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06 July 2022

Reference: Internal Investigation Unit 29 and Chimney, Northface Condominiums, North Conway, NH

Dear Melissa,

As you know, on May 10<sup>th</sup> we were back at Northface Condominiums to perform a more in-depth inspection of the installation conditions of the woodstoves. Specifically, we performed an internal inspection of the condition of the enclosed components inside the walls near the wood stoves, the connection between the wood stove and the chimney and the interior and construction details of the chimney itself. We could not have done this work without your assistance so thank you for providing S.D. Szetela and BTS personnel access to Unit 29 at Northface Condominiums and a special thank you as well to the owners of Unit 29 for permitting this work to be performed in their unit.

While on site on May 10<sup>th</sup> a crew of masons from S.D. Szetela Masonry opened three areas of concern which allowed us to better understand the construction of these chimneys and the overall woodstove installations. Please see the included sketch which shows both a plan view and a cross section view of what we observed. The areas that were opened up were:

1. The exterior cap atop the eastern most chimney at Building 3. This chimney serves Unit 29 as well as Units 21, 22, 25, 26 and 30. Unit 29 is an easterly end unit located on the third story of Building 3 and shares a chimney flue with Units 21 (first story) and 25 (second story).
2. The protective masonry and other wall components around the thimble where it passes through the masonry wall behind the stove.
3. A small section of gypsum wall material that was found to have been applied to the surface of the common wall between Unit #29 and its neighbor to the west, this wall being behind the brick masonry wall finish inside Unit #29.

**Question one: What is the condition and construction of the combustible wall where the thimble passes through the wall framing to transfer flue gasses into the chimney flue?**

In a wood stove installation, the “thimble” is the component that the stoves chimney connector connects to so that flue gases can pass from the stove, through the chimney connector (which is connected to the thimble) and then through the thimble into the chimney flue. In the chimneys at Northface the thimbles are installed in and through the brick masonry that covers the wall behind the wood stoves. In Unit #29, the area around the thimble, as the thimble passes through the masonry wall into the chimney, was surrounded by mortar and brick. Specifically, there was a brick “box” constructed around the metallic thimble. Then, the annular space (or gap) between the



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somewhat square brick frame and the round thimble was filled with mortar. The dimension of the area filled with mortar was approximately 12" high by 12" wide, inside the brick "walls" which were found to be on the top, bottom, and sides. In the case of Unit #29, the thimble was found to be a double-wall "metalbestos" (trade name for insulated double wall stainless steel chimney pipe) insulated vent connector. The minimum clearance to combustibles for this type of connector is not specified within the codes but instead is always based on the manufacturer's specific details or "listing," which in this case we do not have as we do not know the manufacturer of the specific product that had been used. Usually however, similar materials are listed to be installed no closer than 6" to combustible materials.

**Question two: What is the condition of the wood wall studs behind the brick/masonry wall surrounds in the units, particularly in the areas where the vent connectors are so close to the walls?**



A section of the protective masonry behind the stove was removed which allowed access to and observation of the otherwise concealed area behind the brick. We were comforted to see that gypsum wallboard had been applied to the face of the wall framing and after removing a small section of gypsum, we were comforted to find insulation to have been installed between the studs. We observed and noted that the studs visually were in good condition despite that the area that we viewed was quite close to where the chimney connector would be located, immediately adjacent to the thimble. Visually, no area of the wood studs that were viewed appeared to have experienced pyrolysis, were

visually charred or exposed to elevated temperature, or otherwise showed any adverse effects from elevated and/or extended high-heat exposure.

**Question three: Is there an airgap behind the brick, is there any material covering the wood studs behind the brick surround and is this wall insulated?**

As explained above, in the area behind the brick surround that was viewed, we found that gypsum wall board had been installed over the wood stud-wall framing behind the surrounds. Fiberglass insulation was found to have been installed between the studs in the wall cavity of the wall that separates Unit #29 from its neighbor. At the exterior wall however, the wall between the unit and the chimney, the insulation did not fill the stud bay entirely and was absent along the left side of the cavity, adjacent to the thimble. There was a small airspace observed between the back of the brick of the wall surround and the face of the gypsum wall board, this airspace varying between 1/2" to 3/4" in depth. Furthermore, we observed that the airspace was not continuous behind the brick surround as in many areas the mortar between the bricks of the surround had been pushed back into the airspace. Additionally, the airspace was not vented in any manner as it is fully enclosed at the top, bottom and both sides. One inch (1") minimum air space is required between the back of the brick masonry and the face of the wall behind the brick and, the bottom and top courses of brick are to be placed in a staggered configuration which allows free air movement into the area (at the bottom) behind the brick and then outward at the top. This free air movement is what prevents the development of elevated temperatures behind the brick masonry.



