

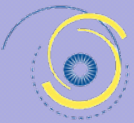


Walker Jones

100 L Street NW
Washington, DC 20005

Technical Assignment #2
Dr. Messner
10/24/08

Maria Piergallini | Construction Management



Project Team

Owner:	Office of the Deputy Mayor for Planning and Economic Development
Architect:	Hord Coplan & Macht
Construction Manager:	Forrester Construction & Columbia Enterprises (joint venture)
Structural Engineer:	Simpson Gumpertz & Heger
MEP Engineer:	Burdette Koehler Murphy & Associates

Mechanical

- 8 roof top air handling units ranging in size from 3,150 CFM to 20,200 CFM with energy recovery wheels
- AHU's work in conjunction with 2 boilers to serve the 2 pipe VAV system that ventilates the building
- Commissioning for all MEP systems
- Pre-occupancy building flush-out to increase indoor air quality

Structural

- Concrete foundation walls sit on spread footing system supported by soil reinforced with impact piers and helical anchors ranging in length from 19' to 42'
- Steel superstructure with concrete composite slabs on metal deck supported by wide flange beams
- W shaped beams and columns with HSS in multi story spaces

Building Statistics

Size:	125,000 SF
Function:	Pre-K – 8 school, public library, and community center
Building Cost:	\$36 Million
Construction Dates:	March 2008-August 2009
Delivery Method:	Design-Bid-Build with GMP

Architecture

- Organized by grade based on floor level with shared spaces at circulation nodes
- “C” shape footprint designed to provide a safe area in the middle of the “C” for kids to play
- Seeking LEED certification upon completion
- 29,000 SF of green roof with access for students

Electrical

- Building distribution is 480V, 3 phase, 4 wire from Pepco supply
- 3000A main switchboard with 1000A, 400 A and 225A distribution panelboards
- 275kW 480/277V emergency generator with 500 gallon fuel tank for 23 hours of operation at full load

Executive Summary

Technical Assignment Two takes a look at key features of the Walker Jones project that affect project execution. Important schedule attributes, site layout planning, and the costs of the structural system and general conditions are analyzed in depth. Additionally, critical industry issues from the PACE Roundtable are summarized and discussed.

The first portion of the report addresses planning by considering the project schedule and site layout. The detailed project schedule consists of 181 activities which help to understand the construction sequence. The Notice to Proceed was granted March 3, 2008 with substantial completion scheduled for July 1, 2009. In these seventeen months, trades will work through the building following the sequence explained in this report and found in the attached schedule. Located in the heart of Washington, DC, the site for Walker Jones is so tight that the walls of the school are built on the property line; however, fields occupying the western portion of the site and a vacant lot across the street allow for better site planning.

The second half of the report consists of a detailed structural system and general conditions estimate. The structural systems estimate, which consists of structural steel, structural concrete, and impact piers, results in a final cost of \$4,759,919, or \$38.89/SF. This estimate is within 2% of the contract amounts for these trades, which is reasonably close for the scope of this assignment. Finally, the general conditions estimate totals \$3,402,578 or \$50,038/week for the 68 week duration. This cost, at about 9% of the total contract cost for the project, seems to be a reasonable estimate.

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Detailed Project Schedule

Schedule Summary

Design for Walker Jones Educational and Community Center began in early 2007. Mid-way through the design process, Forrester Construction was hired to perform paid pre-construction services. Because the project is public, it was put out for competitive bid and on February 18, 2008, Forrester Construction was awarded the project. Construction started shortly after with the Notice to Proceed issued March 3, 2008. Forrester quickly began mobilizing and the groundbreaking ceremony followed two weeks later. After excavation is complete, work on foundations and superstructure begins. This includes installation of soil support system (geopiers), footings, grade beams, below grade walls and slab on grade. Once these items are complete, structural steel will begin followed by MEP work. Masonry façade and storefront will follow behind steel until the building is watertight and interior trades can begin work. The building is expected to be watertight by April 24, 2009 with substantial completion and certificate of occupancy July 1, 2009. The punch list is anticipated to be complete within three weeks of substantial completion.

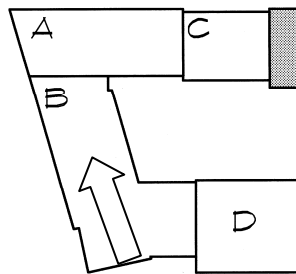


Figure 1 – The breakdown of the building for sequencing purposes.

Sequencing

For all of these milestones to be achieved, a lot of work must go into place. The sequence of construction is Area B, Area A, Area C and finally, Area D. The building breakdown can be seen in Figure 1. Within each area, construction is broken up by floor. All trades start in the end of Area B closest to Area D and work towards Area A. For steel erection, once the second and third floors of Area B are completed, workers jump to the third floor of Area A, since Area A at the second floor is slab on grade. Area A third floor starts, moving into the fourth floor, while fourth floor Area B finishes. Area C is then completed followed by Area D. The sequencing is staged this way based on the importance of each Area. Area B contains the majority of the classrooms. Area A also has many classrooms. Area C is the cafeteria and Area D is the gymnasium, so they are sequenced last in case any unexpected delays occur.

Please see **Appendix A** for Detailed Project Schedule.

Site Layout Plan

Site Layout Summary

The site for Walker Jones is located on the block bound by New Jersey Avenue, Pierce Street, 1st Street, and K Street in Northwest Washington, DC. The location can be seen in Figure 2. While there is nothing directly adjacent to the site, there are several buildings in the area which cause concern. Across Pierce Street, there is a residential neighborhood consisting of two-story row homes. Across New Jersey Avenue, there is an eight-story assisted living community. In both cases, scheduling is an issue as local ordinances limit construction time to 7 am - 7 pm. Additionally, pedestrian access and handicap accessibility around the site was an important issue. A covered walkway with handicap ramps was installed along New Jersey Avenue to ensure safety of pedestrians.

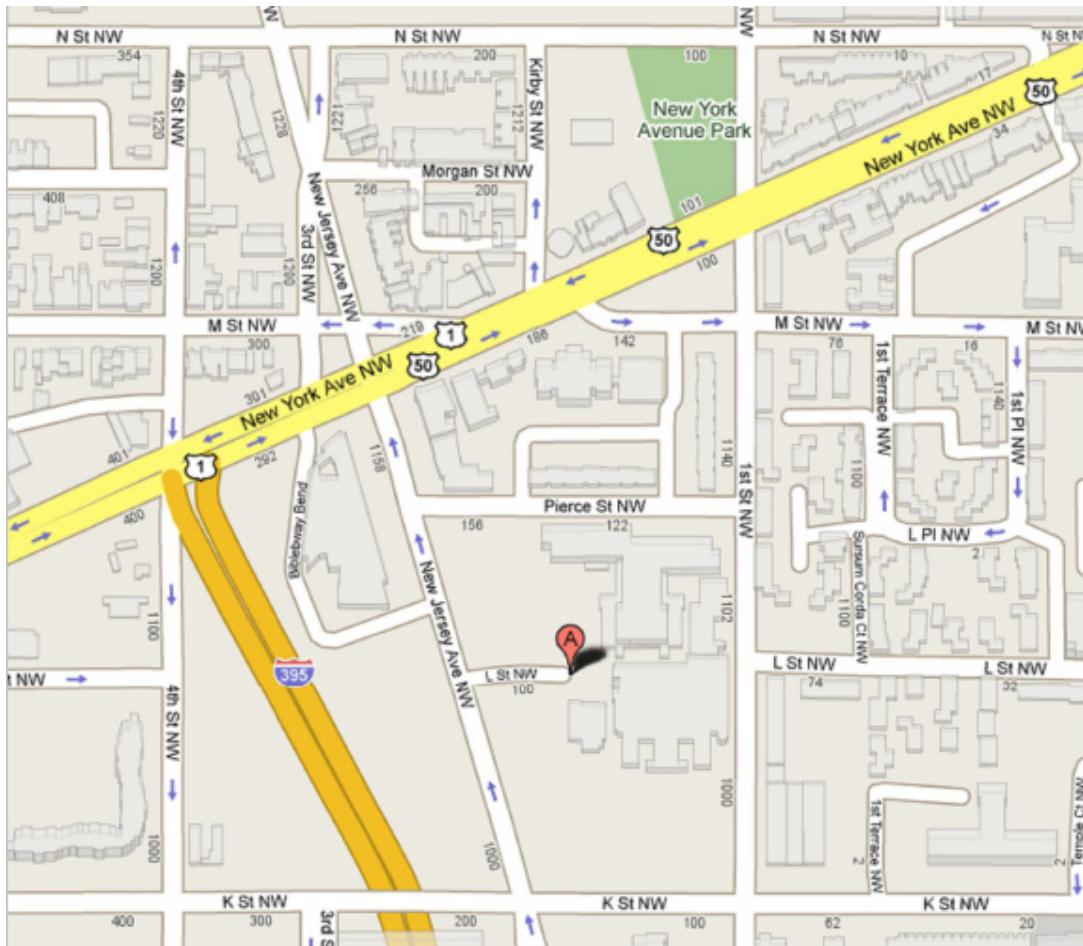


Figure 2 – A map of the surrounding area and site location.

Excavation Site Plan Summary

During Excavation, there is plenty of room onsite. As with all stages of construction, the office trailers, tool trailers, and limited parking space are located in a vacant lot across the street. The gate to access the construction site is located off L Street NW in the southwest corner of the future gymnasium as this area requires little excavation and can be used until slabs are poured. Because the site has open space during excavation, a

second gate is not required; trucks simply turn around and use the same gate to exit the site.

