Project Background

The construction of The Teachers Education and Technology Center (TETC) at Salisbury University has been sparked by growing need for a significant number of new Elementary and Secondary school teachers. Upon completion, the TETC hopes to provide the skills to Elementary and Secondary Education students to teach other young people. This unique 165,000 square foot, $ 45 million project combines a multitude of spaces for instruction and learning. The project is being delivered using a CM at risk approach with Holder Construction Company as the General Contractor.

Owner Information

The owner of this project is the University of Maryland. The University of Maryland Architecture, Engineering, and Construction Department (UMAEC), a subdivision of the owner, directly works to manage the design and construction teams. The State of Maryland has determined that the population growth in the area is going to require a large number of teachers in Elementary and Secondary Education over the next few years. The Teachers Education and Technology Center will be used to instruct college students how to teach Elementary and Secondary students and help meet the demand for teachers. The University of Maryland looked at placing the building on several different campuses within their school system, but Salisbury ended up being the best logistical and financial fit. The building will house teaching spaces for the liberal arts, technology, and lab space for teaching the sciences.

The schedule for this project is the most important factor. Holder Construction Company is working to complete the building ahead of schedule for the Fall Semester of 2008. The current schedule will allow a move-in date at the end of July with substantial completion slated for July 23rd. The building needs to be substantially complete by June 1st to allow enough set up time to hold classes in September 2008.

The budget for the Education and Technology Center is not as critical, but the UMAEC is still working to obtain additional funding for the project. UMAEC is also considering alternatives such as millwork, roofing, and the hardscape/landscape that would be possible with the extra funding. Holder Construction hopes to free some extra money for this work by trying to manage their contingency as effectively as possible. Holder Construction has also performed

several value engineering analyses for cost savings. Analyses presented in this report could also produce additional funding.

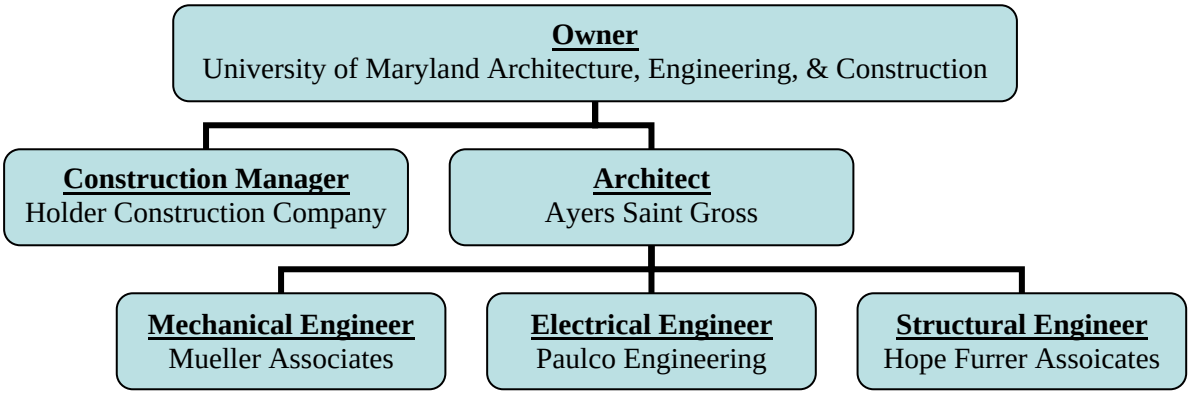
Project Delivery System

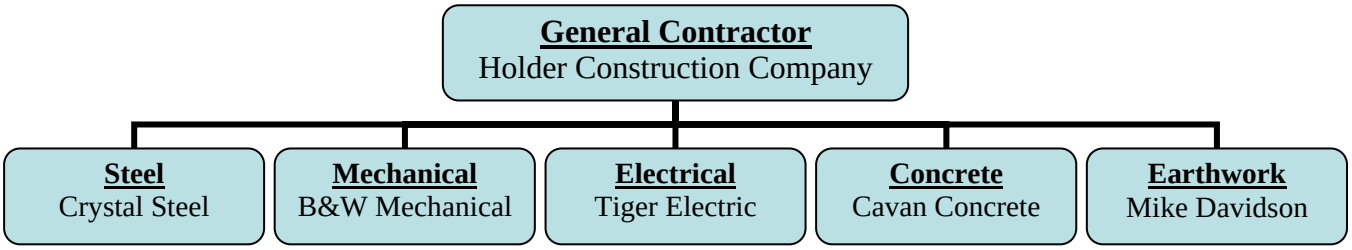
The Teachers Education and Technology Center is being delivered using a Construction Management at risk method. The University of Maryland has used Holder Construction Company is many past projects. Holder will be under a GMP contract with the University of Maryland. The use of the CM at Risk method allows UMAEC to bring Holder into the project very early to advise the owner. The project was awarded to Holder in 2004 and went through the pre-construction phase for two years before breaking ground. The long pre-construction phase creates a team environment very early that ensures the level of quality needed. During pre-construction Holder provided consultations in design, constructability, value analyses, and pricing for the owner. All contracts for Design work will be a lump sump.

