

Executive Summary

The following document provides four comprehensive analyses of the construction process of the Maryland Public Health Laboratories. Areas of the building project were investigated and innovative construction techniques and procedures were implemented to stimulate significant cost and schedule savings. The current project owned by MEDCO will be located on the Johns Hopkin's Science & Technology campus in East Baltimore, MD. This facility is to host the occupants, The Maryland Department of Health and Mental Hygiene, who will be using the facility to conduct medical research. The 234,000 S.F. project is comprised of several research laboratories and office space. It has been mandated by both the city of Baltimore and state of Maryland that this facility achieve a LEED Certification of no less than LEED Silver as this facility is to meet all requirements of the urban renewal project implemented within the community.

Technical Analysis #1: Precast Concrete Structural System

The first technical analysis in the report is focused on the idea of precast construction. Implementing a precast structural system would be a method to accelerate project schedule, as structural members are prefabricated during construction and are erected in short time duration. A structural analysis is introduced in this section to provide assurance that these precast members can resist loading that has been originally designed for a cast in place concrete system. In conclusion to scheduling and cost analyses it has been determined that a precast structural system could accelerate the schedule by 3.4 weeks and eliminate the need for a six day work week, without additional costs to the building project.

Technical Analysis #2: Virtual Mock-ups for Façade Systems

The second technical analysis researches the virtual mock-ups and the potential benefits the technology can produce. Research was mostly conducted through industry professional interviews and case study comparisons. Information has indicated that virtual mock-ups have great effects on the quality and efficiency of construction. This in turns reduces the amount of change orders due to installation error and could potentially save time on building projects. If such technology were to be implemented on the Maryland Public Health Laboratories project cost savings of approximately of \$94,710 could be achieved with little expenditures.

Technical Analysis #3: Implementation of Dewatering System

The third technical analysis was a thorough investigation and re-design of the projects dewatering system. A significant amount of time and money has been lost due to an unanticipated high groundwater table. A mechanical breadth is introduced in this section as a selecting, sizing and mapping of a deep well dewatering system is performed to effectively service the site under the given conditions. Cost analyses and schedule impact analysis have indicated that the lost 2 months of the current project would be save from a dewatering system implemented prior to excavation and a total of greater than \$1.4 million could be saved.

Technical Analysis #4: Stormwater Harvesting System

The fourth and final analysis explores the opportunities for owner cost savings and sustainability improvements with the use of a proposed stormwater harvesting system. It is a goal of both the owner and project teams to acquire an additional two LEED credit points to achieve Gold certification. Unfortunately, due to the building system water load demand the implementation of solely a harvesting system will achieve these points. Water run-off reduction and water consumption have reduced producing an annual savings of \$455,630, but would pay off for the installation cost after 2.6 years of building operation.