

The Educational Activities Building

PSU Harrisburg Campus



Figure 1 Images courtesy of BCJ

Technical Assignment 1

Name: Meshal Alenezi

Option: Construction Management

Advisor: Craig Dubler

Submission Date: 09/16/2013

Table of Contents

Executive Summary	1
Project Schedule Summary	1
Building System Summary	1
Project Cost Evaluation	2
Existing Conditions Site Plans & Local Conditions	2
Client Information	3
Project Delivery System	3
Staffing Plan	3
Appendix A	4

Executive Summary:

The Educational Activities Building project is located on the PSU Harrisburg Campus. The 55,000SF building is the result of rapid growth in student enrolment at the Capital Campus. It consists of two-story and will host engineering laboratory, classrooms, faculty offices, computer labs and multi-purpose room. The New EAB will be connected to the existing building through a pedestrian walkway connector.

Project Schedule Summary:

The planning and design phase lasted for 5 months. On February 4th, 2013 Notice to Proceed construction was granted and the site-work phase started on the same day. First the foundation was poured the structural steel was erected from ground up. Next, the slab-on-grade and slab on deck for the penthouse then the second floor was constructed. Later stages of the construction work started from the top and moving down to the ground floor with MEP rough-in followed by interior construction. Testing and commission of the building will take place within the last 5 months of the project construction. The completion date of the project is May 30th, 2014.

Building Systems Summary:

Table 1 Building Systems Summary

Building System	Description
Demolition	<ul style="list-style-type: none">• Make an opening on the east side wall of the existing building to place a double door.
Structural Steel Frame	<ul style="list-style-type: none">• Three types of bracing:<ol style="list-style-type: none">1. Single Diagonal Bracing2. Eccentric Diagonal Bracing3. Vertical K-Bracing• Mobile crane is used for the steel erection.
Cast-In-Place Concrete	<ul style="list-style-type: none">• Used for the footings, foundation walls, slab-on-grade and suspended slabs.• Engineered formwork system of plywood and metal.• Reshoring is used till proper curing of the concrete.
Mechanical System	<ul style="list-style-type: none">• One mechanical room located in the first floor of the north wing.

	<ul style="list-style-type: none"> • Mechanical unites placed on the roof and penthouse. • HVAC System: Central station air handling unit. • Variable air flow distribution system.
Electrical System	<ul style="list-style-type: none"> • 1600A, 480V, 3 phase and 4 wire electrical service. • 40kW emergency generator. • Various step-down transformers. • Majority of the lighting system consists of LED lighting.
Curtain wall	<ul style="list-style-type: none"> • Glazed aluminum curtain wall



Figure 1 Image courtesy of BCJ

Project Cost Evaluation:

The total project cost is \$19.4 million and \$352/SF, while the actual building construction cost is \$15.75 million and \$286/SF. The difference between the two comes from the land costs, site work and other costs. The MEP systems take the biggest chunk of the construction cost (\$4.6 million), followed by the finishing (\$3.3 million). The CM contingency and other fees is about \$1.6 million. The RS Means Square Foot estimate came out to be about \$202/SF after taking into account the adjustments for location, year, perimeter and height.

Existing Conditions Site Plans & Local Conditions:

The EAB is located in the PSU Harrisburg Campus. The only neighboring structure is the existing two-story building and its located south of the new building. The building is adjacent to a two way street on east, which could be utilized for deliveries. There is a parking lot south of the existing building that could be utilized for temporary parking.

Client Information:

The owner is the Pennsylvania State University; however the building will be occupied by different clients. Occupants consist of the Mechanical, Civil and Electrical Engineering faculty and students. The owner has high expectations for the work to be on schedule, ensure highest quality possible without exceeding the budget and finally the safety of the students, faculty and construction workers.

Project Delivery System:

The project delivery approach is Design-Bid-Build and this approach was chosen because its common for school project and it has proven to be successful with pervious projects. The owner hired BCJ as a lead architect with a lump sum contract. Reynolds Construction was hired early in the process as a CM at Risk with GMP contract and loosely partnered with BCJ. Contractors were prequalified by the CM and bids were open and evaluated privately with Penn State. The low bid was taken for each package.

Staffing Plan:

Penn State is one of the biggest supporters of BIM use and it utilizes it heavily with its projects. As a result, Reynolds made sure to hire BIM manager and BIM consultant for The Educational Activities Building project.

