Brown & Beattie
BUILDING SCIENCE ENGINEERING
588 Edward Avenue, Unit 49, Richmond Hill, ON L4C 9Y6
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REPORT REGARDING STRUCTURAL ASSESSMENT OF FIRE DAMAGED BUILDING

AT
36 LANCASTER STREET EAST
KITCHENER, ONTARIO

PREPARED FOR:
Levente Toth
of
Gore Mutual Insurance Company

DATE:
March 21, 2024

REFERENCE:
Lancaster36.adj/r

25 YEARS Brown&Beattie
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March 21, 2024 Ref. Lancaster36.adj/r

Gore Mutual Insurance Company
252 Dundas Street North,
P.O. Box 70
Cambridge, ON N1R 5T3

Attention: Levente Toth ltoth@goremutual.ca

Re: Structural Assessment of Fire Damaged Building
36 Lancaster Street East, Kitchener, Ontario
Insured: [redacted]
Client Claim Ref.:
Date of Claim: August 4, 2023

As requested, we visited the building at 36 Lancaster Street East in Kitchener to review engineering aspects of the recent structural fire damage. Specifically, we were requested to provide our opinion regarding the appropriate 'structural' Scope of Work to return fire-damaged sections of the building to conditions commensurate with that prior to the fire. Please see the attached structural repair drawings for initial budgeting and subsequent Permit Application.

We have the following summary comments.

1. INVESTIGATION

Mr. Stephen MacDougall P.Eng., from Brown & Beattie visited the subject building on October 20, 2023 to review relevant structural conditions related to the fire damage to the building structure.

The photographs included with this report were taken during our site visit unless otherwise noted. Additional photographs can be provided as considered necessary.

The interior finishes were in place at the time of our inspection, concealing underlying conditions from ready assessment. Our review was limited to visible building components and we have not completed destructive testing unless otherwise noted. We have not reviewed construction drawings or calculations, environmental or concealed conditions. This is not a full Code, By-Law or Zoning Compliance or Structural Assessment of the entire building nor is it a Cause and Origin type assessment of the fire.

This investigation is designed to provide sufficient information for its purpose, while trying to balance the cost of obtaining this information. It is likely that conditions not uncovered by this investigation exist, which may affect the costs or effectiveness of the recommended repairs.

2. INTRODUCTION

This is a two and a half-storey (+basement) three-unit apartment building. We assume the original front portion of the building is in the order of 100 years old with the rear single-storey addition in the order of 40+ years old. We understand the building is a heritage designated property within the City of Kitchener Civic Centre neighbourhood heritage conservation district.

Side Elevation

Rear Elevation

For the purposes of this report, Lancaster Street runs north-south and the building is on the east side of the street (front facing west).

We understand that the fire originated along the rear exterior of the building; however this is not a cause and origin assessment.

3. OBSERVATIONS AND ASSESSMENT

1. This building includes three dwelling units with separate units in the basement, first floor and second floor respectively. Access to the basement unit is provided via the rear exterior stairwell, with access to the first and second floor units provided by separate entrances along the front of the building. We understand that this building was registered as a duplex with the City and that the basement apartment was added without a Permit.

2. Relevant 'structural' building components of the original front portion of the building include stone masonry foundation walls around the perimeter of the excavated basement with a concrete slab-on-grade basement floor. It appears that the foundations within the front half of the original building have been previously underpinned in order to lower the basement floor elevation, the details of which are subject to confirmation.

Where checked, the exterior wall framing includes 2x4 “balloon framed” studs which are continuous from the top of the foundation wall to the roof level. The first floor includes 2x10 joists spaced at 16” o/c spanning front to back where checked. The second-floor framing was concealed at the time of our review; however, is assumed to be similar to the first. It is unknown if the second floor joists include bearing support (typically with the use of a ribbon joist notched into the studs) or if the joists are simply nailed to the side of the balloon framed studs.

The roof framing was mostly concealed at the time of our review; however, appears to include 2x4 rafters supporting plank sheathing. The second floor includes a combination of sloped and horizontal ceilings which are assumed to include concealed collar joists.

