



Clement J. Zablocki Medical Center

FINAL CONSTRUCTION DOCUMENTS

VA Project: Building 41: Repair Building Service
& Roof Truss Stabilization

JUNE 19, 2012

VA Project No: 695-11-117

GENERAL OVERVIEW

In April of 2010 the **Clement J. Zablocki VA Medical Center** undertook a study of three historic buildings on the campus in order to evaluate, among other things, their structural integrity. Among the buildings investigated was the **Ward Theatre**, otherwise known as **Building #41**. The summary report noted that the building was experiencing significant and on-going deterioration as a result of the failure of the building envelope to protect the interior of the building from moisture penetration. The failure had been underway for a significant period of time, and was systemic in nature in that it involved all major elements of the building envelope: roofing systems, drainage and guttering systems, windows and window frames, doors, and exterior brick walls. The ensuing water penetration through these elements was directly responsible for local areas of deterioration in the structural frame, including areas of outright and on-going structural failure at several locations. Left unchecked these areas of failure would ultimately lead to structural collapse of major building elements.

On the basis of this information the **Clement J. Zablocki VA Medical Center** undertook a project in the Fall of 2011 to deal with the two most serious areas of on-going failure in **Building #41**:

- 1.) The connection of the northern most building truss to its supporting brick walls each end. The truss attachments are currently showing signs of severe rot, mold and deterioration, and in the case of the easternmost support, have deteriorated to the point that the truss bearing block has been forced through the plaster ceiling of the theatre below.
- 2.) The main roof support beam on the eastern side spanning between the truss noted above and the proscenium wall. This 3-ply "post-tensioned" beam is also experiencing severe rot and deterioration, to the point that one ply has been rendered almost completely ineffective, and the post tension bar support at mid-span is rotating and crushing the beam edge, and is in danger of being rendered completely ineffective.

As a precursor to work on the structural elements of the project, and to protect it from any potential damage during that work, the **Clement J. Zablocki VA Medical Center** elected to remove the historic stained glass Grant Window on the east elevation of the building and store it offsite for later reinstallation in the repaired structure.

The intent of this project is to stabilize the roof structure of **Building #41** by temporarily supporting the roof loads through a system of shoring down to the basement slab, replacing the failing post-tensioned beam with new construction, while salvaging the original beam for possible display, replacing the rotted portions of the truss and connection to the brick wall at both the east and west ends with similar construction, raising the east end of the truss back to its original bearing elevation, and restoring the various rotted portions of wood framing associated with the east apse framing.

This building has a remarkable historic legacy, and is part of a campus that has recently received the designation of a National Historic Landmark. Consequently, every effort will be made to minimize the impact of the structural work on the visible portions of the building consistent with sound engineering

practice. To that end, the following paragraphs represent the general approach anticipated in the preparation of the construction documents.

DESCRIPTION/EXTENT OF WORK

In preparation for the shoring work described below, as-built drawings of the existing First Floor, ceiling, and Attic framing will be provided as part of the bid documents so that the Contractors will have an accurate picture of the conditions within which the shoring and repair work will take place. These drawings and the accompanying specifications will describe both the existing conditions and the limits of work as noted below.

Temporary shoring will be provided in the Basement area from the Basement Floor to the bottom of the auditorium floor. This shoring serves to transfer roof loads from the First Floor beams to the ground to avoid any possibility of overloading and failing those beams. Shoring is essentially unrestricted in this area, except that vertical legs of the shoring will not be permitted to penetrate the First Floor decking. Contractor will be provided with the results of two soils borings taken in this area to verify the capacity of the soils to support shoring loads. At the conclusion of the project, shoring will be removed.

Temporary shoring will be provided from the top of the First Floor decking to the original ceiling support beams, and to the bottom of the truss. This shoring serves to transfer the load from the ceiling down to the First Floor. Shoring in this volume will have a number of significant restrictions designed to minimize to the greatest extent possible the impact on the building.

