KRISTOPHER J. BRICE

Construction Management
Faculty Consultant: Dr. Magent

New Moon Area High School/ District Administration Offices

8353 University Boulevard, Moon Township, PA 15108

Technical Assignment Two | 10/28/2009

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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

Table of Contents

Executive Summary

Technical Assignment Two analyzes the key features of the project cost and schedule that will have the greatest impact on the overall execution. This includes an in depth study of the project schedule, site layout planning, detailed structural systems estimate and general conditions estimate. Finally, a summary of critical industry issues discussed at the 18th Annual PACE Roundtable is provided along with topic ideas for future analyses.

The report begins by considering the detailed project schedule and the site layout. The project schedule was condensed to meet item limitations presented in this assignment. Therefore, only Areas A & C have been detailed fully, as they are the two most important to the progress of the project. Work in the other five areas of the building has been summarized for easy viewing. Overall, the schedule depicts a construction period of 466 days from the Notice to Proceed on February 3, 2009 to Substantial Completion on November 16, 2010. The site layout planning was divided into three major phases: excavation, steel erection and finishes. A detailed site layout is provided for each phase with the major concern in each being the separation of construction activities from the rest of the Moon Area Campus.

The second half of the report focuses on the costs of construction. This is done through an analysis of both the cost of the structural system and the general conditions. Due to the complexity of the building structure a detailed cost estimate was performed in lieu of using an estimating module. The overall estimate provided a complete structural system cost of $12,480,838 falling only 3.5% short of the actual cost provided by the general contractor. Finally, the general conditions were estimated to be $2,183,968, or roughly 4% of the overall contract value. The estimate appears to be lower than would be typical for this type of work because most of the insurance was provided by the owner through an OCIP. This estimate was also hard to perform due to the type of delivery system being utilized on the project. Most of the general conditions items fall under the responsibility of four of the prime contractors. Therefore, estimate was developed using the schedule of values provided by the general, HVAC, plumbing and electrical contractors.

Detailed Project Schedule

The construction of the New Moon Area High School & District Administration Offices began with the Notice to Proceed on February 3, 2009, and is scheduled to continue until November 16, 2010. Work on the foundations began in April 2009 and was followed by the first piece of steel in July 2009. The façade is scheduled to begin in March 2010 in order to avoid the effects that the harsh winter may have on the installation of the masonry exterior. Finally, the building's HVAC systems are to be fully operational by September 2010 in order for work to begin on interior finishes that require stable climate conditions prior to installation. All work is scheduled to be completed no later than November 16, 2010, allowing the district use of the new facility during the spring semester of the 2010-2011 school year.

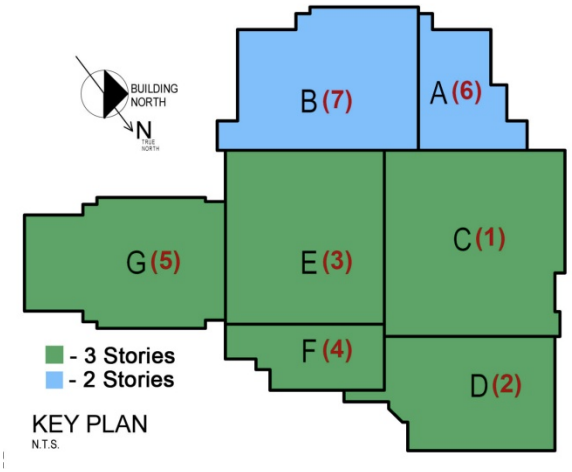


Figure 1: Building Key Plan with Sequencing

For design and construction purposes, the high school was divided into seven parts, Areas A-G. As displayed by the red numbers in Figure 1, work will begin in Area C and continue to Area G before jumping to Areas A & B. This is a result of the split-level design of the building. Areas C-G consist of a ground floor, first floor and second floor. Areas A & B only contain a first floor and second floor. The ground floor must be completed first in order for the first floor structure to be completed in Areas C-G. Whereas, in Areas A & B the first floor is on grade and does not require the erection of the steel structure.

As a result, the overall project schedule is organized mainly by area and then by each floor within the area. In order to accommodate the item limitations of this scheduling exercise, only two areas were fully detailed. Areas A & C were chosen to be the most descriptive of the work flow throughout the schedule. Area C can be used to describe Areas D-G and Area A can be used to describe Area B. A general summary of work by floor for Areas B & D-G has been provided in the detailed schedule.

Please proceed to **Appendix A** for the ***Detailed Project Schedule*.**

Site Layout Plan

Generally speaking, the site for the high school and administration offices is situated in the center of the existing Moon Area Campus, and is easily accessed from University Boulevard. As shown in Figure 2, much of the area surrounding the site is completely bare and will provide adequate space for construction planning. The most important aspect of the planning will involve separating the public from construction activity during times when school is in session. A detailed layout of the site during the excavation, steel erection, and finishes phases can be found in **Appendix B**. Actual contractor site plans were not available for comparison.

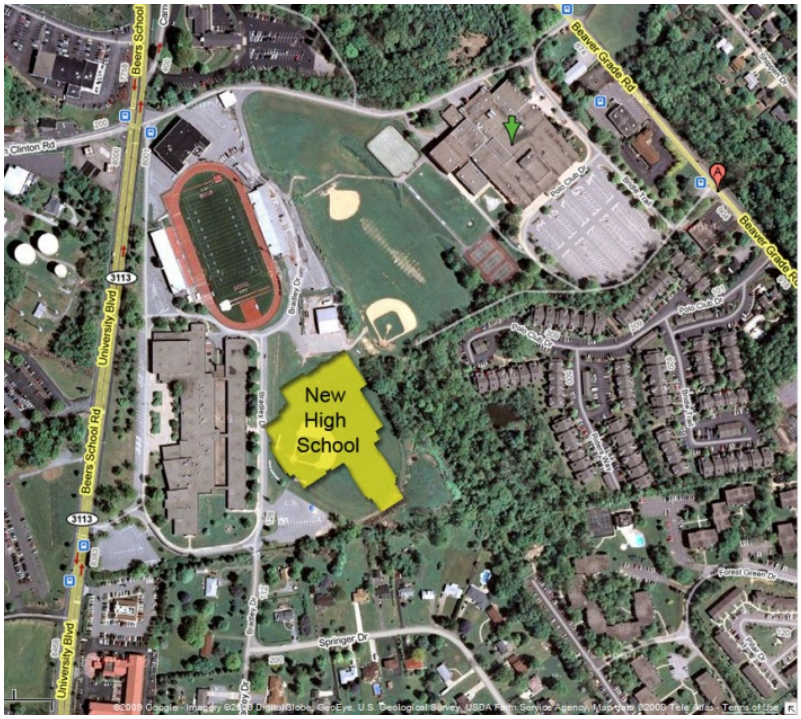


Figure 2: General Site Location

Excavation Site Plan

As the initial phase, this is when many of the general conditions items will start arriving on site. Most importantly, the general contractor will be installing the first stage of the site fence to separate site activity from surrounding school buildings. Take notice that the fence does not fully encompass the site at this point. This is to allow easy movement of earth moving equipment between the building site and the ball fields during the cut and fill process needed to level the overall site. Along with the addition of the fence is the arrival of the construction trailers. For this project the general contractor is required to provide a double-wide trailer for use by the CM and the Architect. Also, the general contractor will have their own office and storage trailer. Finally, a wheel washing station will be put in place at the main entrance and exit gate to ensure that the district's roads and parking lots are not contaminated by the site traffic.

Please proceed to **Appendix B** for the ***Site Layout – Excavation.***

Steel Erection Site Plan

It is important to note that the steel erection phase is scheduled to begin at the beginning of the 2009-2010 school year. For this, the site fence has been completed, and now circles the entire construction site. The most significant additions to this phase are the two cranes, C-1 and C-2. C-1 will be a 110 ton crawler with a 150 ft. main boom and 45 ft. jib. This will be the primary crane for the steel erection. C-1 will start work in Area C and work south to its current location on the plan. C-2 will be a 60 ton hydraulic crane with a 110 ft. main boom and 35 ft. jib. This crane will be used as a secondary lift for areas that C-1 cannot handle, mainly to the north and west. In order to accommodate the bearing needs of the cranes and facilitate movement around the site, this phase includes the addition of a crushed gravel site road. The site road will later be used at a base for permanent roads and parking areas. Finally, to the north of the site, a temporary parking lot has been created for the District to use during construction.

Please proceed to **Appendix B** for the ***Site Layout – Steel Erection.***

Finishes Site Plan

This phase is schedule to begin during the summer of 2010 and includes the addition of site elements that are to be ready for the following school season. The baseball field, softball field and connecting road are all to be completed for the 2010-2011 school year. Also, at this time most of the construction activity has moved within the building and the major site equipment is beginning to disappear. Most notably, the cranes will be removed and the wheel washing stations will be shut down. At this time the loading dock will be functional to allow easy unloading of interior materials. It is also important to note that there will be no man/material hoist used on this project. All material will be delivered via the loading dock or one of the many access points around the building.

Please proceed to **Appendix B** for the ***Site Layout – Finishes.***

Detailed Structural Systems Estimate

The main superstructure of the new high school consists of structural steel that bears on grade beams, supported by reinforced concrete caissons. The lateral loads are carried through a combination of moment frames and masonry shear walls. Overall, the steel structure consists of a wide variety of W-shapes and HSS tubing, with the major roof areas supported by long span, open web joists. Cast-in-place concrete is used for caissons, pile caps, grade beams, walls, piers, SOG's and SOD's. All structural masonry is fully grouted and reinforced using steel rebar.

The following structural estimate was prepared using quantities taken from a Revit Structures model. Due to the complexity of the design, it was too difficult to determine an estimating module that could easily be calculated and repeated throughout the structure. Therefore, a detailed estimate was performed for the entire building structure. All cost data was taken from RSMeans CostWorks 2009 and adjusted for location. Figure 3 depicts the cost of the main elements of the structural system.