3. Relevant 'structural' building components of the rear addition include concrete block masonry foundation walls with assumed concealed footings extending to an unknown depth around the perimeter of an unexcavated crawl space. Where checked, the floor framing includes 2x8 joists spaced at 16” o/c spanning front to back.

   The exterior walls of the addition include 2x4 studs with OSB sheathing supporting 2x8 rafters spaced at 16” o/c with 1x2 strapping and plywood sheathing. The rear addition includes sloped ceilings (no ceiling joists) except for the hallway which includes 2x4 ceiling joists.

4. Relevant building ‘envelope’ components of the original building include an asphalt shingled rain barrier roof above a combination of sloped ceilings and a shallow attic space with assumed insulation and plaster or drywall ceiling finishes. It should be noted that based on the limited depth of the roof rafters, the roof likely does not include adequate thermal insulation or ventilation between the insulation and roof sheathing as required by the current Code.

   The exterior walls of the original building include brick masonry veneer on the exterior and lathe and plaster interior finishes. It is unknown to us if the exterior walls include significant amounts of thermal insulation.

   The basement of the original building is finished and includes drywall finishes with assumed concealed vapour barrier, strapping, and insulation on the interior side of the foundation walls.

5. Relevant building ‘envelope’ components of the rear addition include an asphalt shingled rain barrier roof above a sloped ceiling with batt insulation between the rafters, polyethylene vapour barrier and drywall ceiling finishes. The roof includes cross strapping along the top of the rafters intended to facilitate ventilation; however, the functionality of this ventilated space is suspect due to

the lack of roof top ventilation where the roof of the addition meets the rear wall of the original building.

The exterior walls of the rear addition include board and batten wood siding with batt insulation between the studs, polyethylene vapour barrier and drywall interior finishes.

6. Significant “structural” fire damage to the building appeared to include primarily the rear exterior wall and roof of the single-storey rear addition.

   The fire resulted in significant charring to almost all of the roof rafters forming the roof above the rear addition. This includes the roof extension above the rear deck and supporting beam which was mostly consumed by the fire.

The roof framing above the garage addition was concealed at the time of our review; however, it appears that this roof framing was likely also at least locally damaged by the fire.

Fire damage to the roof extended up and damaged the top of the interior loadbearing wall where the roof of the rear addition meets the original building above the laundry room. This wall appears to have been constructed on the exterior side of the original brick masonry and is assumed to provide loadbearing support for the roof of the addition. It is subject to confirmation following the removal of interior finishes if the adjacent wall of the original building was also damaged.

The fire also damaged the majority of the rear exterior wall of the first-floor bedroom and bathroom within the addition. The full extent of damage to the wall is subject to confirmation; however, it appears that the exterior edge at the top of the wall studs were damaged along the majority of the rear wall.

The fire damaged the rear exterior deck as well as the rear ends of the first-floor joists of the addition. Where checked, the floor does not appear to have included a rim joist along the rear exterior wall, allowing the fire to enter the crawl space. The full extent of damage to the currently concealed floor joists is subject to confirmation and will likely require the removal of the floor sheathing.

7. The following photographs depict the general conditions of the interior finishes of the building noted during our inspection; the full extent of which is beyond our mandate and therefore was not assessed at the time of our inspections (related clean-ups had yet to be completed). It should be noted that the Code required unit fire separations provided by the drywall or plaster ceiling and wall finishes between the units included widespread fire, water, and/or smoke damages.

Basement




First Floor



Second Floor



Third Floor

8. The following photographs depict the general conditions of the exterior of the building noted during our inspection. Externally, fire related damages included widespread damage to the exterior wall cladding and roofing of the rear addition. The fire also resulted in at least localized smoke staining of the exterior brick masonry on the original house, the full extent of which is beyond the scope of this report and subject to confirmation.

9. Unrelated to the recent fire damage, several issues relating to the building's compliance with the current Building Code were noted during our assessment of the fire-related damages (not meant to be a complete inventory of such issues as many areas remain concealed and may reveal additional issues.)