Structural Shoring for **Building #41** to be provided and designed as follows:

- 1.) Shoring will be provided directly beneath and for a distance of four feet either side of the main truss. Existing plaster ceiling will be removed directly beneath the truss and for the full four feet either side of the truss within approximately ten feet of each bearing end to facilitate replacement/rebuilding of the truss-wall connection. Beyond that area in the middle of the truss span it is anticipated that the plaster and lathe ceiling may be able to be left in place on either side of the truss, with shoring fit tight to the bottom of the plaster. Replacement for the lathe and plaster ceiling removed for this portion of the shoring work is not anticipated.
- 2.) Shoring will be provided in the east half of the building between the truss and the proscenium wall to support the roof structure tributary to the failing beam. This shoring must penetrate the sloped barrel type vaulted plaster ceiling that was added to the facility when it was converted from a recreation hall to a theater. This sloped framing supporting the plaster and lathe ceiling is not suitable for "sandwich" framing and will be removed as necessary for the penetration of vertical shoring members. Penetrations will be minimized and neatly cut. Patching or replacement for the lathe and plaster ceiling removed for this portion of the shoring work is not anticipated beneath.
- 3.) Shoring penetrating the sloped barrel type vaulted area noted above will fit tight to original plaster ceiling at attic level, and is not intended to penetrate the ceiling level unless shoring system cannot otherwise be successfully installed. Spreader beams are intended to distribute shoring loads and to minimize the impact on the original plaster ceiling to the greatest extent possible. Patching or replacement of the lath and plaster ceiling damaged or penetrated by the shoring system is not anticipated.
- 4.) Alternative shoring systems contained entirely in the attic space may be feasible for support of the roof necessary to replace the failing post-tensioned beam, and will be entertained if feasible.

- 5.) Chairs, finish flooring resting on sleepers, and front stage projection will be carefully removed prior to shoring activities and temporarily stored elsewhere in the building during construction. Once work has been complete all items will be reinstalled.
- 6.) Shoring members will not be permitted within 12" of any vertical wall or balcony surface in the auditorium. Shoring will not be permitted backstage.
- 7.) Shoring system must be completely internally stable without bracing to any column, any vertical surface in the auditorium or portion of the balcony, box or access stair framing.
- 8.) Shoring system will not be permitted through or beneath any balcony or box area due to the presence of a finish metal ceiling system which would be damaged by tightly fit shoring and which cannot easily be removed without damage.
- 9.) Shoring system will not be permitted in access stairs.

Temporary shoring will be provided from the roof to the top of the attic ceiling framing. This shoring serves to transfer roof load to the ceiling system, which is in turn supported by the auditorium shoring, which is in turn supported by the basement shoring. Shoring is essentially unrestricted in this area, though vertical legs of the shoring system will not be permitted to penetrate the ceiling except as noted above. Shoring will also be provided within the body of the truss proper to maintain the relative relationship of the chords to one another as the truss is elevated and repaired.

While the sequencing of operations is strictly the responsibility of the successful Contractor, once the shoring is in place and the existing roof members have an alternative means of support, it is anticipated that the failing post-tensioned member would be replaced first. Final form and size of the replacement member has not been determined. However, replacement with a similarly constructed "post-tensioned" element has been ruled out, as has replacement with a steel-only beam.

Once the "post-tensioned" beam has been replaced, the truss connections can be addressed. Bricks forming the exterior wall at the truss bearing point will be disassembled and salvaged for reuse to gain full access to the truss connections. Truss will be raised off bearing points at each end, and additionally raised at the east end to be relocated in its original position. Rotted, molded, and deteriorated wood will be carefully cut out, and the remaining wood will be hand prepared to receive the new connection, which will be similar in form to the original design. It is anticipated that the new end connection piece, including bearing block, will be raised into place from below and to the north, slid south into place, and bolted to the existing truss. While this work is ongoing, the adjacent wall will be rebuilt from truss bearing to sill plate bearing with salvaged brick. New brick, if necessary, will match the existing Cream City brick as closely as possible, and will be used in interior wall construction rather than the exterior wythe of the existing wall construction. Once the connection and brick wall are completed the truss will be reset on the wall. At that point various minor repairs to other sills and rafters in the east apse area will be made.

All shoring will be removed upon completion of the project.