October 28 2009

CARDEROCK SPRINGS ELEMENTARY SCHOOL

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CONSTRUCTION MANAGEMENT

TECHNICAL REPORT 2

Table of Contents

A. EXECUTIVE SUMMARY

The following report elaborates upon Technical Report 1 and provides detailed analysis of the schedule and the structural system. This report, Technical Report 2, creates a baseline to perform analyses to better understand where time and costs are allocated over the course of the project. It will be used to help formulate ideas and obtain a greater perspective when choosing possible research topics to apply to this building.

The detailed project schedule describes the phasing and sequencing of the major work activities at Carderock Springs Elementary School. The primary work flow of the building follows the sequence of Area A to Area B. Concurrent work in both areas occurs during the final stages of superstructure erection and will overlap through the completion of the project. The building is expected to take a total of 18 months to build.

Detailed site layout plans depict three stages of construction; excavation, superstructure, and enclosure. The plans show how the site is primarily utilized during each phase. Key issues on this site included space for parking and material staging. Also, small site access roads made for subcontractor delivery coordination critical. Large deliveries such as steel or CMU had to be carefully planned around activities such as concrete pours.

Utilizing RS means cost data, a detailed structural estimate of steel and concrete totaled to $1.9 million. It included foundations and superstructure. The estimates were calculated by extrapolating logical building modules to reflect the total square footage of the building. The estimate breaks down labor, equipment, and materials as well as the total unit costs.

RS Means was used again to derive the general conditions estimate. This estimate will allow for a better analysis of how schedule savings can affect the total overhead of the project. The estimate yielded a cost of about $94,000/month. This is a significant figure since any time fluctuations in the schedule can produce a significant profit or loss for this particular project.

The final section of this report summarizes the topics discussed at the 2009 PACE Roundtable meeting. At the conference key topics such as the Economy, Energy, Building Information Modeling, and Professional Networking were discussed in focus sessions. It was also a unique opportunity to gauge industry perception of the economic recession. Key points mentioned in the economic discussion were a greater investment into personnel and internal audits for cost savings. Both small and large firms seem to be reacting in similar manners. Also the ability to develop new contacts was invaluable as many industry professionals were extremely willing to share their insight toward career development, industry trends, and thesis research.

B. DETAILED PROJECT SCHEDULE

Overview:

Carderock Springs Elementary School is an approximately 80,000 SF elementary school. The construction project included demolition of an existing building starting on October 8, 2008 and will end with the completion of a new school to be turned over to the owner July 7, 2010. The total construction time excluding demolition will be 18 months.

Sequencing Discussion:

This elementary school is broken up into two distinct areas, A and B, and has 3 stories in Area A and 2 stories in Area B. The schedule reflects these designations. The flow of work throughout the entire project typically follows the sequence of Area A Level 1-3 followed by Area B Level 1-2. Sequencing the work in this fashion allows for substantial breaking up of trades. Every trade can obtain the necessary space to efficiently complete their work.

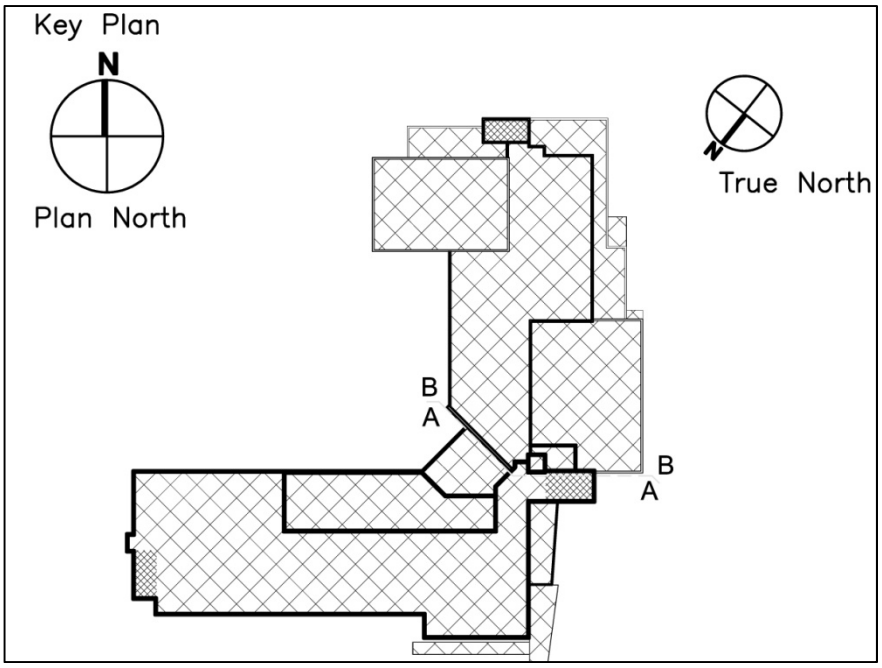


Figure 1 - Building Sections

This is important since the building is relatively small and can cause congestion if manpower is not spaced apart properly. Key things the superintendent managed were material storage and staging during the finishing of the building. Materials must be stored in proper locations and rooms to both protect them from damage and also to stay out of the way of other trades. This sequencing plan should effectively complete this goal.

(See page 9, Appendix 1 for detailed schedule)

C. SITE LAYOUT PLANNING

Excavation and Sitework Plan:

During the excavation and sitework of the project, 3 primary activities drove the layout of the site. These activities were preparation of the building pad, excavation and sitework for the erosion and sedimentation controls, as well as the stripping and stockpiling of topsoil. Also during this phase, gravel site roads were established to ensure productive transportation on site.

Superstructure Plan:

During the erection of steel, the site was very busy. There were four primary activities happening simultaneously. Steel was being erected, the continuation of the permanent stormwater management system, the beginning of the geothermal well drilling, and the continuing preparation of the building slab and foundations. Each of these activities requires large equipment. To deal with this, the superintendent gave "ownership" of certain areas of the site to the subcontractors to complete their work. Each contractor on site was expected to stay on schedule to ensure smooth a smooth transition to different work sequences.

Enclosure Plan:

During this phase of work, the primary goal was to maintain the flow of materials for the masonry contractor to perform their work. They were given a staging area to put their CMU and brick veneer. Materials for other contractors were generally stored in the building. This included ducts, electrical equipment and conduit, as well as plumbing pipe. Also during this time there were paving and grading operations. The base paving will allow a larger area for parking cars but can only be used minimally for stored materials. The surface was not designed for heavy construction traffic.

(See page 15, Appendix 2 for site plans)

D. Detailed Structural Estimate

Assumptions and Project Details:

- Takeoff was performed using logical modules.
- Logical modules extrapolated out to find total system values.
- Concrete strength is 3500 PSI Normal weight.
- Slab on Grade thickness is 4".
- Slab on Deck thickness is nominally 4.75".
- RS Means 2009 was used to obtain values
- Beams and Columns were matched to closest listed value of RS Means.

Table 1 - Detailed Structural System Estimate

Detailed Structural System Estimate Summary							
Item	**Unit**	**Total Quantity**	**Total Material**	**Total Labor**	**Total Equipment**	**Total Cost**	**Unit Cost ($/ton)**
Structural Columns	Ton	65.87	$226,879	$6,993	$5,073	$238,945	$3,628
Structural Beams	Ton	270.83	$768,510	$70,240	$43,491	$882,241	$3,258
Structural Joists	Ton	72.48	$145,453	$32,142	$18,296	$195,890	$2,703
Steel Decking	Ton	118.50	$146,150	$22,120	$2,370	$170,640	$1,440
Total Structural Steel	***Ton***	***527.68***	***$1,286,992***	***$131,495***	***$69,229***	***$1,487,716***	***$2,819***
Item	**Unit**	**Total Quantity**	**Total Material**	**Total Labor**	**Total Equipment**	**Total Cost**	**Unit Cost ($/CY)**
Concrete	C.Y.	1568	$163,654	$44,057	$11,694	$219,405	$139.93
Concrete Reinforcing	C.Y.	1568	$63,972	$164,852	$0	$228,823	$145.93
Total Concrete	***C.Y.***	***1568***	***$227,626***	***$208,909***	***$11,694***	***$448,228***	***$285.87***

(See page 19, Appendix 3 for detailed structural takeoff)

E. GENERAL CONSITIONS ESTIMATE

Assumptions:

- Location Factor for Silver Spring, MD of .895
- Project Duration is 21 months or 84 Weeks
- HESS maintains a fully staffed field office for the duration of the project
- Average unit costs were selected

The costs for this estimate were established using RS Means Building Construction Cost Data 2009. The general conditions estimate yielded a result of **$1,975,830** for the length of 21 months of the project. The tables below summarize the estimate.

Table 2 - General Conditions Estimate Breakdown

Item	Location Adjusted Cost	% of GC	Cost/Month	Cost/Week
Staff	$405,596	21%	$19,314	$4,829
Temporary Utilities	$216,019	11%	$10,287	$2,572
Site Office Expenses	$18,532	1%	$882	$221
Site Security	$15,083	1%	$718	$180
Fee, Insurance, Bonds, and Permits	$1,155,893	59%	$55,043	$13,761
Miscellaneous	$164,708	8%	$7,843	$1,961
TOTAL	**$1,975,830**	**100%**	**$94,087**	**$23,522**

Table 3 - GC Comparisons

General Conditions	
Actual Budget	$1,665,420
RS Means	$1,975,830
Difference	($310,410)
% Difference	17%

After analyzing the above table, the Fee, Insurance, Bonds, and Permits encompass a large percentage of the General Conditions. The staffing probably will represent a high percentage of the budget in actuality with the insurance, bonds and permits representing a smaller percentage. Despite that, the overall numbers are good ballpark figures to use in the analysis of cost savings that could result from reductions in schedule time.

(See page 24, Appendix 4 for GC estimate)

F. CRITICAL INDUSTRY ISSUES

Industry Panel, State of Construction:

The first topic that was discussed at the PACE Roundtable was the current state of the economy. The panel of industry members consisted of individuals representing firms such as Penn State OPP, Balfour Beatty, Hensel Phelps, and Foreman Program and Construction Managers. This panel represented a broad spectrum of the industry from the building owner's thoughts to both large and small firms' perspectives on the current economic climate.

One of the resounding themes that was discussed was each firm's desire to look within the company and search for efficiencies. Due to the fact that there is less work and smaller profit margins on projects that are procured, every penny counts. One firm discussed the idea of a paperless project. Although the idea sounds rather small, when multiplied across many projects it results in savings of thousands of dollars.

