

# **JSE JOHNSON STRUCTURAL ENGINEERING, INC.**

101 Huntoon Memorial Highway (Rt. 56), Rochdale, MA 01542 (508) 892-4884 Fax (508) 892-0477

May 18, 2023

Town of Brimfield  
21 Main Street  
Brimfield, MA  
Attn: Michael Egan

Re: Structural Inspection  
Brimfield Town Hall Annex & Town Hall Buildings

Dear Mr. Egan:

As per your request, Johnson Structural Engineering (JSE) has performed a structural inspection of the Town Hall Annex Building and Town Hall Building located on Main Street in Brimfield, Massachusetts. The purpose of the inspection was to review the existing building structure and to comment on the building's condition. Travis Alexander of JSE performed a site visit on May 4, 2023 to document the existing conditions. The following report summarizes the results of the structural inspection.

## **Town Hall Annex**

The Town Hall Annex is a two story structure with a partial basement and crawl space and a partial attic. There used to be a one-story addition along the rear of the building that connected the building to a barn structure. The one-story connector and the barn have been demolished.

JSE previously performed a structural review on the Town Hall Annex building in August 2016 with Jones Whitsett Architects. JSE's report from that study is attached in Appendix A. A majority of the structural items noted in the 2016 report are still applicable today based on JSE's most recent site visit with the exception of items 12, 13, and 17 which pertain to the one-story connection and barn structure that have since been demolished. This includes the cracked, checked, and rotated roof framing members, the severe slopes in flooring at the first floor and second floor levels, bowed exterior walls, and inadequate shoring.

Item 15 in JSE's 2016 report discusses temporary screw jack shoring that was previously installed to support the existing first floor structure. The screw jack shoring has since been replaced with new steel shoring comprised of W-shape steel beams, HSS steel tubes and steel lally columns (see photographs #1 and #2). However, the steel framing does not appear to have been designed or approved by a structural engineer due to (a) the hardware used to connect the beams to the columns (see photographs #3 and #4), (b) the wood blocking that was installed to support the steel beams on the foundation wall (see photograph #5), (c) how the existing floor joists (round logs) were planed where needed to install the steel beams (see photograph #6), and (d) the thickness of the wood shims that were installed between the existing floor joists (round logs) and the steel beams (see photograph #7).

Comparing photographs taken from JSE's site visit in 2016 to JSE's site visit on May 4, 2023, there appears to have been some horizontal movement in the chimney located on the right side of the building when viewed from Main Street (see photograph #8).

The existing deck/fire escape structure located on the second floor level along the right side of the building does not have a ladder or stair down to grade, is missing a guard along one side, and the rails are structurally inadequate (see photograph #9).

As noted in JSE's 2016 report, the front wall is bowed and appears to have an inward lean (see photographs #10 and #11). It was observed during the most recent site visit that the exterior wall along the left side of the building (when viewed from Main Street) also has an inward lean (see photograph #12). Using a laser measurer, it appears that this wall is around 4" to 5" out of plumb. There has also been settlement in the exterior grade at this corner of the building as evidenced by the exterior stairs (see photograph #13).

The structural issues noted in this report (and JSE's 2016 report) will not improve without substantial structure repairs and reinforcing. The issues may worsen over time if they are not addressed. Due to the extent and severity of the issues, it is our professional opinion that a decision is made in the near future whether to proceed with repairing and reinforcing the existing structure or to look for a new facility.

### **Town Hall**

The Town Hall is a two story building with a full basement and attic. The following summarizes the structural issues noted during JSE's May 4, 2023 site visit. Please note that the inspection was limited to the existing structure that was accessible at the time of the site visit.

- The existing foundation is comprised of field stone and masonry. The mortar in the masonry joints and field stone joints are deteriorated (see photographs #14 through #16).
- There are signs of water damage at the second floor level (see photograph #17).
- The low, flat roof in the rear of the building is in poor condition (see photograph #18).
- There is likely a lot of rotted wood trim around the eaves, windows, doors, etc. (see photographs #19 and #20).
- The exterior masonry at the foundation requires repointing and replacement where deteriorated (see photographs #21 and #22).
- The masonry on the chimney appears to be in poor condition when viewed from grade (see photograph #23).
- It was stated that one of the timber beams comprising a roof truss previously failed. The failed timber was reinforced with steel plates and diagonal 2x members (see photograph #24).
- The timber members comprising the roof trusses are severely split (see photographs #25 through #28).
- There has been a lot of movement within the roof trusses. Large gaps have formed at the member joints (see photographs #29 through #33). Wood shims were installed at some of the joints to fill the gaps (see photograph #34).

