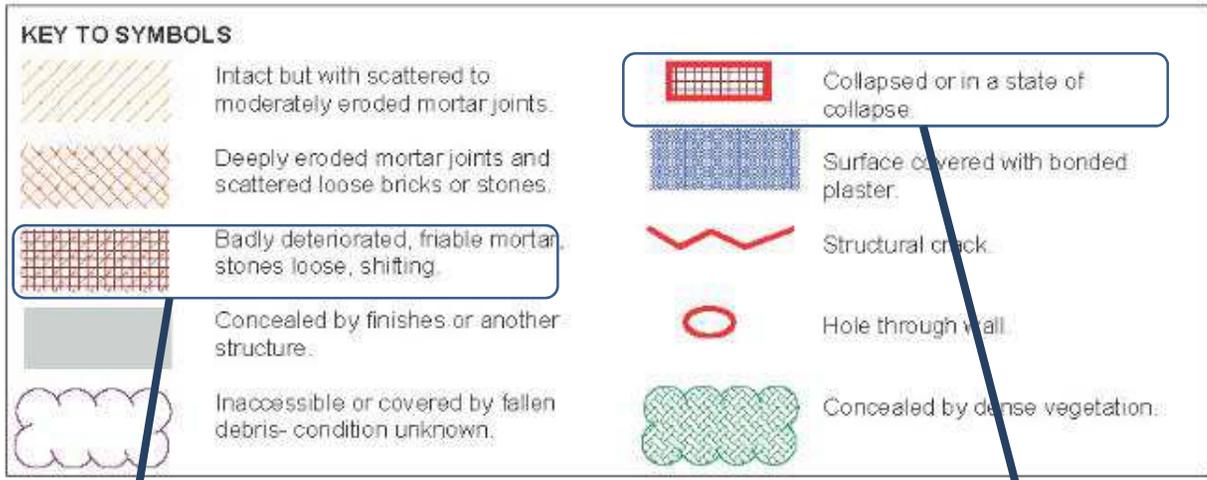


# ❖ STRUCTURAL ASSESSMENT: STACK

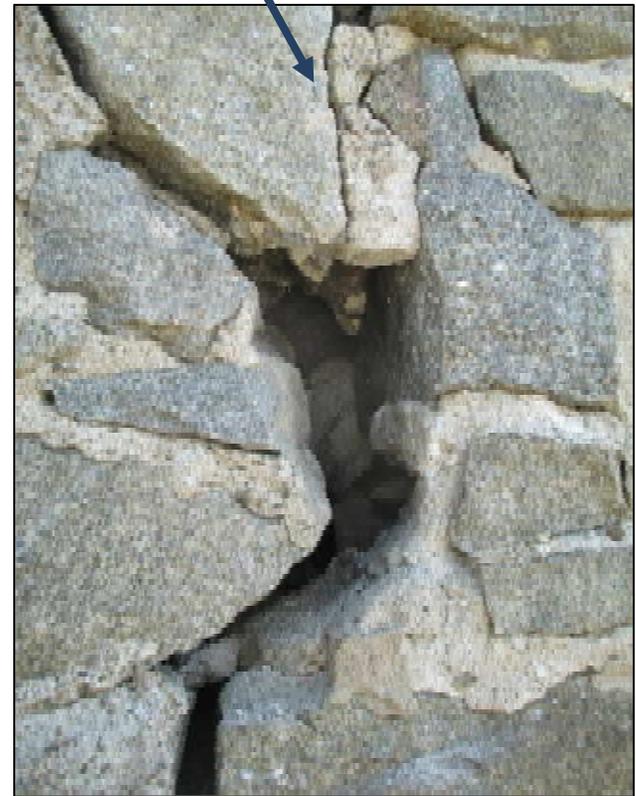
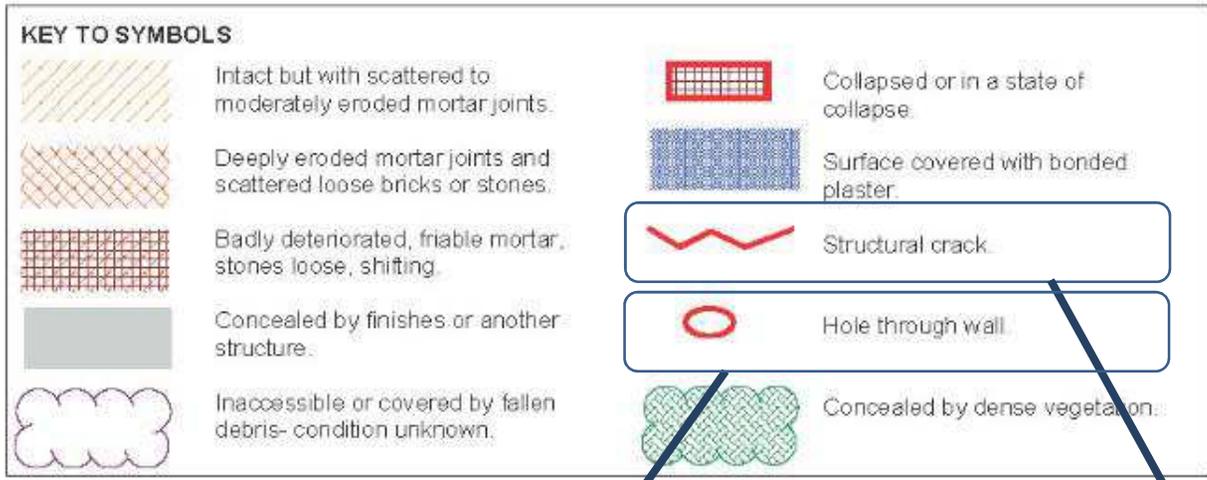