Another method of cutting costs was keeping a database of efficiencies recommended by the employees of the company. The logic behind this is that many tasks in the industry are similar from project to project. If someone has found a better way of doing something they can share it with their co-workers across the whole country working on different projects. This database is available online and is searchable allowing great accessibility and ease of use.

One of the most interesting topics discussed was the competition that now exists in every sector and niche of the industry. Many contractors are now pursuing work that they had historically not attempted to procure. Public Education facilities are currently one of those sectors that are becoming extremely competitive. This market has been historically dominated by small to mid size contractors on a local level, however now larger contractors are starting to get into this market due to the relative strength of this market compared to private sector work. Before the recession hit, the public bids typically had about 3-4 contractors competing for the contract. Now and industry member said that these jobs can now have up to 14 bidders. Some of these bids are now intentionally low with the contractors bidding projects at no profit or even at a loss to keep their retain employees and a labor force. However, this tactic cannot be sustained.

The next topic discussed was business failures due to "low-ball" bid tactics. To date, there have been minimal business failures, but the industry panel suspects that in the coming year the industry will see some contractors go out of business. This could also lead to the progressive failures of subcontractors due to partnerships firms may have with each other.

Even in the current economic climate, firms are still confident they can weather the times. They stressed the importance of responsible bidding. The integrity and reputation of companies can sometimes be more valuable than an extremely low bid.

Break out Session, Energy and the Construction Issue:

Energy is a resounding topic not only in the construction industry, but across all facets of our society. Some of the key factors driving this discussion are environmental concerns, the growing demand for energy globally, and the government's involvement with incentives and mandates for energy efficiency.

My project particularly has some interesting energy dynamics due to a geothermal mechanical system used for the heating, ventilation, and air conditioning of the building. The school district is taking advantage of the systems efficiencies in energy consumption and also different federal and local financial incentives and rebates. The school district is a firm believer in energy conservation as nearly all of their new school facilities are implementing geothermal technology.

The most interesting discussion evolved out of the growing interest of our society in everything that is "Green." Not only are people buying into conservationist theories about preserving our resources and environment, but many businesses are also taking advantage of the marketing tools that green technologies and buildings can create. An example of this is the obvious growth of the USGBC LEED building rating system. However, in this incredible growth of the green industry, consumers must be more aware of fraudulent marketing claims. One term that was used to describe this was "Green Washing," which is using sustainable marketing tactics to sell a product or service that is barely sustainable or highlighting only a very small portion that is sustainable. Consumers with little knowledge of sustainability are often deceived by these tactics.

The discussion of green washing led to some very interesting conversations about the actual building systems performance compared the designed building systems performance. Industry panel members highlighted projects where after completion, the buildings energy efficiency experienced a dramatic degradation. Reasons behind this included changing owner needs, tampering with building controls, and undertrained facility managers.

Branching from the previous topic, an industry member discussed the future possibilities of LEED audits in which a building can lose its rating if the actual performance does not meet the

guidelines to which it was designed. These energy audits can prove to be very integral in leading the push to operate buildings as they are intended. It would also create growth in energy audit and building re-commissioning markets.

These issues revolving around energy are all very important to consider while analyzing my thesis project. The current geothermal systems efficient designs must be checked and maintained to ensure that the owner is actually realizing savings in energy consumption. This building will undergo a commissioning process, however the importance of re-commissioning and maintaining performance is the key variable that must be continually managed to realize the systems true benefits.

Key Contacts and Thesis Relevance:

One of the key contacts I made was with Mike Arnold of Foreman Program and Construction Managers. I had a discussion with him regarding geothermal well systems. Currently his company is preparing a course to teach its personnel about features and constructability issues of the systems. During the breakout session on energy, Dr. Riley suggested becoming an "expert" on the engineering and environmental impacts of a geothermal system. Some impacts discussed was the heating of earth over time. This will result in the reduction of efficiency in the system. There is also concerns of settling of the earth over time which could cause settling issues. This contact is very valuable since FPCM's core business is in public education.

PACE Roundtable Reflection:

The Roundtable was an invaluable experience that connected industry members of various management levels with students. The most surprising thing to me was the willingness of the industry to share their business strategies in such an open forum. Also it was very apparent that all of the members present at the event valued education and guiding young emerging professionals to have productive careers within the industry.

One interesting dynamic of the event was the eagerness and desire to learn from each other. As students ,we were able to gain important knowledge based on the experience of the members present. Inversely, the industry gained insight about our skills and how to create opportunities in their companies based on the knowledge and skill sets my generation has obtained through our experience and education.

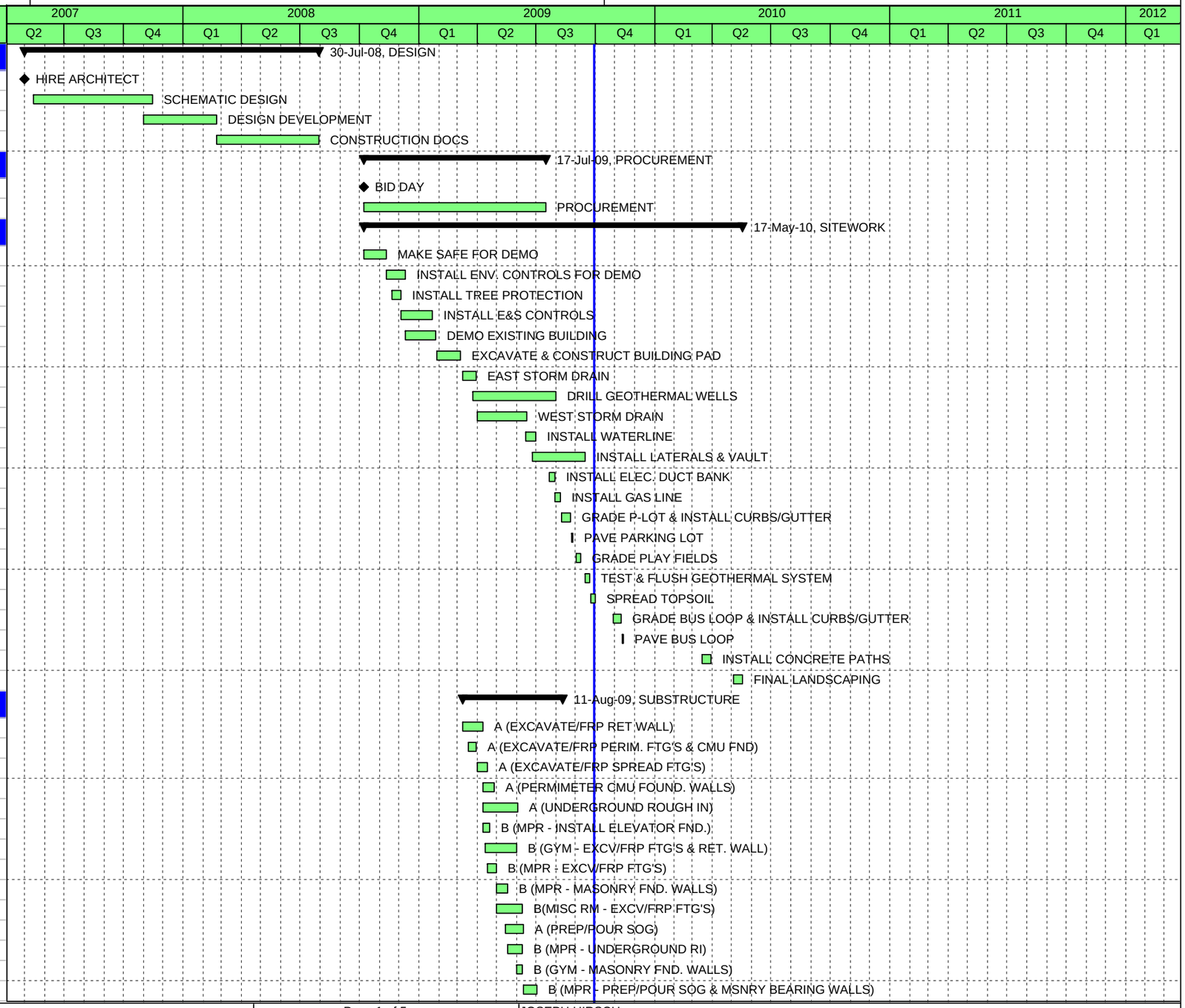
G. APPENDIX 1 – Detailed Project Schedule

The following pages contain the detailed project schedule.