- There are areas of water damage to the roof decking and bell tower floor structure.
- The exterior fire escape along the rear of the building will require reinforcing to comply with the loads and dimensions specified in the building code (see photograph #35).
- The exterior wall along the front right side of the building when viewed from Main Street appears to lean inward (see photograph #36).

During the site visit, it was discussed to possibly construct a second floor addition within the first floor meeting room. The second floor addition will need to be kept structurally separated from the existing building structure in order to not impose any additional gravity or lateral loads onto the existing building. Otherwise, a complete upgrade to lateral system of the existing building will be required if the second floor addition is structurally attached to the existing building. The second floor addition could either be constructed of plywood decking supported by wood floor joists or a concrete slab on metal deck supported by steel infill beams. The wood joists or steel infill beams would be supported by steel girder beams and steel columns. The steel columns supporting the second floor addition would need to be continued down to the basement level and supported by new reinforced concrete footings. The lateral system for the second floor addition would likely be comprised of diagonal steel braced frames or moment frames.

It was also stated during the site visit that an elevator will need to be installed. If the elevator is installed where the existing lift is located, then a new elevator shaft and 5'-0" (+/-) deep elevator pit will be needed. It is likely that concrete underpinning will be needed below the existing foundation walls and interior masonry walls adjacent to the elevator shaft (current lift location) due to the required depth of the elevator pit. Alternatively, it was stated that an elevator addition may be constructed along the outside of the building. The addition will need to be kept structurally separated from the existing building. If the addition is structurally attached to the existing building, then the lateral system of the existing building will need to be upgraded to comply with the wind load and seismic force specified in the current building code. Concrete underpinning may be required below the existing foundation that is adjacent to the elevator addition depending on the depth of the existing foundation.

Substantial structural repairs and reinforcing will be required to address the structural issues noted above before considering any renovations to the existing building. Due to the extent and severity of the issues, it is our professional opinion that a decision is made in the near future whether to proceed with repairing and reinforcing the existing structure or looking for a new facility.

If you have any questions regarding this report, please do not hesitate to call.

Sincerely Yours,  
Johnson Structural Engineering, Inc.



Robert A. Johnson, P.E.  
President



Photograph #1 (Town Hall Annex)  
– First Floor Shoring



Photograph #2 (Town Hall Annex)  
– First Floor Shoring



Photograph #3 (Town Hall Annex)  
– First Floor Shoring Member Connections



Photograph #4 (Town Hall Annex)  
– First Floor Shoring Member Connections



Photograph #5 (Town Hall Annex)  
– Shoring Beam Bearing



Photograph #6 (Town Hall Annex)  
– Plained Floor Joists Above Shoring



Photograph #7 (Town Hall Annex)  
– Wood Blocking Above Shoring



Photograph #8 (Town Hall Annex)  
– Chimney



Photograph #9 (Town Hall Annex)  
– Exterior Fire Escape



Photograph #10 (Town Hall Annex)  
– Bowed & Leaning Front Wall





Photograph #11 (Town Hall Annex)  
– Bowed & Leaning Front Wall



Photograph #12 (Town Hall Annex)  
– Leaning Side Wall



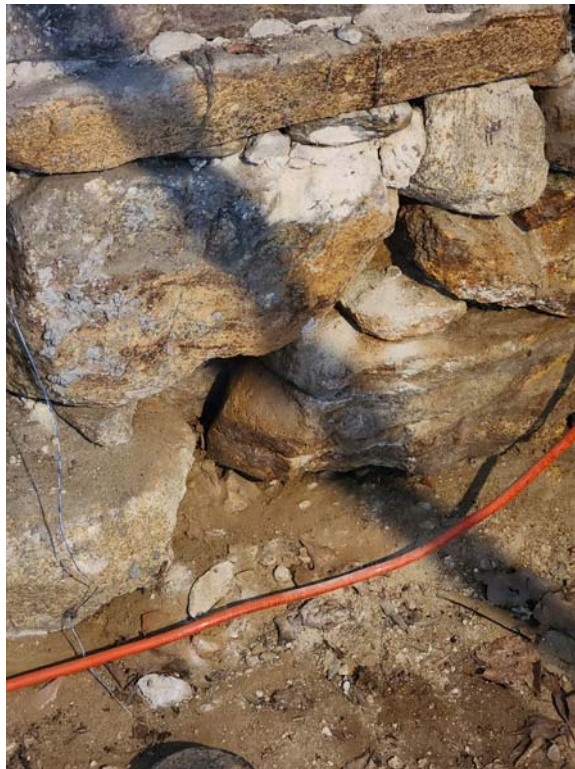
Photograph #13 (Town Hall Annex)  
– Sloped Exterior Side Stairs



