



Jim Garzon
Technical Assignment 2
Cost and Methods Analysis
Apartment Complex
Anytown, USA

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November 2, 2007



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A Executive Summary

In this assignment, areas such as a detailed schedule, a site layout plan for the superstructure, an assembly estimate, a structural estimate and a general condition estimate were analyzed. The purpose of this assignment is to study the Apartment Complex project in more depth. As you get more familiarized with the project, more ideas to improve the building will come up.

The detailed project schedule reveals a 30 month duration from project start-up through the final completion. After analyzing the schedule activities for the construction of the superstructure, a clear progression of work flow was revealed. The strategic planning of the site logistics attempts to minimize the complications and delays that arise from site congestion can be better seen in the 3D site plan. A 3D site plan for the superstructure phase was done for a better visualization of the site and the adjacent buildings. By having a good visualization of the site layout, many conflicts can be avoided. A better and more efficient site planning can be done with 3D model.

Included in this report are estimates evaluating the cost of the exterior wall assembly, the structural system for an area of the building, and the general conditions for the project. The total cost for the exterior wall estimate came to \$2,155,913. For the structural systems estimate, the total cost was \$3,691,674, and the general conditions estimate totaled \$1,842,412. After reviewing the estimates, the conclusion was that there a lot of space for improvement. Cost can be cut in many different areas. The structural system shows a variety of different structural systems combined that avoids the schedule to flow smoothly due to the different trades working together on the same structure.

On future reports I will analyze in more depth how a structural system made from just one component; either all concrete, all wood or even steel, would affect the cost and the schedule of the project.

B. Detailed Project Schedule

The project summary schedule for the Apartment Complex project is shown on the next pages.

ID	Task Name	Duration	Start	Finish	April 1		September 2		March 11		September 1		February 21		August 11		February 1		J				
					2/27	5/22	8/14	11/6	1/29	4/23	7/16	10/8	12/31	3/25	6/17	9/9	12/2	2/24		5/18			
1	Design/Preconstruction	166 days?	Mon 6/6/05	Mon 1/23/06																			
2	Purchase Subs	23 days?	Mon 1/16/06	Wed 2/15/06																			
3	Permitting	117 days?	Wed 11/9/05	Thu 4/20/06																			
4	Excavation	193 days?	Mon 12/12/05	Wed 9/6/06																			
5	Foundations	0 days	Fri 12/16/05	Fri 12/16/05																			
6	Install Piles - Section A	3 days?	Fri 12/16/05	Tue 12/20/05																			
7	Install Piles - Section B	4 days?	Wed 12/21/05	Mon 12/26/05																			
8	Install Piles - Section C	3 days	Wed 12/28/05	Fri 12/30/05																			
9	Excavate for strap beams	3 days?	Tue 2/28/06	Thu 3/2/06																			
10	Pour strap beams	5 days?	Wed 3/1/06	Tue 3/7/06																			
11	Backfill at strap beams	2 days?	Mon 3/20/06	Tue 3/21/06																			
12	Complete Perimeter Piles	35 days?	Mon 4/24/06	Fri 6/9/06																			
13	Excavate to tiebacks	33 days?	Mon 4/24/06	Wed 6/7/06																			
14	Install tiebacks	14 days?	Wed 6/14/06	Mon 7/3/06																			
15	Complete Excavation	49 days?	Fri 6/30/06	Wed 9/6/06																			
16	Install Ave utilities	45 days?	Fri 6/30/06	Thu 8/31/06																			
17	Concrete	0 days	Tue 7/18/06	Tue 7/18/06																			
18	Exc/Pour tower crane bases	1 day?	Thu 8/24/06	Thu 8/24/06																			
19	Pour Footings	44 days?	Wed 8/2/06	Mon 10/2/06																			
20	Pour foundation walls	57 days?	Thu 8/3/06	Fri 10/20/06																			
21	Pour slab on grade	72 days?	Thu 8/3/06	Fri 11/10/06																			
22	Pour G-1 deck	30 days?	Mon 10/9/06	Fri 11/17/06																			
23	Pour first floor deck	29 days?	Thu 11/16/06	Tue 12/26/06																			
24	Pour second floor deck	31 days?	Wed 12/27/06	Wed 2/7/07																			
25	Structural Steel	0 days	Thu 2/8/07	Thu 2/8/07																			
26	Install str. Steel at bridges	5 days?	Thu 2/8/07	Wed 2/14/07																			
27	Inspect Steel	2 days?	Thu 2/15/07	Fri 2/16/07																			
28	Pour bridge	3 days?	Mon 2/19/07	Wed 2/21/07																			
29	Wood Framing	0 days	Thu 2/8/07	Thu 2/8/07																			
30	2nd Floor section 1	0 days	Thu 2/8/07	Thu 2/8/07																			
31	Layout interior walls	2 days?	Thu 2/8/07	Fri 2/9/07																			
32	Frame interior walls	8 days?	Fri 2/9/07	Tue 2/20/07																			
33	floor trusses and deck	3 days?	Mon 2/19/07	Wed 2/21/07																			
34	Frame exterior walls	5 days?	Fri 1/26/07	Thu 2/1/07																			
35	2nd Floor section 2	0 days	Thu 2/22/07	Thu 2/22/07																			
36	Layout interior walls	2 days?	Thu 2/22/07	Fri 2/23/07																			
37	Frame interior walls	8 days?	Fri 2/23/07	Tue 3/6/07																			
38	floor trusses and deck	4 days?	Mon 3/5/07	Thu 3/8/07																			
39	Frame exterior walls	5 days?	Tue 2/13/07	Mon 2/19/07																			

Project: tech 2 schedule Date: Thu 11/1/07	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