MASONRY CONDITION TYPES

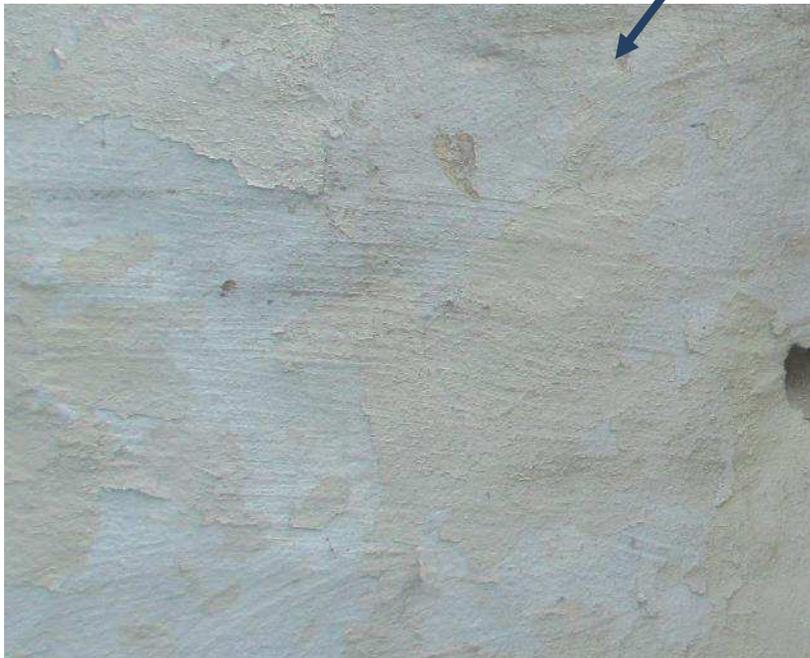
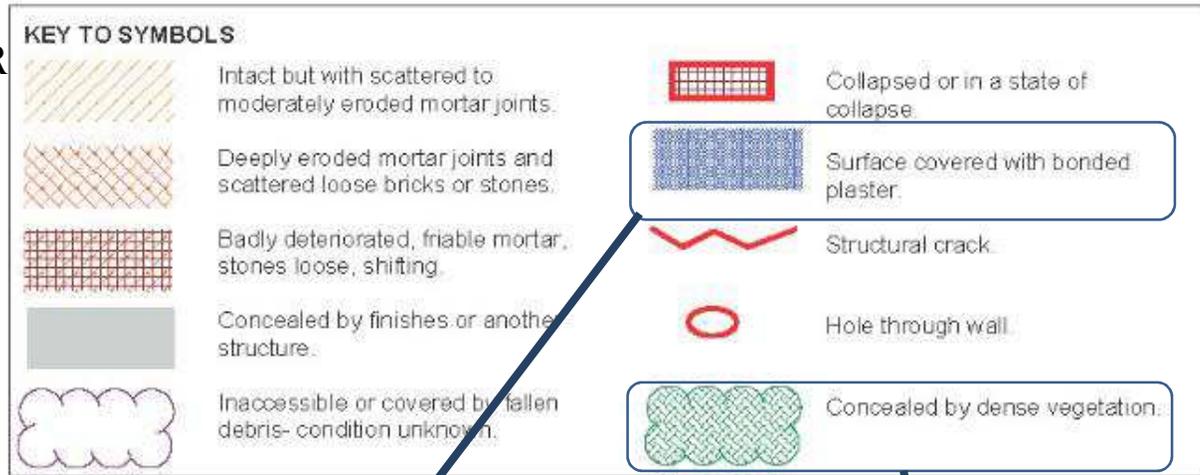


MASONRY CONDITION TYPES



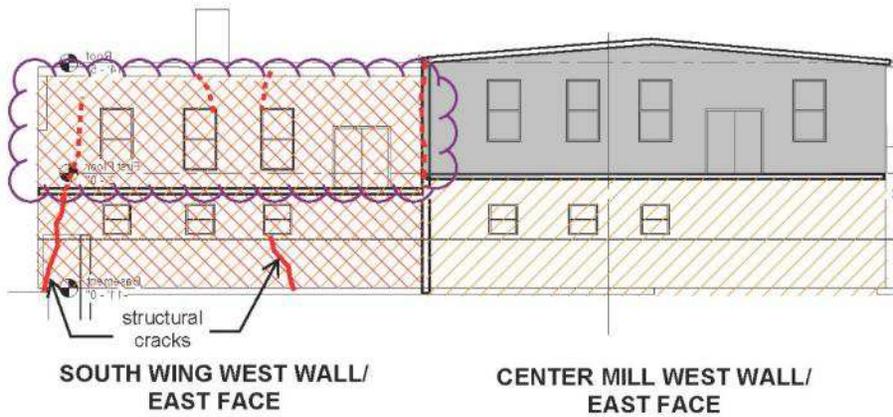
MASONRY CONDITION TYPES

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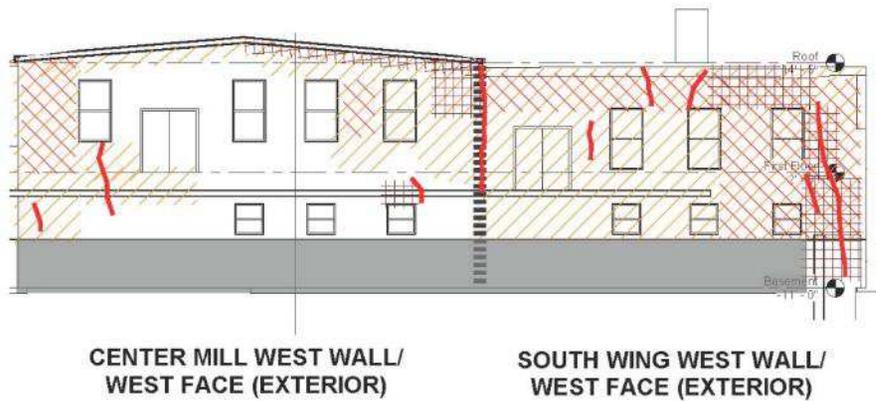


