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30 June 2022

Mr. Richard J. Wenning
Executive Director
BeFoundation
P.O. Box 1330
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Via E-Mail: ***rich@befoundation.org***

Re: 222066
5 North Main Street – Redding, Connecticut
Building Envelope Assessment

Dear Mr. Wenning:

On 16 June 2022, Hoffmann Architects submitted a proposal to the BeFoundation for a Building Envelope Condition Assessment at the former Georgetown Bible Church located at 5 North Main Street in Redding, Connecticut. The BeFoundation is in the process of acquiring the historic church and there is a concern regarding water infiltration at the building. On 19 June 2022, the BeFoundation retained Hoffmann Architects to perform the assessment. On Friday 23 June 2022, Mr. Steven J. Susca, P.E. Senior Engineer for Hoffmann Architects, visited the site to begin the assessment.

Built in 1901, the former Georgetown Bible Church is a two-story masonry structure constructed of locally quarried granite block with a slate roof that is reportedly original to the building. The building is part of the larger Georgetown Historic District and is on the National Register of Historic Places.

Photo 1: Georgetown Bible Church.

Observations

On Friday 23 June 2022, Mr. Susca met Mr. Richard J. Wenning, Executive Director, BeFoundation, on site to discuss concerns with the property and to conduct the assessment. The assessment consisted of visual observations of the building exterior walls, windows, doors and the roof as well as interior portions of the exterior walls.

Stone steps lead up to the main floor at the north end of the church. The basement below the main floor is partially below grade due to the sloping topography that encircles the church.

Main Entry

The main entrance to the church is located at the north side of the building. Stone steps bracketed by stone parapets on each side provide entry to the narthex. Considerable mortar joint erosion is present at both the stairs as well as the parapets (Photos 2 and 3). The main door is showing signs of water damage and rot at the base (Photo 4).

Photo 2: Mortar erosion at stairs.

Photo 3: Mortar erosion at parapets.

Photo 4: Water damage and rot at the base of wood door.

Exterior Walls

The walls of the church are comprised of large granite blocks that were obtained from a local quarry. The blocks are laid up in a random ashlar pattern with beaded mortar joints between stones (Photo 5).

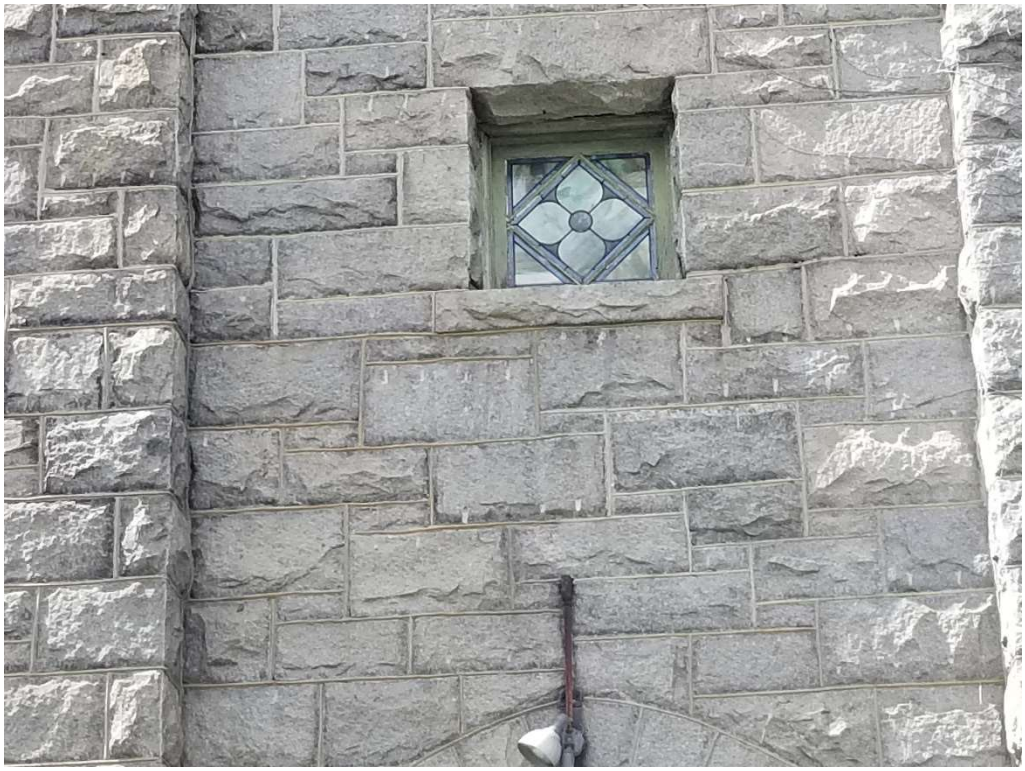

Photo 5: Exterior stone masonry in random ashlar pattern with beaded mortar joints.