ID	Task Name	Duration	Start	Finish	April 1		September 2		March 11		September 1		February 21		August 11		February 1		J
					2/27	5/22	8/14	11/6	1/29	4/23	7/16	10/8	12/31	3/25	6/17	9/9	12/2	2/24	
40	2nd Floor section 3	0 days	Fri 3/9/07	Fri 3/9/07										◆ 3/9					
41	Layout interior walls	2 days?	Fri 3/9/07	Mon 3/12/07									I						
42	Frame interior walls	8 days?	Mon 3/12/07	Wed 3/21/07									I						
43	floor trusses and deck	4 days?	Tue 3/20/07	Fri 3/23/07									I						
44	Frame exterior walls	5 days?	Mon 2/26/07	Fri 3/2/07									I						
45	3rd Floor section 1	0 days	Thu 2/22/07	Thu 2/22/07										◆ 2/22					
46	Layout interior walls	2 days?	Thu 2/22/07	Fri 2/23/07									I						
47	Frame interior walls	8 days?	Fri 2/23/07	Tue 3/6/07									I						
48	floor trusses and deck	3 days?	Mon 3/5/07	Wed 3/7/07									I						
49	Frame exterior walls	5 days?	Tue 2/20/07	Mon 2/26/07									I						
50	3rd Floor section 2	0 days	Fri 3/9/07	Fri 3/9/07										◆ 3/9					
51	Layout interior walls	2 days?	Fri 3/9/07	Mon 3/12/07									I						
52	Frame interior walls	8 days?	Wed 3/14/07	Fri 3/23/07									I						
53	floor trusses and deck	4 days?	Thu 3/22/07	Tue 3/27/07									I						
54	Frame exterior walls	5 days?	Tue 3/6/07	Mon 3/12/07									I						
55	3rd Floor section 3	0 days	Mon 3/26/07	Mon 3/26/07										◆ 3/26					
56	Layout interior walls	2 days?	Mon 3/26/07	Tue 3/27/07									I						
57	Frame interior walls	9 days?	Thu 3/29/07	Tue 4/10/07									I						
58	floor trusses and deck	4 days?	Mon 4/9/07	Thu 4/12/07									I						
59	Frame exterior walls	5 days?	Wed 3/21/07	Tue 3/27/07									I						
60	4th Floor section 1	0 days	Wed 3/7/07	Wed 3/7/07										◆ 3/7					
61	Layout interior walls	2 days?	Wed 3/7/07	Thu 3/8/07									I						
62	Frame interior walls	8 days?	Wed 2/14/07	Fri 2/23/07									I						
63	floor trusses and deck	16 days?	Wed 3/7/07	Wed 3/28/07									I						
64	Frame exterior walls	5 days?	Tue 3/6/07	Mon 3/12/07									I						
65	4th Floor section 2	0 days	Thu 3/29/07	Thu 3/29/07										◆ 3/29					
66	Layout interior walls	2 days?	Thu 3/29/07	Fri 3/30/07									I						
67	Frame interior walls	8 days?	Mon 4/2/07	Wed 4/11/07									I						
68	floor trusses and deck	4 days?	Tue 4/10/07	Fri 4/13/07									I						
69	Frame exterior walls	5 days?	Fri 3/23/07	Thu 3/29/07									I						
70	4th Floor section 3	0 days	Mon 4/16/07	Mon 4/16/07										◆ 4/16					
71	Layout interior walls	2 days?	Mon 4/16/07	Tue 4/17/07									I						
72	Frame interior walls	9 days?	Wed 4/18/07	Mon 4/30/07									I						
73	floor trusses and deck	4 days?	Fri 4/27/07	Wed 5/2/07									I						
74	Frame exterior walls	5 days?	Tue 4/10/07	Mon 4/16/07									I						
75	5th Floor section 1	0 days	Mon 3/26/07	Mon 3/26/07										◆ 3/26					
76	Layout interior walls	2 days?	Mon 3/26/07	Tue 3/27/07									I						
77	Frame interior walls	8 days?	Wed 3/28/07	Fri 4/6/07									I						
78	floor trusses and deck	3 days?	Thu 4/5/07	Mon 4/9/07									I						

Project: tech 2 schedule Date: Thu 11/1/07	Task		Milestone	◆	External Tasks	
	Split		Summary		External Milestone	◆
	Progress		Project Summary		Deadline	↓

ID	Task Name	Duration	Start	Finish	April 1		September 2		March 11		September 1		February 21		August 11		February 1		J
					2/27	5/22	8/14	11/6	1/29	4/23	7/16	10/8	12/31	3/25	6/17	9/9	12/2	2/24	
79	Frame exterior walls	5 days?	Fri 3/23/07	Thu 3/29/07															
80	5th Floor section 2	0 days	Fri 4/13/07	Fri 4/13/07															
81	Layout interior walls	2 days?	Fri 4/13/07	Mon 4/16/07															
82	Frame interior walls	8 days?	Thu 4/19/07	Mon 4/30/07															
83	floor trusses and deck	4 days?	Mon 4/30/07	Thu 5/3/07															
84	Frame exterior walls	5 days?	Wed 4/11/07	Tue 4/17/07															
85	5th Floor section 3	0 days	Fri 5/4/07	Fri 5/4/07															
86	Layout interior walls	2 days?	Fri 5/4/07	Mon 5/7/07															
87	Frame interior walls	8 days?	Tue 5/8/07	Thu 5/17/07															
88	floor trusses and deck	3 days?	Thu 5/17/07	Mon 5/21/07															
89	Frame exterior walls	5 days?	Mon 4/30/07	Fri 5/4/07															
90	Parking Garage	0 days	Mon 2/12/07	Mon 2/12/07															
91	G-2 sprinkler piping	10 days	Mon 2/12/07	Fri 2/23/07															
92	G-1 sprinkler piping	10 days?	Mon 2/26/07	Fri 3/9/07															
93	G-2 CMU	10 days?	Mon 2/12/07	Fri 2/23/07															
94	G-1 CMU	10 days?	Mon 2/26/07	Fri 3/9/07															
95	Set mechanical equipment	15 days?	Mon 3/19/07	Fri 4/6/07															
96	Wire mech equipment	10 days?	Mon 4/9/07	Fri 4/20/07															
97	MEP start-up	10 days?	Wed 8/15/07	Tue 8/28/07															
98	Unit Rough In	0 days	Fri 9/21/07	Fri 9/21/07															
99	1st floor	0 days	Fri 9/21/07	Fri 9/21/07															
100	Sprinkler / Mechanical R-I	10 days?	Fri 9/21/07	Thu 10/4/07															
101	Electrical R-I	11 days?	Fri 10/26/07	Fri 11/9/07															
102	R-I Inspection	5 days?	Fri 11/9/07	Thu 11/15/07															
103	2nd floor section 1	0 days	Wed 2/21/07	Wed 2/21/07															
104	Sprinkler / Mechanical R-I	8 days?	Wed 2/21/07	Fri 3/2/07															
105	Electrical R-I	8 days?	Tue 2/27/07	Thu 3/8/07															
106	R-I Inspection	6 days?	Mon 3/5/07	Mon 3/12/07															
107	2nd floor section 2	0 days	Wed 3/7/07	Wed 3/7/07															
108	Sprinkler / Mechanical R-I	8 days?	Wed 3/7/07	Fri 3/16/07															
109	Electrical R-I	8 days?	Tue 3/13/07	Thu 3/22/07															
110	R-I Inspection	6 days?	Mon 3/19/07	Mon 3/26/07															
111	2nd floor section 3	0 days	Thu 3/22/07	Thu 3/22/07															
112	Sprinkler / Mechanical R-I	8 days?	Thu 3/22/07	Mon 4/2/07															
113	Electrical R-I	8 days?	Wed 3/28/07	Fri 4/6/07															
114	R-I Inspection	6 days?	Tue 4/3/07	Tue 4/10/07															
115	3rd floor section 1	0 days	Wed 4/11/07	Wed 4/11/07															
116	Sprinkler / Mechanical R-I	8 days?	Wed 4/11/07	Fri 4/20/07															
117	Electrical R-I	8 days?	Tue 4/17/07	Thu 4/26/07															

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	Progress		Project Summary		Deadline	

