RESTORATION OF A HERITAGE LOG CHURCH

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ABSTRACT

This paper is a case study of the restoration of a log church located in Oro-Medonte, Ontario. The original Oro African Episcopal Methodist Church (church) was constructed out of square notched log walls, wood roof framing and wood flooring supported on grade. The church was completed in 1849 as part of an African Canadian settlement that was established after the War of 1812. This paper explores the steps taken to complete a heritage restoration project from a consultant's perspective.

The church had gone through multiple stages of modifications and repairs since the 1940's including repairs to address vehicular accidents. Despite those repairs and a series of events that periodically drew new interest in the building, the condition of the church continued to deteriorate and it eventually closed to the public. A renewed interest by ancestors of the settlement and Town Council support brought reason and cause to the restoration of the church, eventually gaining financial contribution in the form of grants to complete the work.

After completion of a Cultural Heritage Assessment and initial restoration working drawings prepared by others, the author was retained at the request of the Township of Oro-Medonte (Township). The authors involvement included a modified design and drawing preparation in collaboration with a team of consultants which saw the project through design and construction phases. The project involved raising the building to accommodate a new crawl space, log wall replacement and repair, and other structural repairs. The authors collaborated to address the building envelope, using an approach that had to differ from modern practices due to the age of the structure. The building envelope considerations included a review of the crawl space and roof venting requirements, detailing of the new cladding, and replacement door and windows.

The restoration approach to the heritage conservation of the church was in conformance with the Standards and Guidelines for the Conservation of Historic Places in Canada (Standards and Guidelines). Although the project experienced challenges, collaboration with a team of consultants, contractors, and the Township of Oro-Medonte resulted in the church being successfully restored to a historical period that had significant heritage value.

INTRODUCTION

On the south-east corner at the intersection of Line 3 of Oro-Medonte and Old Barrie Road, in a grassed landscape of an unmarked burial ground, sits the small but significant Oro African Episcopal Methodist

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Church. The church, built in 1849, was a focal point of an African Canadian settlement established in part by militiamen from the War of 1812 (Canada's Historic Places, 2000).

Even though the original settlement has long disappeared and the church is no longer active, the church building remained. Despite previous attempts at restoration, the condition of the church continued to deteriorate. An awareness campaign was launched by the Township to address the deteriorated state of the church. This was the catalyst in driving community interest and Government support. A sense of urgency was created which manifested in grants and crowdfunding.

The authors, in collaboration with the building team, saw the project through the design and construction phases. The project involved raising the building to accommodate a new crawl space, log wall replacement and repair, re-cladding of the exterior wall, roofing replacement, and provisions for additional structural support.

BACKGROUND/HISTORY

Building History

Following the war of 1812, retired soldiers were rewarded with plots of land. The area of Oro-Medonte was chosen in part because of its location. There were concerns that if the Americans chose to invade Upper Canada (present day Southern Ontario) again it would be done through the Georgian Bay area as a route attacking Toronto's Fort York from the North. The settlement was located so that retired soldiers could be re-activated if such an attack were to occur. One of the regiments was made up of black soldiers, some from colonies of the British Empire, and others freemen from the United States. The settlement continued to grow peaking in the 1840's before the church property was purchased by the trustees of the "Coloured African Episcopal Methodists Church" in 1847 and formalized in 1849 (Crawford, 1999).

The existing building has a footprint of 20' x 30' (6.1m x 9.1m) constructed of wood log wall framing, wood roof framing, and wood floor framing supported on stone foundations. The building's interior included perimeter wainscoting and chair rail with a whitewash interior finish. The church and its site experienced many changes and additions, as outlined below, after its abandonment in the early 1900's to its recent revival (Murdoch et al, 2014).

1947	Stone cairn erected on site containing the family names of early worshippers.
1947-1949	First restoration completed. Alterations include the addition of a new concrete foundation, replacement ceiling, new roof and relocated chimney (Photo 1).
1956	New siding installed and front vestibule / porch removed.
1979	Reinforcing of the roof completed.
1981	Extensive damage as a result of vandalism caused by two trucks.
2000	Designated by the Historic Sites and Monuments Board of Canada as the Oro African Methodist Episcopal Church National Historic Site of Canada.
2004	Church hit by van. Boulders added on site to prevent damage by vehicles.
2013	Church closed to the public.