Detailed Structural Systems Estimate Summary								
Description	**Quantity**	**Unit**	**Bare Material**	**Bare Labor**	**Bare Equipment**	**Bare Total**	**Total O &P**	**Final O & P**
Structural Steel								
Columns	210.87	Tons	$ 3,687.50	$ 334.00	$ 177.50	$4,199.00	$4,835.00	$ 1,019,537.65
Framing Members	1000.13	Tons	$ 3,687.50	$ 334.00	$ 177.50	$4,199.00	$4,835.00	$ 4,835,632.89
48LH	891	LF	$ 45.27	$ 1.19	$ 1.02	$ 48.20	$ 54.00	$ 48,114.00
68DLH17	2912.16	LF	$ 70.05	$ 1.91	$ 1.02	$ 72.98	$ 81.16	$ 236,350.91
60DLH14	1053	LF	$ 33.36	$ 2.10	$ 1.12	$ 36.58	$ 41.57	$ 43,773.21
Metal Decking	288954.87	SF	$ 2.86	$ 0.44	$ 0.04	$ 3.34	$ 3.98	$ 1,374,918.60
Shear Studs	15,966	Each	$ 0.62	$ 0.94	$ 0.46	$ 2.02	$ 2.85	$ 45,503.10
							TOTAL:	**$ 7,603,830.35**
Description	**Quantity**	**Unit**	**Bare Material**	**Bare Labor**	**Bare Equipment**	**Bare Total**	**Total O &P**	**Final O & P**
Concrete								
Caissons (3,000 psi)	4,200	CY	$ 97.16	$ 10.39	$ 0.41	$ 194.32	$ 123.16	$ 517,272.00
Caisson Caps (4,000 psi)	366	CY	$ 101.97	$ 18.07	$ 8.04	$ 128.08	$ 147.86	$ 54,150.55
Grade Beams (4,000 psi)	1,852	CY	$ 101.97	$ 11.03	$ 4.90	$ 117.90	$ 133.85	$ 247,895.36
Concrete Walls (4,000 psi)	770	CY	$ 101.97	$ 18.07	$ 8.04	$ 128.08	$ 147.86	$ 113,910.25
Grouted CMU(4,000 psi)	46,802	SF	$ 4.75	$ 5.08	$ 0.21	$ 10.04	$ 13.16	$ 615,914.32
SOG (4,000 psi)	4,670	CY	$ 101.97	$ 10.75	$ 4.77	$ 117.49	$ 133.25	$ 622,316.14
SOD (3,500 psi lightweight)	3,209	CY	$ 138.53	$ 12.40	$ 5.52	$ 156.45	$ 178.27	$ 572,141.52
							TOTAL:	**$ 2,743,600.14**
Description	**Quantity**	**Unit**	**Bare Material**	**Bare Labor**	**Bare Equipment**	**Bare Total**	**Total O &P**	**Final O & P**
Reinforcing Steel								
12" SOG	0.44	Tons	$ 1,417.48	$ 649.76	$ -	$2,067.24	$2,635.83	$ 1,157.17
S-6.5A	6.35	Tons	$ 1,585.65	$ 513.52	$ -	$2,099.17	$2,573.44	$ 16,339.66
Ribbed SOG	28.84	Tons	$ 1,417.48	$ 649.76	$ -	$2,067.24	$2,635.83	$ 76,017.34
Caissons	168.00	Tons	$ 1,417.48	$ 712.64	$ -	$2,130.12	$2,714.43	$ 456,024.24
Caisson Caps	11.90	Tons	$ 1,345.40	$ 413.96	$ -	$1,759.36	$2,146.73	$ 25,535.35
Grade Beams	204.64	Tons	$ 1,345.40	$ 413.96	$ -	$1,759.36	$2,146.73	$ 439,306.80
Concrete Walls	89.10	Tons	$ 1,417.48	$ 497.80	$ -	$1,915.28	$2,373.83	$ 211,508.25
CMU Walls	140,415.00	lbs	$ 1.48	$ 0.85	$ -	$ 2.33	$ 2.90	$ 407,203.50
WWF 4x4 - W2.9xW2.9	618.7	CSF	$ 48.53	$ 27.77	$ -	$ 76.30	$ 98.40	$ 60,884.02
WWF 6x6 - W2.1xW2.1	2,061.54	CSF	$ 25.47	$ 24.10	$ -	$ 49.57	$ 67.17	$ 138,473.87
WWF 6x6 - W4.0xW4.0	190.10	CSF	$ 44.69	$ 27.77	$ -	$ 72.46	$ 94.07	$ 17,882.73
							TOTAL:	**$ 1,850,332.93**
Description	**Quantity**	**Unit**	**Bare Material**	**Bare Labor**	**Bare Equipment**	**Bare Total**	**Total O &P**	**Final O & P**
Concrete Forming								
Walls and Piers	40,966.00	SFCA	$ 0.83	$ 3.86	$ -	$ 4.69	$ 6.91	$ 283,075.06
							TOTAL:	**$ 283,075.06**
							SYSTEM TOTAL:	**$ 12,480,838**

Figure 3: Detailed Structural Estimate Summary

As displayed in Figure 4 below, the detailed structural estimate was within $450,000 of the estimate performed by the general contractor. Unfortunately, due to the unavailability of the contractor's detailed estimate, only the estimated total cost of the structural system can be compared to the actual costs. The actual cost value was obtained from the general contractor's schedule of values, which does not include the detail required to compare the cost of the individual elements of the structure. Overall, the detailed estimate is 3.5% lower than the actual cost. Although small, the source of error could be contributed to many aspects of the estimate. First, the wide variety of structural steel sizes used in the building frame could not all be accounted for using RSMeans. Instead, a general cost for steel structures in schools was used to calculate this cost. Second, the reinforcing for the concrete and masonry elements is not clearly defined for all instances and was difficult to tabulate. Both instances could cause certain details of the estimate to stagger from the actual cost.

Actual Structure Cost		
Total Cost	$	12,920,878
Cost/SF	$	44.34
Estimated Structure Cost		
Total Cost	$	12,480,838
Cost/SF	$	42.83

Figure 4: Actual Cost vs. Estimated Cost

Please proceed to **Appendix C** for the ***Detailed Structural Systems Estimate*****.**

General Conditions Estimate

Normally, the general conditions would be the responsibility of one project team member. However, in this case the CM has no general conditions costs except for supervision because their trailer, utilities and supplies are provided by the general contractor per their contract. Also, since there are 13 prime contracts, each contractor has their own general conditions responsibilities. Therefore, for this estimate the values were taken from the four major contractors: General, HVAC, Plumbing and Electrical. These four contractors hold over 85% of the total contract value.

The general conditions estimate has been divided into three main categories: Project Supervision, Construction Facilities and Equipment, and Bonds and Insurance. The total estimated cost of the general conditions over a 24 month period is $2,183,968.44 or roughly 4% of the overall contract values. This falls a little short of the normal range of 7-10%. One reason for this shortcoming is the OCIP being utilized on the project. The insurance costs included in Figure 5 only covers minor insurances that are not provided by the OCIP. The overall cost of the OCIP plan purchased by the owner was $1,653,457. Factoring this into the general conditions costs would bring it to 7% of the overall project cost. Another reason for the slightly low numbers could be the exclusion of the nine remaining prime contractors. Although most of them will have very low general conditions costs this may have resulted in a larger deficit.

General Conditions Estimate Summary				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Project Supervision	24	Month	$53,510.42	$ 1,284,250.00
Construction Facilities and Equipment	24	Month	$16,469.10	$ 395,258.44
Bonds and Insurance	24	Month	$21,019.17	$ 504,460.00
			Total:	**$ 2,183,968.44**
			Cost/Month:	**$ 90,998.69**

Figure 5: General Conditions Estimate Summary

Please proceed to **Appendix D** for the ***General Conditions Estimate*.**

Critical Industry Issues

The 18th Annual PACE Roundtable was focused around the theme of "Creating Opportunities". This theme has been especially important to the construction industry during this time of decline in economic movement. The day's discussions were designed to allow both students and industry members the opportunity to express their thoughts regarding the current state of the construction industry and how we can move forward. The three major break-out sessions of the day consisted of: Energy and the Construction Industry, Business and Networking and BIM Executive Planning. All three topics are very important at this moment in time. During a respite in the economy is it crucial for individuals and companies alike to expand their network and work on the success of their business from within. This is the time to educate employees and prepare them for the future. BIM focus is equally important, as it is quickly becoming the industry standard for both design and delivery. However, the industry must develop standards for BIM delivery for it to ultimately be successful for years to come. Finally, the most important of the three topics is a problem not only facing the construction industry but rather facing the world as a whole. Energy consumption may be the single most important issue that will be dealt with in our lifetime. For this reason, I chose to attend the session pertaining to Energy and the Construction Industry.

The Energy and the Construction Industry break-out session was a hot topic, the room was filled with a large number of AE seniors and a handful of industry members. The session began with a brainstorming session guided by Dr. Riley. The idea was to develop a list of "Energy Concerns" that could later be used to explore solutions of building energy use. It was quickly discovered that many of the problems begin at the location where the electricity is produced. As the discussion developed it was clear to see that the building industry has a lot of room for improvement in the future. The conversation bounced from topic to topic, covering everything from alternative fuels to industry standards and energy auditing.

The second half of the break-out was where it got interesting. This time the focus was on exploring materials and systems that can help to reduce the amount of energy that buildings use in the future. At this point, the students were given the opportunity to present ideas for their thesis projects and receive feedback from the industry professionals. The two most common solutions seemed to lean toward photovoltaic panels and geothermal wells. Geothermal is a great source of heating and cooling in many regions of Pennsylvania and struck me as a possible research topic for my thesis. The high school already utilizes water source heat pumps that could possibly be integrated into a geothermal system.

Although I was not able to receive any feedback on my project during the breakout session, I was able to speak with Dan Kerr from the McClure Company. I presented him with idea of installing a central boiler and chiller plant to supply services to both my project and the future middle school project. After a brief discussion Dan and I determined that this might be a feasible analysis that could provide interesting results. Dan is very knowledgeable in this field and could be a valuable resource for any mechanical analysis I may chose to examine.

I was also able to make two other substantial contacts through the events at the PACE conference. During one of the breaks I spoke with Jim Salvino, an MEP Manager with Clark Construction. Mr. Salvino is currently working on the Johns Hopkins Medical Center in Baltimore. His experience with MEP coordination and BIM execution may be very helpful since my project was developed in 3D and may require further exploration into BIM use. I also feel that the BIM Execution Plan developed by the CIC could also be a valuable tool for future analysis. My last contact was with Mike Pittsman of Davis Construction. Mr. Pittsman has years of experience in the construction management field and is currently supervising the construction of a high school campus in Virginia. It might be worth having further conversations with Mr. Pittsman about how Davis is approaching the construction of the high school.

The conclusion of the conference left me with plenty to think about. I now have at least two or three solid ideas for a thesis proposal and a list of professionals willing to help me develop those ideas. Overall, the 18th Annual PACE Roundtable was a successful at "creating opportunities" for me to gather ideas and meet new people.