MASONRY CONDITION TYPES

# ❖ STRUCTURAL ASSESSMENT



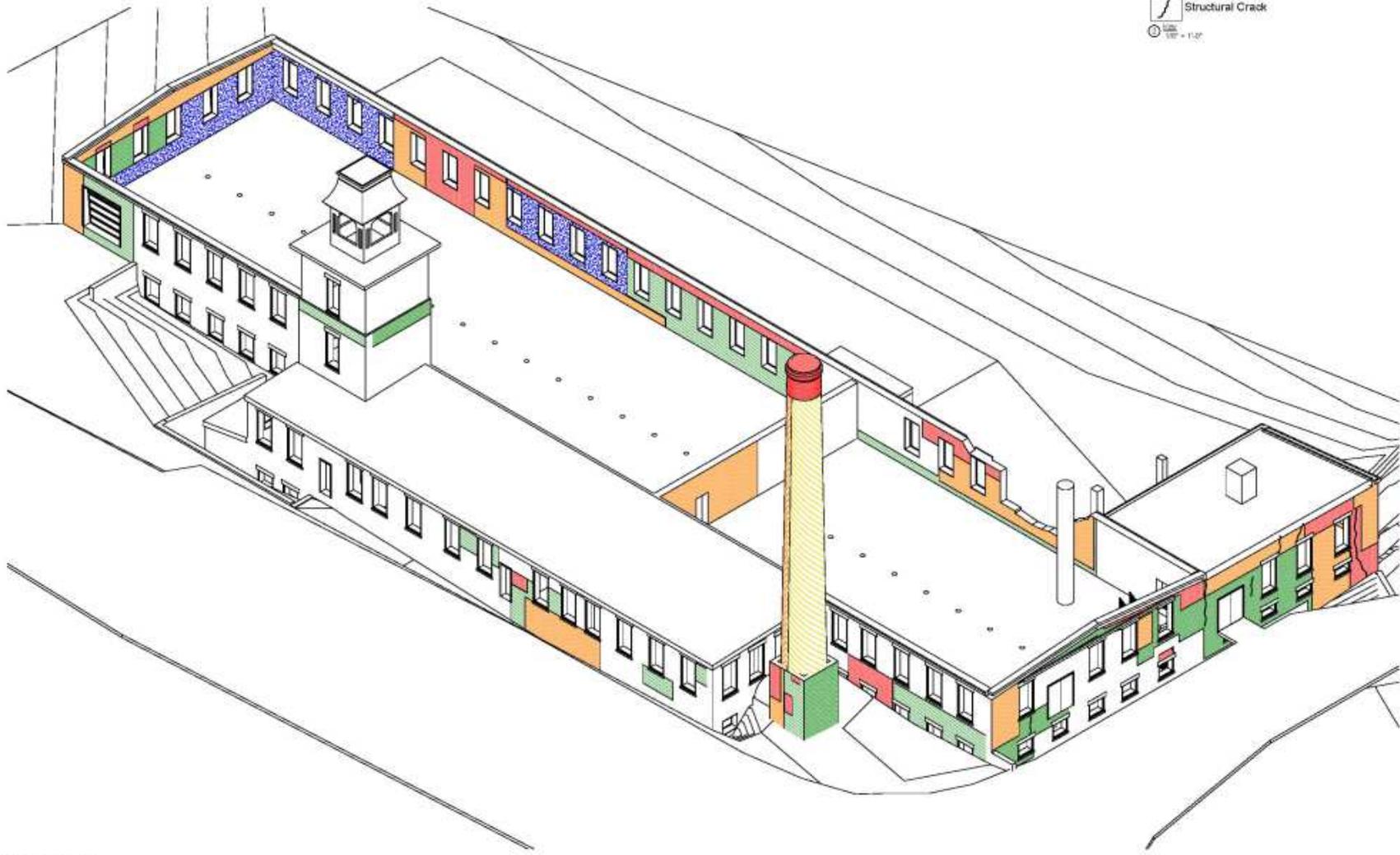
KEY TO SYMBOLS			
	Intact but with scattered to moderately eroded mortar joints.		Collapsed or in a state of collapse.
	Deeply eroded mortar joints and scattered loose bricks or stones.		Surface covered with bonded plaster.
	Badly deteriorated, friable mortar, stones loose, shifting.		Structural crack.
	Concealed by finishes or another structure.		Hole through wall.
	Inaccessible or covered by fallen debris- condition unknown.		Concealed by dense vegetation.