CARDEROCK SPRINGS ELEMENTARY

OCTOBER 28, 2009

Activity Name	Original Duration	Start	Finish
DESIGN	327	01-May-07	30-Jul-08
HIRE ARCHITECT	0	01-May-07	
SCHEMATIC DESIGN	134	14-May-07	15-Nov-07
DESIGN DEVELOPMENT	81	01-Nov-07	21-Feb-08
CONSTRUCTION DOCS	114	22-Feb-08	30-Jul-08
PROCUREMENT	204	07-Oct-08	17-Jul-09
BID DAY	0	07-Oct-08	
PROCUREMENT	203	08-Oct-08	17-Jul-09
SITEWORK	419	08-Oct-08	17-May-10
MAKE SAFE FOR DEMO	25	08-Oct-08	11-Nov-08
INSTALL ENV. CONTROLS FOR DEMO	21	12-Nov-08	10-Dec-08
INSTALL TREE PROTECTION	10	20-Nov-08	03-Dec-08
INSTALL E&S CONTROLS	35	04-Dec-08	21-Jan-09
DEMO EXISTING BUILDING	34	11-Dec-08	27-Jan-09
EXCAVATE & CONSTRUCT BUILDING PAD	27	29-Jan-09	06-Mar-09
EAST STORM DRAIN	17	09-Mar-09	31-Mar-09
DRILL GEOTHERMAL WELLS	92	26-Mar-09	31-Jul-09
WEST STORM DRAIN	55	02-Apr-09	17-Jun-09
INSTALL WATERLINE	11	16-Jun-09	30-Jun-09
INSTALL LATERALS & VAULT	58	26-Jun-09	15-Sep-09
INSTALL ELEC. DUCT BANK	7	22-Jul-09	30-Jul-09
INSTALL GAS LINE	6	31-Jul-09	07-Aug-09
GRADE P-LOT & INSTALL CURBS/GUTTER	11	10-Aug-09	24-Aug-09
PAVE PARKING LOT	3	25-Aug-09	27-Aug-09
GRADE PLAY FIELDS	7	01-Sep-09	09-Sep-09
TEST & FLUSH GEOTHERMAL SYSTEM	5	16-Sep-09	22-Sep-09
SPREAD TOPSOIL	5	25-Sep-09	01-Oct-09
GRADE BUS LOOP & INSTALL CURBS/GUTTER	9	29-Oct-09	10-Nov-09
PAVE BUS LOOP	2	12-Nov-09	13-Nov-09
INSTALL CONCRETE PATHS	12	15-Mar-10	30-Mar-10
FINAL LANDSCAPING	10	04-May-10	17-May-10
SUBSTRUCTURE	112	09-Mar-09	11-Aug-09
A (EXCAVATE/FRP RET WALL)	24	09-Mar-09	09-Apr-09
A (EXCAVATE/FRP PERIM. FTG'S & CMU FND)	9	19-Mar-09	31-Mar-09
A (EXCAVATE/FRP SPREAD FTG'S)	12	01-Apr-09	16-Apr-09
A (PERMIMETER CMU FOUND. WALLS)	12	10-Apr-09	27-Apr-09
A (UNDERGROUND ROUGH IN)	38	10-Apr-09	02-Jun-09
B (MPR - INSTALL ELEVATOR FND.)	7	10-Apr-09	20-Apr-09
B (GYM - EXCV/FRP FTG'S & RET. WALL)	35	14-Apr-09	01-Jun-09
B (MPR - EXCV/FRP FTG'S)	10	17-Apr-09	30-Apr-09
B (MPR - MASONRY FND. WALLS)	12	01-May-09	18-May-09
B(MISC RM - EXCV/FRP FTG'S)	28	01-May-09	09-Jun-09
A (PREP/POUR SOG)	20	15-May-09	11-Jun-09
B (MPR - UNDERGROUND RI)	16	19-May-09	09-Jun-09
B (GYM - MASONRY FND. WALLS)	6	02-Jun-09	09-Jun-09
B (MPR - PREP/POUR SOG & MSNRY BEARING	16	11-Jun-09	02-Jul-09



Actual Work | Critical Remaining Work | Summary

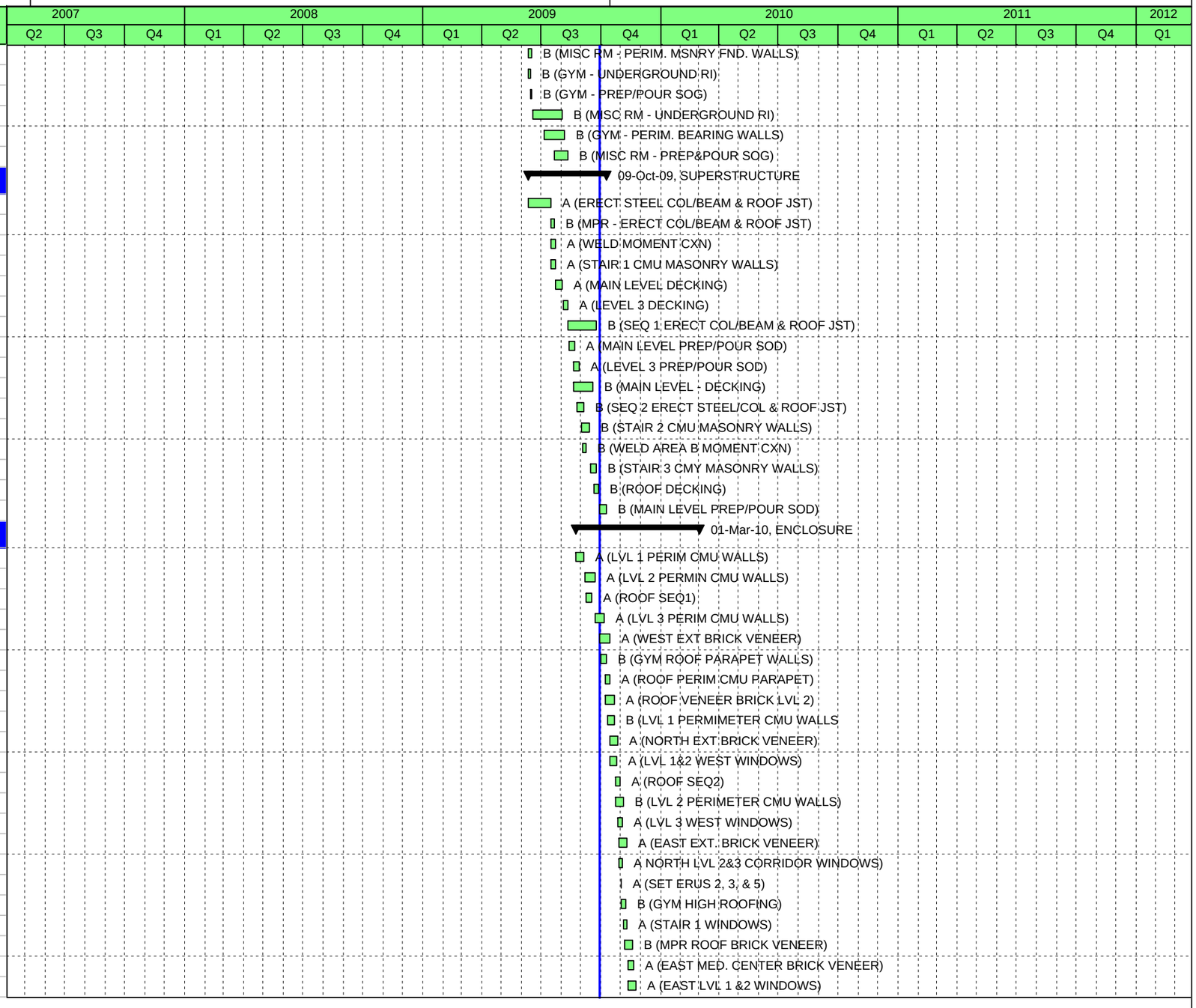
Remaining Work | Milestone

JOSEPH HIRSCH

CARDEROCK SPRINGS ELEMENTARY

OCTOBER 28, 2009

Activity Name	Original Duration	Start	Finish
B (MISC RM - PERIM. MSNRY FND. WALLS)	5	11-Jun-09	17-Jun-09
B (GYM - UNDERGROUND RI)	3	11-Jun-09	15-Jun-09
B (GYM - PREP/POUR SOG)	2	16-Jun-09	17-Jun-09
B (MISC RM - UNDERGROUND RI)	33	18-Jun-09	03-Aug-09
B (GYM - PERIM. BEARING WALLS)	24	06-Jul-09	06-Aug-09
B (MISC RM - PREP&POUR SOG)	15	22-Jul-09	11-Aug-09
SUPERSTRUCTURE	86	12-Jun-09	09-Oct-09
A (ERECT STEEL COL/BEAM & ROOF JST)	25	12-Jun-09	16-Jul-09
B (MPR - ERECT COL/BEAM & ROOF JST)	3	17-Jul-09	21-Jul-09
A (WELD MOMENT CXN)	5	17-Jul-09	23-Jul-09
A (STAIR 1 CMU MASONRY WALLS)	6	17-Jul-09	24-Jul-09
A (MAIN LEVEL DECKING)	7	24-Jul-09	03-Aug-09
A (LEVEL 3 DECKING)	7	04-Aug-09	12-Aug-09
B (SEQ 1 ERECT COL/BEAM & ROOF JST)	32	12-Aug-09	24-Sep-09
A (MAIN LEVEL PREP/POUR SOD)	7	13-Aug-09	21-Aug-09
A (LEVEL 3 PREP/POUR SOD)	7	20-Aug-09	28-Aug-09
B (MAIN LEVEL - DECKING)	22	20-Aug-09	18-Sep-09
B (SEQ 2 ERECT STEEL/COL & ROOF JST)	9	25-Aug-09	04-Sep-09
B (STAIR 2 CMU MASONRY WALLS)	10	01-Sep-09	14-Sep-09
B (WELD AREA B MOMENT CXN)	5	03-Sep-09	09-Sep-09
B (STAIR 3 CMY MASONRY WALLS)	7	15-Sep-09	23-Sep-09
B (ROOF DECKING)	6	21-Sep-09	28-Sep-09
B (MAIN LEVEL PREP/POUR SOD)	9	29-Sep-09	09-Oct-09
ENCLOSURE	136	24-Aug-09	01-Mar-10
A (LVL 1 PERIM CMU WALLS)	10	24-Aug-09	04-Sep-09
A (LVL 2 PERMIN CMU WALLS)	12	07-Sep-09	22-Sep-09
A (ROOF SEQ1)	7	09-Sep-09	17-Sep-09
A (LVL 3 PERIM CMU WALLS)	10	23-Sep-09	06-Oct-09
A (WEST EXT BRICK VENEER)	11	30-Sep-09	14-Oct-09
B (GYM ROOF PARAPET WALLS)	6	02-Oct-09	09-Oct-09
A (ROOF PERIM CMU PARAPET)	5	08-Oct-09	14-Oct-09
A (ROOF VENEER BRICK LVL 2)	11	08-Oct-09	22-Oct-09
B (LVL 1 PERMIMETER CMU WALLS	9	12-Oct-09	22-Oct-09
A (NORTH EXT BRICK VENEER)	9	15-Oct-09	27-Oct-09
A (LVL 1&2 WEST WINDOWS)	8	15-Oct-09	26-Oct-09
A (ROOF SEQ2)	6	23-Oct-09	30-Oct-09
B (LVL 2 PERIMETER CMU WALLS)	10	23-Oct-09	05-Nov-09
A (LVL 3 WEST WINDOWS)	6	27-Oct-09	03-Nov-09
A (EAST EXT. BRICK VENEER)	9	29-Oct-09	10-Nov-09
A NORTH LVL 2&3 CORRIDOR WINDOWS)	4	29-Oct-09	03-Nov-09
A (SET ERUS 2, 3, & 5)	1	02-Nov-09	02-Nov-09
B (GYM HIGH ROOFING)	6	02-Nov-09	09-Nov-09
A (STAIR 1 WINDOWS)	4	05-Nov-09	10-Nov-09
B (MPR ROOF BRICK VENEER)	10	06-Nov-09	19-Nov-09
A (EAST MED. CENTER BRICK VENEER)	7	12-Nov-09	20-Nov-09
A (EAST LVL 1 &2 WINDOWS)	8	12-Nov-09	23-Nov-09