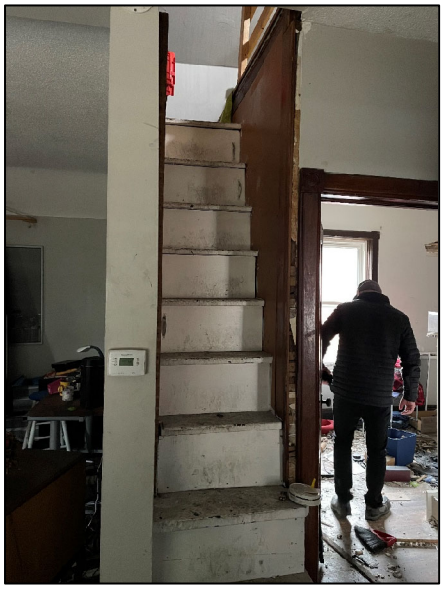
    - As previously discussed, the building is registered with the City as a duplex and it appears that the basement unit (making it a triplex) was added without a Permit. The basement ceiling height ranges between 5'-11" and 6'-2" where checked within the rear half. The current Code requires a minimum height of 6'-11" throughout 75% of the basement with a minimum height of 6'-5" below beams and ducts. Only the front half of the basement which appears to have been previously underpinned to provide a ceiling height of 7'-1" would meet this height requirement. In our opinion, the existing basement window also would not meet current Code requirements for egress and natural lighting.

    - Unrelated to the recent fire, it should be noted that the original building appears to include stone masonry foundation walls. These walls were mostly concealed at the time of our review; however, in our experience, it is not uncommon for stone masonry foundations of this age to develop voids over the long term, as the grout and mortar between the stones (in the element, not just at the surface) disintegrates and washes out, leaving the element less and less stable as this condition progresses. Due to the age of the stone masonry walls, the deterioration of the mortar within the wall may be significantly greater than what is visible on the above grade exterior portions and as a result may have significantly weakened the wall.

    - As previously discussed, the original building includes balloon framing where the studs are continuous from the top of the foundation wall tot the roof level. Where checked, the studs do not include Code required fire blocking at the second floor level and it is unknow if they include adequate bearing support for the floor joists.

    - The third floor joists appear to be secured to sides of roof rafters as the original house includes partially closed ceilings on the second floor level. This framing was concealed at the time of our review; however, in our experience it is unlikely that the third floor joists include adequate bearing support as required by Code. It should also be noted that the third floor may have originally been intended for use as an unconditioned attic space, and as a result the third floor joists may not have been intended to support occupancy loading.

- Access to the third floor is provided via very steep, narrow stairs which do not include a handrail. These stairs would evidently not meet current Code requirements and in our opinion are a falling/safety hazard. As previously discussed, it is unclear if the third floor was originally intended as occupied space or if it was converted from an attic sometime since original construction.



- As previously discussed, the rear addition does not appear to include a rim joist along the rear exterior end. In our opinion, a rim joist is required at this location in order to adequately transfer the loading from the wall and roof above to the foundation.

- The roof of the rear addition appears to be supported in some areas by a ledge board bolted to the rear exterior wall of the original house. The ledger board appears to be located near mid-height of the wall and it is unclear if the ledger board bolts are adequately fastened to the building

structure. It should be noted that the ledger board should not be secured to the brick veneer which is not intended to support roof loads.

- Where visible, the rear wall of the original building appears to include openings in the brick masonry, while maintaining sections of brick above. It is unclear if the remaining brick above these openings is adequately supported.

- As previously discussed, the roofs of the original building and rear addition include sloped ceilings which provide limited space for thermal insulation and Code required ventilation between the insulation and roof sheathing. In our opinion, the existing roof assemblies do not include adequate insulation and ventilation with respect to current Standards and as a result may be susceptible to long-term performance issues such as excessive condensation build-ups during the winter months.

- The basement stairs does not include a handrail as required by the current Code.

4. DISCUSSION

Part 11 of the Ontario Building Code applies to renovations of existing building systems, assuming related Permits were obtained for their original construction. Renovation of existing buildings can fall within the scope of a “basic renovation” or an “extensive renovation” depending on the extent of the repair work at issue to be carried out (in this case the fire damages). Basic renovations allow the existing systems to be repaired to meet existing conditions and to the same performance levels, while extensive renovations require Upgrades in compliance with Part 11 and the other parts of the Ontario Building Code, again assuming Permits were obtained for the original construction. The Building Code indicates that extensive renovations involve significant changes or substantial removal to the interior walls, layouts, floor assemblies, roof assemblies, or building systems, while basic renovations involve material alterations or repairs to the existing systems. In our opinion, Part 11 does not require sections of a building not undergoing renovation to retroactively meet current Codes.

