Technical Report 2

Twin Rivers Elementary & Intermediate School

McKeesport, PA

This Technical Report will provide an overview of the construction of the Twin Rivers Elementary & Intermediate School construction project. Included will be an analysis of schedule, building systems, project cost, site logistics, local conditions, and the project delivery system.

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AE 481W- Fall 2013
Senior Thesis Project Report
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Executive Summary

This report provides a thorough analysis of a detailed project schedule as well as a detailed structural estimate of the McKeesport Elementary/Intermediate School. The project site layout, the project schedule, the general conditions, structural system estimate, assemblies MEP estimate, constructability challenges, and a LEED evaluation are included in the report as well.

The site layout analysis examined the site condition for traffic, steel erection phase, and project finish phase. A logistic plan is developed for each phase to show locations of unique features of different project stages in order to maintain safe, tidy site to promote the construction efficiency and quality.

The detailed project schedule is studied with more detailed breakdown of the construction activities and sequencing of work. A critical path method was used to show the project schedule. Features of this project are then discussed.

The general conditions estimate shows a breakdown of all general conditions used throughout the project, including project management and staff cost, utilities cost, equipment and facilities cost and permitting and bonds cost. The total for the general conditions on this project comes to $ 1,516,200.00. A cost breakdown of different sources was then studied.

The detailed structural estimate studied a typical bay, in Area B from column line 4 to column line 5 of the project. The cost estimate includes footing, columns, grading beams and framing. A quantity takeoff of the footing was shown. The total cost estimate of a typical bay comes down to $224,869.17.

The assemblies MEP estimate is a cost estimate of the mechanical, electrical and plumbing systems. The project is assumed to have an integration of 50% of elementary school and 50% of intermediate school for this estimate purpose. The assembly cost comes to a total of $334,214.00.

The project constructability issues are also analyzed in this report. The challenges were addressed, the resolution were studied for each of the issue. The issues talked about are: environment control, change of construction sequencing and interference of project schedule due to extra LEED Implementation.

The McKeesport Elementary/Intermediate School Project is aiming for a LEED Gold Certificate. The implementation of LEED is studied in this report. This project is looking at to gain 66 points out of 110 possible based on the LEED for Schools, 2009 Edition. A LEED Scorecard is attached in this report.

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Detailed Project Schedule

The project summary schedule included reflects critical milestones and durations of the activities for the project. The project is executed in the sequence of Area A, Area B, Area D, Area C. The schedule of Area A for both floors is the most detailed. The divisions of areas are relatively equal resulting very close duration of similar items for four areas. Thus, for the interior fit out section of the schedule of Area C and D are relatively brief. The detailed project schedule is attached in Appendix I.

Schedule Breakdown			
Phase	Start Date	End Date	Duration
Project Planning Phase	3/24/2009	12/9/2009	260
Schematic Design Phase	12/9/2009	6/1/2010	139
Design Development Phase	3/1/2010	9/6/2010	144
Construction Documents Phase	4/23/2010	5/5/2011	270
Bidding Phase	5/25/2010	8/225/11	328
Construction Administration Phase	7/8/2010	3/24/2014	968
Construction Phase	10/6/2011	12/13/2013	481
Substantial Completion	12/13/2013	12/13/2013	1
Project Close-out	13/13/2013	3/24/2014	110

Sequencing

The work flow of this project is the same as the erection sequence of the project, as talked about, Area A, Area B, Area D, and Area C. The original plan was from Area A, Area B, Area C, and Area D. But due to some reasons the plan was changed after structural of Area A was done. Detailed reasons of the change will be discussed in constructability issues section.

This project has only two floors above ground. As shown in the schedule, the sequencing of the work general is start the first floor of one area, 2/3 way in the first floor of the next area will start. While the second floor of the prior area will be done sequentially following the first floor.

Features

Longer interior fit-out time

The schedule of this project has a significant feature of longer interior fit-out time compared to other similar projects. The reason behind this is a lot of the material and equipment used are very specifically LEED oriented. Another reason is that some equipment used needs more time for installation and testing than regular building fit-out since they are more technologically intense. There is more lead time involved with some of the materials. Such material and equipment include classroom projectors, gymnasium equipment and music room acoustic systems. This also resulted in the wide spread work for the fit-in of different trades.

Longer planning phase

The planning phase of this project is much longer compared to other similar projects. There were a lot of hearings meetings involved. Because of the fact that this project is part of the consolidation of five public schools into three, the discussion and decision making process was much longer on this project. The building permitting phase also took a long time. The demolition of the previous school, Cornell Elementary School, at the current site was treated as another project. So it did not affect this project.

Wide spread work sequence for MEP

Similar to the reason discussed in "longer interior fit-out time", the work sequence of the mechanical, electrical and plumbing are very spread out. Several activities under one trade are worked in the meantime when several activities in the other trades are performing; instead of one trade would finish the majority of its job and towards the end another trade would start working. This is because on this project, there is very many specific work to supplement the final furnish of teaching equipment, LEED implementation, etc.

Detailed Structural Systems Estimates

The detailed structural estimate studied a typical bay, in Area B from column line 4 to column line 5 of the project. The cost estimate includes footing, columns, grading beams and framing. A quantity takeoff of the footing was shown. The total cost estimate of a typical bay comes down to $ 224,869.17 . It is very close to the actual cost of $277,473.00, derived from the total cost of the structural divided by the number of bays.

The assemblies MEP estimate is a cost estimate of the mechanical, electrical and plumbing systems. The project is assumed to have an integration of 50% of elementary school and 50% of intermediate school for this estimate purpose based on the fact that elementary school and intermediate will have each of the two almost symmetric wings and share a core as common area. The assembly cost comes to a total of $334,214.00.

Code	Item	Unit	Quantity2	Waste Factor	Material	Labor	Equipment	Total
03 11 13	Forms in place grading beams, 24"	sfca	274	1.1	$ 2.55	$ 6.55		$ 2,742.74
	Form in place beam	sfca	620	1.1	$ 2.97	$ 7.15		$ 6,901.84
	Form in place column	sfca	1670	1.1	$ 2.47	$ 6.80		$ 17,028.99
	Form in place flat slab with drop panels	sfca	2733.5	1.1	$ 4.06	$ 4.57		$ 25,949.12
	Form in place spread footing	sfca	984	1.1	$ 2.00	$ 4.65		$ 7,197.96
	Form in place walls, 8'-16'	sfca	134	1.1	$ 2.86	$ 9.30		$ 1,792.38
03 21 10	Beams and girders #8-#18	ton	6	1.1	$1,000.00	$ 590.00		$ 10,494.00
	columns #8-#18	ton	44.5	1.1	$1,000.00	$ 679.00		$ 82,187.05
	Footings #8-#18	ton	11.7	1.1	$1,000.00	$ 550.00		$ 19,948.50
	Walls #8-#18	ton	6.5	1.1	$1,000.00	$ 400.00		$ 10,010.00
03 31 05	4000 psi nw concrete	cy	14	1.1	$ 105.79			$ 1,629.17
	5000 psi nw concrete	cy	288	1.1	$ 111.79			$ 35,415.07
	6000 psi nw concrete	cy	13	1.1	$ 123.79			$ 1,770.20
	8000 psi nw concrete	cy	8	1.1	$ 204.79			$ 1,802.15
Subtotal								$ 224,869.17

Site Layout

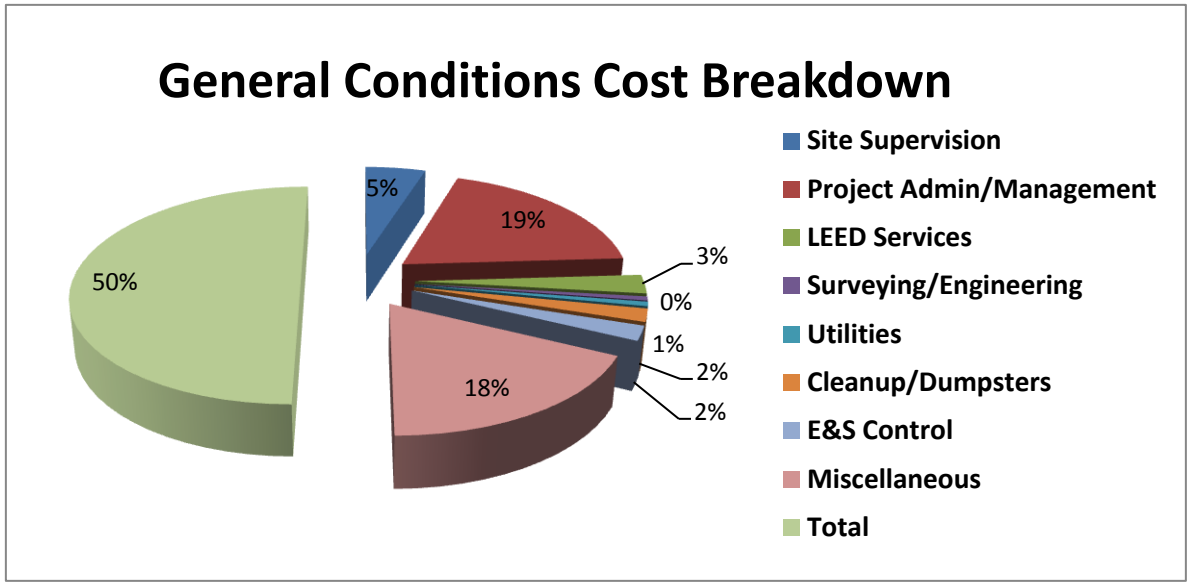
This project is located at the site of a previous elementary school. The old school was demolished before the start of this project. The site of this project takes up the entire block. The site logistics plan for this project is relatively straight-forward since the site has a fair amount of space and the structure is only 2 floors above ground with partial clearstory level. Three site layout plans were attached here in Appendix VI: Site Traffic Plan; Steel Erection Plan; and Finish Phase Site Plan.

Major site utilities including temporary power, chiller, sewer-lines are marked on the plans. The site traffic plan emphasis on the traffic route and direction, noted by red arrows; the location of material staging and delivery are marked. The pedestrian traffic ways are also marked. The steel erection noted the zoning of steel erection. Different locations of mobile cranes are also marked. The locations of the geothermal wells are also noted on this plan to prevent overloading the well fields. The travel route of delivery trucks is also marked. The finish phase site plan is to note the site condition when the project is moving into the close-out phase. The landscaping area is marked along with the parking space.

There is no major trade conflict due to logistics reasons on this project. The only major concern regarding the project site is the sedimentation and erosion control due to continuous rainy weather. The material of the access road to the site was changed from sand and loose gravel to granular rock.

General Conditions Estimates

Description	Cost
Site Supervision	$ 150,000.00
Project Admin/Management	$ 579,200.00
LEED Services	$ 84,000.00
Surveying/Engineering	$ 18,000.00
Utilities	$ 20,000.00
Cleanup/Dumpsters	$ 58,000.00
E&S Control	$ 65,000.00
Miscellaneous	$ 542,000.00
Total	$ 1,516,200.00



The table and figure above showed the allocation of the general condition cost on this project. Project admin and management category ranked the highest percentage due to heavy management requirement and the time the management team was involved on this project. There was also a LEED consultant hired on this job. The cost of the LEED services also contributes to the general conditions.

