

ENGINEERING REPORT

March 31, 2023

Mayor Garrett Jones and the Caldwell Borough Council
Borough of Caldwell
24 Smull Avenue
Caldwell, NJ 07006



Re: Structural Review of Existing Building
Caldwell Municipal Building
1 Provost Square, Caldwell, NJ
KSI Project Number 2300_49

Dear Mayor Garrett Jones and the Caldwell Borough Council,

Pursuant to your request we performed a site visit to the above referenced building on March 10, 2023 to review the existing structural condition. It was our understanding there were general structural concerns with the building. The purpose of our review was to document the readily observable structural deficiencies and provide written recommendations for repair. It was also our understanding the building was being considered for municipal re-use or for demolition/reconstruction. At the time of our site visit, the building was no longer in use. The first floor was previously used by the police department. The second floor was previously used as offices and as a courtroom. For directional purposes of this report, the building side facing Bloomfield Avenue is the North side.

BUILDING DESCRIPTION:

The west side of the building was a two-story structure with combination of a partial basement and first floor slab-on-grade. The east side of the building was a one-story structure with a slab on grade.

The two-story building roof consisted of wood 2x12 rafters spaced at 16" on center located over the offices and 2x8 rafters spaced at 16" on center located over the corridor. The rafter size and spacing over the courtroom could not be determined. There was a hung ceiling below the rafters (Photo 15). The rafters were supported by the perimeter masonry walls and by the interior corridor wood stud walls. The topside of the roof was not observed nor accessible during our site visit.

The perimeter walls were constructed of multi-wythe brick masonry, but the thickness could not be determined. The brick was covered with a newer EIFS finish (Exterior Insulation & Finish System) located on three sides of the building. The EIFS was in poor condition with stress cracking and signs of aging. There were also multiple sections and pieces of the EIFS that were missing, removed, or spalled off (Photos 7, 8, 9, & 10).

The second-floor framing consisted of wood 2x12s spaced at 16" on center located under the offices. Under the 2nd floor corridor above, the joists appeared to be 2x8s spaced at 16" on center. Under the bathroom above, the joists appeared to be 2x6s spaced at 16" on center.

The first-floor interior walls consisted of a combination of wood stud and brick masonry. There were some CMU partitions in various places towards the east side of the building. It was our understanding these CMU walls were constructed after the original construction and was for the police department security.

There was a partial basement located towards the northwest side of the building. The first-floor framing was constructed of an elevated structural concrete slab. The slab was supported by interior, dropped concrete beams, which in turn, were supported by brick piers and the exterior walls. The basement exterior walls were constructed of multi-wythe brick masonry construction.

The one-story roof was constructed of two clear span wood bowstring trusses, which spanned in the north-south direction of the building. Wood 2x10 rafters spaced at 16" on center spanned over top of the trusses and were also supported on the brick masonry perimeter walls. The rafters and the trusses appeared to be in fair condition.

The remainder of the first floor was constructed of a concrete slab on grade. It was our understanding the original slab was pitched for the original garage use. Because of this, wood 2x leveling sleepers were added in attempt to level the floors located at the offices on the north side of the building. The south side of the building remained as a slab on grade with an epoxy coating. The size and the spacing of the wood sleepers could not be determined. Also, per our discussions on site, it was our understanding there was not a slab located under the bathroom sleepers, which is of concern.

STRUCTURAL OBSERVATIONS:

There were multiple areas along the perimeter of the two-story roof that exhibited water damage (Photos 11 & 12). The rafter framing at these areas were not observable due to the ceiling patching, but it is likely the wood rafters were damaged and require repair based on the degree of water staining. It is our understanding the roof leaks are ongoing and the entire roof will most likely need to be replaced.

The joist framing appeared undersized located under the 2nd floor bathroom. The joists appeared to be constructed of 2x6 joists, which were significantly smaller than the surrounding framing. There was a wood wall located at the midspan of the joists. The wall had a single 2x top plate but industry standard is for a double. The single top plate was improperly notched due to a sewer line and requires repair (Photo 21).

The first-floor finishes were damaged and sunken located just east of the lobby (Photo #24). From our conversations on site, it was our understanding there was a utility trench located under this area. It appeared the framing bridging the utility trench had failed and requires repair.