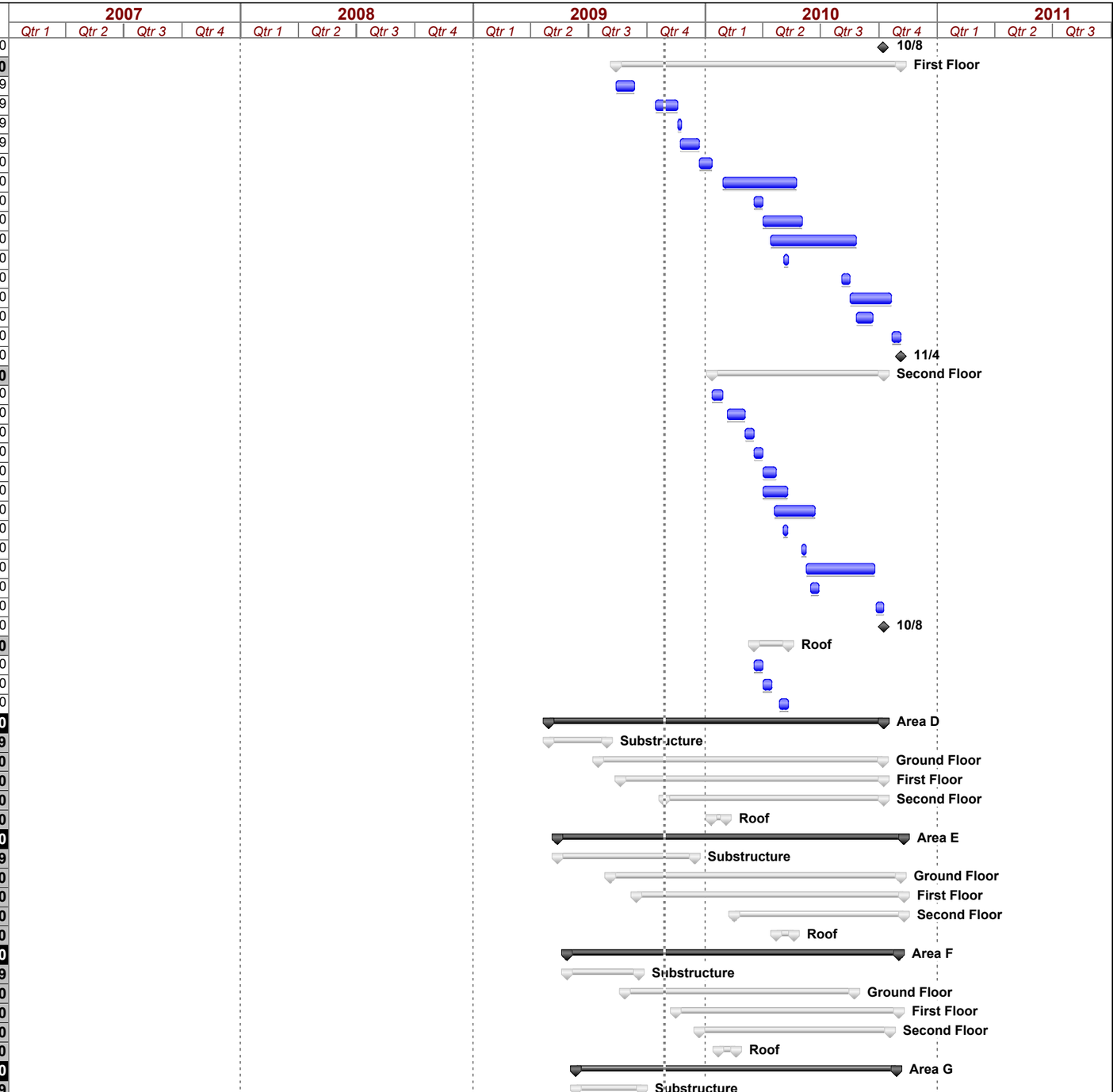
Appendix A: Detailed Project Schedule

ID	Task Name	Duration	Start	Finish
1	**Preconstruction**	**446 days**	**Thu 4/5/07**	**Thu 12/18/08**
2	Design	367 days	Thu 4/5/07	Fri 8/29/08
3	Approvals and Permits	217 days	Mon 12/3/07	Tue 9/30/08
4	Bidding	34 days	Mon 11/3/08	Thu 12/18/08
5	Contracts Awarded	0 days	Thu 12/18/08	Thu 12/18/08
6	**General Dates**	**466 days**	**Tue 2/3/09**	**Tue 11/16/10**
7	Notice to Proceed	0 days	Tue 2/3/09	Tue 2/3/09
8	Mobilization	10 days	Tue 2/3/09	Mon 2/16/09
9	Last Day of Classes '08-'09	0 days	Wed 6/10/09	Wed 6/10/09
10	First Day of Classes '09-'10	0 days	Tue 8/25/09	Tue 8/25/09
11	Permanent HVAC Controls	0 days	Wed 9/22/10	Wed 9/22/10
12	Substantial Completion	0 days	Tue 11/16/10	Tue 11/16/10
13	**Construction**	**456 days**	**Tue 2/10/09**	**Tue 11/9/10**
14	**Site**	**401 days**	**Tue 2/10/09**	**Tue 8/24/10**
15	Silt Fence / E&S Control	3 days	Tue 2/10/09	Thu 2/12/09
16	Site Demolition	22 days	Tue 2/17/09	Wed 3/18/09
17	Bulk Cut for Basement	20 days	Thu 3/19/09	Wed 4/15/09
18	Detention Tanks	8 days	Mon 4/6/09	Wed 4/15/09
19	Swimming Pool Excavation	8 days	Fri 6/12/09	Tue 6/23/09
20	Excavate to Grade	15 days	Tue 6/16/09	Mon 7/6/09
21	North and Northwest site	52 days	Wed 6/10/09	Thu 8/20/09
22	Site Utilities	16 days	Wed 6/10/09	Wed 7/1/09
23	Baseball Field	104 days	Mon 3/22/10	Thu 8/12/10
24	Landscape	35 days	Wed 7/7/10	Tue 8/24/10
25	Complete Site work	0 days	Tue 8/24/10	Tue 8/24/10
26	**Area C**	**406 days**	**Thu 4/16/09**	**Thu 11/4/10**
27	**Substructure**	**130 days**	**Thu 4/16/09**	**Wed 10/14/09**
28	**Ground Floor**	**42 days**	**Thu 4/16/09**	**Fri 6/12/09**
29	Install Caissons	15 days	Thu 4/16/09	Wed 5/6/09
30	Install Grade Beams	8 days	Thu 5/7/09	Mon 5/18/09
31	Concrete Walls	15 days	Tue 5/19/09	Mon 6/8/09
32	CMU to Grade	2 days	Tue 5/19/09	Wed 5/20/09
33	Perimeter Insulation and Waterproofing	5 days	Thu 5/21/09	Wed 5/27/09
34	MEP Underground RI	19 days	Tue 5/19/09	Fri 6/12/09
35	**First Floor**	**79 days**	**Fri 6/26/09**	**Wed 10/14/09**
36	Install Caissons	10 days	Fri 6/26/09	Thu 7/9/09
37	Install Grade Beams	18 days	Mon 7/13/09	Wed 8/5/09
38	CMU to Grade	3 days	Mon 9/21/09	Wed 9/23/09
39	Perimeter Insulation and Waterproofing	6 days	Thu 9/24/09	Thu 10/1/09
40	MEP Underground RI	18 days	Mon 9/21/09	Wed 10/14/09
41	**Ground Floor**	**345 days**	**Mon 6/15/09**	**Fri 10/8/10**
42	Prep/Pour SOG	19 days	Mon 6/15/09	Thu 7/9/09
43	CMU to First Floor Bearing	20 days	Fri 7/10/09	Thu 8/6/09
44	Set Hollow Metal Frames	6 days	Fri 7/10/09	Fri 7/17/09
45	Erect Steel and Deck for First Floor	10 days	Fri 7/31/09	Thu 8/13/09
46	Exterior Masonry	15 days	Fri 3/19/10	Thu 4/8/10
47	Curtain Wall and Windows	13 days	Fri 4/9/10	Tue 4/27/10
48	Fireproofing	2 days	Mon 4/12/10	Tue 4/13/10
49	MEP Overhead RI	55 days	Fri 4/2/10	Thu 6/17/10
50	MEP Installation	112 days	Tue 4/13/10	Wed 9/15/10
51	Standard Gauge Framing	10 days	Wed 5/5/10	Tue 5/18/10
52	Drywall	8 days	Wed 7/7/10	Fri 7/16/10
53	Interior Finishes	50 days	Mon 7/19/10	Fri 9/24/10
54	MEP Testing	24 days	Tue 8/3/10	Fri 9/3/10
55	Punch List Area C.1	10 days	Mon 9/27/10	Fri 10/8/10