Constructability Challenges

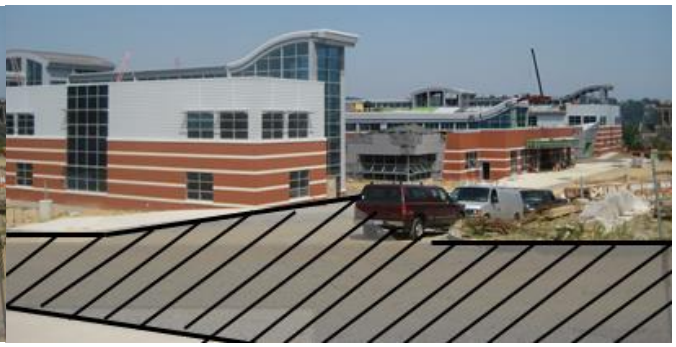
In order to complete the McKeesport Elementary/Intermediate School construction project successfully to achieve owner's needs and project goals, the project team has overcome several constructability challenges. The first and most significant is the request of change of design from Pennsylvania's Department of Environmental Protection after one of the site inspections they performed. A change of order with a value of $156,275.00 was finally approved and executed. Aside from the request of change of design, there was also a big architectural design change with a schedule value of (-$99,518.00). Project team also has dealt with the problem of longer material lead time, caused by an update of LEED implementation half-way through the project. Details of these challenges will be discussed below.

Constructability Issue I: Environmental Controls

The McKeesport Elementary/Intermediate School project is located in western Pennsylvania. The area is usually relatively dry during the summer time and rainier in the fall. However, the summer in 2013 is especially rainy. The accumulative condensation of rain ranked the highest for the past 70 years. Luckily, there isn't too much site work on this project. The overall construction schedule wasn't influenced by this situation. The problem is the original erosion and sediment control plan wasn't sufficient anymore for this much of rain. After an on-site inspection from Pennsylvania's Department of Environmental Protection, the project was asked to develop an alternative plan for erosion and sediment control.

After consulting with the architect, several designs and materials are changed in order to address the concern of environmental control and also to still realize the goal of a LEED Gold Certificate. There was an addition of a sediment trap near the permanent pond. The access rood to the construction entrance and the access road to the pond were required to be granular rock access. To enhance the mold prevention due to concern of future humid weather, the hallway flooring sealant material was changed into grout. The sediment pond storm water drainage system was enhanced to prevent backflow of excess water. Value addresses scope. The total value of these changes, caused by the "rainy season", sums up to be $156,275.00.

Luckily the influence on the schedule due to this matter is minimal. The project was scheduled to have a relatively longer interior fit-out time than typical projects. All the additional work will be completed before the substantial completion and concurrent with the furnishing activities.

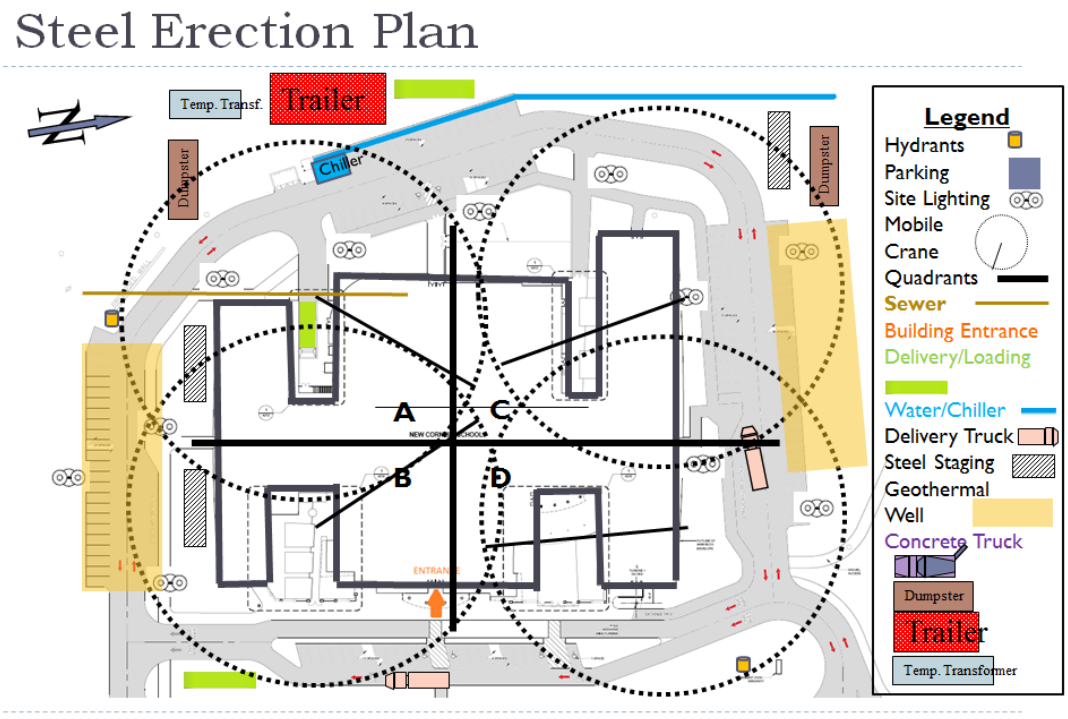


The pictures above showed the existing sandy loose gravel entrance road. The hatched area was to be changed into granular rock materials.

Constructability Issue II: Change of Construction Sequencing

As talked about in the beginning of this section, there was also a big architectural design change with a schedule value of (-$99,518.00). The structural steel erection of this project was originally planned to be in the sequence of quadrants A, B, C, and D. As shown in Appendix VI, Steel Erection Plan. However, when the steel erection of zone A was done, the architect proposed an alternative for the structural deck of library, which is located in zone C. An alternative steel support system for the clearstory was proposed as well in order to implement the value engineering and reduce the project cost. After some discussion between the subcontractor, the architect, the structural engineer and the owner, a total value of $43,518.00 can be saved on the clearstory support. Additional $ 56,000 can be saved on the support system towards the west corner of Zone C where the music room will be located. However, the project team was also looking at a 3-month's schedule delay due to the extra time needed for the designed to be made and approved by the engineer, including the extra possible material lead time.

To solve the problem, the general contractor talked to the contractors and the architect. An alternative steel erection plan was proposed. A new sequence of A, B, D and C was approved and agreed by all trades. This is also reflected on the project summary schedule in Appendix I, where noted the structural steel for Area D first floor started on Jan. 14, 13; whereas the structural steel for Area C first floor didn't start until Mar. 13, 13.



The collaboration and the great communication are the key elements for the success resolution of this issue. Due to the scale of the project, only 2 rental mobile cranes were used. No tower crane was on site. This also helped to reduce the complication of the situation. Eventually, there was no delay in construction schedule. This success is resulted from not only the symmetry of zone C and zone D, but also thanks to the hard work and great communication between the project team.

Constructability Issue III: LEED vs. Project Schedule

Project team also has dealt with the problem of extra material lead time, caused by an update of LEED implementation half-way through the project. Given the public school naturel of this project, there are a lot of hearings and meetings involved in every cent spent here. Same thing happened to the LEED Implementation Plan. This project is aiming for a LEED Gold Certificate after completion. Before the project started, a relatively comprehensive LEED implementation plan has already been developed. However, there are still a few items or criteria were under discussion. 3 month in the project, the decisions finally were made. The decision includes the usage of some new materials in the gym area and a new type of acoustic ceiling tiles. These changes resulted in a change of order of $70,886.00. To the project construction team, this change of order also meant a possibility of project delay due to the extra material leading time. The lucky part is the major new equipment and material wouldn't be used until towards the end of the project, so the project construction team could have the chance to find optimal subcontractors or manufacturers for the materials with minimal lead time and cost. The team currently is looking at a maximum possible delay of one week on the project due to this issue. They are still negotiating with the manufacturer. In the worst case, this delay of one week would still fall into the project team's contingency time for construction. It seemed to be a trade-off of more LEED implementation and less project time. The construction company here is trying their best to make it a win-win to meet the owner's goal and their own.

LEED Evaluation

The McKeesport Elementary/Intermediate School construction project is designed as an environmentally sensitive, high performance building, and is scheduled to be LEED Gold Certified. LEED features will include a robust thermal envelope, high-performance mechanical systems, energy conserving electrical systems, extensive day-lighting along with exterior views, a rain water collection/reuse system, and a potential for a wind-turbine supplemental energy system. The scorecard (available in Appendix VI) has a total of 66-80 points out of a possible 110. With all the LEED feature designs, the McKeesport Elementary/Intermediate School project is particularly strong at sustainable sites, water efficiency, indoor environmental quality and innovation and design process categories. The level of LEED pursuit in the project matches perfectly with the owner's goal of creating not only an innovative and sustainable school but an education center for the school district where students can learn about sustainability. The LEED pursuit of this project takes full advantage of the existing condition of the existing features and local resources. Below is an evaluation of each major category and a summary of the points allocations. The LEED Rating System utilized is LEED for Schools, 2009 Edition.

Sustainable Sites

The McKeesport Elementary/Intermediate School project receives 19-21 points of the 24 possible points for sustainable sites. The project is built on a demolished elementary school. So it is relatively easy for the project to execute sustainable site criteria for LEED on this project. Dedicated walking or bike routes are provided with no barriers on school property. There are public transportation accesses planned including school buses. The possibility of having parking spaces is still under discussion. Since one LEED feature of this project is day-lighting, the light pollution is to be minimal, which also contributed to the sustainable site requirements.

Water Efficiency

The McKeesport Elementary/Intermediate School project scores 9-10 points out of the total 11 possible points. This is one of the strongest of all the categories. The grey water capture system, as known as rain water collection/reuse system is one the important LEED features of this project. This system helps the project achieve a lot of the LEED points in this category. Water efficient landscaping is required, which means no irrigation system or potable water will be used for landscaping. From the grey water capture system, the use of municipal water for sewage conveyance will be reduced by at least 50 percent. Water efficient sinks and lavatories are also required to help with the water efficiency.

Energy and Atmosphere

The McKeesport Elementary/Intermediate School project will receive 10-16 points of the 33 possible points for this category. This is one of the weaker categories for this project due to budget limit, building usage and owner requirements. With the help of the exterior and interior sun control devices and the day lighting system, the building will achieve minimum energy performance. Along with these

systems, the structural insulated panels, the ground source heat pump/ well field will also help to realize optimal energy performance. Although two small-scale wind turbines would be installed for this project, they will not be used as major energy source due to the natural of public school project. They would merely be used for educational purposes as the owner wished. There is a possibility of the owner to enter into a contract for electricity from renewable sources. This would help the project to gain points in for the green power requirement under the energy category. However, this is not part of the construction contract.

Materials and Resources

This project is planning to gain 8 points out of the total 12 possible points for the materials and resources category. This is also a weaker category for the use of LEED on this project. However, the relative lower points are reasonable and pertain to the goal of the owner. Due to this is a new building construction project, this project won't be able to obtain any points in this category related to material reuse. Construction waste management is emphasized on this project. 75 percent of the construction waste will be diverted from disposal. 20% of the construction material and products will be of recycled content including metal-containing products and concrete (both cast-in-place and precast concrete). This project is also construction with 20% of the regional extracted, processed and manufactured materials including cast-in-place concrete, steel framing, and aluminum framing and so on. Other rapidly renewable materials like bamboo flooring and linoleum flooring are also used on this project.