Photograph #14 (Town Hall)  
– Deteriorated Masonry/Field Stone Mortar Joints



Photograph #15 (Town Hall)  
– Deteriorated Masonry/Field Stone Mortar Joints



Photograph #16 (Town Hall)  
– Deteriorated Masonry/Field Stone Mortar Joints



Photograph #17 (Town Hall)  
– Interior Water Damage



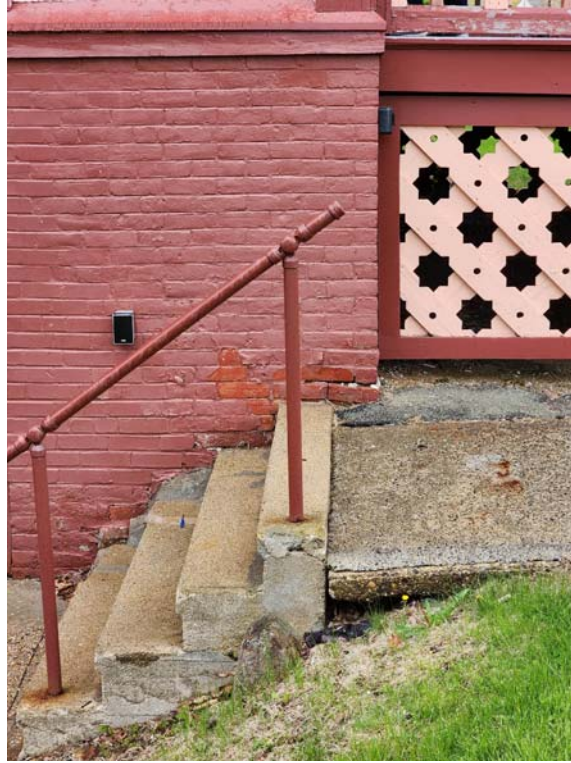
Photograph #18 (Town Hall)  
– Low Roof



Photograph #19 (Town Hall)  
– Rotted Wood Trim



Photograph #20 (Town Hall)  
– Exterior Wood Siding & Trim



Photograph #21 (Town Hall)  
– Damaged Exterior Masonry



Photograph #22 (Town Hall)  
– Deteriorated Exterior Masonry Joints



Photograph #23 (Town Hall)  
– Chimney Masonry



Photograph #24 (Town Hall)  
– Reinforced Roof Truss Member



Photograph #25 (Town Hall)  
– Cracked Truss Member



Photograph #26 (Town Hall)  
– Cracked Truss Member





Photograph #27 (Town Hall)  
– Cracked Truss Member



Photograph #28 (Town Hall)  
– Cracked Truss Member



Photograph #29 (Town Hall)  
– Gaps at Truss Member Joint



Photograph #30 (Town Hall)  
– Gaps at Truss Member Joint



Photograph #31 (Town Hall)  
– Gaps at Truss Member Joint



Photograph #32 (Town Hall)  
– Gaps at Truss Member Joint



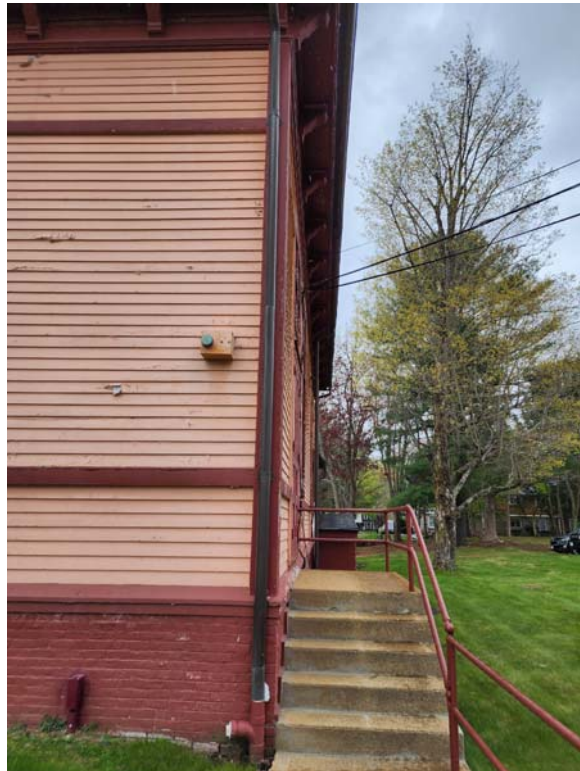
Photograph #33 (Town Hall)  
– Gaps at Truss Member Joint