Project: New Moon Area High School & District Admin. Office
Date: 10/28/2009

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

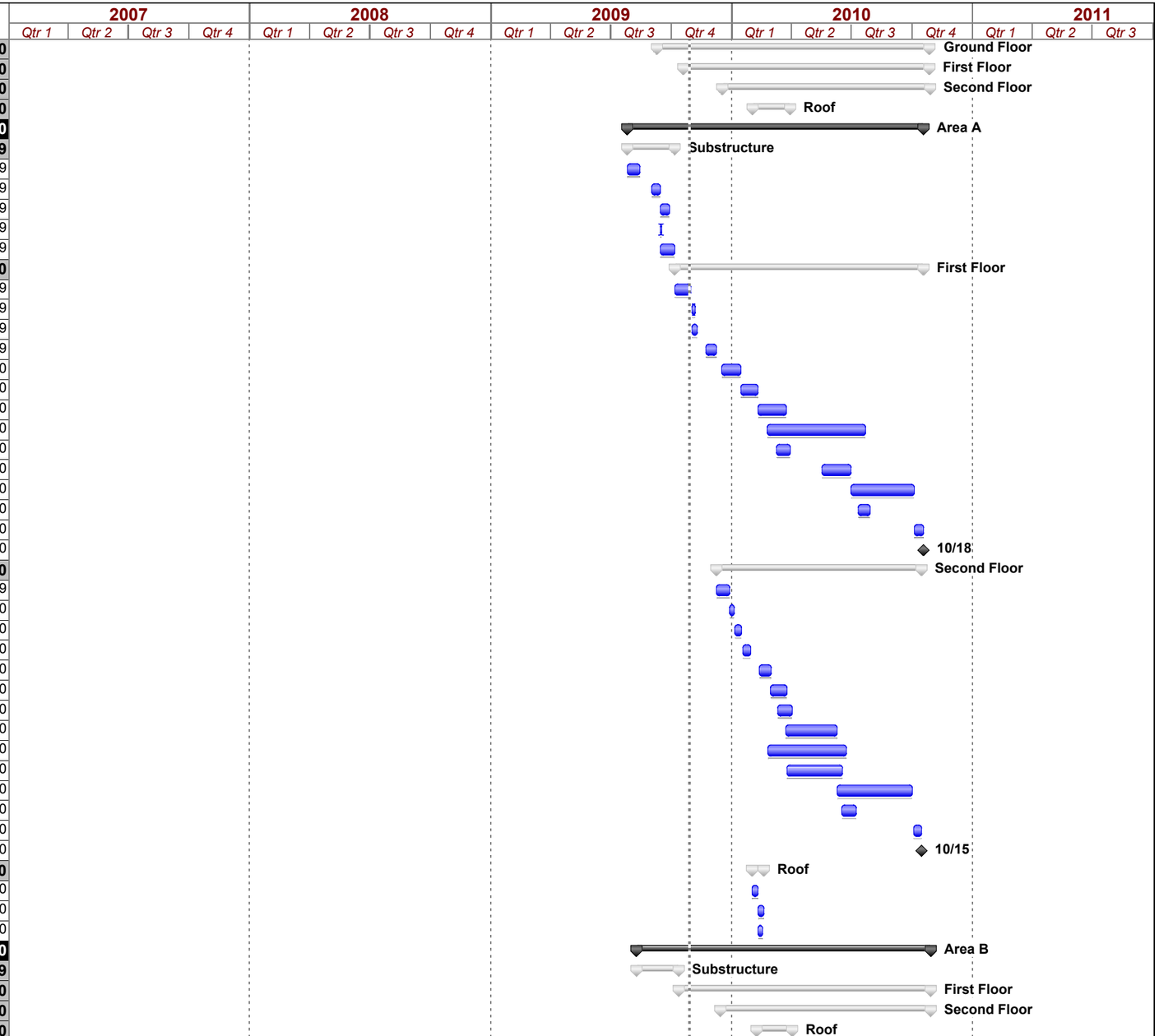
ID	Task Name	Duration	Start	Finish
56	Complete Area C.1	0 days	Fri 10/8/10	Fri 10/8/10
57	**First Floor**	**320 days**	**Fri 8/14/09**	**Thu 11/4/10**
58	Rough-in/Place SOD	21 days	Fri 8/14/09	Fri 9/11/09
59	Prep/Pour SOG	25 days	Thu 10/15/09	Wed 11/18/09
60	Set Hollow Metal Frames	4 days	Thu 11/19/09	Tue 11/24/09
61	CMU to Second Floor Bearing	22 days	Mon 11/23/09	Tue 12/22/09
62	Erect Steel and Deck for 2nd Floor	14 days	Wed 12/23/09	Mon 1/11/10
63	MEP Overhead RI	82 days	Fri 1/29/10	Mon 5/24/10
64	Exterior Masonry - Veneer	10 days	Fri 3/19/10	Thu 4/1/10
65	Curtain Wall and Windows	44 days	Fri 4/2/10	Wed 6/2/10
66	MEP Installation	97 days	Wed 4/14/10	Thu 8/26/10
67	Standard Gauge Framing	5 days	Wed 5/5/10	Tue 5/11/10
68	Drywall	9 days	Wed 8/4/10	Mon 8/16/10
69	Interior Finishes	47 days	Tue 8/17/10	Wed 10/20/10
70	MEP Testing	18 days	Fri 8/27/10	Tue 9/21/10
71	Punch List Area C.2	10 days	Fri 10/22/10	Thu 11/4/10
72	Complete Area C.2	0 days	Thu 11/4/10	Thu 11/4/10
73	**Second Floor**	**194 days**	**Tue 1/12/10**	**Fri 10/8/10**
74	Rough-in/Place SOD	13 days	Tue 1/12/10	Thu 1/28/10
75	CMU to Roof Bearing	20 days	Fri 2/5/10	Thu 3/4/10
76	Erect Steel and Deck for Roof	10 days	Fri 3/5/10	Thu 3/18/10
77	Exterior Masonry - Veneer	10 days	Fri 3/19/10	Thu 4/1/10
78	Curtain Wall and Windows	15 days	Fri 4/2/10	Thu 4/22/10
79	MEP Overhead RI	27 days	Fri 4/2/10	Mon 5/10/10
80	MEP Installation	46 days	Tue 4/20/10	Tue 6/22/10
81	Standard Gauge Framing	5 days	Tue 5/4/10	Mon 5/10/10
82	Drywall	5 days	Wed 6/2/10	Tue 6/8/10
83	Interior Finishes	78 days	Wed 6/9/10	Fri 9/24/10
84	MEP Testing	9 days	Wed 6/16/10	Mon 6/28/10
85	Punch List Area C.3	10 days	Mon 9/27/10	Fri 10/8/10
86	Complete Area C.3	0 days	Fri 10/8/10	Fri 10/8/10
87	**Roof**	**38 days**	**Fri 3/19/10**	**Tue 5/11/10**
88	Install EPDM Roofing	10 days	Fri 3/19/10	Thu 4/1/10
89	Install Roof Screens	10 days	Fri 4/2/10	Thu 4/15/10
90	Final MEP Connections	10 days	Wed 4/28/10	Tue 5/11/10
91	**Area D**	**377 days**	**Thu 4/30/09**	**Fri 10/8/10**
92	**Substructure**	**66 days**	**Thu 4/30/09**	**Thu 7/30/09**
98	**Ground Floor**	**320 days**	**Fri 7/17/09**	**Thu 10/7/10**
109	**First Floor**	**296 days**	**Fri 8/21/09**	**Fri 10/8/10**
121	**Second Floor**	**247 days**	**Thu 10/29/09**	**Fri 10/8/10**
133	**Roof**	**17 days**	**Mon 1/11/10**	**Tue 2/2/10**
137	**Area E**	**389 days**	**Thu 5/14/09**	**Tue 11/9/10**
138	**Substructure**	**154 days**	**Thu 5/14/09**	**Tue 12/15/09**
148	**Ground Floor**	**327 days**	**Wed 8/5/09**	**Thu 11/4/10**
160	**First Floor**	**301 days**	**Tue 9/15/09**	**Tue 11/9/10**
173	**Second Floor**	**191 days**	**Tue 2/16/10**	**Tue 11/9/10**
185	**Roof**	**20 days**	**Fri 4/23/10**	**Thu 5/20/10**
189	**Area F**	**372 days**	**Fri 5/29/09**	**Mon 11/1/10**
190	**Substructure**	**81 days**	**Fri 5/29/09**	**Fri 9/18/09**
194	**Ground Floor**	**257 days**	**Fri 8/28/09**	**Mon 8/23/10**
206	**First Floor**	**251 days**	**Mon 11/16/09**	**Mon 11/1/10**
218	**Second Floor**	**214 days**	**Wed 12/23/09**	**Mon 10/18/10**
230	**Roof**	**20 days**	**Fri 1/22/10**	**Thu 2/18/10**
234	**Area G**	**360 days**	**Fri 6/12/09**	**Thu 10/28/10**
235	**Substructure**	**74 days**	**Fri 6/12/09**	**Wed 9/23/09**



Project: New Moon Area High School & District Admin. Office
Date: 10/28/2009

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

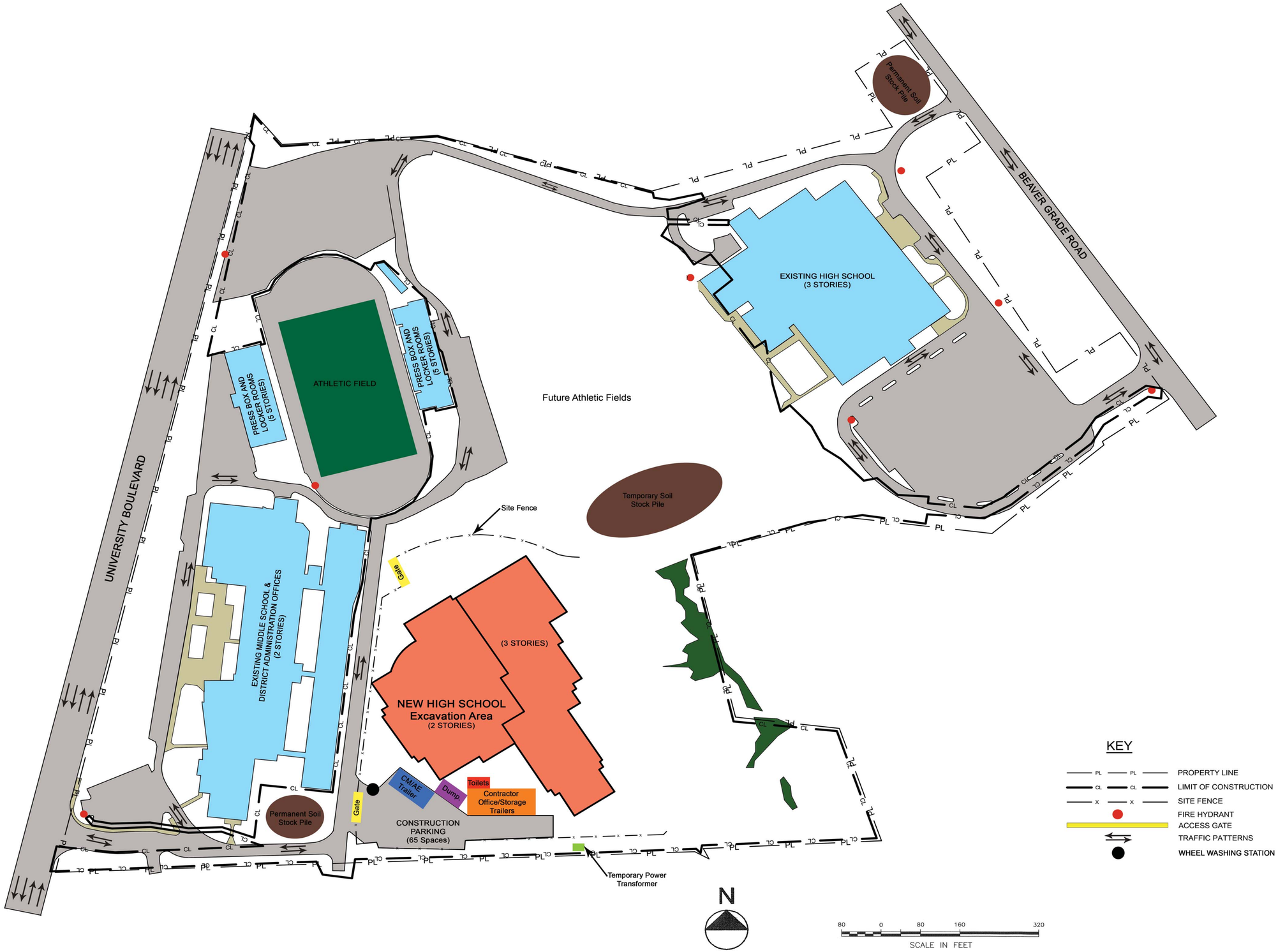
ID	Task Name	Duration	Start	Finish
239	**Ground Floor**	**295 days**	**Thu 9/10/09**	**Wed 10/27/10**
251	**First Floor**	**267 days**	**Tue 10/20/09**	**Wed 10/27/10**
263	**Second Floor**	**225 days**	**Fri 12/18/09**	**Thu 10/28/10**
275	**Roof**	**41 days**	**Tue 2/2/10**	**Tue 3/30/10**
279	**Area A**	**321 days**	**Mon 7/27/09**	**Mon 10/18/10**
280	**Substructure**	**52 days**	**Mon 7/27/09**	**Tue 10/6/09**
281	Install Caissons	15 days	Mon 7/27/09	Fri 8/14/09
282	Install Grade Beams	9 days	Wed 9/2/09	Mon 9/14/09
283	Concrete Walls	10 days	Tue 9/15/09	Mon 9/28/09
284	CMU to Grade	2 days	Tue 9/15/09	Wed 9/16/09
285	MEP Underground RI	16 days	Tue 9/15/09	Tue 10/6/09
286	**First Floor**	**269 days**	**Wed 10/7/09**	**Mon 10/18/10**
287	Prep/Pour SOG	18 days	Wed 10/7/09	Fri 10/30/09
288	CMU to First Floor Bearing	5 days	Mon 11/2/09	Fri 11/6/09
289	Set Hollow Metal Frames	6 days	Mon 11/2/09	Mon 11/9/09
290	Erect Steel and Deck for 2nd Floor	12 days	Mon 11/23/09	Tue 12/8/09
291	Exterior Masonry	21 days	Thu 12/17/09	Thu 1/14/10
292	Curtain Wall and Windows	18 days	Fri 1/15/10	Tue 2/9/10
293	MEP Overhead RI	31 days	Wed 2/10/10	Wed 3/24/10
294	MEP Installation	107 days	Wed 2/24/10	Thu 7/22/10
295	Standard Gauge Framing	15 days	Wed 3/10/10	Tue 3/30/10
296	Drywall	32 days	Tue 5/18/10	Wed 6/30/10
297	Interior Finishes	68 days	Thu 7/1/10	Mon 10/4/10
298	MEP Testing	14 days	Mon 7/12/10	Thu 7/29/10
299	Punch List Area A.2	10 days	Tue 10/5/10	Mon 10/18/10
300	Complete Area A.2	0 days	Mon 10/18/10	Mon 10/18/10
301	**Second Floor**	**223 days**	**Wed 12/9/09**	**Fri 10/15/10**
302	Rough-in/Place SOD	14 days	Wed 12/9/09	Mon 12/28/09
303	Set Hollow Metal Frames	5 days	Tue 12/29/09	Mon 1/4/10
304	CMU to Roof Bearing	8 days	Wed 1/6/10	Fri 1/15/10
305	Erect Steel and Deck for Roof	10 days	Mon 1/18/10	Fri 1/29/10
306	MEP Overhead RI	12 days	Fri 2/12/10	Mon 3/1/10
307	Exterior Masonry	19 days	Mon 3/1/10	Thu 3/25/10
308	Framing and Drywall	16 days	Fri 3/12/10	Fri 4/2/10
309	Drywall	56 days	Wed 3/24/10	Wed 6/9/10
310	MEP Installation	85 days	Thu 2/25/10	Wed 6/23/10
311	Curtain Wall and Windows	60 days	Fri 3/26/10	Thu 6/17/10
312	Interior Finishes	82 days	Thu 6/10/10	Fri 10/1/10
313	MEP Testing	16 days	Thu 6/17/10	Thu 7/8/10
314	Punch List Area A.3	10 days	Mon 10/4/10	Fri 10/15/10
315	Complete Area A.3	0 days	Fri 10/15/10	Fri 10/15/10
316	**Roof**	**14 days**	**Mon 2/1/10**	**Thu 2/18/10**
317	Install EPDM Roofing	7 days	Mon 2/1/10	Tue 2/9/10
318	Install Roof Screens	7 days	Wed 2/10/10	Thu 2/18/10
319	Final MEP Connections	5 days	Wed 2/10/10	Tue 2/16/10
320	**Area B**	**320 days**	**Mon 8/10/09**	**Fri 10/29/10**
321	**Substructure**	**46 days**	**Mon 8/10/09**	**Mon 10/12/09**
326	**First Floor**	**274 days**	**Tue 10/13/09**	**Fri 10/29/10**
338	**Second Floor**	**229 days**	**Tue 12/15/09**	**Fri 10/29/10**
350	**Roof**	**40 days**	**Mon 2/8/10**	**Fri 4/2/10**