Indoor Environmental Quality

The McKeesport School project receives 16-17 points of 19 possible points in this category. This is one of the strongest of all the categories. Indoor air quality (IAQ) Management plans are required on this project before occupancy. Low-emitting materials and furniture will be used to protect and promote the comfort of the major occupants of the building, students. Materials from sealants to acoustical insulations are required to control indoor chemical and pollutant source. Two of the featuring LEED systems, the day lighting and the geothermal system will also help to promote the controllability of the system to improve the lighting and thermal comfort. This is also one of the owner's major goals of the LEED implementation: to ensure the learning environment of the students. Curtain wall and sun shading control device are designed to improve the lighting in the space. Classrooms and other core learning spaces have also been designed to achieve the stated acoustical performance criteria. Mold prevention is also required on this project to ensure the health of the occupants.

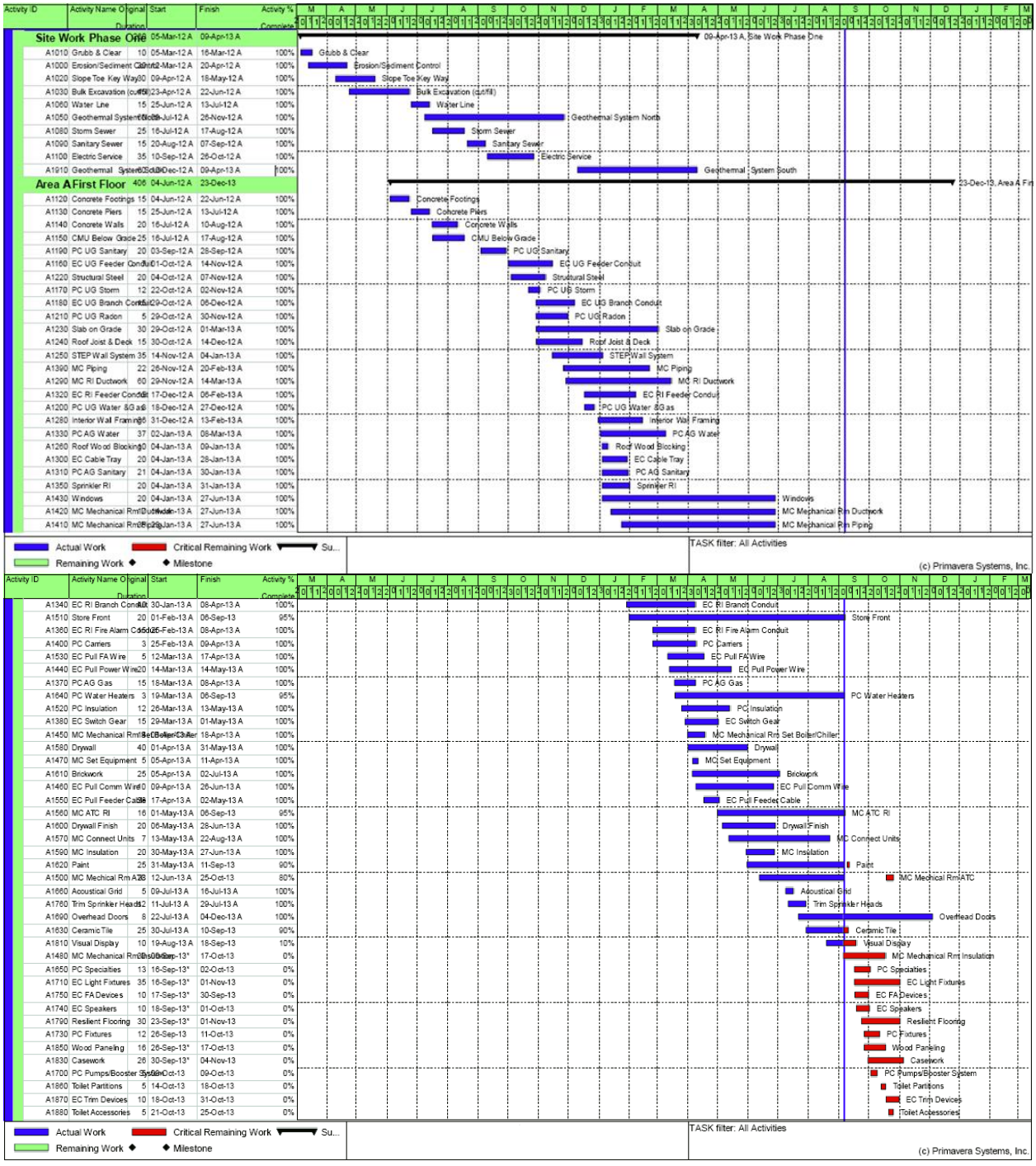
Innovation and Design Process

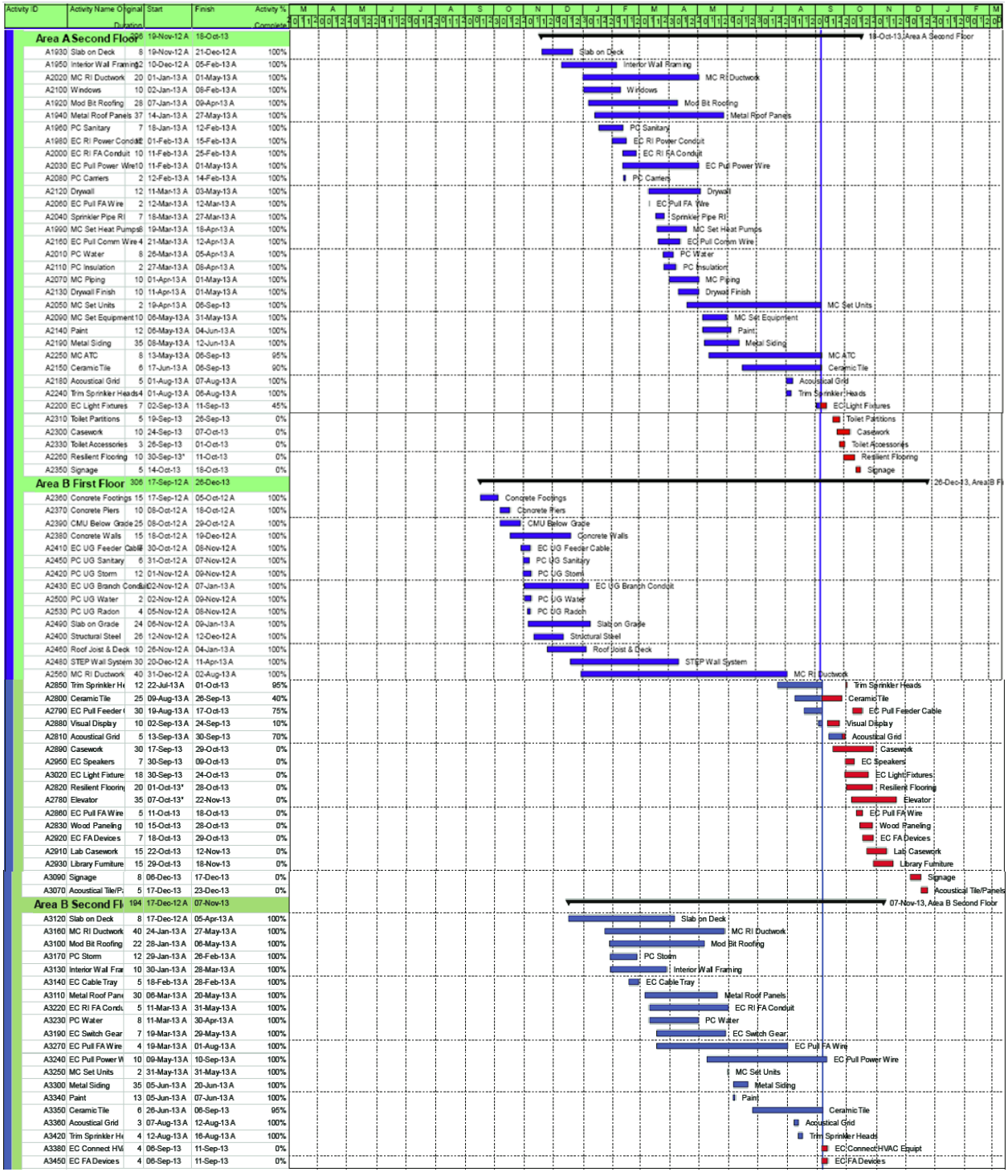
This project will obtain 1-6 of 6 possible points in this category. The project will be used as a teaching tool to show case building sustainability. This is also one of the goals of implementing LEED on this project. Other innovations in designs are to be determined.

Regional Priority Credits

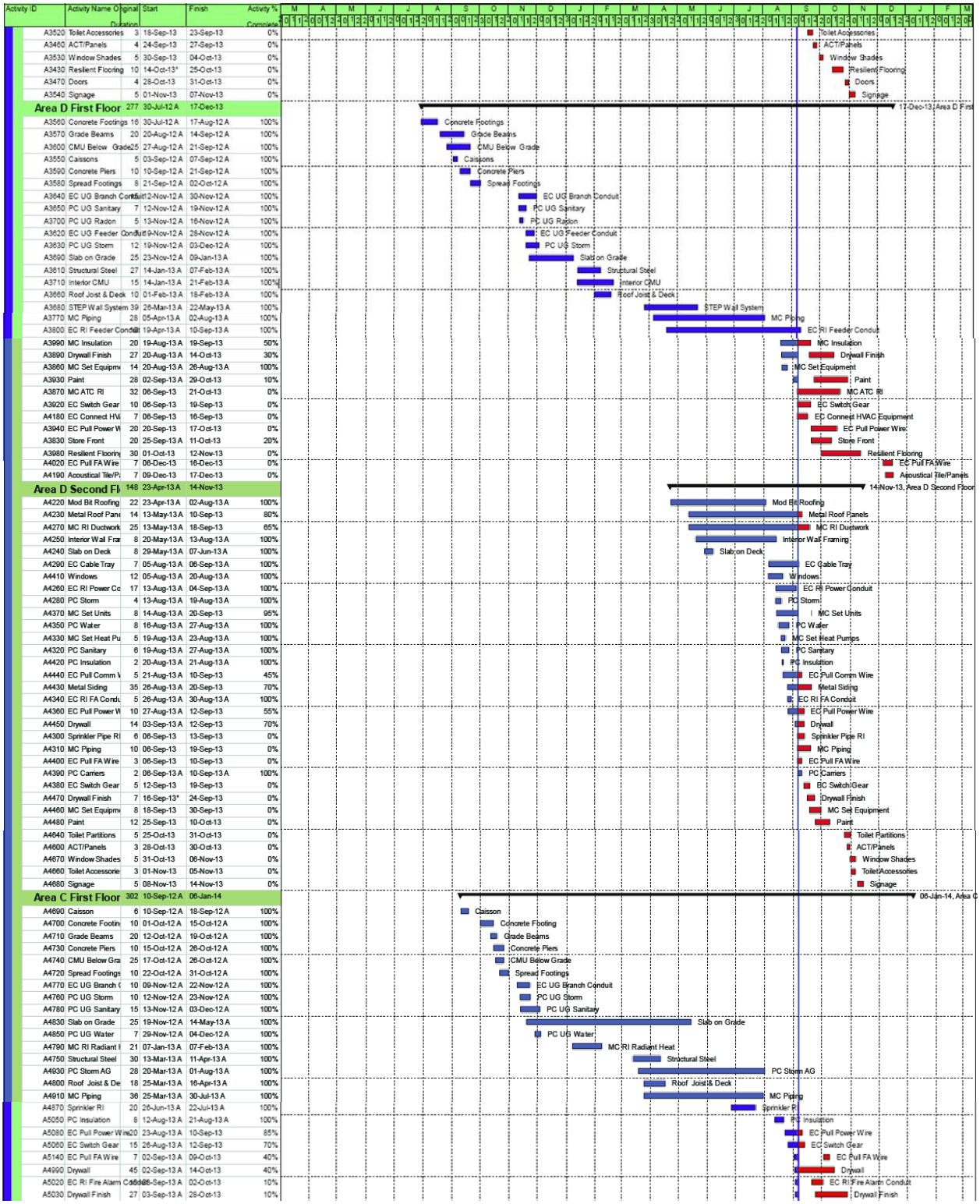
The McKeesport Elementary/Intermediate School project receives 2 of 4 possible points for this category. The construction will help improve the region via the quantity control of the storm water through the grey water reuse system and via the reduction of heat island effect through roof design.