The walls are approximately 20 – 24 inches wide. Review of the stone revealed it to be in good condition. No cracks or spalls in the stone were observed.

Mortar joints in the block walls are characterized by a raised bead on a flush mortar joint. In general, mortar joints in the exterior walls are in fair to good condition (Photo 6), although in many areas a crack or void between the mortar and stone was observed (Photo 7). Additionally, eroded mortar joints were observed, most typically at shaded areas (Photo 8).

Photo 6: Beaded mortar joints in good condition.

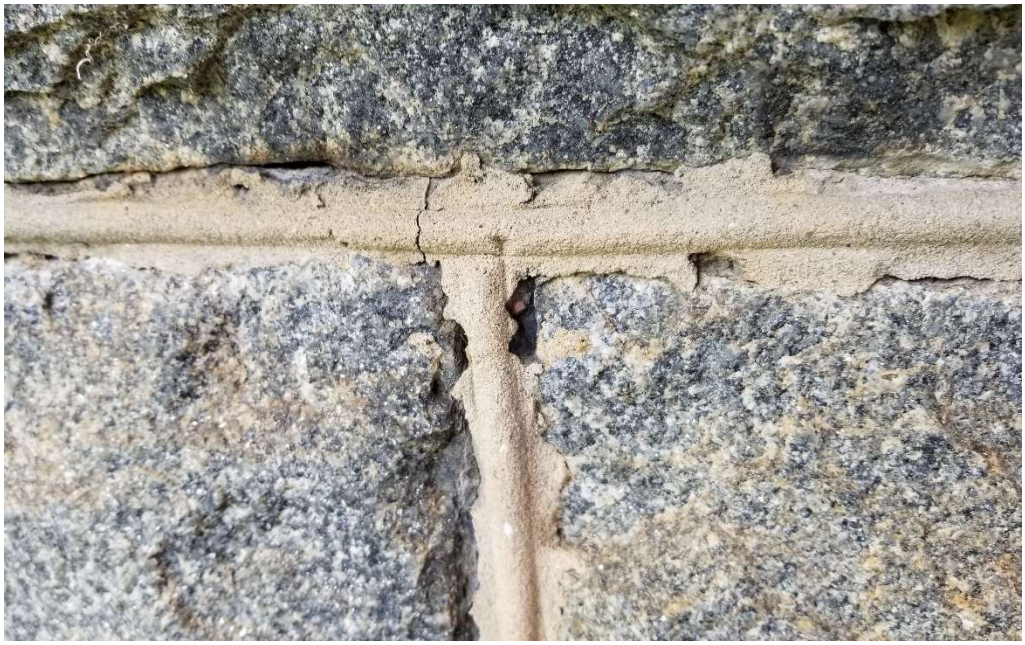

Photo 7: Mortar joints with cracks and voids.

Photo 8: Eroded mortar joints.

Windows

Wood windows are set into punched openings in the exterior stone masonry walls. It is unknown if the windows are original to the building or if they have been replaced at some time in the past. The operable windows on the main floor are double hung with wood sashes. The double hung windows on the main floor are exhibiting signs of deterioration. Peeling paint and the beginning of dry rot is evident in the frames and sashes (Photo 9).

Photo 9: Peeling paint and the beginnings of dry rot in wood window.

Glazing sealant is dry and cracked as is sealant between the window frames and stone masonry (Photo 10). Similar conditions were found at the casement windows at the partially below grade basement (Photo 11). Many of the double hung windows have had storm windows added at some time in the past. Many of these storm windows are broken (Photo 12).

Photo 10: Dried and cracked sealant at perimeter of window.

Photo 11: Peeling paint and beginnings of rot in basement window.

Photo 12: Peeling paint on window frame and broken storm window.

A large stained-glass window is set into the gabled end at the north side of the church (Photo 13). Similar to the wood windows around the basement and main floors, peeling paint and the beginning of rot are present in the window. Rust staining and separation of the wood at the joints was also observed (Photo 14). Glazing sealant is dried and cracked in most areas (Photo 15).

