The Potomac Yard Land Bay E

Arlington, VA

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Construction Management
Technical Assignment #2
October 5, 2009

Table of Contents:

Executive Summary:

Technical assignment 2 will examine some of the construction techniques used on the Potomac Yard Land Bay E project and summarize the PACE Roundtable Event that was held on Thursday October 15, 2009 at the Penn Stater Hotel. This technical assignment will provide analysis for the Land Bay E project through a detailed project schedule, site layout planning drawings, detailed structural systems estimate and a general conditions estimate. This technical assignment will provide a summary of the critical industry issues discussed during the PACE Conference, problem identification for energy and the building industry and a student panel discussion.

The first thing that was analyzed in this assignment was a detailed project schedule for the Potomac Yard Land Bay E project. The detailed project schedule incorporates both the preconstruction and construction for the Potomac Yard Land Bay E project. The Schedule focuses mostly on the construction aspect of the project for this assignment. The schedule highlights important dates and durations between the beginnings of the project, July 13, 2007, to the project completion on September 30, 2009.

The second issue that was analyzed for this assignment was the site layout and planning during different phases of construction. By the usage of site plans it becomes clear how the site was used during different stages of the construction for this project. The two site plans that are incorporated into this report show how the site was organized during the placement of the structural CIP concrete for both the garage and the buildings. The garage plan shows where the excavation perimeter is located along with the traffic movement to enter and exit the site. Also on this plan are locations of critical pieces of equipment and facilities to complete the construction. The building structural CIP concrete plan is very similar to the garage plan except it includes some other pieces of equipment and excludes the excavation area.

The third part to this assignment included a detailed structural estimate to analyze the cost of building's structural system. This project's structural system is an all concrete structure that uses tower cranes, pumping and Georgia buggies for placement. The total structural estimate for this project was approximately $18.476 million. The types of structural materials used on the project were concrete piles, pile caps, CIP foundation walls, post tension concrete beams, CIP slabs and columns.

Next a General Conditions estimate was performed to analyze the cost of personnel and other materials needed to complete the construction of the Potomac Yard Land Bay E. The total General Conditions estimate was approximately $6.11 million. The total estimate was about 7.98% of the total contract value. This estimate was comprised of project staffing, temporary utilities, facilities and equipment, permits, insurance and fee.

Lastly is a summary of the PACE Roundtable event and all of the topics discussed. The discussions and personal interaction with the industry members during this event has given me numerous ideas for further analysis on my thesis project.

Detailed Project Schedule:

Description	Date
Begin Construction	1/2/08
Complete Foundation	9/24/08
Permanent Power	7/27/09
Garage Complete	9/11/09
Project Complete	9/30/09

Table 1: Key Dates

The Potomac Yard Land Bay E project began its preconstruction activities during the summer of 2007 laying out the key plan for what the project was to become. The general contractor on the project was James G. Davis Construction Corporation that began its preconstruction activities in July of 2007. Around late August 2007 the design team released their final construction set of drawings to general contractor and the owner. After all of the preconstruction activities were completed the construction for the Land Bay E project began on January 2, 2008.

The detailed project schedule for the Potomac Yard Land Bay E project includes both preconstruction and construction activities with more of an emphasis on the construction phases. The detailed project schedule breaks down the three different phases of the project in detail for each trade. The three phases of this project include the garage levels, building B and Building A. In these three phases include various sequences that the construction process follows to ensure an organized approach to building the project.

Each phase of the building project is broken down into detail about the structural systems installation, MEP rough-in and trim out, finishes and exterior site work. The structural system for the garage levels starts in late August 2008, the MEP installation begins in late October 2008 and the finishes begin in December 2008. Next on the schedule Building B begins it's placing of structural concrete followed by the same sequence of events as the garage levels. After the structural concrete is placed for Building B, Building A begins its placement of structural concrete. While the placing of concrete is being completed for Building A the MEP work for Building B and the finishes for the garage levels is commencing simultaneously. (Please See Appendix A)

Site Layout Planning:

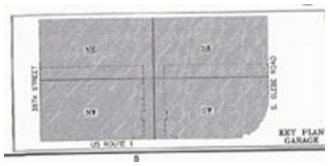


Figure 1: Garage Layout

The Potomac Yard Land Bay E project utilized a deep foundation system that involved the use of 14”x14” precast concrete piles at a length of 35 feet. Theses piles were driven into the site starting in the northwest quadrant of the site working their way around in a counter-clockwise direction finishing in the northeast quad. In total there were 1011 piles that were driven into the site to provide a stable foundation for the structure. There were 17 different types of pile caps that were constructed on this project that ranged from different size, shape and thickness. These pile caps were used to transfer the load from the columns in the building to the piles that distribute the weight of the structure and occupants to stable ground. For the excavation process of the project a retaining wall made of soldier beams a lagging was utilized to retain the surrounding soil while the construction of the foundation and garage levels was commencing.

To gain access to the excavated portion of the site there were two ramps that were constructed, one in the SE quadrant of the site and the second is located in the NE quadrant of the site. For organizational purposes each of the ramps permit one-way traffic. To enter and exit the site you must go down the SE ramp and go up the NE ramp. The CIP concrete garage structure was placed in the same sequence as the piles and pile caps were placed which was starting in the NW quadrant and proceeding counter-clockwise finishing in the NE quadrant. Once the entire placement of the garage structure was completed the building structural system was able to begin. (Please See Appendix B)

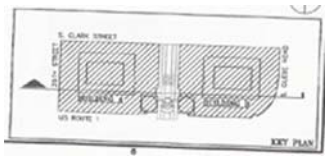


Figure 2: Building Layout

The CIP concrete structure for Building B begins on December 8, 2008 on the southern portion of the project. The placement of the concrete is broken up into three sequences per floor. Tower Crane #1 performs the placement of the concrete for Building B. Once the placement of concrete and some heavy picks are completed Tower Crane #1 may begin disassembly around April 2009. The CIP concrete structure for Building A begins on December 29, 2008. This building will have three similar floor sequences for placing the concrete as performed on Building B. Finally once the placement of concrete is completed for Building A and the heavy equipment is set the disassembly of Tower Crane #2 may begin around May 2009. (Please See Appendix B)

Detailed Structural Systems Estimate:

The structural system for the Potomac Yard Land Bay E project consists of a deep foundation, CIP columns, CIP slabs, CIP walls and post tension concrete beams. There is virtually no steel used on the project except for reinforcing purposes and architectural purposes. The places that the miscellaneous metals are used are on the metal trellises, canopy and the metal roofs on the mechanical rooms. The use of concrete as a structural system in this area is very common. Two tower cranes, pump and Georgia buggies completed the entire concrete placement on this project.

To perform the structural concrete estimate for this project it was broken it into seven categories which include: concrete piles, pile caps, floor slabs, concrete walls, columns, beams and cranes. The deep foundations consisted of concrete piles that were 14"x14" with a length of 35'. There were 17 pile caps that ranged in size, shape and depth. All of these conditions were taken into account to obtain a total cubic yard amount of concrete. The floor slabs varies in thickness, so to determine the total amount of concrete used in them the thickness was multiplied by the total area of the slabs. The total concrete volume for the columns and beams was determined by the cross sectional area multiplied by the total length the size beam. The structural drawings were used to complete the concrete take off for all three parts of the project. Once the take off was completed the total structural estimate was determined by using the cost data provided by 2009 RS Means sources. Once the project total was achieved it was then multiplied by the .93 location factor for Arlington Virginia. After obtaining the adjusted total amount for the location of the project the cost per square foot was obtained by taking the total and dividing it by the total area of the project. (Please See Appendix C)

Code	Description	Cost
31 62 13.23	Prestressed Piles	$1,185,397.50
03 30 53.40	Pile Caps	$769,587.00
03 30 53.40	Floor Slabs	$9,420,722.00
03 30 53.40	Garage Walls	$487,600.00
03 30 53.40	Columns	$235,757.50
03 30 53.40	Beams	$5,029,752.00
01 54 19.50	(2)Cranes 12 Mo	$2,737,500.00
	Total:	$19,866,316.00
	Adjusted:	$18,475,673.88
	Cost/SF:	$29.85

Table 2: Structural Summary

The total structural systems estimate came to $18,475,673.88 that is only about $206,000 over the estimate that was provided by the general contractor. This is only about 1.1%

over the original estimate for the structural system of the project. The reason for the accuracy of the estimate could be due to the common building type of the project. RS Means may compare similar projects for cost data in the reference books. Another factor that helped the accuracy of estimate is that the structure is predominately made up of structural concrete instead of a variety of different structural materials.

General Conditions Estimate:

Total General Conditions	**$6,110,382.88**
% Total Contract Value	7.98
Cost per Month	$305,519.14
Cost per Week	$71,050.96

Table 3: General Conditions Summary

Above is a summary of the General Conditions estimate for the Potomac Yard Land Bay E project. This summary takes into account for the project staff, permits, insurance, fee, construction facilities and equipment and temporary utilities. This estimate was prepared by using 2009 RS Means data and pricing along with the current industry unit costs provided by James G. Davis Construction Corporation. The largest portions of the General Conditions estimate are comprised from the project staff costs and the contractor's fee. The general contractor's project staff estimate was calculated by the industry rate for that position multiplied by the percentage of time a week the individual spent on the project. Some items that are normally included on a GC estimate like a crane and material hoist were not provided in this estimate because they were part of the subcontractor's bid package. (Please See Appendix D)

Critical Industry Issues:

The 2009 PACE Roundtable Event was focused on a variety of issues that include: a panel of industry members that discuss how the industry is changing due to the economic circumstances and stimulus package, a breakout session that involved a problem identification and solution development, and a student panel discussing the communication patterns of the Now Generation. The breakout sessions had three different topics to choose from to attend. The three topics that were offered this year were Energy and the Building Industry, BIM Execution Planning and Business Networking. I chose to attend the Energy and the Building Industry for three reasons. The first reason is to obtain some ideas to incorporate into my thesis project. Secondly, to learn about new and exciting technologies that are being utilized in the industry today and lastly, to become more familiar with the direction the industry is moving involving LEED and its applications.

