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ELECTROSONICS BUILDING EVALUATION REPORT

DECEMBER 2023

NHDES
AND THE
TOWN OF CHESTERFIELD
NEW HAMPSHIRE

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EXECUTIVE SUMMARY

Weston & Sampson, on behalf of the New Hampshire Department of Environmental Services (NHDES), the Town of Chesterfield (Town), and the Southwest Region Planning Commission (SWRPC), visited the former Electrosonics Site on October 23, 2023 to conduct a visual structural assessment of the existing building conditions. The following report includes the identified structural deficiencies, preliminary code analysis, and recommendations for next steps. Hazardous building materials investigation was not conducted and is not included in this building evaluation.

The building is in fair to poor condition and there are two options for the Site: renovation or demolition. The existing structural elements should undergo materials testing to understand the extent of their deterioration before renovation is selected. Reuse of the structure will require substantial structural renovation to meet current building code requirements. The following are structural considerations for proposed renovations:

- Demolish first and second floors (slab and wood decking) to be replaced with new systems. Anchor floor (diaphragm) to the existing exterior masonry walls.
- Demolish and replace existing roof decking. Anchor roof (diaphragm) to the existing exterior masonry walls.
- Reinforce or supplement existing floor and roof steel beams to support anticipated loading.
- Add structural steel bracing to resist anticipated lateral loads from wind and seismic.
- Repair and repoint existing masonry. Lintels over openings may need to be repaired or replaced.
- Reinforce existing masonry parapets.
- Provide perimeter foundation drainage system.

While the building can likely be saved structurally, Weston & Sampson recommends that the Town consider impacts from other disciplines including architectural, mechanical, electrical, and plumbing to make a well-rounded decision about renovating the building. Partial or complete demolition of the building may be the more economical solution.

1.0 EXISTING CONDITIONS

The building located at 409-411 NH-9A in Spofford (Chesterfield) was built in the 1920s and utilized as a Ford auto dealership before serving as the Spofford Garage. Scissors were manufactured at the Site prior to its abandonment more than 30 years ago. The building is in fair to poor condition and has approximately a 1720 square foot footprint at the basement level. The two stories above are each approximately 1700 square feet. The structure has not been maintained since its abandonment and the building has been exposed to weather for over at least three decades. Holes have developed in the roof which allowed precipitation to enter the building, contributing to the structural deterioration evident during the site visit.

1.1 Interior Existing Conditions

1.1.1 Basement Level

The basement level has a concrete slab-on-grade floor with concrete and brick masonry foundation walls. The basement slab was covered with several inches of water at the time of evaluation, but visible areas of the slab appeared to be in fair condition. Freeze thaw cycles have caused some deterioration of the concrete and brick masonry walls. Additional investigation, such as concrete cores, would be required to assess the integrity of the walls.

1.1.2 Framing Supporting the First Floor

The first floor (street level) is reinforced concrete floor supported by corrugated metal arches. The metal arches are likely formwork and not required structurally after the concrete has attained required strength. The arches span approximately 5 feet and are supported on partially encased steel beams which are then supported by 20-inch-deep steel beams spanning the full width of the building (34 feet) and spaced at roughly 8 feet on center. This layout is depicted in Figure 1 below.

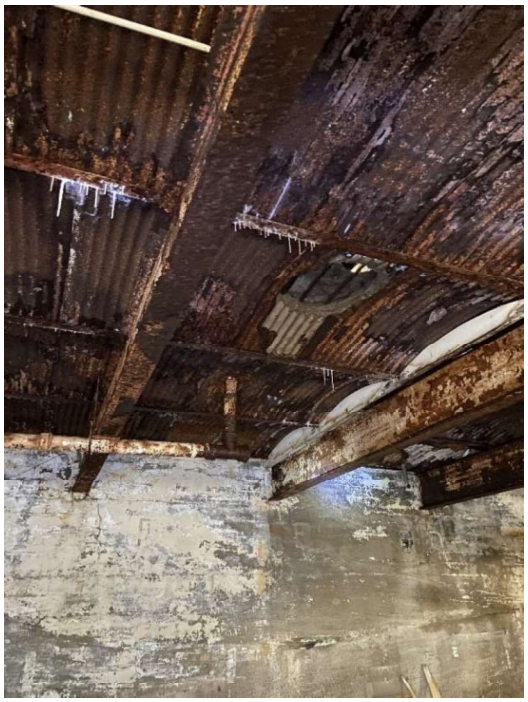


Figure 1 - Steel beams with corrugated metal arches above.

The beams supporting the first floor have a layer of rust with minor section loss. No locations of significant section loss were noted on the main support beams.

At the first-floor level, exposure from the leaking roof, broken windows and a large hole in the second floor has allowed water to corrode the rebar in the approximately 6-inch thick floor slab as evident in Figure 2 below. The moss growth on the first floor indicates consistent exposure to water throughout the building. Corrosion of the rebar in the slab throughout the first floor is assumed.

Figure 2 – Hole in the slab at the first-floor level.

The brick masonry walls on the north end of the first floor have significant moss growth from floor to ceiling.

1.1.3 Framing Supporting the Second Floor

The second-floor framing consists of 3-inch tongue and groove wood plank flooring spanning approximately 8 feet to 15-inch-deep steel beams with a 4-inch-deep wood nailer plate on the top flange. The wooden planks have deflected in areas of high moisture and in some places, have completely caved in. The following figure exhibits the aforementioned issue in the northeast corner of the Site.

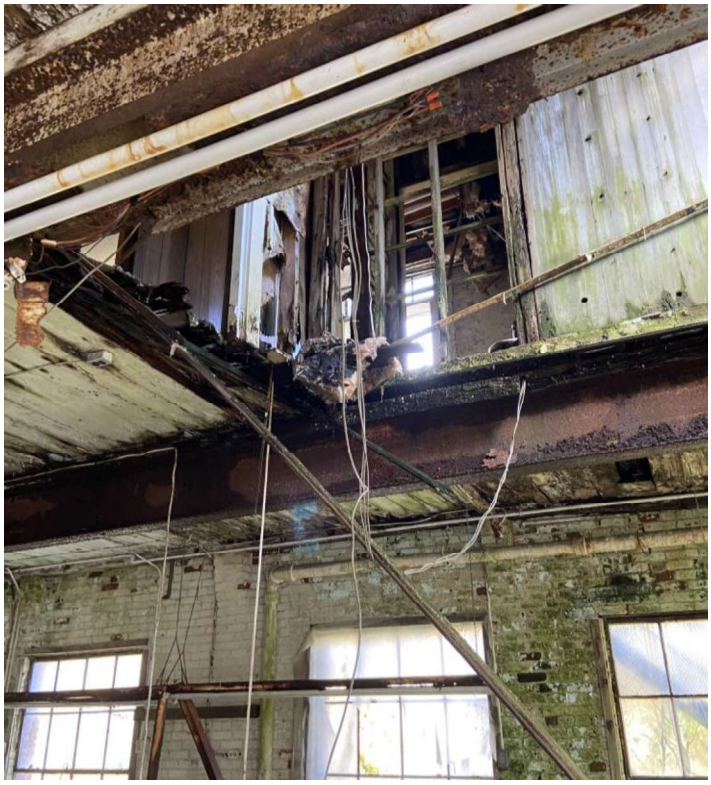


Figure 3 - Floor cave-in between steel beams looking up at the second floor above.

