Technical Assignment 2: Cost and Schedule Analysis

October 28
2009

The Salamander Resort and Spa

Paul Roberts

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The following report provides a comprehensive analysis of the cost and schedule of The Salamander Resort and Spa. The schedule and cost analysis is performed in more depth than in the preceding report. Also included is a summary of the PACE Roundtable discussion. The goal of this report is to provide a greater understanding into the schedule and cost of the project.

The detailed schedule is approximately 160 activities and is broken down by major trades. The schedule is also broken down by building, spa, lodge or main building. The typical orders of trades for the three buildings are concrete/steel, MEP, roofing, and finishes. The main building is the only place where steel structure is used. Key milestones are also included.

The site layout depicts the most critical phase of construction, finishes. The site plan is developed to visualize the location of important areas like material storage, hoists, and trailers. An existing road is used for access to the site. A crane was not necessary during this phase, only a material hoist.

The detailed structural systems estimate was developed using R.S. Means 2009. It includes concrete columns, beams, slabs, structural steel, and reinforcing. After performing a detailed take-off the estimate totaled $1,337,016.57 which is approximately 1.44% of the total construction cost. This cost is also shown by system and by square foot of total building size.

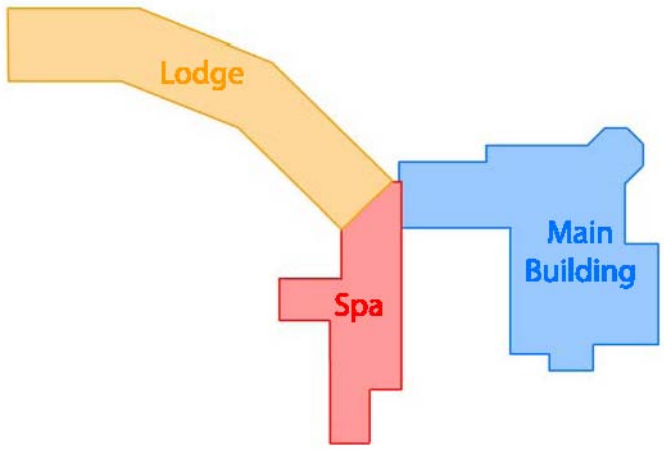
R.S. Means was also used for the general conditions estimate. This estimate included field personnel, general expenses, temporary utilities, and insurance. The total estimate came to $4,880,297.64 which is approximately 5.24% of the total construction cost. Contingency, overhead, and profit are not included in this estimate.

The final section includes a summary of the PACE Roundtable discussion. It allowed for industry members and students to interact and discuss current issues like the state of the economy and how technology is used for communication. The overall consensus among industry members is that the economy is on its way back up but there is still a need for companies to focus on their niche markets, while avoiding office buildings and apartment complexes. We also discussed the importance of green buildings and ways to incorporate energy savings techniques into our own thesis projects.

DETAILED PROJECT SCHEDULE

See Appendix A for a detailed project schedule

The Salamander Resort and Spa schedule is broken up into the construction of three buildings, the guest lodge, the spa, and the main building.



The three buildings each begin and finish construction at about the same time. The important dates are shown below.

Building	Start	Finish	Duration (days)
Lodge	1/23/2008	12/19/2011	976
Spa	2/19/2008	9/8/2011	928
Main Building	2/27/2008	11/30/2011	980

Construction of the spa and main building are very similar except for the inclusion of more structural steel in the main building. Project Substantial Completion occurs less than a week after the finish of the main building. Closeout takes roughly two months, and the building is handed over to the owner in March 2012. In 2008 the schedule was modified and delayed by a year to accommodate the owner's wishes. This change can be seen very clearly in the delay between the structure of the buildings and the finishes. Between January and November 2009, all interior work was put on hold. After the schedule adjustment, the total duration of the project is exactly five years, March 1, 2007 to March 2, 2012.

SITE LAYOUT PLANNING

See Appendix B for site layout planning

The most critical phase of this project is the finishing phase. Due to the large number of custom designed fixtures and materials, transportation and handling should be kept to a minimum to avoid damage. Material storage locations are placed by the guest lodge and restaurant on the northern side of the site, to minimize movement. Turner Construction does not supply any material hoists so the subcontractors should place their hoist in the center section of the guest lodge. The main building and spa is one floor so a hoist is not needed to access those areas.

The on-site trailer and temporary parking is located in the designed parking lot for guests. Dumpsters and recycling collectors are located to the east of the main building, which has relatively flat graded land for easy pick-up. Entrance and exit will on the existing 2-way paved road. Due to the large area and remoteness of the site, no barrier fences are used except for chain link gates at the two entrance and exits.

The planning and coordination for this project benefits greatly from being located on a relatively flat piece of land in the middle of a large open field, free of trees, surrounding buildings, and vehicular/pedestrian traffic. It allows for a lot of freedom when designing a site layout.

DETAILED STRUCTURAL SYSTEMS ESTIMATE

See Appendix C for detailed structural systems estimate

Total Structural Costs			
System	SF	$/SF	Cost
Concrete	230000	$ 1.96	$ 449,821.00
Structural Steel	230000	$ 2.93	$ 672,769.00
Reinforcing	230000	$ 1.04	$ 238,934.00
Sub-Total	230000	$ 5.92	$ 1,361,524.00
		Location Factor	0.982
		Total	$ 1,337,016.57

Assumptions:

- Location Factor, Arlington = .982
- 2 use plywood was used for forming
- No waste factors were used
- Footings used 6 #6 for reinforcing
- Slab on grade used #4 @ 12" O.C. for reinforcing
- Concrete Beams used 6 #7 for reinforcing
- Concrete Column used 8 #10 for reinforcing
- Elevated slab used #4 @ 24" O.C. for reinforcing
- Concrete CY totals do not exclude volume of rebar

The detailed structural estimate was performed using R.S. Means 2009. Due to the irregularity of my project I was unable to do a simple estimate of a typical bay and extrapolate. The guest lodge is the only area that has a repeatable structural system. In order to simplify the take-off of concrete beams, concrete columns, and steel members, I used a length range method. I grouped all the different sized beams and columns into length ranges. For example, I counted up all 24"x24" concrete beams and categorized them as either 10'-15', 15'-20', 20'-25', etc. I then took the average length, in this case 12.5', 17.5', 22.5', and multiplied it by the quantity and size to get cubic yards of concrete. I used a similar method for the concrete columns, footings, and steel members. As seen in the above assumptions, I used uniform reinforcing for slabs, beams, and columns to simplify to the take-off. The total structural cost for the project is $1,337,016.57.

The actual cost of building concrete from the GMP estimate by Turner Construction is $7,191,105. This number is significantly larger than the value that I obtained for structural concrete. The main reason for this difference is that this work was performed by a subcontractor who also had to excavate and backfill

the footings. The actual estimate also includes concrete used for paving, sidewalks, and retaining walls. I also did not take into account the additional material and labor costs of post tensioned concrete in the guest lodge.

GENERAL CONDITIONS ESTIMATE

See Appendix D for General Conditions Estimate breakdown

Assumptions:

- Location factor, Arlington = .982
- Turner Construction employees are on site for entire duration of project
- Project duration: 5 years = 60 months

General Conditions Summary		
Item	Cost	% of GC
Field Personnel	$ 2,419,402.50	49.6%
General Expenses	$ 876,418.50	18.0%
Temporary Utilities	$ 324,177.84	6.6%
Insurance	$ 1,260,298.80	25.8%
Total	$ 4,880,297.64	100.0%

The General Conditions estimate was performed using R.S. Means 2009. The estimate was broken up into four categories, field personnel, general expenses, temporary utilities, and insurance. The estimate came to $4,880,297.64 which is 5.24% of the total construction cost. The largest portion of the cost estimate, roughly 50%, is from field personnel because Turner Construction has seven employees on-site.

CRITICAL INDUSTRY ISSUES

The overall theme of this year's roundtable discussion was "Creating Opportunities", particularly dealing with the economic situation. The session was broken up into 3 different discussions, the economic climate, a breakout group in which participants could pick between three different topics, and communication patterns of the modern generation. For the breakout sessions one could choose between Energy and the Building Industry, BIM Execution Planning, and Business Networking. I chose to go to the Energy discussion.

Industry Panel

The first session consisted of a group of five members from various construction companies. Their main goal was to inform and respond to questions from other industry members and students about how the current economic climate is affecting their company. The representative from Clark Construction said that they are focusing more heavily on health care and data centers and less on apartment complexes. One of the main ideas that a couple of the panel members emphasized was to take special care of clients needs. Good relationships are the key to obtaining repeat business and in a recession, steady work is a must to stay afloat. It is also important, and less expensive, to train and further develop the knowledge of current employees, so that when the economy recovers you will not fall behind. Companies are also seeing a lot more bidders for projects, particularly from smaller companies looking to undercut the larger companies. While the larger companies are not worried in the long run as these smaller companies cannot turn a profit with such low bids. In the mean time, they are forced to bid competitively to win jobs. Most of what the more well known companies have going for them is reputation, even in a recession, owners will pay a little more for assurance that their project is in good hands.

Energy and the Building Industry

The energy breakout group seemed to be the most popular, most likely because of the nations push towards greener and more efficient buildings. We started off by brainstorming things often associated with energy efficient or "going green". One of the interesting topics is the issue of a carbon tax. While we didn't talk about it much in the session, I think it is essential for the US to implement in order to decrease our carbon footprint. The idea of having a monthly tax rather than just an upfront fee for having an energy inefficient building is better. It will encourage building owners to think green because it will pay off for them in the long run. Some of the other interesting topics that we touched on were deregulation, operations costs based

on occupants behavior, energy auditing, the stimulus package, new energy efficient materials, and incentives. We spent the last portion of the breakout session discussing various students' thesis projects and ways to integrate energy savings into them. We talked about various ways to decrease energy use in the hospitality industry, which applies directly to my thesis project. One of the largest energy savers is to install motion sensors to turn off lights in guest rooms when no one is there. Another idea is to use LED lighting which requires less energy to run and puts out less heat. I could also utilize dimmable lighting with the default power set at 75%. Guests would be able to increase the lighting if necessary but most likely would not need it. Each system would create a small energy gain, and if installed in all 165 rooms it could make a large impact.