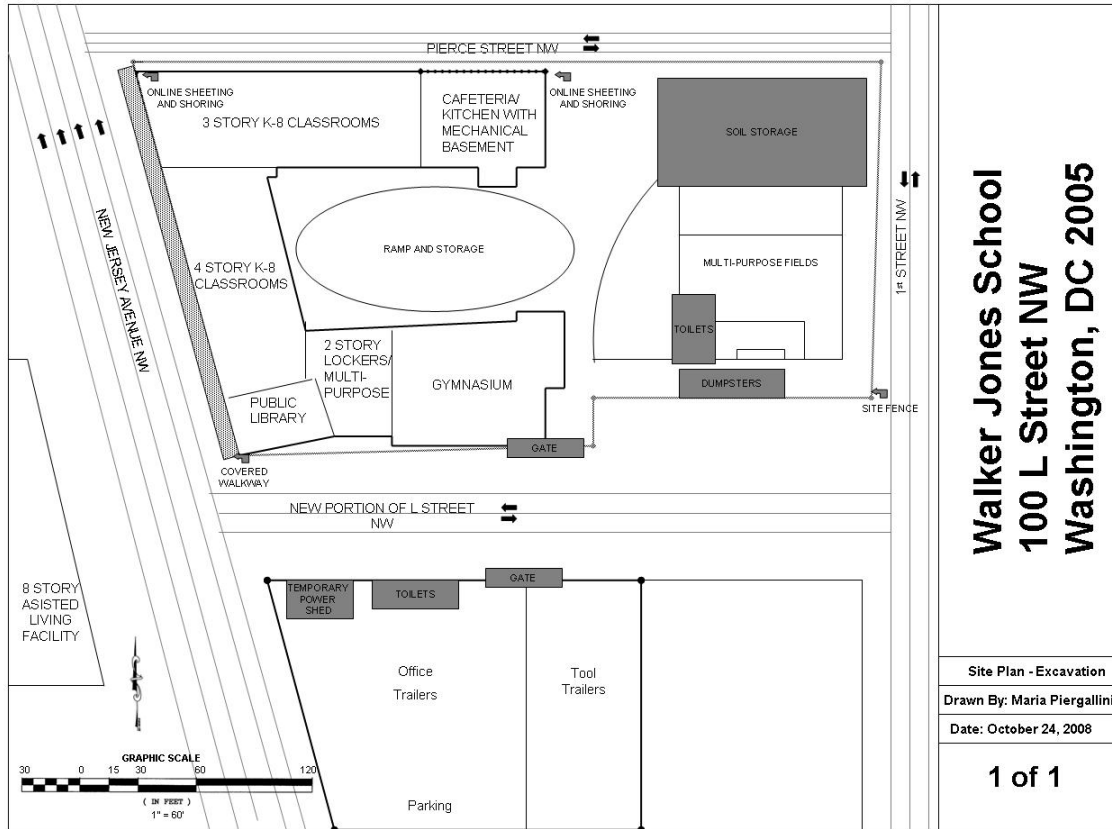


Figure 3 – Site plan for the excavation phase.

The western half of the site is used to store soil, materials, and also provides a place for dumpsters and temporary toilets. The central courtyard area is ramped up and used for storage of materials and equipment. Sheeting and shoring is located on the north wall of Area C and the northeast wall of Area A. Because the building was designed on the property line, online sheeting and shoring is used. The locations of sheeting and shoring can be seen in Figure 3, or more clearly in the site plan in Appendix B.

Steel Erection and Interior Finishes Site Plan Summary

The site plan for the finishes stage of construction can be seen in Figure 4, or in more detail in Appendix B. This site plan is similar to the site plan during steel erection, which can be seen in Appendix B, with the exception of the crane. For both stages, a second gate was added in the northwest corner of the site exiting onto 1st Street NW and the location of storage on the western part of the site is slightly relocated to allow trucks to drive through to the exit gate. Additional toilets and parking were added to accommodate more workers. The covered walkway is removed once the building is enclosed. Permanent power is provided prior to interior finishes, so there is no longer a need for the temporary power shed. There is no loading dock, but the service area located to the west of Area C is used as a makeshift loading dock. Hoists and temporary elevators are not necessary as the highest floor is four stories.

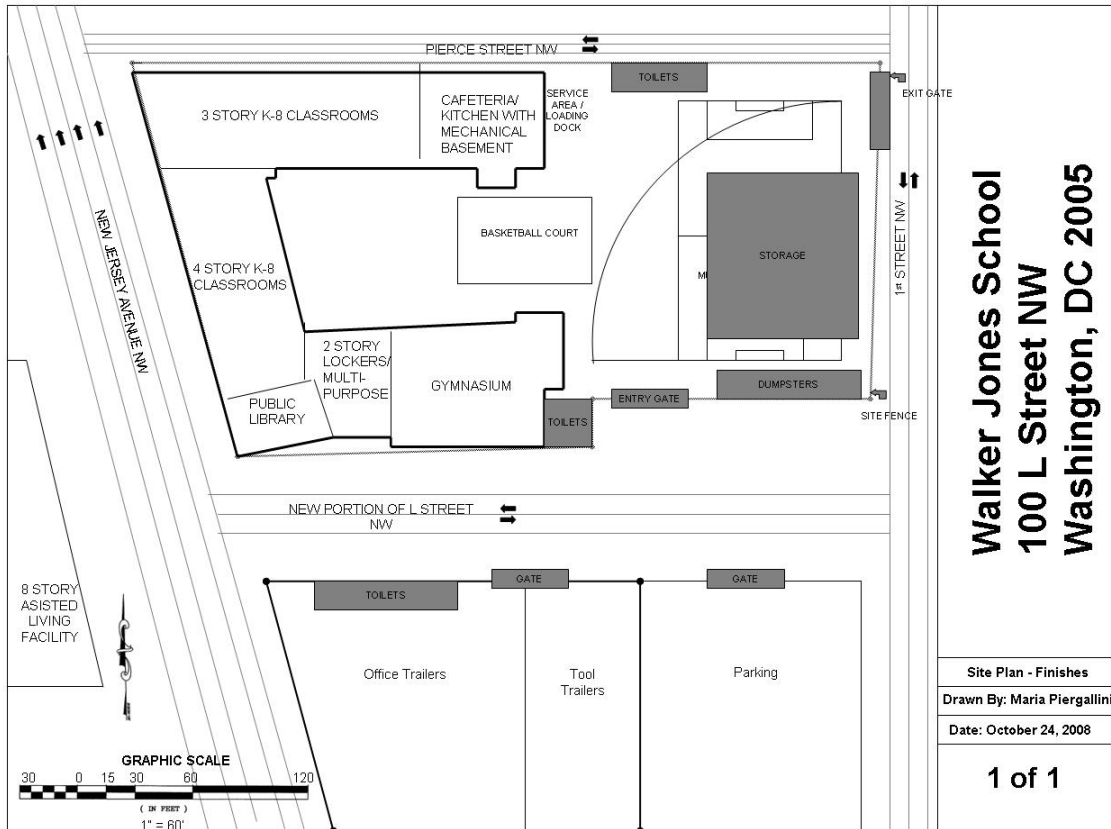


Figure 4 – Site plan for the finishes phase.

The site is more restricted during steel erection and the interior finish stages of construction; however, the fields which are scheduled to be completed later provide some space for storage and maneuvering.

Please see **Appendix B** for full size excavation, steel erection, and interior finishes Site Layout Plans.

Detailed Structural System Estimate

Structural System Summary

Walker Jones School consists of a steel superstructure supported by concrete footings, foundations, and foundation walls which sit on soil reinforced with impact piers. The structural steel is fairly typical, using common W- shapes and lengths with a few Hollow Structural Steel pieces in multi-story spaces. Cast in place concrete is used for spread footings, foundation walls, and floor slabs.

Structural Steel Estimate Analysis

The structural steel take-off was performed on the entire building based on the structural drawings. In most buildings, steel members get smaller as the building rises; however, due to the green roof on Area A and Area B of Walker Jones, the steel sizes increase slightly from the first to the fourth floor. A summary table is included below in Figure 5, and a detailed take-off can be found in Appendix C. All cost information was taken from RS Means 2006, and adjusted for time and location. In 2006, the location factor for Washington, DC was 0.975. To adjust the price to 2008 dollars, the 2006 price was multiplied by the 2008 Historical Cost Index / 2006 Historical Cost Index, or $(173/155.9)=1.109$. These values can be found on page 661 of RS Means Building Construction Cost Data 2008. The “Adjusted Cost” values are in 2008 dollars. The estimated steel cost is \$1,532,722, or about 4.2% of the contract cost for the entire building. This number seems slightly low, but is not entirely unreasonable. Material cost escalation beyond what RS Means can predict may account for some of the difference. Total cost/SF is \$12.52.

Steel Beams	
Total Steel (tons)	306.86
Cost/Ton	\$2,800
Adjusted Cost	\$929,628
Steel Columns	
Total Steel (tons)	921.454687
Cost/Ton	\$2,800
Adjusted Cost	\$238,905
Steel Joists	
Total Steel (tons)	26.73
Cost/ton	\$2,550
Adjusted Cost	\$73,746
Metal Decking	
Total (SF)	106,915
Adjusted Cost	\$290,443
Total Steel Cost	\$1,532,722

Figure 5 – Structural Steel Estimate Summary.

Impact Pier Analysis

Although this is not a required calculation, the impact piers which reinforce the soil supporting the concrete foundation are a critical aspect of the structural system and they add a considerable cost. There are 638 total impact piers varying in length. Average depth is 22 feet, but actual lengths were used in the take-off. Rough estimates of cost per foot of impact piers were provided by GeoConstructors, Inc, who is the subcontractor on the job. A summary can be found in Figure 6 below, and a detailed take-off can be found in Appendix C. Total Cost/SF is \$5.53.

Impact Piers	
Total Ft of Piers	16855
Cost/Ft	\$40.18
Total Cost	\$677,234

Figure 6 – Impact Pier Estimate Summary.

Structural Concrete Analysis

The structural concrete estimate was performed using the drawings. All costs are from RS Means 2006 and prices were adjusted in the same manner described for steel. All prices include forms, concrete, reinforcing and placement. Slab on grade thickness is 5” and slab on deck thickness is 3.5.” Foundation walls are 15” thick and assumed to be 12’ high. Walls and foundations were placed using a crane and bucket while floor slabs were pumped; prices reflect these differences. A summary of the structural concrete estimate can be found below in Figure 7, and a detailed take-off is included in Appendix C. A total cost of \$2,549,963 is a reasonable estimate for a project of this size and is within 3% of the structural concrete contract on the project. The total cost/SF is \$20.83

Footings	
Total (CY)	855.38
Cost/CY	\$340
Adjusted Cost	\$314,660
Mat Foundations	
Total (CY)	402.64
Cost/CY	\$276
Adjusted Cost	\$120,235
Foundation Walls	
Total (CY)	915
Cost/CY	\$385
Adjusted Cost	\$381,142
Slabs	
Total (CY)	56453
Cost/CY	\$28
Adjusted Cost	\$1,676,930
Grade Beams	
Total (CY)	91.46
Cost/CY	\$576
Adjusted Cost	\$56,996
Total Concrete Cost	\$2,549,963

Figure 7 – Structural Concrete Estimate Summary.

