

Thesis
Technical
Assignment II

1099 New York Avenue
Washington, D.C.



William Cox
Construction Management
Dr. Michael J. Horman
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Executive Summary

This Technical Assignment takes a closer look at the construction conditions for the 1099 New York Avenue project in Washington, D.C. Several aspects of the construction management process from the first technical assignment were explored in more detail, including the project schedule, site layout planning and sequencing, an assembly cost of the building's mechanical systems, a detailed estimate of the structural system, and a close look at the General Conditions Requirements for the project.

The project schedule from this report goes more into detail about the time it takes to complete each level and what coordination and sequencing is required between the separate trades. Each level is approximated to take 16 days for structural completion and an average of 100 days for interior construction.

The site layout plan details the pour sequencing for the superstructure. The figures in section B are images taken from a 4 Dimensional Model of this Phase. The model was incorporated in order to increase an understanding of how the building is put together.

An assembly estimate was performed on the mechanical system of the building in order to begin familiarization with its components. One possibility for future analysis is LEED certification. Many of the points attributed to a LEED rating are derived from the design of the mechanical system and a redesign could prove to be beneficial.

The structural system is comprised of post-tensioned concrete. Level 2 was taken off as a typical level from which the cost of the remainder of the system was estimated. The cost calculated was \$6,242,583.74.

General Conditions were looked at in great detail. Only lump sum amounts were provided, so each amount was divided by the project duration of 90 weeks in order to calculate a unit cost for savings possibilities. The current value is approximately 11% of the total contract value.

A. Detailed Project Schedule

Key Project Dates

Issue to proceed	6/22/2006
Substructure Construction Begins	12/12/2006
Excavation Complete	12/20/2006
Superstructure Construction Begins	4/10/2007
Interior Construction Begins (B4 Level)	6/6/2007
Curtainwall Construction Begins	6/14/2007
Topping Out	8/24/2007
Sitework Complete	11/15/2007
Tenant Contractors Granted Access	11/21/2007 (Not included on project schedule)
MEP Complete	1/21/2008
Substantial Completion	3/6/2008

Structural

The building is broken down into four pour zones below grade and three above based on the amount of concrete ONCORE Construction can pour in the period of one day. Concrete Placement begins at the north end of the site at each level and moves south. Work on the substructure was scheduled to commence on 12/12/2006 and be complete by 8/24/2007.

<u>Task</u>	<u>Duration</u>	<u>Start</u>	<u>Finish</u>
Frame, Reinforce, Cast, Cure, Stress, Strip Floor Pour #1	11 days	4/10/07	4/24/07
Frame, Reinforce, Cast, Cure, Stress, Strip Floor Pour #2	11 days	4/16/07	4/30/07
Columns/Interior Walls to Next Level	12 days	4/19/07	5/4/07
Frame, Reinforce, Cast, Cure, Stress, Strip Floor Pour #3	11days	4/20/07	5/4/07

Table A.1 Typical Structural Sequencing

Façade

Construction of the Façade is set to begin on 6/14/2007. It is necessary to begin prior to the completion of the superstructure because each façade takes approximately 100 days to be constructed and building enclosure is required before the winter season. The south elevation will take the longest to complete.

Interior Construction

Interior construction moves from the inside out. Mechanical and Plumbing Trades are the first to begin. As they progress outwards from the core, the fire protection and drywall contractors begin, followed by the electrician. The only trade performing work on the perimeter of the

building is the drywall contractor. Since this is a base build project, tenants are responsible for their own interior construction sequencing. Information on the tenant construction schedule beyond the start date of 11/21/2007 was not provided.

<u>Task</u>	<u>Duration</u>	<u>Start</u>	<u>Finish</u>
Hang Risers/Install Core Mechanical System	13	6/25/07	7/11/07
Install Core Plumbing/Pipe Fixtures	73	6/25/07	10/2/07
Install/Hydro Core Sprinkler	12	7/5/07	7/20/07
Frame/Hang Core Walls and Ceiling	42	7/30/07	9/25/07
Install Electrical/Fire Alarm	44	8/2/07	10/1/07
Install Toilet Partitions and Counters	49	8/2/07	10/8/07
Install Doors and Hardware	3	9/12/07	9/14/07
Frame, Hang, Finish Perimeter Drywall	42	10/11/07	12/7/07

Table A.2 Typical Interior Construction Sequencing

The Detailed Project Schedule can be found in **Appendix A**.