Holder requires that all subcontractors have $5 million of insurance coverage. Subcontractors with a contract exceeding $50,000 were required to be bonded. Holder holds general and builder's risk insurance and was required to be bonded with the owner. The owner allowed Holder to hold only a 5% retainage for bonded subcontractors while a 10% retainage was used for non bonded subcontractors. All subcontractors were selected on a low bid basis.

An item of interest of the project is the Center for Conflict Resolution. The UMAEC set up a partnership to help discuss expectations, challenges, and goals during both pre-construction and construction. The partnership helped better define the lines of communication throughout the construction team, design team, consultants, and the owner. The meetings helped make clear how goals would be met and challenges would be faced. These sessions served as team building and developing a level of commitment and vision for the project.

Organizational Chart





Holder Construction Company Staffing Plan

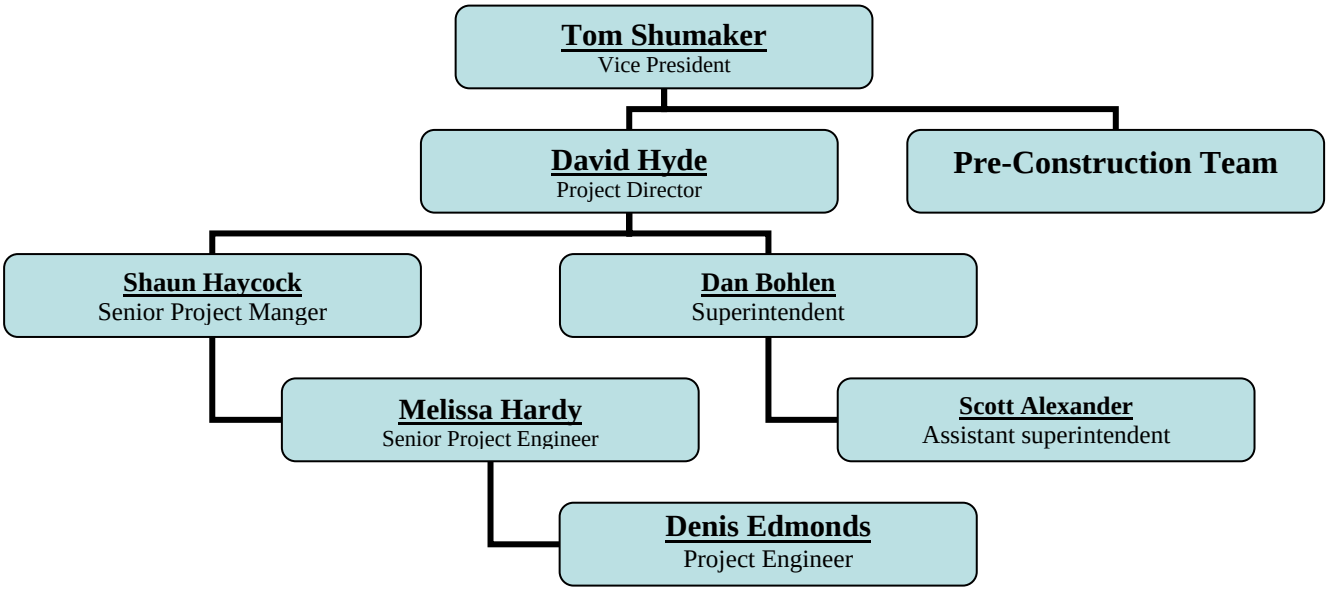
Holder Construction Company split their staff between the pre-construction and operations teams. The pre-construction team was responsible for the two year period prior to breaking ground and the operations team will take care of onsite duties during construction.