Communication patterns of the Now Generation

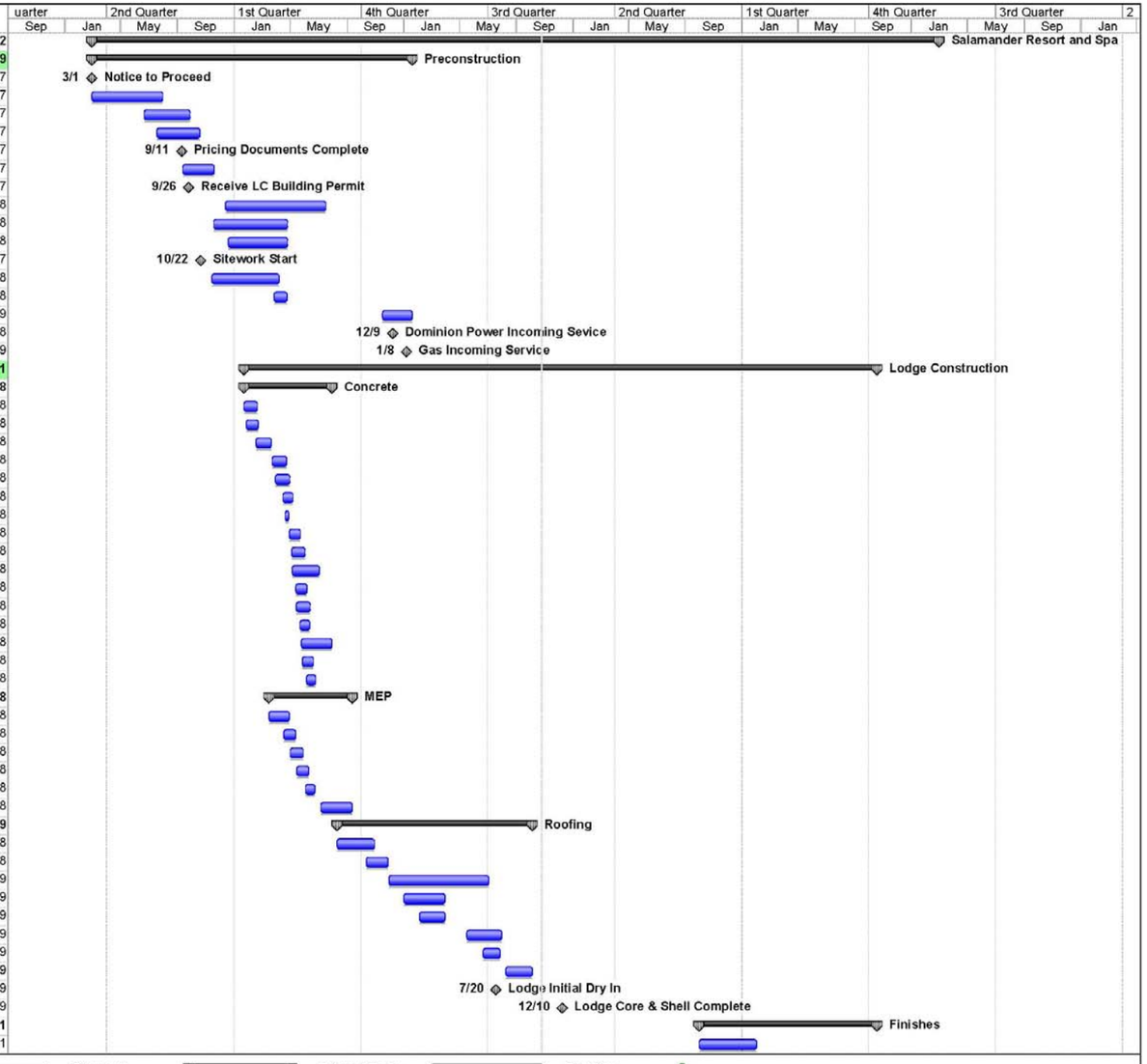
The final session consisted of a student panel to address how the upcoming working generation incorporates technology in daily communication. The first thing we discussed is the issue of availability. With the incorporation of email on cell phones, can one really get away from work? The answer is yes, with some rules. Some of the industry leaders said that they have rules for themselves to never send out work emails at night, or to turn off their phone completely during certain periods at night. This is on the complete opposite end of the spectrum for most of the Now Generation. We are used to instant communication whether via phone, email, or text messaging. This can lead to some problems when we mix with the current working population that does not have the same views as us. We also discussed whether or not social networking websites or twitter could play a role in the workplace. The general consensus is that they are strictly social websites and should not be used while at work. One of the questions that my classmate brought up is the fact that we are never taught when it is appropriate to send an email or just pick up a phone and call. I am more likely to send an email to a person, but they may think it is more appropriate for me to call them. While technology is an excellent tool for communication in this day in age, one has to realize when it is appropriate and more importantly, when it is inappropriate to use.

Thoughts and Opinions

This was my first time to the roundtable discussion and I found it quite informative. It really gave me an inside look at how construction companies are dealing with the economic downturn. Most of the companies agreed that we have hit the bottom and are back on the rise, which is a good sign for the companies that made it through and for the current students looking for jobs.

APPENDIX A: DETAILED PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish
1	**Salamander Resort and Spa**	**1306 days?**	**Thu 3/1/07**	**Fri 3/2/12**
2	**Preconstruction**	**493 days?**	**Thu 3/1/07**	**Mon 1/19/09**
3	Notice to Proceed	0 days	Thu 3/1/07	Thu 3/1/07
4	Design and Development	109 days	Thu 3/1/07	Tue 7/31/07
5	Building and Health Dep. Permits	71 days?	Fri 6/22/07	Fri 9/28/07
6	Construction Documents	67 days?	Thu 7/19/07	Fri 10/19/07
7	Pricing Documents Complete	0 days	Tue 9/11/07	Tue 9/11/07
8	GMP Estimate	48 days?	Thu 9/13/07	Mon 11/19/07
9	Receive LC Building Permit	0 days	Wed 9/26/07	Wed 9/26/07
10	Addendum 2-18	155 days?	Fri 12/14/07	Thu 7/17/08
11	GMP Estimate Review/Value Engineering	115 days?	Mon 11/19/07	Fri 4/25/08
12	Revised GMP Submission	92 days?	Thu 12/20/07	Fri 4/25/08
13	Sitework Start	0 days	Mon 10/22/07	Mon 10/22/07
14	Rough Grading	103 days?	Thu 11/15/07	Mon 4/7/08
15	Lodge Lvl 1 Backfill Walls	20 days?	Fri 3/28/08	Thu 4/24/08
16	Gravity Retaining Wall	46 days?	Mon 11/17/08	Mon 1/19/09
17	Dominion Power Incoming Sevice	0 days	Tue 12/9/08	Tue 12/9/08
18	Gas Incoming Service	0 days	Thu 1/8/09	Thu 1/8/09
19	**Lodge Construction**	**976 days?**	**Wed 1/23/08**	**Wed 10/19/11**
20	**Concrete**	**136 days?**	**Wed 1/23/08**	**Wed 7/30/08**
21	Lodge Excavate Footings	21 days?	Wed 1/23/08	Wed 2/20/08
22	Lodge F/R/P Spread Footings	20 days?	Mon 1/28/08	Fri 2/22/08
23	Lodge F/R/P Walls and Columns	25 days?	Mon 2/18/08	Fri 3/21/08
24	Lodge Waterproof Walls	23 days?	Mon 3/24/08	Wed 4/23/08
25	Lodge Ground Slab on Grade	23 days?	Mon 3/31/08	Wed 4/30/08
26	Lodge Lvl 1 Form Slab	16 days?	Wed 4/16/08	Wed 5/7/08
27	Lodge Lvl 1 Pour Slab/Columns	6 days	Mon 4/21/08	Mon 4/28/08
28	Lodge Lvl 2 Form Slab	18 days?	Wed 4/30/08	Fri 5/23/08
29	Lodge Lvl 2 Pour Slab/Columns	21 days?	Mon 5/5/08	Mon 6/2/08
30	Lodge Lvl 1 Strip/Reshore/Cure/Remove	43 days?	Tue 5/6/08	Thu 7/3/08
31	Lodge Lvl 3 Form Slab	18 days?	Wed 5/14/08	Fri 6/6/08
32	Lodge Lvl 2 Strip/Reshore/Cure/Remove	22 days?	Thu 5/15/08	Fri 6/13/08
33	Lodge Lvl 3 Pour Slab/Columns	15 days?	Fri 5/23/08	Thu 6/12/08
34	Lodge Penthouse Strip/Reshore/Cure/Remov	48 days?	Mon 5/26/08	Wed 7/30/08
35	Lodge Penthouse Lvl Form Slab	18 days?	Wed 5/28/08	Fri 6/20/08
36	Lodge Penthouse Lvl F/R/P Elevated Slab	14 days?	Fri 6/6/08	Wed 6/25/08
37	**MEP**	**130 days?**	**Mon 3/17/08**	**Fri 9/12/08**
38	Lodge Underground MEP	32 days?	Mon 3/17/08	Tue 4/29/08
39	Lodge Lvl 1 In Slab MEP	18 days?	Fri 4/18/08	Tue 5/13/08
40	Lodge Lvl 2 In Slab MEP	20 days?	Fri 5/2/08	Thu 5/29/08
41	Lodge Lvl 3 In slab MEP	18 days?	Fri 5/16/08	Tue 6/10/08
42	Lodge Penthouse Lvl In Slab MEP	14 days?	Wed 6/4/08	Mon 6/23/08
43	Lodge MEP Riser Installation	50 days?	Mon 7/7/08	Fri 9/12/08
44	**Roofing**	**301 days?**	**Mon 8/11/08**	**Mon 10/5/09**
45	Lodge Light Gauge Roof Trusses	59 days?	Mon 8/11/08	Thu 10/30/08
46	Lodge Roof Sheathing & Temp Roofing	35 days?	Mon 10/13/08	Fri 11/28/08
47	Lodge Roof Installation	155 days?	Mon 12/1/08	Fri 7/3/09
48	Lodge Chimney Framing	63 days?	Fri 1/2/09	Tue 3/31/09
49	Lodge Chimney Sheathing	39 days?	Thu 2/5/09	Tue 3/31/09
50	Lodge Expansion Joints	55 days?	Mon 5/18/09	Fri 7/31/09
51	Lodge Chimney Stucco	27 days?	Mon 6/22/09	Tue 7/28/09
52	Lodge Ecostar Slate Roof Installation	41 days?	Mon 8/10/09	Mon 10/5/09
53	Lodge Initial Dry In	0 days	Mon 7/20/09	Mon 7/20/09
54	Lodge Core & Shell Complete	0 days	Thu 12/10/09	Thu 12/10/09
55	**Finishes**	**274 days?**	**Fri 10/1/10**	**Wed 10/19/11**
56	Lodge Elevator Installation (S1 & S2)	88 days?	Fri 10/1/10	Tue 2/1/11