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					2/27	5/22	8/14	11/6	1/29	4/23	7/16	10/8	12/31	3/25	6/17	9/9	12/2	2/24	
118	R-I Inspection	6 days?	Mon 4/23/07	Mon 4/30/07															
119	3rd floor section 2	0 days	Mon 4/23/07	Mon 4/23/07															
120	Sprinkler / Mechanical R-I	119 days?	Mon 4/23/07	Thu 10/4/07															
121	Electrical R-I	8 days?	Mon 4/23/07	Wed 5/2/07															
122	R-I Inspection	6 days?	Thu 5/3/07	Thu 5/10/07															
123	3rd floor section 3	0 days	Thu 5/3/07	Thu 5/3/07															
124	Sprinkler / Mechanical R-I	8 days?	Thu 5/3/07	Mon 5/14/07															
125	Electrical R-I	8 days?	Wed 5/9/07	Fri 5/18/07															
126	R-I Inspection	6 days?	Tue 5/15/07	Tue 5/22/07															
127	4th floor section 1	0 days	Tue 5/15/07	Tue 5/15/07															
128	Sprinkler / Mechanical R-I	7 days?	Tue 5/15/07	Wed 5/23/07															
129	Electrical R-I	8 days?	Mon 5/21/07	Wed 5/30/07															
130	R-I Inspection	6 days?	Fri 5/25/07	Fri 6/1/07															
131	4th floor section 2	0 days	Thu 5/24/07	Thu 5/24/07															
132	Sprinkler / Mechanical R-I	8 days?	Thu 5/24/07	Mon 6/4/07															
133	Electrical R-I	8 days?	Thu 5/31/07	Mon 6/11/07															
134	R-I Inspection	6 days?	Wed 6/6/07	Wed 6/13/07															
135	4th floor section 3	0 days	Tue 6/5/07	Tue 6/5/07															
136	Sprinkler / Mechanical R-I	8 days?	Tue 6/5/07	Thu 6/14/07															
137	Electrical R-I	8 days?	Tue 6/12/07	Thu 6/21/07															
138	R-I Inspection	6 days?	Wed 6/20/07	Wed 6/27/07															
139	5th floor section 1	0 days	Thu 6/28/07	Thu 6/28/07															
140	Sprinkler / Mechanical R-I	9 days?	Thu 6/28/07	Tue 7/10/07															
141	Electrical R-I	8 days?	Thu 7/5/07	Mon 7/16/07															
142	R-I Inspection	6 days?	Wed 7/11/07	Wed 7/18/07															
143	5th floor section 2	0 days	Wed 7/11/07	Wed 7/11/07															
144	Sprinkler / Mechanical R-I	8 days?	Wed 7/11/07	Fri 7/20/07															
145	Electrical R-I	8 days?	Tue 7/17/07	Thu 7/26/07															
146	R-I Inspection	6 days?	Fri 7/20/07	Fri 7/27/07															
147	5th floor section 3	0 days	Mon 7/23/07	Mon 7/23/07															
148	Sprinkler / Mechanical R-I	8 days?	Mon 7/23/07	Wed 8/1/07															
149	Electrical R-I	8 days?	Fri 7/27/07	Tue 8/7/07															
150	R-I Inspection	6 days?	Thu 8/2/07	Thu 8/9/07															
151	Unit Finishes	0 days	Tue 7/3/07	Tue 7/3/07															
152	2nd floor section 1	103 days?	Tue 7/3/07	Thu 11/22/07															
153	2nd floor section 2	88 days?	Thu 7/26/07	Mon 11/26/07															
154	2nd floor section 3	88 days?	Wed 8/8/07	Fri 12/7/07															
155	3rd floor section 1	103 days?	Tue 7/3/07	Thu 11/22/07															
156	3rd floor section 2	87 days?	Tue 8/21/07	Wed 12/19/07															

Project: tech 2 schedule Date: Thu 11/1/07	Task		Milestone		External Tasks	
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ID	Task Name	Duration	Start	Finish	April 1		September 2		March 11		September 1		February 21		August 11		February 1		J
					2/27	5/22	8/14	11/6	1/29	4/23	7/16	10/8	12/31	3/25	6/17	9/9	12/2	2/24	
157	3rd floor section 3	90 days?	Fri 8/31/07	Thu 1/3/08															
158	4th floor section 1	104 days?	Thu 9/13/07	Tue 2/5/08															
159	4th floor section 2	90 days?	Fri 10/5/07	Thu 2/7/08															
160	4th floor section 3	91 days?	Wed 10/17/07	Wed 2/20/08															
161	5th floor section 1	104 days?	Thu 9/13/07	Tue 2/5/08															
162	5th floor section 2	90 days?	Tue 10/30/07	Mon 3/3/08															
163	5th floor section 3	91 days?	Fri 11/9/07	Fri 3/14/08															
164	MEP	0 days	Tue 7/3/07	Tue 7/3/07															
165	Install RTU's 1,2, and 3	6 days?	Tue 7/3/07	Tue 7/10/07															
166	Pipe RTU's	10 days?	Wed 7/11/07	Tue 7/24/07															
167	Wire RTU's	10 days?	Wed 7/11/07	Tue 7/24/07															
168	Install RT condensing units	21 days?	Tue 7/3/07	Tue 7/31/07															
169	Wire RT condensing units	20 days?	Wed 7/18/07	Tue 8/14/07															
170	Vertical Transportation	0 days	Tue 7/3/07	Tue 7/3/07															
171	Install elevator 1	101 days?	Tue 7/3/07	Tue 11/20/07															
172	Install elevator 2	81 days?	Tue 7/3/07	Tue 10/23/07															
173	Install elevator 3 and 4	101 days?	Tue 7/3/07	Tue 11/20/07															
174	Final Cleaning	15 days?	Mon 3/17/08	Fri 4/4/08															
175	Testing and Final Inspection	0 days	Wed 8/29/07	Wed 8/29/07															
176	Parking Garage	10 days?	Wed 8/29/07	Tue 9/11/07															
177	1st floor	5 days?	Thu 1/24/08	Wed 1/30/08															
178	2nd floor	5 days?	Mon 3/17/08	Fri 3/21/08															
179	3rd floor	5 days?	Mon 3/24/08	Fri 3/28/08															
180	4th floor	5 days?	Mon 3/31/08	Fri 4/4/08															
181	5th floor	5 days?	Mon 4/7/08	Fri 4/11/08															
182	Substantial Completion	0 days	Fri 4/11/08	Fri 4/11/08															

◆ 7/3

◆ 7/3

◆ 8/29

◆ 4/11

Project: tech 2 schedule Date: Thu 11/1/07	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

C Site Layout Planning

At this point, the structure of Apartment Complex is being completed. The superstructure of the building can be seen in the following pages, where pictures of a 3D model of the building are shown. As you can see in the picture on the right, there are two tower cranes. Tower Crane #1 is a Pecco SK 400 with a radius of 220' and a capacity of 10,100 lbs at the tip. Tower Crane #2 is a Peiner SK 315 with a radius of 180 and a capacity of 11,900 lbs at the tip. Both cranes interfere with the superstructure of the building. After the structure of the building is completed, they will have to