A 4-inch by 6-inch wood beam spans along the perimeter of the building to support the wooden floor planks above. At the rear of the building, the 4-inch by 6-inch beam is supported on brick corbels and is tied into the brick masonry with through-bolts. The front of the building does not have brick corbels. Figure 4 shows the configuration at the back of the building.

Figure 4 - 4" x 6" beam resting on a corbel.

1.1.4 Framing Supporting the Roof

The roof framing appears to be the same layout as the floor below with 15-inch-deep steel beams, a 4-inch wood sill beam on top, and wooden planks above. The figure below shows this configuration and the building's drop ceiling. Weston & Sampson did not access the roof during the structural assessment due to the observed holes and assumed deterioration.

Figure 5 - Roof framing.

The photo below was taken from the top of the stairs leading to the second floor. The hatch was found open to the roof, exposing interior building elements to weather. The flooring below this opening was spongy and likely deteriorated due to prolonged exposure to precipitation and moisture.

Figure 6 - Roof hatch adjacent to the top of stair at second floor.

1.2 Exterior Existing Conditions

1.2.1 Masonry

The masonry walls were measured to be 12 inches thick with 16-inch-thick pilasters. Brick deterioration was observed by visual inspection. Continuous cycles of freeze-thaw have caused brick faces to pop off. The photos below, taken at the northeast corner of the building and west elevation respectively, highlight areas where this was observed.

Figure 7 - Brick deterioration at the NE corner.

Figure 8 - Brick deterioration at the western face.

Mortar loss and efflorescence were observed in multiple areas of the building. The following figure represents one of these instances.

Figure 9 - Mortar loss and brick efflorescence.

A few sections of the building are missing bricks. The northwest corner of the building, shown in the figure below, is missing bricks from the pilasters and around the vent pipe. The chimney shown in the right-most edge of Figure 10, and more clearly shown in Figure 11, is missing bricks from the top of the structure. See Figure 16 for a top view of the chimney deterioration.

Figure 10 - Missing bricks at the NW corner.

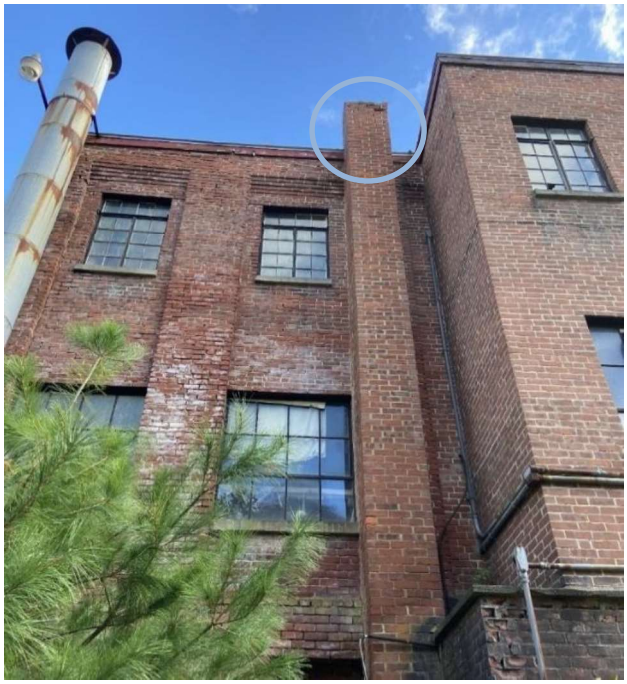


Figure 11 - Bricks missing from the chimney.

At the north side of the building, the exterior masonry wall appears to have been patched with concrete. The brick in this area shows green and brown moss staining associated with moisture trapped by vegetation. Mortar loss is evident in this area, as shown in the following figure.

Figure 12 - Stained bricks and mortar loss at the back of the building.

1.2.2 Retaining Wall

The retaining wall on the western side of the building separating the parking area from the side entrance has visible vertical and longitudinal cracking. The figure below shows a vertical crack where the retaining wall steps down.

Figure 13 - Cracking in the concrete retaining wall.

At the corner where the retaining wall meets the southeastern corner of the building, a chunk of concrete has popped away exposing a steel reinforcing bar beneath. This deficiency is called out in Figure 14.

Figure 14 - Exposed steel reinforcing in the retaining wall.

1.2.3 Roof of the Building

A drone captured images of the roof at the Site. The two primary areas of interest are the northeast and northwest corners at the rear of the building. Review of the photos indicates that water has pooled in these areas and seeped through the roof membrane causing deterioration of the levels below. The hatch noted in Figure 6 is seen from above in the drone photos. Figure 15 shows standing water in the northwestern corner of the building in addition to the hatch and a wooden box, which may have once been the cover to the hatch. The drone photos did not suggest significant roof deterioration at the southern, or street facing, side of the building which is consistent with what the evaluation team observed within the building. The southern side of the building showed minimal evidence of moisture or rot above the basement level.

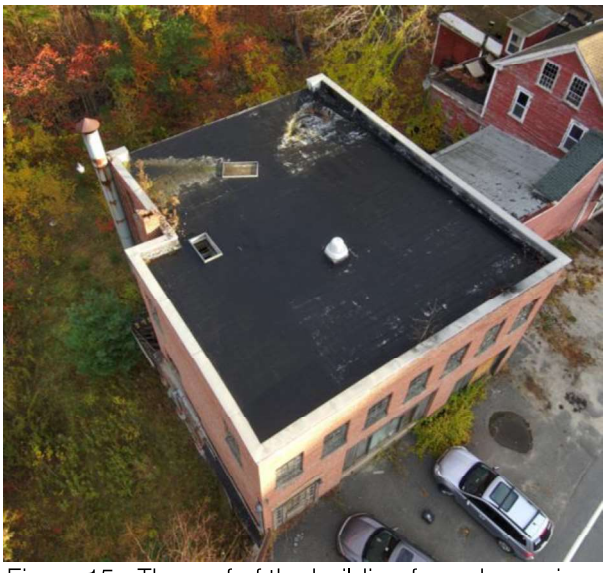


Figure 15 - The roof of the building from drone view.