Appendix I Project Schedule

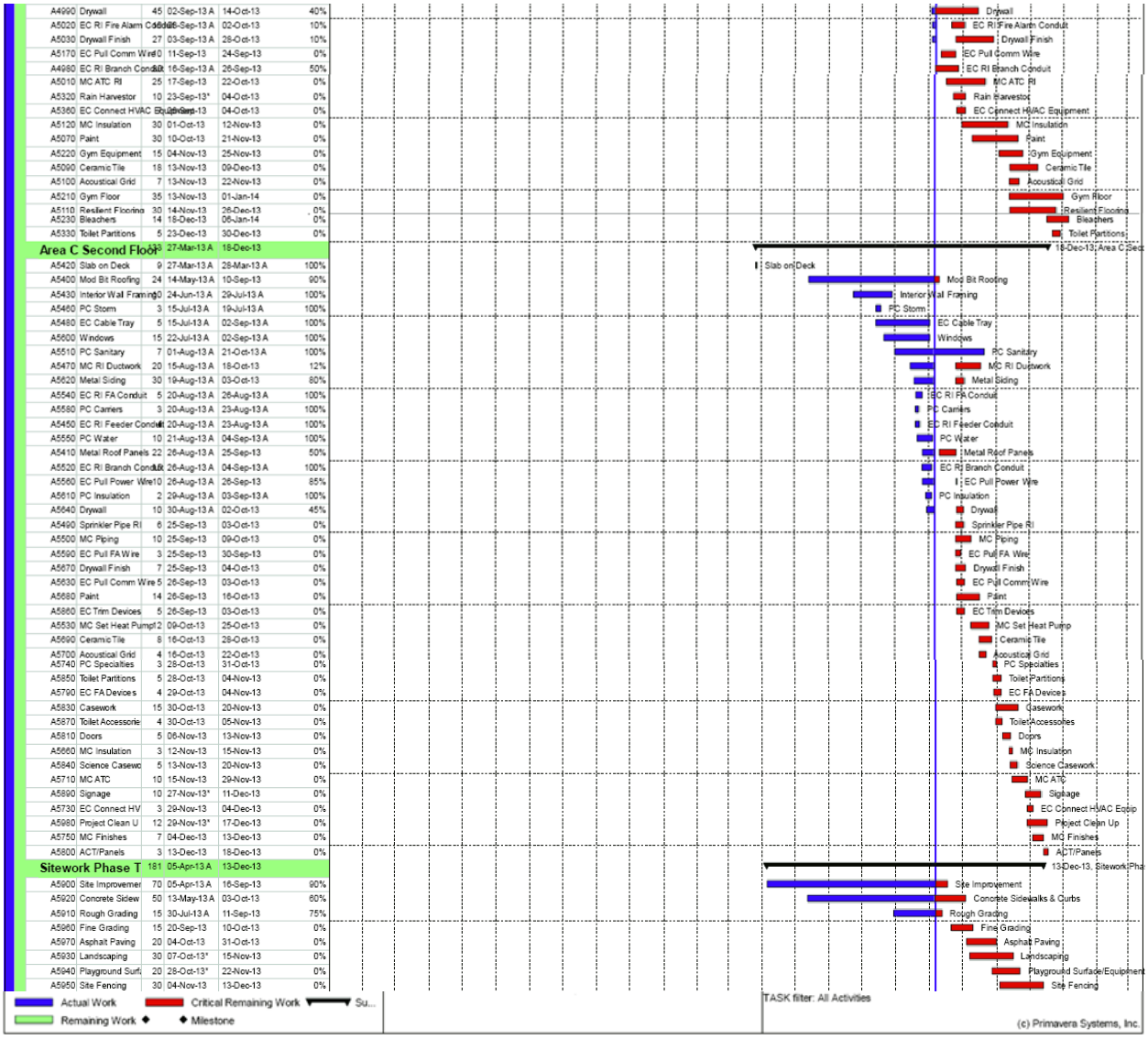




Activity ID	Activity Name	Original Duration	Start	Finish	Activity % Complete
	Area A Second Floor	326	19-Nov-12 A	18-Oct-13	
A1930	Slab on Deck	8	19-Nov-12 A	21-Dec-12 A	100%
A1950	Interior Wall Framing	32	10-Dec-12 A	05-Feb-13 A	100%
A2020	MC RI Ductwork	20	01-Jan-13 A	01-May-13 A	100%
A2100	Windows	10	02-Jan-13 A	08-Feb-13 A	100%
A1920	Mod Bit Roofing	28	07-Jan-13 A	09-Apr-13 A	100%
A1940	Metal Roof Panels	37	14-Jan-13 A	27-May-13 A	100%
A1960	PC Sanitary	7	18-Jan-13 A	12-Feb-13 A	100%
A1980	EC RI Power Conduit	12	01-Feb-13 A	15-Feb-13 A	100%
A2000	EC RI FA Conduit	10	11-Feb-13 A	25-Feb-13 A	100%
A2030	EC Pull Power Wire	10	11-Feb-13 A	01-May-13 A	100%
A2080	PC Carriers	2	12-Feb-13 A	14-Feb-13 A	100%
A2120	Drywall	12	11-Mar-13 A	03-May-13 A	100%
A2060	EC Pull FA Wire	2	12-Mar-13 A	12-Mar-13 A	100%
A2040	Sprinkler Pipe RI	7	18-Mar-13 A	27-Mar-13 A	100%
A1990	MC Set Heat Pumps	8	19-Mar-13 A	18-Apr-13 A	100%
A2160	EC Pull Comm Wire	4	21-Mar-13 A	12-Apr-13 A	100%
A2010	PC Water	8	26-Mar-13 A	05-Apr-13 A	100%
A2110	PC Insulation	2	27-Mar-13 A	08-Apr-13 A	100%
A2070	MC Piping	10	01-Apr-13 A	01-May-13 A	100%
A2130	Drywall Finish	10	11-Apr-13 A	01-May-13 A	100%
A2050	MC Set Units	2	19-Apr-13 A	06-Sep-13	100%
A2090	MC Set Equipment	10	06-May-13 A	31-May-13 A	100%
A2140	Paint	12	06-May-13 A	04-Jun-13 A	100%
A2190	Metal Siding	35	08-May-13 A	12-Jun-13 A	100%
A2250	MC ATC	8	13-May-13 A	06-Sep-13	95%
A2150	Ceramic Tile	6	17-Jun-13 A	06-Sep-13	90%
A2180	Acoustical Grid	5	01-Aug-13 A	07-Aug-13 A	100%
A2240	Trim Sprinkler Heads	4	01-Aug-13 A	06-Aug-13 A	100%
A2200	EC Light Fixtures	7	02-Sep-13 A	11-Sep-13	45%
A2310	Toilet Partitions	5	19-Sep-13	26-Sep-13	0%
A2300	Casework	10	24-Sep-13	07-Oct-13	0%
A2330	Toilet Accessories	3	26-Sep-13	01-Oct-13	0%
A2260	Resilient Flooring	10	30-Sep-13*	11-Oct-13	0%
A2350	Signage	5	14-Oct-13	18-Oct-13	0%
	Area B First Floor	306	17-Sep-12 A	26-Dec-13	
A2360	Concrete Footings	15	17-Sep-12 A	05-Oct-12 A	100%
A2370	Concrete Piers	10	08-Oct-12 A	18-Oct-12 A	100%
A2390	CMU Below Grade	25	08-Oct-12 A	29-Oct-12 A	100%
A2380	Concrete Walls	15	18-Oct-12 A	19-Dec-12 A	100%
A2410	EC UG Feeder Cable	8	30-Oct-12 A	08-Nov-12 A	100%
A2450	PC UG Sanitary	6	31-Oct-12 A	07-Nov-12 A	100%
A2420	PC UG Storm	12	01-Nov-12 A	09-Nov-12 A	100%
A2430	EC UG Branch Conduit	42	02-Nov-12 A	07-Jan-13 A	100%
A2500	PC UG Water	2	02-Nov-12 A	09-Nov-12 A	100%
A2530	PC UG Radon	4	05-Nov-12 A	08-Nov-12 A	100%
A2490	Slab on Grade	24	06-Nov-12 A	09-Jan-13 A	100%
A2400	Structural Steel	26	12-Nov-12 A	12-Dec-12 A	100%
A2460	Roof Joist & Deck	10	26-Nov-12 A	04-Jan-13 A	100%
A2480	STEP Wall System	30	20-Dec-12 A	11-Apr-13 A	100%
A2560	MC RI Ductwork	40	31-Dec-12 A	02-Aug-13 A	100%
A2850	Trim Sprinkler He	12	22-Jul-13 A	01-Oct-13	95%
A2800	Ceramic Tile	25	09-Aug-13 A	26-Sep-13	40%
A2790	EC Pull Feeder (	30	19-Aug-13 A	17-Oct-13	75%
A2880	Visual Display	10	02-Sep-13 A	24-Sep-13	10%
A2810	Acoustical Grid	5	13-Sep-13 A	30-Sep-13	70%
A2890	Casework	30	17-Sep-13	29-Oct-13	0%
A2950	EC Speakers	7	30-Sep-13	09-Oct-13	0%
A3020	EC Light Fixture	18	30-Sep-13	24-Oct-13	0%
A2820	Resilient Floorin	20	01-Oct-13*	28-Oct-13	0%
A2780	Elevator	35	07-Oct-13*	22-Nov-13	0%
A2860	EC Pull FA Wire	5	11-Oct-13	18-Oct-13	0%
A2830	Wood Paneling	10	15-Oct-13	28-Oct-13	0%
A2920	EC FA Devices	7	18-Oct-13	29-Oct-13	0%
A2910	Lab Casework	15	22-Oct-13	12-Nov-13	0%
A2930	Library Furniture	15	29-Oct-13	18-Nov-13	0%
A3090	Signage	8	06-Dec-13	17-Dec-13	0%
A3070	Acoustical Tile/P	5	17-Dec-13	23-Dec-13	0%
	Area B Second Fl	194	17-Dec-12 A	07-Nov-13	
A3120	Slab on Deck	8	17-Dec-12 A	05-Apr-13 A	100%
A3160	MC RI Ductwork	40	24-Jan-13 A	27-May-13 A	100%
A3100	Mod Bit Roofing	22	28-Jan-13 A	06-May-13 A	100%
A3170	PC Storm	12	29-Jan-13 A	26-Feb-13 A	100%
A3130	Interior Wall Fra	10	30-Jan-13 A	28-Mar-13 A	100%
A3140	EC Cable Tray	5	18-Feb-13 A	28-Feb-13 A	100%
A3110	Metal Roof Pane	30	06-Mar-13 A	20-May-13 A	100%
A3220	EC RI FA Condu	5	11-Mar-13 A	31-May-13 A	100%
A3230	PC Water	8	11-Mar-13 A	30-Apr-13 A	100%
A3190	EC Switch Gear	7	19-Mar-13 A	29-May-13 A	100%
A3270	EC Pull FA Wire	4	19-Mar-13 A	01-Aug-13 A	100%
A3240	EC Pull Power W	10	09-May-13 A	10-Sep-13 A	100%
A3250	MC Set Units	2	31-May-13 A	31-May-13 A	100%
A3300	Metal Siding	35	05-Jun-13 A	20-Jun-13 A	100%
A3340	Paint	13	05-Jun-13 A	07-Jun-13 A	100%
A3350	Ceramic Tile	6	26-Jun-13 A	06-Sep-13	95%
A3360	Acoustical Grid	3	07-Aug-13 A	12-Aug-13 A	100%
A3420	Trim Sprinkler He	4	12-Aug-13 A	16-Aug-13 A	100%
A3380	EC Connect HV	4	06-Sep-13	11-Sep-13	0%
A3450	EC FA Devices	4	06-Sep-13	11-Sep-13	0%