## SURVEY RESULTS

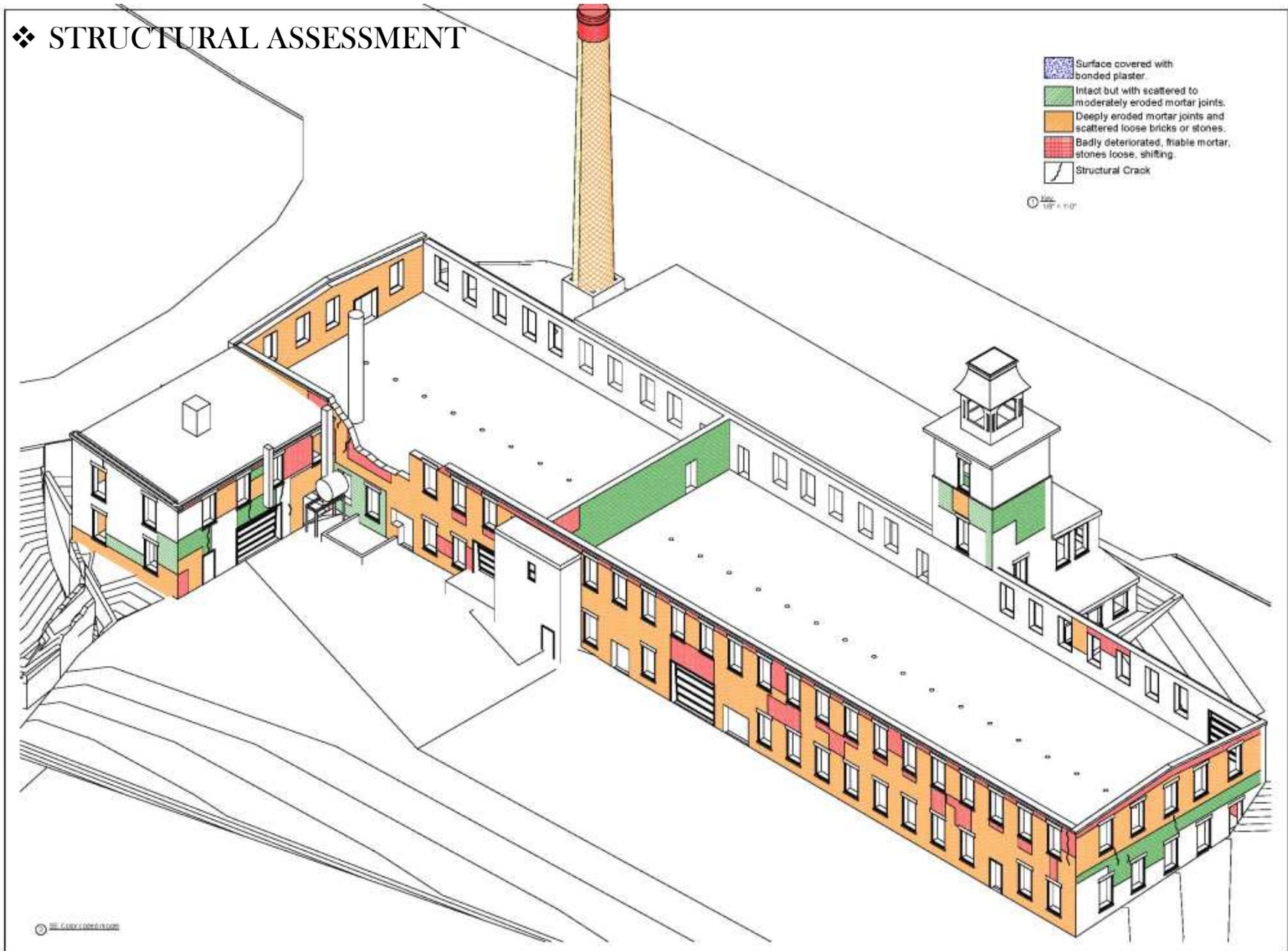
# ❖ STRUCTURAL ASSESSMENT

- Surface covered with bonded plaster.
  - Intact but with scattered to moderately eroded mortar joints.
  - Deeply eroded mortar joints and scattered loose bricks or stones.
  - Badly deteriorated, friable mortar, stones loose, shifting.
  - Structural Crack
- 1/8" = 1'-0"



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# ❖ STRUCTURAL ASSESSMENT



STRUCTURAL CONDITIONS

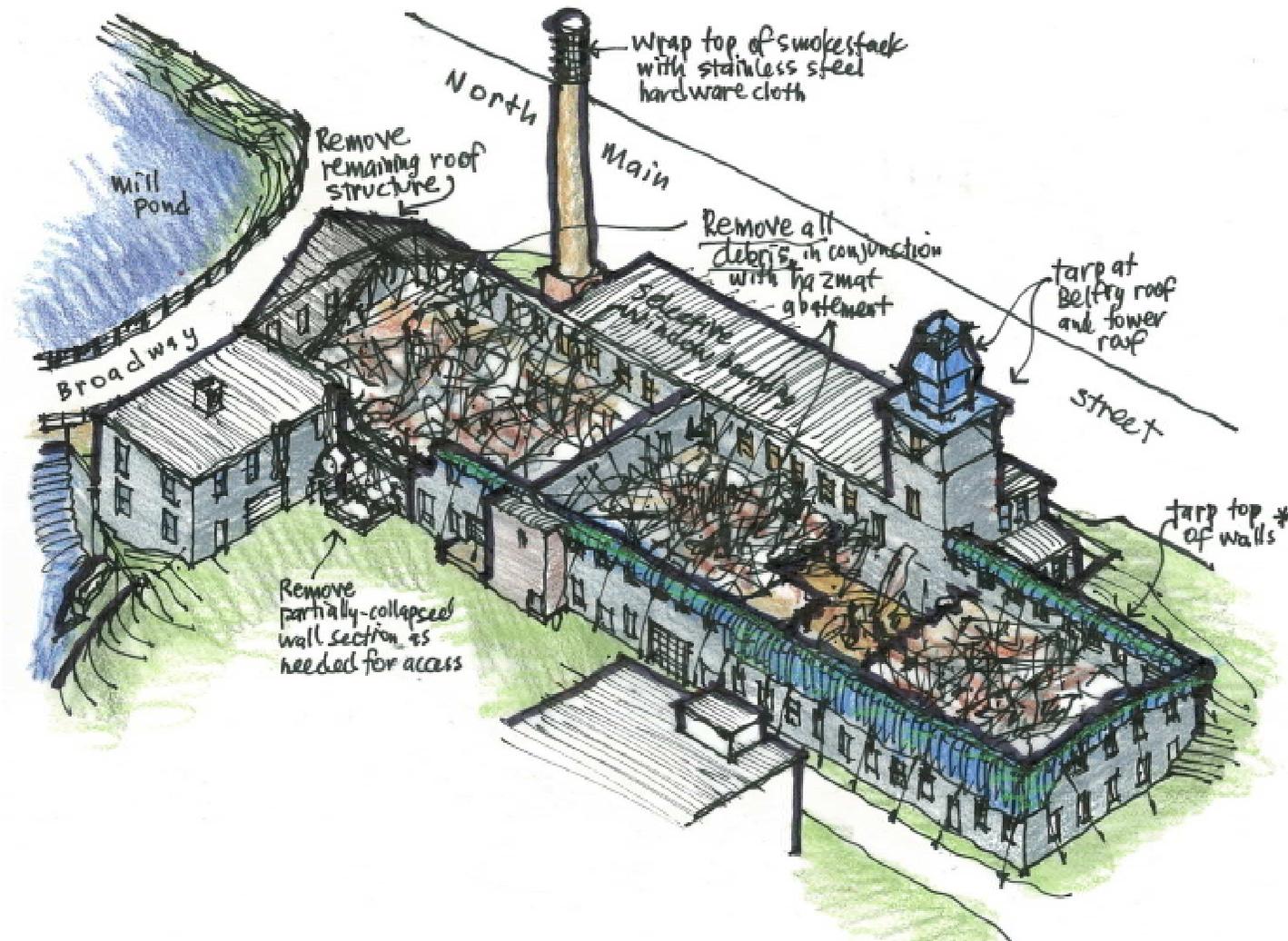
OPTIONS	1	2	3	4
	<b>DEMOLITION + SITE CLEARING</b>	<b>MINIMAL STABILIZATION</b>	<b>PARTIAL DECONSTRUCTION + BASIC STABILIZATION</b>	<b>COMPREHENSIVE STABILIZATION + RESILIENCY UPGRADE</b>
<p><b>Summary of Work:</b></p> 	<p>Demolish and remove entire building complex, including floor slabs, foundations and footings. Demolish smokestack. Fill subterranean pits flush with grade with crushed stone and clean gravel fill.</p>	<p>Provide temporary timber and/or steel shoring and bracing to stabilize extant floor beams and cantilevered masonry wall segments, throughout. Maintain tarps at vulnerable (e.g., upward-facing rubble stone) masonry areas. Deeply cut and point most eroded and loosened masonry to prevent further damage or collapse; inject cracks with hydraulic lime grout; install crack monitor gauges. Provide temporary PVC roof drains as required.</p>	<p>Deconstruct and remove all timber floor framing and decking and designated masonry wall segments at main mill block and other badly-deteriorated areas. Brace and shore existing framing and masonry as required at south ell, bell tower and north wing. Rebuild loosened and/or collapsed masonry; deeply cut and point most eroded mortar joints to prevent further damage while re-setting loose stones; inject cracks with hydraulic lime grout; install crack monitor gauges. Provide metal cap flashing at all vulnerable (e.g., upward-facing) masonry areas.</p>	<p>Deconstruct and remove all timber floor framing and decking and designated masonry wall segments at main mill block and other badly-deteriorated areas. Repair/reset/rebuild deeply eroded stone masonry areas. Rebuild loosened and/or collapsed masonry; deeply cut and point most eroded mortar joints to prevent further damage while re-setting loose stones, conventionally cut and point remaining masonry and inject cracks with hydraulic lime grout. Ered wood- and/or steel-framed canopies to protect exposed masonry; integrate shade shelters, pergolas and/or viewing platforms as applicable.</p>
<b>Estimated Construction Time</b>	2 months	4 months	4 months	6 months

