Technical Assignment 2

Construction Project Management
Oct 28th, 2009

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700 6th Street
Washington, DC

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1. Executive Summary

This project schedule breaks down the 700 6th Street building by phase of construction and activity. The major phases for the building are the substructure, superstructure, exterior skin, and MEP. The building is 12 stories so most of the schedule is broken down by floor. The total schedule for the project is about 31 months.

The site of 700 6th Street is very congested. It is in the middle of downtown Washington, DC. The building footprint takes up almost all the space on the site. The only extra space is walkways between 700 6th Street and neighboring buildings. 700 6th Street is attached to the Gallery Place Building so special care needs to be taken not to damage or disturb the occupants of the neighboring building. There are 3 main site plans for the phasing of 700 6th Street; Excavation Site Plan, Superstructure Site Plan, and interiors/Finishes Site Plan.

The superstructure of 700 6th Street was estimated using RS Means Facilities Construction Data 2009. This was used because it breaks the building down into components and provides an accurate estimate. The estimated cost I came up with from the detailed structural take off is less than the actual cost. The total structural system accounts for 18% of the total project cost. The materials for the detailed structural estimate are 75% of the costs.

The highest cost from the general conditions estimate came from the project staffing costs. The project staffing costs are almost half of the general conditions costs. The general conditions each month are approximately $92,000. If time is saved on the schedule this money could also be saved. The total general conditions for this project is $2,760,887 which is approximately 6% of the total contract value.

I attended the Energy and the Construction Industry break out session. We talked about Green Washing and how LEED rated buildings are not performing the way they should. The next break out session dealt with individual thesis proposals. Riley went around the room and asked students about their building and what a possible redesign would be. A topic that came up multiple times was PV systems.

2. Detailed Project Schedule

This project schedule breaks down the 700 6th Street building by phase of construction and activity. The major phases for the building are the substructure, superstructure, exterior skin, and MEP. The building is 12 stories so most of the schedule is broken down by floor. The schedule can be found in the Appendix.

There was a detailed schedule made for 700 6th Street constructed by the project manager. I could not get a copy of it, but heard it had over 2000 items in it. The attached detailed summary was derived from the summary schedule done in Technical Assignment 1. This project was scheduled to mobilize mid April of 2007. The site will have site fence put up before any demolition work starts.

The concrete foundation consists of spread footings at all columns, mat slab, and slab on grade at all other locations. The foundation is a driver to keep the schedule on time. Nothing can start till the foundation is done. Half of the concrete work was done during warm weather and the other was done during the colder months. Special care had to be taken to adjust the admixtures during the hot and cold months to ensure the concrete cures to its designed strength.

Picture 2.1-Excavation

Once the foundation is complete the concrete superstructure starts construction. The estimated amount of days to complete all the levels is 115 days. Once a few floors are completed precast concrete will start to be hung. A tower crane will handle the concrete superstructure and mobile cranes will hang the precast on the lower levels.

Picture 2.1-Concrete Superstructure

Balfour Beatty is only responsible for lobby, and central core finishes. The owner is responsible for finishing the rest of the building. Finishing the lobby is in the back end the construction schedule. The main reason for this is the finishes cannot start till that floor is sealed from the environment. That means that none of the finishing trades can start till the precast, windows, and EIFS are complete. Once the lobby is finished the trades will go from floor to floor, finishing only the core area. Once testing and finishes come to a close the project team will check their punch list items and turn over the building to the owner.

3. Site Layout Planning

The site of 700 6th Street is very congested. It is in the middle of downtown Washington, DC. The building footprint takes up almost all the space on the site. The only extra space is walkways between 700 6th Street and neighboring buildings. 700 6th Street is attached to the Gallery Place Building so special care needs to be taken not to damage or disturb the occupants of the neighboring building.

Since there was such limited space, Balfour Beatty set up the field office across the street in a neighboring building. The parking for the workers is located in a parking garage across from 700 6th Street.

Excavation Site Plan

There are 3 construction gates for the site. The gate closest to the restaurant building is the main gate for construction. This gate is where all the trucks are loaded with soil from the excavation. There are 2 excavators located in the pit. Once the excavation starts to get deep where trucks cannot get in the soil is piled on the perimeter of the pit. A third excavator with an extended boom is used to scoop that soil and load it in a truck. Please refer to the Excavation Site Plan located in the Appendix and the picture below for more information.

Picture 3.1 Extended Boom Excavator

Superstructure Site Plan

While the structure goes up, the site starts to become very congested. Concrete trucks needs to have constant access to the concrete bucket, but deliveries also have to come in. For that reason it is very beneficial that the site has three entrances. The concrete trucks back into the alleyway in-between 700 6th Street and the Restaurant. There are wash down areas next to the exits for the concrete trucks to get cleaned off before returning to the roadways. The pump truck is mobile and stations itself around the building. The tower crane is located opposite the main construction entrance. It has a swing radius of 164'. The tower crane can cover every inch of the building and can unload trucks at any construction entrance. There isn't a lot of room for lay down areas so almost all of the deliveries have to be coordinated to come in when they are needed. There is one staging area located in-between the tower crane and the street. Please refer to the Superstructure Site Plan located in the Appendix and the picture below for more information.

Picture 3.3-Concrete Pump Truck

Interiors/Finishes Site Plan

This site gets a little less congested than the past site plans. The main reason for this is deliveries can now come in through the Gallery Place/700 6th Street loading dock. All the trucks will come in on H Street and leave on H Street. At this point the building is still surrounded by a site fence but is a lot less cluttered. Some of the smaller deliveries can come in through the alley way in-between 700 6th Street and the Verizon Center. Please refer to the Interiors/Finishes Site Plan located in the Appendix for more information.

4. Detailed Structural Systems Estimate

The structural system for 700 6th Street is made of concrete. Floors 1-12 were considered to be the same structurally. Floor 3 was used for the take offs and the rest of the floors were extrapolated from that. All parking garage levels were considered to be the same. The foundation consists of a thick matt slab, slab on grade, and the columns have a spread footing foundation. All the columns have a thickened slab of 6.5 inches on the suspended floors. The foundation walls were all 15 inch thick.

The superstructure of 700 6th Street was estimated using RS Means Facilities Construction Data 2009. This was used because it breaks the building down into components and provides an accurate estimate. The take-offs and calculation spreadsheets are located in the Appendix.

Assumptions

- Location Factor 1.0
- Concrete CY calculations do not subtract out the volume of rebar
- Rebar was assumed to run the length of the wall, footing, or slab
- Floors 1-12 were assumed to be the same
- Levels P3-P1 were assumed to be the same
- 4 use formwork was utilized
- Concrete strength was 4000 psi throughout
- For items not covered in RS Means the unit costs were interpolated

Structural System Cost Analysis			
Item	**Actual Cost**	**Estimated Cost**	**Difference**
Concrete System	$9,540,000	$7,792,239	$1,747,761

Table 4.1 –Structural System Cost Analysis

As shown in the Structural System Cost Analysis Table the estimated cost is less than the actual cost. There could have been error in the quantity takeoff due to poor drawings. Another factor that could have led to the discrepancy is the elevator pit slabs and walls were excluded from the RS Means take off. The total structural system accounts for 18% of the total project cost.