Photo 1: Church after first renovations and Cairn erected, 1949–1956 (**Murdoch et al, 2014**).

Project Background

The periodic repairs, due to accidents or the deterioration of the building, temporarily renewed public interest but never produced enough momentum to fund a complete restoration. It was not until 2011 that the Township again took an interest in restoring the church. In 2013 a team of heritage consultants was retained to complete a Cultural Heritage Assessment (CHA) with the intent of providing recommendations for the preservation of the building and its site.

The CHA, which included an overview of the National Historic Site (NHS) designation, was completed early in 2014 and outlined detailed recommendations for the Township. During the preparation of the CHA, the exterior clapboard siding was removed to complete an assessment and a water-resistive barrier was added to temporarily enclose the structure (Photo 2). The church was closed to the public until the restoration could be completed at a projected restoration cost of $140,000.

Photo 2: Church enclosed with Tyvek water-resistive barrier, 2014.

Project Methodology

The project was completed in collaboration with Parks Canada using the Parks Canada Standards and Guidelines (Parks Canada, 2010) and the guiding principles in the Conservation of Historic Properties (Ontario Heritage Trust, 2012).

Following the recommendations of the CHA, it was decided to complete a restoration of the building back to as it appeared in its 1941 state while protecting its heritage value (Photo 3). In consultation with Parks Canada, this period in history was selected because it encompassed the evolution of the building during its life as a fully functional church before its abandonment.

Photo 3: Oro Church, 1941 (**late Mrs. Jean (nee Gilchrist) Blackstock**).

STRUCTURAL DESIGN AND CONSTRUCTION

Foundation

In October of 2015, the authors were contacted to review the existing state of the church, and provide design options with respect to a new foundation in keeping with the restoration scope of work approved by Parks Canada. The Township wanted a new permanent foundation system for the building.

The square notched log walls of the church were most heavily deteriorated at their base. The sill logs were mostly at grade, bearing on buried corner and mid stones, with fill stones located in between. Due to the negative slope in grade around the building, and a wall system that was in direct contact with grade at its base, the sill logs were highly susceptible to exposure to the elements. This included repetitive cycles of wet/dry/wet/freeze contributing to the sill log deterioration and loss of mass over time. The sill logs needed replacement, and to mitigate future repairs, a new perimeter foundation that would raise the base of the wall from finished grade was proposed. The designed foundation system supported the log wall framing separated by a polyethylene foam sill gasket on a frost protected foundation wall and strip footing. This decision provided more options for ventilation and future heating of the new crawl space, as well as opportunities for maintaining the new floor structure. It would also allow for a sump pit connected with a perimeter weeping tile to address drainage issues. To temporarily relocate the building to accommodate the new foundation, the Township retained the services of a building raising and moving contractor (Photo 4).

Photo 4: Relocated church for construction of new foundation, 2015.

Although the construction of the new foundation resulted in an increase to the finished interior floor elevation, elevating the church was necessary to protect the remaining original logs from decay. It was challenging to find an acceptable finished elevation that limited the amount of concrete wall exposure; and preserved the integrity of the interior treatments.

Floor Framing

New floor framing was installed to match the existing construction while maintaining the existing wainscot profiles. A new 12” x 12” (305mm x 305mm) pine log beam was installed at mid-span supported by two concrete pier foundations. The existing sill logs that were replaced included dovetail connections spaced at 36” (914mm). New logs, varying in size from 8” (203mm) to 10” (254mm) in diameter, were installed in the floor with new dovetail connections to the center beam at the same spacing as the original. The floor framing logs were left round, but cut flat at top to permit the installation of new 1-1/2” (38mm) thick floor decking.

Log Wall Framing

A total of thirty-four logs formed the exterior of the church, the majority of which were pine. Nine logs on each of the north and south walls and eight on each of the east and west walls. Approximately two-hundred linear feet of log was repaired or replaced including the sill logs. The plate logs on both the north elevation and east gable end were removed and replaced due to deterioration. The north plate log also included a large crack down its center. Where decay had occurred and full replacement not deemed necessary, portions of the logs were repaired in situ.