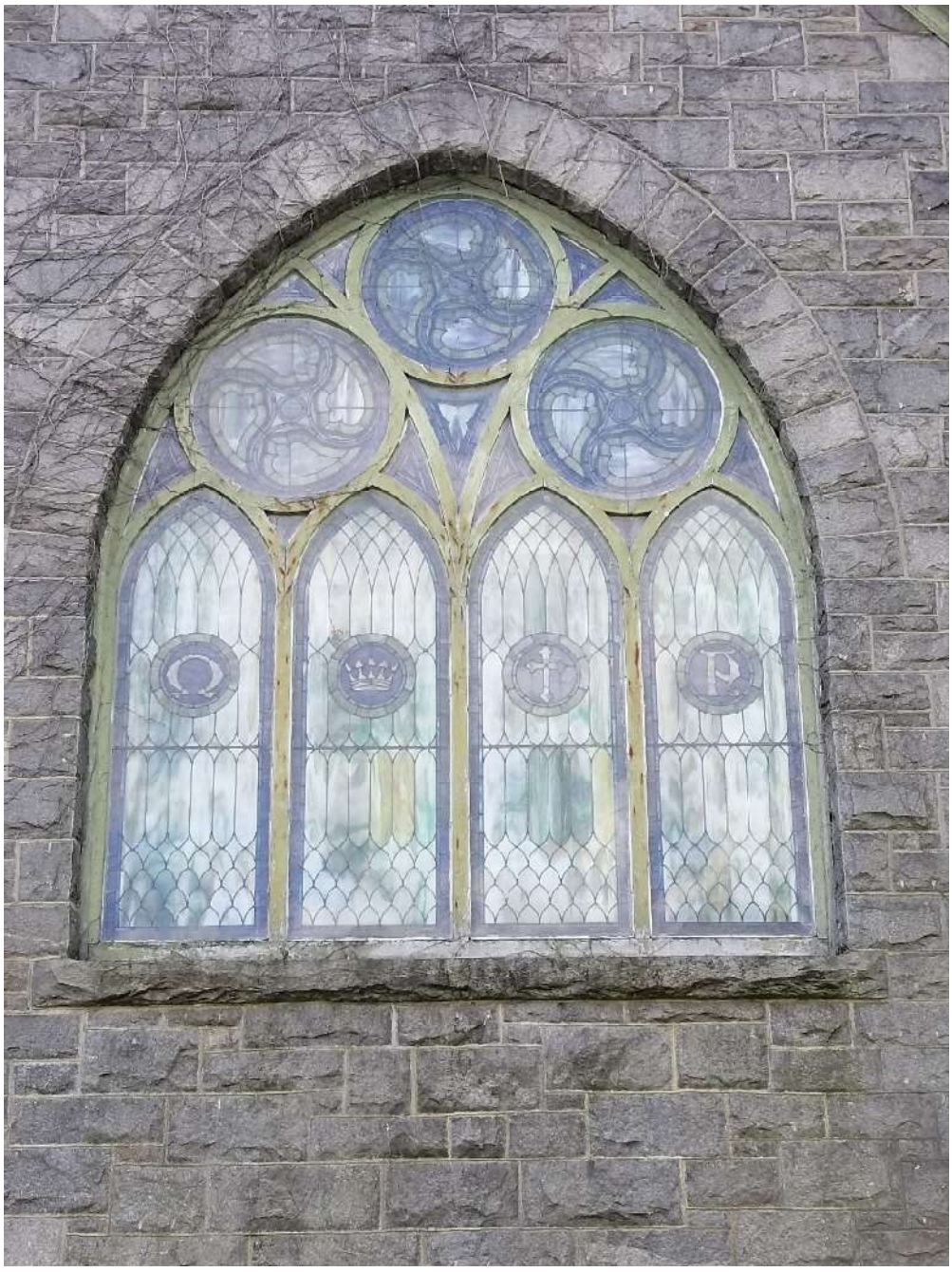

Photo 13: Stained glass window at north gable.

Photo 14: Rust stains, peeling paint and the beginning of wood rot in window.

Photo 15: Dried and cracked glazing sealant.

Stained glass windows around the church are in similar condition. (Photo 16)

Photo 16: Stained glass window showing peeling paint, wood rot and failed glazing sealant.

Bell Tower

A square bell tower sits at the northeast corner of the church. The tower is similarly constructed of granite blocks. An open-air belfry sits at the top of the tower with two arched window openings at each façade. Steel netting over the openings prevents birds from entering, however no windows are set into the openings.

The interior of the bell tower revealed some evidence of moisture intrusion through the masonry walls in the form of efflorescence (Photo 17).