The pre-construction team initially worked to contact subcontractors to obtain bids for each of the trades on the project. The team reviewed each bid for compliance with the construction documents and for bid price to determine the best subcontractor to use on the

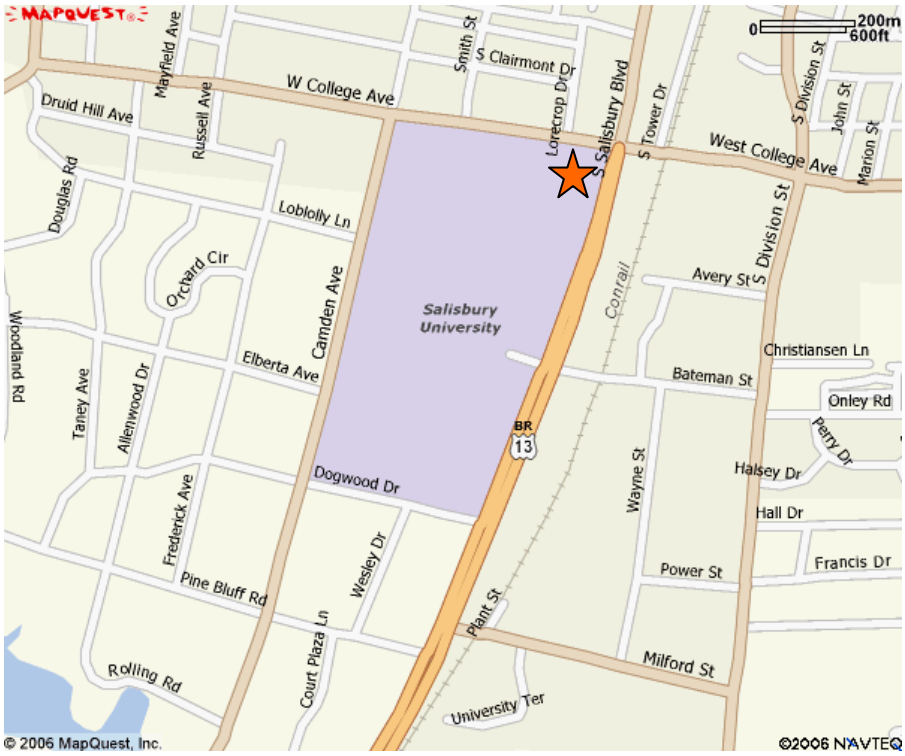
project. A site logistics plan and project schedule was also developed during preconstruction. The final task of the team was to perform value engineering analyses to cut cost from the project budget. As the pre-construction phase got closer to the beginning of construction the team worked with the operations team to revise the schedule and site plan to best fit the construction plan developed by the superintendents.