Roof Framing

The original roof framing was made up of five existing hewn ceiling joists, and existing pole rafters at 24" (610mm) spacing. Additional sawn roof rafters and new trusses were installed as part of the repair work completed in 1947-1949 and 1979 (Photo 5). The supporting walls had bowed to the exterior over time likely due to inadequate restraint at the top of the wall resulting in the existing pole roof rafters separating at the ridge to varying degrees up to 5" (127mm). The idea of realigning the building to remove the separation at the roof ridge was discussed and not implemented at the risk of damaging the original framing and decking. Where possible the butt end connections were re-instated, otherwise new ridge blocks were added. A single existing roof truss remains in position in the roof attic space as a historic record of the repair work completed post 1941.

Photo 5: Existing roof framing including reinforcing from previous work, 2016.

At the request of the Township, additional nominal wood framing was added to allow safe attic access for maintenance purposes. The new framing also provided additional support for ceiling finishes.

A replica of the original chimney was constructed and relocated to its pre-1940's, location. The original chimney may have been supported by the ceiling or from the ground (French 2015). Two new steel beams, bearing on the exterior log walls, were installed within the roof to support the new chimney. The steel framing was designed with the understanding that it must clear span the width of the building with limited deflection, and not alter the visual appearance and character of the roof and ceiling. As the chimney support framing is within the attic space and not visible, period authenticity was not considered to be compromised. Where changes were made, whether it be new material or additional structure, these changes were tagged and dated to avoid confusion of heritage fabric in the future.

ARCHITECTURAL DESIGN AND CONSTRUCTION

Wainscot and Floor Elevation

The first hurdle following the foundation construction, was the new floor framing and its effect on the existing wainscot. The existing wainscot was capped by an existing chair rail that had a set elevation to match the existing windows. The wainscots original location within the building perimeter, which was well documented during removal, had varying lengths between each panel. To accommodate these varying panel lengths, the floor decking stopped short of the log walls to permit the wainscot to extend below the top of finished floor elevation. This decking was not original and had been modified to allow for the various slopes the floor accumulated over time.

Some of the wainscoting panels had deteriorated ends from moisture exposure that required attention. The project team considered the original wainscoting to be an artifact and did not want to cut the panels. Where necessary, on existing panels with deterioration in a single location, they were scarfed with a matching material.

Crawl Space Ventilation

Ventilation between the floor framing and crawl space was an important design consideration as this was the area of work that departed considerably from the buildings original construction. During the construction of the foundation, four 8” x 16” (203mm x 406mm) depressions in the foundation wall were formed around the perimeter for venting. The intended design at time of foundation construction included powered foundation vents in the four locations and finishing the exposed foundation wall to blend the two together in colour. The powered vents posed the potential concern of having to rely on the availability of power as well as the ongoing maintenance requirements of the proposed exposed foundation finishes. An alternative solution was proposed.

The final solution was to use a 3” (76mm) thick x 12” (305mm) high cedar board as a cap bolted to the exposed foundation wall. The cap was finished to replicate the exterior look of the original 12” x 12” (305mm x 305mm) cedar mud sill log (Figure 1). This member was designed to be a ‘sacrificial’ component expected to require occasional replacement from time to time due to its proximity to grade. The attachment was by stainless steel anchors and lags which could be reused in the future. At the vent locations, the foundation cap included a 1-1/2” (38mm) deep x 24” (610mm) long notch on the backside to permit air flow into and out of the crawl space. The foundation cap also included a 1-1/2” (38mm) deep x 4” (102mm) wide continuous notch between foundation vent locations to provide cross-ventilation between foundation vents. The crawlspace venting is directly connected behind the foundation cap and function through a stack effect with the full height cavity that extends to the roof soffit. This addressed the need for venting to the exterior, while keeping an appearance that blended in with the existing building and creating a start/ stop point between new construction and existing heritage fabric. An extension of the crawl space ventilation was provided by the addition of two cast iron grates in opposite corners of the main floor which provided air flow from the crawl space to the remainder of the church.