The first discussion session involving the panel of industry members from OPP, Balfour Beatty, Barton Malow, Hensel Phleps and Foreman discussed the current industry conditions. Some of the issues talked about involved unknown competitors offering low bids to obtain work. Along with the topic of new competitor the problem of quality subcontractors was discussed. The problem with the large supply of subcontractors in this market is that many will cut corners and not provide a quality-finished product for the bid that they submitted. Another issue was the types of markets that are good and those that are struggling. Some of the markets that are sustaining through the recession are the education, healthcare and energy while the private projects are almost nonexistent. The panel all agreed that now is the time for diversification of project types and internal training for the employees. When times are slower it creates an opportunity for a company to try and retain the A-clients and A-employees. Finally the panel discussed the use of emerging technologies like BIM. They spoke about owners requiring the use of a BIM model for the construction of their project but are not sure what to do with it once the project is completed. The panel compared BIM to management software like Prolog, and how it takes many years for the program to become valuable and profitable for a contractor and owner.

The second discussion session for myself involved the Energy and the Building Industry topic. Dr. David Riley conducted this breakout session that involved three parts. The first part of the discussion involved the reasons for concern of energy. Some of the ideas that were given during this discussion were the environment, deregulation for competition, developing nations, federal and state incentives, life cycle costs, marketing image and national security for energy independence. The second discussion topic that the group engaged in involved new materials and systems. Some of the large scale alternate energy resources included: wind, solar, geotherm, nuclear, wave/tidal and biomass fuel. On a building and construction scale some new materials that were discuss include: space age insulation, LED lighting, BAS systems, office interior systems, hydronic heating and cooling systems, reuse/ deconstruction of materials and combine heat and power peak response systems. The group came to the consensus that if all of these technologies and materials would be used on building projects it would create a new generation of smart buildings that evolve and change its energy usage by the

occupancy time and usage requirements. The third topic discussed during the breakout session was ideas for thesis proposals. What is involved was students explaining what type of building they were studying and the industry members gave ideas on what to research for their proposals.

Industry Attendees:

- Alyssa Adams- McClure Company
- Daniel Kerr- McClure Company
- Mark Kosin- Southland Industries
- Timothy Lupcho- Barton Malow Company
- Matt Orosz- Truland Systems Corporation
- Jeremy Sibert- Hensel Phelps

The third discussion of the Roundtable Event involved a student panel consisting of Shane Boyer, Matt Dabrowski, Ronza Abousaid, Brittany Muth and Eric Fedder. During this question and answer discussion the industry members asked questions about the use of Facebook, Twitter, AIM, text messaging and email in the workplace. The students responded stating that the use of some of these tools could be used in the workplace while the others should strictly be used as a social tool. Outside of the discussion involving the New Generation social tools was the topic of when and how to send professional emails. How to write a professional email was a popular topic to the industry members because they find that the younger generation does not know how to write a professional email and are not good at following up with them by a phone call or a meeting.

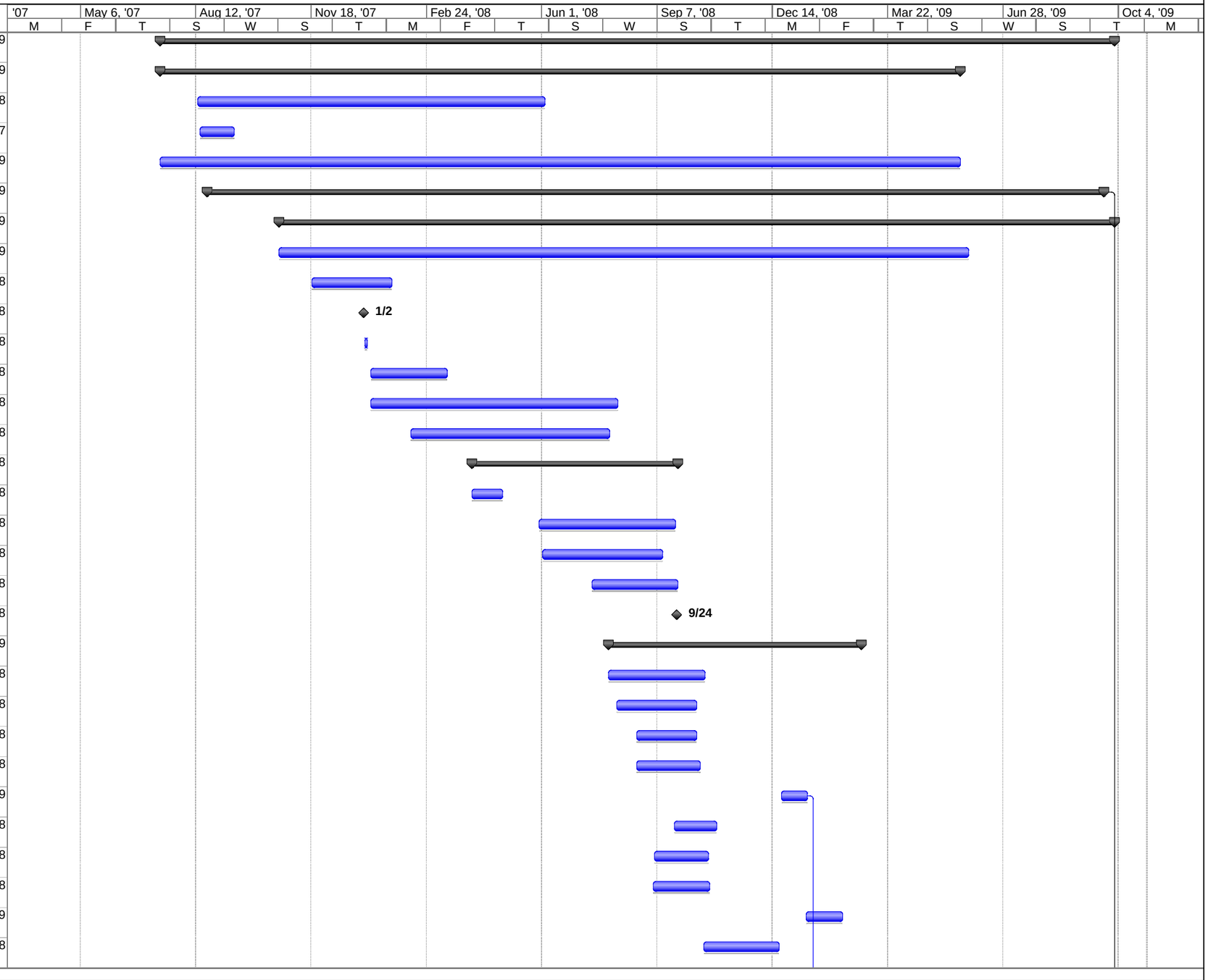
The 2009 PACE Roundtable Event was a very good opportunity to discuss important issues with current industry members, learn about the current economic situation and its affect on the building industry and to obtain ideas and information about topics to research for my thesis project. By listening to the industry input given throughout the Roundtable Event I was able to obtain some ideas that could be a research topic for my thesis project, Potomac Yard Land Bay E. Some of the ideas that I gained from this event include:

- Building envelope change
- Cylinder shaped PV panel installation on existing white TPO roof membrane
- BAS systems
- Hydronic heating and cooling systems

I will expand upon these ideas in later assignments for my thesis project to evaluate the construction challenges, schedule impacts, procurement, savings and incentives that may be involved with implementation of these ideas to the Potomac Yard Land Bay E project.

Appendix A

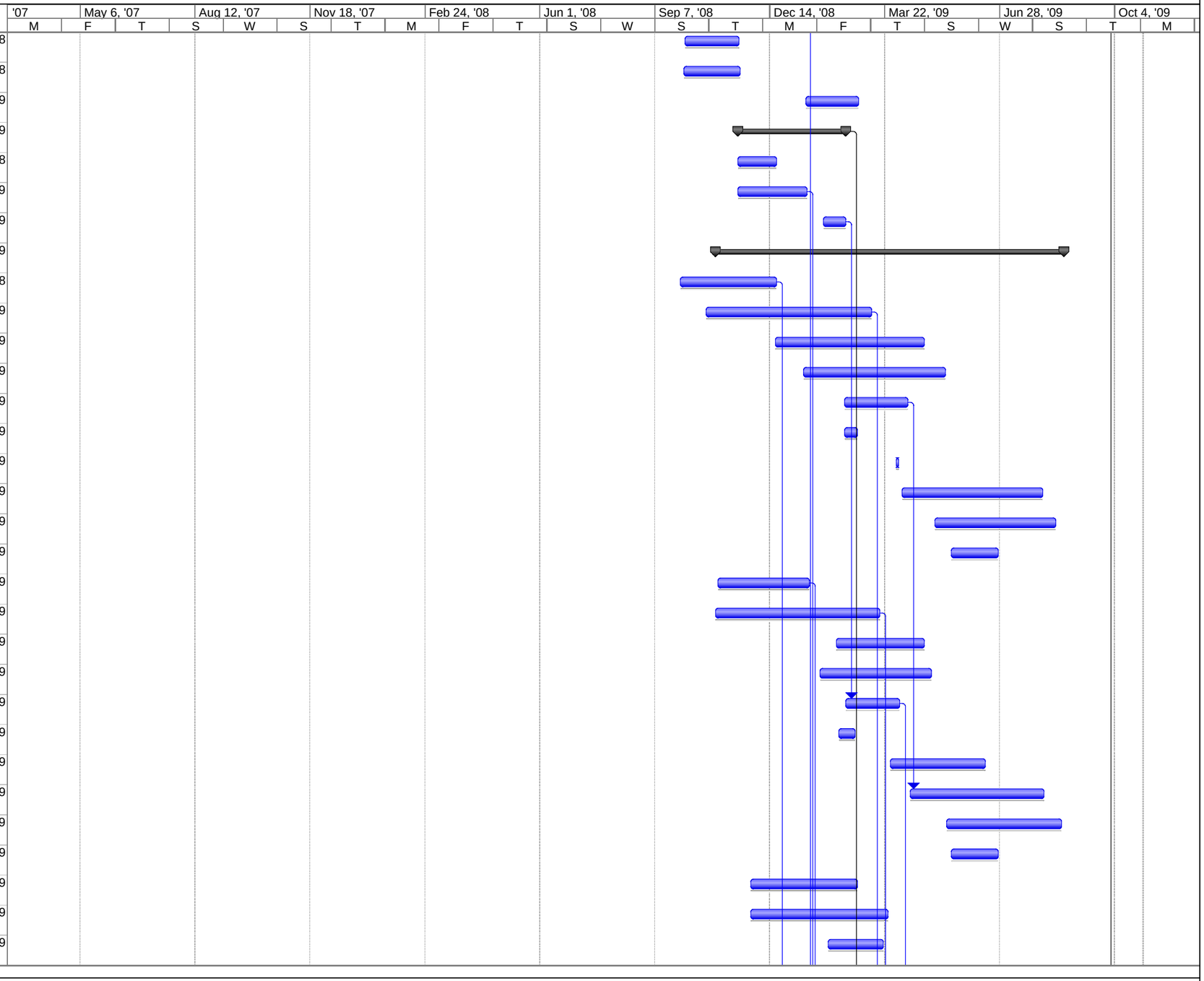
ID	Task Name	Duration	Start	Finish
1	Potomac Yard Land Bay E	579 days?	Fri 7/13/07	Wed 9/30/09
2	Preconstruction	486 days?	Fri 7/13/07	Fri 5/22/09
3	Owner Preconstruction	211 days?	Tue 8/14/07	Tue 6/3/08
4	Design Team	21 days?	Thu 8/16/07	Thu 9/13/07
5	Davis / Procurement	486 days?	Fri 7/13/07	Fri 5/22/09
6	Submittals / Fabrication / Delivery	544 days?	Wed 8/22/07	Mon 9/21/09
7	Construction	508 days?	Mon 10/22/07	Wed 9/30/09
8	Preconstruction Meetings	420 days?	Mon 10/22/07	Fri 5/29/09
9	Install & Develop Dewatering Wells	50 days?	Mon 11/19/07	Fri 1/25/08
10	Begin Construction	0 days	Wed 1/2/08	Wed 1/2/08
11	Mobilize and Establish Entrances	2 days?	Thu 1/3/08	Fri 1/4/08
12	Drive Soldier Piles	47 days?	Tue 1/8/08	Wed 3/12/08
13	Excavate and Lag to Tie-back	150 days?	Tue 1/8/08	Mon 8/4/08
14	Tie-backs	121 days?	Mon 2/11/08	Mon 7/28/08
15	Foundation Piles / Pile Caps	125 days?	Thu 4/3/08	Wed 9/24/08
16	Drive Test Piles	18 days?	Thu 4/3/08	Mon 4/28/08
17	Excavate Pile Caps	82 days?	Fri 5/30/08	Mon 9/22/08
18	Drive Concrete Precast Piles	74 days?	Mon 6/2/08	Thu 9/11/08
19	FRP Foundation & Pile Caps	53 days?	Mon 7/14/08	Wed 9/24/08
20	Complete Foundation	0 days	Wed 9/24/08	Wed 9/24/08
21	Below Grade Concrete Structure	155 days?	Mon 7/28/08	Fri 2/27/09
22	FRP Walls & Columns - P3	60 days?	Mon 7/28/08	Fri 10/17/08
23	Rough in Under Slab Plumbing - P3	50 days?	Mon 8/4/08	Fri 10/10/08
24	In Slab Electrical - P3	37 days?	Thu 8/21/08	Fri 10/10/08
25	FRP SOG - P3	38 days?	Thu 8/21/08	Mon 10/13/08
26	Remove Reshoring - P3	16 days?	Mon 12/22/08	Mon 1/12/09
27	FRP Walls & Columns - P2	26 days?	Mon 9/22/08	Mon 10/27/08
28	In Slab Electrical - P2	32 days?	Fri 9/5/08	Mon 10/20/08
29	FRP Slab - P2	34 days?	Thu 9/4/08	Tue 10/21/08
30	Remove Reshoring - P2	23 days?	Mon 1/12/09	Wed 2/11/09
31	FRP Walls & Columns - P1	46 days?	Fri 10/17/08	Fri 12/19/08