Photograph #34 (Town Hall)  
– Wood Shims at Truss Member Joint



Photograph #35 (Town Hall)  
– Exterior Fire Escape



Photograph #36 (Town Hall)  
– Leaning Exterior Side Wall

**Appendix A**

# **JSE JOHNSON STRUCTURAL ENGINEERING, INC.**

101 Huntoon Memorial Highway (Rt. 56), Rochdale, MA 01542 (508) 892-4884 Fax (508) 892-0477

August 3, 2016

Jones Whitsett Architects  
308 Main Street  
Greenfield, MA 01301  
Attn: Kristian Whitsett

Re: Structural Review  
Town Hall Annex  
Brimfield, MA

Dear Mr. Whitsett:

Travis Alexander of Johnson Structural Engineering performed a site visit on July 18, 2016 at the Town Hall Annex located at 23 Main Street in Brimfield, Massachusetts. The purpose of the site visit was to review the existing building structure, and to comment the building's condition. The following report summarizes what was observed during the site visit.

The original building is approximately 21'-0" by 40'-0", and is a two-story structure with a full basement. It appears that multiple additions were constructed. The first addition is approximately 29'-0" by 32'-0", and is a two-story structure with a crawl space below. The second addition is approximately 16'-0" by 32'-0", and is a two-story structure with a crawl space below. In the rear of the building, there is a one-story connector between the building and the barn structure. Attached is a markup indicating the original building and the various additions. The markups are marked on the existing floor plans that were originally prepared by Drummey Rosane Anderson, Inc. and dated April 17, 2013.

The following list summarizes the issues that were discovered during the site visit. Please reference the attached markups for the locations of the rooms referenced in the list.

1. The roof for the original building is a wood framed hip roof structure. The roof rafters are 4" by 4" members that are spaced at approximately 2'-6" on center. The roof rafter and hip beam connections to the ridge beam are mortise and tenon joints (see photograph #1). The hip beams have large cracks at the tenon ends. At each end of the roof, the wood planking is severely cracked around the existing roof vent openings (see photograph #2).
2. The wood framed roof above the "Storage #2" room is comprised of 2-3/4" by 8" (assumed) rafters spaced at approximately 2'-1 1/2" on center. The rafters span from a 6" deep wood beam along the exterior walls to a single ridge member. The ridge member appears to be scabbed together with multiples wood pieces (see photographs #3 through #5). The 6" deep wood beam along the exterior walls has rotated (see photograph #6). The exterior walls in the "Storage #2" room are approximately 2" out of plumb (see photograph #6.1). The beam rotation and the

- wall being out of plumb is most likely due to the outward thrust of the roof rafters due to the lack of a true ridge beam.
3. It is unknown whether the ceiling framing in the “Kitchen” room is a decorative finish or whether it is the framing for the attic above. Access to the attic space was not accessible. The framing is comprised of 2” by 7” wood joists spaced at 2’-0” on center that are supported by 8” wide by 7” deep wood beams. There is a noticeable downward slope in the framing to the center beam line. The joist to beam connections are mortise and tenon joints, and are pulling apart (see photograph #7). The mortise and tenon beam to beam connections are also pulling apart (see photograph #8). Some of the joists are irregular along their top surface and provide minimal support for the planking (see photograph #9).
  4. The second floor in the “Storage #1” room is severely sloped (see photograph #10, which shows the varying gap width between two adjacent filing cabinets due to the floor slope). There is a high point in the second floor along the two exterior walls and along an assumed center beam. The low points are at the approximate middle of the “Storage #1” room and next to the wall between the “Storage #1” room and the “Toilet & Shower #2” room. The second floor structure was not accessible due to a hard ceiling. However, the exposed timber columns in “Storage #1” have large vertical cracks (see photograph #10.1 and #10.2).
  5. The second floor in the “Treasurer” office is severely sloped (see photograph #11, which shows the varying gap between the bottom of the desk and the flooring). The floor slopes downward from the exterior wall to the interior corridor wall. The second floor structure was not accessible due to a hard ceiling.
  6. The second floor in the “Conservation” office is severely sloped. The floor slopes downward from the exterior wall to the interior corridor wall, and also slopes downward from the masonry fireplace hearth to the interior of the room (see photograph #12). It appears that the masonry hearth has cracked due to the floor slope (see photograph #13).
  7. The main stairs between the first and second floors have a noticeable pitch towards the hallway wall.
  8. There is a sign posted on the door limiting the number of people in the “Meeting Room” (see photograph #14). The perimeter first floor beam below the exterior door in the “Meeting Room” is rotted (see photograph #14.1).
  9. The first floor corridor is severely sloped downward at the front door (see photograph #15).
  10. The first floor corridor in front of the Assessor’s Office is sloped (see photograph #16). When accessed through an opening to the crawl space in the basement, the existing floor framing in this area is comprised of 1-1/2” by 6” joists spaced at approximately 1’-8” on center. A structural analysis was performed, which indicates the floor joists have minimal live load capacity (approximately 30 pounds per square foot).
  11. The first floor in the “Board of Health” room slopes downward from exterior wall to the interior corridor wall (see photograph #17, which shows the varying gap width between two adjacent filing cabinets due to the floor slope). The first floor framing below at this location was not accessible at the time of the site visit.