Actual Work | Critical Remaining Work | Summary

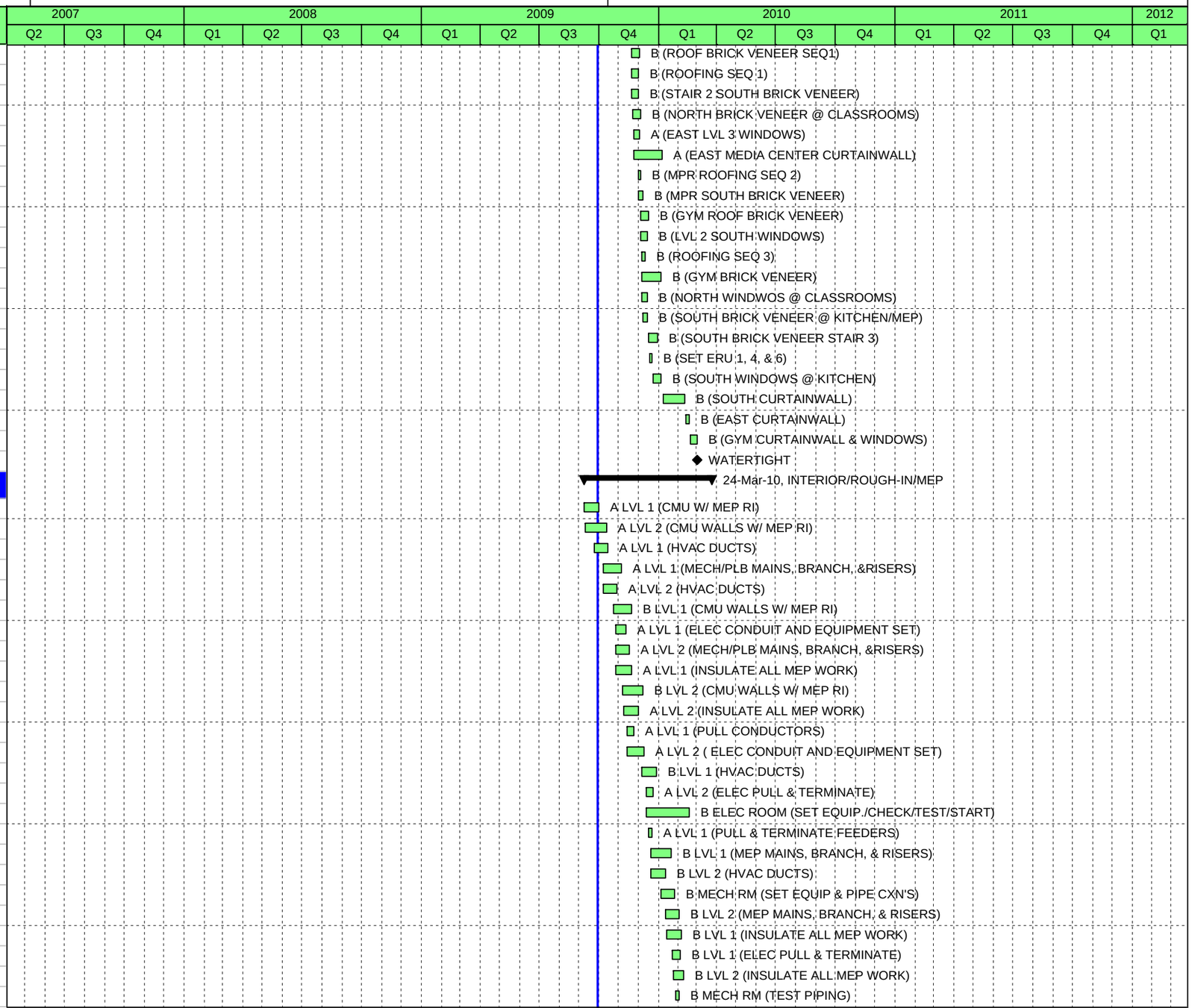
Remaining Work | Milestone

JOSEPH HIRSCH

CARDEROCK SPRINGS ELEMENTARY

OCTOBER 28, 2009

Activity Name	Original Duration	Start	Finish
B (ROOF BRICK VENEER SEQ1)	10	20-Nov-09	03-Dec-09
B (ROOFING SEQ 1)	7	20-Nov-09	30-Nov-09
B (STAIR 2 SOUTH BRICK VENEER)	7	20-Nov-09	30-Nov-09
B (NORTH BRICK VENEER @ CLASSROOMS)	10	23-Nov-09	04-Dec-09
A (EAST LVL 3 WINDOWS)	8	24-Nov-09	03-Dec-09
A (EAST MEDIA CENTER CURTAINWALL)	33	24-Nov-09	07-Jan-10
B (MPR ROOFING SEQ 2)	4	01-Dec-09	04-Dec-09
B (MPR SOUTH BRICK VENEER)	5	01-Dec-09	07-Dec-09
B (GYM ROOF BRICK VENEER)	10	04-Dec-09	17-Dec-09
B (LVL 2 SOUTH WINDOWS)	7	04-Dec-09	14-Dec-09
B (ROOFING SEQ 3)	5	07-Dec-09	11-Dec-09
B (GYM BRICK VENEER)	21	07-Dec-09	04-Jan-10
B (NORTH WINDWOS @ CLASSROOMS)	7	07-Dec-09	15-Dec-09
B (SOUTH BRICK VENEER @ KITCHEN/MEP)	6	08-Dec-09	15-Dec-09
B (SOUTH BRICK VENEER STAIR 3)	11	17-Dec-09	31-Dec-09
B (SET ERU 1, 4, & 6)	2	18-Dec-09	21-Dec-09
B (SOUTH WINDOWS @ KITCHEN)	9	23-Dec-09	04-Jan-10
B (SOUTH CURTAINWALL)	25	08-Jan-10	11-Feb-10
B (EAST CURTAINWALL)	5	12-Feb-10	18-Feb-10
B (GYM CURTAINWALL & WINDOWS)	7	19-Feb-10	01-Mar-10
WATERTIGHT	0		01-Mar-10
INTERIOR/ROUGH-IN/MEP	142	08-Sep-09	24-Mar-10
A LVL 1 (CMU W/ MEP RI)	17	08-Sep-09	30-Sep-09
A LVL 2 (CMU WALLS W/ MEP RI)	24	10-Sep-09	13-Oct-09
A LVL 1 (HVAC DUCTS)	16	24-Sep-09	15-Oct-09
A LVL 1 (MECH/PLB MAINS, BRANCH, &RISERS)	21	08-Oct-09	05-Nov-09
A LVL 2 (HVAC DUCTS)	16	08-Oct-09	29-Oct-09
B LVL 1 (CMU WALLS W/ MEP RI)	21	23-Oct-09	20-Nov-09
A LVL 1 (ELEC CONDUIT AND EQUIPMENT SET)	13	27-Oct-09	12-Nov-09
A LVL 2 (MECH/PLB MAINS, BRANCH, &RISERS)	16	27-Oct-09	17-Nov-09
A LVL 1 (INSULATE ALL MEP WORK)	18	28-Oct-09	20-Nov-09
B LVL 2 (CMU WALLS W/ MEP RI)	23	06-Nov-09	08-Dec-09
A LVL 2 (INSULATE ALL MEP WORK)	17	09-Nov-09	01-Dec-09
A LVL 1 (PULL CONDUCTORS)	7	13-Nov-09	23-Nov-09
A LVL 2 (ELEC CONDUIT AND EQUIPMENT SET)	20	13-Nov-09	10-Dec-09
B LVL 1 (HVAC DUCTS)	17	07-Dec-09	29-Dec-09
A LVL 2 (ELEC PULL & TERMINATE)	9	14-Dec-09	24-Dec-09
B ELEC ROOM (SET EQUIP./CHECK/TEST/STAF	48	14-Dec-09	17-Feb-10
A LVL 1 (PULL & TERMINATE FEEDERS)	4	17-Dec-09	22-Dec-09
B LVL 1 (MEP MAINS, BRANCH, & RISERS)	24	21-Dec-09	21-Jan-10
B LVL 2 (HVAC DUCTS)	16	21-Dec-09	11-Jan-10
B MECH RM (SET EQUIP & PIPE CXN'S)	16	05-Jan-10	26-Jan-10
B LVL 2 (MEP MAINS, BRANCH, & RISERS)	16	12-Jan-10	02-Feb-10
B LVL 1 (INSULATE ALL MEP WORK)	18	13-Jan-10	05-Feb-10
B LVL 1 (ELEC PULL & TERMINATE)	10	22-Jan-10	04-Feb-10
B LVL 2 (INSULATE ALL MEP WORK)	11	25-Jan-10	08-Feb-10
B MECH RM (TEST PIPING)	5	27-Jan-10	02-Feb-10