Project: New Moon Area High School & District Admin. Office
Date: 10/28/2009

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Appendix B: Site Layout Plans



501 North Mercer Street
New Castle, Pa. 16101
p 724.658.5507
f 724.658.0751

132 South Broad Street
Canfield, Oh. 44406
p 330.533.6658
f 330.686.0439

architecture ECKLES engineering

NEW MOON AREA HIGH SCHOOL / DISTRICT ADMIN OFFICE

P.D.E. No. 3442

MOON AREA SCHOOL DISTRICT — MOON TOWNSHIP, PA

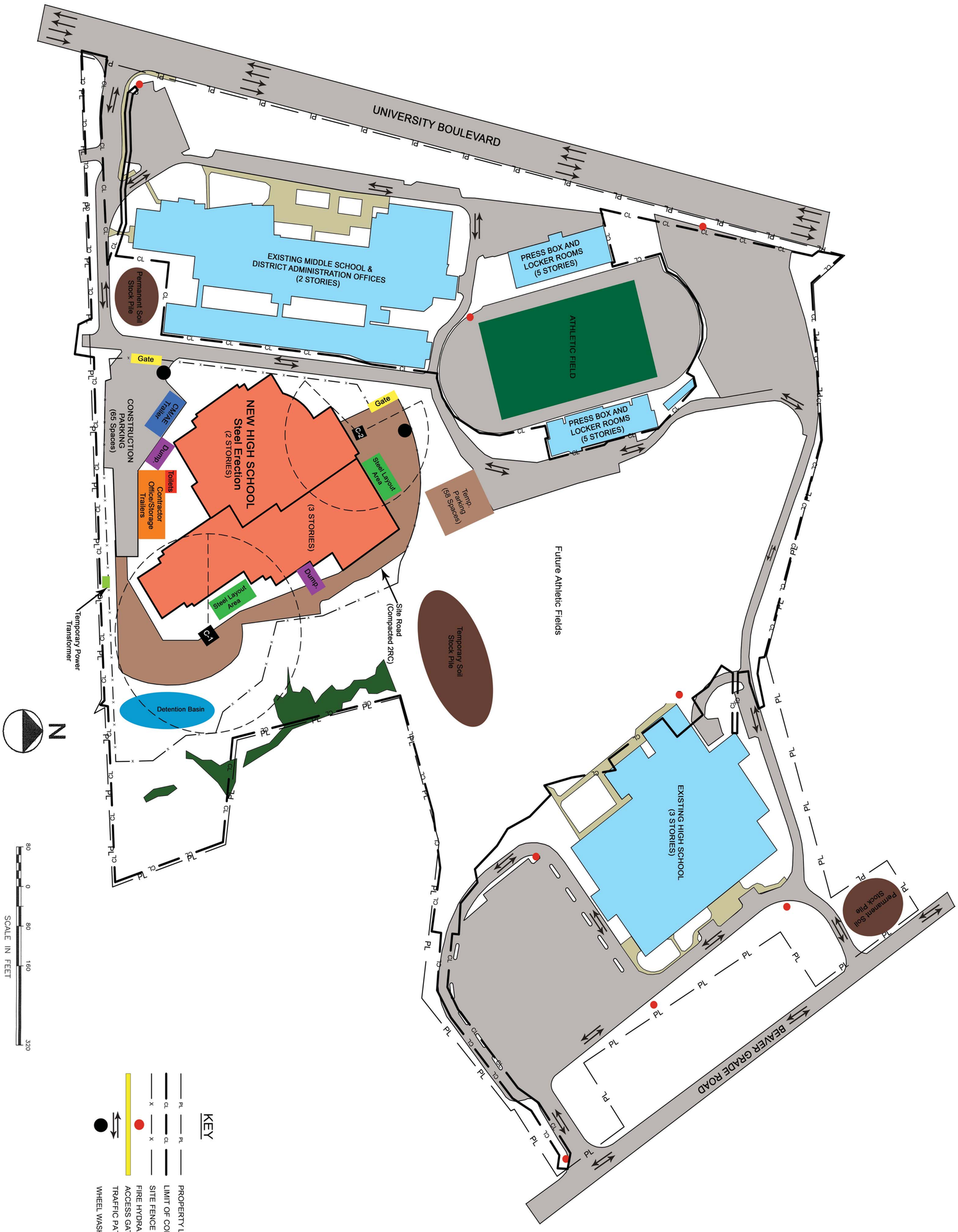
Site Layout - Excavation

Project Number 06750.00 | Date 10/28/2009 | Scale AS NOTED

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

Drawing Number

C1-201



C1-202

Drawing Number

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

Project Number 06750.00

Date 10/28/2009

Scale AS NOTED

NEW MOON AREA HIGH SCHOOL / DISTRICT ADMIN OFFICE

P.D.E. No. 3442

MOON AREA SCHOOL DISTRICT — MOON TOWNSHIP, PA

Site Layout - Steel Erection

architecture ECKLES engineering

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132 South Broad Street
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p 330.286.0438
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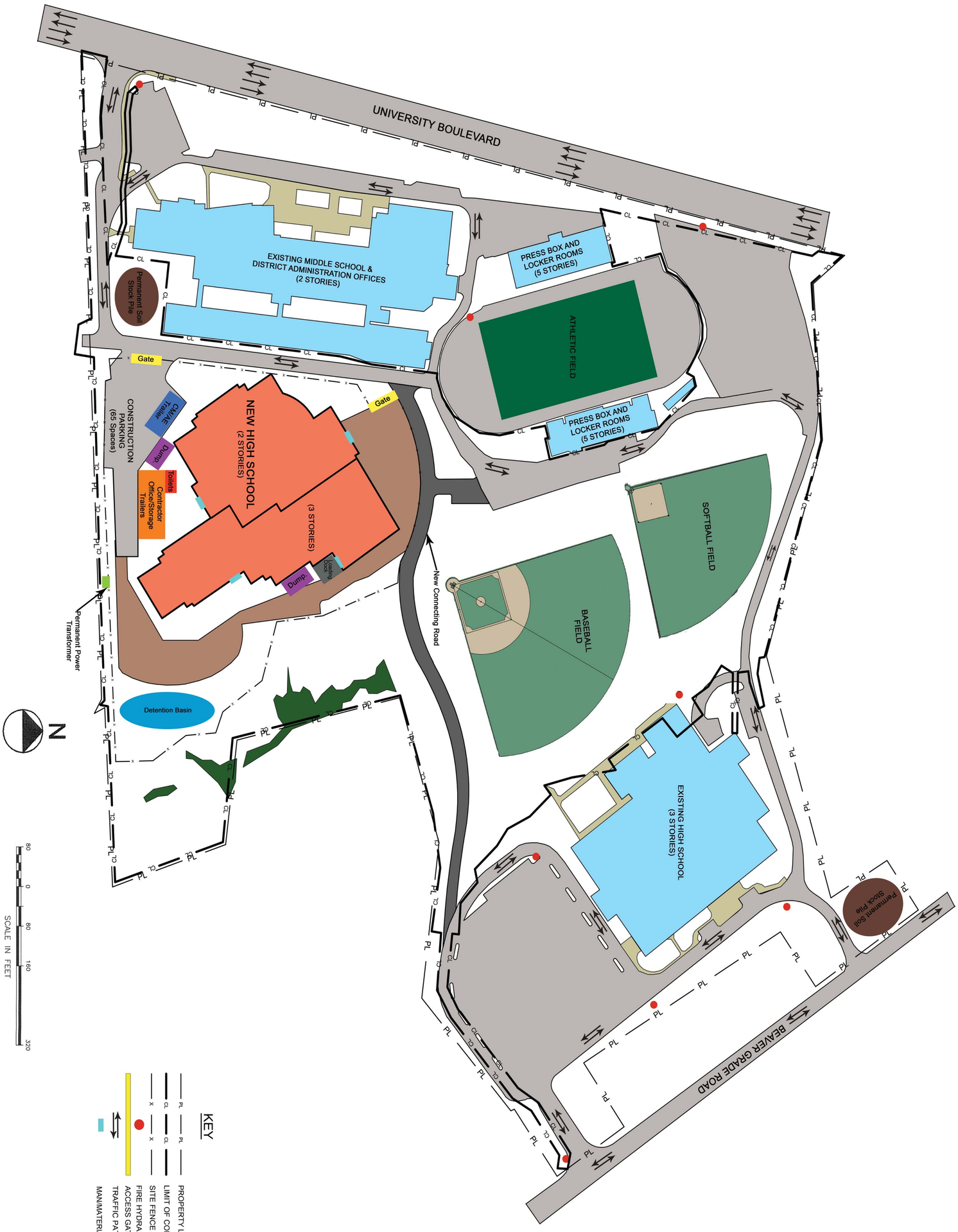