Structural System Analysis

The total structural system cost for steel, impact piers, and concrete is \$4,759,919. This comes out to \$39.89/SF. A cost comparison can be seen below in Figure 8. Actual structural cost as reported by the project team is around \$4,000,000 or \$32.68/SF. This number is a rounded slightly skewed estimate for privacy reasons. Using the ballpark figure which was provided by the project team, the comparison below results in about a 2% margin of error. A slightly low steel estimate may have been compensated for either by a more conservative impact pier or structural concrete estimate. Regardless, this is a reasonably close estimate for the scope of this assignment.

Actual Structural	
Total Cost	\$4,000,000
Cost/SF	\$32.68
Estimated Structural	
Total Cost	\$4,759,919
Cost/SF	\$38.89

Figure 8 – Structural System Cost Comparison.

Please see **Appendix C** for Detailed Structural System Estimate.

General Conditions Estimate

General Conditions Analysis

The General Conditions Estimate was broken into “Construction Management Staff,” “Temporary Utilities,” “Construction Facilities and Equipment,” and “Permits, Insurance and Fee,” as can be seen below in Figure 9. A detailed general conditions estimate can be found in Appendix D. All testing, inspections and surveying contracts are held directly with the owner, and therefore not included in the general conditions estimate. Items such as scaffolding and commissioning are included in separate bid packs and not accounted for in general conditions. Construction management staff estimates were produced assuming the project manager, assistant project manager, senior superintendent and assistant superintendent remain on the job all 68 weeks. Because the project executive has 7 projects under him, he is billed for 1/7 of his time, or 9.7 weeks of the 68 week duration. The senior project manager oversees two projects, and therefore is billed for 34 of the 68 week duration. The estimated amount of \$3,402,578 is approximately 9% of the total contract amount for the project. The estimated total cost/week for general conditions is \$50,038.

General Conditions Estimate Summary				
Description	Quantity	Unit	Average Unit Cost	Total
Construction Management Staff	68	Week	\$13,488.00	\$917,200
Temporary Utilities	68	Week	\$656.60	\$44,649
Construction Facilities and Equipment	68	Week	\$3,469.55	\$235,929
Permits, Insurance and Fee	68	Week	\$32,423.53	\$2,204,800
			Total Cost/Week	\$3,402,578 \$50,038

Figure 9 – General Conditions Estimate Summary.

Please see **Appendix D** for General Conditions Estimate.

Critical Industry Issue

The 17th Annual PACE Roundtable held at The Pennsylvania State University on October 15-16 2008 presented a variety of critical industry issues to Penn State Architectural Engineering students. The theme of the roundtable was “Investing in People.” This theme was incorporated into discussions, industry and student panels, and three main technical topics. These topics were “LEED Evolution,” “BIM Strategies,” and “Energy and the Economy.”

Although Walker Jones is aiming to achieve LEED certification, the Energy and the Economy breakout session was a timely topic which is valuable and applicable to any project. It was surprising how many industry members were interested in this topic rather than discussions focused on hot industry issues such as BIM and LEED. The industry members were especially insightful and interested in new technologies and the ways in which energy and the economy are changing the construction market.

There are many energy topics which were discussed and are applicable to Walker Jones. First is the cost of escalating materials and the need to buy subcontractors early and/or use local or alternative materials. The project team bought out critical packages such as steel and concrete early in an attempt to lock in a price and subcontractor to do the work. The project team also looked into buying local and alternate materials but was not successful. This may be worth looking into further.

Additionally, controls and commissioning were stressed as keys to ensuring that the building functions as efficiently as it was designed to. Walker Jones has a complex control system which would be interesting to look into further. The design of more efficient systems and focus on life-cycle cost was also emphasized during the breakout session. Although a fairly efficient mechanical system was designed, it would be tempting to analyze the system and try to suggest a more efficient design. Finally, a unique but alluring idea is the concept of sizing wires one size above that required by code. On a case study project, it was found that the payback for this was only two years and it resulted in a much more energy efficient building.

The second half of the discussion was especially fascinating. With the session focused on the economy, the discussion veered off into a conversation of opportunities and strategic planning. Some strategies included developing pre-construction services so when clients have money to spend, a project team can hit the ground running. Industry members also offered their opinions about different market sectors that continue to produce work, even when the economy slows down. Examples of these market sectors are federal work, data centers, healthcare, education, and public/private partnerships. Strategic planning and what companies are doing to overcome the dip in the market right now is a really intriguing topic worth spending some time to understand. Researching strategic planning and business acquisition, in varying markets, would be an interesting critical research topic.

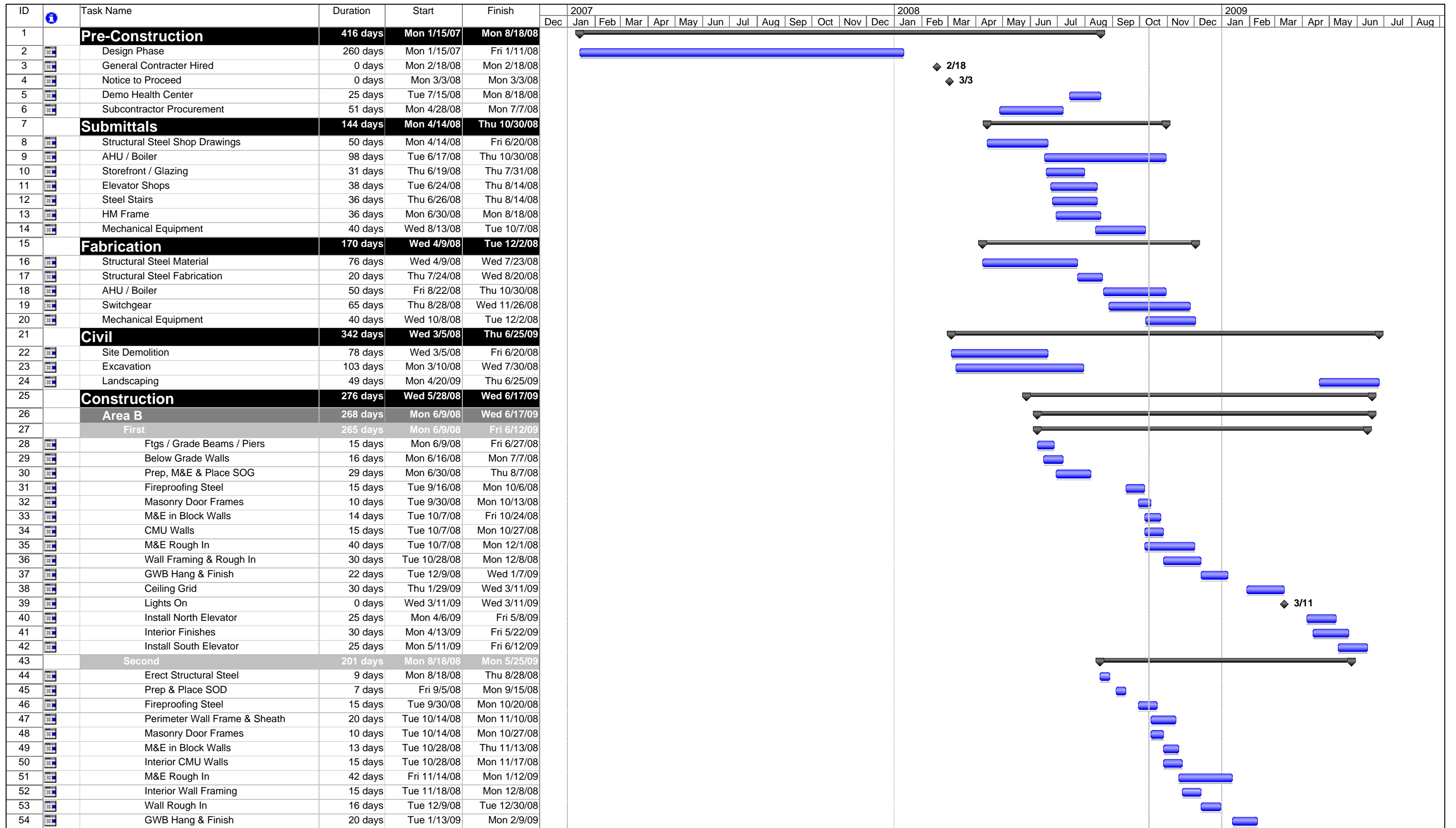
Finally, the breakout session focused on the theme of the Roundtable: Investing in People. A lot of what was discussed during this time tied into the discussion about strategic planning. It is important to understand that taking time and money to develop employees and grow a company is critical to success. Especially during a down time in the market, it is imperative to plan for recovery and there is no better way to do that than by investing in the people you already have.

The key issues that were striking throughout the discussion were selection of materials, new technologies and efficient designs, and planning for recovery/investing in people. All of these aspects apply to Walker Jones and are worth seriously considering as topics in a final proposal for spring thesis.

All of the industry members at the Roundtable were incredibly well informed and more than willing to offer help and advice. Some who were especially striking were Bill Moyer from Davis Construction, Raj Vora from Southland Industries, Charles Tomasco from Truland Systems, Mike Grobaski from Gilbane, and Steve Lee from Benchmark. Mr. Moyer has many years of experience, is very knowledgeable in all areas of construction, and seems to be more than willing to help students in any way he can. Mr. Vora and Mr. Tomasco offer the unique perspectives of specialty contractors and are well informed about efficient MEP systems. Mr. Grobaski and Mr. Lee were also quite knowledgeable and eager to help in any way that they can.

After attending the Roundtable, it is impossible not to start thinking about topics to research next semester. The discussions were informative, interesting, and all relevant to Walker Jones. It was difficult not to leave with a sense of excitement for next semester and a sense of comfort knowing how willing industry members are to help.