Photo 17: Efflorescence in bell tower.

Stained glass windows are set into square openings on each side of the bell tower. From the interior, voids in the masonry at the perimeters of the windows could be seen allowing daylight through the walls (Photo 18).

Photo 18: Daylight at window perimeter.

Roof

The roofs of the building are clad with slate, which is reportedly original to the building. Numerous cracked, loose, and missing slate were observed throughout the roofs (Photo 19). At the eave of the roof on the east side of the building, numerous missing slates have been replaced with asphalt shingles (Photo 20). Considerable damage and deterioration is present in the eave molding as well as the underlying roof decking (Photo 20). There are no gutters at the roof eaves.

Photo 19: Broken, missing and loose slate.

Photo 20: Missing slate at eave replaced with asphalt shingles.

Photo 21: Damage to roof decking and eave molding. Also note, no gutters at the eaves.

Flashings at the interface between the roof and façade elements are in varying stages of disrepair. Step flashings and counter flashings at the bell tower are bent or otherwise damaged thereby leaving gaps where water can enter the building (Photos 22 and 23). Copper ridge flashings are pulled up in many locations (Photo 24).

Photo 22: Damaged copper step flashing.

Photo 23: Damaged sawtooth counter flashing.

Photo 24: Damaged ridge flashing.

Interior Water Damage

In many locations throughout the main floor as well as the basement level, considerable water damage was observed. At the entry to the nave from the narthex, water damage to the interior plaster walls is present at the archway under the bell tower (Photo 25). In the basement, severe water damage to the interior finishes is present at all exterior walls with the exception of those at the transept which are primarily above grade (Photo 26).

Photo 25: Heavy water damage to plaster walls at archway.

Photo 26: Water damage to interior finishes in basement.

Evaluations

The overall condition of the building envelope at the former Georgetown Bible Church is fair to poor. Water infiltration through the building envelope is resulting in damage to interior finishes at both the main floor and the basement. The worst leakage is occurring in the basement through the subgrade walls, however some significant moisture intrusion is also occurring through the roof in many areas.

The stone masonry is generally in fair condition with the exception of several areas where mortar joint damage and deterioration is occurring. These locations primarily occur in shaded areas that do not dry out as quickly as those areas exposed to sunlight.

Mortar joint erosion generally results from the gradual dissolution of cement paste from mortar due to the recurrent wetting of the joint. In northern climates this is effect is greatly increased by freeze-thaw action during the colder seasons. The erosion has

resulted in many voids where water can enter the wall. From there it can continue to erode the mortar joints at the interior of the wall and eventually result in water infiltration. Left unaddressed, this mortar erosion can result in weaking of the walls, although we saw no evidence of this yet occurring during this investigation.

Wood windows are poorly maintained and are exhibiting signs of deterioration in the form of peeling paint and the beginning of wood rot.

Wood rot is a consequence of excess or trapped moisture. As it becomes wet, the grain of the wood is raised, thereby allowing moisture to penetrate further into the wood where it cannot evaporate as quickly. The trapped moisture creates an environment conducive to the growth of various forms of fungi. This fungi is the primary cause of wood rot. Therefore, the key to preventing wood rot is to control the amount of moisture that reaches the wood. Generally, if moisture content in the wood is below 20 percent, rot typically isn't a concern. This threshold can be achieved by redirecting moisture away from wood surfaces, providing a method to ensure any wet wood will dry out quickly, and applying a protective coating such as paint to the surface. The paint must be maintained however. Naturally, areas of peeling paint will expose unprotected wood to moisture and fungal growth will begin. Many of the windows and doors in the building are now at the point where the rot has begun. Eventually the wood and, by extension, the windows become unsalvageable. For this reason, it is important to ensure that wood windows are regularly maintained.

The large stained-glass window at the north gable of the church is in poor condition with the beginnings of rot in the wood along with failed glazing sealant. These defects no longer allow the glass to expand and contract while maintaining a weathertight seal. This allows more moisture into the wood which in turn will cause the deterioration to accelerate.

The slate roof of the church is in poor condition. Damaged flashings and cracked or missing slate tiles are commonplace. The presence of loose slates is widespread. And numerous slates have fallen off the building. Some have been replaced with asphalt shingles while others have not. These defects have directly exposed the interior of the building to moisture infiltration and has resulted in damage to the interior finishes. Typically, a slate roof can be expected to last 100 years. As this roof is reportedly original to the building, it is the opinion of Hoffmann Architects that the slate roof is beyond its useful life and should be replaced.