Summary	Cost Per Square Foot	Total Cost	Percentage
Total	$25	$7,792,239	100%
Labor Total	$5	$1,642,581	21%
Material Total	$18	$5,820,371	75%
Equipment Total	$1	$329,287	4%

Table 4.2-Cost/Square Foot

As shown in the Cost/Square Foot Table, most of the cost is in the Materials. The next highest is Labor and then Equipment. The materials total is high because most of the materials is concrete and rebar.

5. General Conditions Estimate

The general conditions estimate is broken down in the chart below. The highest cost from the general conditions estimate came from the project staffing costs. The project staffing costs is almost half of the general conditions costs. The general conditions each month is approximately $92,000. If time is saved on the schedule this money could also be saved. The total general conditions for this project are $2,760,887 which is approximately 6% of the total contract value.

General Conditions Breakdown		
Description	**$**	**$/Month**
Scheduling	In-Project Management	$0
Supervision	$362,664	$12,089
Executive Management	$150,696	$5,023
Project Management	$687,949	$22,932
Project Secretary/Field Office Manager	$120,540	$4,018
MEP Coordinator	$174,000	$5,800
EEO Representative	In-Project Management	$0
Field Engineer	$183,820	$6,127
Surveying Instrumentation and Equipment	$25,020	$834
Contractor's Office	$50,700	$1,690
Final Cleaning	$60,470	$2,016
Job Office Expense	$34,650	$1,155
Office Equipment	$27,746	$925
Progress Photos	$3,530	$118
Contractor's Telephone	$39,950	$1,332
Drawings and Specs	$9,500	$317
Company Vehicle Expense	$77,175	$2,573
Travel Expense	$9,600	$320
Safety Inspector	$8,820	$294
Safety Carpenter	$99,029	$3,301
Safety Railings	$9,500	$317
Field Clean Up/Laborers	$146,390	$4,880
Water Pumping	$1,000	$33
Dumpsters	$64,400	$2,147
Misc. Tools and Equip.	$13,500	$450
Security	$14,300	$477
Power Consumption	$126,000	$4,200
Temporary Toilets	$11,440	$381
Temporary Water	$2,700	$90
Cost Engineering/Project Accounting	In-Project Management	$0
Purchasing	No Charge	$0
Elevator Operator	$21,651	$722
Liability Insurance	$136,671	$4,556
DIC Insurance	$23,986	$800
Other (Protection, temp heat, safety materials)	$63,490	$2,116
TOTAL	**$2,760,887**	**$92,030**

Table 5.1-General Conditions Breakdown

6. Critical Industry Issues

a) Industry Panel: State of Construction

A very diverse group of people made up the panel, it ranged from a vise-president to a project engineer. Everyone had a consensus when it came to the status of the construction industry and the economy. That consensus was the construction industry seems to be finally getting better. Jobs are starting to come around and they are just waiting on jobs they have bid on to come threw. All companies said they are bidding on different projects than they are use to. With the way things are every job needs to be bid on and you never know where you can find work. All companies seemed optimistic when it came to getting work. In my opinion, I'm pretty sure they would not tell the students that they are not getting work. They will never tell us how bad things really are. It is obvious how they are doing when they do not hire or have internship positions available.

b) Break-Out Sessions
   i. Energy and the Construction Industry

I attended this break-out session; Dr. Riley led this session. The first thing discussed was:

- Challenges/things to understand
  a. Environment
  b. Deregulation (competition)
     i. Supply
     ii. Distribution
  c. Alternate
     i. Wind, solar, geothermal, biomass, waves
  d. World Economy, volatility, security/independence
  e. Developing Nations
  f. Stimulus Package
     i. Mandates/portfolio
     ii. Incentives
  g. PA-ACT 129 (Reduce Demand)
  h. Life Cycle Cost Value
  i. Business/Marketing
  j. Green Washing
     i. Selling something that really isn't green
  k. Operation
     i. Occupants behavior/actual use

All these topics led to a general consensus of LEED buildings are not performing the way they should be. These buildings are being built and not regulated after the fact. LEED buildings can become very inefficient from poor occupant use.

The next topic discussed was:

- New Material/Systems
    a. New Insulation
    b. LED Lighting
    c. Controls/SMART Buildings
    d. Interiors
    e. Hydronic Heating Systems
    f. Re-use/deconstruction
    g. HVAC Systems/Evolving/Right Sizing

During break out session 2, the main topic was thesis proposals. Dr. Riley asked students to talk about their buildings and what would be a possible redesign. A big topic was the integration of PV Systems and schools. An interesting topic that came up was a new solar panel called Solindra. This is a solar panel that is cylindrical and does not weigh a lot. So it won't add a big load to the structural system. This is something I would consider to add to my building. One of the industry leaders told all the students to check out this website called desire.org. This website covers federal incentives, i.e. building green.

ii. Business and Networking

I did not attend this breakout session but heard it was a very helpful and an informative session. One topic of discussion from this session was you can never network too much, especially the way the economy is.

iii. BIM Executive Planning

I did not attend this breakout session but heard it was a very helpful and an informative session. One topic that was discussed from this session was what do you do with BIM after the construction process? How do you turn the BIM model over to the owner? I heard that this was a great discussion and had to end early because of lunch.

c) Student Panel: Communication Patterns Of The Now Generation

The student panel was one of my favorite parts of the PACE Roundtable. At times the discussion got very heated. There was definitely an issue between the student panel and the "old timers". At one point someone said a person's productivity out of college was twice that of someone who was older. A few people were insulted by this and a debate ensued. It was very interesting seeing the "old timers" debate the college kids.

The overall consensus was technology is needed, but it has to be used the right way. Twitter, Facebook, and Myspace should be left out of the working environment and should be used for social networking purposes only.

