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Construction Management
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New Moon Area High School/ District Administration Offices

8353 University Boulevard, Moon Township, PA 15108

Technical Assignment One | 10/5/2009

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New Moon Area High School

& District Administration Offices

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STRUCTURAL SYSTEMS

Foundation:
Grade beams and columns bear on (299) caissons ranging from 24”-54” in diameter, at depths of 13’-40’.

Superstructure:
The ground floor is supported by grade beams spanned by a 21” ribbed, structural slab-on-grade. Floors 1-2 rest on 3-1/2” light weight concrete on 3”, 18 gauge metal decking. The buildings main support comes from a structural steel system made of varying W-shapes and the lateral loads are carried through masonry shear walls.

MEP SYSTEMS

HVAC:
Classroom climates are provided by (130) in-ceiling heat pumps, (11) 100% outside air units with heat recovery, (3) natural gas boilers, and (2) fluid cooling units. Other space heating and cooling is supplied by a combination of (12) variable and constant volume AHU’s, and (15) cabinet heaters.

Electrical:
(2) 5000A, 480Y/277V 3Φ, 4-wire Service feeders are provided by Duquesne Light. The service is then dropped to 208Y/120 by (6) transformers within the building. Back-up power is supplied by a 17 minute UPS and a 250 kW diesel powered generator.

Fire Supression:
The building utilizes a combination of wet and preaction systems.

ARCHITECTURE

The New Moon Area High School will feature a tan brick exterior with stone and red brick accenting, along with the occasional use of a glass curtain wall system. The building is of a split-level design, only allowing for only two of the three stories to be seen from the road. The High School is designed for the community spaces to be most accessible from the main entrance, where the auditorium and gymnasium are on the first floor, and the bulk of the classrooms are on the second floor. The ground floor consists of the cafeteria, natatorium and district administration offices. Overall, the building will accommodate 1,260 students and 172 staff members.


Main Entrance

PROJECT TEAM

Owner:
Moon Area School District
Architect & MEP:
Eckles Architecture & Engineering, Inc.
Building Electrical Engineer:
Tower Engineering
Structural Engineer:
Barber & Hoffman, Inc.
Civil Engineer:
Michael Baker Jr., Inc.
General Contractor:
Nello Construcition Company
CM Agent:
N. John Cunzolo Associates, Inc.

GENERAL BUILDING DATA

Size:
291,387 square feet
Occupancy Class:
Group E - Educational
Cost:
$63,682,117
Dates of Construction:
January 2009 - November 2010
Delivery Method:
Design-Bid-Build w/CM Agent

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1.0 EXECUTIVE SUMMARY

Technical assignment one will ~~discuss the major~~ aspects of the construction of the New Moon Area High School and District Administration Offices located in Moon Township, Pennsylvania. The construction of the high school is the second phase of four year undertaking to revamp the main campus of the Moon Area School District. The first phase of the project included the installation of a new campus entrance and three traffic signals, along with the demolition of a nearby building. Upon completion of the high school the old high school will be completely gutted and renovated, eventually becoming the new middle school. Finally, the last stage of the project will involve the demolition of the current middle school and district administration offices to make room for parking and athletic fields.

Upon completion the 291,400 ft^2 facility will provide education for 1,260 students and community access to a 1,200 seat auditorium. Along with the construction of the high school, phase two includes the construction of a new tennis facility to north of the stadium. Also, a softball and baseball complex with accompanying concession stand will be placed in the area between the current high school and the stadium facility. Phase two began in February 2009 and is scheduled for completion by November 2010. The total cost of the project is expected to be approximately $71 million. When completed the exterior of the building with feature a mainly brick façade with strategically placed curtain wall accenting.

Over the past five years the project has gained unwanted attention from the neighboring community due to some early indecision from the school board. Therefore, it is essential that the building be completed on time and on budget. The success of the 20 month schedule will rely heavily upon the prime contractors' ability to work together. Coordination will be imperative to ensure that the complex structure and air-water HVAC system are installed without putting the project behind schedule. Many times on public school works coordination can be difficult due to the lack of contractual obligation between the prime contractors. Often the task of coordination is built into the scope of the general contractor. Therefore, the success of the schedule will be determined by Nello Construction Company's ability to pull the team together.

The following pages of the technical assignment will highlight the major aspects of the construction of the New Moon Area High School and District Administration Offices. This will include the project summary schedule, building systems summary, project cost evaluations, existing conditions, local conditions, client information, project delivery system and the general contractor's staffing plan.

2.0 PROJECT SCHEDULE SUMMARY

The construction of the New Moon Area High School is the third phase in a four year endeavor to improve the functionality and aesthetics of the District's main campus. The first two phases included the addition of a campus entrance with traffic signaling and the demolition of a previously condemned structure. Construction of the new high school began in the early part of February 2009 and will continue through November 2010. The building must be completed for class use after Christmas break in 2010.

For construction purposes the building has been divided into seven major areas, labeled A-G. As depicted in Figure 1 below, the construction will start in Area C and continue through Area G then jump to Areas A & B. This sequence will begin on the ground floor and continue up through the roof. Areas A & B are on floors one and two, and are not part of the ground floor. The sequencing allows for the ground floor foundations and framing to be put in place before framing begins in Areas A & B, keeping vertical progress consistent throughout the floor plan.