B. Site Layout Planning

The logistics of the site plan have remained constant throughout the project. One lane has been closed on both New York Avenue and 11th Street to provide material staging and a delivery zone on the sidewalk just beyond the property line. In order to keep pedestrian traffic moving, a covered walkway was constructed along 11th Street.

Gates are positioned at three locations around the site; one at each of the southeast, southwest and northeast corners. Material deliveries are to enter the site via the southwest gate, travel northbound and exit via the northwest gate. This allows trucks to continue through site and avoid turning around. Unless permission is given, materials will be stored outside. Dumpsters are also positioned along this driveway for easy access to both the construction workers and the trash removal crews.

One Tower Crane is positioned at the center of the building in order to reach all corners of the site. The crane's primary purpose will be the placing of cast in place concrete. A material hoist will be erected along the south elevation. The hoist is intended for material use only and is not to be used by construction workers. Temporary office trailers will be located at the south end of the site along New York Avenue until the lower levels are enclosed and temporary office facilities can be moved inside the building.

The following images display a 4 Dimensional Model of the Substructure Construction Sequencing.

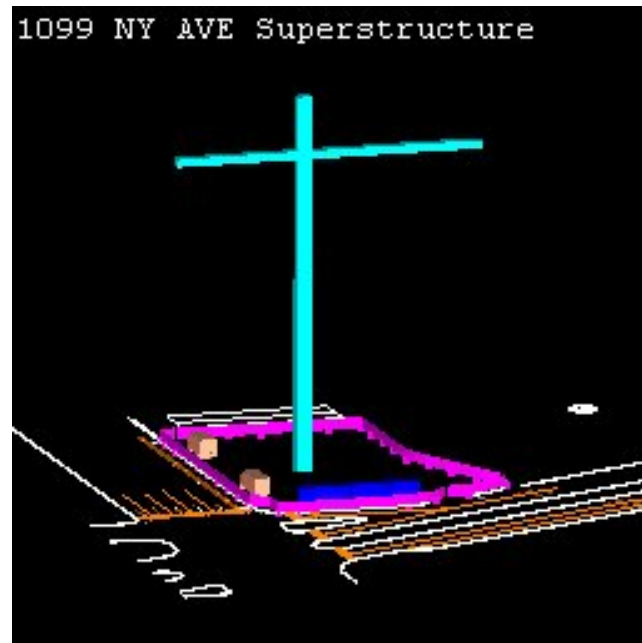


Figure B.1 The site layout prior to construction of the superstructure. Trailers are located along New York Avenue, the crane is located at the center of the site, delivery trucks enter through the south gate and exit through the north.

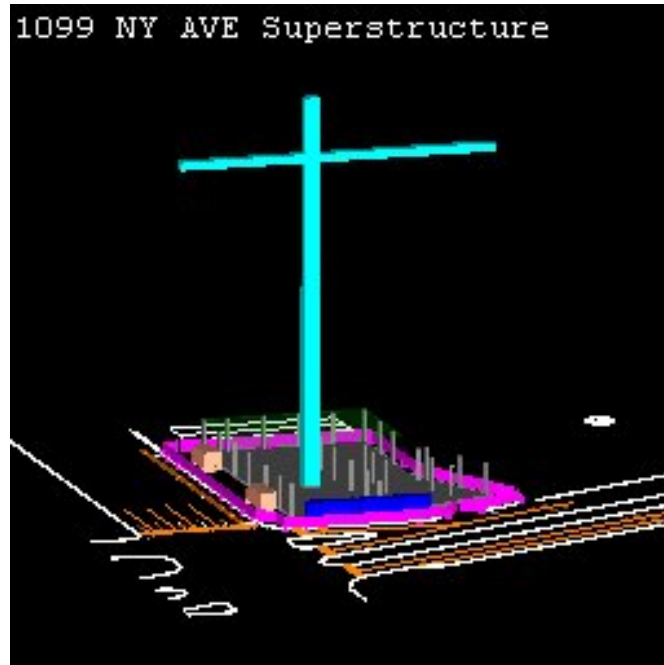


Figure B.2 Construction of the first level slabs and columns are complete, the first pour sequence of the second floor is now beginning.