The sleeper sizing and spacing could not be observed or reviewed in order to determine if it meets code. The sleepers were previously added in attempt to level the floors. However, there were still unlevel sections as observed from the corridor. It appeared the sleepers may have shifted and/or the slab has settled in some locations.

RECOMMENDATIONS:

The two-story building's roofing will require timely repair or removal and replacement in order to stop water from causing further damage to the structure. If the rafters are subjected to prolonged water exposure, the joists could fail and eventually lead to collapse. We recommend sections of the water-stained ceiling to be opened up for further observation of the rafters in order to determine if emergency, temporary shoring is required. Either way, we anticipate wood rafter repairs such as wood sistering and/or selective removal and replacement. Based on the amount of water staining, the damage is widespread throughout the upper roof. We recommend further review by KSI once all the ceiling finishes have been removed. In the meantime, the upper floor should not be used due to safety concerns. The roofing repairs should be reviewed by a NJ licensed architect and professional roofer.

The first-floor wood sleepers/joists will most likely require removal for any type of re-use of the building due to the unliveliness and questionable support below. It is unclear if the sleeper/joists were properly structurally designed to span between support points. Also, the condition of the slab on grade could not be determined with the finishes in place. If all the floor finishes are removed, we recommend further structural observation by KSI.

The second-floor framing will require further investigation located under the corridor and bathrooms. We anticipate repairs to the wood bearing walls and possible strengthening of the existing framing with wood sistering. More of the ceiling would have to be opened up for closer observation by KSI.

SUMMARY:

The building will require miscellaneous structural repairs throughout the building (as noted above) in order to restore the building to a safe working condition. We recommend the services of a NJ licensed architect to determine the best options for re-use, adaptive reuse, or reconstruction. The cost of the structural, MEP, and architectural repairs for this building can be significant. The economic feasibility of repair vs. replacement shall be further studied in conjunction with practical use of the current building layout. At this time, KSI can only comment on the extent of repairs required for the current use. However, KSI can further consult on the repair, renovation or reconstruction options once a more defined building use and layout is determined.

There were also discussions about adding another level to the existing building. However, based on our review, the existing masonry walls would not be suitable to support another story in order to simply "build up". An alternate and common approach to build up without relying on the existing walls is to build steel framed structure/platform to be built inboard of the existing exterior walls. This structure would require many new columns, footings and steel diagonal bracing throughout the building, which could limit floor plan use. It is an expensive option and shall be considered in the repair vs reconstruction study for the building.

Our observations and recommendations are based on our visual review of the exposed areas of the foundation and our experience reviewing this type of construction. We performed limited calculations concerning the existing framing and offer no guarantee or warranty for any part of the existing building. If you have any questions or need clarification, please do not hesitate to contact us.

Sincerely,



Peter J. Aragon, P.E.

NJ Professional Engineer License Number 051243



Photo #1 – Exterior Northwest Side of the Building.



Photo #2 – Front of Building.

825 Bloomfield Ave., Ste 201
Verona, NJ 07044
Phone: 973.577.7739
Fax: 732.938.2661
www.ksi-pe.com

P.O. Box 628
Farmingdale, NJ 07727
Phone: 732.938.2666



Photo #3 – Southwest View of Building.



Photo #4 – South View of Building.

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Photo #5 – East Side of Building.



Photo #6 – North View of Building along Provost Court.

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Photo #7 – Exterior Wall Construction.



Photo #8 – Stress Cracking in Exterior Wall (North).



Photo #9 – Stress Cracking in Exterior Wall (East).



Photo #10 – Surface Rusted Fire Escape & Large Sections of EIFS Removed/Missing.



Photo #11 – Water Damaged Ceiling at Southeast End of Courtroom.



Photo #12 – Water Damaged Ceiling Northwest Corner.

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Photo #13 – Southwest Corner Chimney/Chase with Water Damage.



Photo #14 – Temporary Ceiling Repairs.

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Photo #15 – View of Ceiling Cavity below Roof at Non-water Damaged West End.