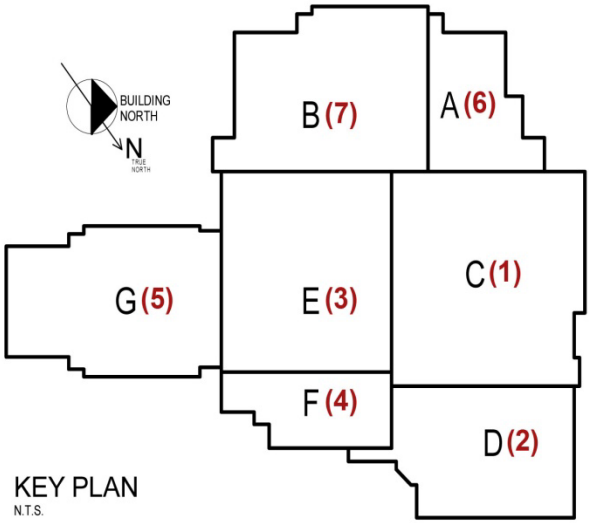

Figure 1: Building Key Plan with Sequencing

Construction in each area uses very logical and simple sequencing. The areas are divided by floors, where each floor is constructed from the bottom-up and the outside-in. On the ground floor, caissons are installed, grade beams are poured and SOG's are placed. Upon completion of the superstructures, MEP work begins, along with the installation of the facades. Once the building reaches a "dry" state, work begins on the interior finishes.

Please see Figure 2: Summary Schedule, for a more detailed look at the overall timeline of the project. As is shown by the long duration, the design phase was impeded by many changes from the owner and a few hurdles during the permitting process. The District had a difficult time deciding whether they wanted to build a new high school or middle school, and ultimately decided a new high school would better serve the needs of the district and the community.

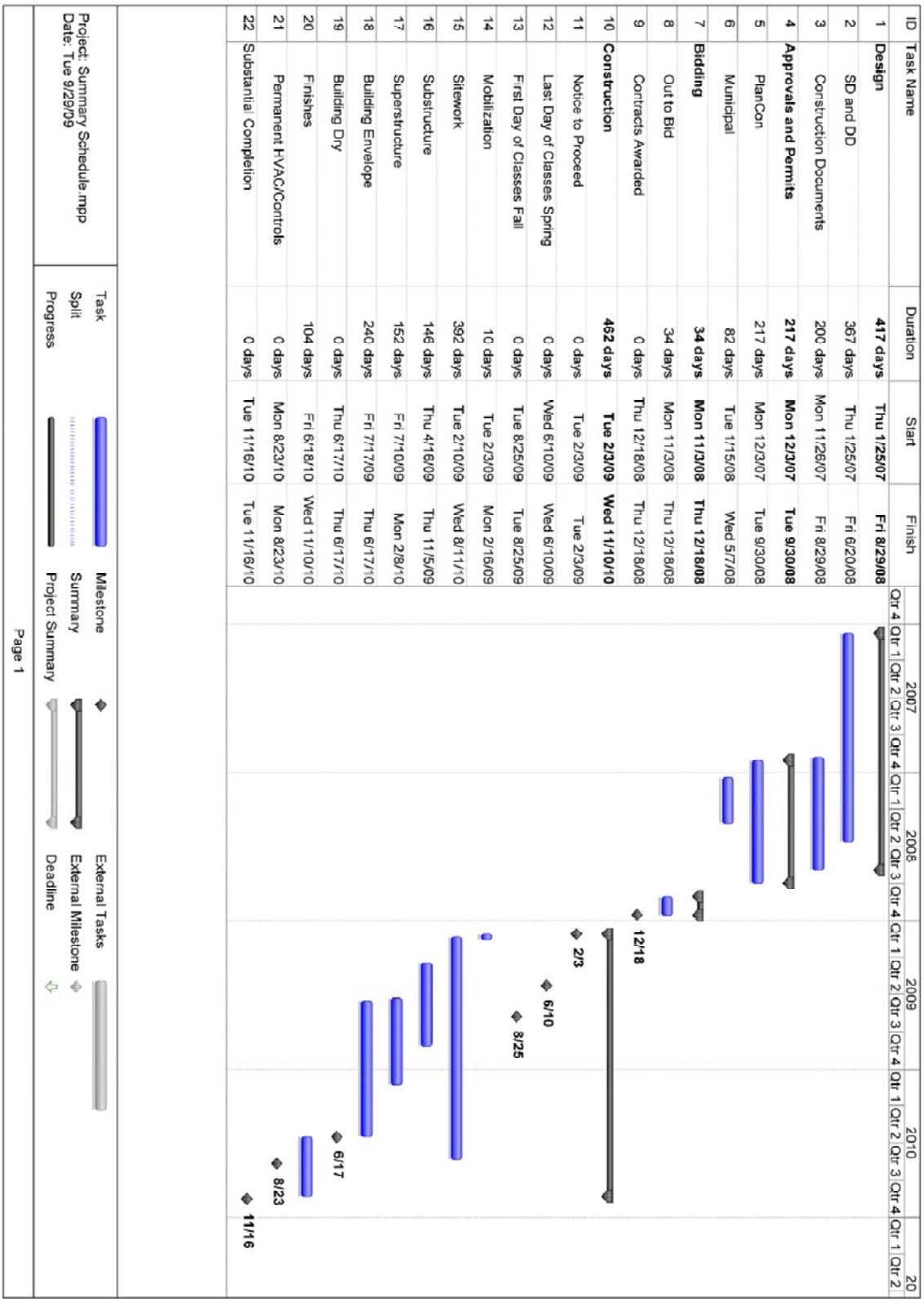

Figure 2: Summary Schedule

3.0 BUILDING SYSTEMS SUMMARY

BUILDING SYSTEMS SUMMARY		
Yes	**No**	**Work Scope**
X		Demolition Required
X		Structural Steel Frame
X		Cast in Place Concrete
	X	Precast Concrete
X		Mechanical System
X		Electrical System
X		Masonry
X		Curtain Wall
X		Support of Excavation

