

November 15, 2016

Art Guadano  
AG Architects, PC  
624 Central Ave.  
Dover, NH 03820

**Re: *Lee Municipal Buildings***  
***7 Mast Rd., Lee, NH***  
***Structural Review***

Dear Art,

At your request, I met with you at the Lee municipal building complex last Thursday afternoon to observe and review the buildings structurally. This review included only visual observations as most of the structures are hidden by finish materials. Within this small complex there are five buildings. Each building will be discussed separately as follows.

### **Town Hall**

The town hall is a 2-story wood framed building with brick veneer exterior walls that originally was an old school house built in the mid 1840's. The second story is within the attic. A wood framed addition was added to the back end of the building in 1968. Exterior views of the building are shown in Photo #1 and #5.

There was concern by the town about the condition of the first-floor framing, which can be observed in the crawl space. This space is extremely tight and shallow; however, I was able to observe some of the framing via a small access panel in the floor on the west side. Upon observation, it became very obvious that a substantial amount of shoring work had been done in this space. First, the exterior sills appear to have rotted some time ago, as well as the ends of the timber joists that mortise into them. Along the west wall a steel I-beam had been installed on its side, blocked with wood on both sides, and supported by pressure treated (PT) dunnage and concrete blocks spaced quite closely together. See Photo #2. This is providing good support for the floor

joists. Since the floor joists mortise into the sill, they are likely still providing adequate support for the wood framed wall. The brick veneer sets directly on the granite foundation so it is supported as well. Depth of foundation for frost protection is unknown.

There are a couple of interior timber beam lines that run the length of the building and support the floor joists. PT wood blocking and concrete blocks have been added at numerous locations to support these beams. I was able to crawl to the closest beam and it appeared to be very solid. Photo #3 shows one of these beams and its supports.

On the east side of the building we could see thru one of the vent holes in the granite foundation. It appears that on this side a timber beam was installed instead of a steel beam to support the building along this edge, and should similarly be providing the necessary support.

The second floor is supported by a central beam in the original building. With only one interior column, this beam spans approximately 28 feet and 18 feet. The beam is covered and could not be viewed, but does not show signs of distress. The roof of the original building is framed with heavy timber rafters that frame to timber floor beams. A very nice interlocking mortised detail was provided at the connection to resist thrust from the rafters.

In the addition, standard rafters were used that lean against a ridge board. At the base of the rafters, ties were added to prevent thrust, as seen in Photo #4.

At some time after original construction a shed dormer was added to the front side of the roof. A ridge beam should have been provided at that time, but apparently was not. Due to this, the ridge behind the dormer has a noticeable sag in it, as would be expected. See Photo #5.

### **Town Hall Recommendations**

As noted above, the first floor has been re-supported and does not currently represent any safety issues. It is however, a propped-up floor with rotten sills, no access, and no moisture barrier. A good recommendation for this building for improvement is to lift it and install a new concrete foundation with basement. A qualified building mover could lift it in place so this work could be done. This would provide additional dry storage space and the opportunity to correct damaged framing. At that time, additional review could be done regarding second floor framing and the dormer issue.

## **Historical Society**

This small building was built in the 1870's and was relocated to this site onto concrete block (CMU) basement walls. See Photo #6. Inside, the second floor is supported by a central beam line with two interior posts. Only one of these posts has a supporting post below it and the other has clearly sagged as seen in Photo #7. In the basement, the framing is clearly visible. The joists appear sound but are very shallow and have some sag as seen in Photo #8. It is apparent that the CMU foundation wall was built without any vertical reinforcing. Photo #9 shows a horizontal crack that has formed from soil pressure pushing the wall inward. This is not a desirable situation for a basement wall. A concrete slab is also present in the basement.

The hip roof is framed with a low-pitch onto balloon framed walls that extend a few feet above the floor as seen in Photo #10. Since there is no ridge support, this structure would expect to deflect outward at the eave. Viewing from outside it is evident that the walls have bowed outward at the eave. The second floor is lightly framed and has a bouncy feel.