## ❖ PHASE 1 – WINTER 2015-16 “MOTHBALL” STABILIZATION

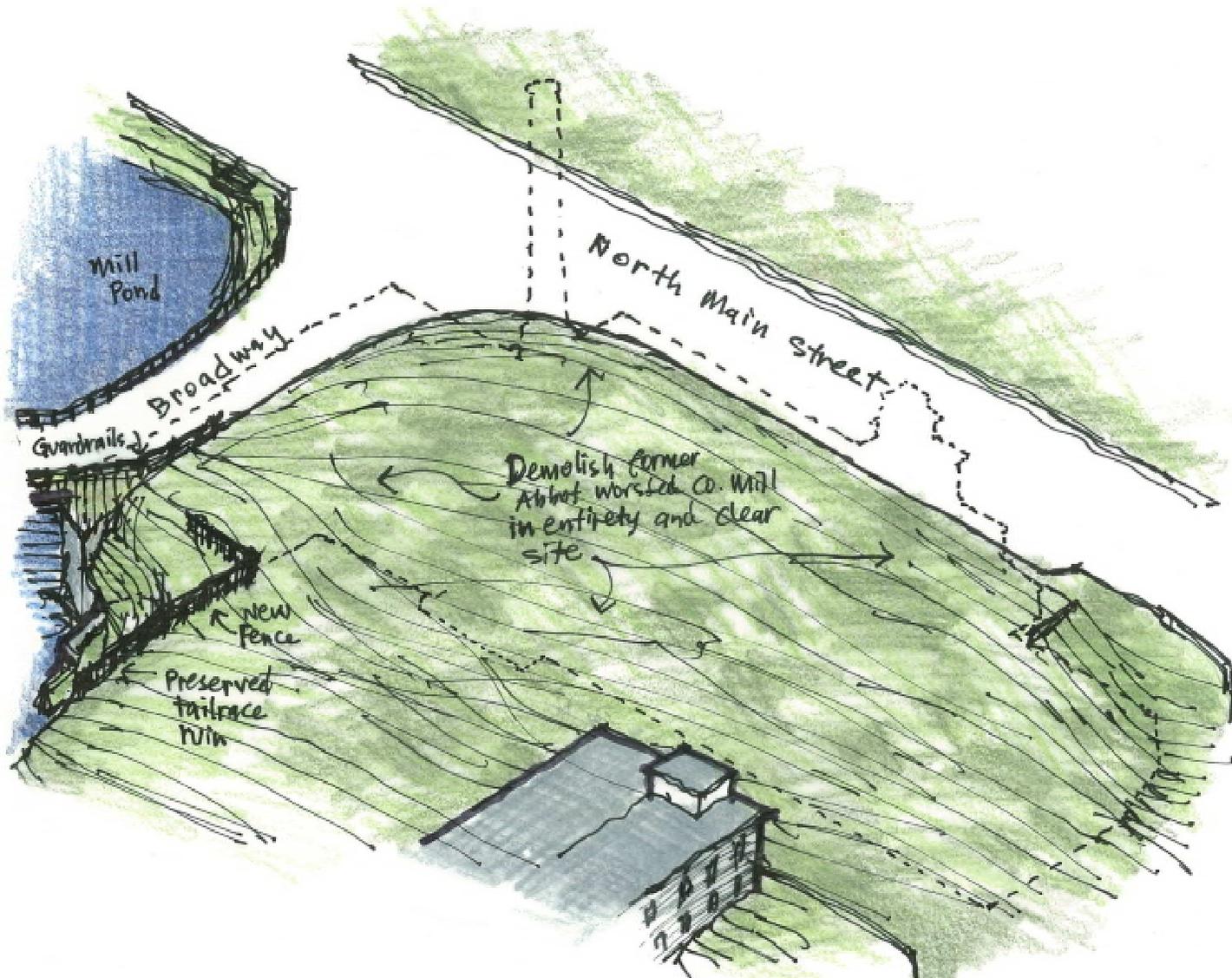
1. DEMOLITION AND SITE CLEARING
2. MINIMAL STABILIZATION
3. PARTIAL DECONSTRUCTION + BASIC STABILIZATION
4. COMPREHENSIVE STABILIZATION + RESILIENCY UPGRADES