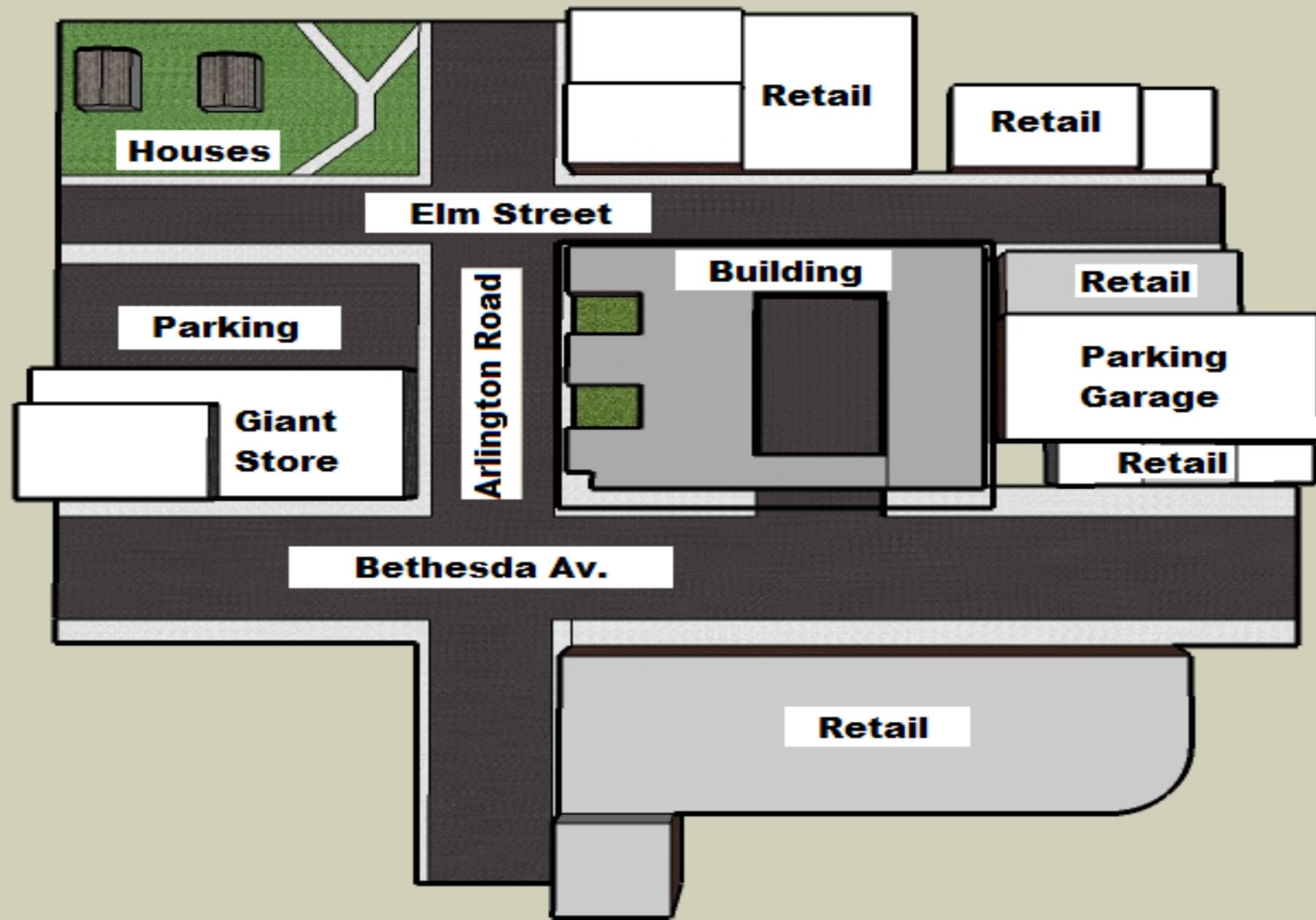


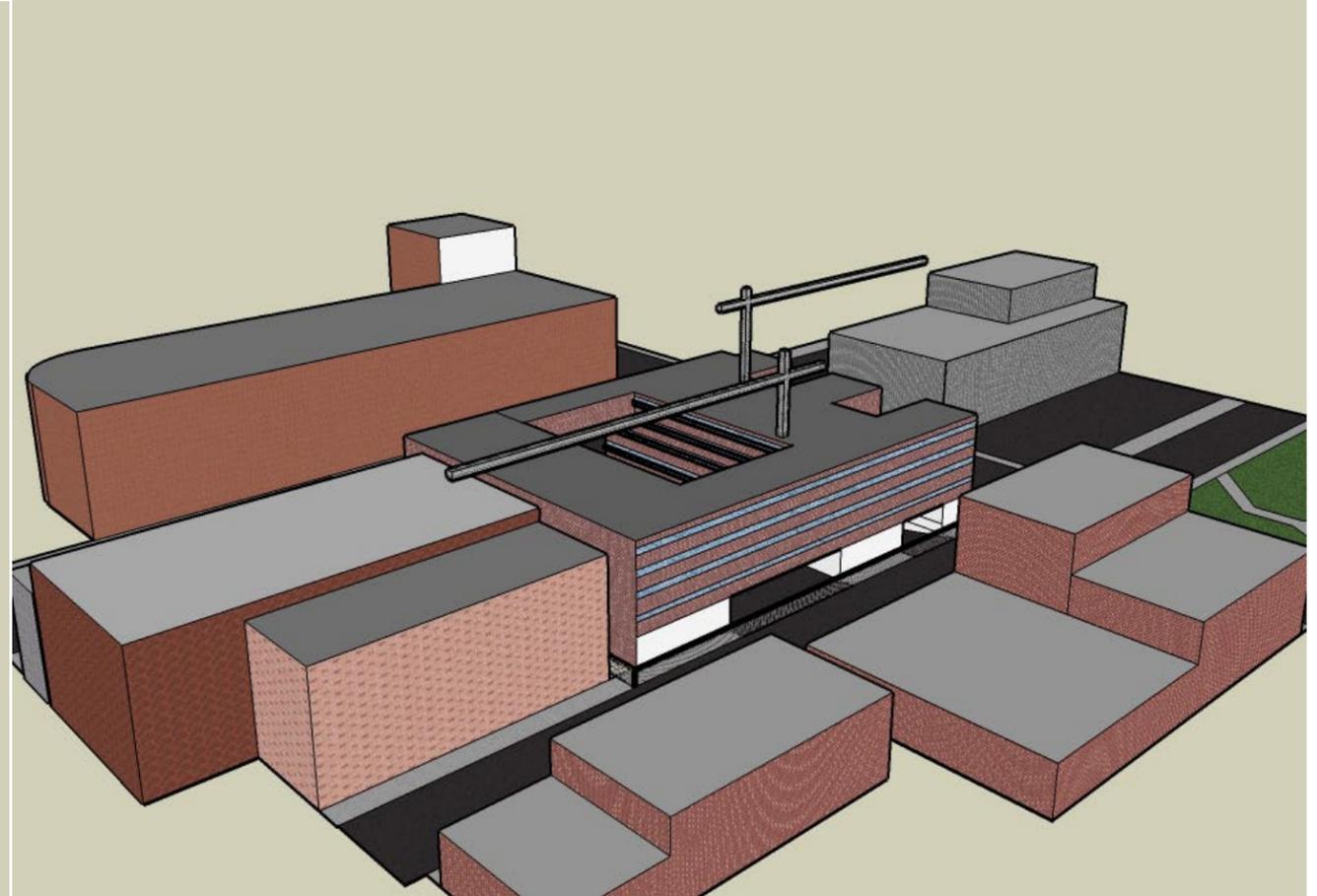
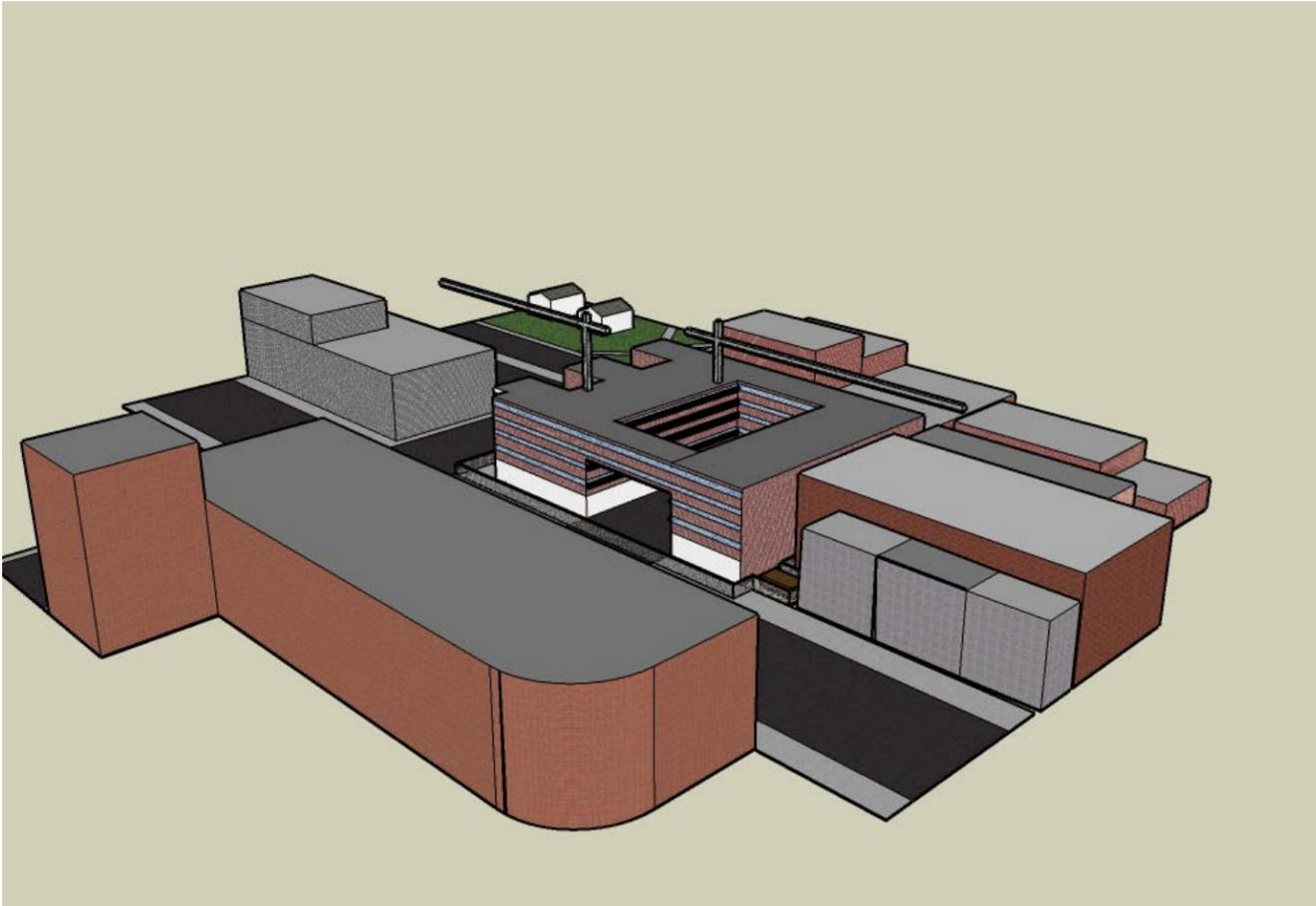
remove the cranes and pour more concrete to finish the slabs. If both cranes were located on Festival Street, then all concrete work would be done all at once and they would not have to deal with filling the wholes later.