Actual Work | Critical Remaining Work | Summary

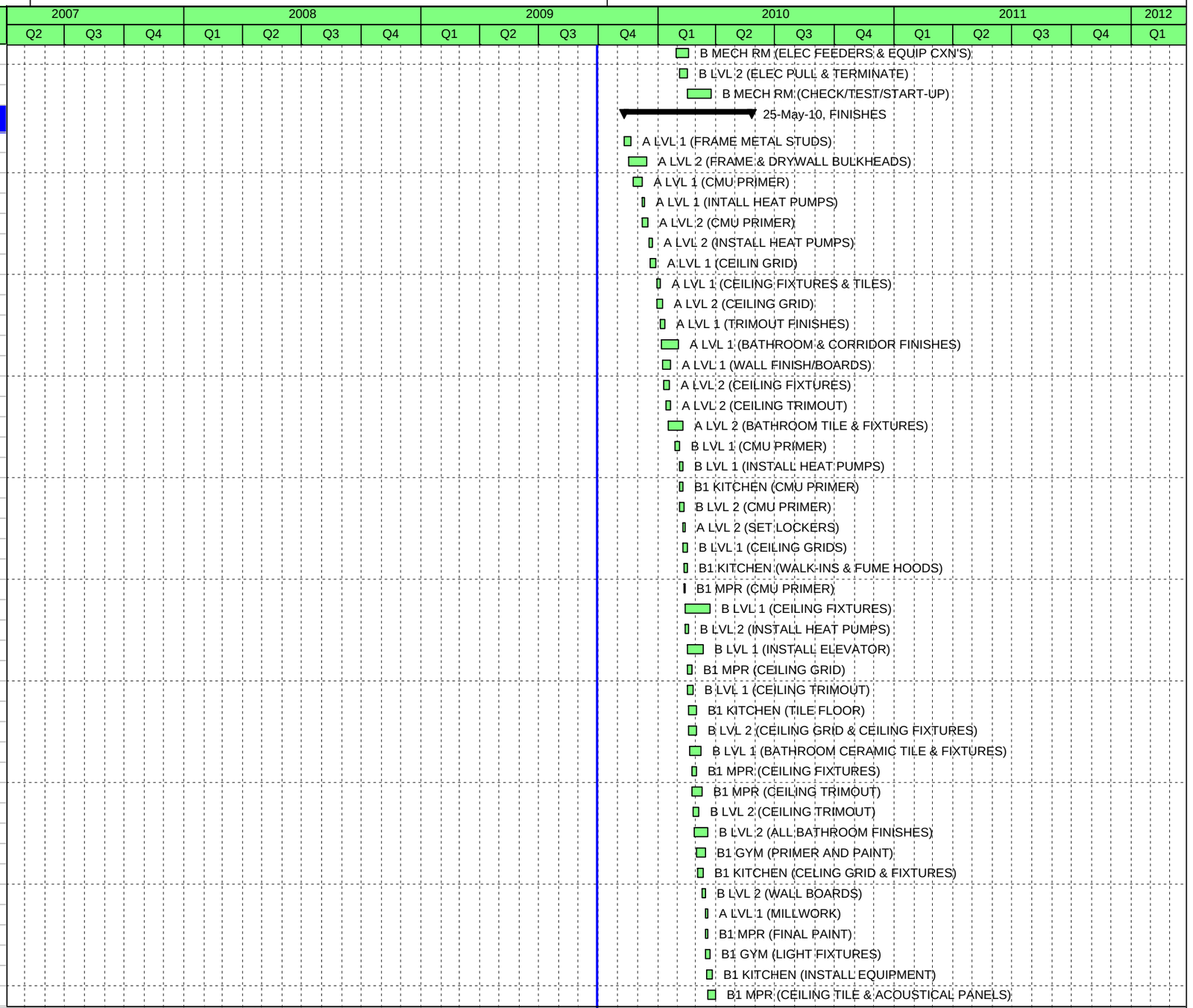
Remaining Work | Milestone

JOSEPH HIRSCH

CARDEROCK SPRINGS ELEMENTARY

OCTOBER 28, 2009

Activity Name	Original Duration	Start	Finish
B MECH RM (ELEC FEEDERS & EQUIP CXN'S)	15	29-Jan-10	18-Feb-10
B LVL 2 (ELEC PULL & TERMINATE)	10	03-Feb-10	16-Feb-10
B MECH RM (CHECK/TEST/START-UP)	28	15-Feb-10	24-Mar-10
FINISHES	140	11-Nov-09	25-May-10
A LVL 1 (FRAME METAL STUDS)	8	11-Nov-09	20-Nov-09
A LVL 2 (FRAME & DRYWALL BULKHEADS)	19	18-Nov-09	14-Dec-09
A LVL 1 (CMU PRIMER)	10	24-Nov-09	07-Dec-09
A LVL 1 (INTALL HEAT PUMPS)	4	08-Dec-09	11-Dec-09
A LVL 2 (CMU PRIMER)	8	08-Dec-09	17-Dec-09
A LVL 2 (INSTALL HEAT PUMPS)	4	18-Dec-09	23-Dec-09
A LVL 1 (CEILIN GRID)	7	21-Dec-09	29-Dec-09
A LVL 1 (CEILING FIXTURES & TILES)	4	30-Dec-09	04-Jan-10
A LVL 2 (CEILING GRID)	8	30-Dec-09	08-Jan-10
A LVL 1 (TRIMOUT FINISHES)	6	05-Jan-10	12-Jan-10
A LVL 1 (BATHROOM & CORRIDOR FINISHES)	19	06-Jan-10	01-Feb-10
A LVL 1 (WALL FINISH/BOARDS)	10	08-Jan-10	21-Jan-10
A LVL 2 (CEILING FIXTURES)	6	11-Jan-10	18-Jan-10
A LVL 2 (CEILING TRIMOUT)	6	13-Jan-10	20-Jan-10
A LVL 2 (BATHROOM TILE & FIXTURES)	16	18-Jan-10	08-Feb-10
B LVL 1 (CMU PRIMER)	6	27-Jan-10	03-Feb-10
B LVL 1 (INSTALL HEAT PUMPS)	4	04-Feb-10	09-Feb-10
B1 KITCHEN (CMU PRIMER)	4	04-Feb-10	09-Feb-10
B LVL 2 (CMU PRIMER)	6	04-Feb-10	11-Feb-10
A LVL 2 (SET LOCKERS)	5	08-Feb-10	12-Feb-10
B LVL 1 (CEILING GRIDS)	7	08-Feb-10	16-Feb-10
B1 KITCHEN (WALK-INS & FUME HOODS)	5	10-Feb-10	16-Feb-10
B1 MPR (CMU PRIMER)	3	10-Feb-10	12-Feb-10
B LVL 1 (CEILING FIXTURES)	27	12-Feb-10	22-Mar-10
B LVL 2 (INSTALL HEAT PUMPS)	4	12-Feb-10	17-Feb-10
B LVL 1 (INSTALL ELEVATOR)	20	15-Feb-10	12-Mar-10
B1 MPR (CEILING GRID)	6	15-Feb-10	22-Feb-10
B LVL 1 (CEILING TRIMOUT)	7	16-Feb-10	24-Feb-10
B1 KITCHEN (TILE FLOOR)	10	17-Feb-10	02-Mar-10
B LVL 2 (CEILING GRID & CEILING FIXTURES)	9	17-Feb-10	01-Mar-10
B LVL 1 (BATHROOM CERAMIC TILE & FIXTURE	12	19-Feb-10	08-Mar-10
B1 MPR (CEILING FIXTURES)	6	23-Feb-10	02-Mar-10
B1 MPR (CEILING TRIMOUT)	12	23-Feb-10	10-Mar-10
B LVL 2 (CEILING TRIMOUT)	6	25-Feb-10	04-Mar-10
B LVL 2 (ALL BATHROOM FINISHES)	16	26-Feb-10	19-Mar-10
B1 GYM (PRIMER AND PAINT)	10	02-Mar-10	15-Mar-10
B1 KITCHEN (CELING GRID & FIXTURES)	7	03-Mar-10	11-Mar-10
B LVL 2 (WALL BOARDS)	4	10-Mar-10	15-Mar-10
A LVL 1 (MILLWORK)	5	15-Mar-10	19-Mar-10
B1 MPR (FINAL PAINT)	4	15-Mar-10	18-Mar-10
B1 GYM (LIGHT FIXTURES)	5	16-Mar-10	22-Mar-10
B1 KITCHEN (INSTALL EQUIPMENT)	8	17-Mar-10	26-Mar-10
B1 MPR (CEILING TILE & ACOUSTICAL PANELS)	9	19-Mar-10	31-Mar-10