Project: Potomac Yard Schedule.mpp
Date: Wed 10/28/09

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

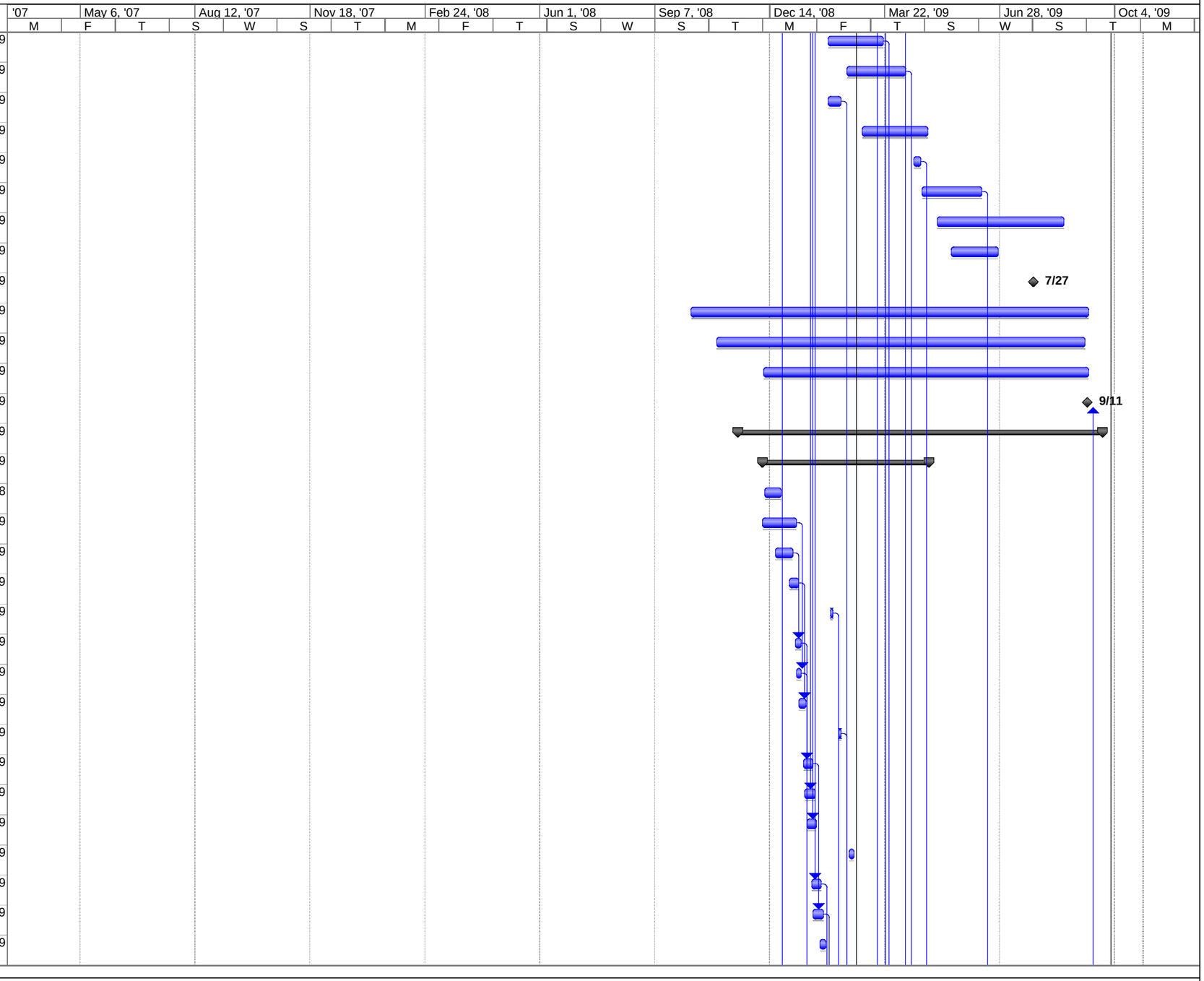
ID	Task Name	Duration	Start	Finish
32	In Slab Electrical - P1	32 days?	Fri 10/3/08	Mon 11/17/08
33	FRP Slab - P1	34 days?	Thu 10/2/08	Tue 11/18/08
34	Remove Reshoring - P1	33 days?	Wed 1/14/09	Fri 2/27/09
35	Ground Floor Concrete Structure	66 days?	Mon 11/17/08	Mon 2/16/09
36	In Slab Electrical	25 days?	Mon 11/17/08	Fri 12/19/08
37	FRP Slab	43 days?	Mon 11/17/08	Wed 1/14/09
38	Remove Shoring	13 days?	Thu 1/29/09	Mon 2/16/09
39	MEP Garage	213 days?	Wed 10/29/08	Fri 8/21/09
40	Plumbing Rough in - P3	60 days?	Mon 9/29/08	Fri 12/19/08
41	Rough in Electrical and Fire Alarm - P3	101 days?	Tue 10/21/08	Tue 3/10/09
42	Rough in Sprinkler - P3	91 days?	Fri 12/19/08	Fri 4/24/09
43	Install Light Fixtures - P3	87 days?	Mon 1/12/09	Tue 5/12/09
44	Set HVAC Equipment - P3	40 days?	Mon 2/16/09	Fri 4/10/09
45	Rough in Ductwork - P3	9 days?	Mon 2/16/09	Thu 2/26/09
46	Set Fuel Oil Tank and Pumps - P3	2 days?	Wed 4/1/09	Thu 4/2/09
47	Fire Alarm Trim Out - P3	86 days?	Mon 4/6/09	Mon 8/3/09
48	HVAC Trim Out - P3	75 days?	Mon 5/4/09	Fri 8/14/09
49	Rough in Controls - P3	30 days?	Mon 5/18/09	Fri 6/26/09
50	Plumbing Rough in - P2	56 days?	Fri 10/31/08	Fri 1/16/09
51	Rough in Electrical and Fire Alarm - P2	100 days?	Wed 10/29/08	Tue 3/17/09
52	Rough in Sprinkler - P2	55 days?	Mon 2/9/09	Fri 4/24/09
53	Install Light Fixtures - P2	69 days?	Mon 1/26/09	Thu 4/30/09
54	Set HVAC Equipment - P2	34 days?	Tue 2/17/09	Fri 4/3/09
55	Rough in Ductwork - P2	10 days?	Wed 2/11/09	Tue 2/24/09
56	Elec Panels/ Connections	57 days?	Fri 3/27/09	Mon 6/15/09
57	Fire Alarm Trim Out - P2	82 days?	Mon 4/13/09	Tue 8/4/09
58	HVAC Trim Out - P2	70 days?	Thu 5/14/09	Wed 8/19/09
59	Rough in Controls - P2	30 days?	Mon 5/18/09	Fri 6/26/09
60	Plumbing Rough in - P1	65 days?	Fri 11/28/08	Thu 2/26/09
61	Rough in Electrical and Fire Alarm - P1	83 days?	Fri 11/28/08	Tue 3/24/09
62	Rough in Sprinkler - P1	35 days?	Mon 2/2/09	Fri 3/20/09