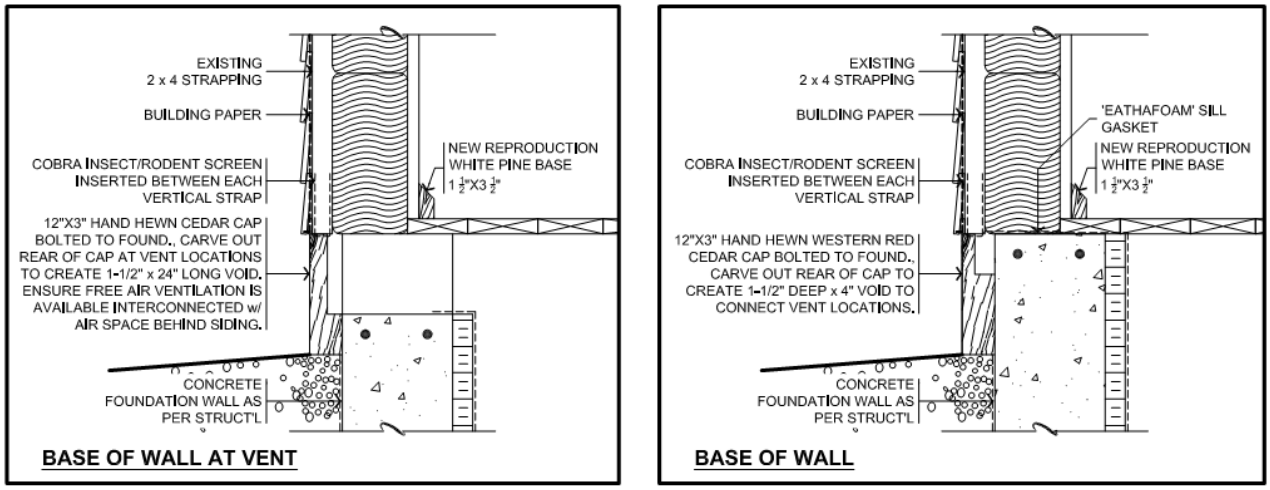

Figure 1: 'Superficial' Sill Log

Chimney

The chimney was relocated from the gable end at the rear of the building to a central location. This was based on 1941 pre-restoration photo evidence, as well as archeological assessments which found elevated organic material in the soil in a central interior location suggesting ashes from a stove. Reclaimed brick was used for the reconstruction of the new exposed chimney using mortar with a 1:1:6 hydrated lime, cement, sand ratio. A stovepipe and mortar thimble was constructed at the ceiling base of the chimney. The Township had no intention of the stovepipe and chimney being functional so attention to the protection of wood elements from heated surfaces was not considered.

Building Envelope

Like traditional heritage log structures, the church was constructed as a breathing building. (English Heritage, 2012) A breathing building is built of permeable materials absorbing moisture and then evaporating internally and externally. The existing church had performed well as a breathing building for over 150 years with minimal decay to the exterior logs, a result of its existing rainscreen cladding system. The exterior log walls were previously clad with overlapping horizontal clapboard siding supported by rough sawn 2 x 4 (51 x 102) vertical strapping. Where driving rain was able to penetrate the siding, it would then stop at the face of the log walls. The air space would have permitted the moisture to be removed via natural venting and water to exit at the base of the cavity. This existing cladding system did however cause damage to the buildings wood sills. Based on the age and state of the exterior logs the building likely experienced extended periods of relative humidity and temperature equilibrium preventing decay. To mitigate risk in altering the dynamics of the existing building envelope, careful consideration was given in the choice of material selection for re-cladding.

Some consideration was given to provide a wood preservative to the exterior log work of the building to prevent decay and deter insects, although, there were no signs of insect infestation and the building is not located in a zone prone to termites. In review with Parks Canada it was brought to the attention of the project team that some brush-on preservatives would not deter insects or fungal growth. In addition, some brush-on preservatives may also trap existing moisture in the logs. A non-toxic, hydrophilic alternative was proposed but not incorporated. A preservative was deemed not necessary at the risk of altering the existing wall

performance.