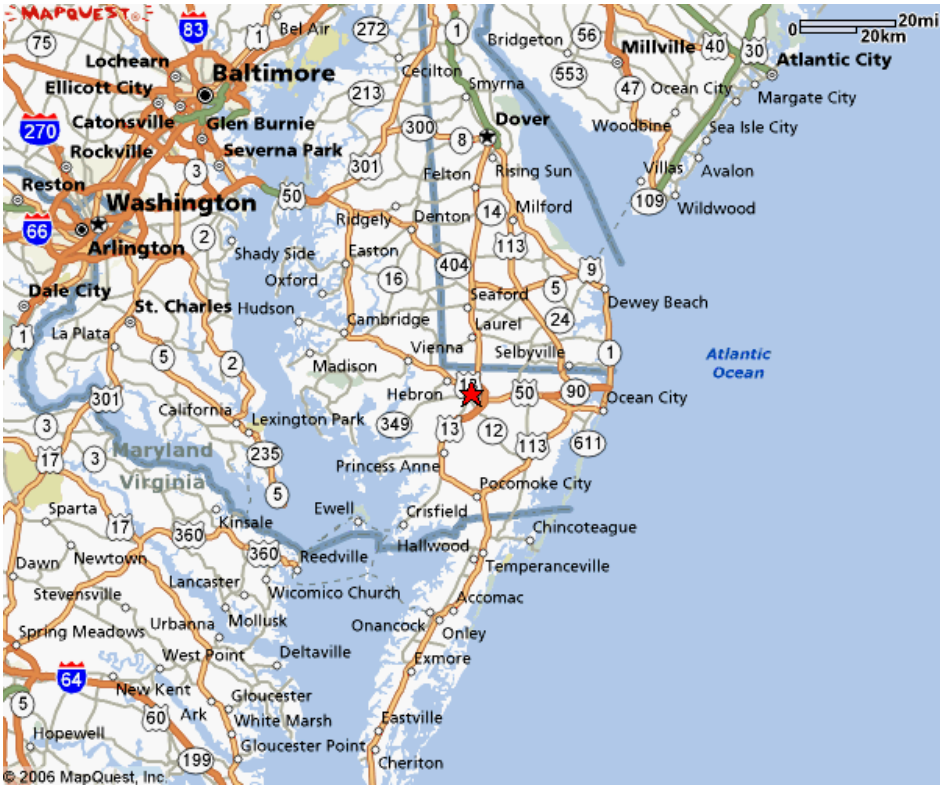
The operations group consists of a vice president, project director, superintendent, assistant superintendent, senior project manager, senior project engineer, and project engineer. Tom Shumaker, vice president, deals with staffing the job, corresponding with the owner, and resolving any subcontractor or budget issues. The Project Director, David Hyde, overees multiple University of Maryland projects that Holder is building, ensuring consistency throughout the projects, and also corresponding with the owner. The Senior Project Manager, Shaun Haycock, has duties that involve cost projections, owner billing, cost loading schedules, owner correspondence, etc. Under Shaun Haycock a Senior Project Engineer, Melissa Hardy, manages the MEP and exterior skin trades. She is also involved in the Project Managers duties such as cost projections and cost loading schedules. Dennis Edmonds, the Project Engineer on site, manages the remaining trades. He reviews submittals, shop drawings, and answers RFI's for all trades. The Superintendent, Dan Bohlen, is responsible for the overall site coordination, the construction plan, updating the schedule, etc. Scott Alexander, the Assistant Superintendent, coordinates day to day field operations, maintains quality control, safety and safety orientations, and erosion

control.


Tom Shumaker
Vice President
David Hyde
Project Director
Pre-Construction Team
Shaun Haycock
Senior Project Manger
Dan Bohlen
Superintendent
Melissa Hardy
Senior Project Engineer
Scott Alexander
Assistant superintendent
Denis Edmonds
Project Engineer

Project Location





Local Conditions

The Teachers Education and Technology Center is located on the eastern shore of southern Maryland on Salisbury University's campus. The building structure is steel with a brick façade to match the brick of the buildings throughout the University of Maryland School System. Two mobile cranes will be utilized to set structural steel starting from the back most corner of the site working towards the intersection of West College Ave. and U.S. 13.

The project site is not constricted by surrounding buildings and there is ample space for lay down areas, parking, and the trailer compound (Refer to Site Plan in Appendix C). The site also has necessary dumpster space for recycling and waste management. Holder Construction will be recycling concrete, steel, drywall, and paper for the project. The owner was considering a LEED certification, but financial constraints did not allow it. The specifications associated with LEED certification that do not increase the project cost are still being used. Additional dumpsters for each type of material being recycled will be placed on site. Waste and recycled material will be hauled off site by the same waste management company.

The Test Borings found that the surface soil to be Silty Sand Fill with layers of various grades of sands and clayey sands below. In general the subsurface layers were found to be alternating layers of poorly graded and well graded sands. The sandy soils of the project site require the use of auger cast piles for the foundation system. Driven piles were considered but the noise was not acceptable with dormitories in the area. During Test Borings groundwater was encountered. The water table should be assumed to be at or below the caved depths for borings where groundwater was not found. The water table was estimated to be between 10 to 14 feet below the surface and the auger cast piles are estimated to be drilled to approximately 20 feet below grade. Therefore some type of site dewatering will be required. The Auger Cast Piles are specified to carry of a maximum load of 55 tons.

Site Layout Planning

Layout & Access

Main access to the site can be found off U.S. Route 13 to the east. Dumpsters for the recycling steel, drywall, and concrete are located inside the construction entrance for haul service. The construction trailers were also placed near the entrance for deliveries, on site meetings, and to better control the site.