Project: Potomac Yard Schedule.mpp
Date: Wed 10/28/09

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

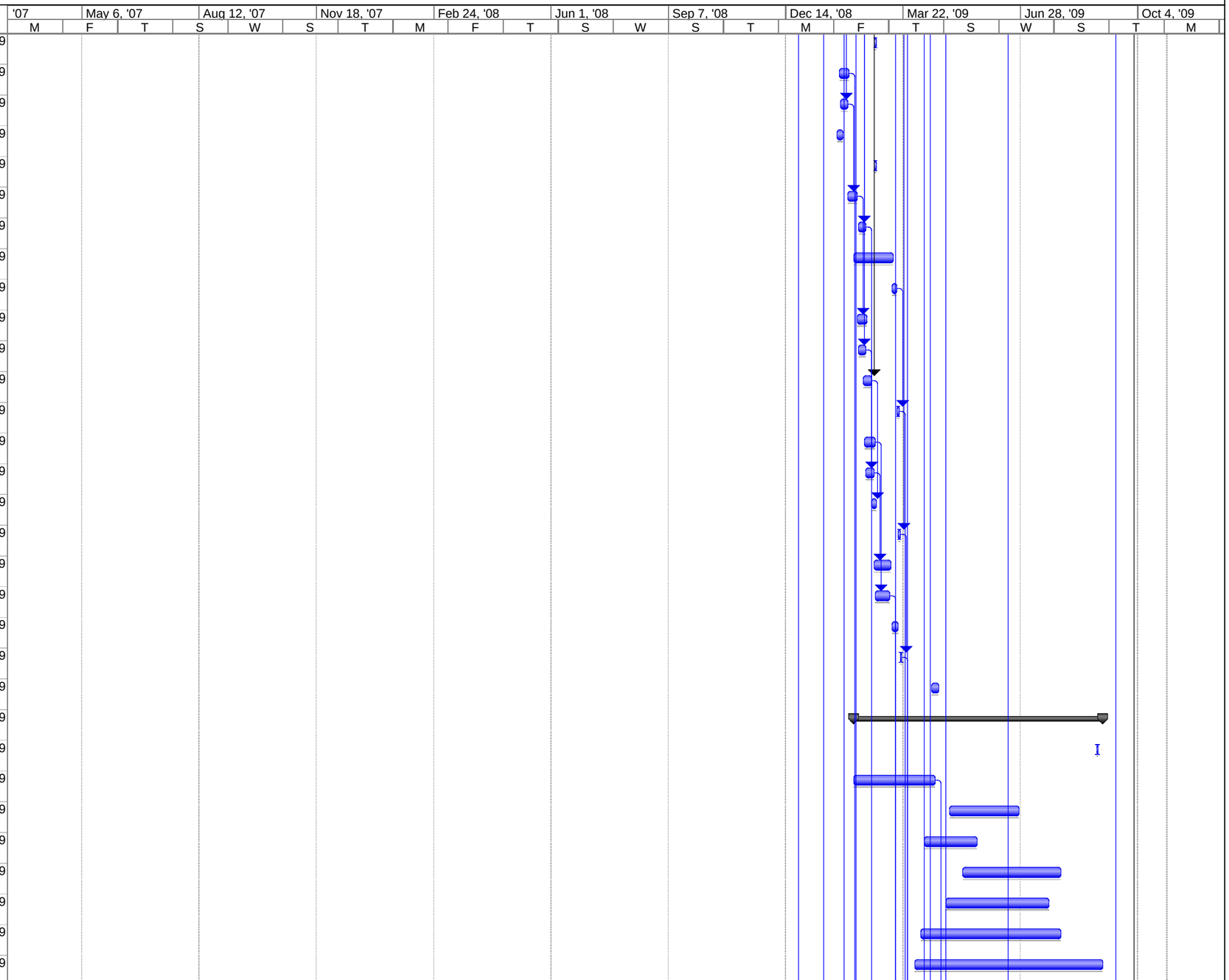
ID	Task Name	Duration	Start	Finish
63	Install Light Fixtures - P1	35 days?	Mon 2/2/09	Fri 3/20/09
64	Set HVAC Equipment - P1	36 days?	Wed 2/18/09	Wed 4/8/09
65	Rough in Ductwork - P2	9 days?	Mon 2/2/09	Thu 2/12/09
66	Build Switch Gear	40 days?	Tue 3/3/09	Mon 4/27/09
67	Fire Alarm Trim Out - P1	4 days?	Thu 4/16/09	Tue 4/21/09
68	Transformer Install	37 days?	Thu 4/23/09	Fri 6/12/09
69	HVAC Trim Out - P1	78 days?	Wed 5/6/09	Fri 8/21/09
70	Rough in Controls - P1	30 days?	Mon 5/18/09	Fri 6/26/09
71	Permanent Power	0 days	Mon 7/27/09	Mon 7/27/09
72	P3 Level Finishes	243 days?	Wed 10/8/08	Fri 9/11/09
73	P2 Level Finishes	224 days?	Thu 10/30/08	Tue 9/8/09
74	P1 Finishes	199 days?	Tue 12/9/08	Fri 9/11/09
75	Garage Levels Completed	0 days	Fri 9/11/09	Fri 9/11/09
76	Building B	223 days?	Mon 11/17/08	Wed 9/23/09
77	Building B Concrete Structure	102 days?	Mon 12/8/08	Tue 4/28/09
78	FRP Walls and Columns on Ground Floc	10 days?	Wed 12/10/08	Tue 12/23/08
79	FRP Slab on 2nd	21 days?	Mon 12/8/08	Mon 1/5/09
80	In Slab Electric on 2nd	11 days?	Fri 12/19/08	Fri 1/2/09
81	FRP Walls and Columns on 2nd	6 days?	Wed 12/31/08	Wed 1/7/09
82	Remove Shoring on 2nd	2 days?	Wed 2/4/09	Thu 2/5/09
83	FRP Slab on 3rd	5 days?	Mon 1/5/09	Fri 1/9/09
84	In Slab Electric on 3rd	4 days?	Tue 1/6/09	Fri 1/9/09
85	FRP Walls and Columns on 3rd	4 days?	Thu 1/8/09	Tue 1/13/09
86	Remove Shoring on 3rd	2 days?	Wed 2/11/09	Thu 2/12/09
87	FRP Slab on 4th	6 days?	Mon 1/12/09	Mon 1/19/09
88	In Slab Electric on 4th	7 days?	Tue 1/13/09	Wed 1/21/09
89	FRP Walls and Columns on 4th	6 days?	Thu 1/15/09	Thu 1/22/09
90	Remove Shoring on 4th	2 days?	Fri 2/20/09	Mon 2/23/09
91	FRP Slab on 5th	6 days?	Mon 1/19/09	Mon 1/26/09
92	In Slab Electric on 5th	7 days?	Tue 1/20/09	Wed 1/28/09
93	FRP Walls and Columns on 5th	5 days?	Mon 1/26/09	Fri 1/30/09



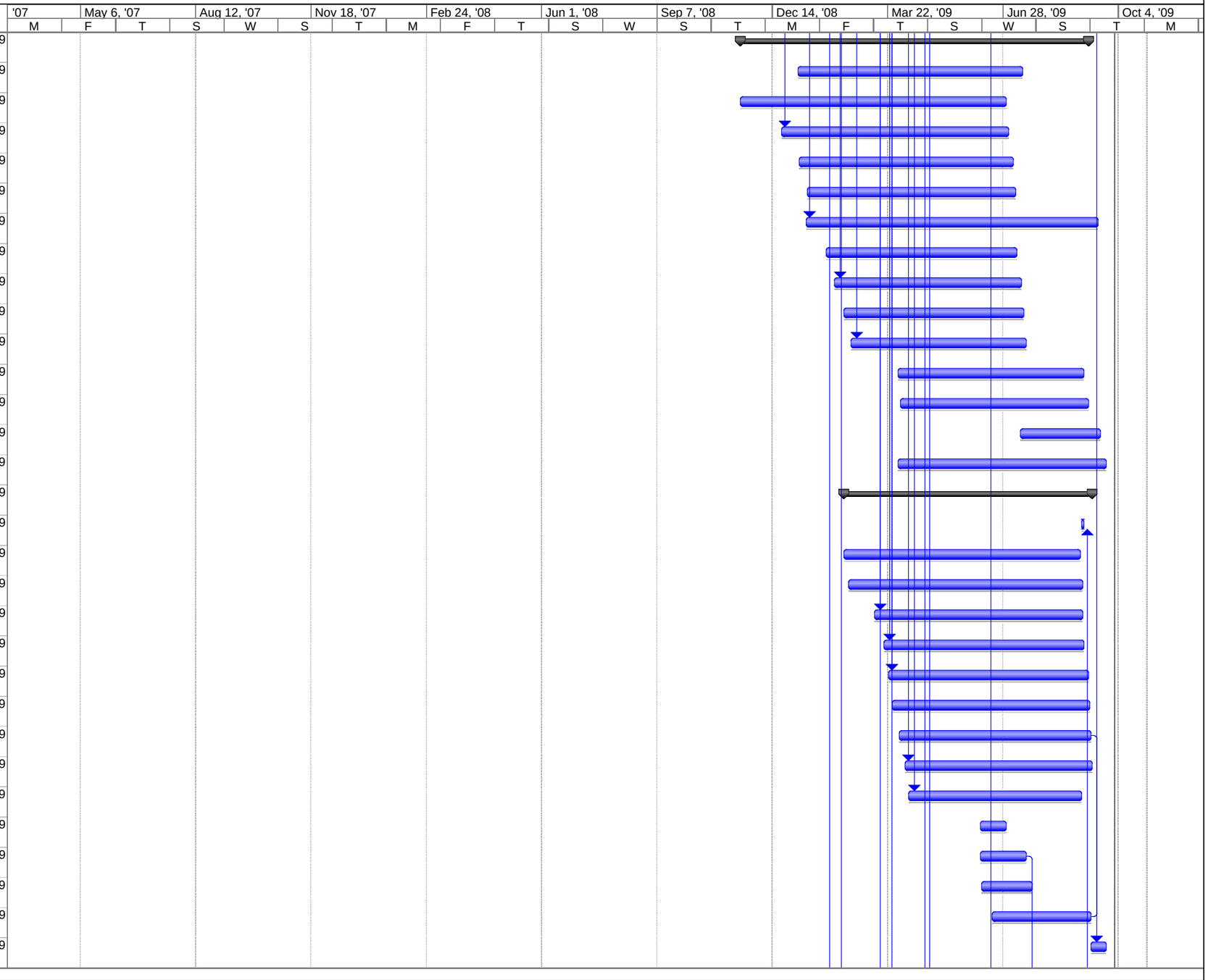
Project: Potomac Yard Schedule.mpp
Date: Wed 10/28/09