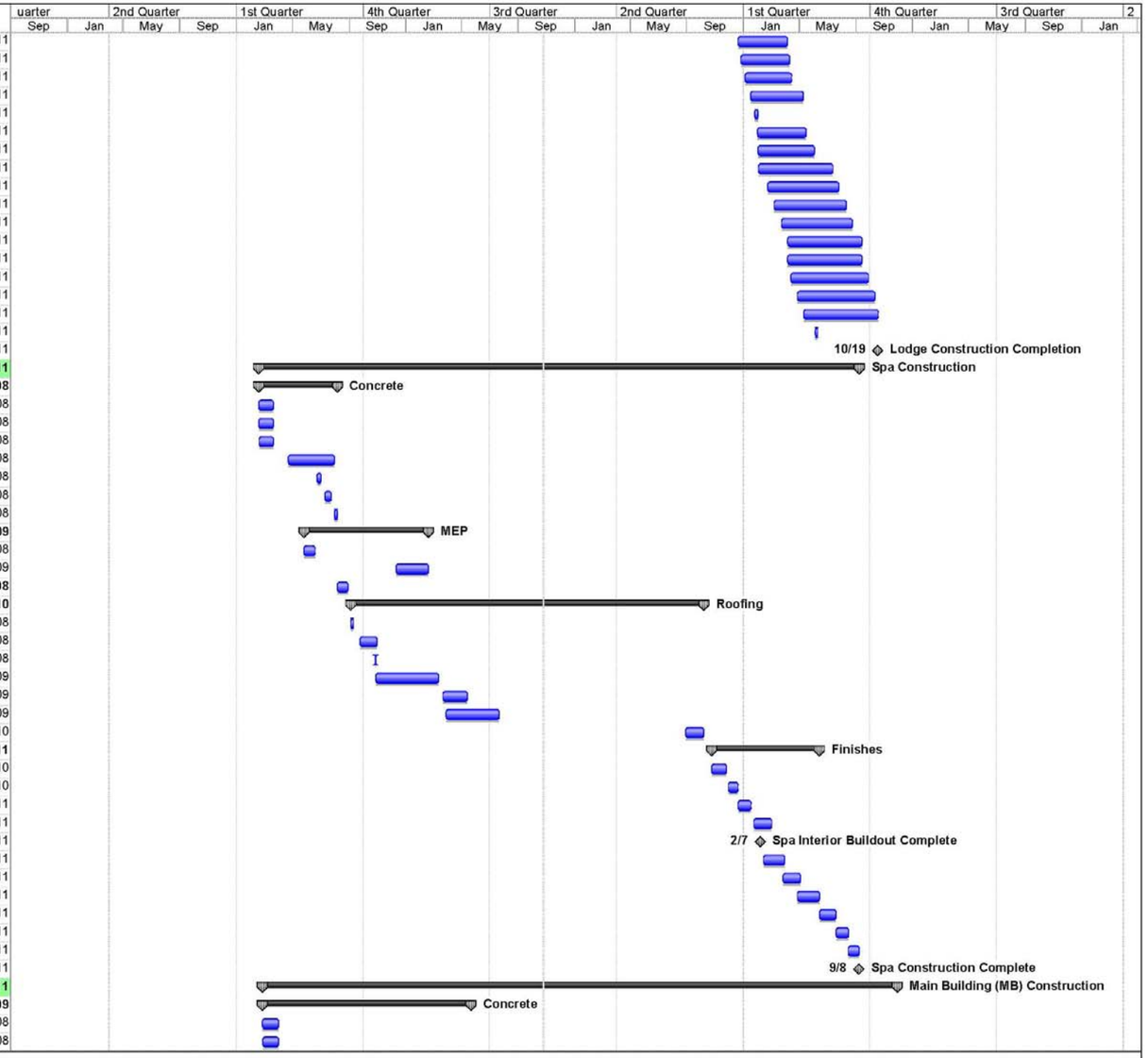


Project: Tech2.1
Date: Sun 10/25/09

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

Page 1

ID	Task Name	Duration	Start	Finish
57	Lodge Hang Drywall Walls	77 days?	Tue 12/21/10	Wed 4/6/11
58	Lodge Tape & Finish Drywall	76 days?	Mon 12/27/10	Mon 4/11/11
59	Lodge Elec/Mech Rough-In	73 days?	Wed 1/5/11	Fri 4/15/11
60	Lodge Hang/Finish Drywall Ceilings	82 days?	Mon 1/17/11	Tue 5/10/11
61	Lodge Elevator Inspection (S1 & S2)	5 days?	Wed 1/26/11	Tue 2/1/11
62	Lodge Prime Walls/Ceilings	75 days?	Tue 2/1/11	Mon 5/16/11
63	Lodge Elevator Installation (P1 & P2)	88 days?	Wed 2/2/11	Fri 6/3/11
64	Lodge Set Doors/Trims	115 days?	Thu 2/3/11	Wed 7/13/11
65	Lodge Paint Walls/Ceilings	110 days?	Wed 2/23/11	Tue 7/26/11
66	Lodge Elec/Plb Fixtures	112 days?	Wed 3/9/11	Thu 8/11/11
67	Lodge Install Carpets	109 days?	Fri 3/25/11	Wed 8/24/11
68	Lodge 1st Clean	115 days?	Thu 4/7/11	Wed 9/14/11
69	Lodge Signage	115 days?	Thu 4/7/11	Wed 9/14/11
70	Lodge Turner Punchlist	120 days?	Thu 4/14/11	Wed 9/28/11
71	Lodge Final Walkthrough	120 days?	Thu 4/28/11	Wed 10/12/11
72	Lodge Final Clean	115 days?	Thu 5/12/11	Wed 10/19/11
73	Lodge Elevator Inspection (P1 & P2)	5 days?	Mon 6/6/11	Fri 6/10/11
74	Lodge Construction Completion	0 days	Wed 10/19/11	Wed 10/19/11
75	**Spa Construction**	**928 days?**	**Tue 2/19/08**	**Thu 9/8/11**
76	**Concrete**	**122 days?**	**Tue 2/19/08**	**Wed 8/6/08**
77	Spa Excavate Footings	24 days?	Tue 2/19/08	Fri 3/21/08
78	Spa F/R/P Footings	24 days?	Tue 2/19/08	Fri 3/21/08
79	Spa F/R/P Walls and Footings	23 days?	Wed 2/20/08	Fri 3/21/08
80	Spa Waterproof Walls	72 days?	Wed 4/23/08	Thu 7/31/08
81	Spa Prep/Pour Slab on Grade	7 days?	Tue 6/24/08	Wed 7/2/08
82	Spa Pour Elevated Slab	10 days?	Fri 7/11/08	Thu 7/24/08
83	Spa Strip/Reshore Elevated Slab	4 days?	Fri 8/1/08	Wed 8/6/08
84	**MEP**	**193 days?**	**Tue 5/27/08**	**Thu 2/19/09**
85	Spa Underground MEP	18 days?	Tue 5/27/08	Thu 6/19/08
86	Spa MEP Riser Installation	50 days?	Fri 12/12/08	Thu 2/19/09
87	**Structural Steel**	**17 days?**	**Thu 8/7/08**	**Fri 8/29/08**
88	**Roofing**	**545 days?**	**Fri 9/5/08**	**Thu 10/7/10**
89	Spa Metal Roof Decking	4 days?	Fri 9/5/08	Wed 9/10/08
90	Spa Light Gauge Roof Trusses	27 days?	Thu 9/25/08	Fri 10/31/08
91	Spa Roof Sheathing/Deck & Temp Roofing	1 day?	Tue 10/28/08	Tue 10/28/08
92	Spray On Fireproofing	98 days?	Wed 10/29/08	Fri 3/13/09
93	Spa Chimney Framing/Sheathing	39 days?	Mon 3/23/09	Thu 5/14/09
94	Spa Roof Installation	83 days?	Mon 3/30/09	Wed 7/22/09
95	Spa Ecostar Slate Roof Installation	29 days?	Mon 8/30/10	Thu 10/7/10
96	**Finishes**	**167 days?**	**Mon 10/25/10**	**Tue 6/14/11**
97	Spa Rough-In	24 days?	Mon 10/25/10	Thu 11/25/10
98	Spa Hang/Tape/Finish Drywall	15 days?	Tue 11/30/10	Mon 12/20/10
99	Spa Ceiling Fixtures	20 days?	Tue 12/21/10	Mon 1/17/11
100	Spa Hardware	29 days?	Mon 1/24/11	Thu 3/3/11
101	Spa Interior Buildout Complete	0 days	Mon 2/7/11	Mon 2/7/11
102	Spa Casework	34 days?	Mon 2/14/11	Thu 3/31/11
103	Spa Flooring	28 days?	Mon 3/28/11	Wed 5/4/11
104	Spa MEP Trimout	34 days?	Thu 4/28/11	Tue 6/14/11
105	Spa 1st Clean	26 days?	Wed 6/15/11	Wed 7/20/11
106	Spa Turner Punchlist	19 days?	Thu 7/21/11	Tue 8/16/11
107	Spa Final Clean	18 days?	Tue 8/16/11	Thu 9/8/11
108	Spa Construction Complete	0 days	Thu 9/8/11	Thu 9/8/11
109	**Main Building (MB) Construction**	**980 days?**	**Wed 2/27/08**	**Wed 11/30/11**
110	**Concrete**	**323 days?**	**Wed 2/27/08**	**Fri 5/22/09**
111	MB Excavate Footings	25 days?	Wed 2/27/08	Tue 4/1/08
112	MB F/R/P Spread Footings	24 days?	Thu 2/28/08	Tue 4/1/08