The re-shingling of the roof was completed first in conjunction with the re-chinking of the log wall framing. Approximately 15% of the existing roof sheathing was replaced due to damage or deterioration. The roof sheathing was finished with building paper (15# black felt paper), and resawn hand split western cedar shakes 24" (610mm) x random in size. A double layer ridge cap incorporating natural ventilation was installed and an extended shake drip edge profile to the roof eave.

The existing chinking and daubing was replaced for the exterior log work. The new chinking was reused off the site from original material including the reuse of existing chinking packing. Where required cedar wedges and strips were also included. The new daubing was reinforced with concealed hot dipped zinc coated nails, partially inserted in the upper side of the log only using a mix with a 2:1:9 lime, portland cement, sand ratio (Photo 6). While the original daubing formula contained clay additive, it was decided in conjunction with representatives of Parks Canada to delete this as it would weaken the mix and the longevity of the installation.

Photo 6: Chinking Installation, 2016.

Where in good condition existing rough sawn 2"x4" (51 x 102) vertical strapping, at 30" (760mm) spacing, was left in place around the buildings perimeter. Visible, modern nails were removed from the existing strapping and cut nails were left in place. Consideration was given to providing additional strapping and extending the clapboard below the edge of the sill logs as an option to minimize the visual impact of the new foundation. The bottom edge of the clapboard would be vulnerable to deterioration and risk water wicking upwards leading to further decay of the cladding. This proposal was not completed in favour of using the notched 'superficial' sill log. The clapboard extension would change the visual proportions of the building, and may be contradictory to the Standards and Guidelines by creating a new condition not previously

possible.

Building paper (15# black felt paper) was applied to the exterior of the building on the vertical strapping and extends over the cedar cap and under the siding so that moisture wicking is controlled. New 7" (178mm) horizontal clapboard siding lapped 1" (25mm) board to board was installed as the finished cladding. The clapboard siding profile, thickness and lap was installed to match the existing clapboard that remained on the gable ends of the roof. Building paper was selected to act as a weather resistive barrier (WRB) at the exterior of the wall due to its ability to dry inward to the ventilated air space or outward in case of wetting. Compared to most modern housewrap, building paper will absorb and store water until drying conditions improve. Adding the breathable building paper would allow the building to breath as it did before. The walls are deliberately not air tight in keeping with the original functionality of the church. The buildings ability to breath has been its success to longevity. The use of building paper was also chosen also due to its methods of installation being easily reversible if future remedial work was necessary. A WRB was not part of the original construction but was included to prevent future deterioration related to moisture of the original heritage fabric located behind (Photo 7).

Photo 7: New Cladding Installation, 2016.

Windows and Doors

The building had for four 12 over 12 sash windows, two symmetrically installed on both the east and west sides. Based on the framing of the window openings, it is believed that the east windows were installed at the time of original construction with the west windows added later to ensure symmetry between the two building faces. The east windows were pinned to the surrounding logs while the openings for the west windows appear to have been sawn out (French, 2015). New window sashes were constructed with old glass,

and wood muntin bars/ frames with profiles that reproduced that of the 1840's construction. New period windows were not painted, but treated with a linseed oil preservative prior to installation. Where possible, original window frames were kept in place. Jambs were wrapped in building paper and lapped to the exterior while taking precaution not to disturb the existing material that was able to remain (Figure 2). Though not characteristic of the original construction, a drip cap and sill extensions were incorporated above and below the window openings with a scored reveal on the underside to direct water away from the cladding. This was deemed necessary to further preserve the building.