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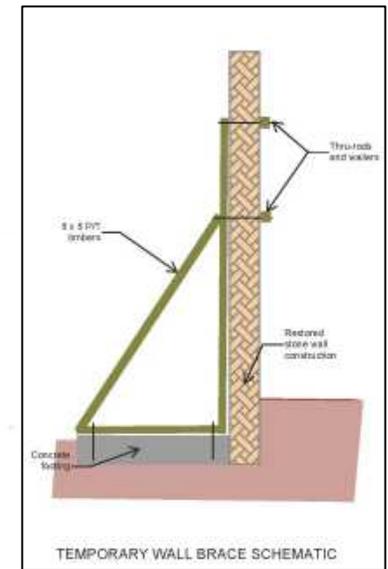
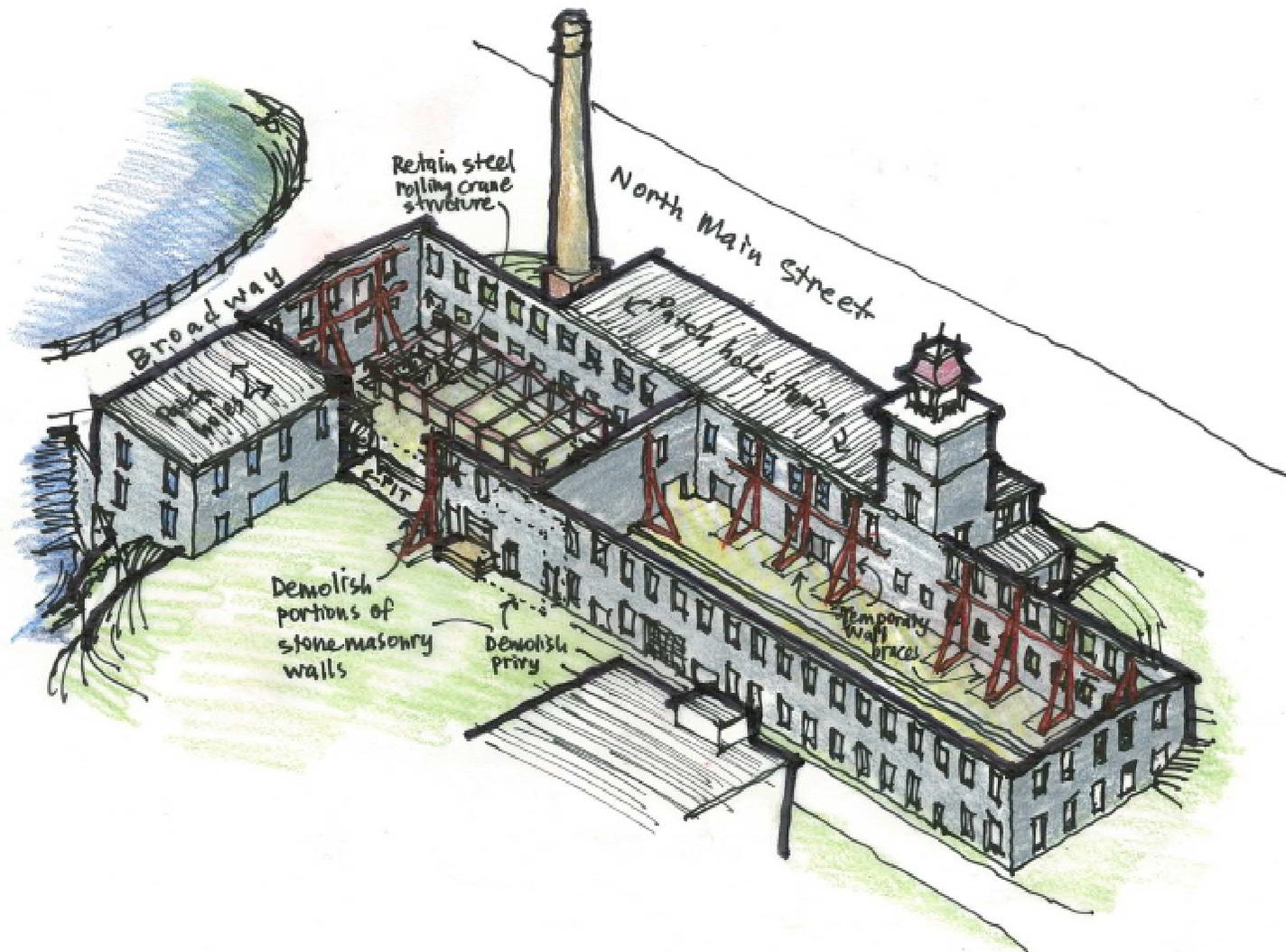
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4. COMPREHENSIVE STABILIZATION + RESILIENCY UPGRADES



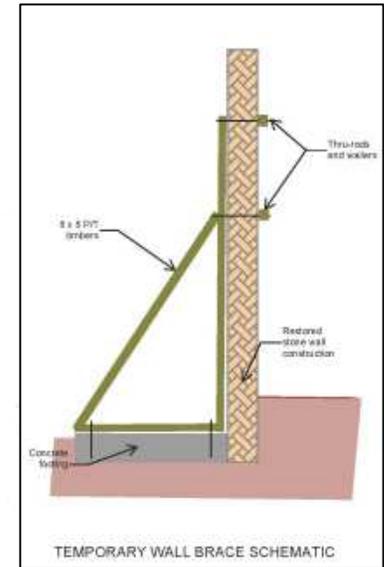
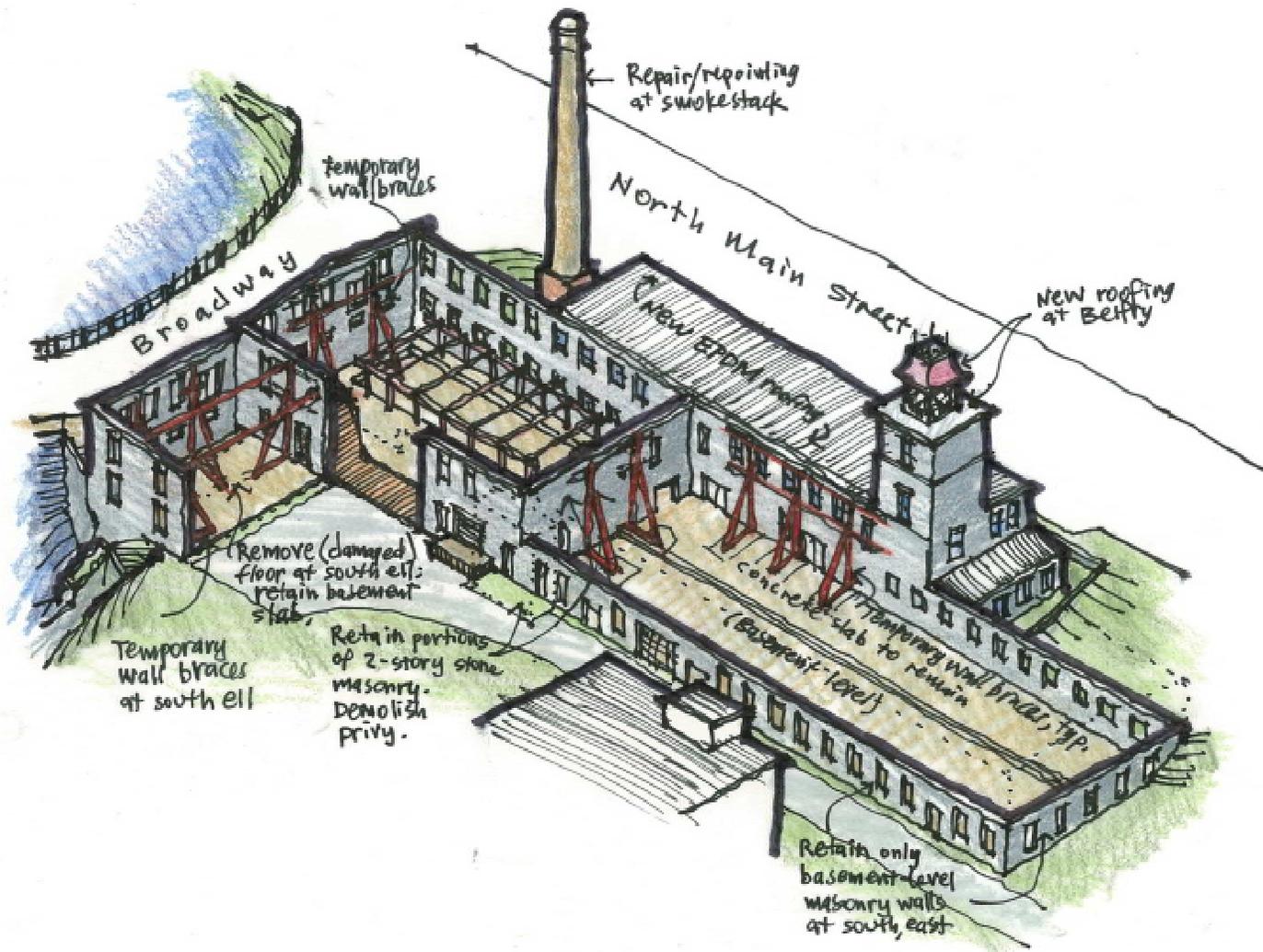
1. DEMOLITION AND SITE CLEARING
2. MINIMAL STABILIZATION
3. PARTIAL DECONSTRUCTION + BASIC STABILIZATION
4. COMPREHENSIVE STABILIZATION + RESILIENCY UPGRADES