Appendix A: Detailed Project Schedule

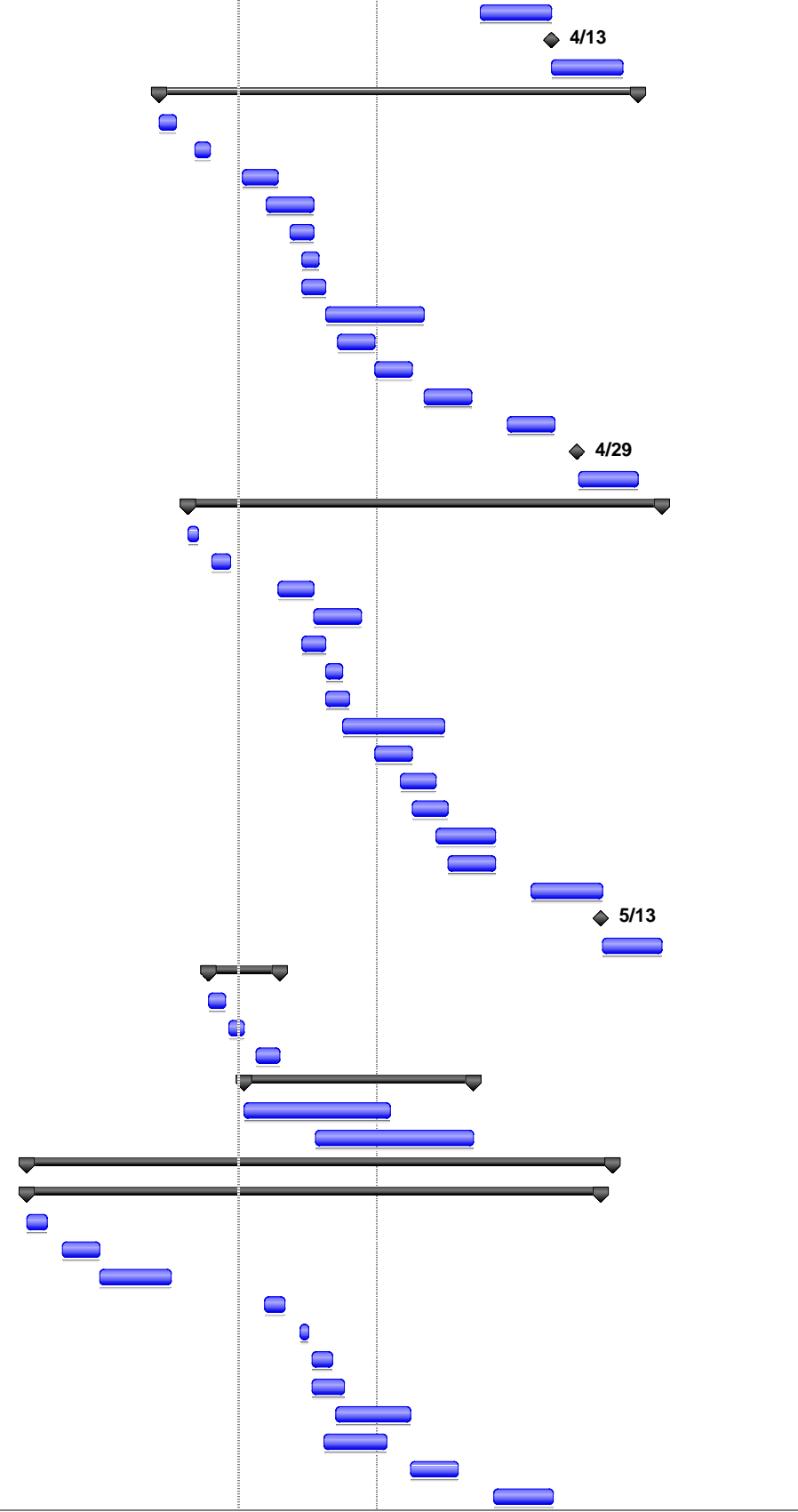


Walker Jones 10/24/08

Task Milestone Rolled Up Task Rolled Up Progress External Tasks Group By Summary

Progress Summary Rolled Up Milestone Split Project Summary Deadline

ID	Task Name	Duration	Start	Finish	2007												2008												2009																	
					Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug									
55	Ceiling Grid	30 days	Tue 3/3/09	Mon 4/13/09																																										
56	Lights On	0 days	Mon 4/13/09	Mon 4/13/09																																										
57	Interior Finishes	30 days	Tue 4/14/09	Mon 5/25/09																																										
58	Third	202 days	Tue 8/26/08	Wed 6/3/09																																										
59	Erect Structural Steel	8 days	Tue 8/26/08	Thu 9/4/08																																										
60	Prep & Place SOD	7 days	Tue 9/16/08	Wed 9/24/08																																										
61	Fireproofing Steel	15 days	Tue 10/14/08	Mon 11/3/08																																										
62	Perimeter Wall Frame & Sheath	20 days	Tue 10/28/08	Mon 11/24/08																																										
63	Masonry Door Frames	10 days	Tue 11/11/08	Mon 11/24/08																																										
64	M&E in Block Walls	8 days	Tue 11/18/08	Thu 11/27/08																																										
65	Interior CMU Walls	10 days	Tue 11/18/08	Mon 12/1/08																																										
66	M&E Rough In	42 days	Tue 12/2/08	Wed 1/28/09																																										
67	Interior Wall Framing	16 days	Tue 12/9/08	Tue 12/30/08																																										
68	Wall Rough In	16 days	Wed 12/31/08	Wed 1/21/09																																										
69	GWB Hang & Finish	20 days	Thu 1/29/09	Wed 2/25/09																																										
70	Ceiling Grid	20 days	Thu 3/19/09	Wed 4/15/09																																										
71	Lights On	0 days	Wed 4/29/09	Wed 4/29/09																																										
72	Interior Finishes	25 days	Thu 4/30/09	Wed 6/3/09																																										
73	Fourth	199 days	Fri 9/12/08	Wed 6/17/09																																										
74	Erect Structural Steel	4 days	Fri 9/12/08	Wed 9/17/08																																										
75	Prep & Place SOD	7 days	Fri 9/26/08	Mon 10/6/08																																										
76	Fireproofing Steel	15 days	Tue 11/4/08	Mon 11/24/08																																										
77	Perimeter Wall Frame & Sheath	20 days	Tue 11/25/08	Mon 12/22/08																																										
78	Masonry Door Frames	10 days	Tue 11/18/08	Mon 12/1/08																																										
79	M&E in Block Walls	8 days	Tue 12/2/08	Thu 12/11/08																																										
80	Interior CMU Walls	10 days	Tue 12/2/08	Mon 12/15/08																																										
81	M&E Rough In	42 days	Fri 12/12/08	Mon 2/9/09																																										
82	Interior Wall Framing	16 days	Wed 12/31/08	Wed 1/21/09																																										
83	Erect Stair 4	15 days	Thu 1/15/09	Wed 2/4/09																																										
84	Wall Rough In	15 days	Thu 1/22/09	Wed 2/11/09																																										
85	Erect Stair 3 & 6	25 days	Thu 2/5/09	Wed 3/11/09																																										
86	GWB Hang & Finish	20 days	Thu 2/12/09	Wed 3/11/09																																										
87	Ceiling Grid	30 days	Thu 4/2/09	Wed 5/13/09																																										
88	Lights On	0 days	Wed 5/13/09	Wed 5/13/09																																										
89	Interior Finishes	25 days	Thu 5/14/09	Wed 6/17/09																																										
90	Roof	30 days	Wed 9/24/08	Tue 11/4/08																																										
91	Erect Structural	8 days	Wed 9/24/08	Fri 10/3/08																																										
92	Prep & Place Roof Slab	7 days	Mon 10/6/08	Tue 10/14/08																																										
93	Install Roof Membrane	10 days	Wed 10/22/08	Tue 11/4/08																																										
94	Façade	97 days	Wed 10/15/08	Thu 2/26/09																																										
95	Masonry Façade	62 days	Wed 10/15/08	Thu 1/8/09																																										
96	Glazing Units	67 days	Wed 11/26/08	Thu 2/26/09																																										
97	Area A	247 days	Mon 6/9/08	Tue 5/19/09																																										
98	Second	242 days	Mon 6/9/08	Tue 5/12/09																																										
99	Foundation Modification	10 days	Mon 6/9/08	Fri 6/20/08																																										
100	Ftgs / Grade Beams / Piers	16 days	Mon 6/30/08	Mon 7/21/08																																										
101	Prep, M&E & Place SOG	30 days	Tue 7/22/08	Mon 9/1/08																																										
102	Fireproofing Steel	10 days	Mon 10/27/08	Fri 11/7/08																																										
103	Masonry Door Frames	5 days	Mon 11/17/08	Fri 11/21/08																																										
104	M&E in Block Walls	10 days	Mon 11/24/08	Fri 12/5/08																																										
105	CMU Walls	15 days	Mon 11/24/08	Fri 12/12/08																																										
106	M&E Rough In	32 days	Mon 12/8/08	Tue 1/20/09																																										
107	Wall Framing & Rough In	27 days	Mon 12/1/08	Tue 1/6/09																																										
108	GWB Hang & Finish	20 days	Wed 1/21/09	Tue 2/17/09																																										
109	Ceiling Grid	25 days	Wed 3/11/09	Tue 4/14/09																																										