The figure below shows a closer view of the northwestern corner of the building. The hatch and potential cover are visible, as well as the deteriorated chimney referenced in Figure 11 with bricks scattered behind the parapet wall. The circle of green moss growing in the rightmost corner of the parapet wall suggests that the roof drain is clogged which has led to water pooling on the roof.

Figure 16 - NW corner of the roof.

Figure 17 shows a closer view of the northeastern corner of the roof. Sagging of the roof framing is evident in the photo.

Figure 17 - NE corner of the roof.

2.0 CODE REVIEW

2.1 2018 International Existing Building Code

The design criteria of the existing building from the 1920s is unknown, but the historic use of the building has been indicated to have been either Business – Group B, or Factory and Industrial – Groups F-1 and F-2. Proposed uses of the renovated building may include occupancy Group A-2, food or drink consumption, taverns or bars or Group A-3, group assembly not classified elsewhere in Group A. A change of code occupancy of the building would require the addition of not fewer than one accessible entrance, not fewer than one accessible route from an accessible building entrance to the primary function area and accessible parking where parking is provided. The existing building code indicates that an elevator may be required depending on future use of the building. A registered architect should be consulted to confirm accessibility and egress requirements for any proposed renovations.

Regardless of what the renovated building space will be used for, the alterations likely required to restore the building to a safe usage would trigger IBC Level 3 alterations in which the work area exceeds 50 percent of the building area and be considered a substantial structural renovation. Assumed renovations to determine the Level 3 alterations include: new floor system on the first floor, second floor and new roof and roof framing; reinforcing of the existing first floor, second floor and potentially roof supporting steel beams to increase load carrying capacity. The steel beams supporting the roof framing appeared to be in fair condition, however building code changes since the 1920s have likely increased the design roof snow load. In addition, new roof-top mechanical equipment will likely be part of the renovation.

New lateral force resisting system would be required with a Level 3 alternation. Reinforcement of the existing brick masonry walls may be possible to enable them to act as shear walls, but more likely supplemental steel framing will be required. The existing building code requires the bracing of roof parapets and anchorage of brick walls at the roof line for buildings.

Fire alarm and detection systems meeting new construction building code requirements would be required. Mechanical systems will need to be upgraded. Registered design professionals should be consulted to determine requirements for the proposed renovations.

3.0 RECOMMENDATIONS

3.1 Renovation Option

Based on the condition of the existing building, reuse will require substantial structural renovation. In general, the structure will need to be repaired and reinforced to meet current building code requirements. The following are structural considerations for proposed renovations:

- Demolish first and second floors (slab and wood decking) to be replaced with new systems. New floor system may be concrete on metal deck. Anchor floor (diaphragm) to the existing exterior masonry walls.
- Demolish existing roof decking. Replace with metal deck system. Anchor roof (diaphragm) to the existing exterior masonry walls.
- Reinforcing or supplement existing floor and roof beams to support anticipated loading.
- Add structural steel bracing to resist anticipated lateral loads from wind and seismic. Bracing would likely consist of X configured steel framing from basement to roof. New foundations would be required for bracing.
- Repair and repoint existing masonry. Lintels over openings may need to be repaired or replaced.
- Reinforce existing masonry parapets.
- Provide perimeter foundation drainage system.

Weston & Sampson recommends conducting materials testing to understand the condition and level of deterioration of the structural elements. Cores can be taken from the masonry and the concrete walls in the basement to determine the compressive strength of the concrete.

While the analysis of the structural elements is important to determine if the building can be reused, Weston & Sampson recommends that the town investigates the economic impact of other disciplines involved in renovation. For example, to upgrade the existing structure to meet current accessibility requirements may have a significant impact on renovation costs, but this does not fall under the structural scope. Compliance with energy codes will also impact costs.

Please consider the following order of magnitude opinions of probable cost for structural renovation: $914,000. Costs exclude hazardous material mitigation.

3.2 Demolition Option

Partial or complete demolition of the building may be the more economical solution. Please consider the follow order of magnitude opinions of probable cost for structural demolition: $288,000. Costs exclude hazardous material mitigation.

A hazardous building material survey was performed in January 2013 by others. The survey identified asbestos-containing material (ACM), lead-based paint (LBP), and polychlorinated biphenyls (PCBs) inside the building. Building demolition will require abating the ACM and properly managing debris with LBP and PCBs. While additional testing is recommended to fully assess the scope and cost of the

required hazardous materials mitigation, based on the initial survey results, we estimate an order of magnitude probable cost for abatement/mitigation of $75,000. This assumes conventional methods can be utilized for the ACM abatement and the occurrence of PCBs will not be subject to the EPA's PCB cleanup requirements under the Toxic Substances Control Act (TSCA). The mitigation cost excludes handling contaminated soil or groundwater during demolition work.

APPENDIX A

Detailed Opinion of Probable Cost

PROJECT: Electrosonics Building Evalutation DATE: Nov. 2023

Demo. & Reno. Order of Magnitude Opinion of Probable Cost

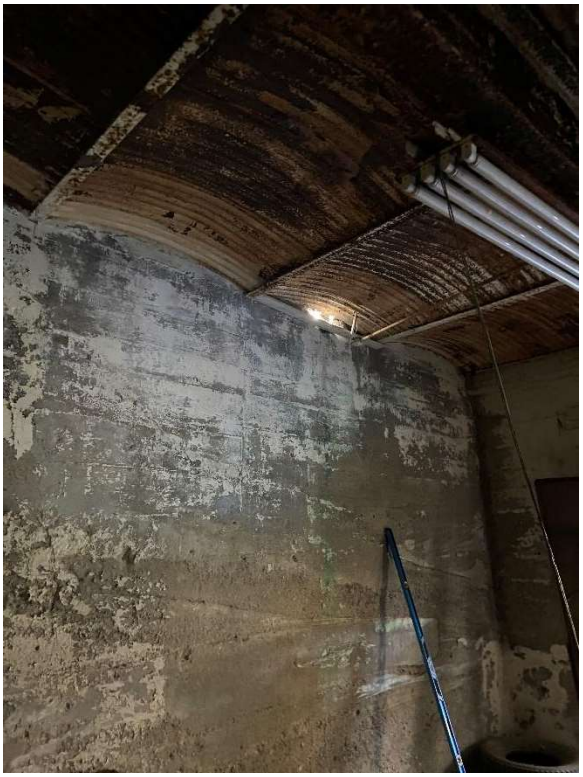
Renovation costs	**Price**	**Unit**		**Project Cost**	Notes:
Mobilization	$ 10,000	LS		$10,000	
Floor Demolition	$ 10	/sf		$51,000	5100 SF approx.
New Concrete Floors	$ 30	/sf		$102,000	3400 SF approx.; 1st and 2nd floors
New Metal Roof	$ 12	/sf		$20,400	1700 SF approx.; roof structure only, roofing cost not included
Floor/Roof Beam Reinforcing	$ 30,000	/floor		$90,000	3 floors (first, second, roof)
New Steel Lateral Bracing	$ 150,000	LS		$150,000	
Lintel Repair/Replacement	$ 30,000	LS		$30,000	
Parapet Bracing/Reinforcing	$ 20,000	LS		$20,000	
Diaphragm Connections	$ 10,000	/floor		$30,000	3 floors (first, second, roof)
Repointing & Masonry Repair	$ 12	/sf		$56,400	4700 SF approx.; assume entire exterior area
Perimeter Foundation Drain	$ 30,000	LS		$30,000	
			Sum	$589,800	*Hazardous materials remediation not included*
Contingency	20%			$117,960	
OHP	15%			$88,470	
Design Allowance	20%			$117,960	
			Sum	$914,190	*Hazardous materials remediation not included*