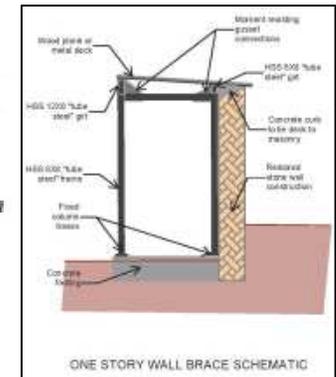
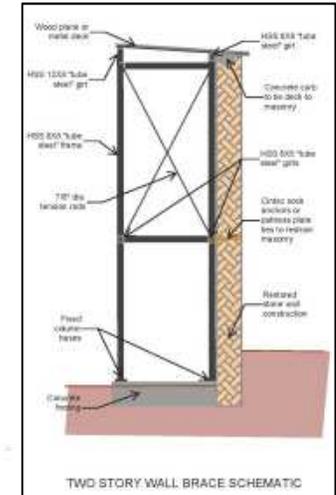
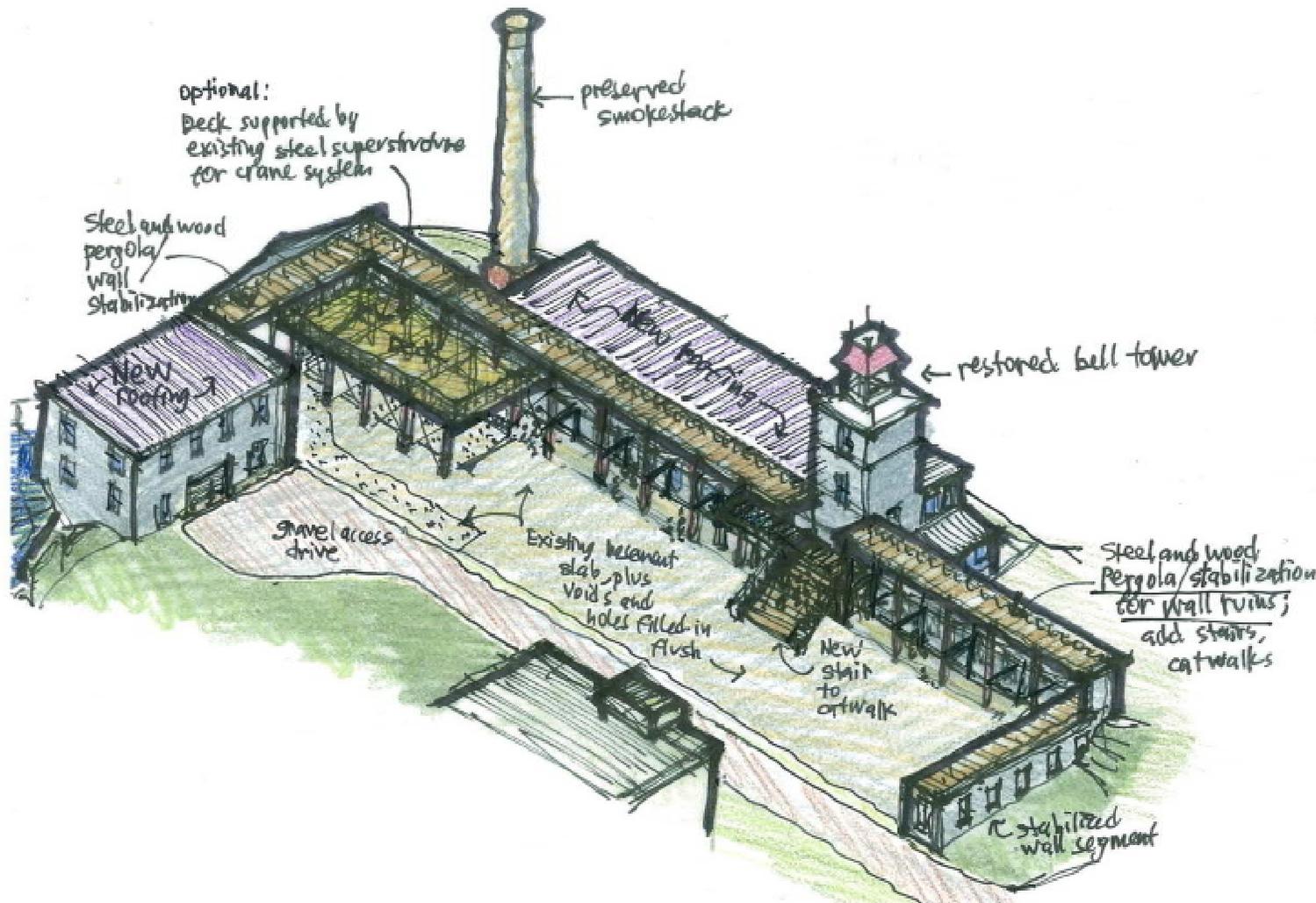
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# Q & A