**Question four: If the flues can be removed, is there sufficient space within the existing brick masonry chimney that six separate flues can be installed, one flue to serve each solid fuel burning appliance, as is required by both the State Fire Code and State Building Code?**

Within each chimney there are two 12" x 12" (outside dimension) 11" x 11" (inside dimension) terracotta flues. Each flue is placed towards the outer edges of the chimney with the space in between the two flues being taken up by a block masonry divider. In the case of the chimney that was opened, each of the flues had been lined with a liner system locally known as the Ahren's method. The perimeter of the interior of each flue has been filled with a proprietary mortar which is installed after sliding an 8" cylindrical form down the chimney. Using this Ahren's method, after the mortar sets up (hardens) around the form, the cylindrical form is removed, leaving behind a round, 8" flue inside what had been an 11" square. Please know that we don't believe each flue in every Northface chimney has had this lining but, for those that have been lined using this method, please know that a round flue is more efficient than a rectangular or square one, but the available flue area has been reduced and this mortar "liner" cannot be removed without destroying the original terracotta flue. IF the two existing flues and the masonry block divider could successfully be removed, we do not believe it possible to properly install six individual flues of appropriate size to serve six solid fuel burning appliances.



**Question five: what to do from here?**

The reason Bergeron Technical asked S.D. Szetela Masonry to be involved in this project is that the Szetela masons are some of the best and most experienced that we know. Working as a team, BTS and Szetela have successfully resolved some difficult masonry problems and long-lasting masonry repairs have been made when others didn't want to be involved. If there is a masonry problem that S.D. Szetela cannot solve, it either cannot be solved or should not be attempted. Collectively, Szetela and Bergeron have contemplated what we found at Northface Unit #29 and have reached some conclusions.

1. **Question:** Is it possible to break out the two flues, in the case of Unit #29 two lined flues, along with the masonry block separator and leave the remainder of the chimney intact?

**Answer:** It may be possible but there's a stronger likelihood that this would be unsuccessful.

2. **Question:** IF the two existing flues and any associated flue liner could be removed, along with the block masonry in between, would it be possible to install six appropriately sized, code compliant flues that could serve six wood burning stoves inside the remaining brick masonry chimney?

**Answer:** No. We have done a lot of research and remain unaware of any flue material that can both fit into the available space and be installed according to either the requirements of the codes or the listing for the material itself. There are several relining materials available, including flexible stainless steel relining materials, DuraFlex being one, however these are "relining" products, listed to be installed to reline an otherwise deteriorated or damaged flue. These are a metallic product that would be used



similar to the "Ahrens" relining that has already been done. They are not to be used as stand-alone flues.

3. **Question:** If the two flues were successfully broken out, might it be possible to use the available area inside the remaining brick masonry to install venting for pellet stoves?

**Answer:** This may be possible, but this would entirely be based on the pellet stoves that are chosen and the required venting method for the stove. It would be quite difficult to work within the existing chimney that would remain.

4. **Question:** Do we see other options?

**Answer:** Stan and Shawn have talked about two options, one much more definite than the other.

**Option 1:** S.D. Szetela is willing to attempt the removal of two flues and the masonry block divider inside one chimney. If this can be accomplished successfully, the interior space that would remain to be worked within would be approximately 13" x 42". Then, however, there's little opportunity due to the woodstoves being in vertical alignment with one another, to install and connect the vents. We don't enjoy this option but... it could be attempted. This has been mentioned BUT IS NOT RECOMMENDED!

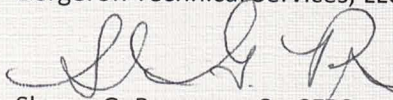
**Option 2:** The chimneys could be removed entirely from top to bottom. Then, each unit could be provided an appropriately sized Class-A insulated metal vent. The lowermost and middle floor units would definitely be vented up the outside of the building, in the area where the present chimneys are located. Perhaps the third-floor unit's vent could also fit into this same space on the exterior of the building or, the third floor could vent straight up from inside the unit, through the attic/truss area and roof to outdoors. Ideally, all six units' vents would fit into the same space where the present chimneys are. Then, the Class-A vents could be "boxed in" inside a wooden "chimney enclosure" much like many other condominiums in the north country. This is definitely accomplishable and can be fully code compliant.

5. **Question:** If the existing chimneys were removed and each unit provided a new Class-A vent would this resolve all safety and code issues that have been identified?

**Answer:** No. The installation of a separate Class-A vent to serve each woodstove would resolve the "three appliances per flue" matter, the code deficiency outside of the building. With that dealt with, at the interior of each unit, the masonry wall protection and the hearths would still not be code compliant.

Thank you again for the opportunity to be involved with this project. We look forward to answering any questions that arise.