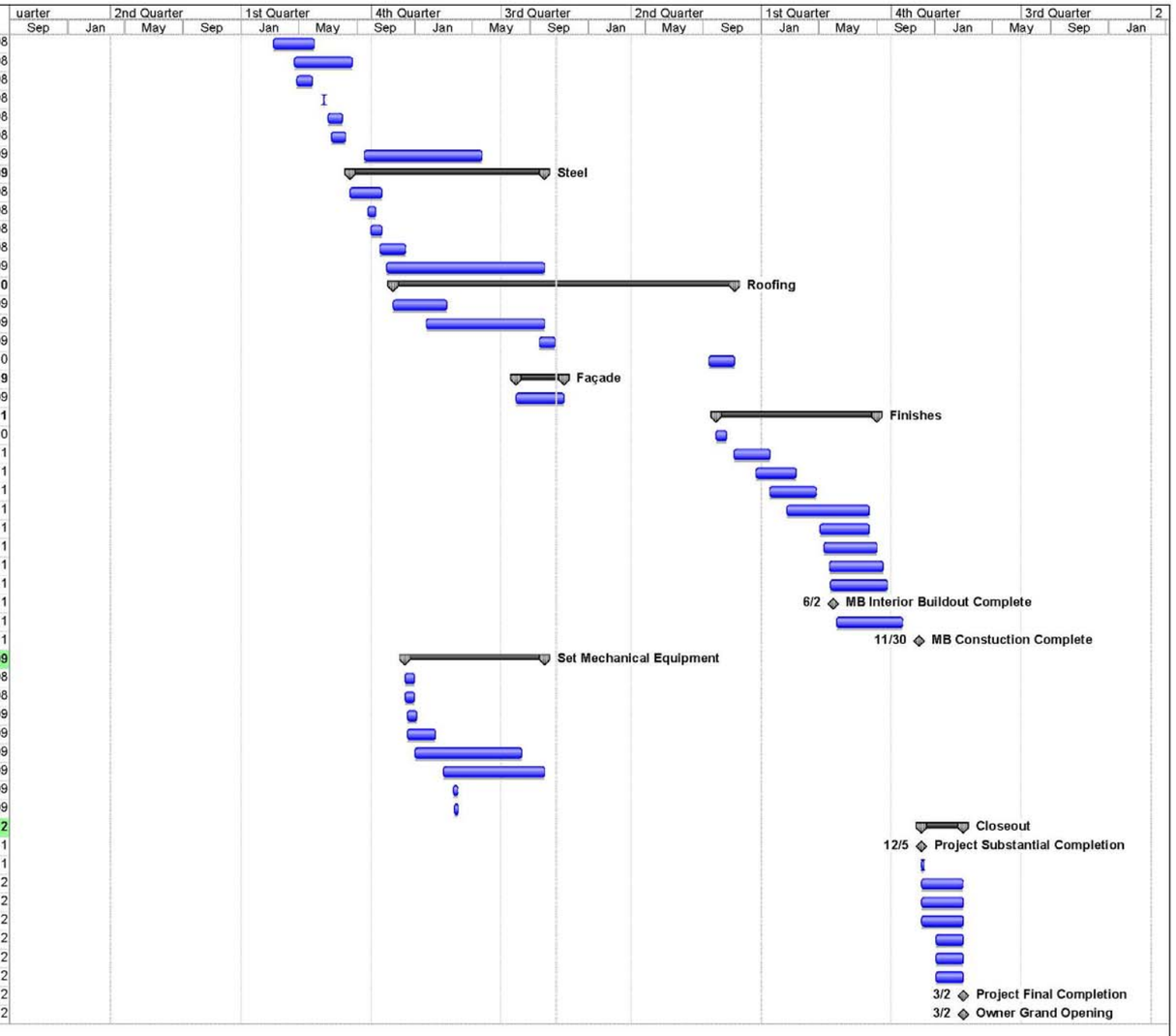


Project: Tech2.1
Date: Sun 10/25/09

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

Page 2

ID	Task Name	Duration	Start	Finish
113	MB F/R/P Walls and Columns	62 days?	Mon 3/10/08	Tue 6/3/08
114	MB Waterproof Walls	88 days?	Wed 4/23/08	Fri 8/22/08
115	MB Underground M&P	25 days?	Mon 4/28/08	Fri 5/30/08
116	MB Prep/Pour Slab on Grade	1 day?	Tue 6/24/08	Tue 6/24/08
117	MB Pour Elevated Slab	22 days?	Thu 7/3/08	Fri 8/1/08
118	MB Strip/Reshore Slab	22 days?	Thu 7/10/08	Fri 8/8/08
119	MB MEP Riser Installation	178 days?	Wed 9/17/08	Fri 5/22/09
120	**Steel**	**294 days?**	**Mon 8/18/08**	**Thu 10/1/09**
121	MB Structural Steel	49 days?	Mon 8/18/08	Thu 10/23/08
122	MB Roof Trusses	12 days?	Thu 9/25/08	Fri 10/10/08
123	MB Metal Roof Decking	17 days?	Wed 10/1/08	Thu 10/23/08
124	MB Light Gauge Roof Trusses	40 days?	Mon 10/20/08	Fri 12/12/08
125	MB Spray On Fireproofing	239 days?	Mon 11/3/08	Thu 10/1/09
126	**Roofing**	**515 days?**	**Mon 11/17/08**	**Fri 11/5/10**
127	MB Roof Sheathing/Deck & Temp Roofing	81 days?	Mon 11/17/08	Mon 3/9/09
128	MB Roof Installation	179 days?	Mon 1/26/09	Thu 10/1/09
129	MB Chimney Framing/Sheathing	25 days?	Mon 9/21/09	Fri 10/23/09
130	MB Ecostar Slate Roof Installation	40 days?	Mon 9/13/10	Fri 11/5/10
131	**Façade**	**73 days?**	**Mon 8/3/09**	**Wed 11/11/09**
132	MB Masonry Veneer Stone	73 days?	Mon 8/3/09	Wed 11/11/09
133	**Finishes**	**243 days?**	**Tue 9/28/10**	**Thu 9/1/11**
134	MB Layout	16 days?	Tue 9/28/10	Tue 10/19/10
135	MB MEP Rough-In	54 days?	Fri 11/5/10	Wed 1/19/11
136	MB Hang/Tape/Finish Drywall	61 days?	Tue 12/21/10	Tue 3/15/11
137	MB Ceiling Fixtures	70 days?	Wed 1/19/11	Tue 4/26/11
138	MB Trim/Casework	124 days?	Thu 2/24/11	Tue 8/16/11
139	MB Install Flooring	74 days?	Thu 5/5/11	Tue 8/16/11
140	MB MEP Trimout	80 days?	Fri 5/13/11	Thu 9/1/11
141	MB 1st Clean	81 days?	Wed 5/25/11	Wed 9/14/11
142	MB Turner Punchlist	86 days?	Fri 5/27/11	Fri 9/23/11
143	MB Interior Buildout Complete	0 days	Thu 6/2/11	Thu 6/2/11
144	MB Final Clean	99 days?	Thu 6/9/11	Tue 10/25/11
145	MB Constuction Complete	0 days	Wed 11/30/11	Wed 11/30/11
146	**Set Mechanical Equipment**	**210 days?**	**Fri 12/12/08**	**Thu 10/1/09**
147	Set Chillers/Boilers	14 days?	Fri 12/12/08	Wed 12/31/08
148	Set HW/CW Pumps	14 days?	Fri 12/12/08	Wed 12/31/08
149	Set AHU 1,11,18	14 days?	Wed 12/17/08	Mon 1/5/09
150	Set AHU 3-8, 16,17	43 days?	Wed 12/17/08	Fri 2/13/09
151	AHU 14, 15, 23 Connections	161 days?	Fri 1/2/09	Fri 8/14/09
152	AHU 3-8,16,17 Connections	153 days?	Tue 3/3/09	Thu 10/1/09
153	Set/Assemble Emergency Generator	7 days?	Tue 3/24/09	Wed 4/1/09
154	Set AHU's 14,15,23	6 days?	Thu 3/26/09	Thu 4/2/09
155	**Closeout**	**64 days?**	**Mon 12/5/11**	**Fri 3/2/12**
156	Project Substantial Completion	0 days	Mon 12/5/11	Mon 12/5/11
157	Occupancy Permit	5 days?	Mon 12/5/11	Fri 12/9/11
158	MB Final Punchlist	63 days?	Mon 12/5/11	Wed 2/29/12
159	Spa Final Punchlist	64 days?	Mon 12/5/11	Thu 3/1/12
160	Lodge Final Punchlist	64 days?	Mon 12/5/11	Thu 3/1/12
161	MB Owner FF&E	42 days?	Wed 1/4/12	Thu 3/1/12
162	Spa Owner FF&E	42 days?	Wed 1/4/12	Thu 3/1/12
163	Lodge Owner FF&E	42 days?	Wed 1/4/12	Thu 3/1/12
164	Project Final Completion	0 days	Fri 3/2/12	Fri 3/2/12
165	Owner Grand Opening	0 days	Fri 3/2/12	Fri 3/2/12

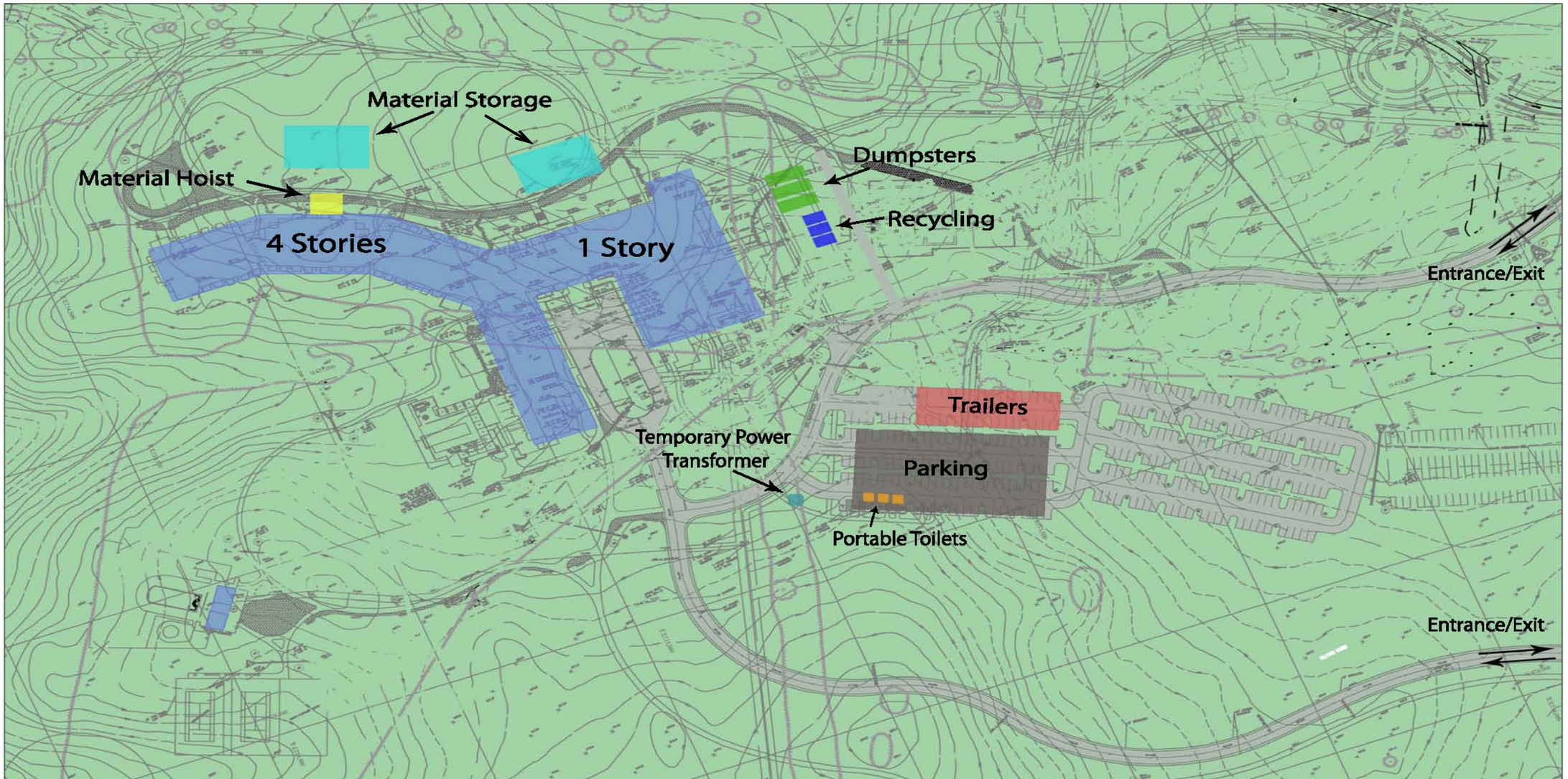


Project: Tech2.1
Date: Sun 10/25/09

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

Page 3

APPENDIX B: SITE PLANNING



N	Salamander Resort and Spa Finishing Construction Phase	Paul Roberts October 28, 2009

APPENDIX C: DETAILED STRUCTURAL SYSTEMS ESTIMATE

Concrete Columns:

Normal Weight Concrete, 3000 psi						
Location	Size	Quantity	Total CY	Unit Mat'l Cost	Material Cost	Total Cost
Area 1	18 x 18	9	7.50	$ 101.00	$ 757.48	$ 757.48
	24 x 24	40	59.26	$ 101.00	$ 5,985.02	$ 5,985.02
Area 2	18 x 18	22	18.33	$ 101.00	$ 1,851.61	$ 1,851.61
	24 x 24	31	45.92	$ 101.00	$ 4,638.39	$ 4,638.39
	24 x 72	2	8.89	$ 101.00	$ 897.75	$ 897.75
Area 3	12 x 12	6	2.22	$ 101.00	$ 224.44	$ 224.44
	12 x 16	2	0.99	$ 101.00	$ 99.75	$ 99.75
	18 x 18	21	17.50	$ 101.00	$ 1,767.45	$ 1,767.45
	18 x 36	5	8.33	$ 101.00	$ 841.64	$ 841.64
	24 x 24	7	10.37	$ 101.00	$ 1,047.38	$ 1,047.38
	26 x 26	5	8.69	$ 101.00	$ 878.01	$ 878.01
Area 4	10 x 30	4	3.09	$ 101.00	$ 311.72	$ 311.72
	12 x 12	11	4.07	$ 101.00	$ 411.47	$ 411.47
	12 x 24	8	5.93	$ 101.00	$ 598.50	$ 598.50
	16 x 24	2	1.98	$ 101.00	$ 199.50	$ 199.50
	16 x 28	73	84.11	$ 101.00	$ 8,495.40	$ 8,495.40
					Total	$29,005.51