Figure B.3 Construction of the ninth level nears completion.



Figure B.4 Construction of the superstructure is complete. The material hoist has been installed as well.

C. Mechanical System Assemblies Estimate

The Assemblies Estimate was calculated using RS Means Assemblies 2007. The areas for each system are based on the areas which they serve inside the building. A location factor of 0.981 for Washington, D.C. was used.

Mechanical System			
Type	SF of Service Area	Cost/SF	Amount
Terminal Unit Heaters	70,875	\$5.46	\$386,977.50
Self-Contained, Water Cooled Unit Systems	165,385	\$7.96	\$1,316,464.60
Fan Coil Units & Ductwork (VAV Boxes)	165,385	\$1.26	\$208,385.10
Split Systems with Air Cooled Condensing Units	4,020	\$6.00	\$24,120.00
Packaged Terminal Air Conditioning Units	280	\$9.57	\$2,679.60
Sub Total			\$1,938,626.80
Location Factor			0.981
Total			\$1,901,792.89

Table C.1 Assemblies Estimate Summary

Terminal Unit Heaters

Terminal Unit Heaters and Cabinet Unit Heaters are located only in the garage levels. Since this is the only heating system located at these floors, the total garage area was used as the service area.

Assumed: 9,280 SF, 135KW, 461 MBH

Self-Contained, Water Cooled Unit Systems

Each Office and Retail Level (1-11) contains its own self-contained, water cooled unit system. The units also serve several VAV Terminal Units. Because terminal units are not included in the assembly provided in RS Means, a value of \$1.26 per SF from a separate assembly was added to provide a more accurate cost estimate.

Assumed: Offices, 10,000 SF, 31.67 ton

VAV Boxes to be Fan coil AC unit, cabinet mounted & filters direct expansion air cool

Split Systems with Air Cooled Condensing Units & Packaged Terminal AC Units

These units are located in Telephone/Communications rooms and the Parking Attendant's office respectively. They make up a relatively small portion of the overall cost for the building's HVAC System.

Assumed: Offices, 1,000 SF, 3.17 ton

The estimate of **\$1,901,792.89** is considered to be relatively accurate since the scheduled value for both the mechanical and plumbing scopes together is **\$3,500,000**.

D. Detailed Structural System Estimate

Detailed Structural System Estimate Summary				
Description	Quantity	Unit	Average Cost/Unit	Total
031113 - Forms In Place	359,080	SFCA	\$9.58	\$3,439,150.35
032110 - Reinforcement in Place	725	Ton	\$1,455.51	\$1,055,900.25
032305 - Stressing Tendons	140,800	LB	\$2.61	\$367,488.00
033105 - Normal Weight Concrete	9,595	CY	\$107.24	\$1,028,929.00
033105 - Concrete Placement	9,595	CY	\$49.19	\$472,022.45
			Location Factor	0.981
			Total	\$6,242,583.74

Table D.1 Structural System Estimate Summary

Please See **Appendix B** for a detailed summary of the structural system estimate.

Foundations

A typical spread footing size of 13'-6" x 12'-6" x 3'-8" was used for material takeoff. This size is an average taken from the dimensions of all the spread footings displayed on the column schedule. Reinforcement was taken off by linear feet as displayed on the column schedule.

Columns

The typical floor was assumed to have 34 columns. Each column was taken of as 24"x24" and 12'-0" in height. With an assumption of 34 columns per floor, it was estimated that the system comprised of 510 columns throughout all 15 levels. Typical reinforcement was assumed to be (8) #11 bars in the vertical direction.

