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A Report on Three Specific Structural Issues On the Exterior of the Read Brothers Buildings

593 King Street, Charleston, South Carolina

Submitted to:
Edye Graves, CBO, City of Charleston
April 17, 2017
Addendum 1: April 30, 2017

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On Wednesday, April 12, 2017, Edye Graves, Chief Building Official of the City of Charleston, asked Craig Bennett of Bennett Preservation Engineering to examine the Read Brothers Buildings (see Figure 1) at the southwest corner of King and Spring Streets and to advise the City on whether or not there was a significant structural issue with any of the three buildings, focusing both on the three-story corner building and the two one-story buildings to the south of the corner building. A city employee had noticed bricks on the sidewalk, just below the cornice of one of the one-story buildings, and believed that they had fallen recently. See Cover.

Bennett was at that time in Florence, South Carolina at a job site and headed to another job site in Greensboro, North Carolina, but asked Taylor Frost of Bennett Preservation Engineering to photograph the building and send a number of photographs to Bennett for evaluation. Frost sent 222 photographs to Bennett on Wednesday afternoon. Bennett was able to evaluate them that evening.

As Graves had notified Bennett that she had closed the area immediately in front of the one-story building, and as Bennett believed that the greatest danger was there, not at the three-story building, Bennett considered the most pressing life safe threat to be under control. On Thursday, April 13, he told Graves that he would evaluate the buildings in person after he got back into town on late Friday afternoon or evening.

On the morning of Saturday, April 15th, Bennett evaluated the Read Brothers Buildings only from the exterior, as the buildings were closed. Since the store had not opened after opening time, it was assumed that the store would be closed during the day for either Passover or Easter.

Following are Bennett Preservation Engineering's findings, conclusions, and recommendations to the City.

Examination of the one-story buildings to the south of 593 King, the corner building, showed, first, that the buildings appeared to be made up of two smaller buildings that had been joined together, roughly in the middle, and that the brick veneer of the upper façade of the south-most of the two was deformed and apparently failing. It appeared that the south-most two thirds of the upper façade of the south building was supported by a steel beam, one of whose flanges was damaging the brick veneer. It appeared that whatever was supporting the north end of the steel beam was failing. At the north end of the beam, the brick veneer was fractured, separating and failing, and several veneer bricks had fallen to the sidewalk. In addition, several more appeared to be in danger of falling. Fortunately, the sidewalk was blocked in that area, so there was relatively little danger to the public. See Figures 2 through 6.

At the three-story building, the main Read Brothers fabric store at 593 King, three issues of concern were found. The first, and the most obvious, was that the column at the northeast corner of the building has been damaged, reportedly by a construction vehicle. See Figures 7 and 8. There was a significant shear fracture in the remaining portion of the brick masonry column. It could not be determined by examination whether the column was a structural load-bearing brick masonry column or whether the brick masonry simply encapsulated a steel column supporting the beam over the front entry. While it is most likely that there is a steel column encapsulated within the brick masonry, it is exceptionally important that this be confirmed, as the present condition of the column poses a grave danger to the public if there is no embedded steel.

A second area of concern was found at the upper corners of the parapet at the southwest and northwest corners of the three-story building. See Figures 9 through 11. It was obvious from both King Street and Spring Street that both corners had moved outward. While there did not appear to be a significant danger to the public under gravity load alone, it appeared that there would be a significant danger to the public if there were vibration or lateral movement from either a seismic event or severe winds. It is possible that there could even be movement with vibration from nearby pile driving.

Of less concern was a missing brick at the second floor level of the northeast corner of the three-story building. We could see no cause for that damage other than perhaps the installation of electrical equipment nearby on the façade. See Figures 12 through 14.

We recommend to the City that the sidewalk in front of the south-most one-story building remain closed until whatever needed structural strengthening under the north end of the steel beam has been successfully accomplished, and all of the bricks in the façade have been stabilized.

We further recommend to the City that the City have the owners of the buildings check the area at the second floor on the northeast corner, where the brick is missing, to make sure that there is no inherent cause for further brick loss in that area.

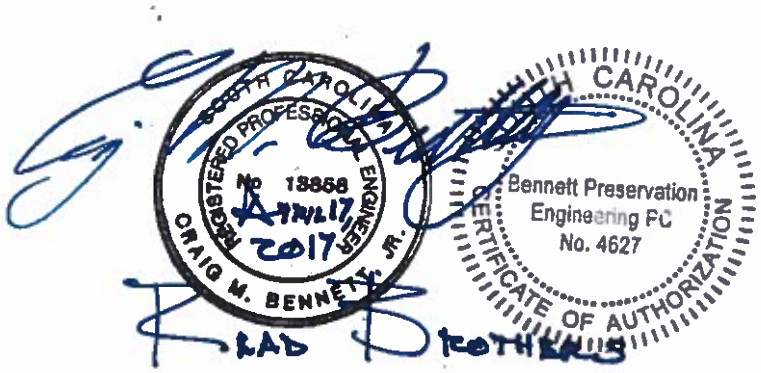
We recommend that the City have the owners of the building replace the corroding steel lintels in the third floor west windows and tie the northwest and southwest corners of the parapet and uppermost portion of the façade back to the remainder of the building.