Figure 3: Building Systems Summary

3.1 DEMOLITION

In order for the new high school to be built, part of the Moon Area campus must be cleared. The majority of the existing site contains athletic facilities including a baseball field and two sets of tennis courts. Demolition of the baseball field consisted of the removal of two CMU dugouts and chain link fencing. The 10' high chain link fence was removed from around both set of tennis courts, and the asphalt playing services were removed and used for fill elsewhere on site. The scoreboards for both the baseball field and tennis courts were carefully dismantled and stored for future installation in new locations. Along with the demolition of the sports facilities was the removal of an existing maintenance building. The building's steel frame was carefully taken down and sold.

Along with the demolition of site structures is the removal of existing utilities. There are many utilities buried under the new site due to its central location on campus, falling between three of the school's other facilities. This demolition includes the removal and relocation of gas, storm and electric lines.

3.2 STRUCTURAL STEEL FRAME

The majority of the structure will be comprised of structural steel members. The beams and girders are made from varying W-shapes, and the columns are a combination of W-shapes and HSS tube steel. The gym, auditorium and pool roof support is provided by LH and DLH long-span steel trusses that bear on reinforced masonry walls. The structures lateral load will be supported by a combination of moment frames and reinforced masonry walls positioned throughout. Finally, each above ground floor will feature a 6½" composite slab (3½" 4,000 psi lightweight concrete on 3", 18 gauge, galvanized decking).

All structural steel will be installed using two different cranes. The main crane will be a 110 ton crawler with a 150 ft. main boom and 45 ft. jib. The secondary crane will be a 60 ton hydraulic crane with a 110 ft. main boom and 35 ft. jib. A site road will be installed around the perimeter of the building allowing the cranes to be relocated as sequences are completed.

3.3 CAST IN PLACE CONCRETE

Cast in place concrete is being used in a variety of locations both on site and in the structure of the building. The site concrete includes sidewalks, stairs, planters and small slabs. All site concrete was formed using traditional hand-made wooden forms and placed by the direct chute method. The building structure uses concrete caissons, pile caps, grade beams, reinforced concrete walls, slabs on grade and elevated slabs on deck. The caissons, pile caps, and grade beams were all formed using the surrounding earth or wooden forms and were placed using the direct chute method. The reinforced concrete walls were formed using Mod-U-Form, a reusable modular concrete formwork system as shown in Figure 4. All elevated slabs are supported by decking and edged with standard formwork. The structural SOG's were edge formed by hand and supported underneath by a combination of soil and void forms. The void forms were used to create the ribs in the structural slabs. All concrete walls and slabs were placed using a pump truck.

Figure 4: Mod-U-Form installation

3.4 MECHANICAL SYSTEM

The high school will feature an air-water heating and cooling system. The building's main heating and cooling is supplied by (130) single zone heat pumps. The pumps are supplied with hot and cold water by (3) natural gas boilers and (2) fluid cooling units (cooling towers). Both the boilers and the sumps for the cooling towers are located in the boiler room on the ground floor in Area D. The heat pumps are used to supply heating and cooling to the classroom areas of the building. Fresh air for the classrooms is supplied by (11) rooftop 100% outside air units with heat recovery. All other heating and cooling needs are supplied by combination of RTU's, AHU's and cabinet heaters. The AHU's service the district administration office, pool area and team locker rooms and are located in the mechanical and boiler rooms on the ground floor in Areas D and G. The (3) AHU's that service these areas are a combination of variable and constant volume units. The (9) RTU's within the system service most of the public spaces within the building including the gym, auditorium, cafeteria and library. Like the AHU's, the roof-top-units are a combination of variable and constant volume.

The fire suppression system will use both wet and pre-action systems. The gymnasium will be the only area of the building to utilize the pre-action system. This is often the case in school design because sprinkler heads in a gymnasium can easily be struck by flying objects. Using a pre-action system ensures that there is no accidental discharge in the event a head in broken.

3.5 ELECTRICAL SYSTEM

The Moon Area School District's power is supplied by Duquesne Light. The building will be provided with (2) 5,000A, 480Y/277V 3Φ, 4-wire service feeders. These feeders will enter the building from the southeast corner of the ground floor near Area G. Once the service enters the building the 480Y/277V is distributed through (2) main switchboards. The 208Y/120V power is provided by (6) step-down transformers located throughout the building. The high school is equipped with two back-up systems; a UPS and a diesel powered generator. The UPS is designed to provide 17 minutes of emergency power. The generator and fuel tank are sized to supply 250 kW of 480Y/277V for a period of up to 24 hours.