Flat Slabs with Drop Panels

An area of 15,750 SF per typical floor was used in calculations. Drop panels were taken off based on the dimensions of drop panels on the second floor and assumed typical at all levels. Reinforcement was priced at 150 LB/CY.

Slab on Grade

Slab on Grade exists only at the B4 Level. The building perimeter was estimated to be 552'-0" and reinforcement was once again assumed to be 150 LB/CY.

Concrete Walls

All concrete walls were assumed to be 4,000 psi concrete and 12'-0" in height. They were taken off with two separate thicknesses, 12" at the exterior and 8" at the interior.

Grade Beams

Grade Beams were taken off directly from the drawings. No typical size was used.

Concrete Beams

Concrete Beams are only located at the garage levels. Level B3 was assumed to be typical.

Stressed Tendons

Stressed tendons were assumed to be 100' in length and be stressed to an average strength of 300kips. The size was calculated to weigh 640 LB per tendon. It was assumed that the typical level (1-11) contained 20 tendons.

Although **\$6,242,583.74** is slightly less than the contract value of **\$7,500,000**, it is still considered accurate as floors were taken off as a typical level and overhead & profit were omitted from cost calculations. Please note all values were taken from RS Means 2008.

E. General Conditions Estimate

General Conditions Estimate Summary				
Description	Quantity	Unit	Average Cost/Unit	Total
Labor	90	WK	\$17,075.00	\$1,536,748.00
Material	90	WK	\$7,123.48	\$641,113.00
Equipment	90	WK	\$2,033.58	\$183,022.00
Insurance/Fee	90	WK	\$12,314.10	\$1,108,267.00
			Total	\$3,469,150.00

Table E.1 General Conditions Estimate Summary

The table above depicts the summary of the General Conditions costs for the project in four categories; Labor, Material, Equipment and Insurance/Fee. The values provided were given in a lump sum amount, not a unit cost. They were therefore divided by the project duration (90 weeks) so a change in cost could be more accurately estimated if the project schedule were to change. Nearly 50% of all General Conditions costs are due to labor. Detailed staffing monitors and reimbursable charges were not provided.

The total value calculated was **\$3,469,150.00**, a little more than 11% of the total contract value. This value has slightly increased from the original value of **\$3,425,433.00**.

Please see **Appendix C** for a more detailed breakdown of the General Conditions Costs.