Actual Work Critical Remaining Work Summary

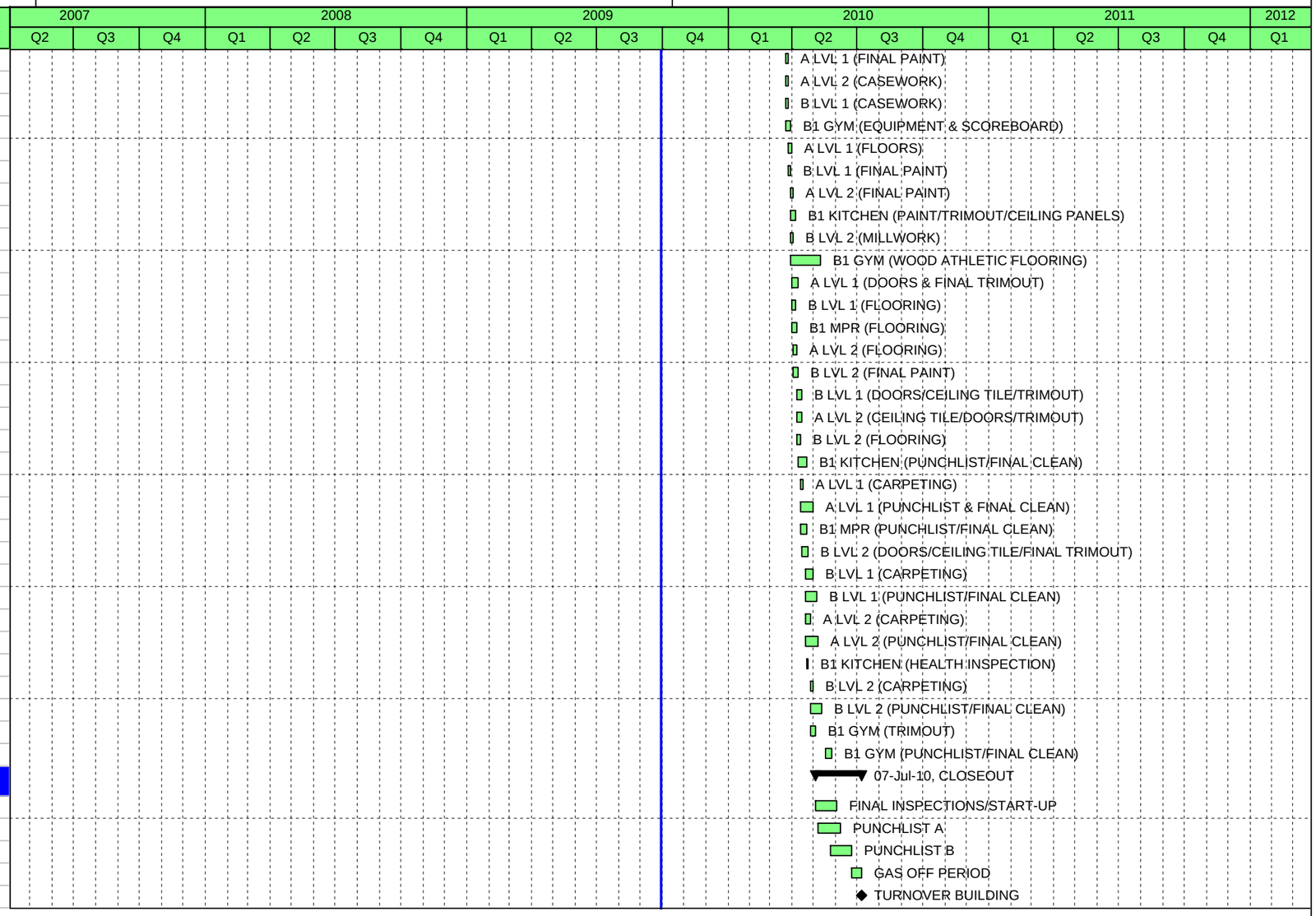
Remaining Work Milestone

JOSEPH HIRSCH

CARDEROCK SPRINGS ELEMENTARY

OCTOBER 28, 2009

Activity Name	Original Duration	Start	Finish
A LVL 1 (FINAL PAINT)	4	22-Mar-10	25-Mar-10
A LVL 2 (CASEWORK)	5	22-Mar-10	26-Mar-10
B LVL 1 (CASEWORK)	4	22-Mar-10	25-Mar-10
B1 GYM (EQUIPMENT & SCOREBOARD)	5	23-Mar-10	29-Mar-10
A LVL 1 (FLOORS)	4	26-Mar-10	31-Mar-10
B LVL 1 (FINAL PAINT)	3	26-Mar-10	30-Mar-10
A LVL 2 (FINAL PAINT)	4	29-Mar-10	01-Apr-10
B1 KITCHEN (PAINT/TRIMOUT/CEILING PANELS)	7	29-Mar-10	06-Apr-10
B LVL 2 (MILLWORK)	4	29-Mar-10	01-Apr-10
B1 GYM (WOOD ATHLETIC FLOORING)	30	30-Mar-10	10-May-10
A LVL 1 (DOORS & FINAL TRIMOUT)	7	01-Apr-10	09-Apr-10
B LVL 1 (FLOORING)	3	01-Apr-10	05-Apr-10
B1 MPR (FLOORING)	5	01-Apr-10	07-Apr-10
A LVL 2 (FLOORING)	4	02-Apr-10	07-Apr-10
B LVL 2 (FINAL PAINT)	5	02-Apr-10	08-Apr-10
B LVL 1 (DOORS/CEILING TILE/TRIMOUT)	6	07-Apr-10	14-Apr-10
A LVL 2 (CEILING TILE/DOORS/TRIMOUT)	5	08-Apr-10	14-Apr-10
B LVL 2 (FLOORING)	4	08-Apr-10	13-Apr-10
B1 KITCHEN (PUNCHLIST/FINAL CLEAN)	9	09-Apr-10	21-Apr-10
A LVL 1 (CARPETING)	3	13-Apr-10	15-Apr-10
A LVL 1 (PUNCHLIST & FINAL CLEAN)	13	13-Apr-10	29-Apr-10
B1 MPR (PUNCHLIST/FINAL CLEAN)	7	13-Apr-10	21-Apr-10
B LVL 2 (DOORS/CEILING TILE/FINAL TRIMOUT)	8	14-Apr-10	23-Apr-10
B LVL 1 (CARPETING)	10	19-Apr-10	30-Apr-10
B LVL 1 (PUNCHLIST/FINAL CLEAN)	13	19-Apr-10	05-May-10
A LVL 2 (CARPETING)	5	20-Apr-10	26-Apr-10
A LVL 2 (PUNCHLIST/FINAL CLEAN)	13	20-Apr-10	06-May-10
B1 KITCHEN (HEALTH INSPECTION)	2	22-Apr-10	23-Apr-10
B LVL 2 (CARPETING)	3	27-Apr-10	29-Apr-10
B LVL 2 (PUNCHLIST/FINAL CLEAN)	12	27-Apr-10	12-May-10
B1 GYM (TRIMOUT)	5	27-Apr-10	03-May-10
B1 GYM (PUNCHLIST/FINAL CLEAN)	7	17-May-10	25-May-10
CLOSEOUT	47	04-May-10	07-Jul-10
FINAL INSPECTIONS/START-UP	21	04-May-10*	01-Jun-10
PUNCHLIST A	22	07-May-10*	07-Jun-10
PUNCHLIST B	22	24-May-10*	22-Jun-10
GAS OFF PERIOD	11	23-Jun-10*	07-Jul-10
TURNOVER BUILDING	0		07-Jul-10



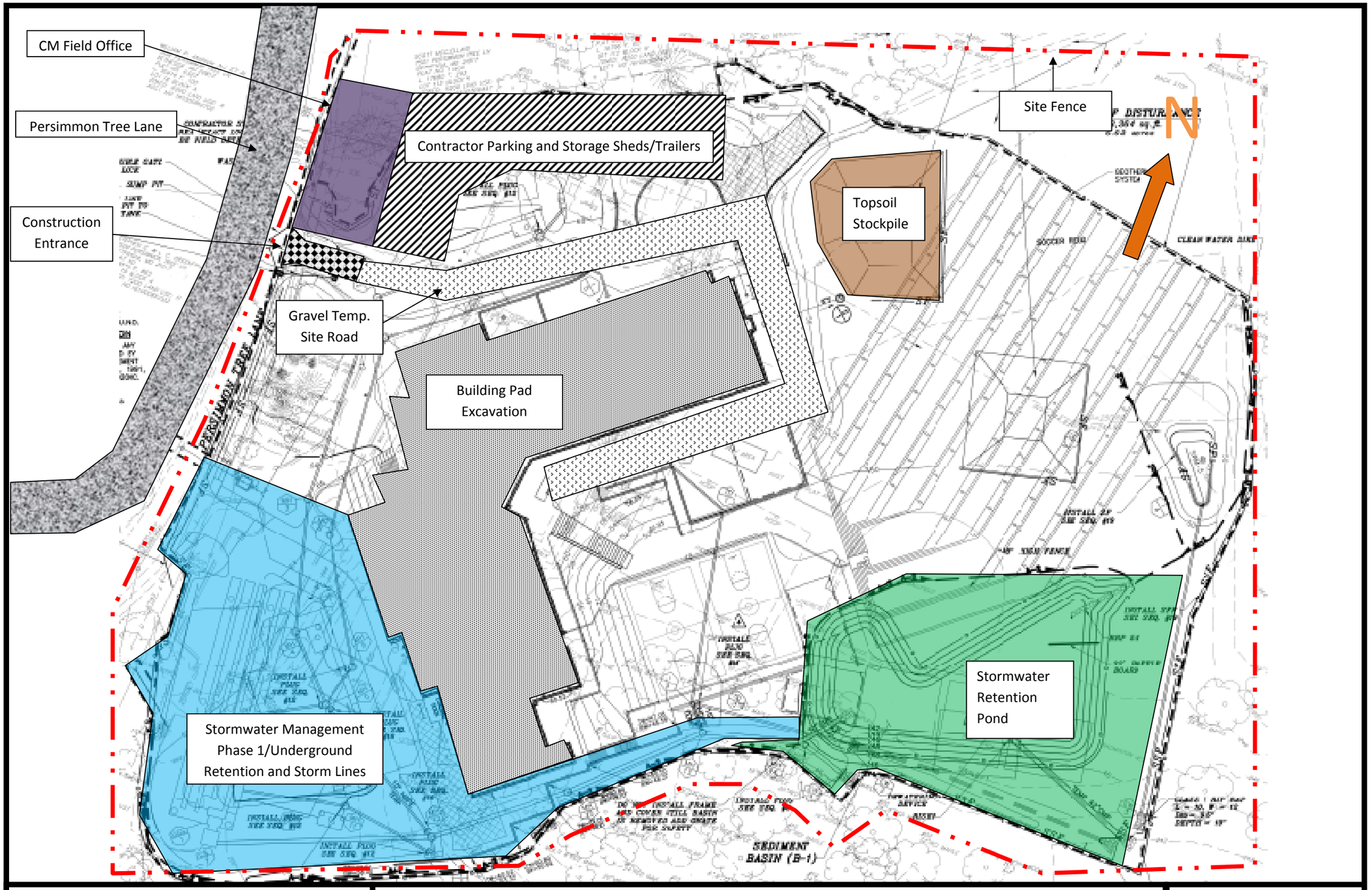
Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