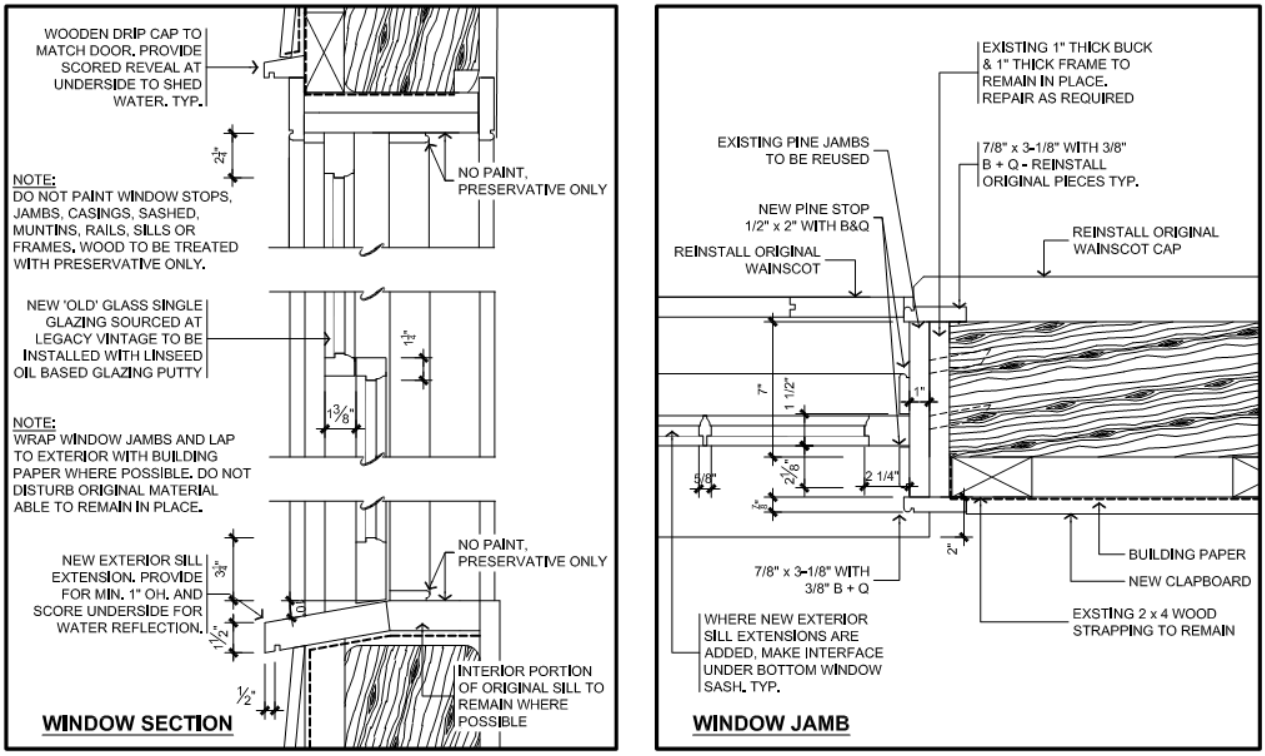

Figure 2: Window Details

Traditional to schools and churches of its time, the entrance door was centrally located in one end of the building (Rempel, 1972). A new set of plank doors were built of similar materials as the windows and shutters using construction methods similar too when it may have been constructed. Consistent with the window installation, a drip cap with scored reveal was incorporated above the door.

CONCLUSION

Lessons Learned

The restoration of heritage structures is often scrutinized by the public. The buildings small footprint and project location made it easily visible during construction. Passers-by would routinely drive past the site and stop, point, stare, and ask questions of the contractors or consultants at the site. Public feedback was carefully considered when preparing the design methodology. Proposed restoration solutions had to address the reason for the deterioration. This identified how critical it was to address 'why' when completing the repair work.

Attention to detail to facilitate ventilation of the building's exterior, in conjunction with accommodating the

new crawl space and maintaining the church's heritage value, was crucial. The result is reminiscent of the buildings state in 1941.

Public and/or Client

The project earned several awards and accolades. In May of 2017 this building opened to the public. The Simcoe County Museum plans to offer tours of the completed church. This project was a great example of the Township and its citizens coming together to restore this building that can now be enjoyed for years to come. What started as a condemned building is now a beautifully restored church that can be enjoyed by everyone (Photo 8).

Photo 8: Completed Church, August 2016.

ACKNOWLEDGMENTS

A successful restoration project requires a group that works well as a team. The initiative by the Township of Oro-Medonte and the Heritage Committee to pursue the funding to complete the restoration work allowed for the successful completion of this project. The work was coordinated by Shawn Binns, on behalf of the Township, with contributions by Su Murdoch Historical Consulting, Loyalist Timber Framing, and carpenter Jorden Lenssen.

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