Appendix A

Detailed Project Schedule

Technical Assignment II
Detailed Project Schedule

ID	Task Name	Duration	Start	Finish	Predecessors	2007												2008					
						May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
1	Excavation/Sheeting & Shoring	130 days	6/22/06	12/20/06		[Gantt bar from 6/22/06 to 12/20/06]																	
2	Issue to Proceed	0 days	6/22/06	6/22/06		◆ 6/22																	
3	Mobilize Site	5 days	6/23/06	6/29/06		[Gantt bar from 6/23/06 to 6/29/06]																	
4	Demolish Existing Bldg. to Grade	11 days	6/30/06	7/14/06		[Gantt bar from 6/30/06 to 7/14/06]																	
5	Drive Soldier Beams	10 days	8/7/06	8/18/06		[Gantt bar from 8/7/06 to 8/18/06]																	
6	Cut to First tie level	7 days	8/18/06	8/28/06		[Gantt bar from 8/18/06 to 8/28/06]																	
7	Drill, grout & test tier ties	40 days	9/8/06	11/2/06		[Gantt bar from 9/8/06 to 11/2/06]																	
8	Cut to Middle Second Level	5 days	9/22/06	9/28/06		[Gantt bar from 9/22/06 to 9/28/06]																	
9	Install Temporary Shoring System at Northwest Corner	7 days	10/26/06	11/3/06		[Gantt bar from 10/26/06 to 11/3/06]																	
10	Install H1-H3 Rakers and Corner Bracing	25 days	11/14/06	12/18/06		[Gantt bar from 11/14/06 to 12/18/06]																	
11	Excavate/Pour Crane Pad	9 days	11/15/06	11/27/06		[Gantt bar from 11/15/06 to 11/27/06]																	
12	Move Ramp to Southwest Corner	5 days	11/17/06	11/23/06		[Gantt bar from 11/17/06 to 11/23/06]																	
13	Excavate to Subgrade	8 days	12/11/06	12/20/06		[Gantt bar from 12/11/06 to 12/20/06]																	
14	Excavation Complete	0 days	12/20/06	12/20/06		◆ 12/20																	
15	Substructure	85 days	12/12/06	4/9/07		[Gantt bar from 12/12/06 to 4/9/07]																	
16	B4 Level	31 days	12/12/06	1/23/07		[Gantt bar from 12/12/06 to 1/23/07]																	
17	Mobilization	5 days	12/12/06	12/18/06		[Gantt bar from 12/12/06 to 12/18/06]																	
18	Erect Tower Crane	2 days	12/19/06	12/20/06		[Gantt bar from 12/19/06 to 12/20/06]																	
19	Elevator Pit	6 days	12/19/06	12/26/06		[Gantt bar from 12/19/06 to 12/26/06]																	
20	Column/Wall Footings	17 days	12/19/06	1/10/07		[Gantt bar from 12/19/06 to 1/10/07]																	
21	Perimeter Walls/Columns to B3	16 days	12/27/06	1/17/07		[Gantt bar from 12/27/06 to 1/17/07]																	
22	Install Underground Plumbing	16 days	12/27/06	1/17/07		[Gantt bar from 12/27/06 to 1/17/07]																	
23	Slab on Grade	14 days	1/4/07	1/23/07		[Gantt bar from 1/4/07 to 1/23/07]																	
24	Tower Crane Operational	0 days	1/11/07	1/11/07		◆ 1/11																	
25	B3 Level	23 days	1/11/07	2/12/07		[Gantt bar from 1/11/07 to 2/12/07]																	
26	Frame, Reinforce, Cast, Cure, Strip Floor Pour #1	11 days	1/11/07	1/25/07		[Gantt bar from 1/11/07 to 1/25/07]																	
27	Frame, Reinforce, Cast, Cure, Strip Floor Pour #2	11 days	1/17/07	1/31/07		[Gantt bar from 1/17/07 to 1/31/07]																	