12. The roof structure at the "Storage" room is comprised of 3" by 3-3/4" rafters spaced at 2'-0" on center. The rafters span from a single ridge member to an 8" by 8" perimeter wood beam along the exterior wall facing the library and a four-ply 2x8 wood beam along the exterior wall facing the parking lot. No collar ties were observed. The ceiling joists are comprised of 2x8 members spaced at 2'-0" on center that span approximately 15'-8" between the beams. A structural analysis was performed, which indicates that the existing roof rafters do not comply with the current design snow load including drifted snow.
13. The barn is in severe disrepair and should not be accessed.
14. The first floor framing for the original building is comprised of round logs of various sizes that are supported by 7-1/2" wide by 6-3/4" deep wood beams. The first floor framing is severely cracked (see photograph #18). Based on how the upper floors sloped in the original building, it is likely that the first floor corridor walls, which align with the two main first floor beams lines, are bearing walls for the second floor framing. A structural analysis was not performed on the round logs due to their irregular shape (the top of the logs were plained flat to support the floor planking).
15. Temporary screw type shoring jacks were previously installed throughout to support the first floor framing (see photograph #18.1). Some of the shoring jacks were installed along the length of various joists and beams, and some were installed below beam connections. The shoring jacks bear on cinder blocks and stones (see photograph #19). Note that temporary screw type shoring jacks are not meant to be used as permanent supports.
16. Wood shims were previously installed between an existing wood beam to wood column connection (see photograph #20). The wood column is partially sitting on a concrete slab and a portion of the column is unsupported (see photograph #21). The concrete slab has cracked around where the post bears on the slab.
17. Portions of the field stone foundation below the "Storage" room is missing (see photograph #22).
18. The chimney is deteriorating (see photograph #23).
19. There is a large bow in the front exterior wall adjacent to the front door (see photograph #24 and #25).

Substantial structural repairs and reinforcing will be required to address the issues noted above. Due to the extent and severity of the issues, it is our professional opinion that a decision be made in the near future whether to proceed with repairing and reinforcing the existing structure or looking for a new facility.

If you have any questions regarding this report, please do not hesitate to call.

Sincerely Yours,  
Johnson Structural Engineering, Inc.



Robert A. Johnson, P.E.  
President



Photograph #1 – Existing Roof Framing (Original Building)



Photograph #2 – Cracked Roof Sheathing



Photograph #3 – “Storage” Ridge Member



Photograph #4 – “Storage” Ridge Member



Photograph #5 – “Storage” Ridge Member



Photograph #6 – “Storage” Perimeter Roof Beam



Photograph #6.1 – Exterior Bowed Wall at “Storage 1”



Photograph #7 – “Kitchen” Ceiling/Attic Framing



Photograph #8 – “Kitchen” Beam-Beam Connection



Photograph #9 – “Kitchen” Ceiling/Attic Joist



Photograph # 10 – “Storage 1” Sloped Floor



Photograph #10.1 – “Storage 1” Cracked Wood Column



Photograph #10.2 – “Storage 1” Cracked Wood Column



Photograph #11 – “Treasurer” Sloped Floor





Photograph #12 – “Conservation” Sloped Floor



Photograph #13 – “Conservation” Cracked Masonry Hearth



Photograph #14 – “Meeting Room” Sign



Photograph #14.1 – Rotted Sill at “Meeting” Exterior Door



Photograph #15 – First Floor Hallway Slope



Photograph #16 – Sloped Hallway in front of Assessor's Office



Photograph #17 – “Board of Health” Sloped Floor



Photograph #18 – First Floor Framing (Cracked)



