



Unity Temple, Oak Park, Illinois

Architectural Consulting Engineers (ACE) was the mechanical engineering consultant to the Unity Temple Restoration Foundation for a Feasibility Study and Design Development Study for adding air conditioning to this historic building in Oak Park, Illinois. The church was completed in 1908 and was designed by Frank Lloyd Wright. The building was declared a National Historic Landmark in 1971.

As part of the feasibility study ACE reviewed extensive archival material related to the design, construction, operation and maintenance of the building mechanical systems. ACE also performed an extensive field survey of the existing conditions of the building and building systems. Given the unique concrete construction of the building and lack of available interstitial spaces for routing new systems, a large part of this study was identifying reasonable methods to implement any system upgrade while minimizing the disruption to the historic fabric of the building. One important aspect of adding air conditioning to structures which were never intended to have this technology is to implement a system that can assist in simultaneously controlling temperature and relative humidity at levels appropriate to the historic nature of the building and the collections displayed and stored on site.

One system type that the church congregation wanted to include in the study was a ground-source heat pump based system. After reviewing several system concepts and working with the physical limits of the building, the site and the program of the congregation, ACE was able to definitively show that a new ground-source heat pump system was not only feasible, but after energy savings were taken into account, this system would pay for the increased installation cost within a very reasonable timeframe. Additionally, ACE was able to demonstrate that this type of system would meet all of the programmatic needs of the building, and could be installed in a way that minimized the impact to the historic fabric of the building.

As a follow-up to the feasibility study and DD study, ACE was further commissioned to develop final construction documents for the ground-source heat pump based HVAC system for this building. Pre-design and Restoration Design services for final restoration documentation were prepared in 2014/2015 which integrate the current ground-source heat pump system design into the broader restoration construction documents. Restoration is currently underway.