Contact

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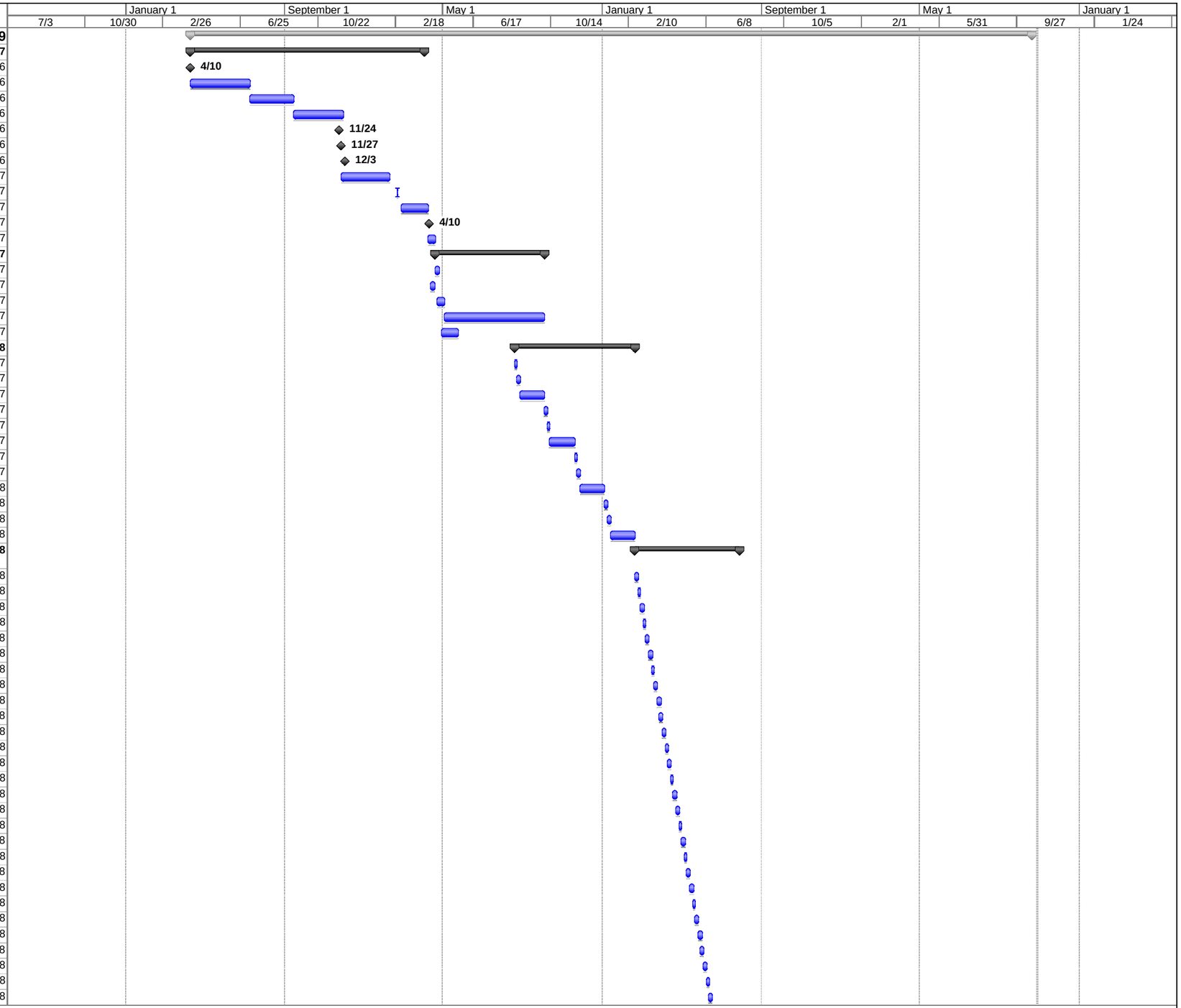
7. Appendix

a. Detailed Project Schedule
b. Excavation Site Plan
c. Superstructure Site Plan
d. Interiors/Finishes Site Plan
e. Detailed Structural Systems Estimate