Water infiltration into the basement of the church is severe. Damage to interior finishes occurs in all perimeter walls that are below grade, while those portions of the walls that

are above grade remain dry. This is a clear indication that moisture is traveling through the subgrade walls and into the basement. Furthermore, the lack of gutters at the roof eaves is contributing to the amount of moisture entering the basement, as runoff is not collected and directed away from the building.

It is unknown if any means of dampproofing of the foundation walls of the church was employed during construction in 1901. Typically, at that time, basements were not meant as living space and therefore extensive waterproofing was not common or needed. Masonry foundations would allow water to seep into the basement in wet conditions where it flowed to a floor drain or seeped into an unfinished (dirt) floor. When the basement of the former Georgetown Bible Church was converted into living space, it was likely not properly waterproofed nor were any drainage improvements to the foundation installed.

When undertaking a rehabilitation project to a building with historical significance, there are many considerations to keep in mind. If the building is listed on the State or National Historic Registry or is a significant landmark, relevant regulatory issues must be addressed as early as possible in the project. The process of gaining approval for construction can take longer than non-historic structures. Furthermore, restoring a National Historic Register property or locally significant landmark may also mean negotiating regulatory restrictions, building codes, and local interests with respect to the community.

Once the historic commission and other regulations have been taken into account, and the causes of deterioration have been considered, a facade rehabilitation and maintenance program can be designed to meet the needs the building Owner.

In undertaking a façade rehabilitation or restoration project on an older building, the job must be planned carefully and logically. If the primary causes of deterioration are not addressed in the rehabilitation program, any repairs will be relatively short lived. For example, if deterioration is caused by excessive moisture infiltration, it is necessary to eliminate the source of the infiltration before repairs can begin. Likewise, if structural deficiencies are discovered, they must be resolved prior to beginning the façade repairs.

Another issue to consider is the overall goal of the restoration project. Prior to developing a rehabilitation program, it must be determined if the objective of the project to fully restore the historic appearance of the building, or to simply repair façade deterioration while maintaining the building's current appearance.

If a historical restoration is chosen, it must then be decided to which time in the buildings history the restoration should be made. For example, shall the building be restored to its original 1901 appearance or how it appeared at some later date.

In order to achieve a successful historic restoration, the most basic objective should be to do no harm. One first must realize that irreversible damage has been done to many buildings by seemingly simple repairs, such as the selection of an incorrect cleaning technique or use of an improper mortar for repointing. For this reason, a painstaking approach must be taken in every aspect of the restoration project, from extensive research of the existing building materials during the initial phases of design, to the execution of the repairs during the restoration of the structure.

Other considerations must include compatibility of modern materials to their historic counterparts to ensure that no unforeseen incompatibilities occur which may cause unexpected harm. Fortunately, there are now numerous methods and materials available to perform restoration work on a wide range of historic materials without losing the essence of the original.

Recommendations

In order to correct deficiencies outlined in this report and arrest further deterioration, Hoffmann Architects recommends a rehabilitation and restoration program be initiated. This program should include the following items:

- Replace the slate roof and all associated flashings. This work would include the installation of gutters and rain leaders at the roof eaves to direct water away from the building foundation.
- Restore the large stained-glass window at the north gable.
  - This will include repairing, prepping and painting wood muntins, and replacement of glazing sealant.
- Restore ancillary stained-glass windows around the church.
- Repair or replace double hung and casement windows at the basement, including sealant replacement around window openings,
- Perform selective repointing of the mortar joints in the exterior stone masonry.
- Restore wood entry doors.
- Apply waterproofing to the foundation walls. This work will include excavation around the perimeter of the foundation and filling voids in the rubble foundation wall prior to application of the waterproofing. Installation of insulation to the exterior or the foundation below grade should also be performed.
- Repair interior finishes.

- Perform a full washdown of the building exterior.

Our opinion of the probable cost of construction for this work is: $995,000.

Please note that these costs do not include professional fees for consultants concerning repair procedures, preparation of construction documents, assistance with bidding, construction contract administration, or on-site observation of construction. They are based on our experience supplemented by published cost estimating sources. They reflect preliminary data and have not been derived from accurate quantities, drawings, details, or specifications. Actual construction costs may therefore differ from those stated above.

It has been a pleasure to assist the BeFoundation with the Building Envelope Condition Assessment at 5 North Main Street in Redding, Connecticut. If you have any questions or comments, or if Hoffmann Architects can be of further assistance, please feel free to reach out to me at any time.

Very truly yours,

Hoffmann Architects, Inc.

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