Sincerely,  
Bergeron Technical Services, LLC

  
Shawn G. Bergeron, Sr. CFPS  
Manager



  
Katharine M. Richardson, CFPS



ENCLOSURE: Plan View and Cross Section View of Existing Installations

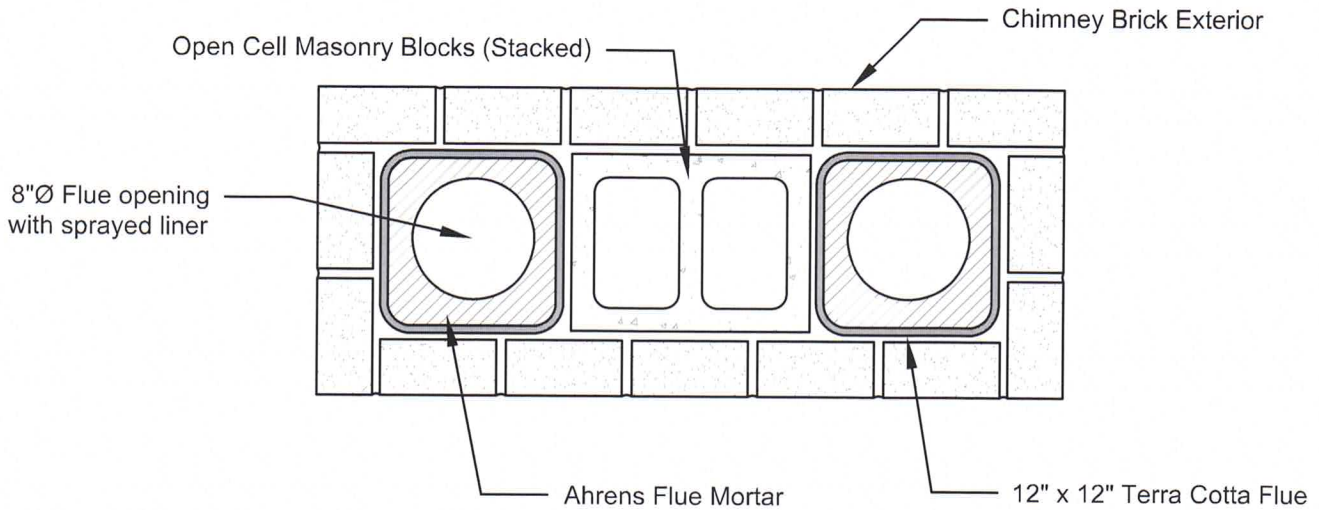
Cc: file  
Stan Szetela, S.D. Szetela Masonry

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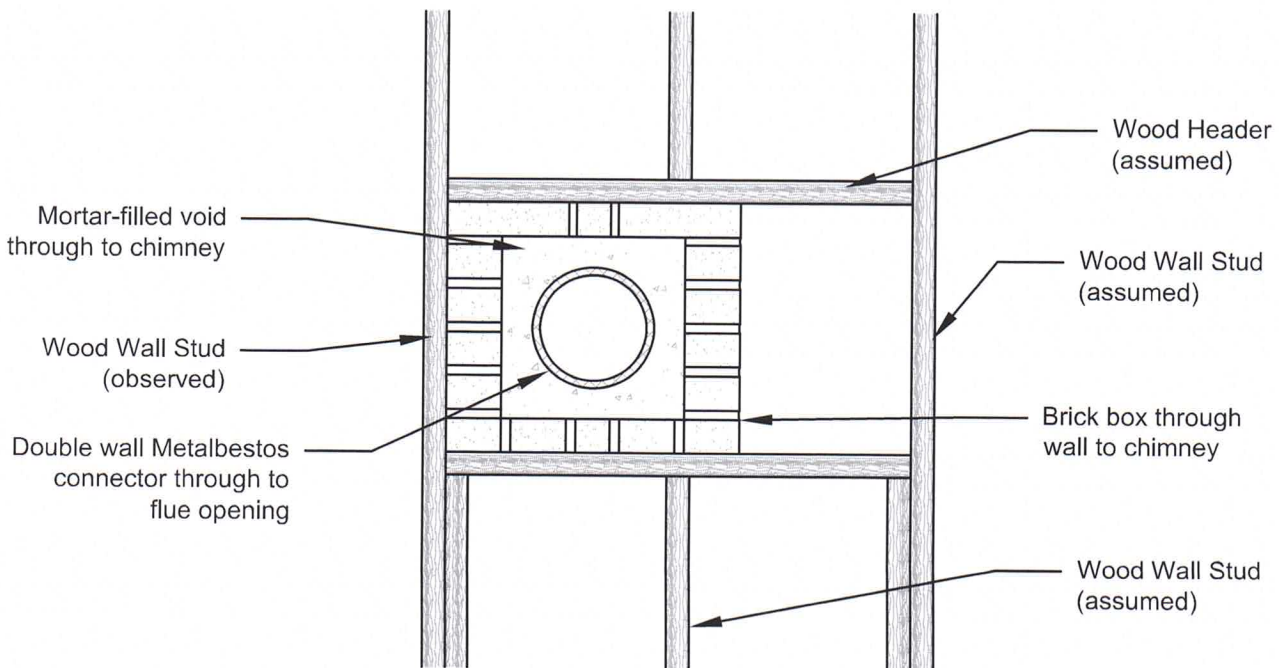
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Northface Condominiums  
Building 3 East Chimney &  
Unit 29 Thimble  
Internal Investigation Findings



Plan View of Chimney with Cap Removed



Cross Section View of Unit 29 Thimble