CONCLUSION

LIGHTING

The original lighting design was adequate for each space and well laid out. The redesign looked at each space from a different aspect than the original design. This study focused on bringing out the key features, architectural design elements, and most importantly, the function or use of each space. The foyer was designed in an effort to create a sense of anticipation for the space to come. The chapel, which is the space that the foyer directs traffic into, was designed to create a sense of awe and admiration. The design in the chapel was focused on keeping the light and the lighting elements as a background focus. The main focus should be on the function of the space which is to worship. The library is another space that has a clear and defined function. The function of the library is to allow a place for the friars to read and write. The illuminance levels on the books were designed to meet the needs of the friars for selecting books from the built-in shelves. The book lights are located on their own switch allowing for the lights to be turned off when not in use. This is important for the upkeep of the books. The last space, the courtyard, accessed by the chapel, was designed for safety and security. This courtyard should be a safe escape to a natural atmosphere. The statues located on the perimeter of the courtyard are uplit to draw reverence to the remembrance of Christ's sacrifice.

ELECTRICAL

The electrical study took into account the lighting loads from redesign to determine if any of the equipment would need to be resized. One panelboard was downsized from 200A to a 150A fuse. Besides this single fuse, the difference in load due to lighting was minor. The new mechanical load based upon the redesign was also calculated. The elimination of the chiller in the mechanical design freed up a 600A fuse on the main switchboard. This allows a spare to be available for future growth. As well, a short circuit coordination analysis was performed to ensure that the overcurrent protection and short circuit protection in the design was adequate to prevent a short circuit. The path from the main switchboard to the EDP to the chapel panelboard was the path that was chosen. The study concluded that the protection devices are adequate to prevent short circuit. The last item taken into account in the electrical section was switching the feeders from copper to aluminum. The St. Francis Friary construction was put on hold due to a lack of funding. Therefore, any savings would be beneficial. The savings for using aluminum vs. copper is $16,237. This is a significant enough amount of savings to warrant the change over.

MECHANICAL

The current mechanical design utilizes a central chiller and boiler that serves the localized air handling units and fan coil units. The four pipe system was designed to serve different zones and allow for variability among these zones. This system was well planned and would serve the spaces comfortably and efficiently. The decision to propose a geothermal heat pump system was based on the concern for the environment. Geothermal systems use the earth's resources to enable the heating and cooling systems to be more efficient and thus use less energy.

CONCLUSION

In the mechanical breadth, Trace was used to model both the existing and the proposed system. According to the energy modeling software, the new system will save 115,891 KWh or 40% of the entire electrical consumption a year. This converts to $10,338 a year in energy costs. Since the installation cost of the system is higher than the current design, the cost benefit will not be seen immediately. The change from copper to aluminum should supplement this cost for the first year and a half.

CONSTRUCTION MANAGEMENT

The implementation of geothermal heat pumps was studied further to determine the implications this system would have on the construction of the friary. The study determined that based upon the geographic location, the type of soil, the experience of the contractors in the area, the schedule time, and the impact on the site, a vertical configuration of piping would be the best option for the project. The study shows that the geothermal heat pump system will have a higher initial cost than the current mechanical system design, however, the payback period in terms of money will be 9 years. The payoff in terms of the impact on the environment will, however, be seen immediately. The site was studied to determine the best location for the vertical boring to occur. As can be seen in the appendix section, the southeast corner was chosen since it will be about the same distance to the mechanical room as the original chiller and will not run the risk of having to coordinate with the underground electrical equipment and thus impacting the schedule. The construction of the original mechanical system did not lie on the critical path in the schedule. It was determined that the boring could and should occur during the sitework. Based upon the current schedule this was determined to not push back the timeline for the ductwork.