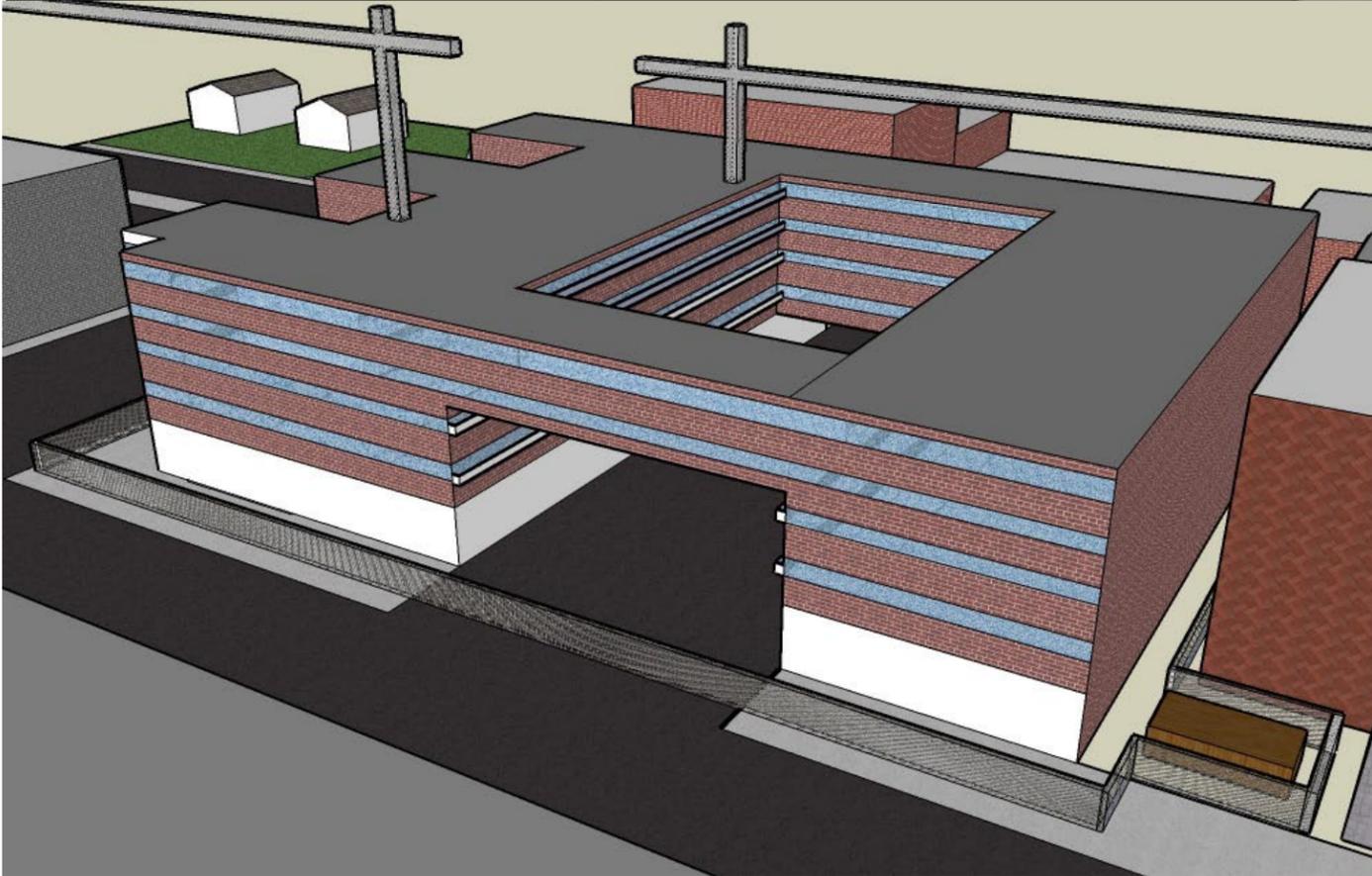
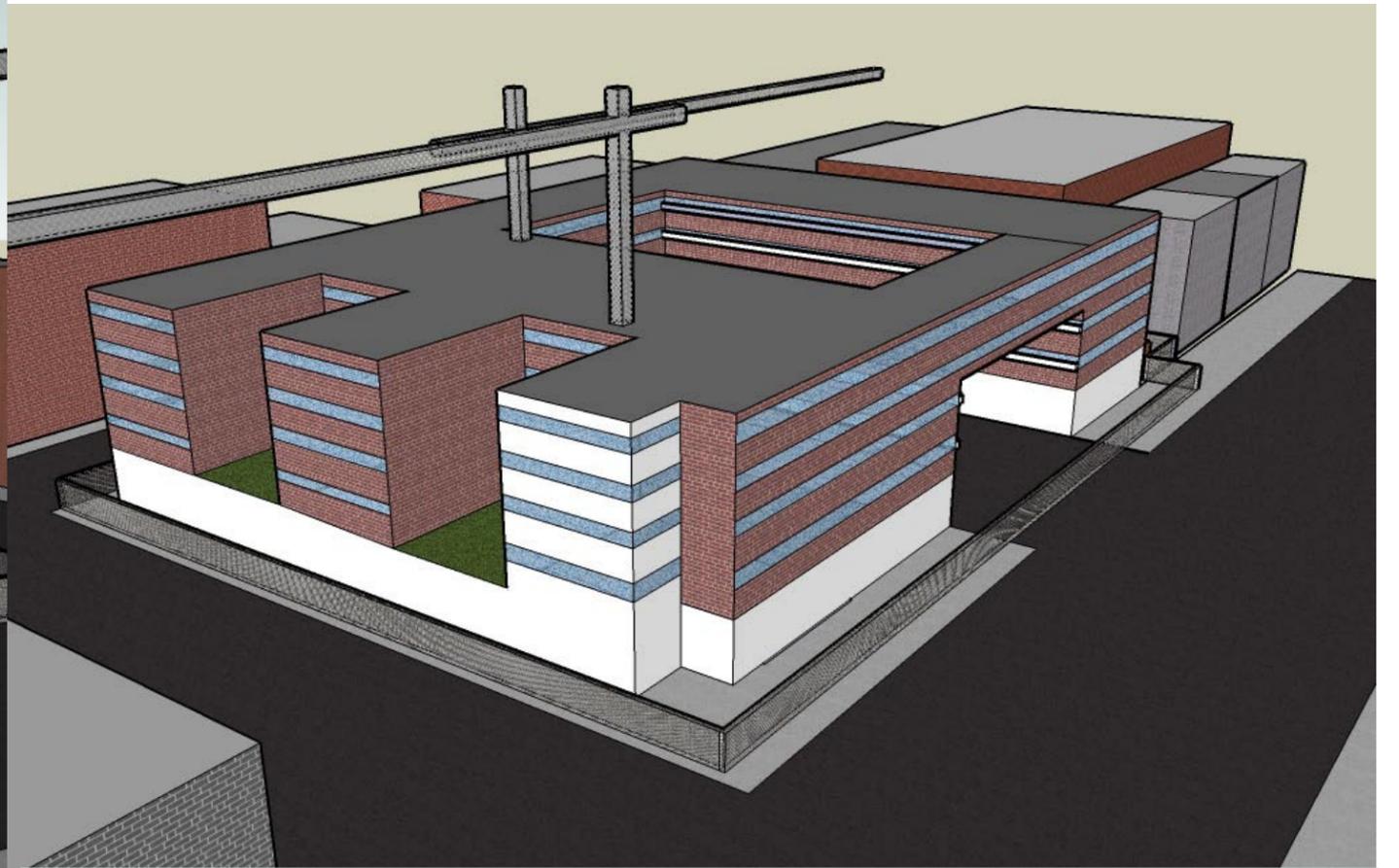
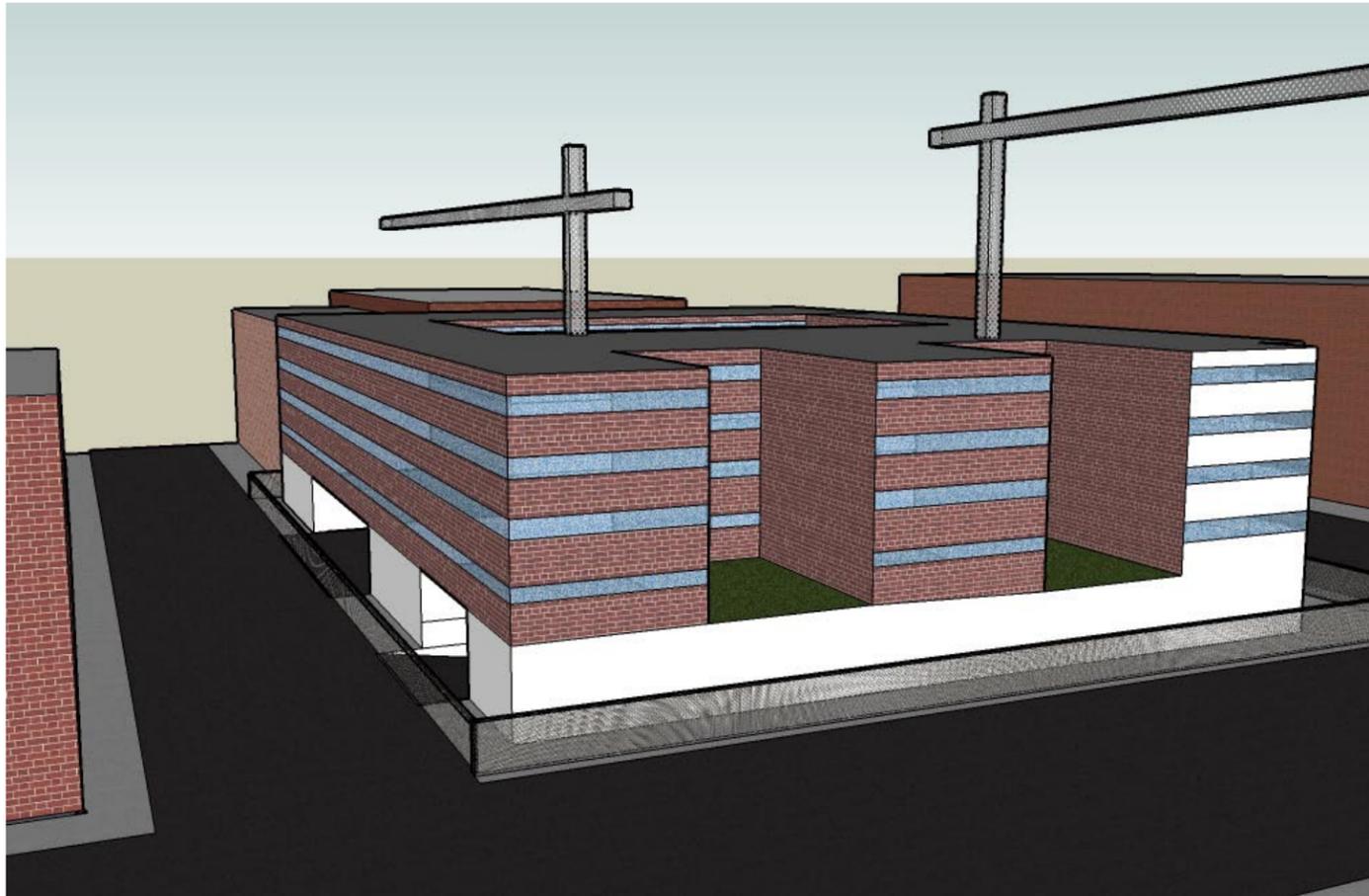