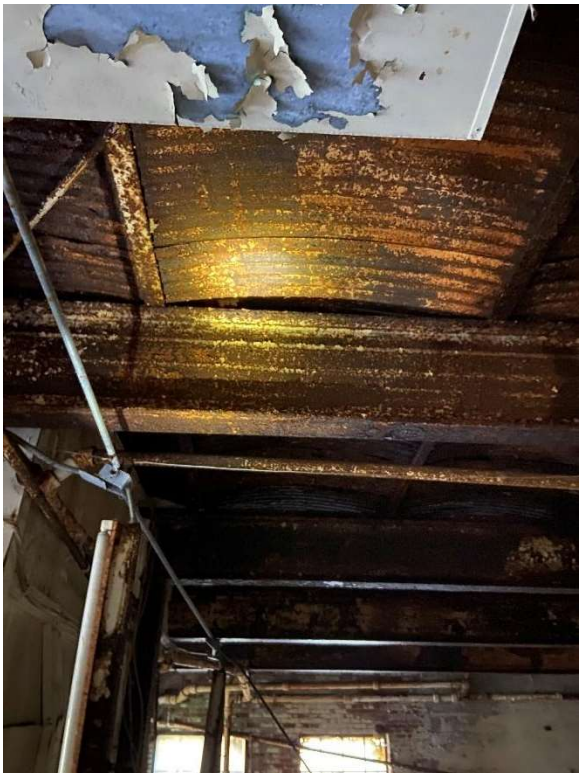
Demo Costs	**Price**	**Unit**		**Project Cost**	
Mobilization	$ 15,000	LS		$15,000	
Demolition	$ 25	/sf/ floor		$170,500	6820 SF approx.; includes basement, 1st, 2nd, roof
			Sum	$185,500	*Hazardous materials remediation not included*
Contingency	20%			$37,100	
OHP	15%			$27,825	
Design Allowance	20%			$37,100	
			Sum	$287,525	*Hazardous materials remediation not included*