3.6 MASONRY

The construction of the high school will feature the use of masonry as a structural element, and for aesthetics. The majority of the building's exterior showcases tan and white utility brick. The utility brick is attached to one of two different wall structures along the perimeter of the building. In some areas the brick is backed by a 12" reinforced CMU wall, and attached with adjustable brick ties. In all other areas the brick is attached to ½" sheeting on 6" structural metal studs. The building uses structurally reinforced CMU walls to help support vertical and lateral loads. Some of the structural masonry walls will utilize Ivany Blocks, as displayed in Figure 5. The Ivany Block system is designed to ensure that the reinforcing within the structural masonry walls is properly placed. The blocks are formed to align the placement of both the vertical and lateral steel bars. All masonry will be placed using the assistance of traditional tube and plank scaffolding.

Figure 5: Ivany Block (www.Ivanyblock.com)

3.7 CURTAIN WALL

The exterior of the high school will feature 8,000 ft^2 of traditional aluminum framed curtain wall divided amongst several locations. The design of the system is the responsibility of the curtain wall subcontractor, Specified Systems from Canonsburg, PA. The curtain walls will have an array of glazing types, ranging from ¼" clear tempered glass to 1" insulated low "E" panels. The exterior of the curtain walls will also feature a 2' aluminum finned sunscreen, providing shade to all three floors.

3.8 SUPPORT OF EXCAVATION

Soldier beams and lagging are being used to support the area around where the pool will be installed. The soldier beams were set in previously drilled holes and grouted around the base. The soil was then excavated starting at the deep end of the pool and working outward. Lagging was placed at varying depths to meet the contour of the pool bottom. This system will be kept in place permanently and backfilled as part of the final support system for the pool's structure. Since the water table in this area of the site was recorded to be below the excavation depth of the pool, there are no permanent dewatering techniques being used. In the event of a rain storm, the pool area will be evacuated using a portable, gasoline water pump.

Figure 6: Supported excavation around pool

4.0 PROJECT COST EVALUATION

All actual cost data represented in the following section was obtained using the amounts submitted for each of the prime contractor's lump sum bid. In some cases, the general contractor's schedule of values was used to extract more precise pricing. All square foot based costs were derived using a total building square footage of 291,400 ft^2.

Project Cost	
Building Construction Cost (CC)	
Total	Cost/SF
$ 59,323,640	$ 203.58
Total Project Cost	
Total	Cost/SF
$ 70,802,748	$ 242.97

Figure 7: Project Cost Analysis

Building Systems Cost			
Building System	**Cost**	**Cost/SF**	**Source**
Structure (Steel, Concrete, Structural Masonry)	$ 13,244,228	$45.45	GC Schedule of Values
HVAC	$ 7,560,000	$25.94	Lump Sum Bid
Electrical	$ 5,836,400	$20.03	Lump Sum Bid
Plumbing	$ 3,082,400	$10.58	Lump Sum Bid
Fire Suppression	$ 594,450	$ 2.04	Lump Sum Bid
Technology & Communications	$ 2,368,450	$ 8.13	Lump Sum Bid

Figure 8: Building Systems Cost Summary

Lump Sum Bid Summary		
Contract	Bid	Winning Contractor
General Construction	$ 38,649,220	Nello Construction Company
HVAC Construction	$ 7,560,000	A. J. Demor & Sons, Inc.
Plumbing Construction	$ 3,082,400	Vrabel Plumbing Company
Electrical Construction	$ 5,836,400	Clista Electric, Inc.
Fire Suppression Construction	$ 594,450	S. A. Communale Fire Protection
Technology & Communications Construction	$ 2,368,450	Merit Electric Group, Inc.
Food Service Construction	$ 590,838	Gateway Kitchen Equipment
Swimming Pool Construction	$ 982,744	Aqua Pools, Inc.
Stage Equipment Construction	$ 218,000	Pittsburgh Stage, Inc.
Gym Equipment Construction	$ 121,500	Maffei Strayer Furnishings, Inc.
Casework Construction	$ 1,450,745	Polyvision
Landscaping Construction	$ 269,063	Executive Landscaping

Figure 9: Lump Sum Bid Summary

Figure 10 depicts the results of a parametric estimate using D4Cost, a cost estimating software. The software utilizes a catalog of previously completed projects and allows the user to pick a similar type of project and adjust the size, time and location. Figure 11 is a square foot estimate from RS Means CostWorks (www.meanscostworks.com).

D4Cost Estimate				
Code	Division Name	%	Cost/SF	Projected Cost
01	General Requirements	7.96%	$ 17.31	$ 5,044,899
03	Concrete	9.36%	$ 20.37	$ 5,935,825
04	Masonry	13.42%	$ 29.21	$ 8,509,963
05	Metals	8.93%	$ 19.44	$ 5,664,509
06	Wood, Plastics, and Composites	3.97%	$ 8.64	$ 2,516,499
07	Thermal and Moisture Protection	5.57%	$ 12.12	$ 3,530,923
08	Openings	3.89%	$ 8.47	$ 2,468,171
09	Finishes	7.49%	$ 16.29	$ 4,746,823
10	Specialties	1.06%	$ 2.31	$ 671,798
11	Equipment	2.62%	$ 5.69	$ 1,659,438
12	Furnishings	1.25%	$ 2.71	$ 791,092
14	Conveying Systems	0.29%	$ 0.63	$ 184,085
21	Fire Suppression	1.02%	$ 2.23	$ 649,866
22	Plumbing	3.76%	$ 8.19	$ 2,386,375
23	HVAC	11.17%	$ 24.31	$ 7,084,671
26	Electrical	11.70%	$ 25.46	$ 7,417,266
27	Communications	1.83%	$ 3.99	$ 1,163,425
	Total:	100%	$ 207.37	$ 60,425,628