JOSEPH HIRSCH

H. APPENDIX 2 – Site Layout Plans

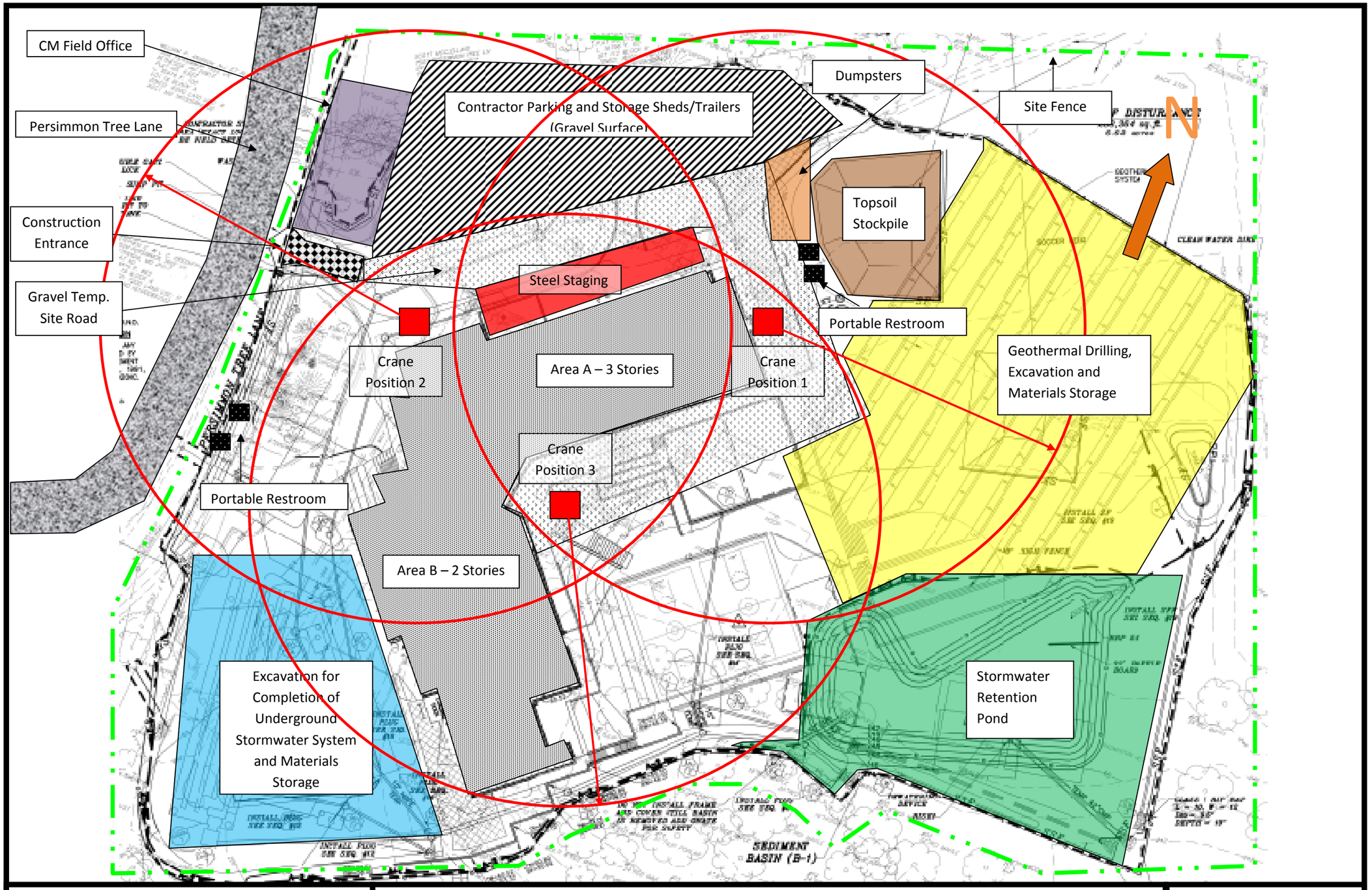
The following pages contain the site layout plans.



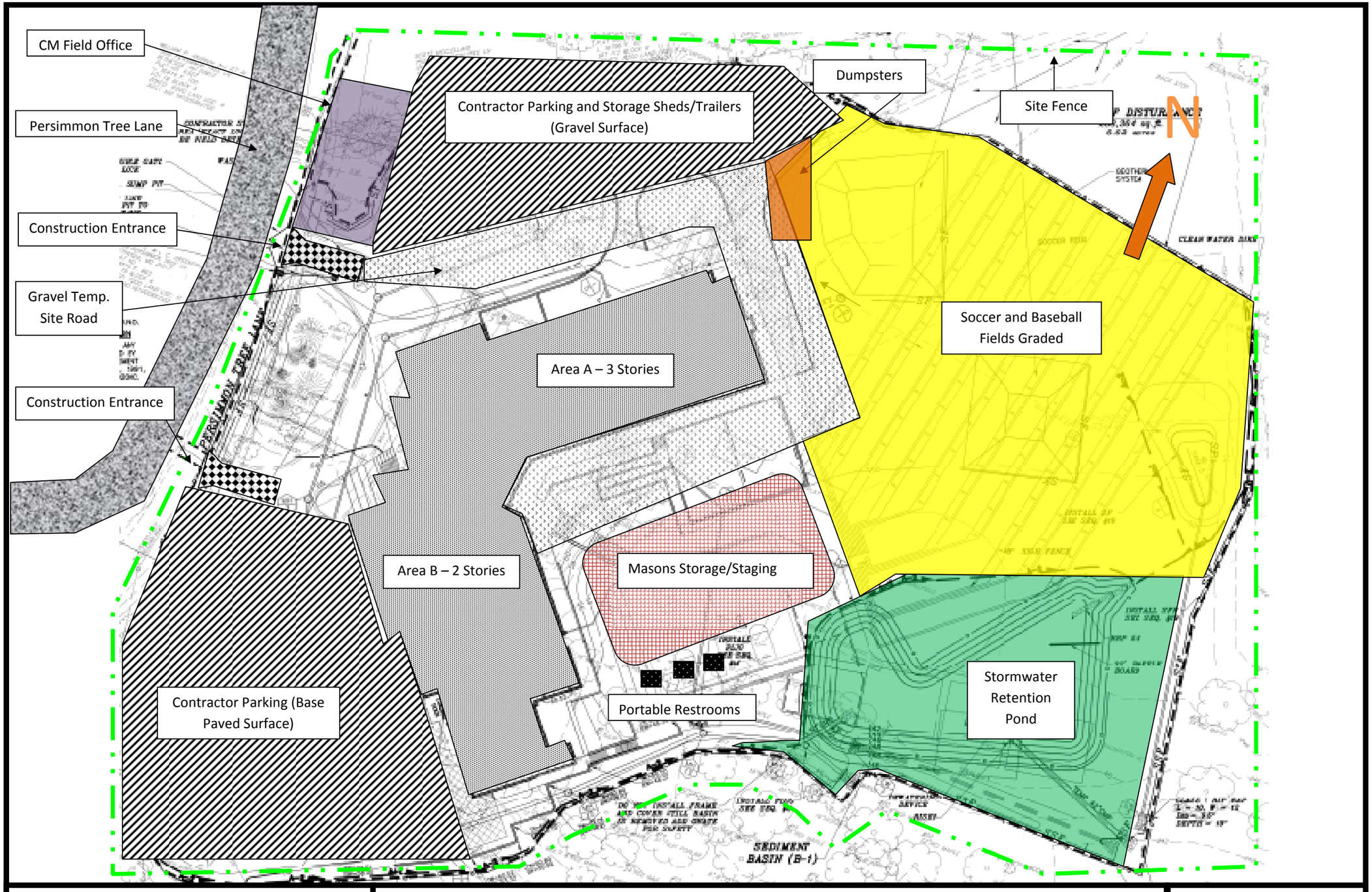
JOSEPH HIRSCH
The Pennsylvania State University
Technical Report 2
October 28, 2009

CARDEROCK SPRINGS ELEMENTARY SCHOOL MODERNIZATION
MONTGOMERY COUNTY PUBLIC SCHOOLS
BETHESDA, MARYLAND

Excavation Site Plan
SP-1.0



JOSEPH HIRSCH **The Pennsylvania State University** **Technical Report 2** **October 28, 2009**	**CARDEROCK SPRINGS ELEMENTARY SCHOOL MODERNIZATION** **MONTGOMERY COUNTY PUBLIC SCHOOLS** **BETHESDA, MARYLAND**	**Superstructure Site Plan** **SP-1.1**



JOSEPH HIRSCH **The Pennsylvania State University** **Technical Report 2** **October 28, 2009**	**CARDEROCK SPRINGS ELEMENTARY SCHOOL MODERNIZATION** **MONTGOMERY COUNTY PUBLIC SCHOOLS** **BETHESDA, MARYLAND**	**Enclosure Site Plan** **SP-1.2**

I. APPENDIX 3 – Structural Estimate Calculations

The following pages contain calculations to support the conclusions of the detailed estimate.

Structural Columns (Entire Building)			*Bare Costs*				*Project Costs*				*Weights*	
Member Size	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**	**Weight (lb)**	**Weight (ton)**
W10x45	L.F.	994	$74.50	$2.26	$1.69	$78.45	$74,053	$2,246	$1,680	$77,979	44,730	22.37
W8x31	L.F.	4	$51.00	$2.26	$1.61	$54.87	$204	$9	$6	$219	84	0.04
W12x50	L.F.	426	$82.50	$2.36	$1.69	$86.55	$35,145	$1,005	$720	$36,870	21,300	10.65
W12x87	L.F.	174	$144.00	$2.48	$1.77	$148.25	$25,056	$432	$308	$25,796	15,138	7.57
W14x74	L.F.	58	$122.00	$2.48	$1.77	$126.25	$7,076	$144	$103	$7,323	4,292	2.15
W16x57	L.F.	436	$82.50	$3.05	$2.18	$87.73	$35,970	$1,330	$950	$38,250	24,852	12.43
HSS 8"x4"x3/8"x12'-0"	Ea.	10	$550.00	$45.00	$32.00	$627.00	$5,500	$450	$320	$6,270	3,910	1.95
HSS 12"x8"x1/2"x16'-0"	Ea.	27	$1,625.00	$51.00	$36.50	$1,712.50	$43,875	$1,377	$986	$46,238	17,431	8.72
SUBTOTALS	***L.F.***	***2644***					***$226,879***	***$6,993***	***$5,073***	***$238,945***	***131,737***	***65.87***

Structural Beams (Lower Level - 9000 sq. ft. module)			*Bare Costs*				*Project Costs*				*Weights*	
Member Size	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**	**Weight (lb)**	**Weight (ton)**
W12x19	L.F.	1131	$36.50	$2.77	$1.98	$41.25	$41,282	$3,133	$2,239	$46,654	21,489	10.74
W16x26	L.F.	138	$43.00	$2.44	$1.74	$47.18	$5,934	$337	$240	$6,511	3,588	1.79
W16x36	L.F.	60	$66.00	$3.05	$2.18	$71.23	$3,960	$183	$131	$4,274	2,160	1.08
W18x40	L.F.	25	$66.00	$3.67	$1.95	$71.62	$1,650	$92	$49	$1,791	1,000	0.50
W21x44	L.F.	161	$72.50	$3.32	$1.76	$77.58	$11,673	$535	$283	$12,490	7,084	3.54
W21x55	L.F.	56	$82.50	$3.32	$1.76	$87.58	$4,620	$186	$99	$4,904	3,080	1.54
W24x94	L.F.	29	$155.00	$3.27	$1.74	$160.01	$4,495	$95	$50	$4,640	2,726	1.36
W27x84	L.F.	30	$139.00	$2.96	$1.58	$143.54	$4,170	$89	$47	$4,306	2,520	1.26
W33x118	L.F.	58	$195.00	$3.00	$1.59	$199.59	$11,310	$174	$92	$11,576	6,844	3.42
W36x135	L.F.	24	$223.00	$3.02	$1.60	$227.62	$5,352	$72	$38	$5,463	3,240	1.62
SUBTOTALS	***L.F.***	***1712***					***$94,445***	***$4,895***	***$3,269***	***$102,609***	***53,731***	***26.87***
Multiplier Totals (3.33)	***L.F.***	***5701***					***$314,502***	***$16,300***	***$10,887***	***$341,689***	***178,924***	***89.46***