Photograph #18.1 – First Floor Shoring Jacks



Photograph #19 – First Floor Shoring Jacks



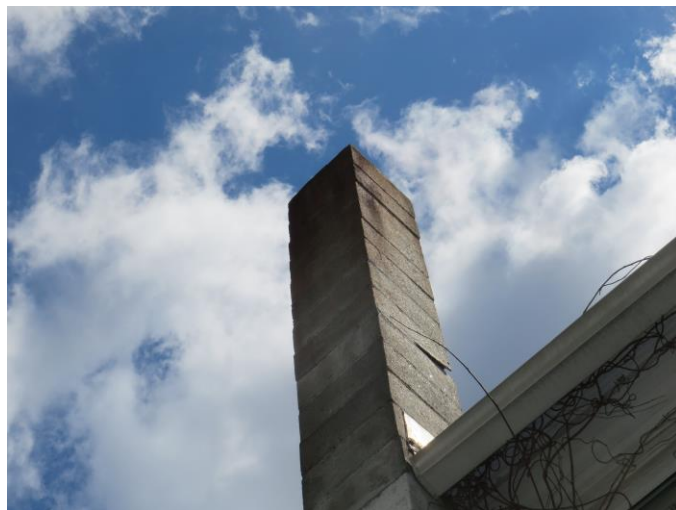
Photograph #20 – First Floor Beam-Column Connection