Walker Jones
10/24/08

Task

Milestone

Rolled Up Task

Rolled Up Milestone

External Tasks

Project Summary

Group By Summary

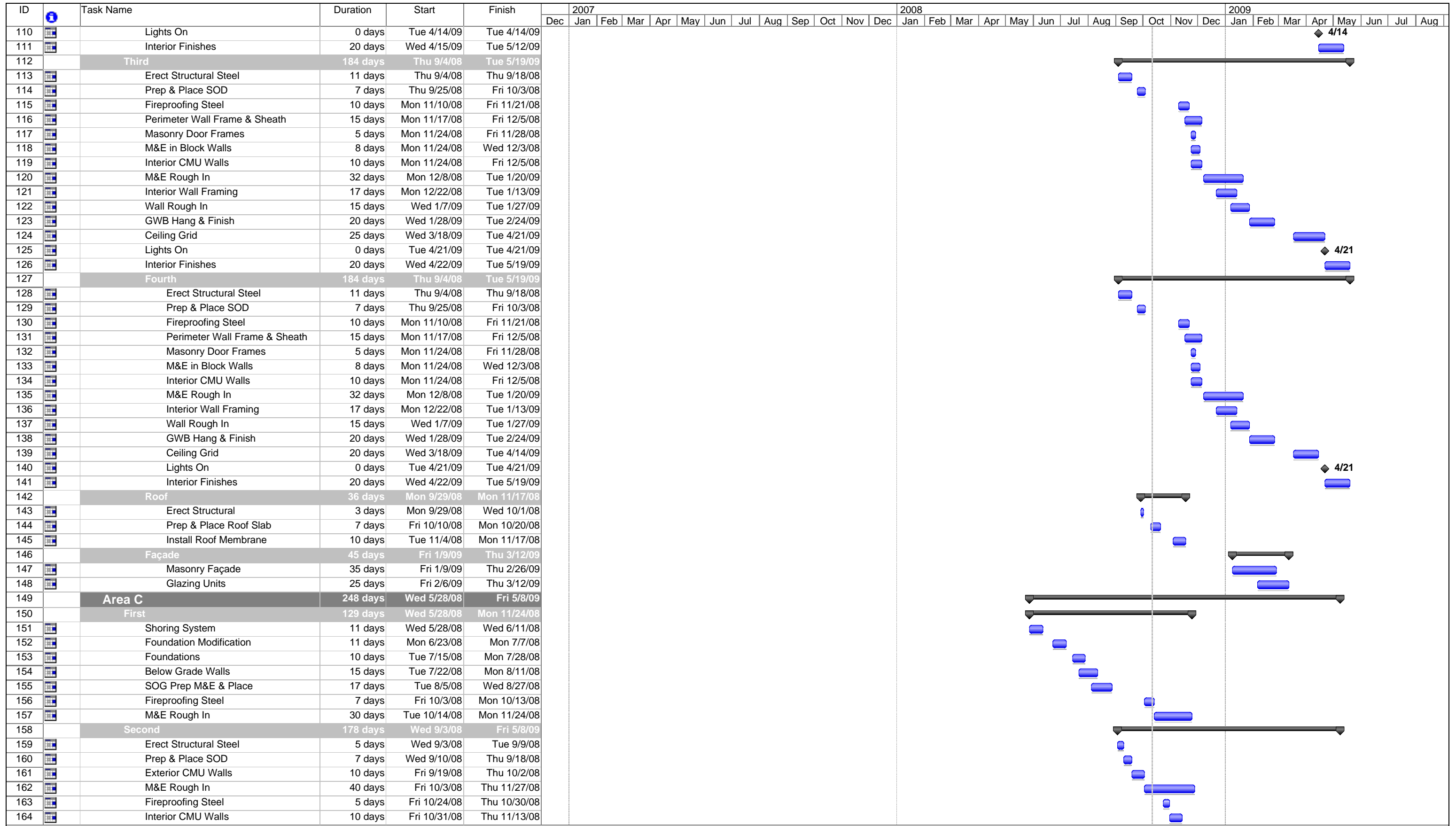
Deadline

Progress

Summary

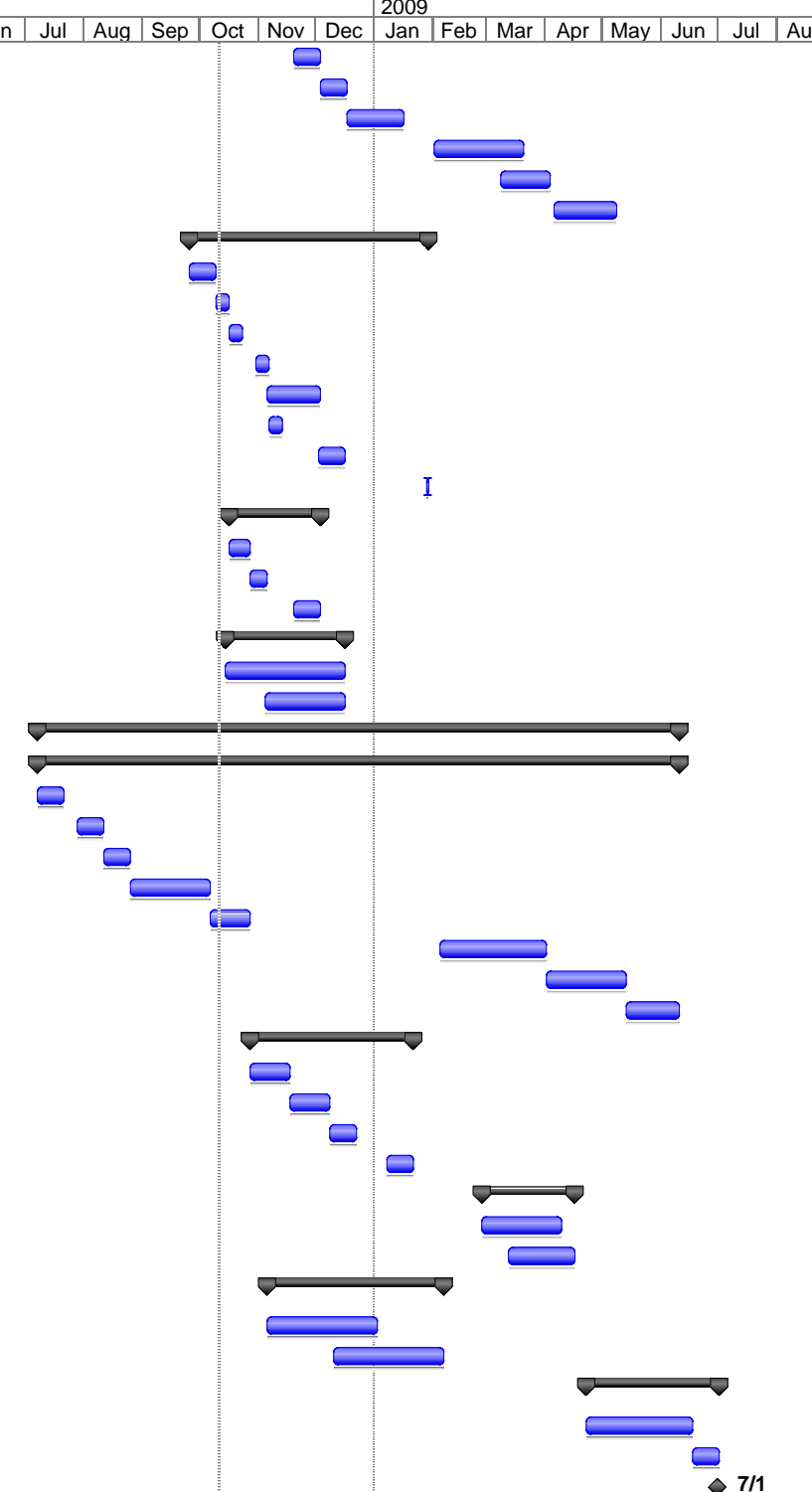
Rolled Up Progress

Split



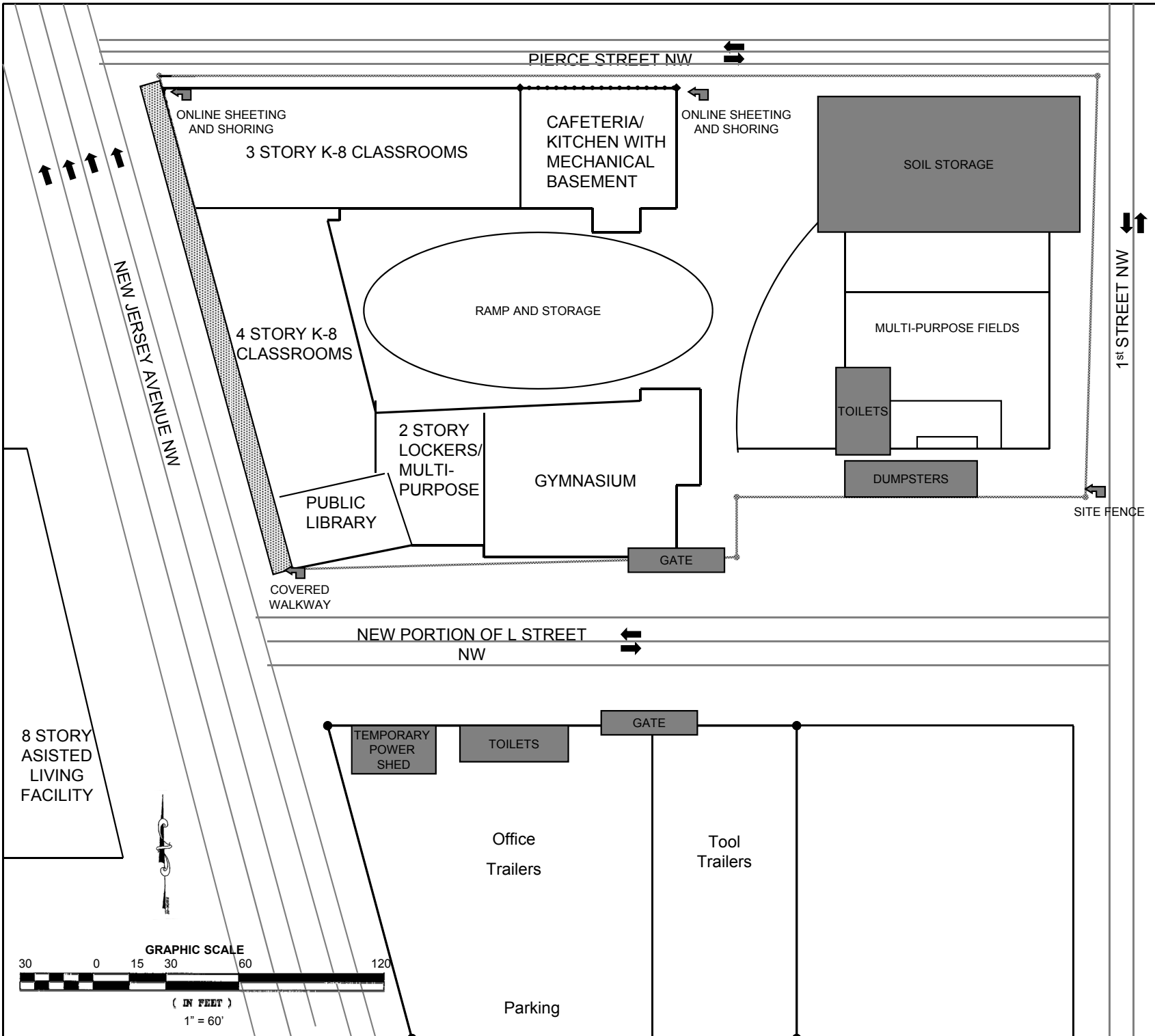
Walker Jones 10/24/08	Task		Milestone		Rolled Up Task		Rolled Up Progress		External Tasks		Group By Summary	
	Progress		Summary		Rolled Up Milestone		Split		Project Summary		Deadline	