28	Walls/Columns to B2	15 days	1/22/07	2/9/07		[Gantt bar from 1/22/07 to 2/9/07]																	
29	Frame, Reinforce, Cast, Cure, Strip Floor Pour #3	11 days	1/23/07	2/6/07		[Gantt bar from 1/23/07 to 2/6/07]																	
30	Frame, Reinforce, Cast, Cure, Strip Floor Pour #4	11 days	1/29/07	2/12/07		[Gantt bar from 1/29/07 to 2/12/07]																	
31	B2 Level	21 days	2/2/07	3/2/07		[Gantt bar from 2/2/07 to 3/2/07]																	
32	Frame, Reinforce, Cast, Cure, Strip Floor Pour #1	11 days	2/2/07	2/16/07		[Gantt bar from 2/2/07 to 2/16/07]																	
33	Frame, Reinforce, Cast, Cure, Strip Floor Pour #2	11 days	2/7/07	2/21/07		[Gantt bar from 2/7/07 to 2/21/07]																	
34	Frame, Reinforce, Cast, Cure, Strip Floor Pour #3	11 days	2/12/07	2/26/07		[Gantt bar from 2/12/07 to 2/26/07]																	
35	Walls/Columns to B1	15 days	2/12/07	3/2/07		[Gantt bar from 2/12/07 to 3/2/07]																	
36	Frame, Reinforce, Cast, Cure, Strip Floor Pour #4	11 days	2/15/07	3/1/07		[Gantt bar from 2/15/07 to 3/1/07]																	
37	B1 Level	21 days	2/20/07	3/20/07		[Gantt bar from 2/20/07 to 3/20/07]																	
38	Frame, Reinforce, Cast, Cure, Strip Floor Pour #1	11 days	2/20/07	3/6/07		[Gantt bar from 2/20/07 to 3/6/07]																	
39	Frame, Reinforce, Cast, Cure, Strip Floor Pour #2	11 days	2/23/07	3/9/07		[Gantt bar from 2/23/07 to 3/9/07]																	
40	Frame, Reinforce, Cast, Cure, Strip Floor Pour #3	11 days	2/28/07	3/14/07		[Gantt bar from 2/28/07 to 3/14/07]																	
41	Walls/Columns to B1	15 days	2/28/07	3/20/07		[Gantt bar from 2/28/07 to 3/20/07]																	
42	Frame, Reinforce, Cast, Cure, Strip Floor Pour #4	11 days	3/5/07	3/19/07		[Gantt bar from 3/5/07 to 3/19/07]																	
43	Ground Floor	23 days	3/8/07	4/9/07		[Gantt bar from 3/8/07 to 4/9/07]																	
44	Frame, Reinforce, Cast, Cure, Strip Floor Pour #1	12 days	3/8/07	3/23/07		[Gantt bar from 3/8/07 to 3/23/07]																	
45	Frame, Reinforce, Cast, Cure, Strip Floor Pour #2	12 days	3/14/07	3/29/07		[Gantt bar from 3/14/07 to 3/29/07]																	
46	Columns/Interior Walls to 2nd Floor	15 days	3/19/07	4/6/07		[Gantt bar from 3/19/07 to 4/6/07]																	
47	Frame, Reinforce, Cast, Cure, Strip Floor Pour #3	12 days	3/20/07	4/4/07		[Gantt bar from 3/20/07 to 4/4/07]																	
48	Frame, Reinforce, Cast, Cure, Strip Floor Pour #4	11 days	3/26/07	4/9/07		[Gantt bar from 3/26/07 to 4/9/07]																	
49	Substructure Concrete Complete	0 days	4/9/07	4/9/07		◆ 4/9																	
50	Superstructure	135 days	4/10/07	10/12/07		[Gantt bar from 4/10/07 to 10/12/07]																	
51	Second Floor	19 days	4/10/07	5/4/07		[Gantt bar from 4/10/07 to 5/4/07]																	
52	Frame, Reinforce, Cast, Cure, Stress, Strip Floor Pour #1	11 days	4/10/07	4/24/07		[Gantt bar from 4/10/07 to 4/24/07]																	
53	Frame, Reinforce, Cast, Cure, Stress, Strip Floor Pour #2	11 days	4/16/07	4/30/07		[Gantt bar from 4/16/07 to 4/30/07]																	