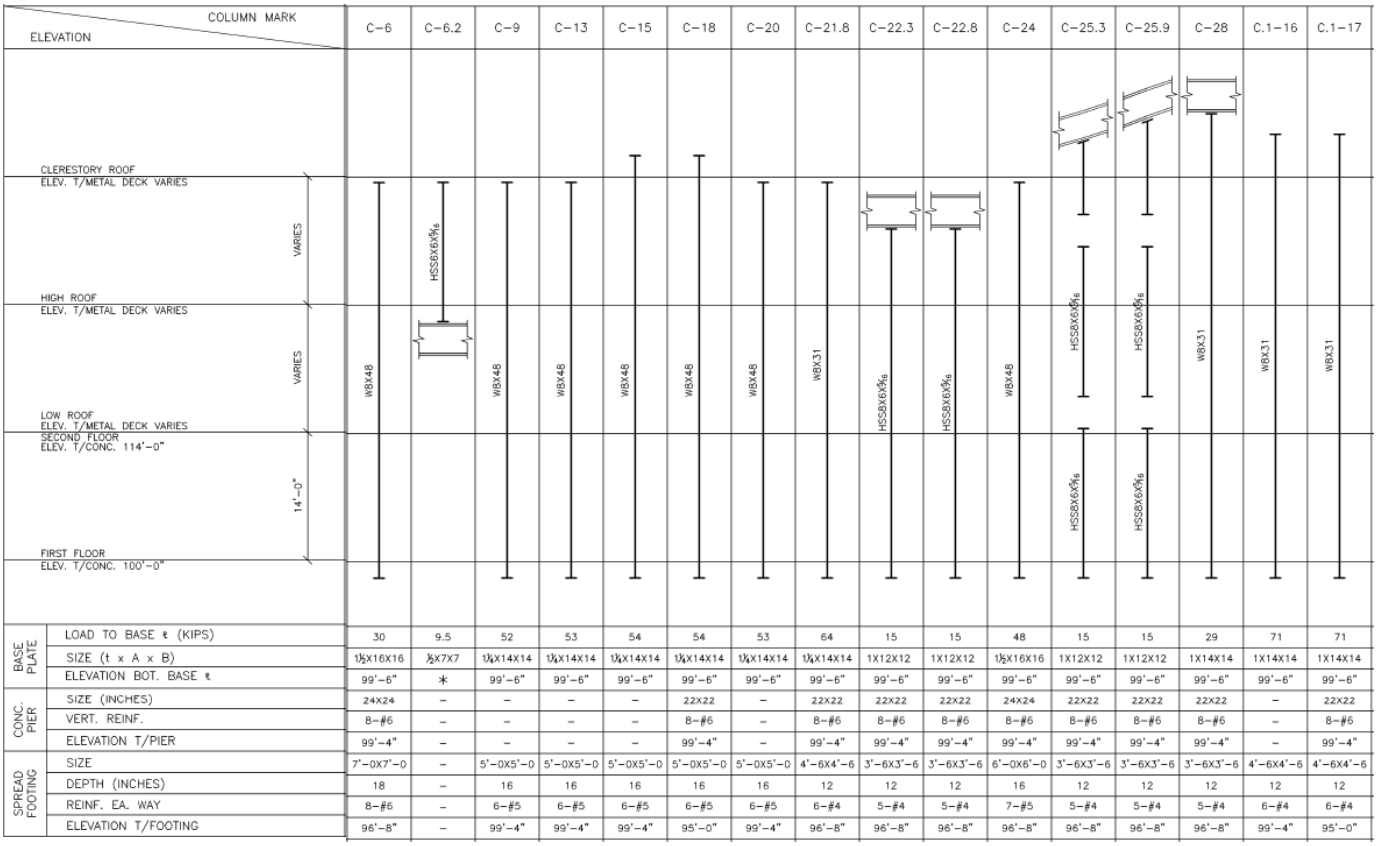
Activity ID	Activity Name	Original Duration	Start	Finish	Activity % Complete
A3520	Toilet Accessories	3	18-Sep-13	23-Sep-13	0%
A3460	ACT/Panels	4	24-Sep-13	27-Sep-13	0%
A3530	Window Shades	5	30-Sep-13	04-Oct-13	0%
A3430	Resilient Flooring	10	14-Oct-13*	25-Oct-13	0%
A3470	Doors	4	28-Oct-13	31-Oct-13	0%
A3540	Signage	5	01-Nov-13	07-Nov-13	0%
Area D First Floor		277	30-Jul-12 A	17-Dec-13	
A3560	Concrete Footings	15	30-Jul-12 A	17-Aug-12 A	100%
A3570	Grade Beams	20	20-Aug-12 A	14-Sep-12 A	100%
A3600	CMU Below Grade	25	27-Aug-12 A	21-Sep-12 A	100%
A3550	Caissons	5	03-Sep-12 A	07-Sep-12 A	100%
A3590	Concrete Piers	10	10-Sep-12 A	21-Sep-12 A	100%
A3580	Spread Footings	8	21-Sep-12 A	02-Oct-12 A	100%
A3640	EC UG Branch Conduit	15	12-Nov-12 A	30-Nov-12 A	100%
A3650	PC UG Sanitary	7	12-Nov-12 A	19-Nov-12 A	100%
A3700	PC UG Radon	5	13-Nov-12 A	16-Nov-12 A	100%
A3620	EC UG Feeder Conduit	9	19-Nov-12 A	28-Nov-12 A	100%
A3630	PC UG Storm	12	19-Nov-12 A	03-Dec-12 A	100%
A3690	Slab on Grade	25	23-Nov-12 A	09-Jan-13 A	100%
A3610	Structural Steel	27	14-Jan-13 A	07-Feb-13 A	100%
A3710	Interior CMU	15	14-Jan-13 A	21-Feb-13 A	100%
A3660	Roof Joist & Deck	10	01-Feb-13 A	18-Feb-13 A	100%
A3680	STEP Wall System	39	26-Mar-13 A	22-May-13 A	100%
A3770	MC Piping	28	05-Apr-13 A	02-Aug-13 A	100%
A3800	EC RI Feeder Conduit	41	19-Apr-13 A	10-Sep-13 A	100%
A3990	MC Insulation	20	19-Aug-13 A	19-Sep-13	50%
A3890	Drywall Finish	27	20-Aug-13 A	14-Oct-13	30%
A3860	MC Set Equipment	14	20-Aug-13 A	26-Aug-13 A	100%
A3930	Paint	28	02-Sep-13 A	29-Oct-13	10%
A3870	MC ATC RI	32	06-Sep-13	21-Oct-13	0%
A3920	EC Switch Gear	10	06-Sep-13	19-Sep-13	0%
A4180	EC Connect HVAC	7	06-Sep-13	16-Sep-13	0%
A3940	EC Pull Power Wire	20	20-Sep-13	17-Oct-13	0%
A3830	Store Front	20	25-Sep-13 A	11-Oct-13	20%
A3980	Resilient Flooring	30	01-Oct-13	12-Nov-13	0%
A4020	EC Pull FA Wire	7	06-Dec-13	16-Dec-13	0%
A4190	Acoustical Tile/Panels	7	09-Dec-13	17-Dec-13	0%
Area D Second Fl		148	23-Apr-13 A	14-Nov-13	
A4220	Mod Bit Roofing	22	23-Apr-13 A	02-Aug-13 A	100%
A4230	Metal Roof Panels	14	13-May-13 A	10-Sep-13	80%
A4270	MC RI Ductwork	25	13-May-13 A	18-Sep-13	65%
A4250	Interior Wall Framing	8	20-May-13 A	13-Aug-13 A	100%
A4240	Slab on Deck	8	29-May-13 A	07-Jun-13 A	100%
A4290	EC Cable Tray	7	05-Aug-13 A	06-Sep-13 A	100%
A4410	Windows	12	05-Aug-13 A	20-Aug-13 A	100%
A4260	EC RI Power Conduit	17	13-Aug-13 A	04-Sep-13 A	100%
A4280	PC Storm	4	13-Aug-13 A	19-Aug-13 A	100%
A4370	MC Set Units	8	14-Aug-13 A	20-Sep-13	95%
A4350	PC Water	8	16-Aug-13 A	27-Aug-13 A	100%
A4330	MC Set Heat Pumps	5	19-Aug-13 A	23-Aug-13 A	100%
A4320	PC Sanitary	6	19-Aug-13 A	27-Aug-13 A	100%
A4420	PC Insulation	2	20-Aug-13 A	21-Aug-13 A	100%
A4440	EC Pull Comm Wire	5	21-Aug-13 A	10-Sep-13	45%
A4430	Metal Siding	35	26-Aug-13 A	20-Sep-13	70%
A4340	EC RI FA Conduit	5	26-Aug-13 A	30-Aug-13 A	100%
A4360	EC Pull Power Wire	10	27-Aug-13 A	12-Sep-13	55%
A4450	Drywall	14	03-Sep-13 A	12-Sep-13	70%
A4300	Sprinkler Pipe RI	6	06-Sep-13	13-Sep-13	0%
A4310	MC Piping	10	06-Sep-13	19-Sep-13	0%
A4400	EC Pull FA Wire	3	06-Sep-13	10-Sep-13	0%
A4390	PC Carriers	2	06-Sep-13 A	10-Sep-13 A	100%
A4380	EC Switch Gear	5	12-Sep-13	19-Sep-13	0%
A4470	Drywall Finish	7	16-Sep-13*	24-Sep-13	0%
A4460	MC Set Equipment	8	18-Sep-13	30-Sep-13	0%
A4480	Paint	12	25-Sep-13	10-Oct-13	0%
A4640	Toilet Partitions	5	25-Oct-13	31-Oct-13	0%
A4600	ACT/Panels	3	28-Oct-13	30-Oct-13	0%
A4670	Window Shades	5	31-Oct-13	06-Nov-13	0%
A4660	Toilet Accessories	3	01-Nov-13	05-Nov-13	0%
A4680	Signage	5	08-Nov-13	14-Nov-13	0%
Area C First Floor		302	10-Sep-12 A	06-Jan-14	
A4690	Caisson	6	10-Sep-12 A	18-Sep-12 A	100%
A4700	Concrete Footing	10	01-Oct-12 A	15-Oct-12 A	100%
A4710	Grade Beams	20	12-Oct-12 A	19-Oct-12 A	100%
A4730	Concrete Piers	10	15-Oct-12 A	26-Oct-12 A	100%
A4740	CMU Below Grade	25	17-Oct-12 A	26-Oct-12 A	100%
A4720	Spread Footings	10	22-Oct-12 A	31-Oct-12 A	100%
A4770	EC UG Branch Conduit	10	09-Nov-12 A	22-Nov-12 A	100%
A4760	PC UG Storm	10	12-Nov-12 A	23-Nov-12 A	100%
A4780	PC UG Sanitary	15	13-Nov-12 A	03-Dec-12 A	100%
A4830	Slab on Grade	25	19-Nov-12 A	14-May-13 A	100%
A4850	PC UG Water	7	29-Nov-12 A	04-Dec-12 A	100%
A4790	MC RI Radiant Heat	21	07-Jan-13 A	07-Feb-13 A	100%
A4750	Structural Steel	30	13-Mar-13 A	11-Apr-13 A	100%
A4930	PC Storm AG	28	20-Mar-13 A	01-Aug-13 A	100%
A4800	Roof Joist & Deck	18	25-Mar-13 A	16-Apr-13 A	100%
A4910	MC Piping	36	25-Mar-13 A	30-Jul-13 A	100%
A4870	Sprinkler RI	20	26-Jun-13 A	22-Jul-13 A	100%
A5050	PC Insulation	8	12-Aug-13 A	21-Aug-13 A	100%
A5080	EC Pull Power Wire	20	23-Aug-13 A	10-Sep-13	85%
A5060	EC Switch Gear	15	26-Aug-13 A	12-Sep-13	70%
A5140	EC Pull FA Wire	7	02-Sep-13 A	09-Oct-13	40%
A4990	Drywall	45	02-Sep-13 A	14-Oct-13	40%
A5020	EC RI Fire Alarm Conduit	20	26-Sep-13 A	02-Oct-13	10%
A5030	Drywall Finish	27	03-Sep-13 A	26-Oct-13	10%