## **Historical Society Recommendations**

Regarding the second floor beam, a post should be added in the basement so that they align with and support the posts at the main level. The crack in the CMU foundation wall should be monitored year by year to determine if it is continuing to open wider. If so, reinforcing will be required. The roof structure and tops of walls have deflected, but should be at a stable state at this time.

## **Library Building**

The original Library building was built around the late 1800's as a school house and moved to the site in 1962. Additions were added in the 1970's and 1990's. The original building appears very sound and is seen at the right side of Photo #11. It is two stories of timber frame on a concrete foundation wall. There are two courses of CMU on top of the concrete foundation that the timber frame bears on. In the basement, the framing is visible as seen in Photo #12. In many places joist hangers have been added to reinforce the original mortised connection of joist to beam. Some timber posts are present, and some adjustable steel lally columns have been added. The space appears dry and the framing appears sound.

The 1970's addition is seen in the front left of Photo #11, and the 1990's addition is behind it. The 1972 addition has a crawl space but it was not accessible. The 1990's addition has a basement but all framing is covered with sheetrock. Apparently the 1990's portion was designed for book stack loads.

### **Library Building Recommendations**

There are no particular recommendations at this time. If additional capacity is desired for book stacks in the original building, reinforcing could easily be done in the basement.

### **Garage Building**

This small building is referred to as the Hobo shed, and is seen in Photo #13. It is a two-bay garage with large sliding doors; one on the outside and one on the inside. It has a corrugated metal roof that is quite rusty. A shed style addition was added to the rear. It all rests on a CMU foundation. This building is in satisfactory condition but needs some attention. The roof construction is quite light but has lasted this long. The timber rafters bear together at the ridge, and only two timber ties run across to prevent from spreading. There is some diagonal bracing but is located rather haphazardly. See Photo #14.

### **Garage Building Recommendations**

This is not an essential building but seems to have historic value and emotional attachment. It's a very quaint building with a colorful history. This building could easily be moved and repaired or renovated. The logistics of moving it would vary with contractors, but it could be moved in whole or in parts and put back together.

### **Town Hall Annex**

This building currently houses the Planning, Zoning, and Code Enforcement offices. It was built

around 1954 as a fire department and is a one-story saltbox with attic, however the attic was not accessible. See Photo #15. All of the structure is covered with finishes. The floor is concrete slab-on-grade and is very unlevel. The foundation is old concrete. The front roof slope looks fine structurally, but the shingles are far past their useful lifetime. The rear slope has a noticeable bow to it.

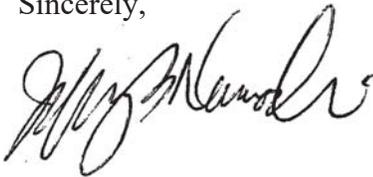
### **Town Hall Annex Recommendations**

We have no recommendations for this structure at this point. If it has historic value it certainly could be renovated appropriately.

Thank you for contacting JSN Associates, Inc. to provide this review. As the project develops, we are available to provide additional engineering to meet the needs of the Town for continued use of these buildings.

Please contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey S. Nawrocki". The signature is fluid and cursive, with a large initial "J" and "S".

Jeffrey S. Nawrocki, P.E.  
President

Photo #1 – Town Hall Building



Photo #2 – I-beam support at perimeter



Photo #3 – Support of timber beams



Photo #4 – Addition conventional framing with ties



Photo #5 – Shed dormer and sag at main ridge



Photo #6 – Historical Society building



Photo #7 – Sagging 2<sup>nd</sup> floor beam



Photo #8 – Shallow joists with sag



Photo #9 – Horizontal crack in CMU wall



Photo #10 – Roof/ceiling in attic



Photo #11 – Library and additions



Photo #12 – Basement of original building



Photo #13 – Hobo shed



Photo #14 – Roof structure



Photo #15 - Annex