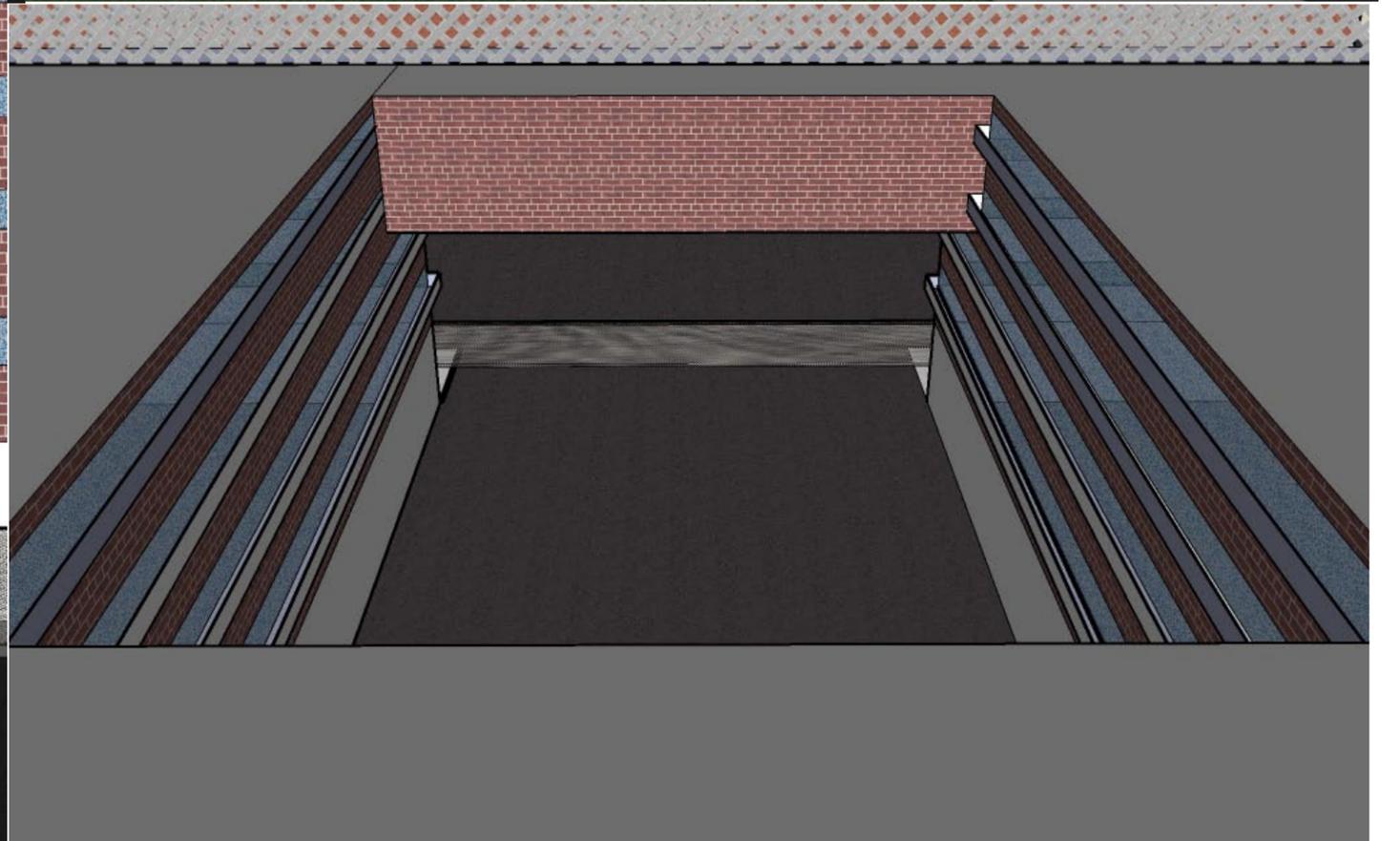
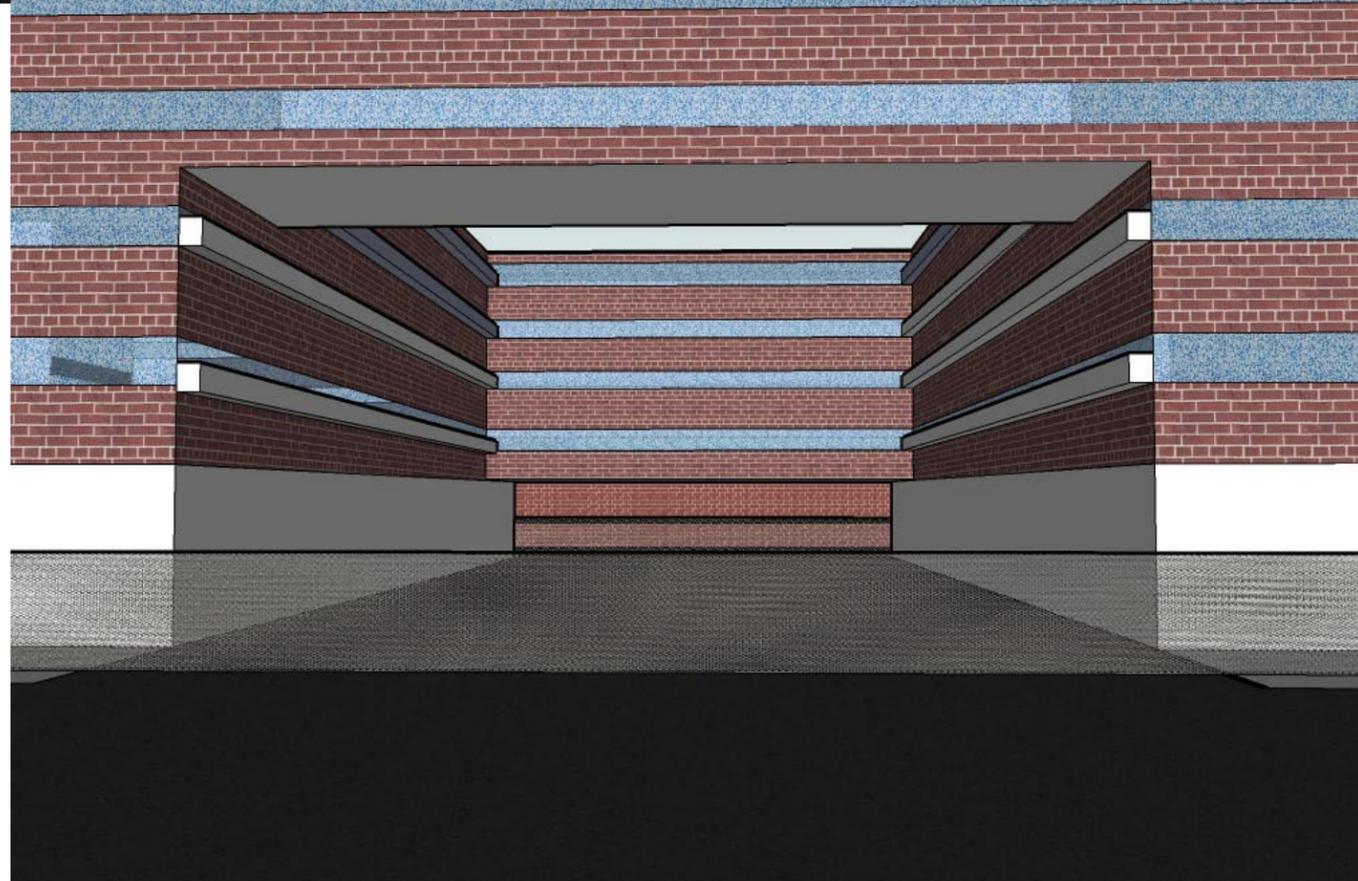
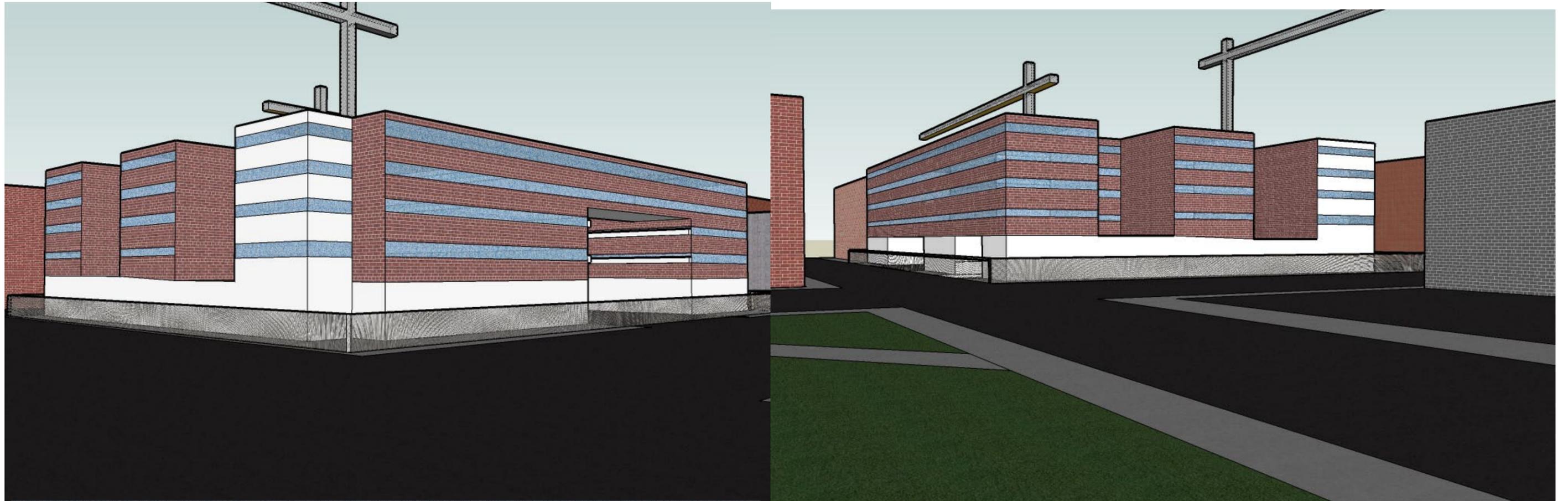
Space in Washington DC is very limited. Therefore, space needs to be very well planned in order to use it effectively. Clark's site office is situated on garage two. That space will not interfere with any activity until the building is completed. That way Clark is saving money and space by avoiding having a trailer in the middle of the jobsite. As we can see in the picture on the left, M&L trailer is on the first level, but it is located outside of the perimeter of the building.