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

ID	Task Name	Duration	Start	Finish
94	Remove Shoring on 5th	2 days?	Thu 2/26/09	Fri 2/27/09
95	FRP Slab on 6th	6 days?	Wed 1/28/09	Wed 2/4/09
96	In Slab Electric on 6th	4 days?	Thu 1/29/09	Tue 2/3/09
97	FRP Walls and Columns on 6th	5 days?	Mon 1/26/09	Fri 1/30/09
98	Remove Shoring on 6th	2 days?	Thu 2/26/09	Fri 2/27/09
99	FRP Slab on 7th	6 days?	Wed 2/4/09	Wed 2/11/09
100	In Slab Electric on 7th	4 days?	Fri 2/13/09	Wed 2/18/09
101	FRP Walls and Columns on 7th	25 days?	Mon 2/9/09	Fri 3/13/09
102	Remove Shoring on 7th	2 days?	Fri 3/13/09	Mon 3/16/09
103	FRP Slab on 8th	6 days?	Thu 2/12/09	Thu 2/19/09
104	In Slab Electric on 8th	4 days?	Fri 2/13/09	Wed 2/18/09
105	FRP Walls and Columns on 8th	5 days?	Tue 2/17/09	Mon 2/23/09
106	Remove Shoring on 8th	2 days?	Tue 3/17/09	Wed 3/18/09
107	FRP Slab on 9th	7 days?	Wed 2/18/09	Thu 2/26/09
108	In Slab Electric on 9th	5 days?	Thu 2/19/09	Wed 2/25/09
109	FRP Walls and Columns on 9th	4 days?	Tue 2/24/09	Fri 2/27/09
110	Remove Shoring on 9th	2 days?	Wed 3/18/09	Thu 3/19/09
111	FRP Slab on PH	10 days?	Thu 2/26/09	Wed 3/11/09
112	In Slab Electric on PH	8 days?	Fri 2/27/09	Tue 3/10/09
113	FRP Walls and Columns on PH	3 days?	Fri 3/13/09	Tue 3/17/09
114	Remove Shoring on PH	1 day?	Fri 3/20/09	Fri 3/20/09
115	Remove Tower Crane #1	4 days?	Wed 4/15/09	Mon 4/20/09
116	Building Façade / Roof B	150 days?	Mon 2/9/09	Fri 9/4/09
117	Install Fiberglass Dome B	1 day?	Mon 8/31/09	Mon 8/31/09
118	Install Architectural Precast B	50 days?	Mon 2/9/09	Fri 4/17/09
119	Install Curtin Wall System B	42 days?	Thu 4/30/09	Fri 6/26/09
120	Install Punch Windows B	32 days?	Thu 4/9/09	Fri 5/22/09
121	Precast Caulking B	60 days?	Mon 5/11/09	Fri 7/31/09
122	Window Caulking B	62 days?	Mon 4/27/09	Tue 7/21/09
123	Penthouse Steel / Enclosure B	85 days?	Mon 4/6/09	Fri 7/31/09
124	Roofing Weathertight B	113 days?	Wed 4/1/09	Fri 9/4/09



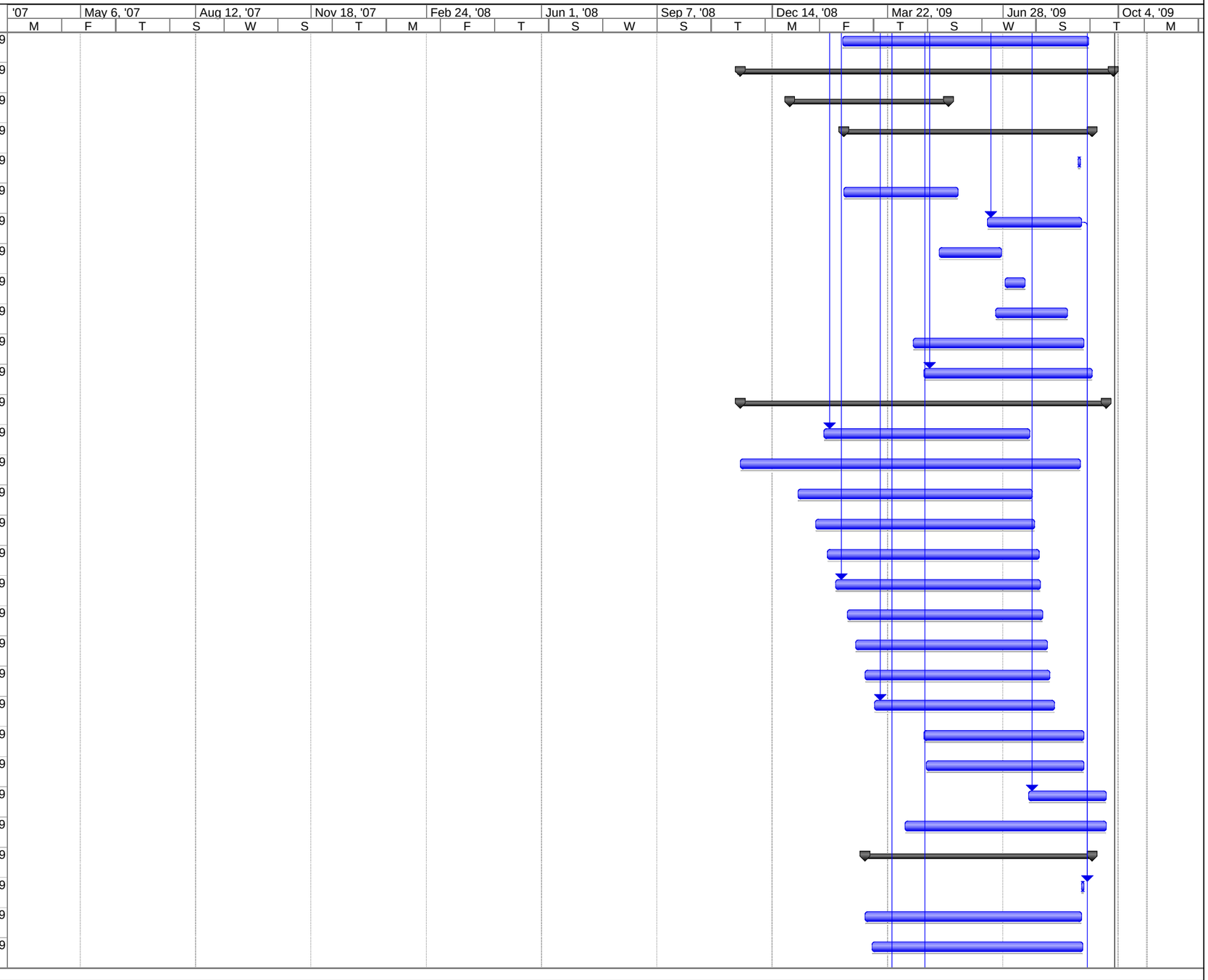
ID	Task Name	Duration	Start	Finish
125	MEP B	212 days?	Mon 11/17/08	Tue 9/8/09
126	MEP Risers	137 days?	Mon 1/5/09	Tue 7/14/09
127	MEP Rough in Ground Floor	162 days?	Mon 11/17/08	Tue 6/30/09
128	MEP Rough in 2nd Floor	139 days?	Mon 12/22/08	Thu 7/2/09
129	MEP Rough in 3rd Floor	130 days?	Tue 1/6/09	Mon 7/6/09
130	MEP Rough in 4th Floor	127 days?	Tue 1/13/09	Wed 7/8/09
131	MEP Rough in 5th Floor	178 days?	Mon 1/12/09	Wed 9/16/09
132	MEP Rough in 6th Floor	116 days?	Thu 1/29/09	Thu 7/9/09
133	MEP Rough in 7th Floor	113 days?	Thu 2/5/09	Mon 7/13/09
134	MEP Rough in 8th Floor	109 days?	Fri 2/13/09	Wed 7/15/09
135	MEP Rough in 9th Floor	107 days?	Thu 2/19/09	Fri 7/17/09
136	MEP Rough in Penthouse	114 days?	Tue 3/31/09	Fri 9/4/09
137	MEP Trim Out	114 days?	Thu 4/2/09	Tue 9/8/09
138	Start Up and Commissioning	50 days?	Mon 7/13/09	Fri 9/18/09
139	Elevators	127 days?	Tue 3/31/09	Wed 9/23/09
140	Building Cores and Finishes	151 days?	Fri 2/13/09	Fri 9/11/09
141	Ground Floor Finishes	2 days?	Thu 9/3/09	Fri 9/4/09
142	2nd Floor Finishes	143 days?	Fri 2/13/09	Tue 9/1/09
143	3rd Floor Finishes	143 days?	Tue 2/17/09	Thu 9/3/09
144	4th Floor Finishes	127 days?	Wed 3/11/09	Thu 9/3/09
145	5th Floor Finishes	122 days?	Thu 3/19/09	Fri 9/4/09
146	6th Floor Finishes	122 days?	Mon 3/23/09	Tue 9/8/09
147	7th Floor Finishes	120 days?	Thu 3/26/09	Wed 9/9/09
148	8th Floor Finishes	117 days?	Wed 4/1/09	Thu 9/10/09
149	9th Floor Finishes	115 days?	Mon 4/6/09	Fri 9/11/09
150	PH Floor Finishes	105 days?	Thu 4/9/09	Wed 9/2/09
151	Frame Perimeter Partitions Typ Floor B	16 days?	Tue 6/9/09	Tue 6/30/09
152	Install Fire Safe at Slab Edge Typ Floor I	29 days?	Tue 6/9/09	Fri 7/17/09
153	Insulate Perimeter Walls Typ Floor B	31 days?	Wed 6/10/09	Wed 7/22/09
154	Hang and Finish Perimeter Walls Typ Flo	60 days?	Fri 6/19/09	Thu 9/10/09
155	Install Blinds Typ Floor B	9 days?	Fri 9/11/09	Wed 9/23/09