Placing Concrete, pumped								
Location	Size	Quantity	Total CY	Unit Labor Cost	Labor Cost	Unit Equipment	Equipment Cost	Total Cost
Area 1	18 x 18	9	7.50	$ 24.00	$ 179.99	$ 8.80	$ 66.00	$ 245.99
	24 x 24	40	59.26	$ 23.50	$ 1,392.55	$ 8.60	$ 509.62	$ 1,902.17
Area 2	18 x 18	22	18.33	$ 24.00	$ 439.99	$ 8.80	$ 161.33	$ 601.32
	24 x 24	31	45.92	$ 23.50	$ 1,079.23	$ 8.60	$ 394.95	$ 1,474.18
	24 x 72	2	8.89	$ 15.50	$ 137.77	$ 5.65	$ 50.22	$ 187.99
Area 3	12 x 12	6	2.22	$ 36.00	$ 80.00	$ 13.15	$ 29.22	$ 109.22
	12 x 16	2	0.99	$ 24.00	$ 23.70	$ 8.80	$ 8.69	$ 32.39
	18 x 18	21	17.50	$ 24.00	$ 419.99	$ 8.80	$ 154.00	$ 573.98
	18 x 36	5	8.33	$ 15.50	$ 129.16	$ 5.65	$ 47.08	$ 176.25
	24 x 24	7	10.37	$ 23.50	$ 243.70	$ 8.60	$ 89.18	$ 332.88
	26 x 26	5	8.69	$ 15.50	$ 134.74	$ 5.65	$ 49.12	$ 183.86
Area 4	10 x 30	4	3.09	$ 23.50	$ 72.53	$ 8.60	$ 26.54	$ 99.07
	12 x 12	11	4.07	$ 36.00	$ 146.66	$ 13.15	$ 53.57	$ 200.24
	12 x 24	8	5.93	$ 23.50	$ 139.26	$ 8.60	$ 50.96	$ 190.22
	16 x 24	2	1.98	$ 23.50	$ 46.42	$ 8.60	$ 16.99	$ 63.41
	16 x 28	73	84.11	$ 15.50	$ 1,303.75	$ 5.65	$ 475.24	$ 1,778.99
							Total	$ 8,152.15

Forms in Place, plywood 2 use								
Location	Size	Quantity	SFCA	Unit Mat'l Cost	Material Cost	Unit Labor Cost	Labor Cost	Total Cost
Area 1	18 x 18	9	26.00	$ 1.37	$ 35.62	$ 5.60	$ 145.60	$ 181.22
	24 x 24	40	28.00	$ 1.37	$ 38.36	$ 5.60	$ 156.80	$ 195.16
Area 2	18 x 18	22	26.00	$ 1.37	$ 35.62	$ 5.60	$ 145.60	$ 181.22
	24 x 24	31	28.00	$ 1.37	$ 38.36	$ 5.60	$ 156.80	$ 195.16
	24 x 72	2	36.00	$ 1.03	$ 37.08	$ 6.28	$ 226.08	$ 263.16
Area 3	12 x 12	6	24.00	$ 1.25	$ 30.00	$ 5.75	$ 138.00	$ 168.00
	12 x 16	2	24.67	$ 1.19	$ 29.35	$ 5.65	$ 139.37	$ 168.72
	18 x 18	21	26.00	$ 1.37	$ 35.62	$ 5.60	$ 145.60	$ 181.22
	18 x 36	5	29.00	$ 1.03	$ 29.87	$ 6.28	$ 182.12	$ 211.99
	24 x 24	7	28.00	$ 1.37	$ 38.36	$ 5.60	$ 156.80	$ 195.16
	26 x 26	5	28.67	$ 1.03	$ 29.53	$ 6.28	$ 180.03	$ 209.55
Area 4	10 x 30	4	26.67	$ 1.03	$ 27.47	$ 6.28	$ 167.47	$ 194.93
	12 x 12	11	24.00	$ 1.25	$ 30.00	$ 5.75	$ 138.00	$ 168.00
	12 x 24	8	26.00	$ 1.37	$ 35.62	$ 5.60	$ 145.60	$ 181.22
	16 x 24	2	26.67	$ 1.37	$ 36.53	$ 5.60	$ 149.33	$ 185.87
	16 x 28	73	27.33	$ 1.03	$ 28.15	$ 6.28	$ 171.65	$ 199.81
							Total	$3,080.39

Concrete Slabs:

Normal Weight Concrete								
Location	Type of Slab	Area (SF)	Depth (in)	PSI	Total CY	Unit Mat'l Cost	Material Cost	Total Cost
Area 1	SOG	20500	5	3000	43.94	$ 101.00	$ 4,437.80	$ 4,437.80
Area 2	SOG	20400	5	3000	43.72	$ 101.00	$ 4,416.15	$ 4,416.15
Area 3	SOG	17100	5	3000	36.65	$ 101.00	$ 3,701.77	$ 3,701.77
Area 4.B	SOG	30000	5	3000	64.30	$ 104.00	$ 6,687.24	$ 6,687.24
Area 4.1	Elevated	30000	9	3500	208.33	$ 104.00	$21,666.64	$ 21,666.64
Area 4.2	Elevated	30000	9	3500	208.33	$ 104.00	$21,666.64	$ 21,666.64
Area 4.3	Elevated	30000	9	3500	208.33	$ 104.00	$21,666.64	$ 21,666.64
Area 4.P	Elevated	30000	10	3500	257.20	$ 104.00	$26,748.94	$ 26,748.94
							Total	$110,991.83

Placing, pumped								
Location	Type of Slab	Depth (in)	Total CY	Unit Labor Cost	Labor Cost	Unit Equipment	Equipment Cost	Total Cost
Area 1	SOG	5	43.94	16.7	733.77	$ 6.10	$ 268.03	$ 1,001.80
Area 2	SOG	5	43.72	16.7	730.19	$ 6.10	$ 266.72	$ 996.91
Area 3	SOG	5	36.65	16.7	612.08	$ 6.10	$ 223.57	$ 835.65
Area 4.B	SOG	5	64.30	16.7	1073.82	$ 6.10	$ 392.23	$ 1,466.05
Area 4.1	Elevated	9	208.33	13.55	2822.91	$ 4.94	$ 1,029.17	$ 3,852.08
Area 4.2	Elevated	9	208.33	13.55	2822.91	$ 4.94	$ 1,029.17	$ 3,852.08
Area 4.3	Elevated	9	208.33	13.55	2822.91	$ 4.94	$ 1,029.17	$ 3,852.08
Area 4.P	Elevated	10	257.20	13.55	3485.08	$ 4.94	$ 1,270.57	$ 4,755.65
							Total	$ 20,612.30

Forming									
Location	Type of Slab	SFCA	Depth (in)	L.F.	Unit Mat'l Cost	Material Cost	Unit Labor Cost	Labor Cost	Total Cost
Area 1	SOG	295.83	5	710.00	$ 0.46	$ 326.60	$ 3.03	$ 2,151.30	$ 2,477.90
Area 2	SOG	254.17	5	610.00	$ 0.46	$ 280.60	$ 3.03	$ 1,848.30	$ 2,128.90
Area 3	SOG	291.67	5	700.00	$ 0.46	$ 322.00	$ 3.03	$ 2,121.00	$ 2,443.00
Area 4.B	SOG	500.00	5	1200.00	$ 0.46	$ 552.00	$ 3.03	$ 3,636.00	$ 4,188.00
Area 4.1	Elevated	900.00	9	1200.00	$ 0.70	$ 840.00	$ 5.90	$ 7,080.00	$ 7,920.00
Area 4.2	Elevated	900.00	9	1200.00	$ 0.70	$ 840.00	$ 5.90	$ 7,080.00	$ 7,920.00
Area 4.3	Elevated	900.00	9	1200.00	$ 0.70	$ 840.00	$ 5.90	$ 7,080.00	$ 7,920.00
Area 4.P	Elevated	1000.00	10	1200.00	$ 0.70	$ 840.00	$ 5.90	$ 7,080.00	$ 7,920.00
								Total	$42,917.80

Footings

Normal Weight Concrete, 3000 psi							
Width (ft.)	Length (ft.)	Depth (in.)	Quantity	Total CY	Unit Mat'l Cost	Material Cost	Total Cost
4	4	12	4	2.37	$ 101.00	$ 239.41	$ 239.41
4.5	4.5	12	9	6.75	$ 101.00	$ 681.75	$ 681.75
5	5	12	8	7.41	$ 101.00	$ 748.15	$ 748.15
5.5	5.5	13	17	20.63	$ 101.00	$ 2,083.98	$ 2,083.98
6	6	14	42	65.33	$ 101.00	$ 6,598.66	$ 6,598.66
6.5	6.5	16	17	35.47	$ 101.00	$ 3,582.38	$ 3,582.38
7	7	17	24	61.70	$ 101.00	$ 6,232.07	$ 6,232.07
7.5	7.5	18	31	96.87	$ 101.00	$ 9,784.37	$ 9,784.37
8	8	19	10	37.53	$ 101.00	$ 3,790.61	$ 3,790.61
8.5	8.5	20	11	49.06	$ 101.00	$ 4,954.92	$ 4,954.92
9	9	21	2	10.50	$ 101.00	$ 1,060.50	$ 1,060.50
9.5	9.5	22	10	61.28	$ 101.00	$ 6,189.36	$ 6,189.36
10.5	10.5	25	12	102.08	$ 101.00	$10,310.41	$ 10,310.41
12	12	28	1	12.44	$ 101.00	$ 1,256.89	$ 1,256.89
12.5	12.6	28	12	163.33	$ 101.00	$16,496.65	$ 16,496.65
13	13	30	12	187.78	$ 101.00	$18,965.54	$ 18,965.54
14	14	31	10	187.53	$ 101.00	$18,940.60	$ 18,940.60
15	15	34	1	23.61	$ 101.00	$ 2,384.72	$ 2,384.72
9	12	19	2	12.67	$ 101.00	$ 1,279.33	$ 1,279.33
10	14	26	1	11.23	$ 101.00	$ 1,134.69	$ 1,134.69
10	15	24	3	33.33	$ 101.00	$ 3,366.66	$ 3,366.66
18.5	28	24	1	38.37	$ 101.00	$ 3,875.40	$ 3,875.40
5	8	16	1	1.98	$ 101.00	$ 199.51	$ 199.51
						Total	$124,156.54