Figure 10: D4Cost Building Estimate

Square Foot Cost Estimate Report				
Building Type:	School, High, 2-3 Story with Face Brick with Concrete Block Back-up / Steel Frame			
Location:	PITTSBURGH, PA			
Story Count:	3			
Story Height (L.F.):	14			
Floor Area (S.F.):	291400			
Labor Type:	Union			
Basement Included:	No			
Data Release:	Year 2008 Quarter 4	Costs are derived from a building model with basic components.		
Cost Per Square Foot:	$108.93	Scope differences and market conditions can cause costs to vary significantly.		
Building Cost:	$31,741,000	Parameters are not within the ranges recommended by RSM eans.		
		% of Total	Cost Per S.F.	Cost
A Substructure		2.70%	$2.98	$869,000
B Shell		30.70%	$33.46	$9,750,000
C Interiors		21.00%	$22.85	$6,658,500
D Services		38.70%	$42.10	$12,266,500
E Equipment & Furnishings		6.90%	$7.47	$2,175,500
F Special Construction		0.00%	$0.00	$0
G Building Sitework		0.10%	$0.07	$21,500
Total Building Cost			$108.93	$31,741,000

Figure 11: RS Mean Square Foot Estimate

Summary of Building Cost Estimates		
Source	Total Cost	Cost/SF
Actual Cost	$ 59,323,640	$203.58
D4Cost	$ 60,425,628	$207.36
RS Mean CostWorks	$ 31,741,000	$108.93

Figure 12: Summary of Cost Estimates

When comparing the parametric and the square foot estimates to the actual cost of the building, the number that stands out the most is the RS Means estimate. The square foot estimator produced a number that was only slightly higher than 50% of the actual cost and parametric estimate. There are many factors that could contribute to this inconsistency. First, the RS Means estimate only allotted $869,000 for the construction of the substructure. This only takes into consideration using a traditional spread footing to support the structure. In reality the high school will be supported by 299 drilled concrete caissons and a 21" ribbed structural slab. This difference alone could result in a change of several million dollars. Second, the RS Means estimating software only recommends that the estimating tool be used for a high school with a building size between 42500 ft^2 – 241500 ft^2. At 291,400 ft^2 the Moon Area High School does not fall within that region. Finally, the services portion of the square foot estimate does not compare to the numbers submitted by the HVAC, plumbing and electrical contractors. This could be attributed to the complexity of the heat pump system being installed.

When comparing the D4Cost parametric estimate to the actual cost of construction, the numbers are very similar. The project that this estimate was derived from was constructed in 2006 and was very similar in size, structure and finishes. All of these factors would lead one to believe that this is a much more reliable number than the one produced using RS Mean CostWorks.

5.0 SITE PLAN OF EXISTING CONDITIONS

The site of the New Moon Area High School is located at 8353 University Boulevard in Moon Township, Pennsylvania. University Boulevard provides immediate access to many of the major highways surrounding the Pittsburgh area. The high school will be centrally located on the existing 59 acre campus as depicted in Figure 13.

Before construction, the majority of the site was covered by athletic fields. This will resulted in the need for very little demolition. Also, the site contained very few major utilities. Most of the campus' main utilities enter by way of either University Boulevard, to the west, or Beaver Grade Road, to the east. Most of the utilities under the site were able to be demolished during the sitework phase.

The project's construction entrance will be off of University Boulevard to the south of the existing middle school. This is the area that will be most crucial for the general contractor to create a barrier between the active school campus and the construction zone. Due to the immense size of the site there will not be a construction fence used around the entire perimeter. However, careful planning has been done to create a barrier between the project and the middle school. During the summer of 2009 the construction forced the closing of the road between the current high school and middle. During this time a new road was built to the north of the new high school that connects the old middle school and high school. This now splits the site into two parts, with the athletic fields to the north and the high school to the south.

Please refer to Appendix A for a plan of existing site conditions, along with a rendered site plan provided by EAE displaying the final state of the site concluding all phases of the renovation.