ID	Task Name	Duration	Start	Finish	2007												2008												2009											
					Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug			
165	Wall Framing	10 days	Thu 11/20/08	Wed 12/3/08																																				
166	Wall Rough In	10 days	Thu 12/4/08	Wed 12/17/08																																				
167	GWB Hang & Finish	22 days	Thu 12/18/08	Fri 1/16/09																																				
168	Ceiling Grid	35 days	Mon 2/2/09	Fri 3/20/09																																				
169	Kitchen Equipment	20 days	Mon 3/9/09	Fri 4/3/09																																				
170	Interior Finishes	25 days	Mon 4/6/09	Fri 5/8/09																																				
171	Third	90 days	Fri 9/26/08	Thu 1/29/09																																				
172	Exterior CMU Walls	10 days	Fri 9/26/08	Thu 10/9/08																																				
173	Erect Structural Steel	5 days	Fri 10/10/08	Thu 10/16/08																																				
174	Prep & Place SOD	5 days	Fri 10/17/08	Thu 10/23/08																																				
175	Fireproofing Steel	5 days	Fri 10/31/08	Thu 11/6/08																																				
176	Erect Stairs 1 & 2	20 days	Thu 11/6/08	Wed 12/3/08																																				
177	Interior CMU Walls	5 days	Fri 11/7/08	Thu 11/13/08																																				
178	Hoist Boilers to Floor	10 days	Wed 12/3/08	Tue 12/16/08																																				
179	M&E Rough In	1 day	Thu 1/29/09	Thu 1/29/09																																				
180	Roof	34 days	Fri 10/17/08	Wed 12/3/08																																				
181	Erect Structural	7 days	Fri 10/17/08	Mon 10/27/08																																				
182	Prep & Place Roof Slab	7 days	Tue 10/28/08	Wed 11/5/08																																				
183	Install Roof	10 days	Thu 11/20/08	Wed 12/3/08																																				
184	Façade	45 days	Wed 10/15/08	Tue 12/16/08																																				
185	Masonry Façade	45 days	Wed 10/15/08	Tue 12/16/08																																				
186	Glazing Units	30 days	Wed 11/5/08	Tue 12/16/08																																				
187	Area D	242 days	Tue 7/8/08	Wed 6/10/09																																				
188	First	242 days	Tue 7/8/08	Wed 6/10/09																																				
189	Foundation Modification	10 days	Tue 7/8/08	Mon 7/21/08																																				
190	Footings	10 days	Tue 7/29/08	Mon 8/11/08																																				
191	Below Grade Walls	10 days	Tue 8/12/08	Mon 8/25/08																																				
192	SOG Prep M&E & Place	30 days	Tue 8/26/08	Mon 10/6/08																																				
193	CMU Walls	15 days	Tue 10/7/08	Mon 10/27/08																																				
194	M&E Rough In	40 days	Thu 2/5/09	Wed 4/1/09																																				
195	Interior Finishes	30 days	Thu 4/2/09	Wed 5/13/09																																				
196	Gym Equipment	20 days	Thu 5/14/09	Wed 6/10/09																																				
197	Third	62 days	Tue 10/28/08	Wed 1/21/09																																				
198	CMU Walls	15 days	Tue 10/28/08	Mon 11/17/08																																				
199	Roof Framing	15 days	Tue 11/18/08	Mon 12/8/08																																				
200	Prep & Place Roof Slab	10 days	Tue 12/9/08	Mon 12/22/08																																				
201	Install Roof	10 days	Thu 1/8/09	Wed 1/21/09																																				
202	Façade	35 days	Fri 2/27/09	Thu 4/16/09																																				
203	Masonry Façade	30 days	Fri 2/27/09	Thu 4/9/09																																				
204	Glazing Units	25 days	Fri 3/13/09	Thu 4/16/09																																				
205	Mechanical / Electrical	67 days	Thu 11/6/08	Fri 2/6/09																																				
206	AHU Installation	42 days	Thu 11/6/08	Fri 1/2/09																																				
207	Switchgear Installation	42 days	Thu 12/11/08	Fri 2/6/09																																				
208	Closeout	50 days	Thu 4/23/09	Wed 7/1/09																																				
209	Systems Commissioning	40 days	Thu 4/23/09	Wed 6/17/09																																				
210	Final Inspections	10 days	Thu 6/18/09	Wed 7/1/09																																				
211	Substantial Completion & C. of O.	0 days	Wed 7/1/09	Wed 7/1/09																																				



Walker Jones 10/24/08	Task		Milestone		Rolled Up Task		Rolled Up Progress		External Tasks		Group By Summary	
	Progress		Summary		Rolled Up Milestone		Split		Project Summary		Deadline	

Appendix B: Site Layout Planning

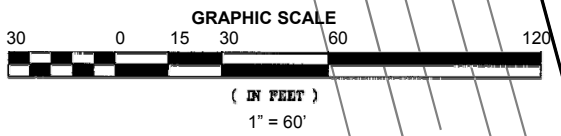


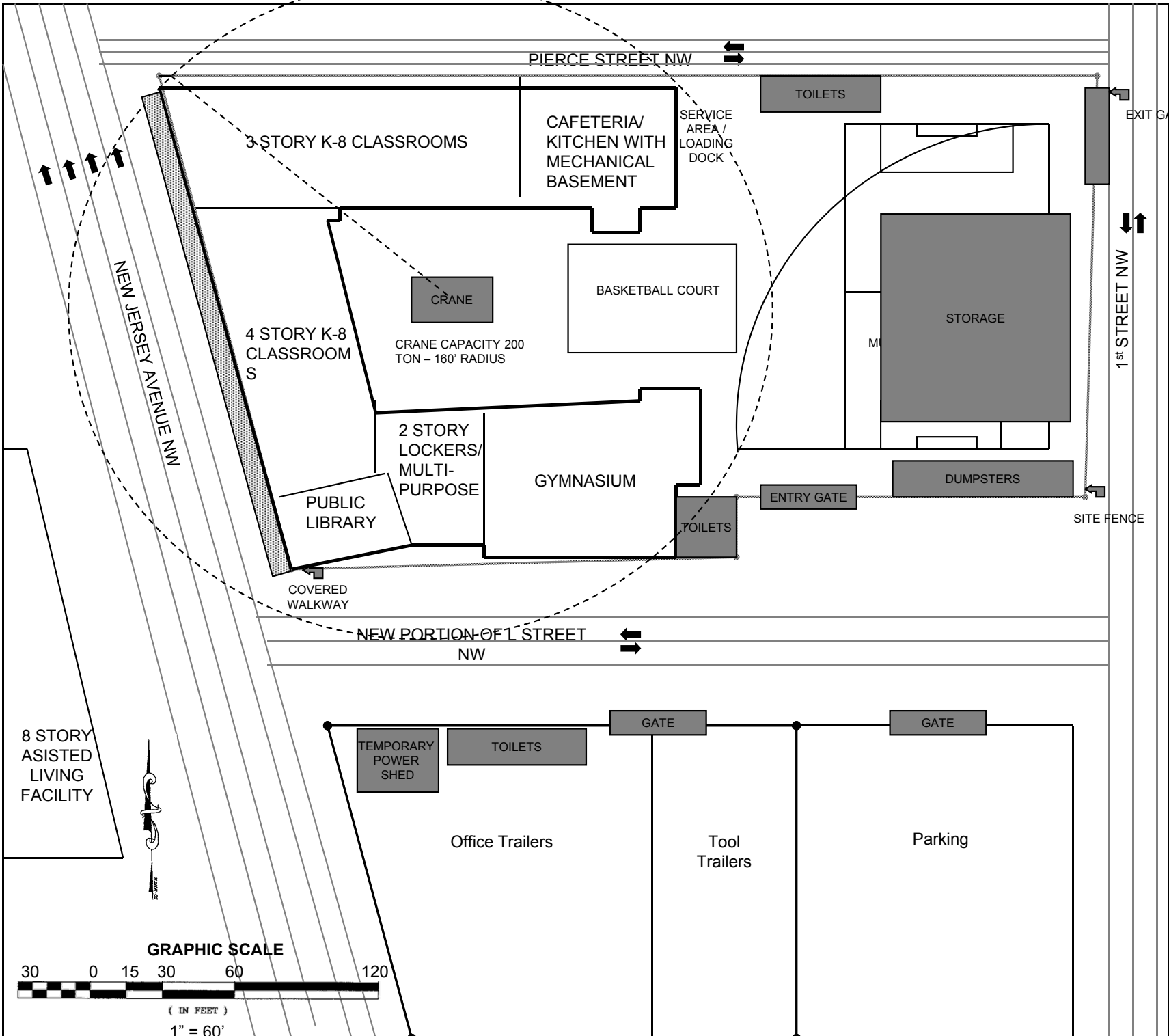
Walker Jones School 100 L Street NW Washington, DC 2005

Site Plan - Excavation

Drawn By: Maria Piergallini

Date: October 24, 2008





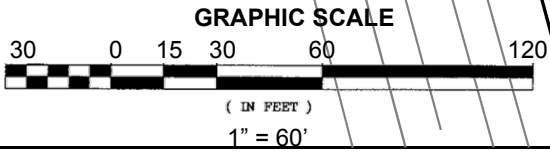
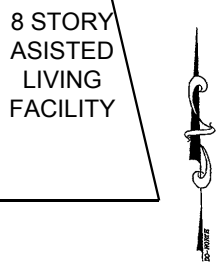
Walker Jones School 100 L Street NW Washington, DC 2005