Appendix A
Technical Assignment 1
Power Point

Educational Activities Building PSU Harrisburg



Image courtesy of BCI

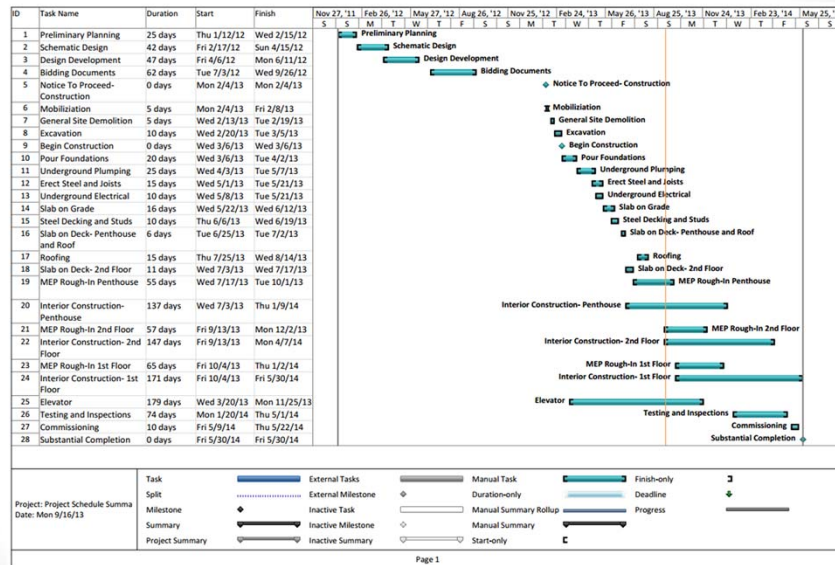


Meshal Alenezi
Construction Management
Technical assignment 1

Craig Dubler
09/16/2013

Reynolds

Project Schedule Summary

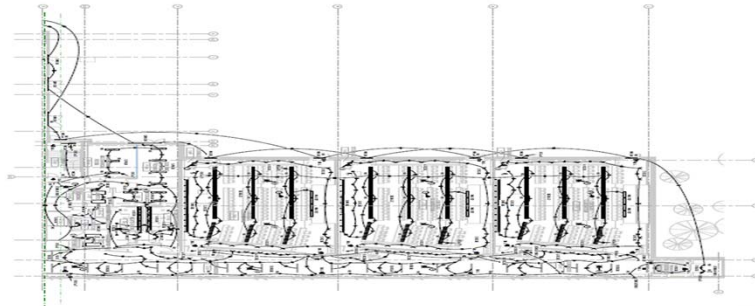


- The planning and design phase took about 5 months.
- The site work started on February 4th, 2013 and lasted for 20 work days.
- The foundations work took 20 work days.
- The structural steel frame was erected from the ground up and as soon as it was finished the work on slab on grade started.
- The slab on deck was built from the penthouse to the ground floor.
- Working from the top to the ground floor, the MEP rough-in was done first followed by the interior construction for each floor.
- Testing and commissioning stage will be done during the last 5 months of the project schedule.
- The Substantial Completion is set for May 30th, 2014.

Building Systems Summary

Work Scope

Electrical System



Demolition: saw-cut and remove masonry for a new double door, which will serve as an entrance from the pedestrian walkway connector. (Image courtesy of BCJ)

Structural Steel Frame: 3 types of steel bracing; Single diagonal bracing, Eccentric diagonal bracing and Vertical K-bracing. (Image courtesy of Mr. Dent)

Cast in place concrete: Engineered formwork system of plywood and metal are used to ensure the best finishing quality. Reshoring system is used until proper curing of concrete.

Cast in place concrete is used for the footings, foundation walls, suspended slabs and slabs-on-grade. The concrete needs to be placed continuously in one layer and consolidated with mechanical vibrating equipment. (Image courtesy of IN.gov)

Mechanical System: One mechanical room located in the first floor of the north wing. The mechanical units are placed on the roof. The HVAC system is a central station air handling unit, which utilizes chilled water for cooling and hot water for heating. The distribution system is a variable air flow system.

Electrical system: The electrical service is 1600A, 480V, 3 phase, 4 wire service from a pad mounted transformer located outside the electrical room. The service enters to a switchgear which distributes the power to sub-distribution panels and transformers. Included in the project is a 40kW emergency generator to provide life safety loads and other misc. loads with back up power in the event normal power is not available.

Project Cost

Item	SF Cost (\$/SF)	Total
Structural Steel	21.74	1,197,000
General Trades	50.46	2,778,000
Site Work	12.9	710,000
Masonry	7.14	393,300
MEP	83.89	4,618,468
General Conditions	22.13	1,107,660
Finishing	60.22	3,315,867
CM Contingency and others	-	1,630,730
Total	286.1	15,751,025

Project Title: Educational Activities Building
Model: College, Classroom, 2-3 Story
Construction: Face Brick with Concrete Block Back-up / Steel Frame
Location: HARRISBURG, PA
Stories: 2
Story Height (f.f.): 12
Floor Area (s.f.): 55,057
Data Release: Year 2012 Quarter 3
Wage Rate: Union
Basement: Not included