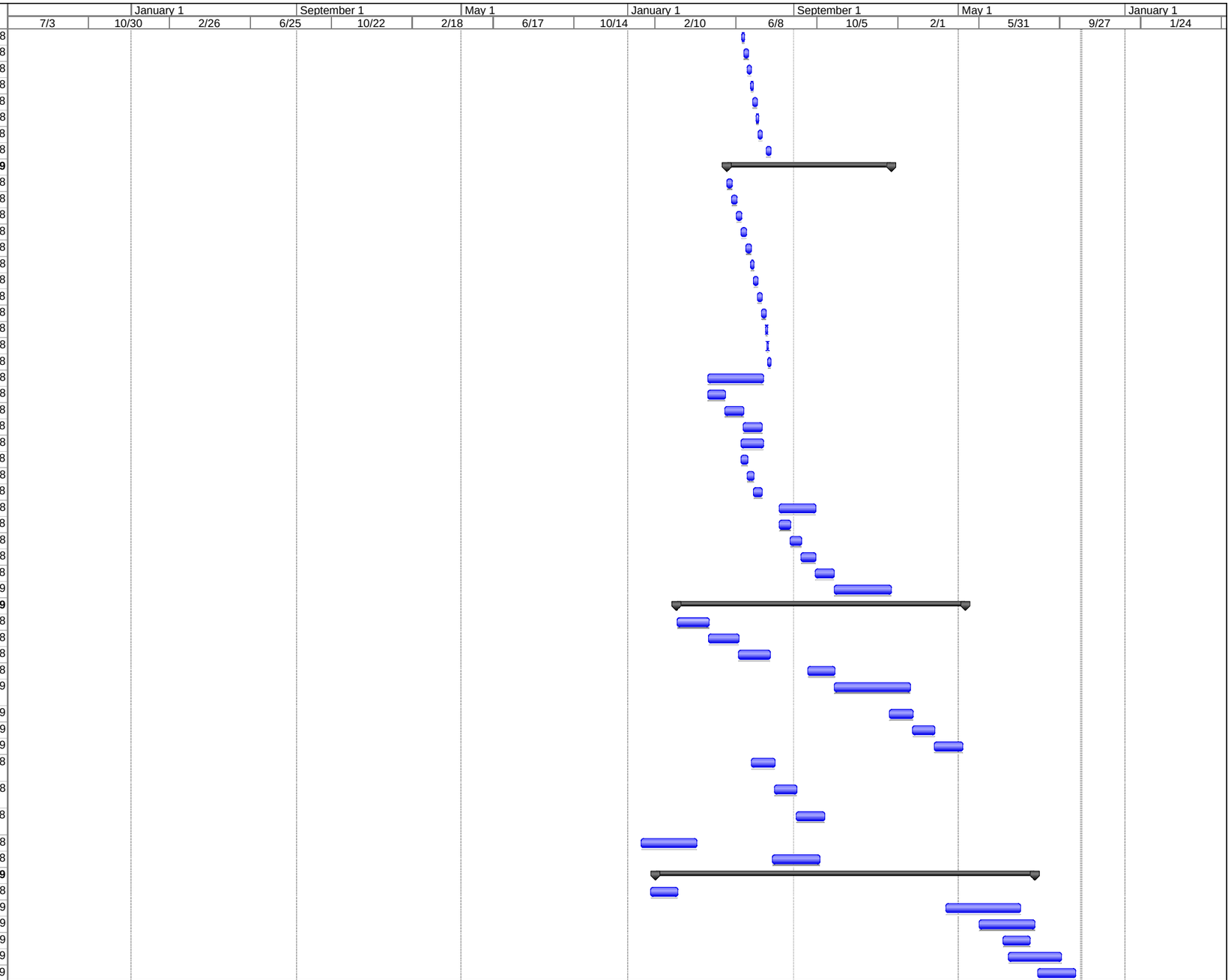
ID	Task Name	Duration	Start	Finish
0	**Detailed Schedule**	**922 days**	**Mon 4/10/06**	**Tue 10/20/09**
1	**PRECONSTRUCTION**	**257 days**	**Mon 4/10/06**	**Tue 4/3/07**
2	HIRE ARCHITECTS & CONSTRUCTION MANAGERS	0 days	Mon 4/10/06	Mon 4/10/06
3	CONCEPTUAL PLANNING STAGE	66 days	Mon 4/10/06	Mon 7/10/06
4	SCHEMATIC DESIGN PHASE	50 days	Mon 7/10/06	Fri 9/15/06
5	SCHEMATIC DESIGN ESTIMATE	55 days	Fri 9/15/06	Thu 11/30/06
6	DESIGN DOCUMENTS	0 days	Fri 11/24/06	Fri 11/24/06
7	PRE BID CONFERENCE	0 days	Mon 11/27/06	Mon 11/27/06
8	RECEIVE BIDS	0 days	Sun 12/3/06	Sun 12/3/06
9	BID	55 days	Mon 11/27/06	Fri 2/9/07
10	AWARD	1 day	Wed 2/21/07	Wed 2/21/07
11	PROCUREMENT	30 days	Tue 2/27/07	Mon 4/9/07
12	NOTICE TO PROCEED	0 days	Tue 4/10/07	Tue 4/10/07
13	NTP/MOBILIZATION	10 days	Mon 4/9/07	Fri 4/20/07
14	**SITEWORK SHORING EXCAVATION**	**120 days**	**Fri 4/20/07**	**Thu 10/4/07**
15	INSTALL TEMPORARY FACILITIES	5 days	Fri 4/20/07	Thu 4/26/07
16	DEMO EXISTING BUILDING	5 days	Fri 4/13/07	Thu 4/19/07
17	INSTALL PILES	10 days	Mon 4/23/07	Fri 5/4/07
18	EXCAVATE	110 days	Fri 5/4/07	Thu 10/4/07
19	INSTALL DEWATERING	20 days	Mon 4/30/07	Fri 5/25/07
20	**CONCRETE FOUNDATIONS TO GRADE**	**133 days**	**Mon 8/20/07**	**Wed 2/20/08**
21	SET FORMS FOR SOG	4 days	Mon 8/20/07	Thu 8/23/07
22	SET REBAR SOG	4 days	Thu 8/23/07	Tue 8/28/07
23	CONCRETE SOG	28 days	Tue 8/28/07	Thu 10/4/07
24	SET FORMS LEVEL P3	4 days	Thu 10/4/07	Tue 10/9/07
25	SET REBAR LEVEL P3	4 days	Tue 10/9/07	Fri 10/12/07
26	CONCRETE LEVEL P3	28 days	Fri 10/12/07	Tue 11/20/07
27	SET FORMS LEVEL P3	4 days	Tue 11/20/07	Fri 11/23/07
28	SET REBAR LEVEL P2	4 days	Fri 11/23/07	Wed 11/28/07
29	CONCRETE LEVEL P2	28 days	Wed 11/28/07	Fri 1/4/08
30	SET FORMS LEVEL P1	4 days	Fri 1/4/08	Wed 1/9/08
31	SET REBAR LEVEL P1	4 days	Wed 1/9/08	Mon 1/14/08
32	CONCRETE LEVEL P1	28 days	Mon 1/14/08	Wed 2/20/08
33	**CONCRETE SUPERSTRUCRURE LEVELS 1 TO PENTHOUSE**	**115 days**	**Wed 2/20/08**	**Tue 7/29/08**
34	FORMWORK SUPERSTRUCTURE LEVEL 1	4 days	Wed 2/20/08	Mon 2/25/08
35	SET REBAR SUPERSTRUCTURE LEVEL 1	4 days	Mon 2/25/08	Thu 2/28/08
36	CONCRETE SUPERSTRUCTURE LEVEL 1	5 days	Thu 2/28/08	Wed 3/5/08
37	FORMWORK SUPERSTRUCTURE LEVEL 2	4 days	Tue 3/4/08	Fri 3/7/08
38	SET REBAR SUPERSTRUCTURE LEVEL 2	4 days	Fri 3/7/08	Wed 3/12/08
39	CONCRETE SUPERSTRUCTURE LEVEL 2	5 days	Wed 3/12/08	Tue 3/18/08
40	FORMWORK SUPERSTRUCTURE LEVEL 3	4 days	Mon 3/17/08	Thu 3/20/08
41	SET REBAR SUPERSTRUCTURE LEVEL 3	4 days	Thu 3/20/08	Tue 3/25/08
42	CONCRETE SUPERSTRUCTURE LEVEL 3	5 days	Tue 3/25/08	Mon 3/31/08
43	FORMWORK SUPERSTRUCTURE LEVEL 4	4 days	Fri 3/28/08	Wed 4/2/08
44	SET REBAR SUPERSTRUCTURE LEVEL 4	4 days	Wed 4/2/08	Mon 4/7/08
45	CONCRETE SUPERSTRUCTURE LEVEL 4	5 days	Mon 4/7/08	Fri 4/11/08
46	FORMWORK SUPERSTRUCTURE LEVEL 5	4 days	Thu 4/10/08	Tue 4/15/08
47	SET REBAR SUPERSTRUCTURE LEVEL 5	4 days	Tue 4/15/08	Fri 4/18/08
48	CONCRETE SUPERSTRUCTURE LEVEL 5	5 days	Fri 4/18/08	Thu 4/24/08
49	FORMWORK SUPERSTRUCTURE LEVEL 6	4 days	Wed 4/23/08	Mon 4/28/08
50	SET REBAR SUPERSTRUCTURE LEVEL 6	4 days	Mon 4/28/08	Thu 5/1/08
51	CONCRETE SUPERSTRUCTURE LEVEL 6	5 days	Thu 5/1/08	Wed 5/7/08
52	FORMWORK SUPERSTRUCTURE LEVEL 7	4 days	Tue 5/6/08	Fri 5/9/08
53	SET REBAR SUPERSTRUCTURE LEVEL 7	4 days	Fri 5/9/08	Wed 5/14/08
54	CONCRETE SUPERSTRUCTURE LEVEL 7	5 days	Wed 5/14/08	Tue 5/20/08
55	FORMWORK SUPERSTRUCTURE LEVEL 8	4 days	Mon 5/19/08	Thu 5/22/08
56	SET REBAR SUPERSTRUCTURE LEVEL 8	4 days	Thu 5/22/08	Tue 5/27/08
57	CONCRETE SUPERSTRUCTURE LEVEL 8	5 days	Tue 5/27/08	Mon 6/2/08
58	FORMWORK SUPERSTRUCTURE LEVEL 9	4 days	Fri 5/30/08	Wed 6/4/08
59	SET REBAR SUPERSTRUCTURE LEVEL 9	4 days	Wed 6/4/08	Mon 6/9/08
60	CONCRETE SUPERSTRUCTURE LEVEL 9	5 days	Mon 6/9/08	Fri 6/13/08
61	FORMWORK SUPERSTRUCTURE LEVEL 10	4 days	Thu 6/12/08	Tue 6/17/08