A4990	Drywall	45	02-Sep-13 A	14-Oct-13	40%
A5020	EC RI Fire Alarm Conduit	10	06-Sep-13 A	02-Oct-13	10%
A5030	Drywall Finish	27	03-Sep-13 A	28-Oct-13	10%
A5170	EC Pull Comm Wire	10	11-Sep-13	24-Sep-13	0%
A4980	EC RI Branch Conduit	30	16-Sep-13 A	26-Sep-13	50%
A5010	MC ATC RI	25	17-Sep-13	22-Oct-13	0%
A5320	Rain Harvestor	10	23-Sep-13*	04-Oct-13	0%
A5360	EC Connect HVAC Equipment	10	23-Sep-13	04-Oct-13	0%
A5120	MC Insulation	30	01-Oct-13	12-Nov-13	0%
A5070	Paint	30	10-Oct-13	21-Nov-13	0%
A5220	Gym Equipment	15	04-Nov-13	25-Nov-13	0%
A5090	Ceramic Tile	18	13-Nov-13	09-Dec-13	0%
A5100	Acoustical Grid	7	13-Nov-13	22-Nov-13	0%
A5210	Gym Floor	35	13-Nov-13	01-Jan-14	0%
A5110	Resilient Flooring	30	14-Nov-13	26-Dec-13	0%
A5230	Bleachers	14	18-Dec-13	06-Jan-14	0%
A5330	Toilet Partitions	5	23-Dec-13	30-Dec-13	0%
Area C Second Floor		183	27-Mar-13 A	18-Dec-13	
A5420	Slab on Deck	9	27-Mar-13 A	28-Mar-13 A	100%
A5400	Mod Bit Roofing	24	14-May-13 A	10-Sep-13	90%
A5430	Interior Wall Framing	30	24-Jun-13 A	29-Jul-13 A	100%
A5460	PC Storm	3	15-Jul-13 A	19-Jul-13 A	100%
A5480	EC Cable Tray	5	15-Jul-13 A	02-Sep-13 A	100%
A5600	Windows	15	22-Jul-13 A	02-Sep-13 A	100%
A5510	PC Sanitary	7	01-Aug-13 A	21-Oct-13 A	100%
A5470	MC RI Ductwork	20	15-Aug-13 A	18-Oct-13	12%
A5620	Metal Siding	30	19-Aug-13 A	03-Oct-13	80%
A5540	EC RI FA Conduit	5	20-Aug-13 A	26-Aug-13 A	100%
A5580	PC Carriers	3	20-Aug-13 A	23-Aug-13 A	100%
A5450	EC RI Feeder Conduit	4	20-Aug-13 A	23-Aug-13 A	100%
A5550	PC Water	10	21-Aug-13 A	04-Sep-13 A	100%
A5410	Metal Roof Panels	22	26-Aug-13 A	25-Sep-13	50%
A5520	EC RI Branch Conduit	10	26-Aug-13 A	04-Sep-13 A	100%
A5560	EC Pull Power Wire	10	26-Aug-13 A	26-Sep-13	85%
A5610	PC Insulation	2	29-Aug-13 A	03-Sep-13 A	100%
A5640	Drywall	10	30-Aug-13 A	02-Oct-13	45%
A5490	Sprinkler Pipe RI	6	25-Sep-13	03-Oct-13	0%
A5500	MC Piping	10	25-Sep-13	09-Oct-13	0%
A5590	EC Pull FA Wire	3	25-Sep-13	30-Sep-13	0%
A5670	Drywall Finish	7	25-Sep-13	04-Oct-13	0%
A5630	EC Pull Comm Wire	5	26-Sep-13	03-Oct-13	0%
A5680	Paint	14	26-Sep-13	16-Oct-13	0%
A5860	EC Trim Devices	5	26-Sep-13	03-Oct-13	0%
A5530	MC Set Heat Pump	12	09-Oct-13	25-Oct-13	0%
A5690	Ceramic Tile	8	16-Oct-13	28-Oct-13	0%
A5700	Acoustical Grid	4	16-Oct-13	22-Oct-13	0%
A5740	PC Specialties	3	28-Oct-13	31-Oct-13	0%
A5850	Toilet Partitions	5	28-Oct-13	04-Nov-13	0%
A5790	EC FA Devices	4	29-Oct-13	04-Nov-13	0%
A5830	Casework	15	30-Oct-13	20-Nov-13	0%
A5870	Toilet Accessories	4	30-Oct-13	05-Nov-13	0%
A5810	Doors	5	06-Nov-13	13-Nov-13	0%
A5660	MC Insulation	3	12-Nov-13	15-Nov-13	0%
A5840	Science Casework	5	13-Nov-13	20-Nov-13	0%
A5710	MC ATC	10	15-Nov-13	29-Nov-13	0%
A5890	Signage	10	27-Nov-13*	11-Dec-13	0%
A5730	EC Connect HV	3	29-Nov-13	04-Dec-13	0%
A5980	Project Clean U	12	29-Nov-13*	17-Dec-13	0%
A5750	MC Finishes	7	04-Dec-13	13-Dec-13	0%
A5800	ACT/Panels	3	13-Dec-13	18-Dec-13	0%
Sitework Phase T		181	05-Apr-13 A	13-Dec-13	
A5900	Site Improvemer	70	05-Apr-13 A	16-Sep-13	90%
A5920	Concrete Sidew	50	13-May-13 A	03-Oct-13	60%
A5910	Rough Grading	15	30-Jul-13 A	11-Sep-13	75%
A5960	Fine Grading	15	20-Sep-13	10-Oct-13	0%
A5970	Asphalt Paving	20	04-Oct-13	31-Oct-13	0%
A5930	Landscaping	30	07-Oct-13*	15-Nov-13	0%
A5940	Playground Surf	20	28-Oct-13*	22-Nov-13	0%
A5950	Site Fencing	30	04-Nov-13	13-Dec-13	0%

Appendix II Structural Estimates

Footing & Column:



		C-6	C-6.2	C-9	C-13	C-15	C-18	C-20	C-21.8	C-22.3	C-22.8	C-24	C-25.3	C-25.9	C-28	C.1-16	C.1-17
BASE PLATE	LOAD TO BASE ℄ (KIPS)	30	9.5	52	53	54	54	53	64	15	15	48	15	15	29	71	71
	SIZE (t x A x B)	1½X16X16	½X7X7	1¼X14X14	1¼X14X14	1¼X14X14	1¼X14X14	1¼X14X14	1¼X14X14	1X12X12	1X12X12	1½X16X16	1X12X12	1X12X12	1X14X14	1X14X14	1X14X14
	ELEVATION BOT. BASE ℄	99'-6"	*	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"	99'-6"
CONC. PIER	SIZE (INCHES)	24X24	–	–	–	–	22X22	–	22X22	22X22	22X22	24X24	22X22	22X22	22X22	–	22X22
	VERT. REINF.	8-#6	–	–	–	–	8-#6	–	8-#6	8-#6	8-#6	8-#6	8-#6	8-#6	8-#6	–	8-#6
	ELEVATION T/PIER	99'-4"	–	–	–	–	99'-4"	–	99'-4"	99'-4"	99'-4"	99'-4"	99'-4"	99'-4"	99'-4"	–	99'-4"
SPREAD FOOTING	SIZE	7'-0X7'-0	–	5'-0X5'-0	5'-0X5'-0	5'-0X5'-0	5'-0X5'-0	5'-0X5'-0	4'-6X4'-6	3'-6X3'-6	3'-6X3'-6	6'-0X6'-0	3'-6X3'-6	3'-6X3'-6	3'-6X3'-6	4'-6X4'-6	4'-6X4'-6
	DEPTH (INCHES)	18	–	16	16	16	16	16	12	12	12	16	12	12	12	12	12
	REINF. EA. WAY	8-#6	–	6-#5	6-#5	6-#5	6-#5	6-#5	6-#4	5-#4	5-#4	7-#5	5-#4	5-#4	5-#4	6-#4	6-#4
	ELEVATION T/FOOTING	96'-8"	–	99'-4"	99'-4"	99'-4"	95'-0"	99'-4"	96'-8"	96'-8"	96'-8"	96'-8"	96'-8"	96'-8"	96'-8"	99'-4"	95'-0"