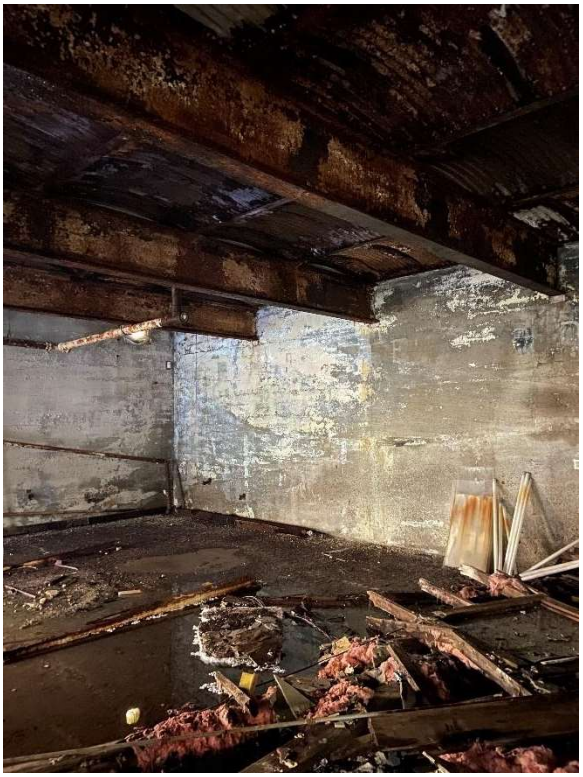
APPENDIX B

Photos

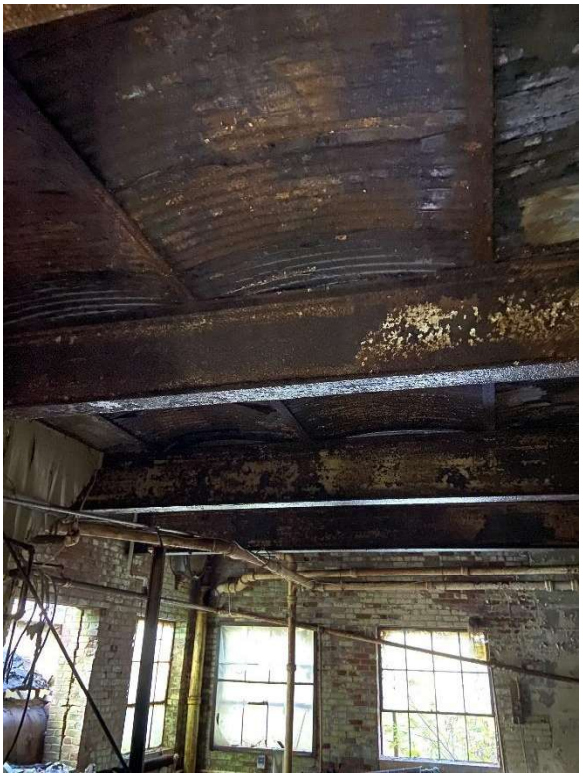
Basement Photos

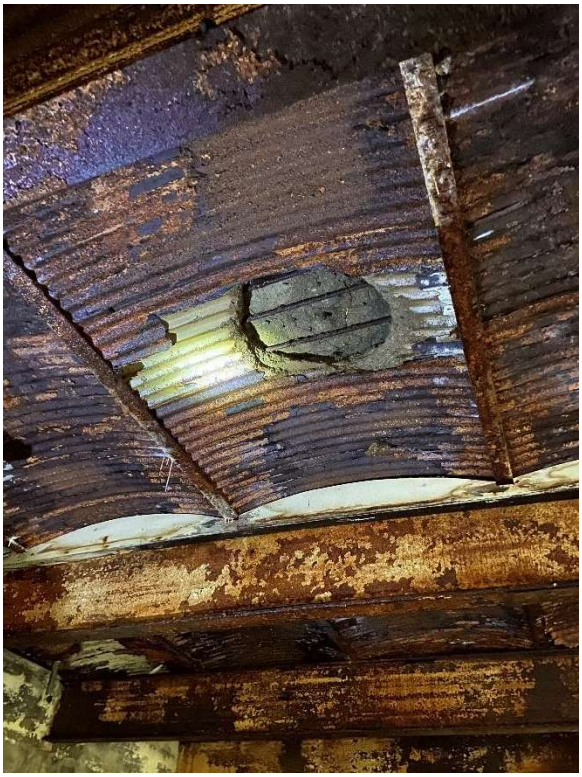


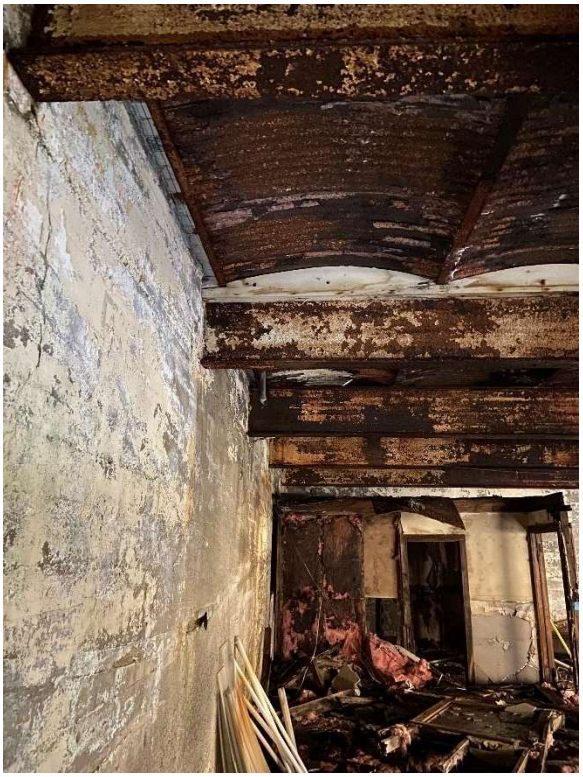




Basement Photos







Basement Photos

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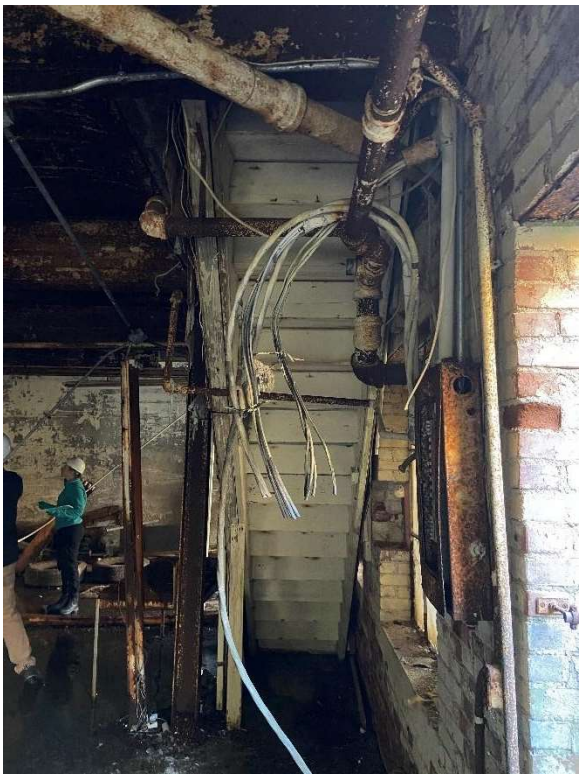

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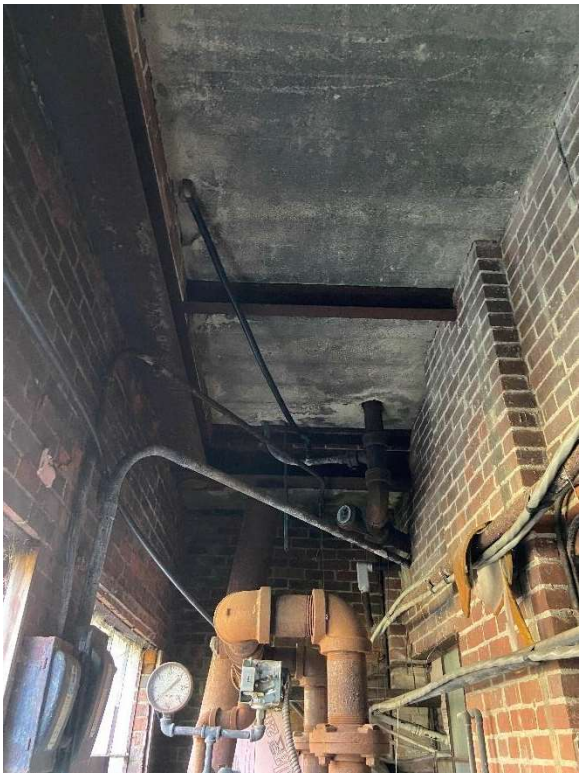
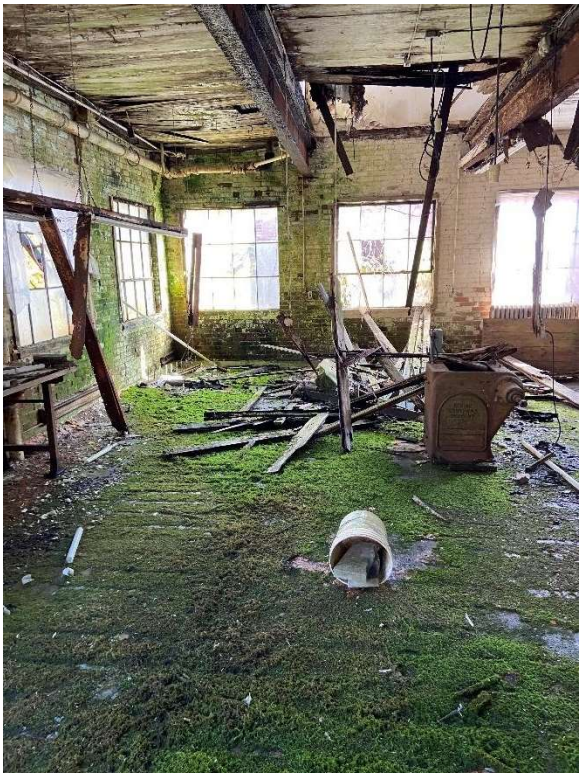
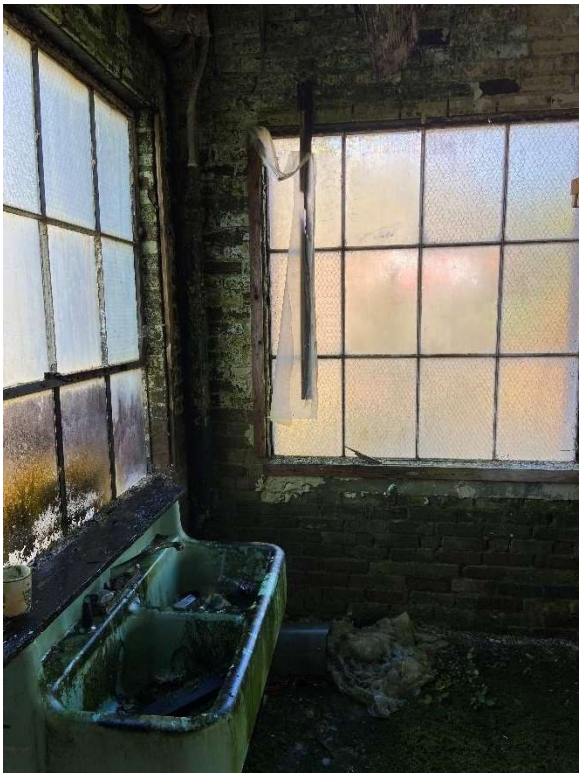