Project: Detailed Schedule.mpp
Date: Wed 10/28/09

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

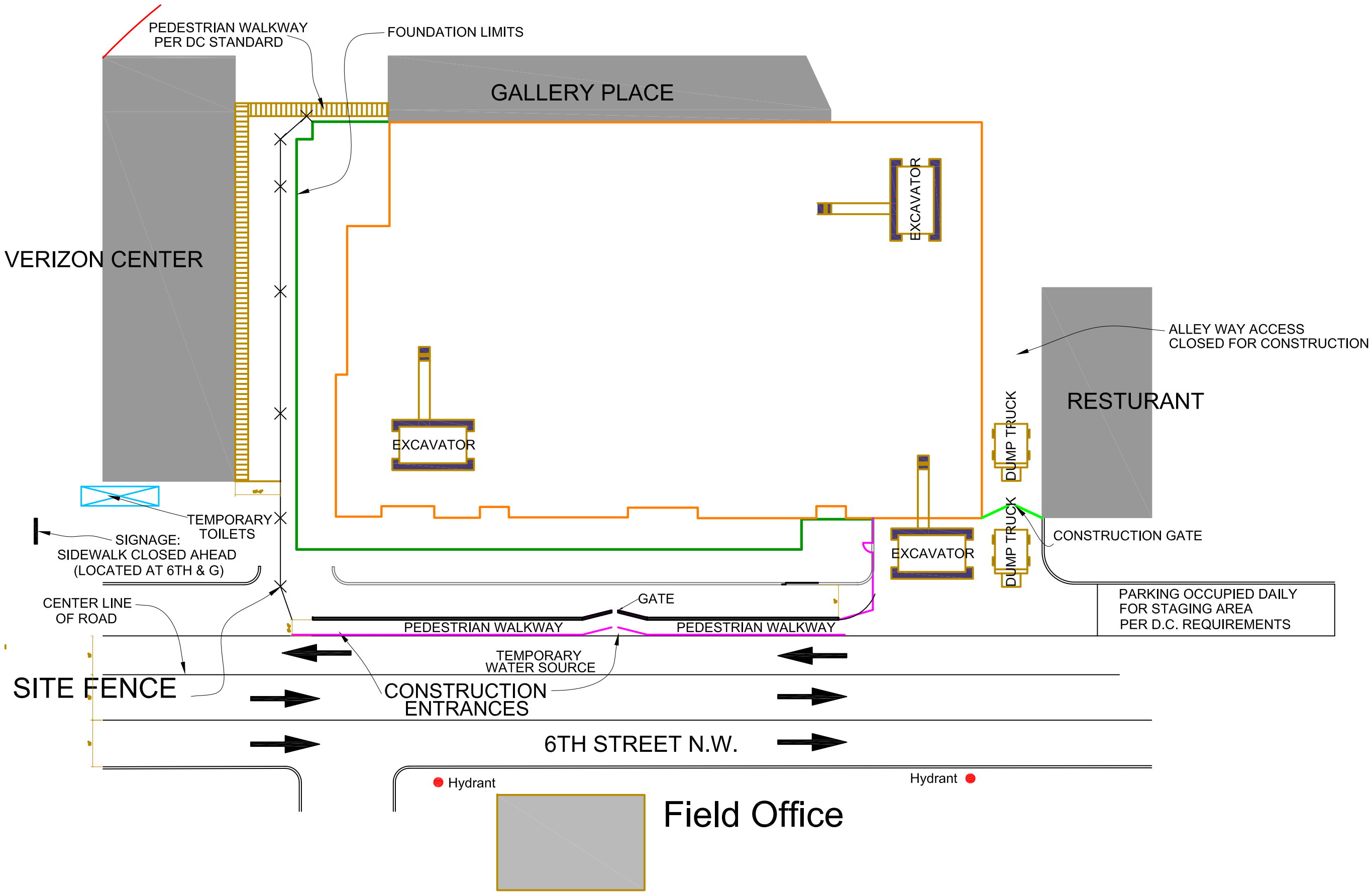
ID	Task Name	Duration	Start	Finish
62	SET REBAR SUPERSTRUCTURE LEVEL 10	4 days	Tue 6/17/08	Fri 6/20/08
63	CONCRETE SUPERSTRUCTURE LEVEL 10	5 days	Fri 6/20/08	Thu 6/26/08
64	FORMWORK SUPERSTRUCTURE LEVEL 11	4 days	Wed 6/25/08	Mon 6/30/08
65	SET REBAR SUPERSTRUCTURE LEVEL 11	4 days	Mon 6/30/08	Thu 7/3/08
66	CONCRETE SUPERSTRUCTURE LEVEL 11	5 days	Thu 7/3/08	Wed 7/9/08
67	FORMWORK SUPERSTRUCTURE LEVEL 12	4 days	Tue 7/8/08	Fri 7/11/08
68	SET REBAR SUPERSTRUCTURE LEVEL 12	4 days	Fri 7/11/08	Wed 7/16/08
69	CONCRETE SUPERSTRUCTURE LEVEL 12	5 days	Wed 7/23/08	Tue 7/29/08
70	**BUILDING ENVELOPE**	**174 days**	**Mon 5/26/08**	**Thu 1/22/09**
71	PRECAST LEVEL 1	6 days	Mon 5/26/08	Mon 6/2/08
72	PRECAST LEVEL 2	6 days	Mon 6/2/08	Mon 6/9/08
73	PRECAST LEVEL 3	6 days	Mon 6/9/08	Mon 6/16/08
74	PRECAST LEVEL 4	6 days	Mon 6/16/08	Mon 6/23/08
75	PRECAST LEVEL 5	6 days	Mon 6/23/08	Mon 6/30/08
76	PRECAST LEVEL 6	5 days	Mon 6/30/08	Fri 7/4/08
77	PRECAST LEVEL 7	5 days	Fri 7/4/08	Thu 7/10/08
78	PRECAST LEVEL 8	5 days	Thu 7/10/08	Wed 7/16/08
79	PRECAST LEVEL 9	5 days	Wed 7/16/08	Tue 7/22/08
80	PRECAST LEVEL 10	3 days	Tue 7/22/08	Thu 7/24/08
81	PRECAST LEVEL 11	2 days	Thu 7/24/08	Fri 7/25/08
82	PRECAST LEVEL 12	3 days	Fri 7/25/08	Tue 7/29/08
83	EXTERIOR CMU/HANDSET STONE	60 days	Mon 4/28/08	Fri 7/18/08
84	EXTERIOR CMU/HANDSET STONE WEST ELEV	20 days	Mon 4/28/08	Fri 5/23/08
85	EXTERIOR CMU/HANDSET STONE EAST ELEV	20 days	Fri 5/23/08	Thu 6/19/08
86	EXTERIOR CMU/HANDSET STONE NORTH ELEV	20 days	Thu 6/19/08	Wed 7/16/08
87	EXTERIOR STUDS	25 days	Mon 6/16/08	Fri 7/18/08
88	EXTERIOR STUDS LEVELS 1-4	8 days	Mon 6/16/08	Wed 6/25/08
89	EXTERIOR STUDS LEVELS 4-8	8 days	Wed 6/25/08	Fri 7/4/08
90	EXTERIOR STUDS LEVELS 8-12	9 days	Fri 7/4/08	Wed 7/16/08
91	PUNCH WINDOWS	40 days	Mon 8/11/08	Fri 10/3/08
92	PUNCH WINDOWS LEVELS 1-4	13 days	Mon 8/11/08	Wed 8/27/08
93	PUNCH WINDOWS LEVELS 4-8	13 days	Wed 8/27/08	Fri 9/12/08
94	PUNCH WINDOWS LEVELS 8-12	16 days	Fri 9/12/08	Fri 10/3/08
95	EIFS	20 days	Fri 10/3/08	Thu 10/30/08
96	ROOFING	60 days	Fri 10/31/08	Thu 1/22/09
97	**MECHANICAL AND ELECTRICAL SYSTEMS**	**303 days**	**Thu 3/13/08**	**Mon 5/11/09**
98	MEP ROUGH IN LEVELS 1-4	33 days	Fri 3/14/08	Tue 4/29/08
99	MEP ROUGH IN LEVELS 4-8	33 days	Tue 4/29/08	Thu 6/12/08
100	MEP ROUGH IN LEVELS 8-12	33 days	Thu 6/12/08	Mon 7/28/08
101	SWITCH GEAR ROOM FIT OUT	30 days	Mon 9/22/08	Fri 10/31/08
102	ROOF TOP EQUIPMENT AND PENTHOUSE MEP	80 days	Fri 10/31/08	Thu 2/19/09
103	MECHANICAL ROOM LEVELS 1-4	25 days	Tue 1/20/09	Mon 2/23/09
104	MECHANICAL ROOM LEVELS 1-4	25 days	Mon 2/23/09	Fri 3/27/09
105	MECHANICAL ROOM LEVELS 1-4	30 days	Fri 3/27/09	Thu 5/7/09
106	CORE CONSTRUCTION AND ROUGH INS LEVELS 1-4	25 days	Tue 7/1/08	Mon 8/4/08
107	CORE CONSTRUCTION AND ROUGH INS LEVELS 4-8	25 days	Mon 8/4/08	Fri 9/5/08
108	CORE CONSTRUCTION AND ROUGH INS LEVELS 8-12	30 days	Fri 9/5/08	Thu 10/16/08
109	ELECTRICAL VAULTS AND SITE UTILITIES	60 days	Mon 1/21/08	Fri 4/11/08
110	MEP TRIM OUT	50 days	Fri 8/1/08	Thu 10/9/08
111	**INTERIORS**	**400 days**	**Mon 2/11/08**	**Fri 8/21/09**
112	INTERIOR CMU	30 days	Mon 2/4/08	Fri 3/14/08
113	LOBBY FINISHES	80 days	Mon 4/13/09	Fri 7/31/09
114	CORE/BATHROOM FINISHES	60 days	Mon 6/1/09	Fri 8/21/09
115	PARKING GARAGE FINISHES	30 days	Mon 7/6/09	Fri 8/14/09
116	TESTING AND BALANCING	56 days	Tue 7/14/09	Tue 9/29/09
117	PROJECT CLOSEOUT	40 days	Wed 8/26/09	Tue 10/20/09