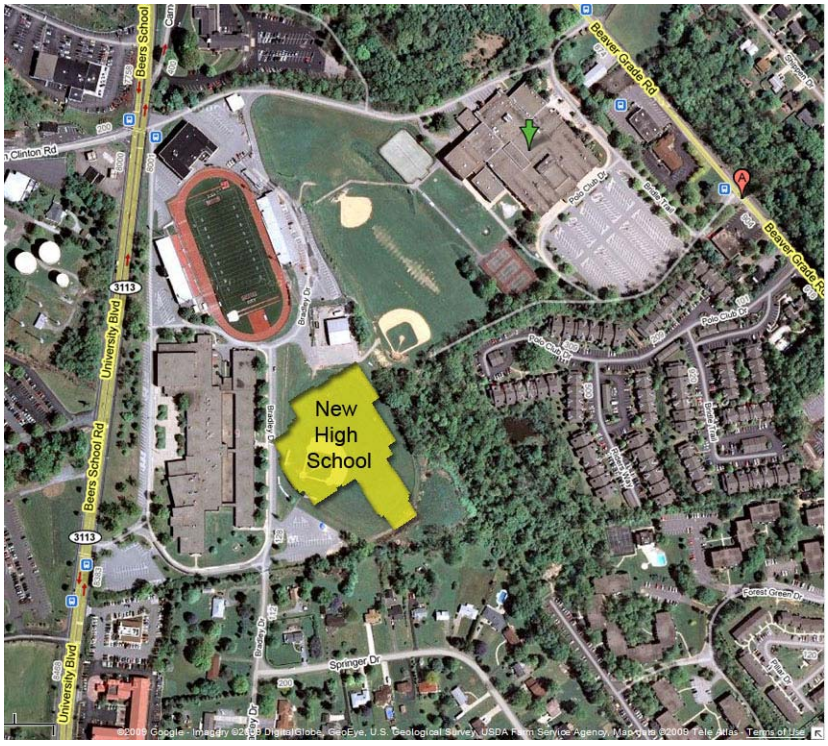

Figure 13: Arial View of Moon School District's Campus (www.maps.google.com)

6.0 LOCAL CONDITIONS

The New Moon Area High School is located approximately 30 minutes outside of the City of Pittsburgh. In this area the use of a structural steel frame is common along with the use of structural masonry shear walls. It is also very typical for schools to feature brick veneer facades with the occasional use of precast panels and glass curtain walls.

The large size of the site will allow for construction parking to be separated from school parking. Although, during the summer of 2009 construction workers were permitted to use school parking lots until school started in August 2009. It is not clear whether or not the GC will be employing any forms of recycling at this time. The GC was also unable to be contacted in regards to local tipping fees.

As mentioned earlier, the substructure of the building will rely heavily on the support of caissons. The caissons range in diameter from 24" to 54" and range in depth from 13' to 40'. This type of system was chosen do to the types of soils discovered by the geotechnical engineer, Cernica Engineering, Inc, during their subsurface investigation. Appendix B shows the details of a test boring that was chosen by Cernica as the best representative of the overall site conditions. Underneath the topsoil most of the site contains approximately 8' of sandy silt and then 5' of weathered shale. A coal seam was also discovered to be running through a small portion of the site. Upon this investigation it was Cernica's recommendation to support the building through the use of auger cast piles similar to those designed by the structural engineer.

7.0 CLIENT INFORMATION

The owners of the New Moon Area High School are the Moon Area School District. The district is located in Moon Township, PA and encompasses approximately 23 square miles. The population in the district is around 25,000, and during the 2005-2006 school year, the school provided services for 3,705 students (2009 Allegheny County Performance Audit). Below, is the school's mission statement taken directly from the district's website (www.masd.k12.pa.us). Along with this mission statement, the district takes great pride in its mascot, the tiger. The phrase "Tiger Pride" is used to describe the attitude of the district and the surrounding community.

"Moon Area School District, in partnership with the community, is dedicated to educating every individual in a respectful, safe, enriching environment through comprehensive programs that inspire excellence, lifelong learning and responsibility."

The core values of this mission statement demonstrate the reasons the district is currently in the middle of a four year plan to revitalize its facilities. The high school is being built to better serve the needs of the community and students. The current high school is very much outdated and suffering from a stint of reoccurring mold issues that are currently being dealt with. The school board hopes that the new facilities will draw more attention to the district and provide students with more opportunities.

At the inception of the idea five years ago, the school board did not know what they were getting in to. In late 2004, contracts were awarded for the design of a new high school. Sometime in early 2006 the design was completed, and $76 million in contracts were awarded for the construction of the new facilities. However, shortly before the project was to begin, a few new school board members were elected and the board changed majority power. The new school board decided they could make better use of the money by focusing on some other renovations and the construction of a new middle school. The project was terminated. The district spent the next few years discussing how the money could be better spent. After much debate it was decided that the best course of action involved the construction of a new high school and the renovation of the old high school into a new middle school. In January 2008, a contract was awarded to Eckles Architecture & Engineering for the design of the new facilities.

The project has become high profile in the area due to much of the controversy associated with its past. This will require the project to be executed with few mistakes. As is the case with most school construction, it will be crucial that all deadlines are met and the school is ready to be opened for the second half of the 2010-2011 school year. The district also hopes the high school will become their "show piece", adding the need for a higher quality of construction. According to the architect, the school board has very high hopes for the success of this project, and is relying heavily upon the experience of the design and construction teams to ease the minds of the community with a high quality and timely product.

All information for this section of the report was obtained via the school district's website and through conversation with the project architect.

8.0 PROJECT DELIVERY SYSTEM

The high school is being delivered to the district using the traditional design-bid-build method with the addition of a CM Agency. This method was chosen simply because it is a Pennsylvania state law to employ the design-bid-build method on state funded projects. Due to the owner's inexperience, the decision was made by the school board to employ a CM Agent. Figure 14 represents the overall structure of the project with solid lines indicating a contractual agreement, and dashed lines signifying non-binding lines of communication. The diagram does not include all prime contractors and their subcontractors, nor does it include all design consultants.