First Floor Photos





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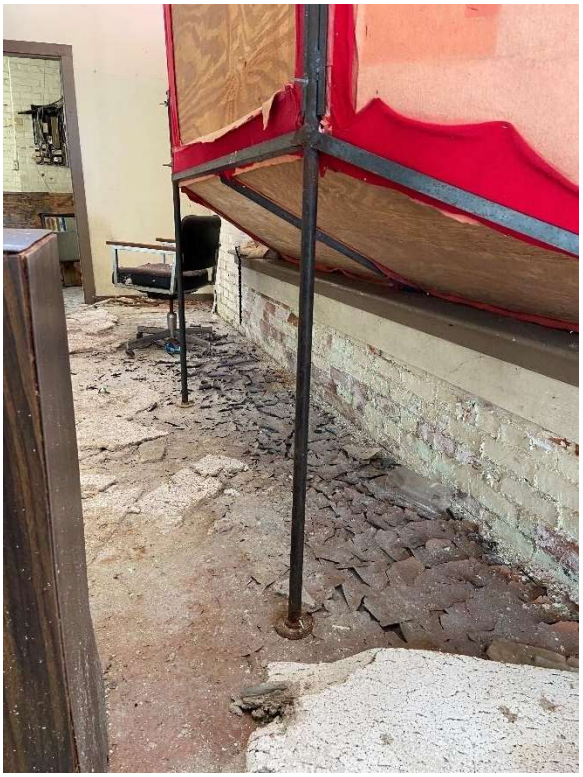

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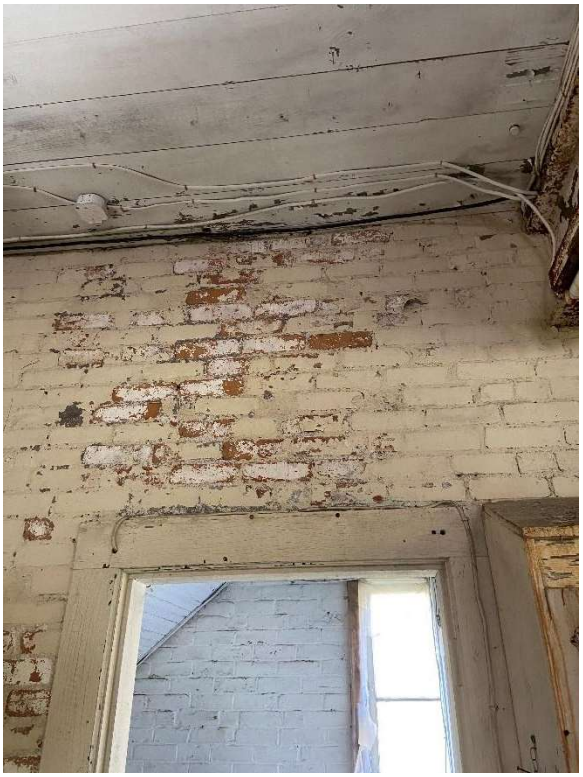

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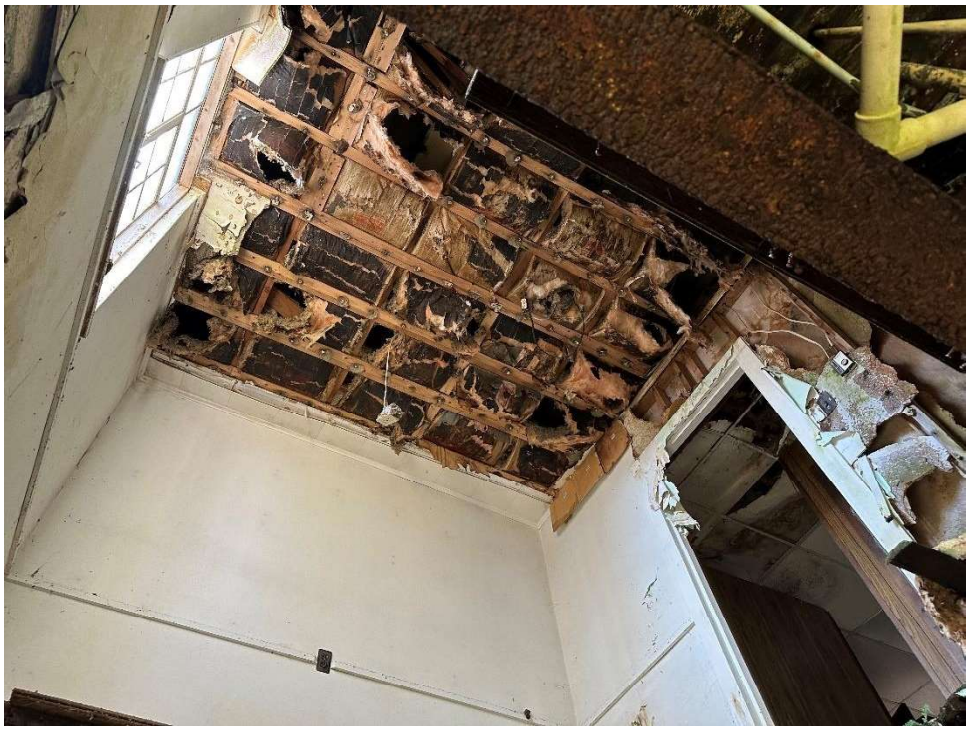