C1-203

Drawing Number

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

Project Number 06750.00

Date 10/28/2009

Scale AS NOTED

NEW MOON AREA HIGH SCHOOL / DISTRICT ADMIN OFFICE

P.D.E. No. 3442

MOON AREA SCHOOL DISTRICT — MOON TOWNSHIP, PA

Site Layout - Finishes

architecture ECKLES engineering

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

Appendix C: Detailed Structural Systems Estimate

Structural Steel:

Steel Column Summary					
Pieces	Total Length	Type	LB/FT	Total (LB)	Total (Tons)
4	123.07	HSS10X0.375	38.6	4750.50	2.38
8	13.24	HSS10X0.625	62.6	828.82	0.41
2	59.14	HSS10X6X1/2	48.7	2880.12	1.44
4	142.00	HSS12X12X.500	75.9	10777.80	5.39
1	34.82	HSS12X12X1/2	75.9	2642.84	1.32
2	67.45	HSS12X12X3/8	58	3912.10	1.96
7	123.91	HSS12X6X1/2	55.5	6877.01	3.44
1	29.64	HSS12X8X3/8	47.8	1416.79	0.71
3	44.91	HSS14X6X5/8	76.1	3417.65	1.71
8	260.41	HSS20X12X3/8	78.4	20416.14	10.21
2	70.96	HSS20X12X5/8	127	9011.92	4.51
46	241.58	HSS4X3X5/16	12.7	3068.07	1.53
50	113.73	HSS4X4X1/4	12.2	1387.51	0.69
284	583.86	HSS5X5X1/4	15.6	9108.22	4.55
6	9.65	HSS6X0.375	22.5	217.13	0.11
3	8.88	HSS6X4X3/8	22.3	198.02	0.10
4	159.15	HSS6X5X3/8	24.9	3962.84	1.98
20	152.00	HSS6X6X1/4	19	2888.00	1.44
7	250.76	HSS6X6X3/8	27.4	6870.82	3.44
5	148.00	HSS8X6X1/2	41.9	6201.20	3.10
28	127.26	HSS8X8X1/2	48.7	6197.56	3.10
20	106.60	HSS8X8X3/8	37.6	4008.16	2.00
20	598.04	W10X100	100	59804.00	29.90
15	532.53	W10X33	33	17573.49	8.79
7	194.39	W10X39	39	7581.21	3.79
16	479.67	W10X45	45	21585.15	10.79
31	1005.72	W10X49	49	49280.28	24.64
9	236.05	W10X54	54	12746.70	6.37
27	714.61	W10X60	60	42876.60	21.44
8	183.84	W10X68	68	12501.12	6.25
10	193.30	W10X77	77	14884.10	7.44
21	566.36	W10X88	88	49839.68	24.92
1	32.32	W12X45	45	1454.40	0.73
4	116.67	W12X53	53	6183.51	3.09
5	160.70	W12X58	58	9320.60	4.66
1	44.2	W12X65	65	2873.00	1.44
1	43.33	W14X43	43	1863.19	0.93
2	18.11	W8X18	18	325.98	0.16
				Total:	**210.87**

Steel Framing Summary					
Pieces	Type	Total Length	LB/FT	Total (LB)	Total (Tons)
3	2C12X20.7	14.01	41.4	580.01	0.29
3	2C6X10.5	10.44	41.4	432.22	0.22
2	2L4X4X3/8	49.5	19.4	960.30	0.48
35	C10X15.3	350.25	15.3	5358.83	2.68
12	C12X20.7	184.57	20.7	3820.60	1.91
14	C6X10.5	294.9	10.5	3096.45	1.55
17	C8X11.5	158.96	11.5	1828.04	0.91
3	HSS12X2X1/4	63.79	22.4	1428.90	0.71
10	HSS12X4X3/8	183.85	37.6	6912.76	3.46
2	HSS12X8X3/8	45.17	37.6	1698.39	0.85
1	HSS16X12X1/2	40	89.6	3584.00	1.79
2	HSS16X12X3/8	45.33	68.3	3096.04	1.55
5	HSS16X8X1/2	105.99	75.9	8044.64	4.02
3	HSS18X6X5/8	70.83	93.1	6594.27	3.30
2	HSS20X12X3/8	37.34	78.4	2927.46	1.46
1	HSS20X12X5/8	46.67	78.4	3658.93	1.83
1	HSS6X6X3/8	16.17	27.4	443.06	0.22
56	HSS8X8X.375	627.79	37.6	23604.90	11.80
3	L4X4X3/8	60.5	9.8	592.90	0.30
3	L6X4X3/8	56.18	12.3	691.01	0.35
3	MC12X31	56.82	31	1761.42	0.88
338	W10X12	3062.26	12	36747.12	18.37
60	W10X22	523.86	22	11524.92	5.76
9	W10X39	88.69	39	3458.91	1.73
52	W12X14	627.75	14	8788.50	4.39
68	W12X16	962.48	16	15399.68	7.70
1	W12X22	22.33	22	491.26	0.25
19	W12X26	259.46	26	6745.96	3.37
1	W12X50	19.5	50	975.00	0.49
751	W14X22	7979.52	22	175549.44	87.77
5	W14X26	104.98	26	2729.48	1.36
4	W14X34	28.09	34	955.06	0.48
94	W16X26	1933.63	26	50274.38	25.14
33	W16X31	890.17	31	27595.27	13.80
21	W16X36	278.04	36	10009.44	5.00
7	W16X40	136.04	40	5441.60	2.72
8	W16X45	93.94	45	4227.30	2.11
4	W16X67	42.84	67	2870.28	1.44
196	W18X35	5552.2	35	194327.00	97.16

Steel Framing Summary (Continued)					
Pieces	Type	Total Length	LB/FT	Total (LB)	Total (Tons)
55	W18X40	1595.05	40	63802.00	31.90
15	W18X46	234.42	46	10783.32	5.39
15	W18X50	210.44	50	10522.00	5.26
3	W18X55	119.01	55	6545.55	3.27
1	W21X111	26.52	111	2943.72	1.47
162	W21X44	4676.73	44	205776.12	102.89
134	W21X50	4547.44	50	227372.00	113.69
15	W21X55	446.24	55	24543.20	12.27
12	W21X62	467.7	62	28997.40	14.50
1	W21X68	29	68	1972.00	0.99
2	W24X103	60	103	6180.00	3.09
2	W24X104	49.67	104	5165.68	2.58
3	W24X117	99.98	117	11697.66	5.85
1	W24X279	44.5	279	12415.50	6.21
80	W24X55	2576.75	55	141721.25	70.86
32	W24X62	854.89	62	53003.18	26.50
56	W24X68	1588.44	68	108013.92	54.01
20	W24X76	592.79	76	45052.04	22.53
2	W24X84	67.15	84	5640.60	2.82
12	W24X94	372.34	94	34999.96	17.50
13	W27X102	430.49	102	43909.98	21.95
1	W27X114	22.83	114	2602.62	1.30
4	W27X129	157.32	129	20294.28	10.15
11	W27X146	313.67	146	45795.82	22.90
26	W27X84	853.82	84	71720.88	35.86
2	W27X94	78.66	94	7394.04	3.70
1	W30X108	50.33	108	5435.64	2.72
8	W30X116	305.85	116	35478.60	17.74
11	W30X90	344.99	90	31049.10	15.52
5	W33X118	181.83	118	21455.94	10.73
2	W33X130	44.78	130	5821.40	2.91
1	W36X150	39.83	150	5974.50	2.99
1	W36X170	34	170	5780.00	2.89
1	W40X167	46.67	167	7793.89	3.90
1	W40X211	66.67	211	14067.37	7.03
2	W6X15	19.34	15	290.10	0.15
41	W8X10	249.32	10	2493.20	1.25
93	W8X18	1183.11	18	21295.98	10.65
1	W8X21	7.83	21	164.43	0.08
10	W8X24	211.3	24	5071.20	2.54
				Total:	**1,000.13**

Roof Joist Summary				
Location	**Type**	**Quantity**	**Unit Length**	**Total Length (FT)**
Nat. Roof	48LH16	11	81	891
Gym Roof	68DLH17	24	121.34	2912.16
Aud. Roof	60DLH14	12	87.75	1053

Metal Decking		
Decking Type	**Total Perimeter (LF)**	**Total Area(SF)**
2" 22 gauge Gal. Form Deck	436.3	731.71
1-1/2" 20 gauge comp.	1772.1	2606.94
1-1/2" 20 Gauge Gal. RD	1280.2	3478.86
2" 18 gauge galvanized dovetail RD	424	10473.5
2" 20 gauge galvanized dovetail RD	1074.1	25205.43
3" 18 gauge Gal. RD	7075.4	89659.75
3" 18 gauge galvanized	7813.5	156798.68
	Total:	**288,954.87**

Concrete:

Caissons				
Building	**Diameter (inches)**	**Depth**	**Quantity**	**CY Concrete**
X	48	36.67	11	188
X	42	35.67	19	241
X	36	34.67	24	218
X	30	33.67	9	55
Y	48	60.67	15	423
Y	42	59.67	17	361
Y	36	58.67	4	61
Y	30	57.67	2	21
Y	24	56.67	2	13
Z	54	47.67	2	56
Z	48	46.67	17	369
Z	42	45.67	49	797
Z	36	44.67	106	1239
Z	30	43.67	16	127
Z	24	42.67	6	30
		Totals:	299	4200