Spread Footings					
ID	*Quantity (Ea)*	*Rebar Size*	*F'c (psi)*	*Total Concrete (CY)*	*Total Rebar (Lbs)*
F4.5	4	#6	6000 NW	6	288
F6.5	2	#8	6000 NW	10	449
F8	2	#9	6000 NW	19	918
F9.5	5	#10	6000 NW	81	4260
F10	5	#11	6000 NW	93	5552
F10.5	1	#11	6000 NW	22	1275
F11	2	#11	6000 NW	51	2901
F11.5	2	#11	6000 NW	57	3507
F12	2	#11	6000 NW	66	3910
F12.5	2	#11	6000 NW	75	4335
TOTAL				479	27395

Slab on Grade					
Length (ft)	*Width (ft)*	*Depth (in)*	*Reinforcing*	*Reinforced Area (SF)*	*Concrete (CY)*
300	30	5	6X6 w2.1Xw2.1 WWF	9000	139

Columns									
ID	Size (in)	area (SF)	L (Ft)	W (Ft)	Height (ft)	Reinforcing	Concrete (CY)	Total Rebar (Lbs.)	SFCA
4/A.5	42X42	12.25	3.5	3.5	55	44-#11	25.0	12857	770
4/B.7	42X42	12.25	3.5	3.5	30	44-#11	34.4	7013	420
	60X30	12.5	5	2.5	45			10520	675
4/D	24X42	7	2	3.5	75	24-#11	19.4	9563	825
4/F	24X60	10	2	5	35	36#11	27.8	6694	490
	60X24	10	5	2	40			7651	560
4/G	24X30	5	2	2.5	51	6-#11	9.4	1626	459
4/H	24X24	4	2	2	40	4-#11	5.9	850	320
4/J	24X24	4	2	2	40	4-#11	5.9	850	320
4/K	24X24	4	2	2	51	4-#11	7.6	1084	408
4/L	36X24	6	3	2	75	22-#11	16.7	8766	750
4/M	24X24	4	2	2	75	8-#11	11.1	3188	600
4/N	24X50	8.5	2	4.167	75	28-#11	23.6	11157	925
4/P	24X24	4	2	2	75	12-#11	11.1	4782	600
4/R	24X24	4	2	2	75	12-#11	11.1	4782	600
4/R.5	24X24	4	2	2	75	4-#11	11.1	1594	600
4/S	24X24	4	2	2	75	12-#11	11.1	4782	600
4/T	24X24	4	2	2	75	12-#11	11.1	4782	600
4/V	24X24	4	2	2	75	12-#11	11.1	4782	600
5/A.5	32X32	7.1	2.67	2.67	55	24-#11	14.5	7013	587
5/B.7	24X84	14	2	7	75	28-#11	38.9	11157	1350
5/C	24X24	4	2	2	62	4-#11	9.2	1318	496
5/D	24X48	8	2	5	75	28-#11	22.2	11157	1050
5/F	24X42	7	2	3.5	75	24-#11	19.4	9563	825
5/G	24X30	5	2	2.5	51	8-#11	9.4	2168	459
5/H	24X48	8	2	4	75	28-#11	22.2	11157	900
5/J	24X48	8	2	4	75	28-#11	22.2	11157	900
5/K	24X24	4	2	2	51	8-#11	7.6	2168	408
5/L	24X42	7	2	3.5	75	24-#11	19.4	9563	825
5/M.3	24X36	6	2	3	75	22-#11	16.7	8766	750
5/N	24X50	8.3	2	4.167	75	28-#11	23.1	11157	925
5/P	24X24	4	2	2	75	12-#11	11.1	4782	600
5/R	24X36	6	2	3	75	22-#11	16.7	8766	750
5/R.5	24X24	4	2	2	75	8-#11	11.1	3188	600
5/S	24X36	6	2	3	75	22-#11	16.7	8766	750
5/T	24X24	4	2	2	75	12-#11	11.1	4782	600
5/V	24X24	4	2	2	75	12-#11	11.1	4782	600

Walls								
location	length (ft)	thickness (ft)	height (ft)	SFCA	Reinforcing	Reinforcing/sf	Total Volume (CY)	Total Rebar (Lbs)
CL 4/B.5-C G7-G5 (Subgrade)	15	1	21	672	#8-#18	5.34	11.7	1682.1
					#3-#7	3.004		946.26
CL 4-5/B.5 G7-G5 (subgrade)	30	1.33	21	1316	#8-#18	5.34	31.0	3364.2
					#3-#7	2.086		1314.18
CL 4-5/C G7-G5	30	1	21	1302	#3-#7	5.09	23.3	3206.7
CL 4/B.5-c G5-G3(Subgrade)	15	1	15	480	#3-#7	7.9	8.3	1777.5
CL 4-5/B.5 G5-G3 (subgrade)	30	1.17	15	935	#3-#7	6.97	19.5	3136.5
CL 4-5/C G5-G3	30	1	15	930	#3-#7	4.172	16.7	1877.4
CL 4-5/V G7-G1 (subgrade)	30	1.17	62	3865	#3-#7	5.09	80.6	9467.4
					#8-#18	5.34		9932.4
G3 CL 4-5/B.5	90	0.83	11	1998	#3-#7	3.005	30.4	2974.95
G3 CL 5/G-L	45	1	11	1012	#3-#7	4.172	18.3	2065.14
G3-P1 CL 4-5/B.5	30	0.83	40	2466	#3-#7	5.09	36.9	6108

Beams									
Type	*Length in bay(ft)*	*Width (in)*	*Depth (in)*	*#3-#7 Rebar Weight/LF*	*#8-#18 Rebar Weight/LF*	*Total Reinforcing Steel (#3-#7) (Lbs)*	*Total Reinforcing Steel (#8-#18) (Lbs)*	*SFCA*	*Volume (CY)*
B1	60	14	16	5.8	16.02	348	961.2	230	3.46
B7	15	24	24	9.8	12.1	147	181.5	90	2.22
B16	15	24	21	9.6	42.5	144	637.5	82.5	1.94
B14	60	24	24	6.53	37.2	391.8	2232	360	8.89
B45	30	24	24	6.53	40	195.9	1200	180	4.44
B50	60	24	24	7	26	420	1560	360	8.89
B55	60	24	24	7.16	25.8	429.6	1548	360	8.89
B59	30	20	24	6.53	31.3	195.9	939	170	3.70

Appendix III Assemblies Cost Estimates

Assembly Number			Description	Quantity	Unit	Total Incl. O&P	Ext. Total Incl. O&P
A Substructure							
A20202200000			Subdrainage piping	0.00			$0.00
A20202200800			Subdrainage piping	0.00			$0.00
A20202202130			Subdrainage piping, excavation & backfill excluded, PVC, perforated, 4" diameter	440.00	L.F.	$5.59	$2,459.60
A20202202150			Subdrainage piping, excavation & backfill excluded, PVC, perforated, 6" diameter	4.00	L.F.	$7.74	$30.96
D Services							
D20101102080			Water closet, vitreous china, bowl only with flush valve, wall hung	100.00	Ea.	$2,583.66	$258,366.00
D20102102000			Urinal, vitreous china, wall hung	130.00	Ea.	$1,414.94	$183,942.20
D20103101960			Lavatory w/trim, vanity top, vitreous china, 19" x 16"	60.00	Ea.	$1,480.43	$88,825.80
D20104101920			Kitchen sink w/trim, countertop, stainless steel, 25" x 22" single bowl	10.00	Ea.	$1,984.54	$19,845.40
D20108101880			Drinking fountain, 1 bubbler, wall mounted, non recessed, fiberglass, 12" back	10.00	Ea.	$2,427.51	$24,275.10
D20202202420			Gas fired water heater, residential, 100< F rise, 100 gal tank, 63 GPH	3.00	Ea.	$4,925.25	$14,775.75
D20202401900			Electric water heater, commercial, 100< F rise, 80 gal, 36 KW 147 GPH	6.00	Ea.	$10,697.50	$64,185.00
D20202402460			Electric water heater, commercial, 100< F rise, 1500 gal, 60 KW 245 GPH	1.00	Ea.	$80,932.60	$80,932.60
D20402102120			Roof drain, DWV PVC, 5" diam, 10' high	10.00	Ea.	$2,136.85	$21,368.50
D30105302000			Commercial building heating systems, terminal unit heaters, forced hot water, 1mil SF bldg, 10mil CF, total, 5 floors	235,000.00	S.F.	$2.88	$676,800.00
D30106751210			Solar, air to water heat exchange, for space/hot water heating	3.00	Ea.	$104,586.40	$313,759.20
D30201261020			Boiler, electric, hot water, 30 KW, 103 MBH	15.00	Ea.	$11,697.28	$175,459.20
D30201261080			Boiler, electric, hot water, 444 KW, 1515 MBH	6.00	Ea.	$43,072.60	$258,435.60
D30203301030			Pump, base mounted with motor, end-suction, 4" size, 7-1/2 HP, to 350 GPM	12.00	Ea.	$20,134.20	$241,610.40

	Substructure	Services	Total
Subtotal	$ 2,459.60	$ 331,754.40	$ 334,214.00

Appendix IV General Conditions Estimates

Management & Staffing				
Description	Unit	Quantity	Unit Rate	Cost
Project Executive	wk	35	$ 2,320.00	$ 81,200.00
Project Manager A	wk	74	$ 1,950.00	$ 144,300.00
Project Manager B	wk	45	$ 1,770.00	$ 79,650.00
Superintendent	wk	70	$ 1,640.00	$ 114,800.00
Project Administrator	wk	75	$ 1,480.00	$ 111,000.00
Accountant	wk	30	$ 1,250.00	$ 37,500.00
LEED Consultant	wk	40	$ 2,100.00	$ 84,000.00
Subtotal				$ 663,200.00

Utilities				
Description	Unit	Quantity	Unit Rate	Cost
Fencing	lf	250	$ 18.00	$ 4,500.00
Temp Water	ls	1	$ 1,200.00	$ 1,200.00
Temp Power	m	60	$ 90.00	$ 5,400.00
Temp Toilets	m	78	$ 60.00	$ 4,680.00
Mobilization	m	40	$ 100.00	$ 4,000.00
Dumpster	m	72	$ 805.56	$ 58,000.00
Subtotal				$ 78,000.00

Equipment & Facilities				
Description	Unit	Quantity	Unit Rate	Cost
Trailer Set-up	ls	2	$ 2,000.00	$ 4,000.00
Trailer Removal	ls	2	$ 2,000.00	$ 4,000.00
Trailer	m	60	$ 1,500.00	$ 90,000.00
Storage Trailer	m	60	$ 440.00	$ 26,400.00
Office Equipment	m	74	$ 200.00	$ 14,800.00
Fire Extinguisher	m	78	$ 150.00	$ 11,700.00
E&S Control	m	74	$ 878.38	$ 65,000.00
Subtotal				$ 215,000.00

Insurance, Permits & Bonds				
Description	Unit	Quantity	Unit Rate	Cost
Permits	ls	1	$ 290,000.00	$ 290,000.00
Bonds	ls	1	$ 270,000.00	$ 270,000.00
Subtotal				$ 560,000.00