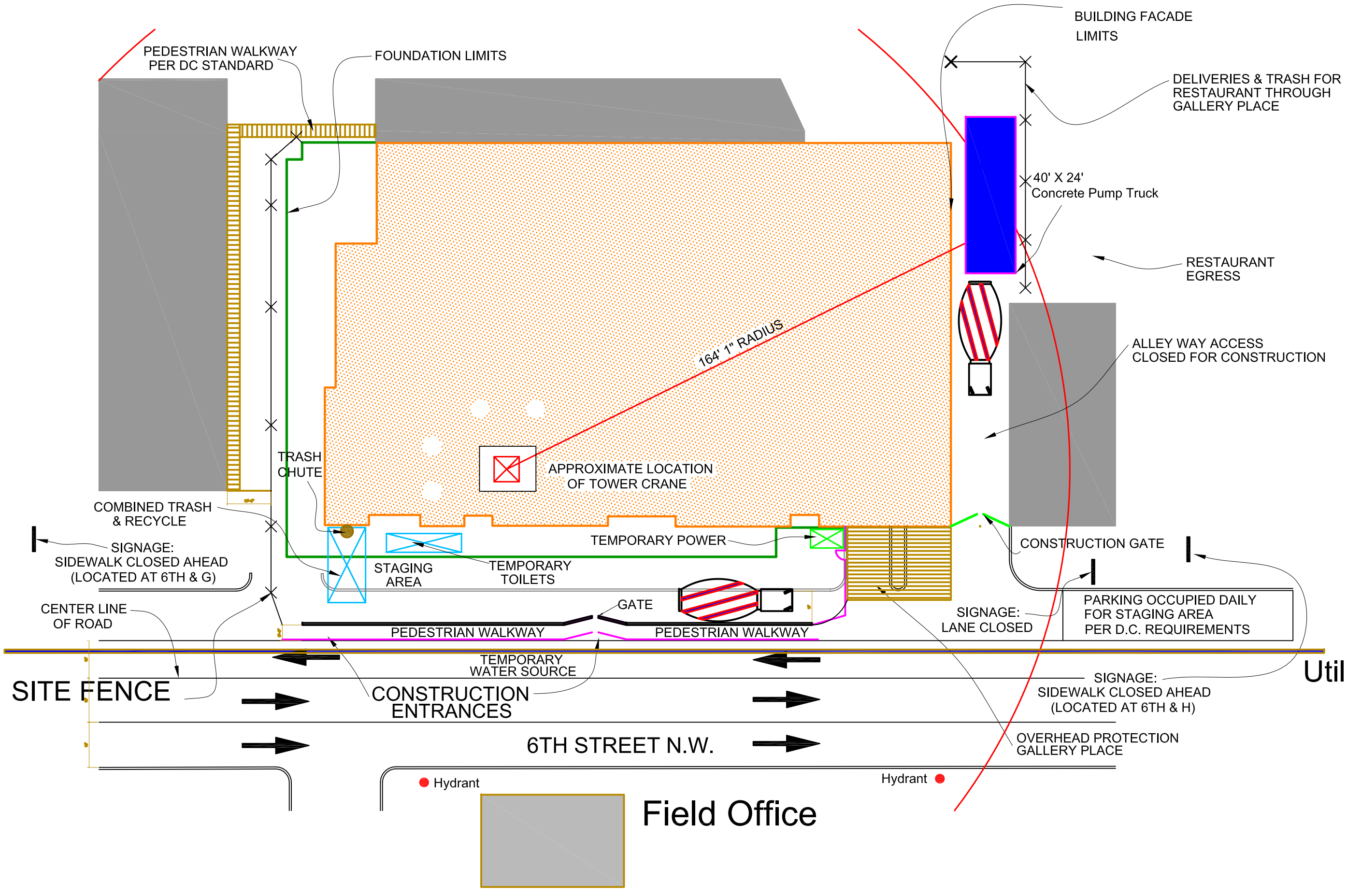
Project: Detailed Schedule.mpp
Date: Wed 10/28/09