Placing Concrete Footings, Pumped									
Width (ft.)	Length (ft.)	Depth (in.)	Quantity	Total CY	Unit Labor Cost	Labor Cost	Unit Equipment	Equipment Cost	Total Cost
4	4	12	4	2.37	$ 14.45	$ 34.25	$ 5.25	$ 12.44	$ 46.70
4.5	4.5	12	9	6.75	$ 14.45	$ 97.54	$ 5.25	$ 35.44	$ 132.97
5	5	12	8	7.41	$ 14.45	$ 107.04	$ 5.25	$ 38.89	$ 145.93
5.5	5.5	13	17	20.63	$ 14.45	$ 298.15	$ 5.25	$ 108.33	$ 406.48
6	6	14	42	65.33	$ 14.45	$ 944.07	$ 5.25	$ 343.00	$ 1,287.07
6.5	6.5	16	17	35.47	$ 14.45	$ 512.53	$ 5.25	$ 186.21	$ 698.74
7	7	17	24	61.70	$ 14.45	$ 891.62	$ 5.25	$ 323.94	$ 1,215.56
7.5	7.5	18	31	96.87	$ 14.45	$ 1,399.84	$ 5.25	$ 508.59	$ 1,908.44
8	8	19	10	37.53	$ 14.45	$ 542.32	$ 5.25	$ 197.04	$ 739.36
8.5	8.5	20	11	49.06	$ 14.45	$ 708.90	$ 5.25	$ 257.56	$ 966.45
9	9	21	2	10.50	$ 14.45	$ 151.72	$ 5.25	$ 55.12	$ 206.85
9.5	9.5	22	10	61.28	$ 14.45	$ 885.51	$ 5.25	$ 321.72	$ 1,207.23
10.5	10.5	25	12	102.08	$ 14.45	$ 1,475.10	$ 5.25	$ 535.94	$ 2,011.04
12	12	28	1	12.44	$ 14.45	$ 179.82	$ 5.25	$ 65.33	$ 245.16
12.5	12.6	28	12	163.33	$ 14.45	$ 2,360.16	$ 5.25	$ 857.50	$ 3,217.66
13	13	30	12	187.78	$ 14.45	$ 2,713.39	$ 5.25	$ 985.83	$ 3,699.22
14	14	31	10	187.53	$ 14.45	$ 2,709.82	$ 5.25	$ 984.54	$ 3,694.35
15	15	34	1	23.61	$ 14.45	$ 341.18	$ 5.25	$ 123.96	$ 465.14
9	12	19	2	12.67	$ 14.45	$ 183.03	$ 5.25	$ 66.50	$ 249.53
10	14	26	1	11.23	$ 14.45	$ 162.34	$ 5.25	$ 58.98	$ 221.32
10	15	24	3	33.33	$ 14.45	$ 481.67	$ 5.25	$ 175.00	$ 656.67
18.5	28	24	1	38.37	$ 14.45	$ 554.45	$ 5.25	$ 201.44	$ 755.90
5	8	16	1	1.98	$ 14.45	$ 28.54	$ 5.25	$ 10.37	$ 38.91
								Total	$24,216.67

Forms in Place, Plywood, 2 use									
Width (ft.)	Length (ft.)	Depth (in.)	Quantity	SFCA	Unit Mat'l Cost	Material Cost	Unit Labor Cost	Labor Cost	Total Cost
4	4	12	4	72.00	$ 4.10	$ 295.20	$ 2.75	$ 198.00	$ 493.20
4.5	4.5	12	9	180.00	$ 4.10	$ 738.00	$ 2.75	$ 495.00	$ 1,233.00
5	5	12	8	176.00	$ 4.10	$ 721.60	$ 2.75	$ 484.00	$ 1,205.60
5.5	5.5	13	17	410.83	$ 4.10	$ 1,684.42	$ 2.75	$1,129.79	$ 2,814.21
6	6	14	42	1106.00	$ 4.10	$ 4,534.60	$ 2.75	$3,041.50	$ 7,576.10
6.5	6.5	16	17	487.33	$ 4.10	$ 1,998.07	$ 2.75	$1,340.17	$ 3,338.23
7	7	17	24	740.00	$ 4.10	$ 3,034.00	$ 2.75	$2,035.00	$ 5,069.00
7.5	7.5	18	31	1023.00	$ 4.10	$ 4,194.30	$ 2.75	$2,813.25	$ 7,007.55
8	8	19	10	351.67	$ 4.10	$ 1,441.83	$ 2.75	$ 967.08	$ 2,408.92
8.5	8.5	20	11	410.67	$ 4.10	$ 1,683.73	$ 2.75	$1,129.33	$ 2,813.07
9	9	21	2	79.00	$ 4.10	$ 323.90	$ 2.75	$ 217.25	$ 541.15
9.5	9.5	22	10	416.67	$ 4.10	$ 1,708.33	$ 2.75	$1,145.83	$ 2,854.17
10.5	10.5	25	12	554.00	$ 4.10	$ 2,271.40	$ 2.75	$1,523.50	$ 3,794.90
12	12	28	1	52.67	$ 4.10	$ 215.93	$ 2.75	$ 144.83	$ 360.77
12.5	12.6	28	12	658.40	$ 4.10	$ 2,699.44	$ 2.75	$1,810.60	$ 4,510.04
13	13	30	12	684.00	$ 4.10	$ 2,804.40	$ 2.75	$1,881.00	$ 4,685.40
14	14	31	10	611.67	$ 4.10	$ 2,507.83	$ 2.75	$1,682.08	$ 4,189.92
15	15	34	1	65.67	$ 4.10	$ 269.23	$ 2.75	$ 180.58	$ 449.82
9	12	19	2	90.33	$ 4.10	$ 370.37	$ 2.75	$ 248.42	$ 618.78
10	14	26	1	52.33	$ 4.10	$ 214.57	$ 2.75	$ 143.92	$ 358.48
10	15	24	3	162.00	$ 4.10	$ 664.20	$ 2.75	$ 445.50	$ 1,109.70
18.5	28	24	1	97.00	$ 4.10	$ 397.70	$ 2.75	$ 266.75	$ 664.45
5	8	16	1	28.67	$ 4.10	$ 117.53	$ 2.75	$ 78.83	$ 196.37
								Total	$58,292.82

Concrete Beams:

Normal Weight Concrete 3000 psi							
Size	Length Range (ft.)	Avg. Length (ft.)	Quantity	Total CY	Unit Mat'l Cost	Material Cost	Total Cost
12 x 24							
	10 . 15	12.5	1	0.93	$ 101.00	$ 93.52	$ 93.52
16 x 24							
	5 . 10	7.5	1	0.74	$ 101.00	$ 74.81	$ 74.81
	10 . 15	12.5	2	2.47	$ 101.00	$ 249.38	$ 249.38
18 x 22							
	0 . 5	7.5	1	0.76	$ 101.00	$ 77.15	$ 77.15
18 x 32							
	10 . 15	12.5	1	1.85	$ 101.00	$ 187.04	$ 187.04
22 x 24							
	5 . 10	7.5	1	1.02	$ 101.00	$ 102.87	$ 102.87
24 x 24							
	0 . 5	7.5	2	2.22	$ 101.00	$ 224.44	$ 224.44
	5 . 10	7.5	2	2.22	$ 101.00	$ 224.44	$ 224.44
	10 . 15	12.5	2	3.70	$ 101.00	$ 374.07	$ 374.07
	15 . 20	17.5	3	7.78	$ 101.00	$ 785.55	$ 785.55
	20 . 25	22.5	10	33.33	$ 101.00	$3,366.66	$ 3,366.66
	25 . 30	27.5	5	20.37	$ 101.00	$2,057.41	$ 2,057.41
24 x 30							
	10 . 15	12.5	1	2.31	$ 101.00	$ 233.80	$ 233.80
	15 . 20	17.5	1	3.24	$ 101.00	$ 327.31	$ 327.31
	20 . 25	22.5	4	16.67	$ 101.00	$1,683.33	$ 1,683.33
	25 . 30	27.5	2	10.19	$ 101.00	$1,028.70	$ 1,028.70
24 x 32							
	10 . 15	12.5	1	2.47	$ 101.00	$ 249.38	$ 249.38
24 x 57							
	20 . 25	22.5	1	7.92	$ 101.00	$ 799.58	$ 799.58
	25 . 30	27.5	1	9.68	$ 101.00	$ 977.27	$ 977.27
12 x 18							
	5 . 10	7.5	4	1.67	$ 101.00	$ 168.33	$ 168.33
12 x 24							
	10 . 15	12.5	13	12.04	$ 101.00	$1,215.74	$ 1,215.74
	15 . 20	17.5	6	7.78	$ 101.00	$ 785.55	$ 785.55
	20 . 25	22.5	6	10.00	$ 101.00	$1,010.00	$ 1,010.00
12 x 36							
	10 . 15	12.5	4	5.56	$ 101.00	$ 561.11	$ 561.11
	15 . 20	17.5	2	3.89	$ 101.00	$ 392.78	$ 392.78
	15 . 20	17.5	2	3.89	$ 101.00	$ 392.78	$ 392.78
12 x 38							
	10 . 15	12.5	1	1.47	$ 101.00	$ 148.07	$ 148.07
Post-Tensioning Beams							
18 x 22							
		19	8	15.48	$ 101.00	$1,563.63	$ 1,563.63
		30	2	6.11	$ 101.00	$ 617.22	$ 617.22
		40	8	32.59	$ 101.00	$3,291.85	$ 3,291.85
		50	9	45.83	$ 101.00	$4,629.16	$ 4,629.16
18 x 25							
		50	1	5.79	$ 101.00	$ 584.49	$ 584.49
22 x 24							
		30	1	4.07	$ 101.00	$ 411.48	$ 411.48
		40	1	5.43	$ 101.00	$ 548.64	$ 548.64
22 x 32							
		19	2	6.88	$ 101.00	$ 694.95	$ 694.95
		40	2	14.49	$ 101.00	$1,463.04	$ 1,463.04
		50	1	9.05	$ 101.00	$ 914.40	$ 914.40
22 x 36							
		19	1	3.87	$ 101.00	$ 390.91	$ 390.91
		40	1	8.15	$ 101.00	$ 822.96	$ 822.96
		50	1	10.19	$ 101.00	$1,028.70	$ 1,028.70
24 x 36							
	10 . 15	12.5	1	2.78	$ 101.00	$ 280.56	$ 280.56
	20 . 25	22.5	2	10.00	$ 101.00	$1,010.00	$ 1,010.00
	25 . 30	27.5	2	12.22	$ 101.00	$1,234.44	$ 1,234.44
						Total	$36,043.09