Due to the space constrains, some deliveries from trucks are done directly from the street. Trucks stop in Arlington Road to deliver material. It is not very convenient due to the fact that they interfere with the traffic. However Elm Street and Bethesda Avenue are very crowded and trucks are not able to pass through those roads. Even though it is dangerous and inefficient to deliver materials directly from Arlington road, it is the only alternative that they have.









D. Assemblies Estimate

The assemblies estimate focuses on the exterior envelope of the building. The Apartment Complex has a building envelope system that involves many different elements. The building incorporates five major façade materials: Norman brick veneer, EIFS, CMU, windows, and doors. The envelope estimate was approximately \$2,155,913, which is about 5% of the total cost of the building. The Assemblies Estimate was calculated using *RSMMeans Assemblies Cost Data 2007*.

Detailed building envelope estimate

Category	CSI	Type	Quantity	Unit	Material	Labor	Tot. Unit Price	Total Cost
Masonry	5350	EIFS	14,000	SF	5.7	14.40	20.1	\$281,400
	1400	Brick	33,000	SF	15.05	18.35	33.40	\$1,102,200
	2750	CMU	3,000	SF	3.05	5.9	8.95	\$26,850
Doors	5100	Overhead door	32	EA	1752	703	\$2,455	\$78,560
	1980	Storefronts	32	EA	743	351	\$1,694	\$54,208
Windows	5850	Type 1	250	EA	1400	294	1694	\$423,500
	5500	Type 2	115	EA	975	243	1218	\$140,070
	5250	Type 3	75	EA	535	120	655	\$49,125
							Total	\$2,155,913

E. Detailed Structural System Estimate

The following structural estimate will be done for the east wing of the building. The structural estimate takes in account all the floors including the two parking garages below grade. Since Apartment Complex is a hybrid, the structure is composed of various structural systems. Concrete, masonry, wood, and metal studs are basically the four component of the structural system. Due to the different layout of the apartments in the east wing, the structural system of the east portion is not consistent throughout the building. A completely different estimate would have to be done in order to estimate the rest of the structure.

Assumptions

- Reinforcing prices are included on the concrete prices.
- Concrete placement method for footings is direct chute.
- Slabs, walls, beams, and columns were poured with a pump.
- Concrete price includes backfill and forms as well.

Concrete

CSI	Item	Quantity	Unit	Cost/material	Cost/Labor	Tot. Unit cost	Total Cost
8010	Footings	22	EA	1225	1075	2300	50,600
4500	Columns	2,110	V.L.F	50	111	161	339,710
6800	Beams/Slabs	40,075	SF	8.3	8.8	17.1	685,291
2280	Slab on grade	13,358	SF	2.49	2.99	5.48	73,204
7400	Perimeter wall	9,828	SF	7.2	15.85	23.05	226,535

Metal Studs

CSI	Item	Quantity	Unit	Cost/material	Cost/Labor	Tot. Unit cost	Total Cost
6060	Brick Veneer/ Metal stud backup	35,000	SF	17.3	21	38.3	1,340,500

Masonry

CSI	Item	Quantity	Unit	Cost/material	Cost/Labor	Tot. Unit cost	Total Cost
1490	8"CMU Exterior walls	1,674	SF	1.96	5.75	7.71	12,906
2010	8"CMU interior walls	5,420	SF	2.68	8.05	10.73	58,156

Wood

CSI	Item	Quantity	Unit	Cost/material	Cost/Labor	Tot. Unit cost	Total Cost
2550	Wood Beam & Joist	26,717	SF	11.25	4.26	15.51	414,381
1950	Wood studs	53,434	SF	2.19	3.68	5.87	313,658
2550	Roof system	13,358	SF	8.5	4.73	13.23	176,733

Total Structural System Estimate: \$ 3,691,674

F. General Conditions Estimate

A general conditions estimate was performed for the Apartment Complex project. Included in the summary are total prices for the project staff, temporary facilities, equipment rental, temporary utilities, and other miscellaneous costs. Unit prices were based on R.S. Means Building Construction Costs 2007 and ICE 2000 estimating software. Some items were not considered since they were part of the subcontractor's scope. 8% tax was added to every item beside project staff. The Apartment Complex project is scheduled for thirty months.

Project Staff	Months	Price
Project Executive	30	\$250,000
Project Manager	30	\$162,000
Project Engineer	30	\$135,000
Superintendent	30	\$130,000
Assistant Superintendent	30	\$105,000
Field Engineer	30	\$125,000
Foreman	30	\$110,000
Intern	7	\$22,000
Subtotal Project Staff		\$1,039,000

Temporary Facilities	Months	Price
Jobsite Office	30	\$15,000
Telephone/Fax	30	\$8,000
Cell Phone usage	30	\$7,000
Temporary toilets	30	\$5,000
Office Furniture	30	\$15,000
Office Supplies	30	\$4,000
Blueprinting	30	\$3,000
Mailing	30	\$4,500
Tax @ 8%		\$4,880
Total Temp. Facilities		\$65,880

Equipment Rental	Time	Price
Cranes	172 Days	\$232,200
Tax @ 8%		\$18,576
Total Equip. Rental		\$250,776

Temporary Utilities	Months	Price
Electric	30	\$3000
Water	30	\$1000
Ethernet	30	\$1200
Tax @ 8%		\$416
Total Temp. Utilities		\$5,616

Other costs	Months	Price
Bond		\$350,000
Fence	30	\$20,000
Dumpsters	30	\$50,000
Signage	30	\$500
Miscellaneous items	30	\$25,000
Tax @ 8%		\$35,640
Total Other cost		\$481,140

Total General conditions

Personnel	\$1,039,000
Temporary Facilities	\$65,880
Equipment Rental	\$250,776
Temporary Utilities	\$5,616
Other costs	\$481,140
Total General Conditions	\$1,842,412

Total General Conditions: \$1,842,412

Fee: \$2,147,912

Contingency: \$450,000

Liability Insurance: \$331,797