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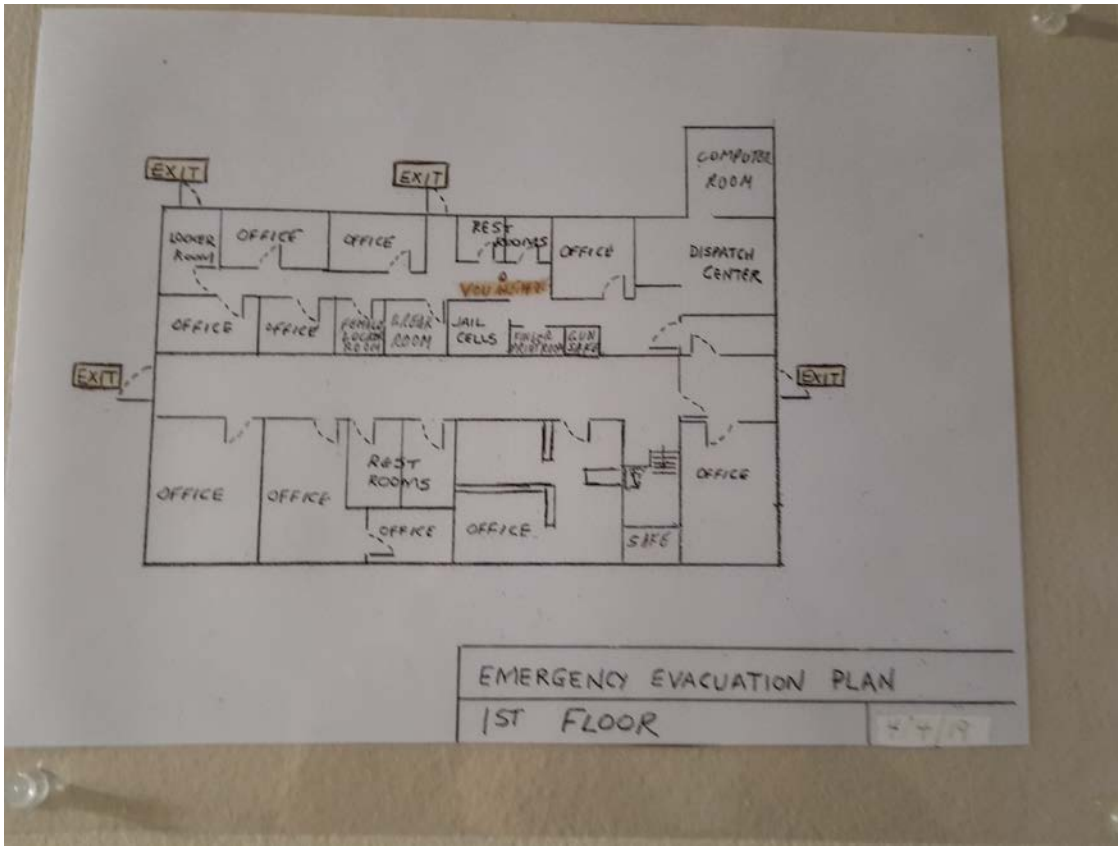


Photo #16 – Existing First Floor Plan (Evacuation Plan).



Photo #17 – Rear Roof – Bowstring Truss & Rafters above.

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Photo #18 – Existing First Floor Plan (Evacuation Plan).



Photo #19 – 2x Ceiling Joists without Hangers to Truss.