CAISSON CAPS		
Mark	**Length**	**CY**
X1-XE	2' - 4"	1.75
X1-XG	2' - 4"	2.16
X1-XJ	2' - 4"	2.16
X1-XM	2' - 4"	1.75
X2-XN	2' - 4"	1.38
X3-XN	2' - 4"	1.38
X3-XP	2' - 4"	1.75
X3-XQ	2' - 4"	1.38
X6-XQ	2' - 4"	1.75
X9-XQ	2' - 4"	1.75
X11-XQ	2' - 4"	1.38
X2-XD	2' - 4"	1.38
X3-XD	2' - 4"	1.38
X3-XC	2' - 4"	2.16
X3-XB	2' - 4"	1.38
X6-XB	2' - 4"	2.16
X9-XB	2' - 4"	2.16
X11-XB	2' - 4"	2.16
X11-XC	2' - 4"	2.16
X9-XC	2' - 4"	2.16
X6-XC	2' - 4"	2.61
X4-XD	2' - 4"	1.75
X7-XD	2' - 4"	2.16
X10-XD	2' - 4"	1.75
X12-XD	2' - 4"	1.75
X10-XE	2' - 4"	1.75
X8-XE	2' - 4"	2.16
X5-XE	2' - 4"	1.38
X4-XE	2' - 4"	2.16
X4-XG	2' - 4"	2.61
X5-XG	2' - 4"	2.16
X8-XG	2' - 4"	2.16
X10-XG	2' - 4"	2.61
X12-XE	2' - 4"	1.38
X12-XF	2' - 4"	1.38
X10-XJ	2' - 4"	2.61
X12-XK	2' - 4"	1.38
X8-XH	2' - 4"	1.38
X8-XL	2' - 4"	1.38
X5-XJ	2' - 4"	1.75

CAISSON CAPS (Continued)		
Mark	**Length**	**CY**
X4-XJ	2' - 4"	2.61
X10-XM	2' - 4"	1.75
X8-XM	2' - 4"	1.75
X7-XN	2' - 4"	2.16
X10-XN	2' - 4"	2.16
X5-XM	2' - 4"	1.38
X12-XN	2' - 4"	2.16
X4-XN	2' - 4"	1.75
X4-XM	2' - 4"	2.16
X11-XP	2' - 4"	2.16
X9-XP	2' - 4"	2.16
X6-XP	2' - 4"	2.16
X8-XJ	2' - 4"	1.38
X14-XA	3' - 0"	2.78
X14-XB.6	3' - 0"	3.06
Z1-XC	3' - 0"	3.06
X14-XD	3' - 0"	3.06
X14-XF	3' - 0"	3.06
X14-XG	3' - 0"	3.06
Z1-XJ	3' - 0"	3.06
X14-XK	3' - 0"	3.06
X14-ZN.7(4' - 7 7/8")	3' - 0"	3.06
Z2-ZB	2' - 4"	2.16
Z2-ZD	2' - 4"	2.16
Y1-YF	2' - 4"	2.16
Y1-YD	2' - 4"	1.75
Y1(-2' - 8")-YC	2' - 4"	1.38
Y3-YC	2' - 4"	2.16
Y3-YB	2' - 4"	2.16
Y5-YC	2' - 4"	2.16
Y5-YB	2' - 4"	2.16
Y3-YA	2' - 4"	1.75
Y6-YA	2' - 4"	2.16
Z7-ZR	2' - 4"	2.16
Z9-ZP	2' - 4"	2.16
Z9-ZQ	2' - 4"	2.16
Z12-ZR	2' - 4"	2.16
Z10.8-ZL	2' - 4"	2.16
Z10.8-ZK	2' - 4"	2.16
Z10.8-ZJ	2' - 4"	2.16

CAISSON CAPS (Continued)		
Mark	**Length**	**CY**
Z10.8-ZG	2' - 4"	2.16
Z10.8-ZF	2' - 4"	2.16
Z10.8-ZD	2' - 4"	2.16
Z10-ZD	2' - 4"	2.16
Z8-ZD	2' - 4"	2.16
Z5-ZD	2' - 4"	2.16
Z4-ZD	2' - 4"	2.16
Z4-ZB	2' - 4"	2.16
Z5-ZB	2' - 4"	2.16
Z8-ZB	2' - 4"	2.16
Z10-ZB	2' - 4"	2.16
Z12-ZB	2' - 4"	2.16
Z14-ZB	2' - 4"	2.16
Z14-ZD	2' - 4"	2.16
Z13-ZD	2' - 4"	2.16
Z15-ZD	2' - 4"	2.16
Z15-ZE	2' - 4"	2.16
Z13-ZF	2' - 4"	2.16
Z16-ZE	2' - 4"	2.16
Z16-ZG	2' - 4"	2.16
Z15-ZG	2' - 4"	2.16
Z13-ZG	2' - 4"	2.16
Z13-ZJ	2' - 4"	2.16
Z15-ZJ	2' - 4"	2.16
Z16-ZJ	2' - 4"	2.16
Z16-ZK	2' - 4"	2.16
Z17-ZJ.9	2' - 4"	2.16
Z16-ZL	2' - 4"	2.16
Z17-ZM.5(-7' - 0 1/4")	2' - 4"	2.16
Z17-ZN.8	2' - 4"	2.16
Z15-ZK	2' - 4"	2.16
Z15-ZL	2' - 4"	2.16
Z15-ZN.8	2' - 4"	2.16
Z13-ZK	2' - 4"	2.16
Z13-ZL	2' - 4"	2.16
Z14.3-ZP.8	2' - 4"	2.16
Z14.3-ZR.7	2' - 4"	2.16
Y4-YH	2' - 4"	2.16
Y6-YH	2' - 4"	2.16
Y7-YH	2' - 4"	2.16

CAISSON CAPS (Continued)		
Mark	**Length**	**CY**
Y12-YH	2' - 4"	2.16
Y9-YH	2' - 4"	2.16
Y12-YG	2' - 4"	2.16
Y12-YF	2' - 4"	2.16
Y12-YD	2' - 4"	2.74
Y12(2' - 8")-YC	2' - 4"	1.38
Y9(-14' - 0")-YC	2' - 4"	1.38
Y9(-14' - 0")-YB	2' - 4"	1.75
Y9(-14' - 0")-YA	2' - 4"	1.38
Y7-YA	2' - 4"	2.16
Y8-YB	2' - 4"	2.16
Y8-YC	2' - 4"	2.16
Y8-YE	2' - 4"	1.75
Y8-YF	2' - 4"	2.16
Y9-YF	2' - 4"	1.75
Y9-YE	2' - 4"	1.38
Y8-YG	2' - 4"	2.16
Y9-YG	2' - 4"	2.16
Y5-YG	2' - 4"	2.16
Y4-YG	2' - 4"	2.16
Y5-YE	2' - 4"	2.16
Y5-YF	2' - 4"	2.16
Y1-YG	2' - 4"	2.16
Y1-YH	2' - 4"	2.16
Z3-ZB	2' - 4"	2.74
Z3-ZD	2' - 4"	2.74
Z5.1-ZF.6	2' - 4"	2.16
Z5.1-ZJ.3	2' - 4"	2.16
Z4-ZE	2' - 4"	2.16
Y4-YE	2' - 4"	1.38
Y4-YF	2' - 4"	1.75
Z9-ZR	2' - 4"	2.16
Z18-ZN	2' - 4"	2.16
Z18-ZN.9	2' - 4"	2.16
X7.8-XR	2' - 4"	0.96
X9.4-XR	2' - 4"	0.96
X11-XR	2' - 4"	0.96
Z18-ZN.6	2' - 4"	2.16
Z18-ZN.4	2' - 4"	2.16
Z17.6-ZN	2' - 4"	2.16

CAISSON CAPS (Continued)		
Mark	**Length**	**CY**
Z17.4-ZN	2' - 4"	2.16
Z18-ZQ.7	2' - 4"	2.16
Z18-ZP.8(7' - 4")	2' - 4"	2.16
Z10-ZN	2' - 4"	2.16
Z16.6-ZN	2' - 4"	2.16
Z15.6-ZN	2' - 4"	2.16
Z16-ZP.4	2' - 4"	2.16
Z3-ZE	2' - 4"	2.74
Z5-ZK	2' - 4"	2.74
Z3.6-ZE	2' - 4"	2.16
Z5.1-ZH.1	2' - 4"	2.16
Z5.1-ZE	2' - 4"	2.16
Z17-ZL	2' - 4"	2.16
X11.2-XA	2' - 4"	0.96
Y.5A-Y6.6	2' - 4"	0.69
Y.5A-Y8(-12' - 5")	2' - 4"	0.69
Z14.3-ZT.1	2' - 4"	2.16
X14-XP	3' - 0"	2.78
	TOTAL:	**366.23**

Grade Beams		
Type	**Total Length (FT)**	**Volume (CY)**
GB 24x28	484.00	24.50
GB 36x28	5397.23	1163.70
GB 36x36	361.16	121.50
GB 40x28	398.41	152.14
GB 42x32	418.5	130.32
GB 48x36	269.95	102.03
GB 68x28	242.96	157.85
	Total:	**1852.04**

Concrete Walls				
Type	Length (FT)	Width (FT)	Area (SF)	Volume (CY)
Exterior - 10" Concrete	22	0.83	293	9.05
Exterior - 12" Concrete	12.06	1	74	2.73
Exterior - 12" Concrete	20.67	1	317	3.91
Exterior - 12" Concrete	8.03	1	27	1.00
Exterior - 12" Concrete	10.56	1	28	1.04
Exterior - 12" Concrete	10.73	1	32	1.19
Exterior - 12" Concrete	70.83	1	738	27.33
Exterior - 12" Concrete	2.86	1	7	0.26
Exterior - 8" Concrete	94.33	0.67	1405	34.69
Exterior - 8" Concrete	106.67	0.67	1636	40.38
Exterior - 8" Concrete	33	0.67	470	11.44
Exterior - 8" Concrete	2.67	0.67	31	0.76
Exterior - 8" Concrete	57.67	0.67	884	21.83
Exterior - 8" Concrete	15	0.67	240	5.93
Exterior - 8" Concrete	95.32	0.67	1081	26.69
Exterior - 8" Concrete	57.67	0.67	484	11.74
Exterior - 8" Concrete	14.67	0.67	204	5.05
Exterior - 8" Concrete	15.67	0.67	200	4.94
Exterior - 8" Concrete	2.67	0.67	36	0.88
Exterior - 8" Concrete	108	0.67	1431	35.34
Exterior - 8" Concrete	4.33	0.67	18	0.44
Exterior - 8" Concrete	4.33	0.67	53	0.92
Exterior - 8" Concrete	14.67	0.67	215	5.30
Exterior - 8" Concrete	45.64	0.67	498	12.30
Foundation - 12" Concrete	1.67	1	26	0.32
Foundation - 16" Concrete	66.83	1.33	936	46.24
Foundation - 16" Concrete	5.17	1.33	17	0.84
Foundation - 17" Concrete	39.65	1.42	588	30.84
Foundation - 18" Concrete	209.57	1.5	3195	177.48
Foundation - 20" Concrete	9.79	1.67	174	10.73
Foundation - 20" Concrete	24.33	1.67	348	21.45
Foundation - 20" Concrete	10	1.67	179	11.04
Foundation - 20" Concrete	24.42	1.67	362	22.32
Foundation - 20" Concrete	88.03	1.67	1293	79.82
Foundation - 20" Concrete	95.13	1.67	473	29.20
Generic - 4" Concrete	72.36	0.33	127	1.56
Generic - 4" Concrete	76.04	0.33	133	1.64
Generic - 4" Concrete	75.72	0.33	133	1.64
Generic - 4" Concrete	75.45	0.33	132	1.63
Generic - 4" Concrete	75.21	0.33	132	1.62
Generic - 4" Concrete	75	0.33	132	1.62
Generic - 4" Concrete	74.81	0.33	131	1.62
Generic - 4" Concrete	74.65	0.33	131	1.61
Generic - 4" Concrete	74.5	0.33	115	1.42
Generic - 4" Concrete	63.28	0.33	77	0.94
Generic - 4" Concrete	68.63	0.33	97	1.20
Generic - 4" Concrete	75.72	0.33	133	1.64
Generic - 6" Concrete	31.98	0.5	431	7.98
Generic - 6" Concrete	22	0.5	293	5.43
Generic - 6" Concrete	22	0.5	293	5.43
			Total:	**732.41**