Project: Potomac Yard Schedule.mpp
Date: Wed 10/28/09

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

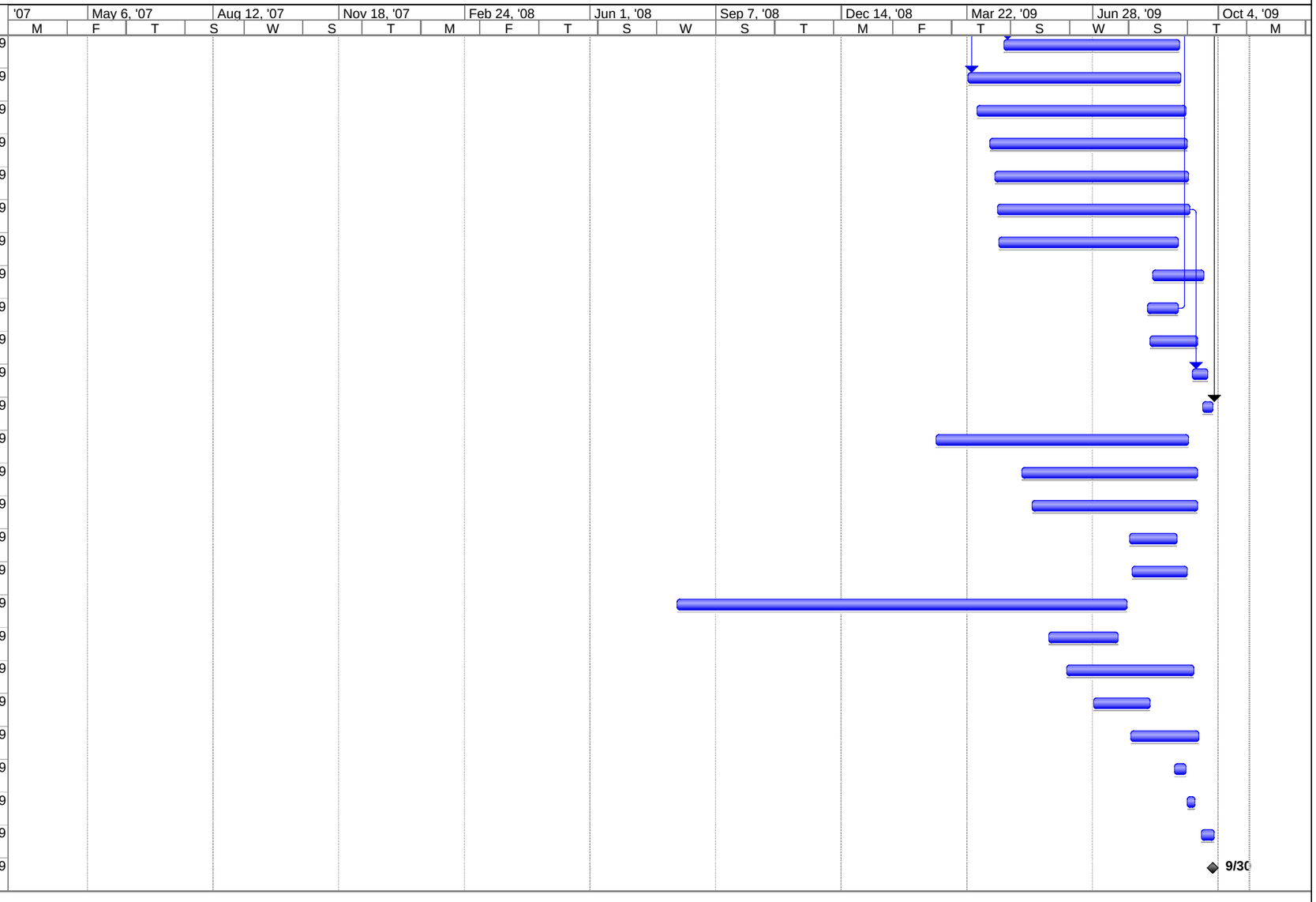
ID	Task Name	Duration	Start	Finish
156	Finishes Main Lobby B	149 days?	Thu 2/12/09	Tue 9/8/09
157	Building A	227 days?	Mon 11/17/08	Tue 9/29/09
158	Building A Concrete Structure (Same as	97 days?	Mon 12/29/08	Tue 5/12/09
159	Building Façade / Roof A	151 days?	Fri 2/13/09	Fri 9/11/09
160	Install Fiberglass Dome A	2 days?	Mon 8/31/09	Tue 9/1/09
161	Install Architectural Precast A	69 days?	Fri 2/13/09	Wed 5/20/09
162	Install Curtin Wall System A	58 days?	Mon 6/15/09	Wed 9/2/09
163	Install Punch Windows A	39 days?	Tue 5/5/09	Fri 6/26/09
164	Precast Caulking A	13 days?	Tue 6/30/09	Thu 7/16/09
165	Window Caulking A	45 days?	Mon 6/22/09	Fri 8/21/09
166	Penthouse Steel / Enclosure A	105 days?	Mon 4/13/09	Fri 9/4/09
167	Roofing Weathertight A	103 days?	Wed 4/22/09	Fri 9/11/09
168	MEP A	223 days?	Mon 11/17/08	Wed 9/23/09
169	MEP Risers	125 days?	Tue 1/27/09	Mon 7/20/09
170	MEP Rough in Ground Floor	207 days?	Mon 11/17/08	Tue 9/1/09
171	MEP Rough in 2nd Floor	143 days?	Mon 1/5/09	Wed 7/22/09
172	MEP Rough in 3rd Floor	134 days?	Tue 1/20/09	Fri 7/24/09
173	MEP Rough in 4th Floor	128 days?	Fri 1/30/09	Tue 7/28/09
174	MEP Rough in 5th Floor	124 days?	Fri 2/6/09	Wed 7/29/09
175	MEP Rough in 6th Floor	120 days?	Mon 2/16/09	Fri 7/31/09
176	MEP Rough in 7th Floor	117 days?	Mon 2/23/09	Tue 8/4/09
177	MEP Rough in 8th Floor	113 days?	Tue 3/3/09	Thu 8/6/09
178	MEP Rough in 9th Floor	109 days?	Wed 3/11/09	Mon 8/10/09
179	MEP Rough in Penthouse	98 days?	Wed 4/22/09	Fri 9/4/09
180	MEP Trim Out	96 days?	Fri 4/24/09	Fri 9/4/09
181	Start Up and Commissioning	48 days?	Mon 7/20/09	Wed 9/23/09
182	Elevators	123 days?	Mon 4/6/09	Wed 9/23/09
183	Building Cores and Finishes	139 days?	Tue 3/3/09	Fri 9/11/09
184	Ground Floor Finishes	2 days?	Thu 9/3/09	Fri 9/4/09
185	2nd Floor Finishes	132 days?	Tue 3/3/09	Wed 9/2/09
186	3rd Floor Finishes	129 days?	Mon 3/9/09	Thu 9/3/09



Project: Potomac Yard Schedule.mpp
Date: Wed 10/28/09

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

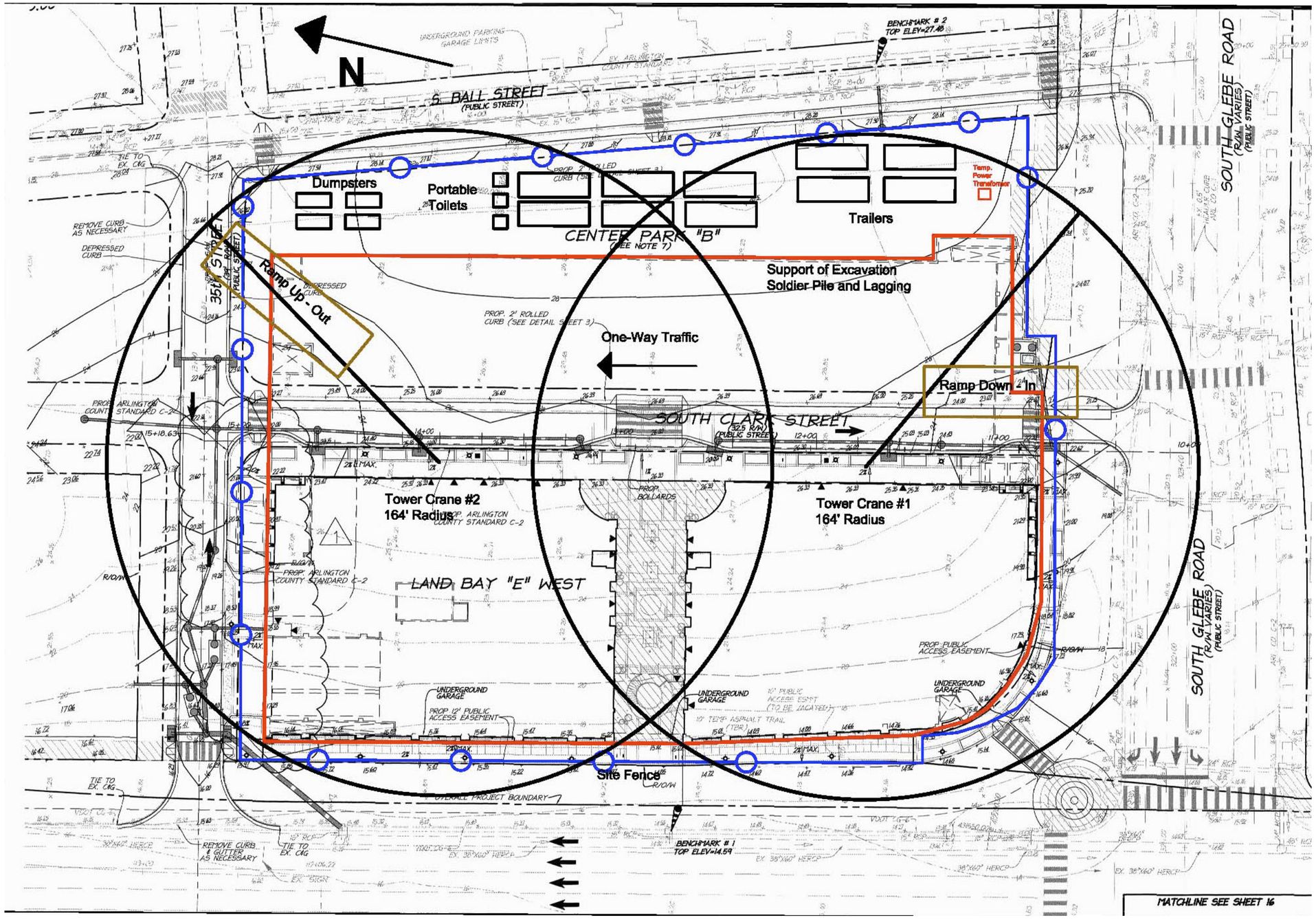
ID	Task Name	Duration	Start	Finish
187	4th Floor Finishes	99 days?	Mon 4/20/09	Thu 9/3/09
188	5th Floor Finishes	120 days?	Mon 3/23/09	Fri 9/4/09
189	6th Floor Finishes	117 days?	Mon 3/30/09	Tue 9/8/09
190	7th Floor Finishes	110 days?	Thu 4/9/09	Wed 9/9/09
191	8th Floor Finishes	109 days?	Mon 4/13/09	Thu 9/10/09
192	9th Floor Finishes	108 days?	Wed 4/15/09	Fri 9/11/09
193	PH Floor Finishes	100 days?	Thu 4/16/09	Wed 9/2/09
194	Frame Perimeter Partitions Typ Floor A	28 days?	Fri 8/14/09	Tue 9/22/09
195	Install Fire Safe at Slab Edge Typ Floor A	18 days?	Mon 8/10/09	Wed 9/2/09
196	Insulate Perimeter Walls Typ Floor A	27 days?	Wed 8/12/09	Thu 9/17/09
197	Hang and Finish Perimeter Walls Typ Flo	10 days?	Mon 9/14/09	Fri 9/25/09
198	Install Blinds Typ Floor A	6 days?	Tue 9/22/09	Tue 9/29/09
199	Finishes Main Lobby A	141 days?	Thu 2/26/09	Thu 9/10/09
200	Building B Canopy	99 days?	Mon 5/4/09	Thu 9/17/09
201	Building A Canopy	93 days?	Tue 5/12/09	Thu 9/17/09
202	Main Canopy	27 days?	Mon 7/27/09	Tue 9/1/09
203	Trellis on Roof A&B	31 days?	Wed 7/29/09	Wed 9/9/09
204	Site Utilities	251 days?	Fri 8/8/08	Fri 7/24/09
205	Site Grading	40 days?	Mon 5/25/09	Fri 7/17/09
206	Site Electric	71 days?	Mon 6/8/09	Mon 9/14/09
207	Site Concrete	32 days?	Mon 6/29/09	Tue 8/11/09
208	Site Paving	39 days?	Tue 7/28/09	Fri 9/18/09
209	Site Furnishings	7 days?	Mon 8/31/09	Tue 9/8/09
210	Landscaping	4 days?	Thu 9/10/09	Tue 9/15/09
211	Inspections and Closeout	8 days?	Mon 9/21/09	Wed 9/30/09
212	PROJECT COMPLETE	0 days	Wed 9/30/09	Wed 9/30/09