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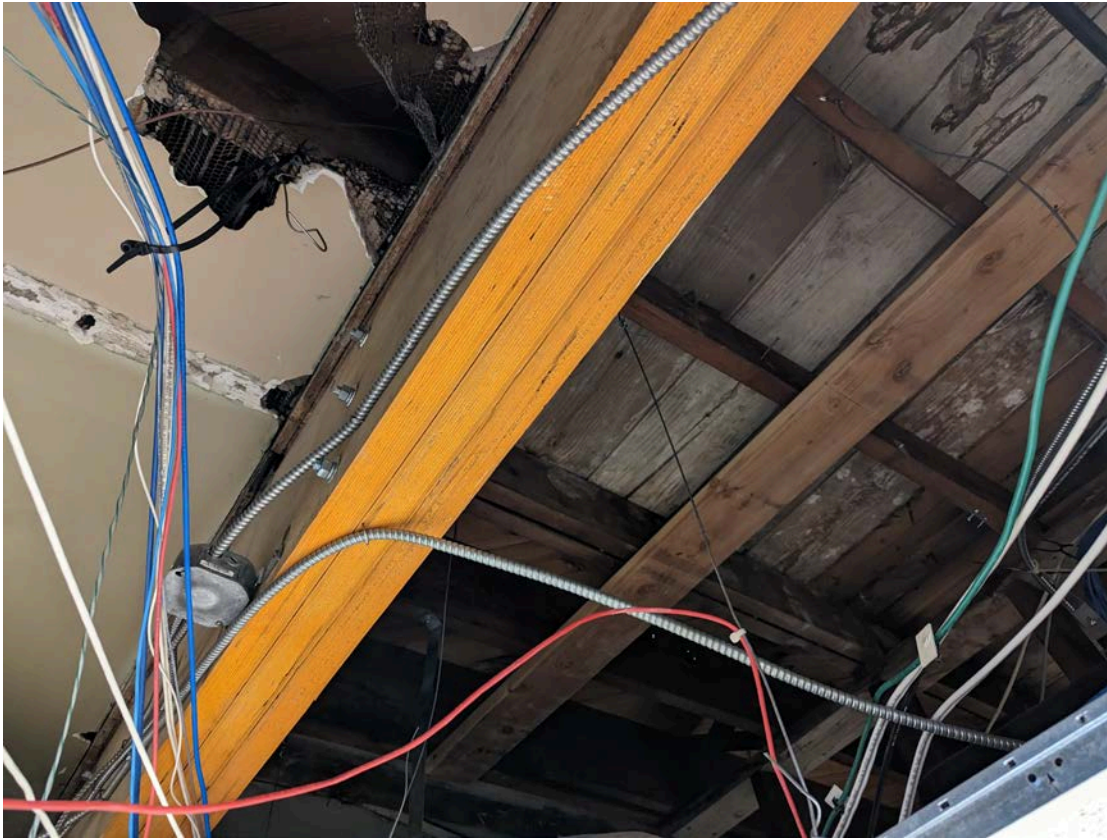


Photo #20 – Dropped LVL Beam & Exposed 2nd Floor Framing at Southeast of Building.

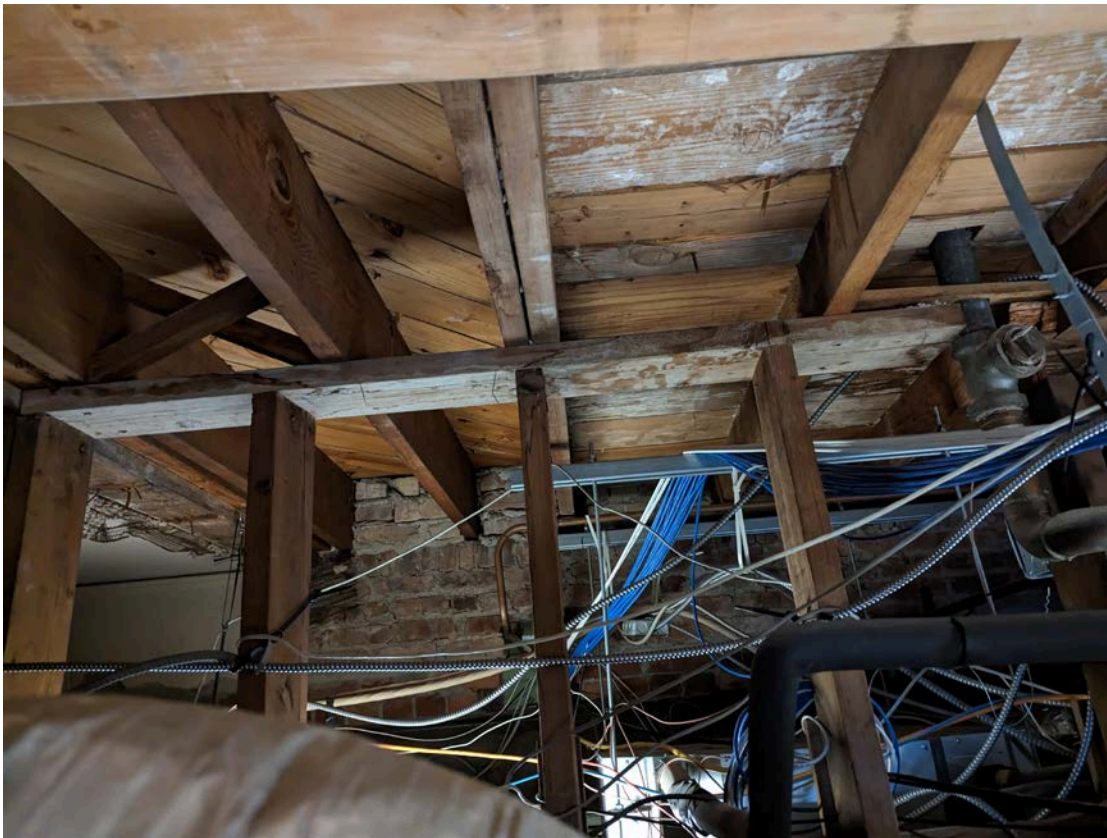


Photo #21 – Notched Wall Plate & 2x6 Floor Joists located under Corridor/Bath Above.