Project Organizational Chart:

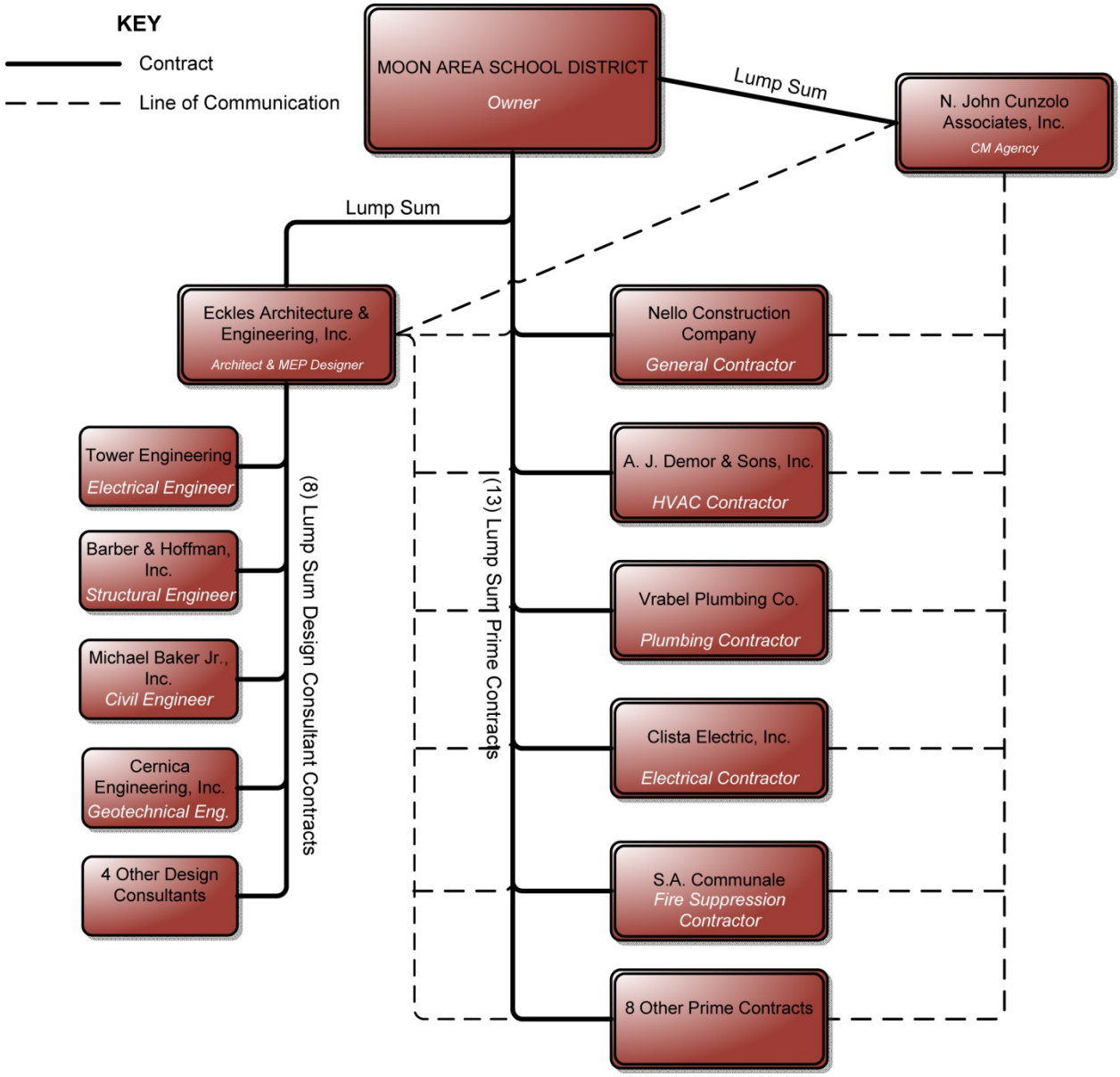

Figure 14: Project Organizational Diagram

As depicted in Figure 14, the construction was divided into (13) lump sum, prime contracts. The contracts were awarded to the lowest bidder in each category. Upon submitting bids, contractors were required to provide a bid bond and proof of liability insurance. Within seven days of the being awarded a bid, the contractors were required to furnish payment and performance bonds. This project did not require any additional insurance since it is being performed under an OCIP (Owner Controlled Insurance Program). The program has been purchased by the owner and will cover the insurance of all prime contractors and registered subcontractors. The program provides a way for the owner to ensure that all contractors are properly insured and often results in a cost savings to the owner.

The selection of the architect and CM Agent were done separately from the selection of the construction team. Both the architect and CM Agent were required to submit proposals and present their plans for the high school in front of a selection committee. N. John Cunzolo Associates, Inc. was chosen to perform the CM Agent responsibilities based upon their qualifications and lump sum bid of $2.6 million. The architect, Eckles Architecture & Engineering, Inc. was chosen based upon their design proposal and 7% lump sum fee. The 7% fee is awarded based upon the final building cost. The fee includes the amounts of the lump sum contracts that the architect holds with its (8) consultants. It is important to note that Eckles Architecture & Engineering was selected to be the architect for all phases of the campus renovation.

In the end, the owner made a wise decision to employ the services of a CM Agent on the project. Even though the CM Agent has no contractual control over the prime contractors, they can still serve as a valuable asset to an inexperienced owner. The traditional design-bid-build delivery system is required by law, and was also a wise selection for this project. Due to the indecisive attitude of the school board at the outset of the project, which required the design to be completed before construction could begin, other delivery methods could not be employed.