Site Plan - Steel

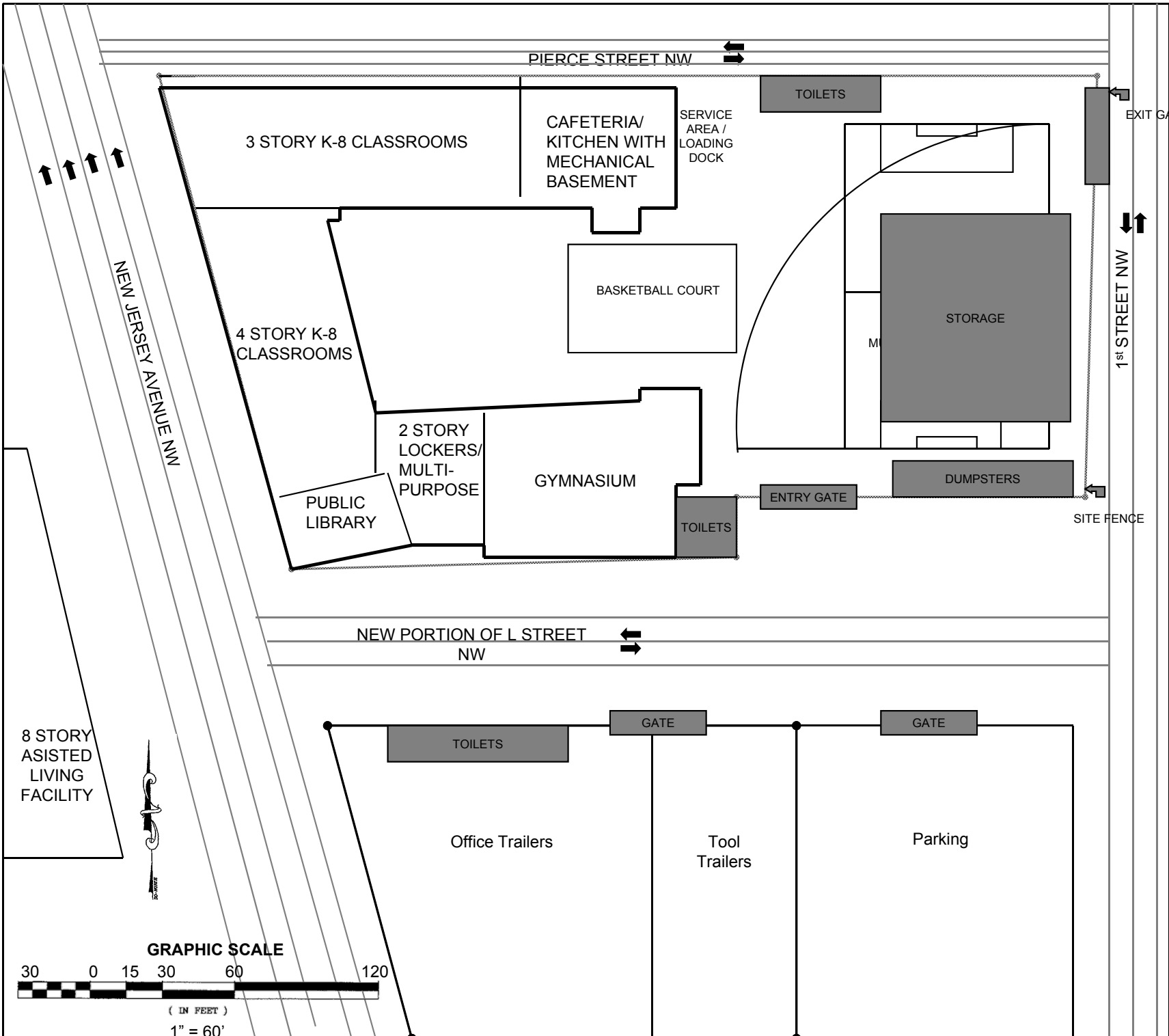
Drawn By: Maria Piergallini

Date: October 24, 2008

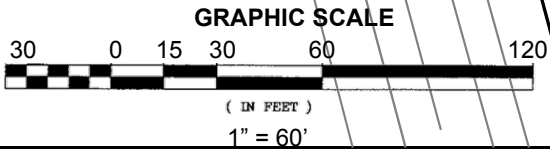
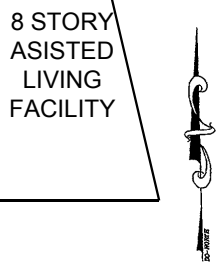
1 of 1



Walker Jones School 100 L Street NW Washington, DC 2005



Site Plan - Finishes
 Drawn By: Maria Piergallini
 Date: October 24, 2008



Appendix C: Detailed Structural Systems Estimate

Structural Steel Estimate:

Steel Beams - Second Floor B				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W16 x 26	3	25	26	1950
	6	26.5	26	4134
	18	26.87	26	12575.16
	21	30.81	26	16822.26
W8 x 10	26	10	10	2600
W10 x 15	9	11	15	1485
	6	14.5	15	1305
	1	10	15	150
W18 x 35	4	28.7	35	4018
W27 x 84	3	32	84	8064
W10 x 39	2	15.8	39	1232.4
	4	14	39	2184
W8 x 21	5	22	21	2310
	7	23	21	3381
	2	25	21	1050
Steel Beams - Second Floor C				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W10 x 15	8	16.92	15	2030.4
W10 x 30	4	15.78	30	1893.6
W12 x 19	2	10	19	380
W18 x 35	4	35	35	4900
W18 x 40	2	35	40	2800
HSS 8x4x1/4	1	10	19.02	190.2
Steel Beams - Third Floor A				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
HSS 12x8x1/2	7	14.5	47.9	4861.85
	5	13.81	47.9	3307.495
	8	20.62	47.9	7901.584
W12 x 26	3	30.74	26	2397.72
W12 x 14	4	10.12	14	566.72
W8 x 15	6	14.5	16	1392
W8 x 10	31	10	10	3100
W14 x 22	48	26.25	22	27720

Steel Beams - Third Floor B				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W12 x 26	3	30.74	26	2397.72
W12 x 14	2	10.12	14	283.36
W8 x 10	37	10.12	10	3744.4
W16 x 26	51	30.58	26	40549.08
W18 x 35	14	23.5	35	11515
W14 x 22	25	26.25	22	14437.5
W21x55	3	30.58	55	5045.7
W24 x 62	7	25	62	10850
W24 x 76	3	14.5	76	3306
W12 x 19	18	10.12	19	3461.04
	4	11	19	836
	5	14.5	19	1377.5
Steel Beams - Third Floor C				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
HSS 12x8x1/2	3	10.7	47.9	1537.59
	2	13.64	47.9	1306.712
	4	14.5	47.9	2778.2
HSS 8x4x1/4	1	13.64	19.02	259.4328
	2	14.5	19.02	551.58
	3	20.62	19.02	1176.5772
W8 x 10	4	26.25	10	1050
W18 x 49	2	10.7	49	1048.6
	5	30.58	49	7492.1
W10 x 39	7	11	30	2310
Steel Beams - Fourth Floor A				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
HSS 12x8x1/2	6	14.5	47.9	4167.3
	5	13.81	47.9	3307.495
	8	20.62	47.9	7901.584
W12 x 14	6	10.12	14	850.08
W8 x 15	4	14.5	16	928
W8 x 10	34	10	10	3400
W14 x 22	46	26.25	22	26565
W18 x 35	3	11	35	1155
	4	14.5	35	2030
	6	16.8	35	3528
	2	10.5	35	735

Steel Beams - Fourth Floor B				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
HSS 12x8x1/2	9	14.5	47.9	6250.95
	6	13.81	47.9	3968.994
	4	20.62	47.9	3950.792
W12 x 26	8	30.74	26	6393.92
W12 x 14	9	10.12	14	1275.12
W8 x 15	7	14.5	16	1624
W8 x 10	39	10	10	3900
	4	11.5	10	460
W16 x 26	48	26.25	26	32760
	3	24	26	1872
W24 x 55	2	30	55	3300
	1	22.6	55	1243
W24 x 76	4	12.75	76	3876
W10 x 15	4	11	15	660
	3	14.5	15	652.5
	8	10	15	1200
W21 x 50	3	30	50	4500
W14 x 26	5	24	26	3120
W18 x 40	2	24	40	1920
	1	22	40	880
	3	23	40	2760
	2	25	40	2000
	1	20	40	800
W14 x 22	16	16.8	22	5913.6
	4	24.6	22	2164.8
Steel Beams - Fourth Floor C				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
HSS 12x8x1/2	3	14.5	47.9	2083.65
	1	13.81	47.9	661.499
	2	20.62	47.9	1975.396
W12 x 26	1	30.74	26	799.24
W12 x 14	2	10.12	14	283.36
W8 x 15	8	14.5	16	1856
W8 x 10	9	10	10	900

Steel Beams - Roof Area A				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W8 x 10	27	11	10	2970
W8 x 21	6	17.5	21	2205
W10 x 15	6	17.5	15	1575
W14 x 22	48	26.25	22	27720
	1	18	22	396
	1	20	22	440
	1	19	22	418
	6	14.5	22	1914
W16 x 26	5	30	26	3900
	2	18	26	936
W16 x 31	5	27	31	4185
W18 x 35	1	26	35	910
	3	29	35	3045
	2	26.5	35	1855
W18 x 40	2	26.25	40	2100
	1	11	40	440
	1	17.5	40	700
Steel Beams - Roof Area B				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W8 x 10	26	11	10	2860
W8 x 15	3	10	15	450
W14 x 22	2	11	22	484
W16 x 26	53	30.6	26	42166.8
	4	24	26	2496
	4	22	26	2288
	2	25	26	1300
	2	23	26	1196
	2	23.6	26	1227.2
W16 x 31	11	22	31	7502
	3	23	31	2139
	2	25	31	1550
	5	24	31	3720
	3	28.4	31	2641.2
W21 x 44	2	24	44	2112
	1	28.4	44	1249.6

Steel Beams - Roof Area C				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W8 x 10	5	11	10	550
W12 x 22	28	13.5	22	8316
W27 x 84	7	31	84	18228
W16 x 26	8	17.5	26	3640
	2	11	26	572
W24 x 55	2	14	55	1540
Steel Beams - Roof Area D				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W8 x 10	7	11	10	770
W12 x 22	33	14.5	22	10527
W27 x 84	9	30	84	22680
W16 x 26	11	17.5	26	5005
	4	10	26	1040
W24 x 55	2	13.5	55	1485
W27 x 84	4	11	84	3696
Total (tons)				306.86
Cost/Ton				\$2,800
Total Cost				\$859,220
Adjusted Cost				\$929,628

Steel Columns - Whole Building				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
W10 x 33	14	28	33	12936
	9	32	33	9504
	7	34	33	7854
	19	42	33	26334
W10 x 39	3	14		
	4	28	39	4368
	2	32	39	2496
	3	34	39	3978
	5	42	39	8190
W10 x 45	3	14	45	1890
	2	32	45	2880
	4	42	45	7560
W10 x 49	2	14	49	1372
	1	32	49	1568
	4	34	49	6664
	6	42	49	12348
W10 x 54	1	28	54	1512
	1	34	54	1836
	2	42	54	4536
W10 x 68	1	28	68	1904
	1	42	68	2856
W10 x 88	1	28	88	2464
	3	32	88	8448
	2	34	88	5984
	4	42	88	14784
W10 x 100	5	14	100	7000
HSS 4x4x3/8	2	28	17.27	967.12
HSS 5x5x3/8	1	28	22.37	626.36
HSS 10x10x1/2	2	14	62.46	1748.88
	3	28	62.46	5246.64
			Total Steel (tons)	84.9275
			Cost/Ton	\$2,800
			Total Cost	\$237,797
			Adjusted Cost	\$238,905