The fire resulted in significant damage to the majority of the rear addition roof and rear exterior wall as discussed in this report. Based on this, it is our opinion that the renovations required due to the fire damage would be considered an “extensive renovation” of the fire-damaged framing systems, requiring the replaced building systems to meet the structural requirements of the current Code.

An extensive renovation under Part 11 of the Code requires that the renovated fire-damaged building system which is being substantially replaced meet the requirements of the current Code. Part 11 of the current Code provides compliance alternatives to allow for components that do not meet the current Code to remain in an existing building if they are affected by the construction work and not replaced. It also allows for areas and structures not affected by the construction work to remain in an existing building.

In our opinion, all significantly damaged structural and fire rated assemblies that require replacement as discussed in this report should be replaced with new assemblies that meet current Code requirements within the limitations of existing construction.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the information available, it is our opinion that the recent fire resulted in significant structural damage to the majority of the rear addition roof and rear exterior wall to the extent that the complete replacement of this roof section and rear exterior wall is warranted. The fire also damaged the rear exterior deck to the extent that its complete replacement is warranted. Localized fire damage was noted to the rear end of the first-floor joists for the rear addition to the extent that the augmentation or replacement of at least some of these joists is warranted, the full extent of which is subject to further review. Localized fire damage was also noted to the interior stud wall supporting the roof of the addition along the rear wall of the original building to the extent that the partial replacement of this wall is also warranted, again the extent of which is subject to further review.

Unrelated to the recent fire damage, several issues related to the building's compliance with current Code requirements were identified during our review of the fire damages. As previously discussed, Part 11 of the Code allows for existing building components not affected by the construction work to remain in an existing building; however, several of these items should be addressed as part of the repairs due to potential safety concerns, recognizing these are not a result of the fire. We recommend reviewing issues further following the removal of interior finishes.

As we understand the basement dwelling unit was added without a Permit, Part 11 of the Code does not apply to the replacement of that unit. As discussed, the existing basement ceiling height and egress does not meet current Code requirements. Based on our discussions, we have included for the removal of the basement dwelling unit for the purposes of the fire damage repairs. If the Insured wishes, a separate permit application may be submitted to the City to convert the building from a duplex to a triplex.

Additional repairs may be necessary around the discussed areas in this report, the full extent of which is subject to confirmation upon interior finish removals and as the Work progresses to expose presently concealed conditions. We recommend we return to site following the removal of the interior finishes to review conditions further.

Please see the attached structural repair drawings for budgeting, and Permit Application. As discussed, the full scope of work is subject to confirmation following the removal of interior finishes.

Please note this report is based primarily on technical considerations. We recommend final decisions also take into account other considerations such as costs, timings, coverage, desired alterations, Permit implications, etc.

We can prepare a further report with additional photographs and comment or drawings as considered necessary. Should you wish to review matters further in the interim, or review additional information that becomes available, please contact us at 905-737-0111.

Yours truly,
BROWN & BEATTIE LTD.

Stephen MacDougall, P.Eng.

Tim Beattie, P.Eng.

c. Ben O'Malley, Gore Mutual (bomalley@GoreMutual.ca)

Please note *this report was based on a visual assessment of the accessible areas only. Unless noted specifically, no intrusive or destructive testing was completed during this assessment. Technical specifications should be prepared for any work decided upon as a result of this report. The material in this report reflects best judgement in light of the information available and does not imply fitness for a particular purpose and should not be considered a verification of past or present regulations. Brown & Beattie Ltd. cannot be held responsible for any deficiencies that may be found within inaccessible areas by others, which have not been documented in this report. Copies of this report are subject to authentication from the writer. Brown & Beattie Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. Use of this report or any other aspect of our service is not authorized until and unless our account is paid in full and on time.*