Photograph #21 -Cracked Wood Column and Concrete Slab



Photograph #22 - Missing "Storage" Foundation



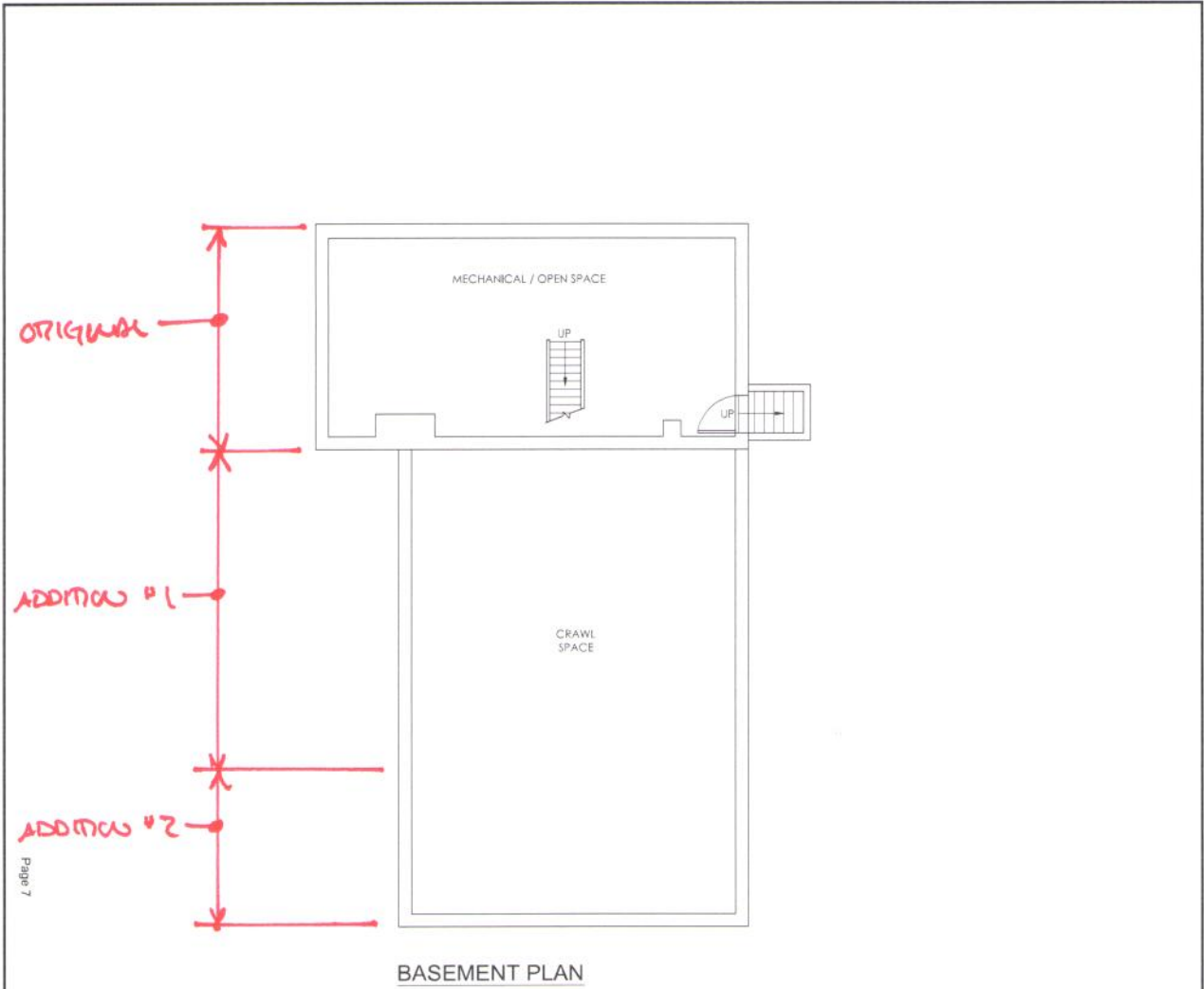
Photograph #23 - Chimney



Photograph #24 – Bowed Front Exterior Wall



Photograph #25 – Bowed Front Exterior Wall



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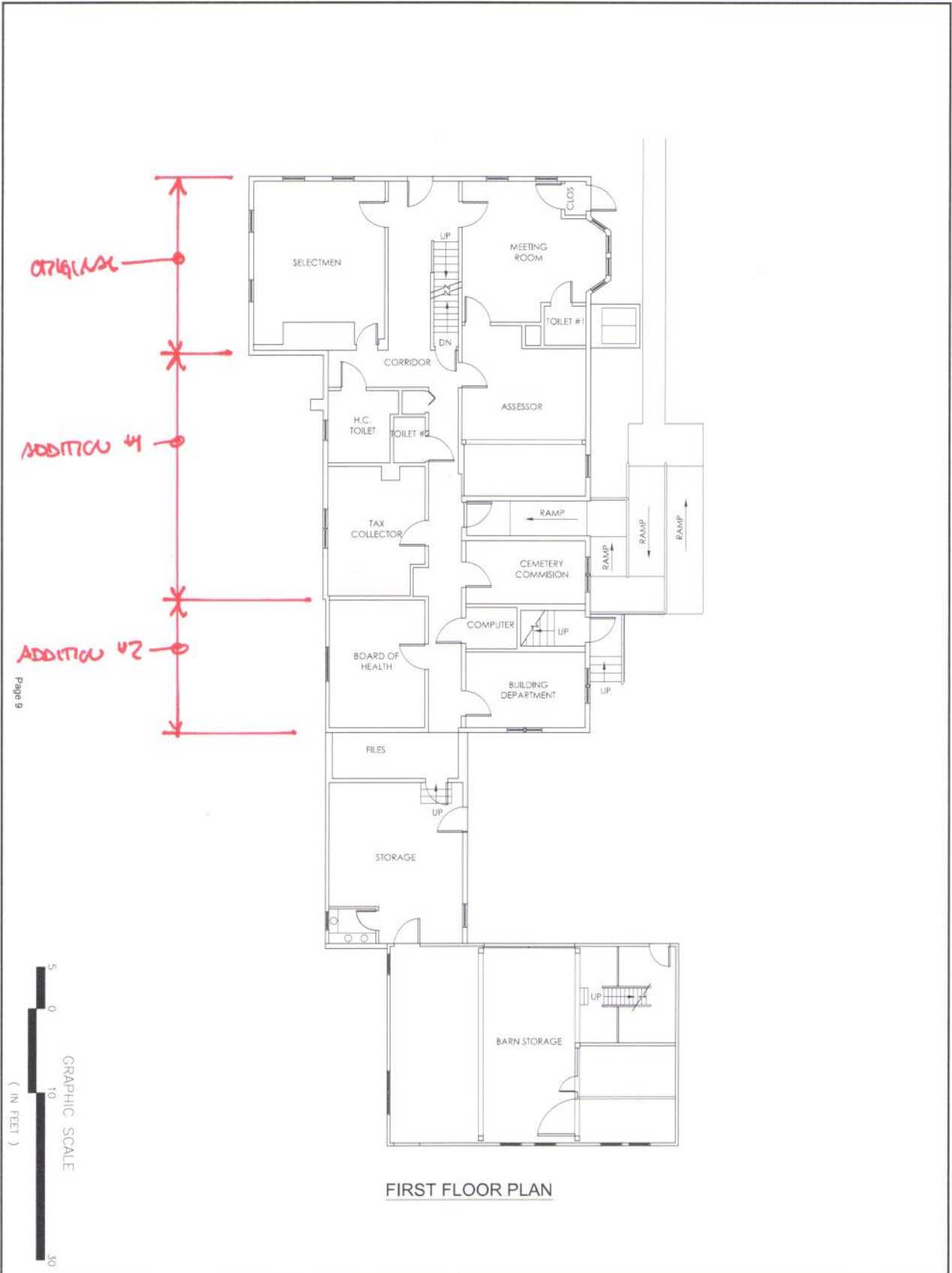
**EX-THA1**