Photo #22 – Typical First Floor Concrete Construction above Basement.



Photo #23 – Basement Wall Construction.

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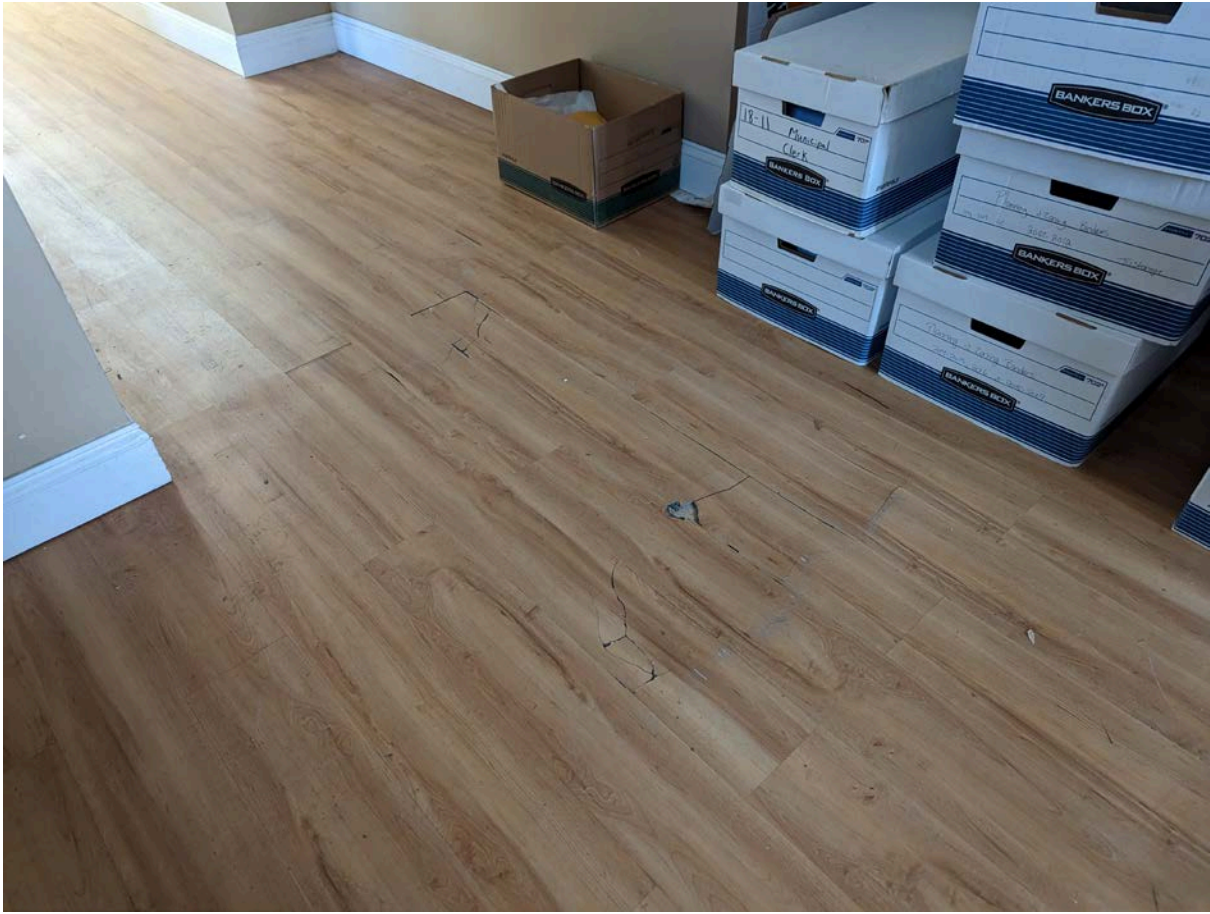


Photo #24 – Damage to First Floor Finish – Sleepers over Slab on Grade.

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