Project: Potomac Yard Schedule.mpp
Date: Wed 10/28/09

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

Appendix B



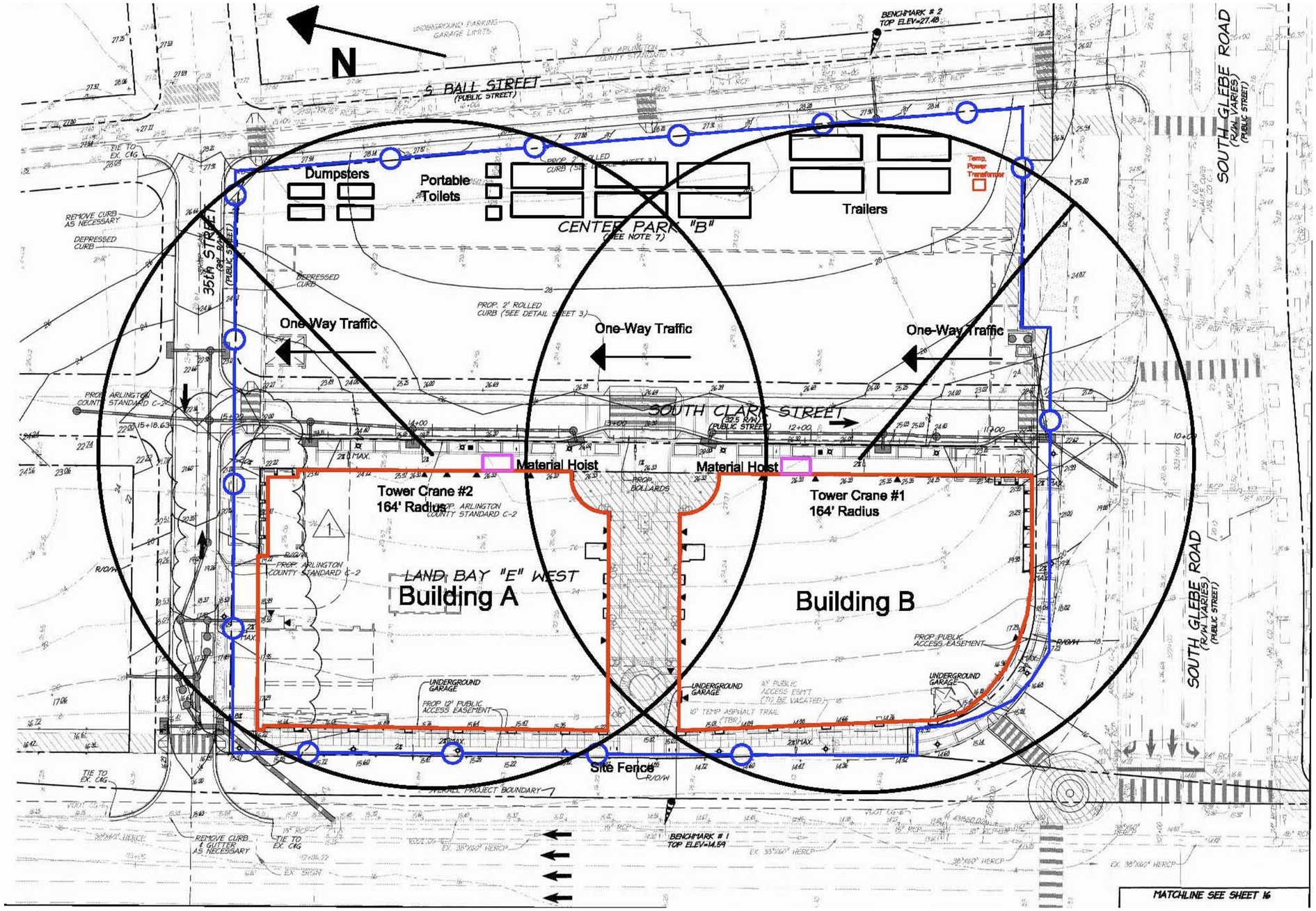
Potomac Yard Land Bay E
Arlington, VA

Structural Sequence: Garage Levels

By: Drew Heilman

Tech 2

Date: October 28, 2009



Potomac Yard Land Bay E
Arlington, VA

Structural Sequence:
Buildings A&B

By: Drew Heilman

Tech 2

Date: October 28, 2009

Appendix C

Potomac Yard Land Bay E
Structural Estimate

Prestressed Piles	Description	Linear Feet	Quantity	Cubic Yards	
	14"x14"	35	1011	1783.8	5000psi
		Cost: $33.50/ft	$1,185,397.50		

Pile Caps	Description	Volume ft^3	Quantity	Cubic Yards	Total CY
	3P	199.3	136	7.38	1003.68
	4P	265.2	7	9.82	68.74
	5P	379.3	7	14.05	98.35
	6P	628.2	15	23.27	349.05
	7P	408	1	15.11	15.11
	8P	681.3	1	25.23	25.23
	8PC	612	1	22.67	22.67
	8PA	592	1	21.93	21.93
	8PB	480	1	17.77	17.77
	9P	628.2	2	23.27	46.54
	9PA1	646	3	23.93	71.79
	9PB1	719.7	2	26.65	53.3
	10P	918.7	8	34.02	272.16
	10PB	592	1	21.93	21.93
	10PA	1024.2	1	37.93	37.93
	11P	1000	8	37.04	296.32
	P39	2679.4	4	99.24	396.96
				Subtotal:	2819.46
					5000psi
		Cost: $237/CY	$769,587		

Floor Slabs					
	Floor/Building	Slabs	Area (ft^2)	Cubic Yards	Stength (psi)
	P3	5" SOG	98,592	1521.48	4500
	P2	8"	98,592	2434.37	5000
	P1	8"	99,339	2452.81	5000
	1st A	8"	2,694	66.52	5000
	2nd A	8"	22,325	551.18	5000
	3-8 A	8"	117,880	2910.33	5000

Potomac Yard Land Bay E
Structural Estimate

	9th A	8"	21,620	533.77	5000
	Roof/PH A	10"	21,620	667.28	5000
	1st B	8"	3,020	74.56	5000
	2nd B	8"	21,485	530.44	5000
	3-8 B	8"	113,210	2795.03	5000
	9th B	8"	21,209	523.63	5000
	Roof/PH B	10"	21,209	654.6	5000
			Sub 4500:	1521.48	
			Sub 5000:	14194.52	
		Cost: $193/CY	$293,645.64		
		Cost: $643/CY	$9,127,076.36		
			$9,420,722.00		

Garage Levels	Walls	Linear Feet	Cubic Yards	Strength (psi)
P3	12"	1,097	406.37	4000
P2	12"	1,097	406.37	4000
P1	12"	1,097	406.37	4000
		Sub 4000:	1219	
		Cost: $400/CY	$487,600	

Columns					
	Floor/Building	Description	Linear Feet	Cubic Yards	Strength (psi)
	P3	24x24	152	22.52	8,000
	P3	24x30	6	1.11	8,000
	P3	24x36	24	5.33	8,000
	P3	36x36	5	1.67	8,000
	P2	24x24	152	22.52	6,000
	P2	24x30	6	1.11	6,000
	P2	24x36	24	5.33	6,000
	P2	36x36	5	1.67	6,000
	P1	24x24	135	20	6,000
	P1	24x30	6	1.11	6,000
	P1	24x36	24	5.33	6,000

Potomac Yard Land Bay E
Structural Estimate

	P1	36x36	5	1.67	6,000
	1st A	24x24	23	3.41	6,000
	1st A	24x30	14	2.59	6,000
	1st A	36x36	4	1.33	6,000
	2nd A	24x24	24	3.56	6,000
	2nd A	24x30	12	2.22	6,000
	2nd A	36x36	1	0.33	6,000
	3rd A	24x24	25	3.7	6,000
	3rd A	24x30	12	2.22	6,000
	4-7 A	24x24	148	21.93	6,000
	8th A	24x24	38	5.63	5,000
	9th A	24x24	18	2.67	5,000
	1st B	24x24	27	4	6,000
	1st B	24x30	12	1.78	6,000
	1st B	36x36	1	0.33	6,000
	2nd B	24x24	25	3.7	6,000
	2nd B	24x30	12	2.22	6,000
	2nd B	36x36	1	0.33	6,000
	3rd B	24x24	26	3.85	6,000
	3rd B	24x30	12	2.22	6,000
	4-7 B	24x24	36	5.33	6,000
	8th B	24x24	36	5.33	5,000
	9th B	24x24	23	3.41	5,000