Structural Beams (Main Level - 8000 sq. ft. module)			*Bare Costs*				*Project Costs*				*Weights*	
Member Size	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**	**Weight (lb)**	**Weight (ton)**
W12x16	L.F.	276	$26.50	$2.77	$1.98	$31.25	$7,314	$765	$546	$8,625	4,416	2.21
W12x19	L.F.	560	$36.50	$2.77	$1.98	$41.25	$20,440	$1,551	$1,109	$23,100	10,640	5.32
W16x26	L.F.	170	$43.00	$2.44	$1.74	$47.18	$7,310	$415	$296	$8,021	4,420	2.21
W16x36	L.F.	28	$66.00	$3.05	$2.18	$71.23	$1,848	$85	$61	$1,994	1,008	0.50
W21x44	L.F.	83	$72.50	$3.32	$1.76	$77.58	$6,018	$276	$146	$6,439	3,652	1.83
W21x48	L.F.	28	$72.50	$3.32	$1.76	$77.58	$2,030	$93	$49	$2,172	1,232	0.62
W21x55	L.F.	28	$82.50	$3.32	$1.76	$87.58	$2,310	$93	$49	$2,452	1,540	0.77
W24x62	L.F.	28	$102.00	$3.18	$1.69	$106.87	$2,856	$89	$47	$2,992	1,736	0.87
SUBTOTALS	***L.F.***	***1201***					***$50,126***	***$3,366***	***$2,304***	***$55,796***	***28,644***	***14.32***
Multiplier Totals (7.28)	***L.F.***	***8743***					***$364,914***	***$24,508***	***$16,774***	***$406,195***	***208,528***	***104.26***

Structural Beams (Roof Level - 8000 sq. ft. module)			*Bare Costs*				*Project Costs*				*Weights*	
Member Size	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**	**Weight (lb)**	**Weight (ton)**
W10x45	L.F.	56	$81.00	$4.43	$3.17	$88.60	$4,536	$248	$178	$4,962	2,520	1.26
W16x26	L.F.	199	$43.00	$2.44	$1.74	$47.18	$8,557	$486	$346	$9,389	5,174	2.59
W18x35	L.F.	114	$58.00	$3.67	$1.95	$63.62	$6,612	$418	$222	$7,253	3,990	2.00
W21x44	L.F.	83	$72.50	$3.32	$1.76	$77.58	$6,018	$276	$146	$6,439	3,652	1.83
W24x68	L.F.	27	$112.00	$3.18	$1.69	$116.87	$3,024	$86	$46	$3,155	1,836	0.92
SUBTOTALS	***L.F.***	***479***					***$28,747***	***$1,513***	***$938***	***$31,198***	***17,172***	***8.59***
Multiplier Totals (8.98)	***L.F.***	***4301***					***$258,144***	***$13,591***	***$8,421***	***$280,156***	***154,205***	***77.10***

Structural Joists (Roof - 9400 sq. ft. module)			*Bare Costs*				*Project Costs*				*Weights*	
Member Size	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**	**Weight (lb)**	**Weight (ton)**
16K2	L.F.	600	$6.40	$1.96	$1.12	$9.48	$3,840	$1,176	$672	$5,688	3,780	1.89
20K4	L.F.	1272	$8.20	$1.76	$1.00	$10.96	$10,430	$2,239	$1,272	$13,941	10,430	5.22
26K7	L.F.	352	$10.60	$1.60	$0.91	$13.11	$3,731	$563	$320	$4,615	3,731	1.87
SUBTOTALS	***L.F.***	***2224***					***$18,002***	***$3,978***	***$2,264***	***$24,244***	***17,942***	***8.97***
Multiplier Totals (8.08)	***L.F.***	***17970***					***$145,453***	***$32,142***	***$18,296***	***$195,890***	***144,968***	***72.48***

Steel Composite Decking (Roof Decking and Slab Decking) - Entire Building			*Bare Costs*				*Project Costs*				*Weights*	
Description	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**	**Weight (lb)**	**Weight (ton)**
1 1/2" Deep, 22 gauge, over 500	S.F.	79000	$1.85	$0.28	$0.03	$2.16	$146,150	$22,120	$2,370	$170,640	237,000	118.50
SUBTOTALS	***S.F.***	***79000***					***$146,150***	***$22,120***	***$2,370***	***$170,640***	***237,000***	***118.50***

Miscellaneous Steel - Entire Building			*Bare Costs*				*Project Costs*				*Weights*	
Description	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**	**Weight (lb)**	**Weight (ton)**
Rebar, #6 Bars	L.F.	5819	$6.40	$7.45	$0.00	$13.85	$37,242	$43,352	$0	$80,593	8,740	4.37
WWF	S.F.	81000	$0.33	$1.50	$0.00	$1.83	$26,730	$121,500	$0	$148,230	17,010	8.51
SUBTOTALS							***$63,972***	***$164,852***	***$0***	***$228,823***	***25,750***	***12.88***

Concrete (Material Only - Entire Building)			*Bare Costs*				*Project Costs*			
Description	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**
Footings, 3500 PSI NW	C.Y.	388	$104.00	$0.00	$0.00	$104.00	$40,344	$0	$0	$40,344
Slab on Grade, 3500 PSI NW, 4" thick	C.Y.	511	$104.00	$0.00	$0.00	$104.00	$53,144	$0	$0	$53,144
Slab on Deck, 3500PSI NW, 4 3/4" thick	C.Y.	586	$104.00	$0.00	$0.00	$104.00	$60,944	$0	$0	$60,944
Walls	C.Y.	83	$104.00	$0.00	$0.00	$104.00	$8,632	$0	$0	$8,632
SUBTOTALS	***C.Y.***	***1568***					***$163,064***	***$0***	***$0***	***$163,064***

Misc. Concrete Items			*Bare Costs*				*Project Costs*			
Description	**Unit**	**Quantity**	**Material**	**Labor**	**Equipment**	**Total**	**Material**	**Labor**	**Equipment**	**Total**
Placing Concrete, Pumped	C.Y.	1180	$0.00	$15.50	$5.65	$21.15	$0	$18,290	$6,667	$24,957
Placing Concrete, Direct Chute	C.Y.	388	$0.00	$13.20	$0.43	$13.63	$0	$5,121	$167	$5,287
Finishing, Power screed, Ride	S.F.	81000	$0.00	$0.22	$0.06	$0.28	$0	$17,820	$4,860	$22,680
Forms, SOG, 4 use, 6"-12"	SFCA	641	$0.92	$4.41	$0.00	$5.33	$590	$2,827	$0	$3,417
SUBTOTALS							***$590***	***$44,057***	***$11,694***	***$56,341***

J. APPENDIX 4 – General Conditions Estimate

The following pages contain calculations to support the conclusions of the GC estimate.

General Conditions Estimate										
Div.	*Description*	*Unit*	*Quantity*	*Mat'l Unit*	*Mat'l Cost*	*Labor Unit Cost*	*Labor Cost*	*Equipment*	*Equipment*	*Total Cost*
01 11 31.20 Construction Management Fees										
300	50,000,000 job, minimum	Project	2.50%							$525,000
01 31 13.20 Field Personnel										
20	Clerk	Week	84			$380.00	$31,920.00			$31,920
100	Field Engineer	Week	84			$1,165.00	$97,860.00			$97,860
200	Project Manager, average	Week	84			$1,925.00	$161,700.00			$161,700
250	Superintendent 1, average	Week	84			$1,925.00	$161,700.00			$161,700
01 31 13.30 Insurance										
20	Builders risk, standard, minimum	Job	.40%							$84,000
01 31 13.90 Performance Bond										
20	Performance bond for buildings, minimum	Job	2.0%							$420,000
01 32 13.50 Scheduling										
650	Rule of thumb, CPM scheduling, large job	Job	.04%							$8,400
01 41 26.50 Permits										
20	Rule of thumb, most cities	Job	1.25%							$262,500
01 45 23.50 Testing and Inspecting Services										
10	Testing and Inspecting Services for building costing $10,000,000	Project								$48,182
01 51 13.80 Temporary Utilities										
100	Heat, incl. fuel and operation, per week, 12 hrs.	CSF Flr.	811.21	$27.00	$21,903	$4.00	$3,244.84			$150,885
350	Lighting, incl. service lamps, wiring & outlets	CSF Flr.	811.21	$4.00	$3,245	$14.00	$11,356.94			$14,602
400	Power for temp lighting only, per month, min/month 6.6 KWH	Month	12.00				$1.50			$14,602
600	Power for job duration incl. elevator, ect. minimum	CSF Flr.	811.21							$48,673
1000	Toliet 1, portable	Month	21.0	$150	$3,150					$3,150
1000	Toliet 2, portable	Month	21.0	$150	$3,150					$3,150
1000	Toliet 3, portable	Month	21.0	$150	$3,150					$3,150
1000	Toliet 4, portable	Month	21.0	$150	$3,150					$3,150
01 52 13.20 Office and Storage Space										
500	Trailer, furnished, no hookups, 50'x12' rent per	Month	21.0	$416	$8,736					$8,736
01 52 13.40 Field Office Expense										
100	Office equipment rental, average	Month	21.0	$155	$3,255					$3,255
120	Office supplies, average	Month	21.0	$85	$1,785					$1,785
140	Telephone bill; avg	Month	21.0	$80	$1,680					$1,680
160	Lights & HVAC	Month	21.0	$150	$3,150					$3,150
01 55 23.50 Roadways and Sidewalks										
50	Roads, gravel fill, no surfacing, 4" gravel depth	S.Y	2,950	$4.97	$14,662	$2.23	$6,578.50	$0.41	$1,210	$22,450
01 56 26.50 Temporary Fencing and Protective Walkways										
100	Rented chainlink, 6' high, over 1000' (21 Months)	L.F	2,250	$2.59	$5,828	$1.69	$3,802.50			$16,853
01 58 13.50 Signs										
20	High intrensity reflectorized, no posts, buy	S.F	100	$21.00	$2,100					$2,100
01 74 13.20 Cleaning Up										
20	After job completion, allow, minimum	Job	.50%							$105,000

TOTAL PROJECT GENERAL CONDITIONS	$2,207,632
x Location Factor of 0.895	**$1,975,830**