Project: 1099 New York Avenue
Date: 11/2/2007

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

Appendix B

Detailed Structural System Estimate

Detailed Structural Estimate							
Description	Quantity	Unit	Material	Labor	Equipment	Cost/Unit	Total
031113 - Forms In Place							
Columns	48,960	SFCA	\$2.64	\$6.10		\$8.74	\$427,910.40
Flat Slabs with Drop Panels	230,104	SFCA	\$4.84	\$3.97		\$8.81	\$2,027,216.24
Slab on Grade	552	LF	\$0.32	\$1.93		\$2.25	\$1,242.00
Grade Beams	3,625	SFCA	\$2.53	\$3.36		\$5.89	\$21,351.25
Concrete Beams	3,664	SFCA	\$4.19	\$5.95		\$10.14	\$37,152.96
Spread Footings	6,875	SFCA	\$1.95	\$3.79		\$5.74	\$39,462.50
Walls	65,300	SFCA	\$7.20	\$6.35		\$13.55	\$884,815.00
						Total	\$3,439,150.35
032110 - Reinforcement in Place							
Columns #8-#18	132	Ton	\$935.00	\$600.00		\$1,535.00	\$202,620.00
Elevated Slabs	475	Ton	\$990.00	\$475.00		\$1,465.00	\$695,875.00
Footings #4-#7	0.45	Ton	\$890.00	\$655.00		\$1,545.00	\$695.25
Footings #8-#18	23	Ton	\$840.00	\$380.00		\$1,220.00	\$28,060.00
Grade Beams	16	Ton	\$840.00	\$380.00		\$1,220.00	\$19,520.00
Concrete Beams	4	Ton	\$935.00	\$510.00		\$1,445.00	\$5,780.00
Slab on Grade	15	Ton	\$890.00	\$600.00		\$1,490.00	\$22,350.00
Walls #3-#7	60	Ton	\$890.00	\$460.00		\$1,350.00	\$81,000.00
						Total	\$1,055,900.25
032305 - Stressing Tendons							
100' Span @ 300 kip	140,800	LB	\$1.79	\$0.79	\$0.03	\$2.61	\$367,488.00
						Total	\$367,488.00
033105 - Normal Weight Concrete							
3,000 psi	1,200	CY	\$100.00			\$100.00	\$120,000.00
4,000 psi	2,042	CY	\$106.00			\$106.00	\$216,452.00
5,000 psi	6,353	CY	\$109.00			\$109.00	\$692,477.00
						Total	\$1,028,929.00
033105 - Concrete Placement							
Columns	908	CY		\$34.00	\$16.95	\$50.95	\$46,262.60
Slabs 6"-10" Thick	3,970	CY		\$21.50	\$10.80	\$32.30	\$128,231.00
Slabs over 10" Thick	2,335	CY		\$18.20	\$9.15	\$27.35	\$63,862.25
Spread Footings over 5 CY	830	CY		\$13.90	\$5.20	\$19.10	\$15,853.00
Grade Beams	175	CY		\$13.00	\$4.86	\$17.86	\$3,125.50
Concrete Beams	48	CY		\$52.50	\$26.50	\$79.00	\$3,792.00
Slab on Grade	195	CY		\$21.50	\$10.80	\$32.30	\$6,298.50
Walls 8" Thick	152	CY		\$29.50	\$14.85	\$44.35	\$6,741.20
Walls 12" Thick	982	CY		\$29.50	\$13.20	\$42.70	\$41,931.40
Floor Finish	236,250	SF		\$0.66		\$0.66	\$155,925.00
						Total	\$472,022.45

Appendix C

Detailed General Conditions Estimate

Labor				
Category	Qty.	Units	Unit Price	Total
Sheeting/Shoring	1	LS	\$9,518.00	\$9,518.00
Senior Superintendent	90	WK	\$4,394.16	\$395,474.00
Superintendent	90	WK	\$1,290.43	\$116,139.00
Layout Engineer	90	WK	\$872.44	\$78,520.00
Safety Inspections	90	WK	\$69.11	\$6,220.00
Miscellaneous Labor	90	WK	\$102.21	\$9,199.00
Project Executive	90	WK	\$2,125.14	\$191,263.00
Project Manager	90	WK	\$2,481.49	\$223,334.00
Assistant Project Manager	90	WK	\$2,555.98	\$230,038.00
Project Administrator	90	WK	\$337.21	\$30,349.00
Scheduling	1	LS	\$8,661.00	\$8,661.00
MEP Coordinator	1	LS	\$11,273.00	\$11,273.00
Cost Engineer	90	WK	\$315.17	\$28,365.00
Yard Delivery	90	WK	\$33.33	\$3,000.00
Field Office Setup	1	LS	\$7,000.00	\$7,000.00
Construction Signage	1	LS	\$1,000.00	\$1,000.00
Construction Site Fence	1	LS	\$1,975.00	\$1,975.00
Dewatering	1	LS	\$12,000.00	\$12,000.00
Material Hoist	1	LS	\$3,000.00	\$3,000.00
Temporary Power	1	LS	\$5,000.00	\$5,000.00
Clean Up Expense	1	LS	\$74,226.00	\$74,226.00
Protect Existing	90	WK	\$23.74	\$2,137.00
Covered Walkway	1	LS	\$17,035.00	\$17,035.00
Guard Rails	1	LS	\$24,354.00	\$24,354.00
Punchlist	1	LS	\$7,429.00	\$7,429.00
Site Development	1	LS	\$6,800.00	\$6,800.00
Rough Carpentry	90	WK	\$55.56	\$5,000.00
Blocking	90	WK	\$111.11	\$10,000.00
Doors/Frames/Hardware	90	WK	\$139.72	\$12,575.00
Elevator Protection	90	WK	\$65.16	\$5,864.00
			Total	\$1,536,748.00