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

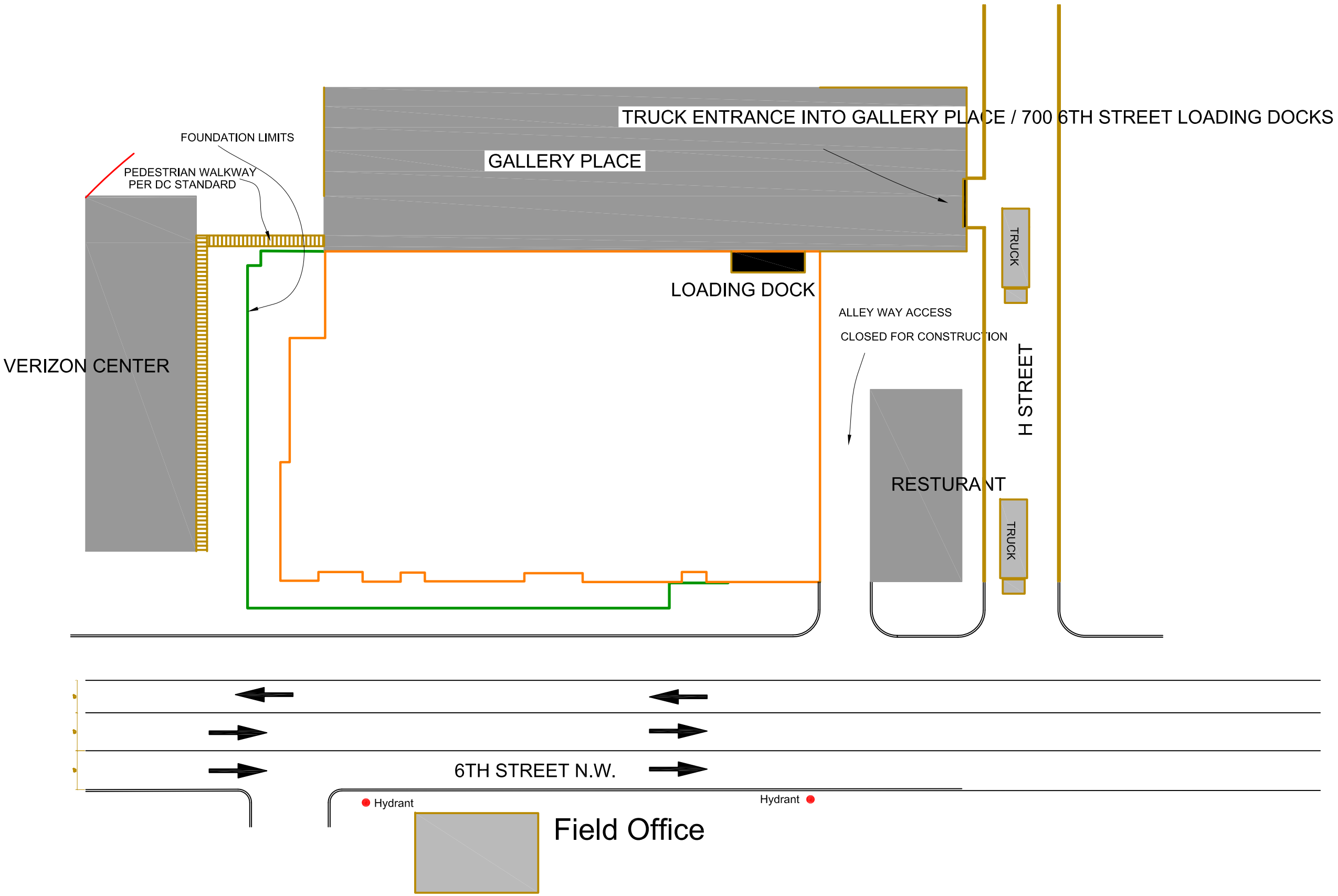
Site Plan For Excavation Phase



Site Plan For Superstructure Phase



Site Plan For Finish Phase



Full Structural Estimate										
			Labor		Material		Equipment		Total	
Item	Unit	Quantity	Cost/Unit	Cost	Cost/Unit	Cost	Cost/Unit	Cost	Cost/Unit	Cost
Column Forms	SFCA	15,456.00	1.44	22,256.64	4.84	74,807.04	0.00	0.00	6.28	$97,063.68
Column Concrete	CY	1,345.00	55.52	74,674.40	145.00	195,025.00	15.78	21,224.10	216.30	$920,867.00
Column Rebar	Tons	63.00	620.00	39,060.00	1,550.00	97,650.00	0.00	0.00	2,170.00	$136,710.00
Suspended Slab Forms	SF	102,345.00	3.33	340,808.85	1.47	150,447.15	0.00	0.00	4.80	$491,256.00
Suspended Slab Concrete	CY	9,879.00	15.50	153,124.50	113.00	1,116,327.00	5.65	55,816.35	134.15	$1,965,400.00
Suspended Slab Rebar	Tons	105.00	490.00	51,450.00	1,550.00	162,750.00	0.00	0.00	2,040.00	$214,200.00
Suspended Slab Finish	SF	88,567.00	0.43	38,083.81	0.00	0.00	0.80	70,853.60	1.23	$108,937.41
Slab On Grade Forms	SF	13,365.00	1.44	19,245.60	5.00	66,825.00	0.00	0.00	6.44	$86,070.60
Slab On Grade Concrete	CY	1,856.40	16.70	31,001.88	113.00	209,773.20	6.10	11,324.04	135.80	$252,099.12
Slab On Grade Rebar	Tons	11.00	490.00	5,390.00	1,550.00	17,050.00	0.00	0.00	2,040.00	$22,440.00
Slab on Grade Finish	SF	10,124.00	0.43	4,353.32	0.00	0.00	0.00	0.00	0.43	$4,353.32
Matt Slab Forms	SF	1,485.00	3.33	4,945.05	4.84	7,187.40	0.00	0.00	8.17	$12,132.45
Matt Slab Concrete	CY	2,475.00	23.50	58,162.50	113.00	279,675.00	8.60	21,285.00	145.10	$359,122.50
Matt Slab Rebar	Tons	5.00	490.00	2,450.00	1,550.00	7,750.00	0.00	0.00	2,040.00	$10,200.00
Matt Slab Finish	SF	1,267.00	0.43	544.81	0.00	0.00	0.00	0.00	0.43	$544.81
Column Footings Forms	SF	12,346.00	1.44	17,778.24	4.84	59,754.64	0.00	0.00	6.28	$77,532.88
Column Footings Concrete	CY	987.00	16.70	16,482.90	109.00	107,583.00	6.10	6,020.70	131.80	$130,086.60
Column Footings Rebar	Tons	10.00	490.00	4,900.00	1,550.00	15,500.00	0.00	0.00	2,040.00	$20,400.00
Beam Forms	SF	10,982.00	4.85	53,262.70	1.11	12,190.02	0.00	0.00	5.96	$65,452.72
Beam Concrete	CY	2,435.00	23.50	57,222.50	109.00	265,415.00	8.60	20,941.00	141.10	$343,578.50
Beam Rebar	Tons	20.00	620.00	12,400.00	1,550.00	31,000.00	0.00	0.00	2,170.00	$43,400.00
Foundation Wall Forms	SF	10,050.00	18.10	181,905.00	9.40	94,470.00	6.60	66,330.00	34.10	$342,705.00
Foundation Wall Concrete	CY	1,567.00	18.10	28,362.70	113.00	177,071.00	6.60	10,342.20	137.70	$215,775.90
Foundation Wall Rebar	Tons	12.00	490.00	5,880.00	1,550.00	18,600.00	22.50	270.00	2,062.50	$24,750.00
Decking	SF	356,400.00	0.47	167,508.00	3.06	1,090,584.00	0.05	17,820.00	3.58	$1,275,912.00
		Total		**1,391,253.40**		**4,257,434.45**		**302,226.99**		**$7,792,239.00**