Finally, we recommend to the City that the owners of the building confirm to the city, through testing, that there is an embedded steel column within the brick masonry column. If the owners are unable to confirm that there is a steel column embedded in the masonry, we recommend that the City have the owners shore the beam and wall above the column and repair the structural damage to the masonry column. Again, if there is no embedded steel column, we further recommend that the adjacent portions of both King and Spring Streets be closed to all traffic until the masonry can be shored or repaired.

The findings, conclusions, and recommendations in this report have been written and reviewed by Craig M. Bennett, Jr. PE of Bennett Preservation Engineering PC, with additional help from Taylor C. Frost of this firm. We have based this report on information available to us at this time. If conditions change or more information becomes available, we would like to have the opportunity to reevaluate our conclusions and recommendations.

We understand that the information submitted in this report could require additional explanation. We welcome the opportunity to review this information and to answer any questions. We appreciate the opportunity to present this report and hope that we may be of additional service in the future.

Sincerely,



Craig M. Bennett, Jr., PE
Bennett Preservation Engineering PC

The following photographs were taken by Taylor Frost and Craig Bennett of Bennett Preservation Engineering.

Figure 1 - Read Brothers Buildings.

Figure 2 - South-most building.

Figure 3 - Fractured upper facade.

Figure 4 - Break in veneer at end of embedded steel beam.

Figure 5 - Same.

Figure 6 - End of steel beam.

Figure 7 - Damaged corner column.

Figure 8 - Shear fracture in column.

Figure 9 - Missing brick at third floor, corner.

Figure 10 - Same.

Figure 11 - Same.

Figure 12 - Damage at south side of southwest corner.

Figure 13 - Damage at northwest corner caused by expansion of corroding lintel.

Figure 14 - Similar damage at southwest corner.

Introduction

On Thursday, April 20th, 2017, Bennett visited the Read Brothers buildings with Edye Graves and Rick Anewalt of the City of Charleston. They met with both Tom and Marianne Read, owners, and toured all of the Read Brothers buildings (593, 591, 589 1/2 and 589 (exterior only) King Street). This addendum to the original report covers observations made on both on the interior and the exterior of the buildings.

Additional Findings

The first floor of the 593 King Street Building appeared to be in acceptable shape except for the severely damaged brick masonry column on the northeast corner of the building. Close examination of that column indicated both that it was unlikely that there was any internal steel in the column and that the column supported a concrete arch over the north window on the east façade. See Figures 15, 16 and 17.

A tour of the upper levels of the same building showed that the second floor was in relatively poor condition and that it was used for stacked storage. Deformations of the girders supporting the second and third floors indicated the likelihood of significant overload. See Figures 18, 19 and 20. The third floor was in significantly worse condition than the second, with roof leaks, fallen plaster, deteriorating steel lintels, and deteriorating millwork. See Figures 21, 22 and 23.

The one story building immediately south of 593 King appeared in be in better condition than the second building to the south (589 1/2 King), which showed severe deterioration from water intrusion, both on the King Street façade and along the column line supporting the roof system. See Figures 24 and 25.

Additional Conclusions

General conclusions are, first, that all of the properties suffer from water intrusion. Secondly, there is a significant threat to public life safety from failure of the beam supporting the masonry façade on King Street at the 589 1/2 King Street building. Third, there is some possibility of failure of the northeast corner column on the 593 building. Such a failure would be catastrophic. Finally, deterioration of the interior wall in the 589 1/2 building poses some threat to the building occupants.

Additional Recommendations

We recommend:

- That the sidewalk and parking lane in front of 589 1/2 King remain closed until the façade and its supporting structure have been repaired.

- That the northeast corner column of the 593 King Street building be clamped to prevent a possible sliding shear failure and that it be repaired as soon as possible. Clamping will almost certainly require removal of the glass on both the south and west sides of the column.

- That the same column be permanently repaired with grout injection and the installation of internal tie rods and plates, to prevent the sliding shear failure previously mentioned.

- That the loading on the upper floors of 593 King Street be reduced significantly.

- That the 589 1/2 King building not be occupied until the roof has been replaced and the structural framing thoroughly checked.

- That the roof of the 593 King building be repaired, that the third floor steel lintels on the west façade be removed, treated and replaced, and that the loose brick masonry be repaired and tied back to the building.

Additional Figures (on the following pages)

Figure 15 - First floor of 593 King Street building.

Figure 16 - Northeast corner column supporting concrete arch.

Figure 17 - Fracture in the same column.

Figure 18 - Second floor used for storage.

Figure 19 - Same.

Figure 20 - Same.

Figure 21 - Roof leak on the third floor.

Figure 22 - Same.

Figure 23 - Same. Note fallen plaster in the northwest corner of building.

Figure 24 - Ceiling of 589 1/2 King Street building.

Figure 25 - Damaged roof structure in the same building.