9.0 STAFFING PLAN

Nello Construction Company out of Canonsburg, PA was awarded the contract for general construction. The staffing structure employed by Nello is depicted in Figure 15 below. As smaller construction company, Nello does not utilize a large staff on projects. The majority of the project is handled by the Senior Project Manager, Project Manager and Superintendent. The President, Contract Administrator and Project Coordinator are all involved in multiple projects and are only involved with the high school as needed. Jerry Falso, the senior project manager, focuses his time on the project budgeting and material acquisition. Christopher Couture, the project manager, is the project scheduler and handles the processing of change orders. Jerry and Christopher work out of Nello's main office in Canonsburg at this time, but will eventually become part of the site staff as the project reaches peak production. Butch Rupnik, the superintendent, leads all field laborers. The number of labor foreman working under Butch will vary throughout the project depending on the amount of work being completed at that time.

Nello Construction Company Organizational Chart:

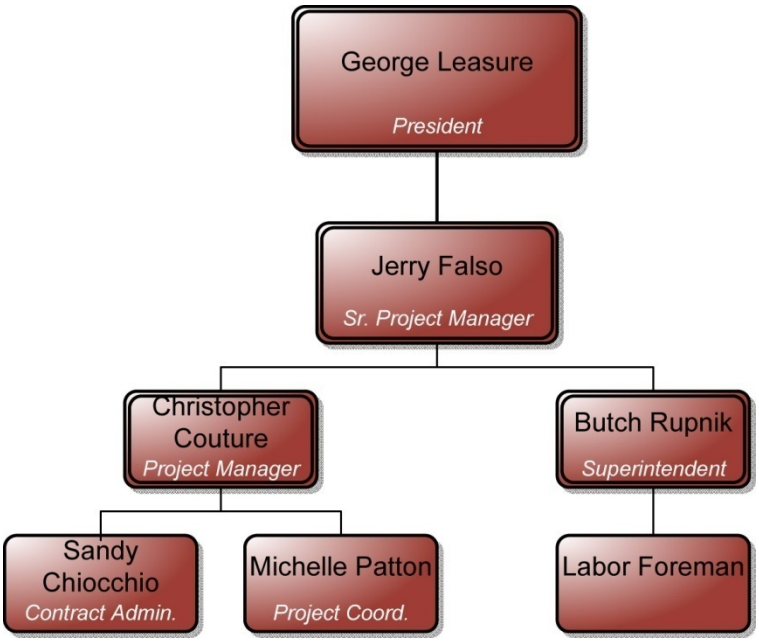

Figure 15: Project Organizational Diagram

Appendix A:

Existing and Future Site Conditions

C0-001
Drawing Number

DRAWN BY: KRISTOPHER BRICE
OPTION: CM
ASSIGNMENT: TECH 1

Project Number 06750.00
Date 10/5/2009
Scale AS NOTED

NEW MOON AREA HIGH SCHOOL / DISTRICT ADMIN OFFICE

P.D.E. No. 3442

MOON AREA SCHOOL DISTRICT — MOON TOWNSHIP, PA

EXISTING SITE CONDITIONS

architecture ECKLES engineering

301 North Mercer Street
New Castle, Pa. 16101
p 724.652.5507
f 724.652.0751

132 South Broad Street
Canfield, Oh. 44406
p 330.286.0438
f 330.286.0439

C0-002

Drawing Number

EDITED BY: KRISTOPHER BRICE
OPTION: CM
ASSIGNMENT: TECH 1

Project Number 06750.00

Date 10/5/2009

Scale N.T.S.

NEW MOON AREA HIGH SCHOOL / DISTRICT ADMIN OFFICE

P.D.E. No. 3442

MOON AREA SCHOOL DISTRICT MOON TOWNSHIP, PA

OVERALL SITE RENDERING

architecture ECKLES engineering

301 North Mercer Street
New Castle, Pa. 16101
p 724.652.5507
f 724.652.0751

132 South Broad Street
Canfield, Oh. 44406
p 330.286.0438
f 330.286.0439

Appendix B:

Test Boring Results

Boring log -- Boring # 29

Elevation at top of hole: **1012.50**

Cernica Engineering, Inc.

Water levels (ft.): Initial: Final:

Project: **MOON NEW MIDDLE and HIGH SCHOOL ADDITIONS**

Location: **MOON TOWNSHIP, ALLEGHENY COUNTY, PENNSYLVANIA**

Remarks: BORING REPORTED TO BE DRY 24 HOURS AFTER COMPLETION OF DRILLING

Sample Number & Type	Blows/6" Or %Rec. And RQD	Depth (ft.)	Soil Description
		0.5	3" TOPSOIL
1 SS	20 11 11	1.0 1.5 2.0	FILL: GRAY SANDSTONE AND CONCRETE FRAGMENTS, SOME SILT AND SAND (SHELBY TUBE - NO RECOVERY)
		3.5	
2 SS	20 50/2"	4.0 4.2	BROWN SANDY SILT AND SANDSTONE FRAGMENTS
		8.5	
3 SS	32 50/3"	9.0 9.3	GRAY WEATHERED SHALE
		13.5	
4 SS	50/3"	13.8	

SS=Split Spoon ST=Shelby Tube