Column Take-Off 3rd Floor (Typical for Floors 1-12)				
Quantity	Size (Inches)	Height	CF	CY
32	24x24	10'-6"	1344	49.8
13	12x24	10'-6"	273	10.1
2	16x24	10'-6"	56.0	2.1
2	12x34	10'-6"	59.5	2.2
		Total	1732.5	64.2
		Total for 12 Levels	20789.7	770.0

Column Take-Off P3 Level (Typical for Levels P1-P3)				
Quantity	Size (Inches)	Height	CF	CY
6	24x24	9	216	8.0
3	28x24	9	125.82	4.7
19	36x24	9	1026	38.0
1	32x18	9	36	1.3
12	12x24	9	216	8.0
1	18x18	9	20.25	0.8
3	24x32	9	143.91	5.3
1	16x24	9	23.94	0.9
1	12x42	9	31.5	1.2
2	14x24	9	41.94	1.6
		Total	1881.36	69.7
		Total for 3 Levels	5644.08	209.0

Suspended Slab Take-Off 3rd Floor (Typical for Floors P2-Roof)				
Length (Feet)	Width (Feet)	Thickness (Inches)	CF	CY
198	120	9	17820	660.0
		Total for 15 Levels	267300	9900.0

Slab on Grade Take-Off				
Length (Feet)	Width (Feet)	Thickness (Inches)	CF	CY
148.5	90	5	5569.2	206.3

Matt Slab Take-Off				
Length (Feet)	Width (Feet)	Thickness (Feet)	CF	CY
49.5	30	5	7425	275.0

Column Footings Take-Off				
Length (Feet)	Width (Feet)	Thickness (Inches)	CF	CY
4.5	4.5	16	27.0	1.0
15	21.5	54	1451.3	53.8
15.5	19.5	54	1360.1	50.4
16.5	19.5	54	1447.9	53.6
17.5	17.5	58	1480.2	54.8
18	18	60	1620.0	60.0
18.5	27	60	2497.5	92.5
18.5	18.5	60	1711.3	63.4
12	20	54	1080.0	40.0
14	20.6	60	1442.0	53.4
17	23	58	1889.8	70.0
		Total	16007.0	592.9

Beam Take-Off 3rd Floor (Typical for Floors 1-12)				
Length (Feet)	Width (Inches)	Thickness (Inches)	CF	CY
40	12	16	53.3	2.0
40	12	18	60	2.2
6	8	16.5	5.5	0.2
6	8	16.5	5.5	0.2
36	8	16.5	33	1.2
12	8	16.5	11	0.4
12	8	16.5	11	0.4
6	8	16.5	5.5	0.2
36	8	16.5	33	1.2
12	8	24	16	0.6
12	8	16.5	11	0.4
40	12	18	60	2.2
6	8	16.5	5.5	0.2
6	8	16.5	5.5	0.2
36	8	16.5	33	1.2
12	8	16.5	11	0.4
12	8	16.5	11	0.4
6	8	16.5	5.5	0.2
36	8	16.5	33	1.2
12	8	24	16	0.6
12	8	16.5	11	0.4
		Total	436.3	16.2
		Total for 12 Floors	5236	193.9

Beam Take-Off Level P-1 (Typical for Levels P3-P1)				
Length (Feet)	Width (Inches)	Thickness (Inches)	CF	CY
35	8	16.5	32.1	1.2
35	8	16.5	32.1	1.2
14	8	16.5	12.8	0.5
14	8	16.5	12.8	0.5
14	8	16.5	12.8	0.5
35	12	16.5	48.1	1.8
35	12	16.5	48.1	1.8
14	8	30	23.3	0.9
14	8	24	18.7	0.7
20	12	25	41.7	1.5
20	12	20	33.3	1.2
20	12	20	33.3	1.2
20	12	20	33.3	1.2
20	12	20	33.3	1.2
20	12	20	33.3	1.2
35	12	16.5	48.1	1.8
35	12	16.5	48.1	1.8
14	8	30	23.3	0.9
14	8	24	18.7	0.7
20	12	25	41.7	1.5
20	12	20	33.3	1.2
20	12	20	33.3	1.2
20	12	20	33.3	1.2
20	12	20	33.3	1.2
20	12	20	33.3	1.2
20	12	21	35.0	1.3
20	12	42	70.0	2.6
50	72	16.5	412.5	15.3
30	24	20	100.0	3.7
15	12	21	26.3	1.0
		Total	1439.6	53.3
		Total for 3 Levels	4319	160.0

Foundation Walls				
Perimeter (Feet)	Height (Feet)	Thickness (Inches)	CF	CY
636	40	15	31800	1177.8

Metel Deck			
Length (Feet)	Width (Feet)	# of Floors	SF
198	120	15	356400

Rebar Take Off			
	Type	LF	Tons
Foundation Walls	12 #10 & 4 # 12	636	12
Beams	13 #9	1394	20
Column Footings	18 # 10	1234	10
Suspended Slab Typical Bay (28 bays per Floor)	4 #8, 15 #7, 12 #5, 4 #7, 16 #6, 3 #8, 6 #7, 9 #8	84	105
Columns	18 # 10	3245	63
Matt Slab Rebar Typical Bay (6 Bays)	16 #8, 3 #10, 6 #12, 9 #10	112	5
Slab On Grade (6 Bays)	4 #8, 15 #7, 12 #5	86	11