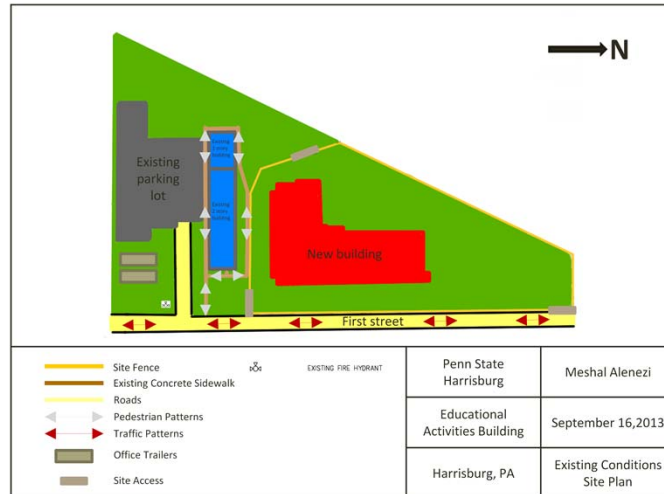


Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.

	Cost per Square Foot (\$/SF) Adjusted
Floor Area: 55,057SF	193.4
Perimeter: 806LF	5.1
Story Height: 15FT	3.4
Total	201.9

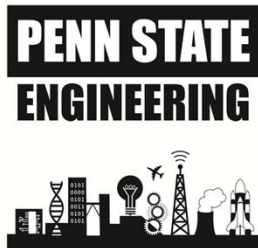
- Total project cost: \$19.4 Million and \$352/SF
- Actual building construction cost: \$15.75 Million and \$286/SF
- RS means square foot estimate: \$201.9/SF

Existing Conditions Site Plans & Local Conditions



- The construction site will be closed with a 6ft high fence.
- The project is adjacent to First Street on East, which will be used as the main entrance to the construction site.
- There will be 3 gates, one
 - South East corner of the site: located on First Street and will be used as the main entrance for contraction deliveries and equipment.
 - North East corner of the site: Will serve as the main exit.
 - South West corner of the site: Will serve as an additional entrance for the workers.
- The office trailers will be located across from the existing building due to it is center location between the parking and the work site.

Client Information



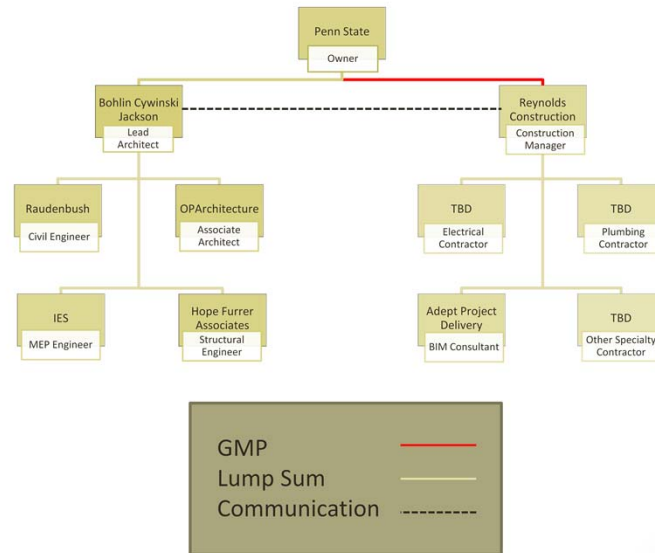
The owner: The Pennsylvania State University is one of the leading universities in the nation, with 24 campuses across the state. Penn state Harrisburg is experiencing growth in student population and this project was designed to meet the needs of the new students. The owner has a few expectations regarding the following:

- **Cost:** Keep the cost within the budget to ensure low tuitions for the students.
- **Quality:** one of the university main goals is to provide state of the art facilities to its students and faculty. The owner demanded the best quality for everything, starting from the project team and ending with the finishing.
- **Schedule:** The owner wants the building to be up and running by summer 2014 to get it ready for the new academic year.
- **Safety:** This is a very important part of the construction work within any of the Penn State campuses. Penn State pays much attention to the smallest details of construction safety to ensure the well being of its students, faculty and the construction workers.

For the mentioned reasons above, Penn State selected the best team to deliver this project. Additionally, Reynolds Construction was chosen due to their familiarity with area and local trades.

The owner wants the exciting Educational Activities building to be occupied during construction. The new building will be connected to the existing building through a pedestrian walkway connector. As a result, the owner requires the walkway to be finished when the students are on break.

Project Delivery System



The delivery method for the Educational Activities Building project is design-bid-build. The owner hired Bohlin Cywinski Jackson as a lead architect with Lump Sum contract to design the project. Reynolds Construction was on board from the beginning as a CM at Risk and loosely partnered with the architect. The contract type between Penn State and Reynolds Construction is Guaranteed Maximum Price, which is very common for school projects and it has been successful with previous projects. Contractors were prequalified by the CM and the different construction packages were bids. The bids were open and evaluated privately with PSU personnel and low bid was taken in each case.

Staffing Plan