Masonry Walls			
Type	**Length (FT)**	**Width (FT)**	**Area (SF)**
Generic - 10" Masonry	149.5	4.8	101
Generic - 12" Masonry #5 @ 48"	2,370.54	41.74	69,707
Generic - 12" Masonry IVANY	870.61	19.4	20,246
Generic - 4" Masonry	131.2	0.9	73
Generic - 6" Masonry	29.83	0.94	40
Generic - 8" Masonry	608.8	12.8	4,996

Slab on Grade					
Level	**Type**	**Perimeter (LF)**	**Area(SF)**	**Volume (CF)**	**Volume (CY)**
GROUND FLOOR	12" S.O.G.	81.8	369.95	369.95	13.70
GROUND FLOOR	12" S.O.G.	46.7	133.33	133.33	4.94
GROUND FLOOR	12" S.O.G.	50	153.93	153.93	5.70
GROUND FLOOR	4" S.O.G.	663	3855.38	1285.13	47.60
GROUND FLOOR	4" S.O.G.	1862.8	45684.23	15228.08	564.00
GROUND FLOOR	4" S.O.G.	91.6	518.41	172.8	6.40
GROUND FLOOR	4" S.O.G.	323	4531.02	1510.34	55.94
GROUND FLOOR	4" S.O.G.	165.4	1700.47	566.82	20.99
GROUND FLOOR	4" S.O.G.	264.4	2642.67	880.89	32.63
SECOND FLOOR	4" S.O.G.	147.5	241.97	80.66	2.99
GROUND FLOOR	5" S.O.G.	312.4	3177.84	1324.1	49.04
GROUND FLOOR	5" S.O.G.	155.7	1323.68	551.53	20.43
FIRST FLOOR	8" S.O.G.	18.3	20.62	13.75	0.51
FIRST FLOOR	8" S.O.G.	18.3	20.62	13.75	0.51
FIRST FLOOR	S-16	418.4	8552.93	11403.9	422.37
FIRST FLOOR	S-16	526.2	10399.01	13865.35	513.53
FIRST FLOOR	S-16	498.6	14915.96	19887.94	736.59
FIRST FLOOR	S-16	195.4	2368.73	3158.31	116.97
FIRST FLOOR	S-16	213.1	1767.4	2356.53	87.28
FIRST FLOOR	S-16	177.2	1810.76	2414.35	89.42
FIRST FLOOR	S-16	248.2	1776.65	2368.87	87.74
FIRST FLOOR	S-16	267.8	1238.8	1651.73	61.18
FIRST FLOOR	S-16	172	1569.24	2092.31	77.49
FIRST FLOOR	S-16	172	1569.24	2092.31	77.49
FIRST FLOOR	S-16	116.8	804.8	1073.07	39.74
FIRST FLOOR	S-21	629.1	23435.38	41011.92	1518.96
GROUND FLOOR	S-24	59.5	218.05	436.1	16.15
				Total:	**4,670.29**

Slab on Deck					
Level	Type	Perimeter (LF)	Area(SF)	Volume (CF)	Volume (CY)
SECOND FLOOR	S-4	128.1	224.42	74.81	2.77
SECOND FLOOR	S-4	153.6	221.41	73.8	2.73
UPPER BALCONY	S-4	158.1	227.98	75.99	2.81
UPPER BALCONY	S-4	158.4	227.34	75.78	2.81
UPPER BALCONY	S-4	157.8	226.54	75.51	2.80
UPPER BALCONY	S-4	157.3	225.83	75.28	2.79
UPPER BALCONY	S-4	157.5	225.7	75.23	2.79
UPPER BALCONY	S-4	160.5	231.74	77.25	2.86
UPPER BALCONY	S-4	165.8	239.65	79.88	2.96
FIRST FLOOR	S-4	137.3	217.78	72.59	2.69
FIRST FLOOR	S-4	136.5	195.74	65.25	2.42
FIRST FLOOR	S-4	101.2	142.81	47.6	1.76
SECOND FLOOR	S-6.5	1003.7	30434.79	16485.53	610.58
FIRST FLOOR	S-6.5	620.2	20722.06	11224.45	415.72
FIRST FLOOR	S-6.5	755.7	18204.47	9860.76	365.21
FIRST FLOOR	S-6.5	125	363.21	196.74	7.29
FIRST FLOOR	S-6.5	251.8	3377.55	1829.51	67.76
SECOND FLOOR	S-6.5	632.5	20765.96	11248.23	416.60
SECOND FLOOR	S-6.5	884.4	18150.42	9831.48	364.13
SECOND FLOOR	S-6.5	778.8	14051.19	7611.06	281.89
SECOND FLOOR	S-6.5	330.5	4194.23	2271.9	84.14
UPPER BALCONY	S-6.5	208	912.78	494.44	18.31
FIRST FLOOR	S-6.5	105.1	679.55	368.09	13.63
SECOND FLOOR	S-6.5	224.8	3025.26	1638.68	60.69
FIRST FLOOR	S-6.5	165.1	1670.52	904.86	33.51
SECOND FLOOR	S-6.5	267.3	1236.67	669.86	24.81
FIRST FLOOR	S-6.5A	935.9	14355.57	7775.94	288.00
FIRST FLOOR	S-6.5A	181.9	1252.78	678.59	25.13
FIRST FLOOR	S-6.5A	59.4	205.69	111.42	4.13
FIRST FLOOR	S-6.5A	60.3	214.77	116.34	4.31
FIRST FLOOR	S-6.5A	223.1	2981.21	1614.82	59.81
GROUND FLOOR	F.F.S.	24.5	35.49	19.22	0.71
GROUND FLOOR	F.F.S.	24.5	35.49	19.22	0.71
GROUND FLOOR	F.F.S.	34.9	59.11	32.02	1.19
FIRST FLOOR	F.F.S.	23.2	30.42	16.48	0.61
FIRST FLOOR	F.F.S.	41.7	84.34	45.69	1.69
FIRST FLOOR	F.F.S.	40	78.38	42.45	1.57
FIRST FLOOR	F.F.S.	43.3	90.65	49.1	1.82
FIRST FLOOR	F.F.S.	24.9	36.67	19.87	0.74
GROUND FLOOR	F.F.S.	24.9	36.99	20.04	0.74
GROUND FLOOR	F.F.S.	25.3	37.33	20.22	0.75
GROUND FLOOR	F.F.S.	24.5	35.49	19.22	0.71
GROUND FLOOR	F.F.S.	24.9	36.99	20.04	0.74
GROUND FLOOR	F.F.S.	51.3	92.25	49.97	1.85
FIRST FLOOR	F.F.S.	28.4	42.11	22.81	0.84
FIRST FLOOR	S-3	375.4	1658.39	414.6	15.36
FIRST FLOOR	S-3	38.5	81.14	20.28	0.75
FIRST FLOOR	S-3	38.8	84.25	21.06	0.78
				Total:	**3,209.41**

Reinforcing Steel					
Description	**Quantity**	**Unit**	**lb/Unit**	**Total (LB)**	**Total (Tons)**
12" SOG	657	SF	1.3	878.03	0.44
S-6.5A	19,010	SF	0.7	12,698.69	6.35
Structural Ribbed SOG	3,845	CY	15	57,673.72	28.84
Caissons	4,200	CY	80.0	336,000.00	168.00
Caisson Caps	366	CY	65.0	23,790.00	11.90
Grade Beams	7,272	LF	56.3	409,279.98	204.6
Concrete Walls	2,543	LF	70.1	178,264.30	89.1
CMU Walls	46,805	SF	3.0	140415	70.21
Welded Wire Fabric					
WWF 4x4 - W2.9xW2.9	61,874.0	SF			
WWF 6x6 - W2.1xW2.1	206,154.34	SF			
WWF 6x6 - D4.0xD4.0	19,010.02	SF			

Appendix D: General Conditions Estimate

General Contractor				
Supervision				
Description	**Unit**	**Unit Price**	**Quantity**	**Total Cost**
Project Executive	Week	$ 4,500.00	30	$ 135,000.00
Senior Project Manager	Week	$ 2,975.00	70	$ 208,250.00
Project Manager	Week	$ 2,500.00	90	$ 225,000.00
Site Superintendent	Week	$ 2,750.00	100	$ 275,000.00
Labor Foreman	Week	$ 2,400.00	100	$ 240,000.00
			Total:	**$ 1,083,250.00**
Construction Facilities and Equipment				
Description	**Unit**	**Unit Price**	**Quantity**	**Total Cost**
Office Trailer	Each	$ 12,562.00	1	$ 12,562.00
Owner's Rep. Office Trai	Each	$ 18,792.00	1	$ 18,792.00
Telephone	Month	$ 145.00	24	$ 3,480.00
Trailer Lights & HVAC	Month	$ 320.00	24	$ 7,680.00
Storage Trailer 1	Month	$ 105.62	24	$ 2,534.88
Storage Trailer 2	Month	$ 105.62	12	$ 1,267.44
Project Sign	SF	$ 22.29	60	$ 1,337.40
Toilets (4)	Month	$ 764.00	24	$ 18,336.00
Site Fencing	LF	$ 10.86	4000	$ 43,440.00
Clean-up - Progressive	MSF	$ 40.33	291	$ 11,736.03
Clean-up - Final	MSF	$ 83.59	291	$ 24,324.69
Hoist	Month	$ 2,904.00	12	$ 34,848.00
Dumpsters	Week	$ 240.00	52	$ 12,480.00
Safety Equipment	Month	$ 35.00	24	$ 840.00
Construction Photos	Set	$ 600.00	6	$ 3,600.00
			Total:	**$ 197,258.44**

Bonds and Insurance	
Contractor	**Amount**
General	$ 356,960.00
HVAC	$ 46,500.00
Plumbing	$ 41,000.00
Electrical	$ 60,000.00
Total:	**$ 504,460.00**

HVAC Contractor	
Supervision	$ 110,000.00
Fac. And Equip.	$ 104,000.00
Plumbing Contractor	
Supervision	$ 50,000.00
Fac. And Equip.	$ 48,000.00
Electrical Contractor	
Supervision	$ 41,000.00
Fac. And Equip.	$ 46,000.00