Placing Concrete, Pumped									
Size	Length Range (ft.)	Avg. Length (ft.)	Quantity	Total CY	Unit Labor Cost	Labor Cost	Unit Equipment Cost	Equipment Cost	Total Cost
12 x 24									
	10 . 15	12.5	1	0.93	$36.00	$ 33.33	$ 13.15	$ 12.18	$ 45.51
16 x 24									
	5 . 10	7.5	1	0.74	$36.00	$ 26.67	$ 13.15	$ 9.74	$ 36.41
	10 . 15	12.5	2	2.47	$36.00	$ 88.89	$ 13.15	$ 32.47	$ 121.36
18 x 22									
	0 . 5	7.5	1	0.76	$36.00	$ 27.50	$ 13.15	$ 10.05	$ 37.55
18 x 32									
	10 . 15	12.5	1	1.85	$36.00	$ 66.67	$ 13.15	$ 24.35	$ 91.02
22 x 24									
	5 . 10	7.5	1	1.02	$36.00	$ 36.67	$ 13.15	$ 13.39	$ 50.06
24 x 24									
	0 . 5	7.5	2	2.22	$36.00	$ 80.00	$ 13.15	$ 29.22	$ 109.22
	5 . 10	7.5	2	2.22	$36.00	$ 80.00	$ 13.15	$ 29.22	$ 109.22
	10 . 15	12.5	2	3.70	$36.00	$ 133.33	$ 13.15	$ 48.70	$ 182.04
	15 . 20	17.5	3	7.78	$36.00	$ 280.00	$ 13.15	$ 102.28	$ 382.28
	20 . 25	22.5	10	33.33	$36.00	$1,200.00	$ 13.15	$ 438.33	$ 1,638.33
	25 . 30	27.5	5	20.37	$36.00	$ 733.33	$ 13.15	$ 267.87	$ 1,001.20
24 x 30									
	10 . 15	12.5	1	2.31	$36.00	$ 83.33	$ 13.15	$ 30.44	$ 113.77
	15 . 20	17.5	1	3.24	$36.00	$ 116.67	$ 13.15	$ 42.62	$ 159.28
	20 . 25	22.5	4	16.67	$36.00	$ 600.00	$ 13.15	$ 219.17	$ 819.17
	25 . 30	27.5	2	10.19	$36.00	$ 366.67	$ 13.15	$ 133.94	$ 500.60
24 x 32									
	10 . 15	12.5	1	2.47	$36.00	$ 88.89	$ 13.15	$ 32.47	$ 121.36
24 x 57									
	20 . 25	22.5	1	7.92	$36.00	$ 285.00	$ 13.15	$ 104.10	$ 389.10
	25 . 30	27.5	1	9.68	$36.00	$ 348.33	$ 13.15	$ 127.24	$ 475.57
12 x 18									
	5 . 10	7.5	4	1.67	$36.00	$ 60.00	$ 13.15	$ 21.92	$ 81.92
12 x 24									
	10 . 15	12.5	13	12.04	$36.00	$ 433.33	$ 13.15	$ 158.29	$ 591.62
	15 . 20	17.5	6	7.78	$36.00	$ 280.00	$ 13.15	$ 102.28	$ 382.28
	20 . 25	22.5	6	10.00	$36.00	$ 360.00	$ 13.15	$ 131.50	$ 491.50
12 x 36									
	10 . 15	12.5	4	5.56	$36.00	$ 200.00	$ 13.15	$ 73.06	$ 273.06
	15 . 20	17.5	2	3.89	$36.00	$ 140.00	$ 13.15	$ 51.14	$ 191.14
	15 . 20	17.5	2	3.89	$36.00	$ 140.00	$ 13.15	$ 51.14	$ 191.14
12 x 38									
	10 . 15	12.5	1	1.47	$36.00	$ 52.78	$ 13.15	$ 19.28	$ 72.06
Post-Tensioning Beams									
18 x 22									
		19	8	15.48	$36.00	$ 557.33	$ 13.15	$ 203.58	$ 760.91
		30	2	6.11	$36.00	$ 220.00	$ 13.15	$ 80.36	$ 300.36
		40	8	32.59	$36.00	$1,173.33	$ 13.15	$ 428.59	$ 1,601.92
		50	9	45.83	$36.00	$1,650.00	$ 13.15	$ 602.71	$ 2,252.71
18 x 25									
		50	1	5.79	$36.00	$ 208.33	$ 13.15	$ 76.10	$ 284.43
22 x 24									
		30	1	4.07	$36.00	$ 146.67	$ 13.15	$ 53.57	$ 200.24
		40	1	5.43	$36.00	$ 195.56	$ 13.15	$ 71.43	$ 266.99
22 x 32									
		19	2	6.88	$36.00	$ 247.70	$ 13.15	$ 90.48	$ 338.18
		40	2	14.49	$36.00	$ 521.48	$ 13.15	$ 190.49	$ 711.97
		50	1	9.05	$36.00	$ 325.93	$ 13.15	$ 119.05	$ 444.98
22 x 36									
		19	1	3.87	$36.00	$ 139.33	$ 13.15	$ 50.90	$ 190.23
		40	1	8.15	$36.00	$ 293.33	$ 13.15	$ 107.15	$ 400.48
		50	1	10.19	$36.00	$ 366.67	$ 13.15	$ 133.94	$ 500.60
24 x 36									
	10 . 15	12.5	1	2.78	$36.00	$ 100.00	$ 13.15	$ 36.53	$ 136.53
	20 . 25	22.5	2	10.00	$36.00	$ 360.00	$ 13.15	$ 131.50	$ 491.50
	25 . 30	27.5	2	12.22	$36.00	$ 440.00	$ 13.15	$ 160.72	$ 600.72
								Total	$ 18,140.50

Forms in Place, Plywood, 2 use									
Size	Length Range (ft.)	Avg. Length (ft.)	Quantity	SFCA	Unit Mat'l Cost	Material Cost	Unit Labor Cost	Labor Cost	Total Cost
12 x 24									
	10 . 15	12.5	1	31.00	$ 1.57	$ 48.67	$ 5.10	$158.10	$ 206.77
16 x 24									
	5 . 10	7.5	1	21.67	$ 1.57	$ 34.02	$ 5.10	$110.50	$ 144.52
	10 . 15	12.5	2	31.67	$ 1.57	$ 49.72	$ 5.10	$161.50	$ 211.22
18 x 22									
	0 . 5	7.5	1	21.67	$ 1.57	$ 34.02	$ 5.10	$110.50	$ 144.52
18 x 32									
	10 . 15	12.5	1	33.33	$ 1.57	$ 52.33	$ 5.10	$170.00	$ 222.33
22 x 24									
	5 . 10	7.5	1	22.67	$ 1.57	$ 35.59	$ 5.10	$115.60	$ 151.19
24 x 24									
	0 . 5	7.5	2	23.00	$ 1.57	$ 36.11	$ 5.10	$117.30	$ 153.41
	5 . 10	7.5	2	23.00	$ 1.57	$ 36.11	$ 5.10	$117.30	$ 153.41
	10 . 15	12.5	2	33.00	$ 1.57	$ 51.81	$ 5.10	$168.30	$ 220.11
	15 . 20	17.5	3	43.00	$ 1.57	$ 67.51	$ 5.10	$219.30	$ 286.81
	20 . 25	22.5	10	53.00	$ 1.57	$ 83.21	$ 5.10	$270.30	$ 353.51
	25 . 30	27.5	5	63.00	$ 1.57	$ 98.91	$ 5.10	$321.30	$ 420.21
24 x 30									
	10 . 15	12.5	1	34.00	$ 1.57	$ 53.38	$ 5.10	$173.40	$ 226.78
	15 . 20	17.5	1	44.00	$ 1.57	$ 69.08	$ 5.10	$224.40	$ 293.48
	20 . 25	22.5	4	54.00	$ 1.57	$ 84.78	$ 5.10	$275.40	$ 360.18
	25 . 30	27.5	2	64.00	$ 1.57	$ 100.48	$ 5.10	$326.40	$ 426.88
24 x 32									
	10 . 15	12.5	1	34.33	$ 1.57	$ 53.90	$ 5.10	$175.10	$ 229.00
24 x 57									
	20 . 25	22.5	1	58.50	$ 1.57	$ 91.85	$ 5.10	$298.35	$ 390.20
	25 . 30	27.5	1	68.50	$ 1.57	$ 107.55	$ 5.10	$349.35	$ 456.90
12 x 18									
	5 . 10	7.5	4	20.00	$ 1.57	$ 31.40	$ 5.10	$102.00	$ 133.40
12 x 24									
	10 . 15	12.5	13	31.00	$ 1.57	$ 48.67	$ 5.10	$158.10	$ 206.77
	15 . 20	17.5	6	41.00	$ 1.57	$ 64.37	$ 5.10	$209.10	$ 273.47
	20 . 25	22.5	6	51.00	$ 1.57	$ 80.07	$ 5.10	$260.10	$ 340.17
12 x 36									
	10 . 15	12.5	4	33.00	$ 1.57	$ 51.81	$ 5.10	$168.30	$ 220.11
	15 . 20	17.5	2	43.00	$ 1.57	$ 67.51	$ 5.10	$219.30	$ 286.81
	15 . 20	17.5	2	43.00	$ 1.57	$ 67.51	$ 5.10	$219.30	$ 286.81
12 x 38									
	10 . 15	12.5	1	33.33	$ 1.57	$ 52.33	$ 5.10	$170.00	$ 222.33
Post-Tensioning Beams									
18 x 22									
		19	8	44.67	$ 1.57	$ 70.13	$ 5.10	$227.80	$ 297.93
		30	2	66.67	$ 1.57	$ 104.67	$ 5.10	$340.00	$ 444.67
		40	8	86.67	$ 1.57	$ 136.07	$ 5.10	$442.00	$ 578.07
		50	9	106.67	$ 1.57	$ 167.47	$ 5.10	$544.00	$ 711.47
18 x 25									
		50	1	6.67	$ 1.57	$ 10.47	$ 5.10	$ 34.00	$ 44.47
22 x 24									
		30	1	67.67	$ 1.57	$ 106.24	$ 5.10	$345.10	$ 451.34
		40	1	87.67	$ 1.57	$ 137.64	$ 5.10	$447.10	$ 584.74
22 x 32									
		19	2	47.00	$ 1.57	$ 73.79	$ 5.10	$239.70	$ 313.49
		40	2	89.00	$ 1.57	$ 139.73	$ 5.10	$453.90	$ 593.63
		50	1	109.00	$ 1.57	$ 171.13	$ 5.10	$555.90	$ 727.03
22 x 36									
		19	1	47.67	$ 1.57	$ 74.84	$ 5.10	$243.10	$ 317.94
		40	1	89.67	$ 1.57	$ 140.78	$ 5.10	$457.30	$ 598.08
		50	1	109.67	$ 1.57	$ 172.18	$ 5.10	$559.30	$ 731.48
24 x 36									
	10 . 15	12.5	1	35.00	$ 1.57	$ 54.95	$ 5.10	$178.50	$ 233.45
	20 . 25	22.5	2	55.00	$ 1.57	$ 86.35	$ 5.10	$280.50	$ 366.85
	25 . 30	27.5	2	65.00	$ 1.57	$ 102.05	$ 5.10	$331.50	$ 433.55
								Total	$14,449.44

Structural Steel:

Size	Length Range	Avg. Length	Quantity	L.F.	Unit Mat'l Cost	Material Cost	Unit Labor Cost	Labor Cost	Unit Equipment Cost	Equipment Cost	Total Cost
C 8 x 12											
	10 . 15	12.5	173	2163	$ 10.35	$ 22,381.88	$ 30.50	$ 65,956.25	$ 3.73	$ 8,066.13	$ 96,404.25
	15 . 20	17.5	12	210	$ 10.35	$ 2,173.50	$ 30.50	$ 6,405.00	$ 3.73	$ 783.30	$ 9,361.80
W 8 x 10											
	10 . 15	12.5	75	937.5	$ 16.50	$ 15,468.75	$ 4.06	$ 3,806.25	$ 2.90	$ 2,718.75	$ 21,993.75
	15 . 20	17.5	48	840	$ 16.50	$ 13,860.00	$ 4.06	$ 3,410.40	$ 2.90	$ 2,436.00	$ 19,706.40
W 8 x 21											
	15 . 20	17.5	10	175	$ 34.50	$ 6,037.50	$ 4.06	$ 710.50	$ 2.90	$ 507.50	$ 7,255.50
W 10 x 12											
	5 . 10	7.5	25	187.5	$ 19.80	$ 3,712.50	$ 4.06	$ 761.25	$ 2.90	$ 543.75	$ 5,017.50
	10 . 15	12.5	14	175	$ 19.80	$ 3,465.00	$ 4.06	$ 710.50	$ 2.90	$ 507.50	$ 4,683.00
	20 . 25	22.5	31	697.5	$ 19.80	$ 13,810.50	$ 4.06	$ 2,831.85	$ 2.90	$ 2,022.75	$ 18,665.10
W 10 x 15											
	15 . 20	17.5	4	70	$ 25.00	$ 1,750.00	$ 4.06	$ 284.20	$ 2.90	$ 203.00	$ 2,237.20
W 10 x 19											
	15 . 20	17.5	4	70	$ 36.50	$ 2,555.00	$ 4.06	$ 284.20	$ 2.90	$ 203.00	$ 3,042.20
W 12 x 16											
	10 . 15	12.5	23	287.5	$ 26.50	$ 7,618.75	$ 2.77	$ 796.38	$ 1.98	$ 569.25	$ 8,984.38
	15 . 20	17.5	14	245	$ 26.50	$ 6,492.50	$ 2.77	$ 678.65	$ 1.98	$ 485.10	$ 7,656.25
	25 . 30	27.5	4	110	$ 26.50	$ 2,915.00	$ 2.77	$ 304.70	$ 1.98	$ 217.80	$ 3,437.50
W 12 x 19											
	5 . 10	7.5	17	127.5	$ 36.50	$ 4,653.75	$ 2.77	$ 353.18	$ 1.98	$ 252.45	$ 5,259.38
	15 . 20	17.5	11	192.5	$ 36.50	$ 7,026.25	$ 2.77	$ 533.23	$ 1.98	$ 381.15	$ 7,940.63
	20 . 25	22.5	24	540	$ 36.50	$ 19,710.00	$ 2.77	$ 1,495.80	$ 1.98	$ 1,069.20	$ 22,275.00
W 14 x 22											
	15 . 20	17.5	24	420	$ 43.00	$ 18,060.00	$ 2.46	$ 1,033.20	$ 1.76	$ 739.20	$ 19,832.40
	20 . 25	22.5	30	675	$ 43.00	$ 29,025.00	$ 2.46	$ 1,660.50	$ 1.76	$ 1,188.00	$ 31,873.50
W 14 x 26											
	10 . 15	12.5	24	300	$ 43.00	$ 12,900.00	$ 2.46	$ 738.00	$ 1.76	$ 528.00	$ 14,166.00
	25 . 30	27.5	10	275	$ 43.00	$ 11,825.00	$ 2.46	$ 676.50	$ 1.76	$ 484.00	$ 12,985.50
W 14 x 35											
	10 . 15	12.5	5	62.5	$ 56.00	$ 3,500.00	$ 3.01	$ 188.13	$ 2.15	$ 134.38	$ 3,822.50
	30 . 35	32.5	4	130	$ 56.00	$ 7,280.00	$ 3.01	$ 391.30	$ 2.15	$ 279.50	$ 7,950.80
W 16 x 26											
	20 . 25	22.5	17	382.5	$ 43.00	$ 16,447.50	$ 2.44	$ 933.30	$ 1.74	$ 665.55	$ 18,046.35
	25 . 30	27.5	6	165	$ 43.00	$ 7,095.00	$ 2.44	$ 402.60	$ 1.74	$ 287.10	$ 7,784.70
W 16 x 31											
	20 . 25	22.5	26	585	$ 51.00	$ 29,835.00	$ 2.71	$ 1,585.35	$ 1.93	$ 1,129.05	$ 32,549.40
	30 . 35	32.5	14	455	$ 51.00	$ 23,205.00	$ 2.71	$ 1,233.05	$ 1.93	$ 878.15	$ 25,316.20
W 16 x 40											
	25 . 30	27.5	2	55	$ 66.00	$ 3,630.00	$ 3.05	$ 167.75	$ 2.18	$ 119.90	$ 3,917.65
W 16 x 57											
	10 . 15	12.5	7	87.5	$ 82.50	$ 7,218.75	$ 3.05	$ 266.88	$ 2.18	$ 190.75	$ 7,676.38
	30 . 35	32.5	5	162.5	$ 82.50	$ 13,406.25	$ 3.05	$ 495.63	$ 2.18	$ 354.25	$ 14,256.13
W 18 x 13											
	10 . 15	12.5	3	37.5	$ 58.00	$ 2,175.00	$ 3.67	$ 137.63	$ 1.95	$ 73.13	$ 2,385.75
	25 . 30	27.5	1	27.5	$ 58.00	$ 1,595.00	$ 3.67	$ 100.93	$ 1.95	$ 53.63	$ 1,749.55
W 18 x 35											
	25 . 30	27.5	12	330	$ 58.00	$ 19,140.00	$ 3.67	$ 1,211.10	$ 1.95	$ 643.50	$ 20,994.60
	30 . 35	32.5	6	195	$ 58.00	$ 11,310.00	$ 3.67	$ 715.65	$ 1.95	$ 380.25	$ 12,405.90
W 18 x 55											
	20 . 25	22.5	3	67.5	$ 91.00	$ 6,142.50	$ 3.87	$ 261.23	$ 2.06	$ 139.05	$ 6,542.78
	25 . 30	27.5	4	110	$ 91.00	$ 10,010.00	$ 3.87	$ 425.70	$ 2.06	$ 226.60	$ 10,662.30
	30 . 35	32.5	5	162.5	$ 91.00	$ 14,787.50	$ 3.87	$ 628.88	$ 2.06	$ 334.75	$ 15,751.13
W 20 x 26											
	25 . 30	27.5	6	165	$ 72.50	$ 11,962.50	$ 3.32	$ 547.80	$ 1.76	$ 290.40	$ 12,800.70
W 21 x 50											
	20 . 25	22.5	4	90	$ 82.50	$ 7,425.00	$ 3.32	$ 298.80	$ 1.76	$ 158.40	$ 7,882.20
	30 . 35	32.5	2	65	$ 82.50	$ 5,362.50	$ 3.32	$ 215.80	$ 1.76	$ 114.40	$ 5,692.70
W 21 x 68											
	30 . 35	32.5	1	32.5	$ 112.00	$ 3,640.00	$ 3.41	$ 110.83	$ 1.81	$ 58.83	$ 3,809.65
W 24 x 55											
	20 . 25	22.5	5	112.5	$ 91.00	$ 10,237.50	$ 3.18	$ 357.75	$ 1.69	$ 190.13	$ 10,785.38
	25 . 30	27.5	2	55	$ 91.00	$ 5,005.00	$ 3.18	$ 174.90	$ 1.69	$ 92.95	$ 5,272.85
W 24 x 84											
	15 . 20	17.5	1	17.5	$ 139.00	$ 2,432.50	$ 3.27	$ 57.23	$ 1.74	$ 30.45	$ 2,520.18
W 27 x 84											
	20 . 25	22.5	10	225	$ 139.00	$ 31,275.00	$ 2.96	$ 666.00	$ 1.58	$ 355.50	$ 32,296.50
										Total	$ 595,649.48

Size	Length (ft.)	Quantity	L.F.	Unit Mat'l Cost	Material Cost	Unit Labor Cost	Labor Cost	Unit Equipment	Equipment Cost	Total Cost
HSS 6 x 6 x 3/8										
	23	16	368	$ 880.00	$14,080.00	$ 49.00	$ 784.00	$ 35.00	$ 560.00	$15,424.00
	15	40	600	$ 880.00	$35,200.00	$ 49.00	$1,960.00	$ 35.00	$1,400.00	$38,560.00
	13	24	312	$ 880.00	$21,120.00	$ 49.00	$1,176.00	$ 35.00	$ 840.00	$23,136.00
									Total	$77,120.00

Reinforcing:

Rebar in Concrete					
Location	Rebar	L.F.	Unit Mat'l Cost	Material Cost	Total
Footing	6 #6	8670	$ 1.35	$11,704.50	$ 11,704.50
Slab on Grade	#4 @ 12" O.C.	140400	$ 0.70	$98,280.00	$ 98,280.00
Elevated Slab	#4 @ 24" O.C.	69000	$ 0.70	$48,300.00	$ 48,300.00
Concrete Column	8 #10	15000	$ 3.45	$51,750.00	$ 51,750.00
Concrete Beam	6 #7	17000	$ 1.70	$28,900.00	$ 28,900.00
				Total	$238,934.50

APPENDIX D: GENERAL CONDITIONS ESTIMATE

General Conditions Estimate				
Description	Unit	Quantity	Cost/Unit	Total
Field Personnel				
Project Manager	Week	250	$1,925.00	$ 481,250.00
Superintendent	Week	250	$1,775.00	$ 443,750.00
Asst. Superintendent	Week	250	$1,600.00	$ 400,000.00
Asst. Superintendent	Week	250	$1,600.00	$ 400,000.00
Field Engineer	Week	250	$1,165.00	$ 291,250.00
Asst. Field Engineer	Week	250	$ 895.00	$ 223,750.00
Asst. Field Engineer	Week	250	$ 895.00	$ 223,750.00
General Expenses				
Field Trailer 32'x8'	Mo	60	$ 200.00	$ 12,000.00
Office Equipment	Mo	60	$ 155.00	$ 9,300.00
Office Supplies	Mo	60	$ 85.00	$ 5,100.00
Office Telephone	Mo	60	$ 80.00	$ 4,800.00
Office Lights and HVAC	Mo	60	$ 150.00	$ 9,000.00
Temporary Fencing, 6' high	L.F.	30	$ 9.44	$ 283.20
Toilet 1, portable	Mo	60	$ 150.00	$ 36,000.00
Toilet 2, portable	Mo	60	$ 150.00	$ 36,000.00
Toilet 3, portable	Mo	60	$ 150.00	$ 36,000.00
Permits	Job	1	0.50%	$ 465,000.00
Final Clean Up	Job	1	0.30%	$ 279,000.00
Temporary Utilities				
Temporary Lighting, 4 floors	CSF/Flr.	900	$ 13.68	$ 49,248.00
Temporary Heating, 4 floors	CSF/Flr	900	$ 30.27	$ 108,972.00
Temporary Power, 4 floors	CSF/Flr.	900	$ 47.75	$ 171,900.00
Insurance				
Insurance, All-risk type	Job	1	0.25%	$ 232,500.00
Performance Bond	Job	1	0.60%	$ 558,000.00
Scheduling, Large job	Job	1	0.03%	$ 27,900.00
Permits, Rule of thumb	Job	1	0.50%	$ 465,000.00
			Sub-Total	$ 4,969,753.20
			Location Factor	0.982
			Total	$ 4,880,297.64