Subtotal	$ 1,516,200.00
Subtotal Per Week	$ 39,900.00

Appendix V LEED Scorecard

LEED 2009 for Schools New Construction and Major Renovations

McKeesport Elementary/Intermediate School Project — McKeesport, PA

Y	?	N			
19	**2**		**Sustainable Sites**	**Possible Points:**	**24**
Y			Prereq 1	Construction Activity Pollution Prevention	
Y			Prereq 2	Environmental Site Assessment	
1			Credit 1	Site Selection	1
4			Credit 2	Development Density and Community Connectivity	4
		N	Credit 3	Brownfield Redevelopment	1
4			Credit 4.1	Alternative Transportation—Public Transportation Access	4
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
	1		Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehi	2
1	1		Credit 4.4	Alternative Transportation—Parking Capacity	2
1			Credit 5.1	Site Development—Protect or Restore Habitat	1
1			Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
		N	Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
1			Credit 8	Light Pollution Reduction	1
1			Credit 9	Site Master Plan	1
1			Credit 10	Joint Use of Facilities	1
9	**1**		**Water Efficiency**	**Possible Points:**	**11**
Y			Prereq 1	Water Use Reduction—20% Reduction	
4			Credit 1	Water Efficient Landscaping	2 to 4
2			Credit 2	Innovative Wastewater Technologies	2
3	1		Credit 3	Water Use Reduction	2 to 4
		N	Credit 3	Process Water Use Reduction	1
10	**6**		**Energy and Atmosphere**	**Possible Points:**	**33**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
8	4		Credit 1	Optimize Energy Performance	1 to 19
		N	Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
		N	Credit 4	Enhanced Refrigerant Management	1
		N	Credit 5	Measurement and Verification	2
	2		Credit 6	Green Power	2

8			**Materials and Resources**	Possible Points:	**13**
Y			Prereq 1	Storage and Collection of Recyclables	
		N	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 2
		N	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2

Materials and Resources, Continued

Y	?	N			
		N	Credit 3	Materials Reuse	1 to 2
2			Credit 4	Recycled Content	1 to 2
2			Credit 5	Regional Materials	1 to 2
1			Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1

16	1		**Indoor Environmental Quality**	Possible Points:	**19**
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
Y			Prereq 3	Minimum Acoustical Performance	
1			Credit 1	Outdoor Air Delivery Monitoring	1
1			Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
3	1		Credit 4	Low-Emitting Materials	1 to 4
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
1			Credit 7.2	Thermal Comfort—Verification	1
1			Credit 8.1	Daylight and Views—Daylight	1 to 3
1			Credit 8.2	Daylight and Views—Views	1
1			Credit 9	Enhanced Acoustical Performance	1
1			Credit 10	Mold Prevention	1

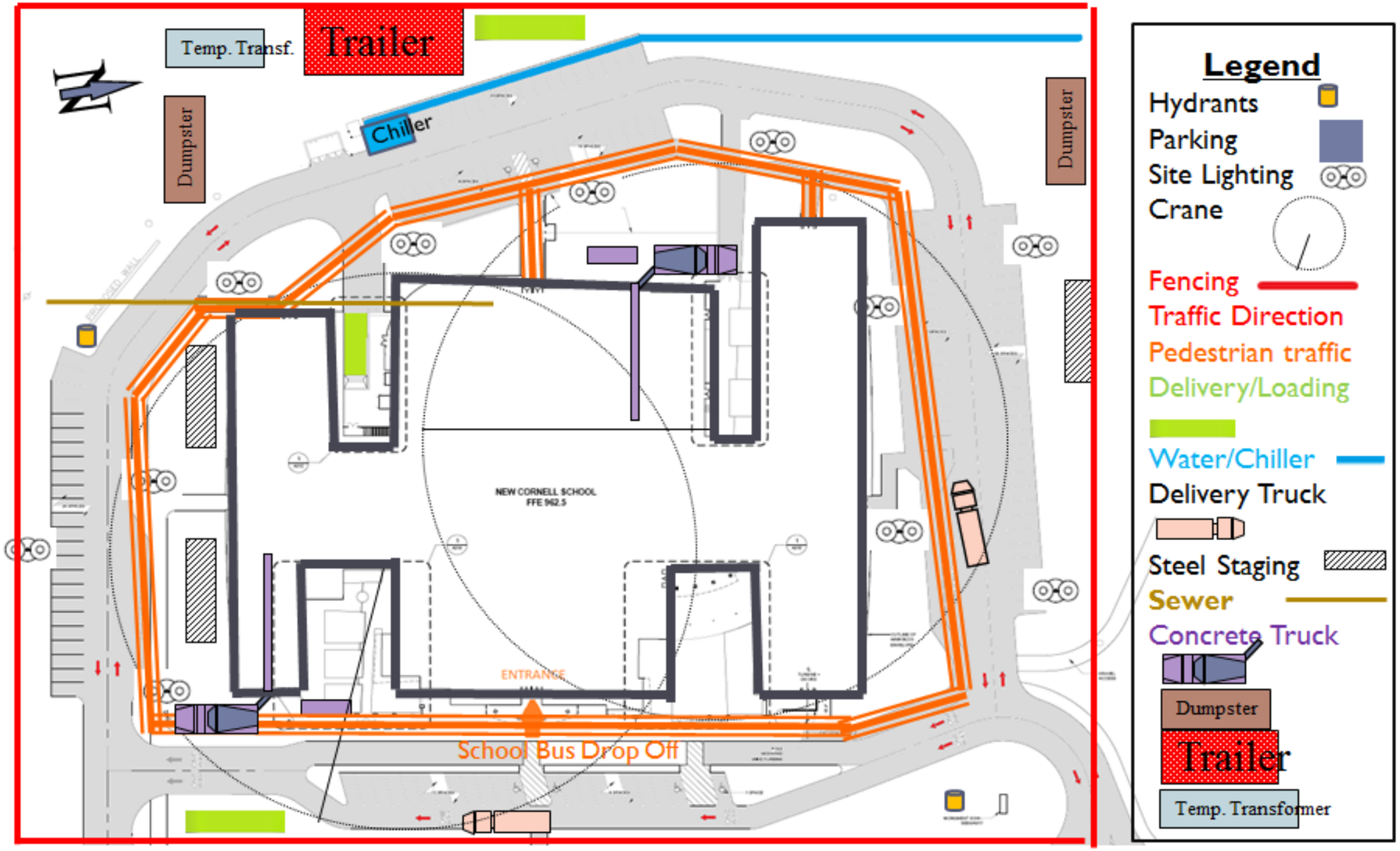
2	4		**Innovation and Design Process**	Possible Points:	**6**
	1		Credit 1.1	Innovation in Design: Specific Title	1
	1		Credit 1.2	Innovation in Design: Specific Title	1
	1		Credit 1.3	Innovation in Design: Specific Title	1
	1		Credit 1.4	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1
1			Credit 3	The School as a Teaching Tool	1

2			**Regional Priority Credits**	Possible Points:	**4**
1			Credit 1.1 Regional Priority: Specific Credit		1
1			Credit 1.2 Regional Priority: Specific Credit		1
		N	Credit 1.3 Regional Priority: Specific Credit		1
		N	Credit 1.4 Regional Priority: Specific Credit		1
66	14		**Total**	Possible Points:	**110**

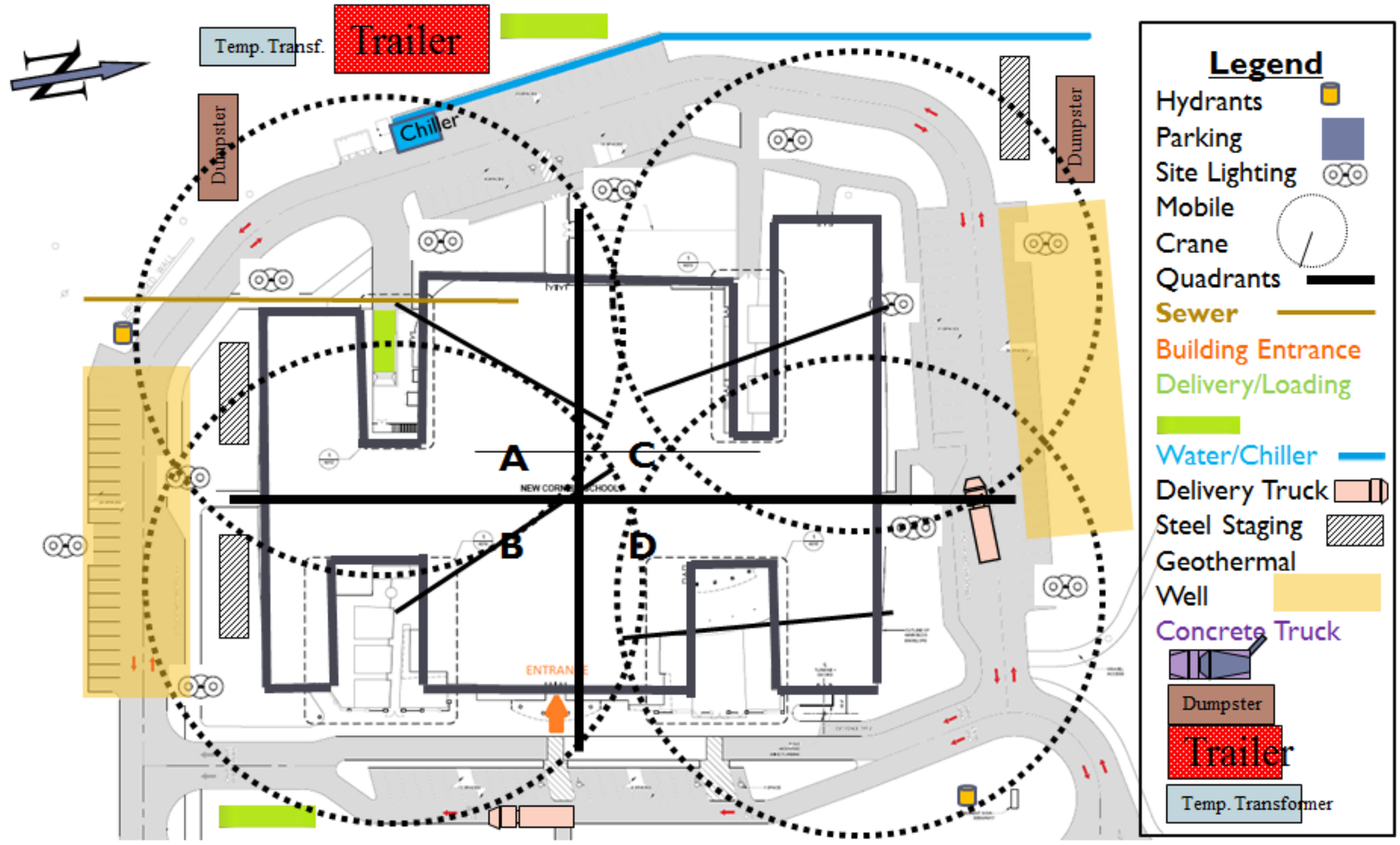
Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Appendix VI Site Plans

Site Traffic Plan



Steel Erection Plan



Finish Phase Site Plan