Potomac Yard Land Bay E
Structural Estimate

Sub 8000:	30.63
Sub 6000:	123.79
Sub 5000:	17.04
Cost: $1375/CY	$235,757.50

Beams					
Floor/Building	Description	Type	Linear Feet	Cubic Yards	Strength (psi)
1st A	12x20	Reinforced	52	3.21	5,000
1st A	12x30	Reinforced	288	26.67	5,000
1st A	24x29	Reinforced	36	6.44	5,000
1st A	24x30	Reinforced	414	76.67	5,000
1st A	24x48	Reinforced	16	4.74	5,000
1st A	24x78	Reinforced	28	13.48	5,000
1st A	34x18	Reinforced	36	5.67	5,000
1st A	72x18	Post Ten	494	164.67	5,000
1st A	108x18	Post Ten	90	45	5,000
2nd A	12x18	Reinforced	82	4.55	5,000
2nd A	24x18	Reinforced	66	7.33	5,000
2nd A	34x18	Reinforced	96	15.11	5,000
2nd A	34x48	Reinforced	18	7.55	5,000
2nd A	24x18	Post Ten	20	2.22	5,000
2nd A	42x18	Post Ten	20	3.88	5,000
2nd A	72x18	Post Ten	548	182.67	5,000
2nd A	72x78	Post Ten	168	242.67	5,000
3rd A	12x18	Reinforced	84	4.67	5,000
3rd A	24x18	Reinforced	88	9.78	5,000
3rd A	24x18	Post Ten	32	3.56	5,000
3rd A	34x18	Post Ten	200	31.48	5,000
3rd A	37x18	Post Ten	20	3.43	5,000
3rd A	38x18	Post Ten	24	4.22	5,000
3rd A	42x18	Post Ten	20	3.89	5,000
3rd A	48x18	Post Ten	136	30.22	5,000
3rd A	72x18	Post Ten	714	238	5,000

Potomac Yard Land Bay E
Structural Estimate

4-8 A	12x18	Reinforced	84	4.67	5,000
4-8 A	24x18	Reinforced	88	9.78	5,000
4-8 A	24x18	Post Ten	54	6	5,000
4-8 A	34x18	Post Ten	76	11.96	5,000
4-8 A	37x18	Post Ten	20	3.43	5,000
4-8 A	38x18	Post Ten	24	4.22	5,000
4-8 A	42x18	Post Ten	20	3.89	5,000
4-8 A	48x18	Post Ten	112	24.89	5,000
4-8 A	72x18	Post Ten	714	238	5,000
9th A	12x18	Reinforced	84	4.67	5,000
9th A	24x18	Reinforced	88	9.78	5,000
9th A	24x18	Post Ten	54	6	5,000
9th A	24x20	Post Ten	32	3.95	5,000
9th A	34x20	Post Ten	116	20.29	5,000
9th A	37x20	Post Ten	20	3.81	5,000
9th A	38x20	Post Ten	24	4.69	5,000
9th A	42x20	Post Ten	20	4.32	5,000
9th A	48x20	Post Ten	68	16.79	5,000
9th A	72x20	Post Ten	714	264.34	5,000
9th A	89x20	Post Ten	18	8.24	5,000
Roof/PH A	12x20	Reinforced	52	3.21	5,000
Roof/PH A	24x20	Reinforced	28	3.46	5,000
Roof/PH A	48x20	Reinforced	172	42.47	5,000
Roof/PH A	34x20	Post Ten	248	43.37	5,000
Roof/PH A	72x20	Post Ten	640	237.03	5,000
Roof/PH A	92x20	Post Ten	128	60.57	5,000
1st B	12x18	Reinforced	6	0.33	5,000
1st B	12x20	Reinforced	40	2.47	5,000
1st B	18x18	Reinforced	35	2.92	5,000
1st B	24x18	Reinforced	301	33.44	5,000
1st B	24x48	Reinforced	15	4.44	5,000

Potomac Yard Land Bay E
Structural Estimate

1st B	48x48	Reinforced	108	64	5,000
1st B	24x20	Post Ten	20	2.47	5,000
1st B	41x18	Post Ten	20	4.22	5,000
1st B	48x24	Post Ten	32	9.48	5,000
1st B	72x18	Post Ten	493	182.56	5,000
1st B	72x22	Post Ten	240	97.78	5,000
1st B	108x18	Post Ten	58	29	5,000
2nd B	12x18	Reinforced	44	2.44	5,000
2nd B	24x18	Reinforced	68	7.56	5,000
2nd B	24x20	Post Ten	20	2.47	5,000
2nd B	34x18	Post Ten	114	17.94	5,000
2nd B	37x18	Post Ten	20	3.43	5,000
2nd B	41x18	Post Ten	20	3.8	5,000
2nd B	72x18	Post Ten	796	265.33	5,000
3rd B	12x18	Reinforced	44	2.44	5,000
3rd B	24x18	Reinforced	68	7.56	5,000
3rd B	24x20	Post Ten	20	2.47	5,000
3rd B	34x18	Post Ten	94	14.8	5,000
3rd B	37x18	Post Ten	20	3.43	5,000
3rd B	41x18	Post Ten	20	3.8	5,000
3rd B	48x18	Post Ten	64	14.22	5,000
3rd B	72x18	Post Ten	752	250.67	5,000
4-8 B	12x18	Reinforced	44	2.44	5,000
4-8 B	24x18	Reinforced	68	7.56	5,000
4-8 B	24x18	Post Ten	28	3.11	5,000
4-8 B	24x20	Post Ten	20	2.47	5,000
4-8 B	34x18	Post Ten	76	14.8	5,000
4-8 B	34x20	Post Ten	44	7.7	5,000
4-8 B	37x18	Post Ten	20	3.43	5,000
4-8 B	41x18	Post Ten	20	3.8	5,000
4-8 B	48x18	Post Ten	20	14.22	5,000
4-8 B	72x18	Post Ten	752	250.67	5,000

Potomac Yard Land Bay E
Structural Estimate

9th B	12x18	Reinforced	44	2.44	5,000
9th B	24x18	Reinforced	68	7.56	5,000
9th B	24x20	Post Ten	48	5.93	5,000
9th B	34x20	Post Ten	96	16.79	5,000
9th B	41x20	Post Ten	20	4.22	5,000
9th B	72x20	Post Ten	752	250.67	5,000
Roof/PH B	12x18	Reinforced	40	2.22	5,000
Roof/PH B	12x20	Reinforced	152	9.38	5,000
Roof/PH B	18x18	Reinforced	82	6.83	5,000
Roof/PH B	24x20	Reinforced	38	4.69	5,000
Roof/PH B	48x20	Reinforced	154	38.02	5,000
Roof/PH B	34x18	Post Ten	24	3.78	5,000
Roof/PH B	34x20	Post Ten	96	16.79	5,000
Roof/PH B	72x20	Post Ten	632	234.07	5,000
Roof/PH B	92x20	Post Ten	120	56.79	5,000

Subtotal: 4191.46
Cost: $1200/CY $5,029,752.00

Potomac Yard Land Bay E
Structural Estimate

Code	Description	Cost
31 62 13.23	Prestressed Piles	$1,185,397.50
03 30 53.40	Pile Caps	$769,587.00
03 30 53.40	Floor Slabs	$9,420,722.00
03 30 53.40	Garage Walls	$487,600.00
03 30 53.40	Columns	$235,757.50
03 30 53.40	Beams	$5,029,752.00
01 54 19.50	(2)Cranes 12 Mo	$2,737,500.00
	Total:	$19,866,316.00
	Cost/SF:	$32.10

Appendix D

General Contrator Staff					
Description	Time on Job	Quantity	Unit	Unit Price	Total
Project Executive	30%	86	week	$1,144.00	$98,384.00
Senior Project Manager	80%	86	week	$2,653.00	$182,526.40
Project Managers (2)	100%	86	week	$2,083.00	$358,276.00
Assistant Project Managers (2)	100%	86	week	$1,555.00	$267,460.00
Superintendents (2)	100%	86	week	$3,345.00	$575,340.00
Assistant Superintendents (1)	100%	86	week	$2,465.00	$211,990.00
Safety	10%	86	week	$161.00	$13,846.00
Layout Engineer	60%	86	week	$1,373.00	$118,078.00
				Total Cost	$1,825,900.40
Temporary Utilities					
Description	Quantity	Unit	Duration	Unit Price	Total
Heat	1	CSF/week	20	$12.50	$154,750.00
Lighting	1	CSF		$29.42	$18,210.98
Power	1	CSF		$51.70	$32,002.30
Toilets	8	Month	20	$162.00	$25,920.00
				Total Cost	$230,883.28
Construction Facilities and Equipment					
Description	Quantity	Unit	Duration	Unit Price	Total
Trailers	4	EA/month	10	$410.00	$16,400.00
Storage Boxes	3	EA/month	10	$79.00	$2,370.00
Field Office Equipment Rental	4	Month	10	$171.00	$6,840.00
Office Supplies	4	Month	10	$93.50	$3,740.00
Field Office Lights & HVAC	4	Month	10	$165.00	$6,600.00
Scaffolding	30	CSF		$124.00	$3,720.00
Fencing	808	LF		$11.15	$9,009.20
Signage	100	SF		$25.00	$2,500.00
Dumpsters	4	Week	86	$620.00	$213,280.00
Tower Crane/ Material Hoist (Trades)					$0.00
Testing and Inspections (Owner)					$0.00
				Total Cost	$264,459.20
Permits, Insurance and Fee					
Description	Quantity	Unit		Unit Price	Total
Permits	1	LS		$383,000.00	$383,000.00
Building Permit and others (Owner)					$0.00
Payment and Performance Bond	1	LS		$459,600.00	$459,600.00
General Liability Insurance	1	LS		$183,840.00	$183,840.00
Builder's Risk Insurance (Owner)					$0.00
Contractors Fee	1	LS		$2,762,700.00	$2,762,700.00
				Total Cost	$3,789,140.00

Total General Conditions	**$6,110,382.88**
% Total Contract Value	7.98
Cost per Month	$305,519.14
Cost per Week	$71,050.96