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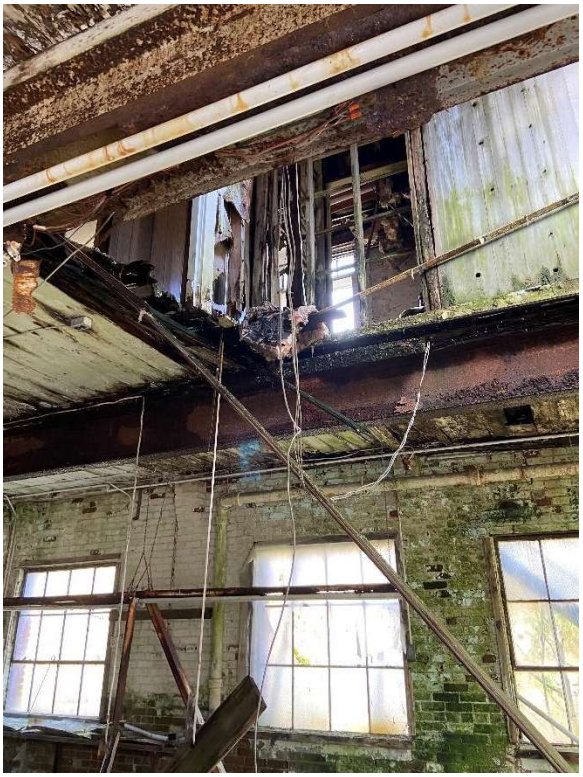
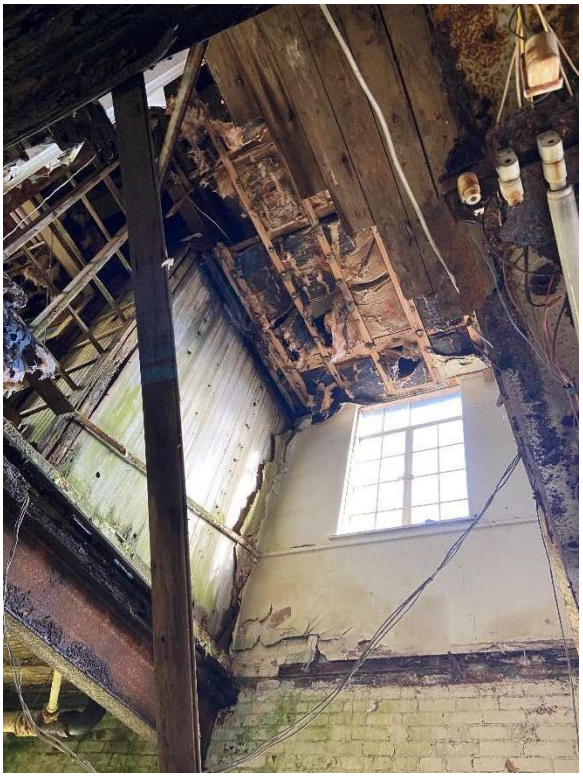
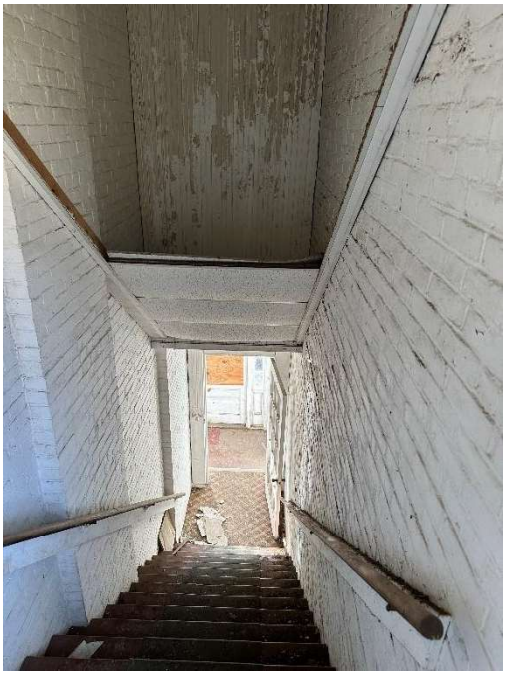