Material				
Category	Qty.	Units	Unit Price	Total
Permits/Expediting	1	LS	\$317.00	\$317.00
Document Reproduction	1	LS	\$28,553.00	\$28,553.00
Travel Expenses	1	LS	\$10,575.00	\$10,575.00
Overnight & Hand Delivery	1	LS	\$4,708.00	\$4,708.00
Courier Delivery	1	LS	\$2,174.00	\$2,174.00
Miscellaneous	1	LS	\$9,414.00	\$9,414.00
Field Office Setup	1	LS	\$3,000.00	\$3,000.00
Field Trailer	90	WK	\$84.53	\$7,608.00
Field Telephone Hook-up	1	LS	\$1,058.00	\$1,058.00
Field Telephone Monthly	90	WK	\$120.76	\$10,868.00
Cell Phones	90	WK	\$592.67	\$53,340.00
Construction Signage	90	WK	\$11.11	\$1,000.00
Construction Site Fence	90	WK	\$33.33	\$3,000.00
Dewatering	1	LS	\$3,000.00	\$3,000.00
Temporary Power	90	WK	\$1,345.84	\$121,126.00
Temporary Lighting	90	WK	\$87.72	\$7,895.00
Storage/Change House	90	WK	\$36.22	\$3,260.00
Vehicle Allowance	1	LS	\$1,058.00	\$1,058.00
Layout Engineer	90	WK	\$19.00	\$1,710.00
Tools	1	LS	\$5,000.00	\$5,000.00
Dumpsters	90	WK	\$752.00	\$67,680.00
Jersey Barriers	90	WK	\$50.91	\$4,582.00
First Aid Kit and Supplies	1	LS	\$2,115.00	\$2,115.00
Fire Extinguishers	1	LS	\$5,413.00	\$5,413.00
Temporary Toilets	90	WK	\$771.09	\$69,398.00
Potable Water	90	WK	\$96.24	\$8,662.00
Head/Hearing/Eye Protection	1	LS	\$3,913.00	\$3,913.00
Covered Walkway	90	WK	\$148.06	\$13,325.00
Guard Rails	90	WK	\$198.81	\$17,893.00
General Liability	1	LS	\$121,680.00	\$121,680.00
Signaling	90	WK	\$58.76	\$5,288.00
TV Survey Utilities	90	WK	\$27.78	\$2,500.00
Stair Tower	1	LS	\$25,000.00	\$25,000.00
Rough Carpentry	1	LS	\$10,000.00	\$10,000.00
Blocking	1	LS	\$5,000.00	\$5,000.00
			Total	\$641,113.00

Equipment				
Category	Qty.	Units	Unit Price	Total
Yard Delivery	1	LS	\$700.00	\$700.00
Yard Dump Truck	1	LS	\$1,702.00	\$1,702.00
Computer/LAN/Misc.	90	WK	\$643.02	\$57,872.00
Field Staff Vehicle	90	WK	\$559.72	\$50,375.00
Office Staff/Vehicle	90	WK	\$612.52	\$55,127.00
Survey/Layout	1	LS	\$1,765.00	\$1,765.00
Gang Box	1	LS	\$1,585.00	\$1,585.00
Industrial Vacuum	1	LS	\$400.00	\$400.00
Two Way Radios	1	LS	\$7,921.00	\$7,921.00
Miscellaneous	1	LS	\$5,575.00	\$5,575.00
			Total	\$183,022.00
Insurance/Fee				
Category	Qty.	Units	Unit Price	Total
Insurance	1	LS	\$121,660.00	\$121,660.00
Contractor's Fee	1	LS	\$986,607.00	\$986,607.00
			Total	\$1,108,267.00