Steel Phasing & Crane Locations

Two mobile cranes will be necessary to erect the steel and their locations show on the site plans found in Appendix C. The 2nd of the mobile cranes will be removed on February 15th, 2007 when Building A is complete. Steel will be staged in two major areas that will allow on site unloading of members and no traffic interruptions. As mentioned above, structural steel erection and placement of elevated slabs will begin with sequence 1 at Building A. The relevant sequences to Building are A, B, & C are as following:

- Building A: Sequences 1-12
- Building B: Sequences 13-20
- Building C: Sequences 21-31

Project Schedule Summary- *See Schedule Following Page*

Schedule Notes - Key Elements to Sequences

- **Foundations**
  - Drill and Place Concrete for Piles
  - Placement of Reinforcing Steel and Formwork for Pile Caps, Piers, Grade Beams to Follow
  - 4” of Granular Base, Reinforcing Steel, and Formwork Prepped for SOG
- **Structure**
  - Structural Steel Columns, Beams, and Roof Trusses
  - Metal Floor and Roof Decking

- Installation of Elevated Concrete Composite Slabs

• **Finishes**

- Drywall
- Paint
- Acoustical and Hardboard Ceilings
- Flooring
- Millwork and Casework

MEP

- Underground Electrical & Plumbing
- MEP overhead and in slab rough-in
- MEP Terminations
- Setting of Equipment
- Commissioning

Architecture

The Teacher Education and Technology Center consists of three levels of lecture/classroom spaces, faculty offices, and laboratory spaces. The main architectural feature of the building is the curved corner colonnade, mimicking the curve of the street corner the building sits on. The "S" shaped building footprint creates a large courtyard space shielded from the busy street. A stairwell tower located on the southwest corner of the building is an added feature to the back of the building. The facility is broken down into three separate buildings, all interconnecting. These connection spaces allow for study and impromptu meeting spaces.

The exterior façade of the building features 4" hand-laid brick, vertically & horizontally running architectural pre-cast concrete bands, and punch out windows. The gabled roof is covered with a standing seam aluminum roof.

Building Systems

Building Envelope

The Teacher Education and Technology Center roofing system consists of a combination of an interior flat roof and a perimeter gable roof. The entire systems utilizes "W" shape steel framing and trusses with metal decking. A standing seam aluminum roof covers the roof gables and a rubber roofing membrane covers the interior flat roof.

The building exterior walls consist of both brick and architectural pre-cast concrete panels. 4" Nominal brick is used and pre-cast panels range in depth from 4"-9". The exterior masonry back-up consists of 8" cold formed metal framing, 1" rigid cavity board, 2" air space and an air barrier. The façade system rests on foundation concrete at the ground floor and is supported using 6" x 6" shelf angles at the floor levels.

The majority of the building utilizes "punch-out" windows with the exception of the corner colonnade, back side stairwell tower, and courtyard "porch". These areas of the building utilize full height windows, broken by pre-cast concrete panels that increase the amount of natural daylight in the building.

Superstructure & Foundation

The building rests on Auger Cast Piles with an average depth of -20'. Pile Caps, Ranging from 36"-46", and Piers ranging from 24"x24" to 30"x30"support steel columns/base plates. Grade beams are utilized between columns to help lateral force resisting. Slab-on-grades consist of 5" of concrete with 6"x6" Welded Wire Fabric reinforcing.

The building is comprised of a braced structural steel frame with bolted/welded moment & shear connections. A 6.25" composite metal deck and concrete floor system is used with light weight concrete. Foundation and elevated slab concrete was placed using a concrete pump.

Mechanical

Eight Air Handling Units ranging from 3,000 to 34,000 CFM utilizing Variable Air Volume Boxes service the building. Two 350 Ton Chillers and Boilers servicing the AHU's are contained in the ground floor mechanical room with two equal capacity cooling towers located in the adjacent mechanical yard.

Electrical

A 4000 amp, 480/277 V, 3 Phase, 4 Wire feed services the building's main distribution. This service is manipulated using a series of transformers ranging from 9 to 112.5 KVA. A3000 KVA, 480/277 V diesel powered emergency generator is located at the ground floor mechanical yard for back-up power. A buried diesel fuel oil system is adjacent.

Project Cost Background

	Total Cost	Cost per SF (165,000)
Construction Cost	$45,060,520	$273.09
Total Construction Cost	$47,222,372	$286.20
Building Systems Cost		
Mechanical (HVAC, Plumbing, Fire Protection)	**$11,000,322**	**$66.67**
Electrical (Including Telecommunications)	**$ 4, 718,350**	**$ 28.59**
Structural		
• Concrete	**$2,019,110**	
• Steel	**$ 5,316,274**	
• Total Structure	**$7,335,384**	**$44.46**
Masonry & Pre-cast	**$4,012,837**	**$24.32**