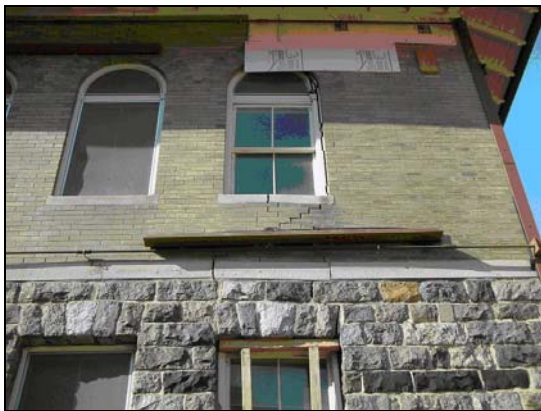


University of Michigan North Hall
Investigation, Analysis, and Repair of Wall Cracking
Ann Arbor, Michigan



CLIENT

Barton-Malow Company

STRUCTURE

Built in 1899, North Hall originally functioned as a hospital and is currently home to the University of Michigan ROTC program. This historic building is three stories in height, and constructed of load bearing stone and brick masonry.

CHALLENGE

Construction of the University of Michigan Life Sciences Institute involved significant excavations in close proximity to North Hall. In 2003, widening of cracks in the interior and exterior walls were reported. Despite the contractor's efforts to minimize and monitor its effects on the structure, occupants felt that the adjacent construction was damaging North Hall. A previous consultant recommended demolition and rebuilding of the exterior walls. WJE was retained to investigate the recent movement of the building, and to develop a repair plan sensitive to its historic nature.

SCOPE OF SERVICE

- Field Investigation
- Laboratory and Non-Destructive Testing
- Structural Analysis
- Interior and Exterior Repair Documents
- Construction Period Services

SOLUTION

- Conducted a field investigation including:
 - Visual and sounding surveys of the exterior walls
 - Crack mapping for interior and exterior walls
 - Crack monitoring
 - Investigation of mortar condition at various locations
- Performed petrographic tests on mortar samples in WJE's Janney Technical Center
- Utilized ground penetrating radar to locate header stones
- Made inspection openings to determine existing conditions and quantify repairs in areas of walls that were not visible
- Analyzed walls to confirm structural integrity after cracking had occurred
- Determined that the walls could be repaired rather than demolished and rebuilt, saving the owner nearly \$1,000,000 in construction costs
- Stabilized the structure by compaction grouting of the subgrade and permeation grouting of the foundation walls
- Provided construction period services and worked with the contractors to ensure that improvements were properly completed while preserving historic details