**Town Of Brimfield**  
 Municipal Facilities Study and Planning  
 Brimfield, Massachusetts

EXISTING TOWN HALL ANNEX BASEMENT PLAN

**D.R.A**  
 Drumsey Rosane Anderson, Inc.  
 235 Bear Hill Road, 4th Floor  
 Waltham, MA 02451  
 Planning: 617-264-1700  
 Architecture: 617-264-1701 fax  
 Interior Design: info@drains.com





FIRST FLOOR PLAN

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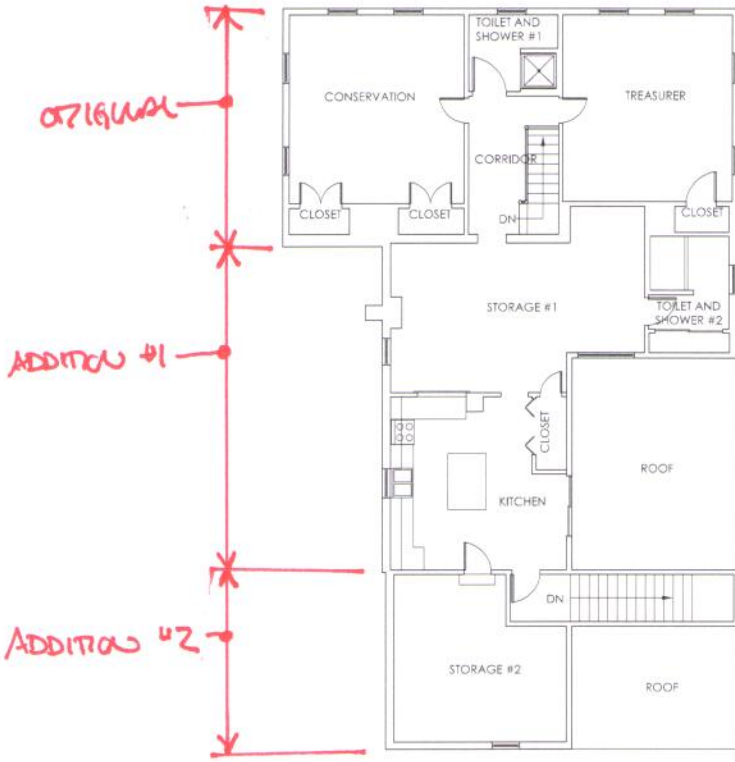
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 Date: 4/17/13

**EX-THA2**

**Town Of Brimfield**  
 Municipal Facilities Study and Planning  
 Brimfield, Massachusetts

EXISTING TOWN HALL ANNEX FLOOR PLANS

**D.R.A.**  
 Drumroy Rosane Anderson, Inc.  
 235 Bear Hill Road 4th Floor  
 Waltham, MA 02451  
 Planning  
 Architecture  
 Interior Design  
 617.964.1700  
 617.964.1711 fax  
 info@drains.com



SECOND FLOOR PLAN



Scale: 3/32"=1'-0"  
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 Date: 4/17/13

EX-THA3

**Town Of Brimfield**  
 Municipal Facilities Study and Planning  
 Brimfield, Massachusetts

EXISTING TOWN HALL ANNEX SECOND FLOOR PLAN

**Drumey Rosane Anderson, Inc.**  
 235 Bear Hill Road, 4th Floor  
 Wallham, MA 02451  
 Planning  
 Architecture  
 Interior Design  
 617-264-1700  
 617-264-1701 fax  
 info@drumey.com