First Floor Photos

First Floor Photos

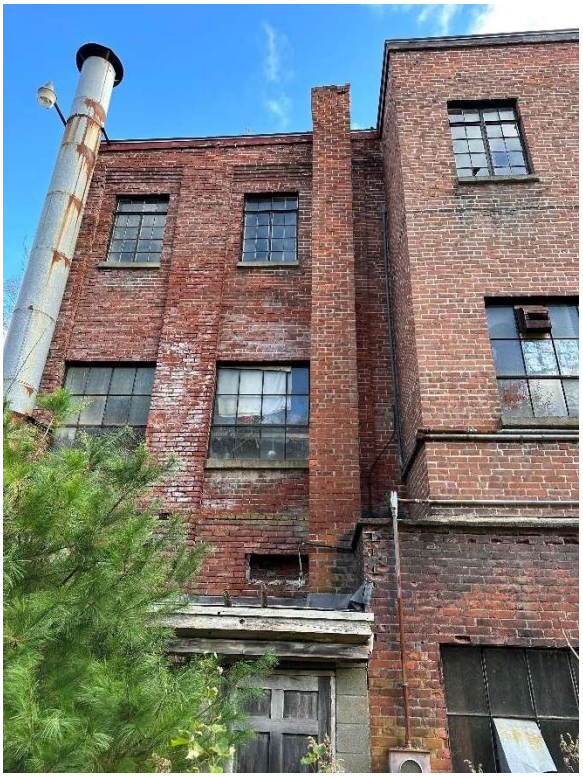
Second Floor Photos



Second Floor Photos

Exterior Photos

Exterior Photos



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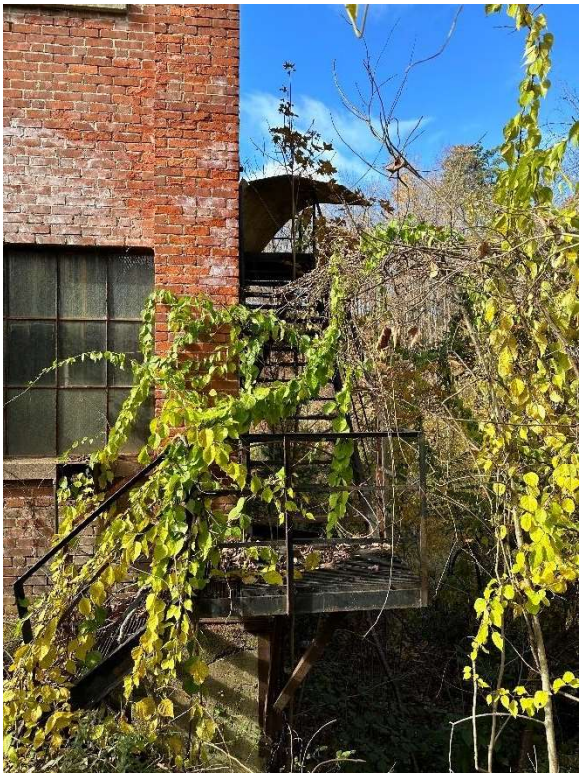

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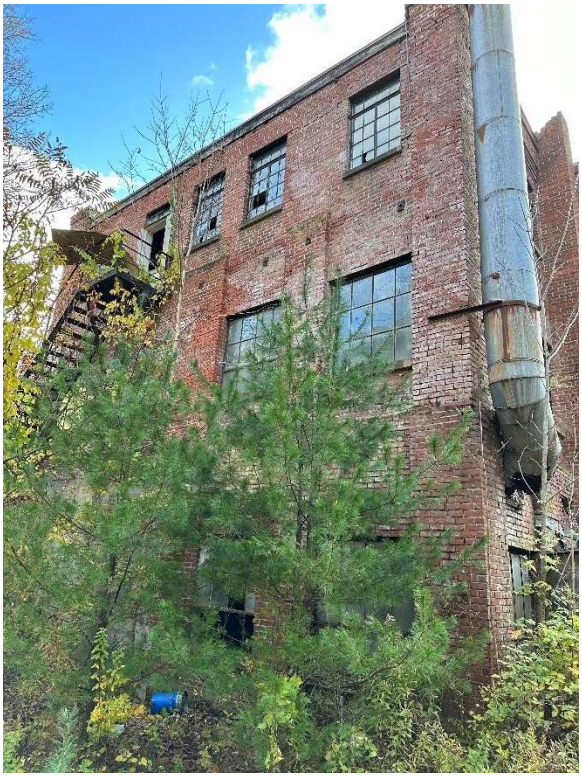

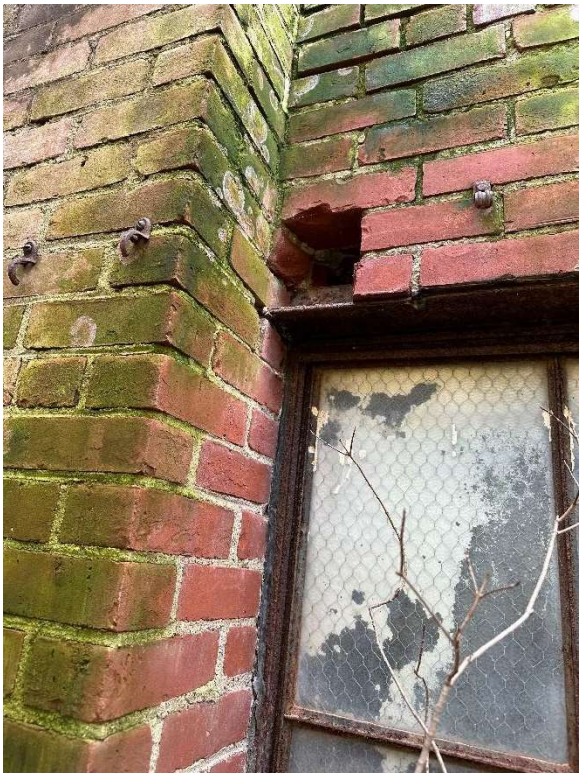

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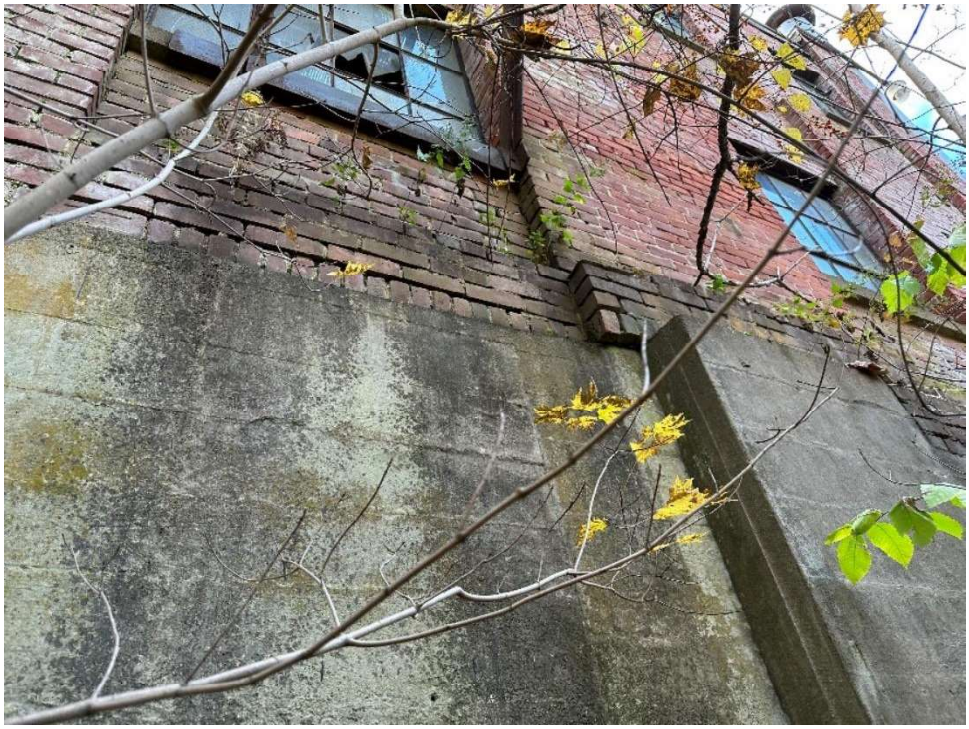

Exterior Photos

Exterior Photos

Exterior Photos

Roof Photos