Steel Joists - Whole Building				
Description	Quantity	Length (Ft)	Weight (Lb/Ft)	Total Weight (Lb)
40LH15	5	65.7	36	11826
40LH13	3	65.7	30	5913
	4	76	30	9120
40LH12	11	65.7	25	18067.5
24K8	15	32	11.5	5520
	6	27.5	11.5	1897.5
12K1	12	11.5	5	690
	5	17	5	425
			Total Steel (tons)	26.73
			Cost/ton	\$2,550
			Total Cost	\$68,160
			Adjusted Cost	\$73,746

Metal Deck - Whole Building				
Description	Quantity	Unit	Cost / SF	Total Cost
2" 18 Gage Composite	98,870	SF	\$2.56	\$253,107
1.5" 22 Gage Acoustical	7,780	SF	\$1.75	\$13,615
3" 18 Gage Roof Deck	144	SF	\$10.45	\$1,505
1" 24 Gage Form Deck	121	SF	\$1.81	\$219
			Total Cost	\$268,446
			Adjusted Cost	\$290,443

Structural Steel Summary:

Steel Beams	
Total Steel (tons)	306.86
Cost/Ton	\$2,800
Adjusted Cost	\$929,628
Steel Columns	
Total Steel (tons)	921.454687
Cost/Ton	\$2,800
Adjusted Cost	\$238,905
Steel Joists	
Total Steel (tons)	26.73
Cost/ton	\$2,550
Adjusted Cost	\$73,746
Metal Decking	
Total (SF)	106,915
Adjusted Cost	\$290,443
Total Steel Cost	\$1,532,722
Total Cost/SF	\$12.52

Structural Concrete Estimate:

Footings - Whole Building			
Description	Quantity	Volume (CY)	Total Volume (CY)
F-46	27	0.94	25.31
F-50	11	1.23	13.58
F-56	9	1.68	15.13
F-60	14	2.22	31.11
F-66	11	2.74	30.12
F-70	8	3.48	27.83
F-76	17	4.34	73.78
F-80	7	5.14	35.95
F-70x36	9	1.74	15.65
F-80x40	6	2.57	15.41
F-90x46	7	3.71	25.94
CF-20	23	2.41	55.37
CF20-A	12	2.96	35.56
CF-26	7	3.70	25.93
CF-26A	11	2.78	30.56
CF-30	24	3.33	80.00
CF-30A	11	3.06	33.61
CF-30B	7	2.67	18.67
CF-30C	6	2.25	13.48
CF-36	4	2.19	8.75
CF-40	5	4.44	22.22
CF-40A	4	4.07	16.30
CF-60	4	7.41	29.63
CF-90	3	58.50	175.50
		Total (CY)	855.38
		Cost/CY	340
		Total Cost	290,828
		Adjusted	314,660

Mat Foundations			
Description	Quantity	Volume (CY)	Total Volume (CY)
M-B1	2	19.01	38.02
M-B2	3	20.22	60.65
M-B3	2	16.43	32.86
M-B4	4	25.60	102.40
M-A1	1	25.84	25.84
M-A2	2	28.72	57.44
M-A3	2	42.71	85.42
		Total (CY)	402.64
		Cost/CY	\$276
		Total Cost	\$111,129
		Adjusted	\$120,235

Foundation Walls				
Description	Length (LF)	Thickness (in)	Height (ft)	Volume (CY)
Area A	528	15	12	293.33
Area B	576	15	12	320.00
Area C	297	15	12	165.00
Area D	246	15	12	136.67
Total (CY)				915
Cost/CY				\$385
Total Cost				\$352,275
Adjusted				\$381,142

Slab on Grade			
Description	Area (SF)	Thickness (in)	Volume (CY)
SOG - A	11478	5	4782.50
SOG - B	12544	5	5226.67
SOG-C	3204	5	1335.00
SOG - D1	3575	5	1489.58
Total (CY)			12833.75
Cost/CY			\$29
Total Cost			\$372,179
Adjusted			\$402,676

Slab on Deck			
Description	Area (SF)	Thickness (in)	Volume (CY)
A-2	14678	3.5	4281.08
B-2.1	12763	3.5	3722.54
B-2.2	4578	3.5	1335.25
C-3	3929	3.5	1145.96
A-3	14678	3.5	4281.08
B-3.1	12763	3.5	3722.54
B-3.2	4578	3.5	1335.25
D-R	15000	3.5	4375.00
A-4	14678	3.5	4281.08
C-R	4568	3.5	1332.33
B-4	15763	3.5	4597.54
A-R	14687	3.5	4283.71
B-R	16892	3.5	4926.83
Total (CY)			43620.21
Cost/CY			\$27
Total Cost			\$1,177,746
Adjusted			\$1,274,254

Grade Beams				
Description	Length (ft)	Width (in)	Depth (in)	Volume (CY)
GB-1 A	30	18	18	2.50
	32	18	18	2.67
	28	18	18	2.33
	32	18	18	2.67
	38	18	18	3.17
	36	18	18	3.00
	26	18	18	2.17
GB-2 A	36	18	18	3.00
	36	18	20	3.33
	34	18	20	3.15
	36	18	20	3.33
GB-3 A	36	18	20	3.33
	26.25	18	20	2.43
	26.25	18	20	2.43
	26.25	18	20	2.43
	28	18	20	2.59
GB-4 A	28	18	20	2.59
	26.25	30	20	4.05
	26.25	30	20	4.05
	26.25	30	20	4.05
	28	30	20	4.32
GB-2 B	28	30	20	4.32
	30.7	18	20	2.84
	30.7	18	20	2.84
	30.7	18	20	2.84
	34	18	20	3.15
	30.7	18	20	2.84
	36	18	20	3.33
	30.7	18	20	2.84
30.7	18	20	2.84	
Total (CY)				91.46
Cost/CY				\$576
Total Cost				\$52,679
Adjusted				\$56,996

Structural Concrete Summary:

Footings	
Total (CY)	855.38
Cost/CY	\$340
Adjusted Cost	\$314,660
Mat Foundations	
Total (CY)	402.64
Cost/CY	\$276
Adjusted Cost	\$120,235
Foundation Walls	
Total (CY)	915
Cost/CY	\$385
Adjusted Cost	\$381,142
Slabs	
Total (CY)	56453
Cost/CY	\$28
Adjusted Cost	\$1,676,930
Grade Beams	
Total (CY)	91.46
Cost/CY	\$576
Adjusted Cost	\$56,996
Total Concrete Cost	\$2,549,963
Cost/SF	\$20.83

Impact Pier Estimate:

Impact Piers - Area A	
Quantity	Length (Ft)
84	14
65	17
72	18
36	26
27	28
17	37
21	42
Impact Piers - Area B	
Quantity	Length (Ft)
43	14
37	17
61	18
23	26
17	28
24	37
14	42

Impact Piers - Area C	
Quantity	Length (Ft)
21	14
17	17
27	18
11	26
9	28
14	37
8	42
Impact Piers - Area D	
Quantity	Length (Ft)
23	14
14	17
33	18
17	26
7	28
13	37
11	42
Total Ft of Piers	16855
Cost/Ft	\$40.18
Total Cost	\$677,234

Impact Pier Summary:

Impact Piers	
Total Ft of Piers	16855
Cost/Ft	\$40.18
Total Cost	\$677,234
Cost/SF	\$5.53

Cost Comparison of Actual Structural System vs. Estimated Steel, Concrete & Impact Piers:

Actual Structural	
Total Cost	\$4,000,000
Cost/SF	\$32.68
Estimated Structural	
Total Cost	\$4,759,919
Cost/SF	\$38.89

Appendix D: General Conditions Estimate

Construction Management Staff				
Description	Unit	Unit Price	Quantity	Total
Project Executive	Week	\$5,000.00	9.7	\$48,500.00
Senior Project Manager	Week	\$4,000.00	34	\$136,000.00
Project Manager	Week	\$3,000.00	68	\$204,000.00
Assistant Project Manager	Week	\$2,600.00	68	\$176,800.00
Senior Superintendent	Week	\$2,750.00	68	\$187,000.00
Assistant Superintendent	Week	\$2,425.00	68	\$164,900.00
			Total	\$917,200.00

Temporary Utilities					
Description	Quantity	Unit	Unit Price	Duration	Total
Heat	3	CSF Floor, per week	\$12.50	20	\$915.00
Temp Power	3	CSF Floor, per week	\$87.20	68	\$21,702.34
Toilets	8	Month	\$162.00	17	\$22,032.00
				Total	\$44,649.34

Construction Facilities and Equipment					
Description	Quantity	Unit	Unit Price	Duration	Total
Trailer	3	Month	\$420.00	17	\$21,420.00
Storage Box	1	Month	\$120.00	17	\$2,040.00
Field Office Equipment	3	Month	\$160.00	17	\$8,160.00
Office Supplies	2	Month	\$99.00	17	\$3,366.00
Telephone	2	Month	\$231.00	17	\$7,854.00
Field Office Lights & HVAC	3	Month	\$121.00	17	\$6,171.00
Fencing	2370	L.F.	\$5.05	-	\$11,968.50
Signage	6	S.F	\$18.20	25	\$2,730.00
Material Hoist	1	Month	\$850.00	8	\$6,800.00
Covered Walkway	1	LS	-	-	\$18,540.00
Dumpsters	3	Week	\$620	68	\$126,480.00
Photographs	68	Set	\$300.00	-	\$20,400.00
				Total	\$235,929.50

Permits, Insurance and Fee				
Description	Quantity	Units	Unit Price	Total
Permits	1	LS	\$180,000.00	\$180,000.00
Insurance	1	LS	\$217,600.00	\$217,600.00
General Liability	1	LS	\$727,200.00	\$727,200.00
Contractor's Fee	1	LS	\$1,080,000.00	\$1,080,000.00
			Total	\$2,204,800.00

General Conditions Estimate Summary

Description	Quantity	Unit	Average Unit Cost	Total
Construction Management Staff	68	Week	\$13,488.00	\$917,200.00
Temporary Utilities	68	Week	\$656.60	\$44,649.00
Construction Facilities and Equipment	68	Week	\$3,469.55	\$235,929.50
Permits, Insurance and Fee	68	Week	\$32,423.53	\$2,204,800.00
			Total Cost/Week	\$3,402,578 \$50,038