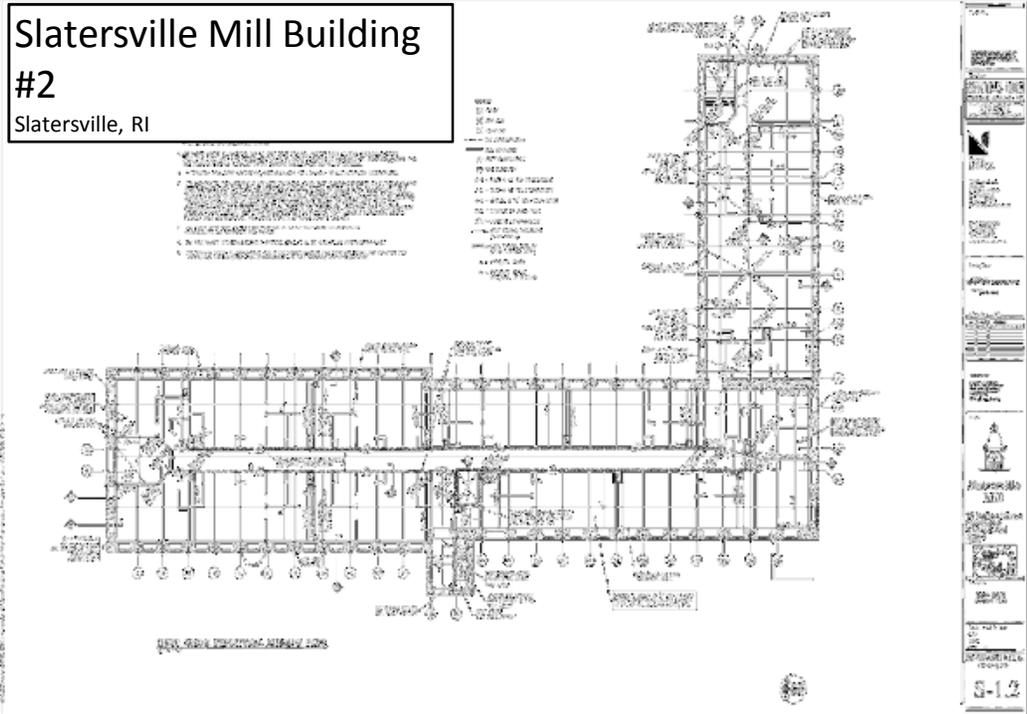
# STABILIZATION AT CHALLENGING SITES



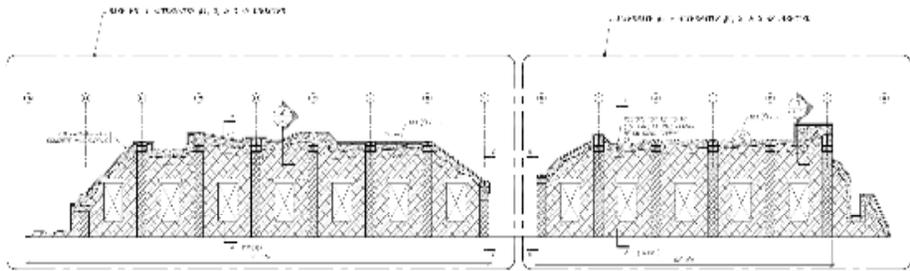
## Slatersville Mill Building

#2

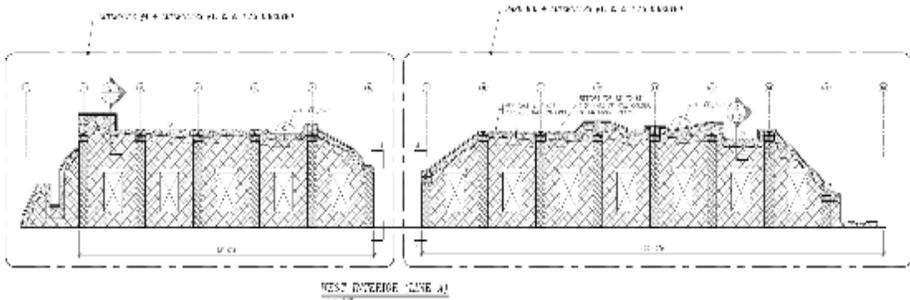
Slatersville, RI



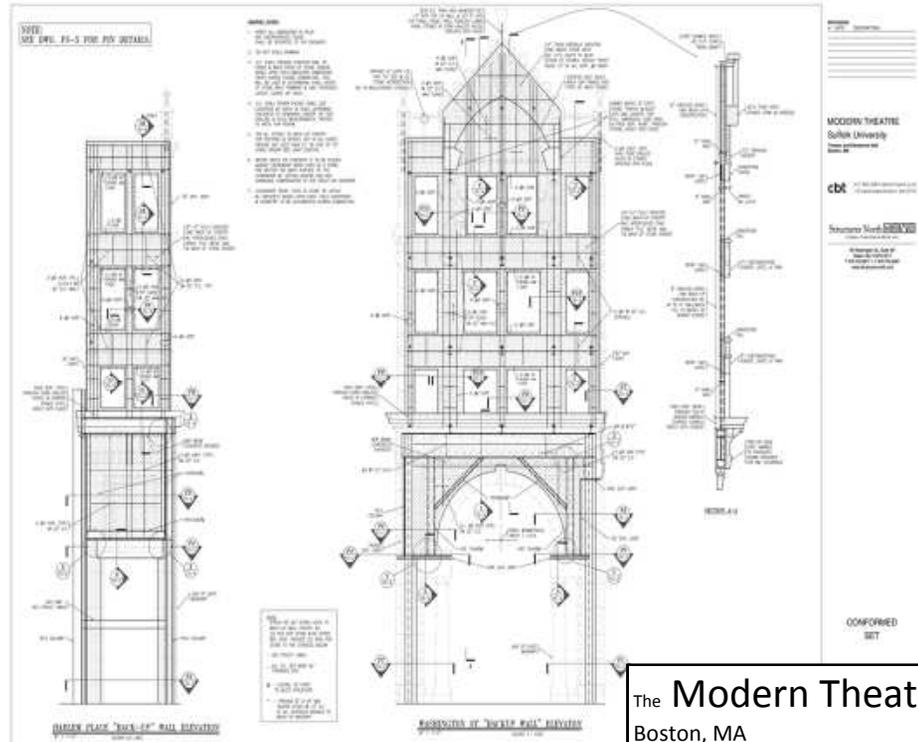
# STABILIZATION AT CHALLENGING SITES



**Lyon's Turning Mill**  
Quincy, MA



# STABILIZATION AT CHALLENGING SITES



The Modern Theater  
Boston, MA

