Josh Raphael | CM | Dr. Riley

Technical Report 2

Holiday Inn Express

Absecon, NJ

October 28, 2009

Table of Contents

Executive Summary

The Technical Report 2 on the Holiday Inn Express addition is used to determine a more detailed schedule, site layouts by phasing, cost estimates for structural building elements and general conditions, and finally a review of the 18th annual Pace Roundtable meeting.

The detailed schedule divides the scope of work into 8 sections, Procurement, Substructure, Superstructure, Interior, Enclosure, Finishes, Sitework, and Occupancy. The schedule begins May 26, 2009 after the design phase and ends on April 19, 2009. This schedule shows in detail how and when the building will be constructed from bottom up.

The site layout developed from the Technical Report 1 was separated into two phases. The first layout shows where the equipment and temporary facilities are located during substructure construction the second layout is during the superstructure construction. This section goes in depth on when equipment arrives and leaves the site and also shows available spacing during each phase.

The first of the two detailed estimates was the Structural Systems Estimate. In this section R.S. Means were used to determine the cost amounts of Structural steel, wood, concrete, and masonry. The total estimate determined was $232,161. The second was the General Conditions estimate which was broken into 4 sections personnel, utilities/facilities, site office support, and general requirements. This section helps determine what DRK Associates needed to assist the construction. The total estimated cost for General Conditions was $341,458.

Finally the Critical Industry Issues section is based around the Energy and the Construction Industry breakout section. This section explains what energy issues our industry faces and how to solve them. Also included in this section are thesis proposal ideas that were received from this discussion.

Detailed Project Schedule

Schedule Overview

The Holiday Inn Express addition consists of two new buildings. The first of which is an entirely new three story hotel building that is approximately the same size and design of the existing hotel building. Along with that is a pre-manufactured aluminum/glass pool/spa area which attaches the existing building to the new hotel building. The schedule is designed for bottom up construction. The construction will begin with the excavation of the new area and the demolition of the existing area which will be connected to the addition. After that the substructure for both new facilities will be simultaneously constructed along with installation of structural steel on the first floor.

The construction is then shifted over to just the new hotel addition where the entire stair tower is constructed with the first floor framing. Once the first floor is framed the second floor gets framed and the first floor rough-in and enclosure are installed simultaneously. This continues up the building until all three floors are framed and enclosed with rough-in installed. The roof structure is then installed and the building is enclosed.

Finally sitework including curbs, paving, and landscaping are installed as the finishes to the interior and exterior of the building are installed. The site is then cleaned up and the building is ready for occupancy.

The primavera schedule can be found in Appendix I at the back of this assignment.

Phasing Requirements

There are two main phasing milestones for this project. The first main milestone is the completion of the excavation and substructure on August 31, 2009. Besides the structural steel for the first floor the superstructure cannot begin until the foundation and concrete slabs are in place. The second main milestone is the completion of the superstructure for both the hotel and pool enclosure on December 25, 2009. After this phase is complete sitework and finishes can be implemented for project completion.

Site Layout Planning

Although the site is fairly open with a lot of room to move around, site planning is still an issue because the land is to be shared with the existing hotel being operable. One thing that I was not aware of when writing my tech 1 assignment was the implementation of a second construction entrance at the south end of the site were the new hotel addition is being constructed. This additional entrance allows less interaction between the existing facility operations and the new addition construction. Because the existing entrance and the parking in the front and partially on the side will still be used for existing operations most construction traffic will arrive through the new temporary entrance.

The site layout will appear differently during two different phases of construction. The phases are Excavation, Demolition, & Substructuture, and Superstructure. These two site layouts can be found in Appendix II at the back of this assignment.

Excavation, Demolition, & Substructure

During this phase of construction four main pieces of equipment are used. An excavator, a bull dozer, and a direct chute concrete truck. Construction for this phase begins May 14, 2009 and ends on August 31, 2009.

Shallow excavation is needed for the new hotel addition to allow underground piping and foundation work. They must excavate much deeper for the pool area. The excavator can be removed from the site on June 30, 2009 after the pool area is completely excavated.

The bull dozer is used to help assist in the demolition of the one existing room that will act as the new lobby connection. In addition the dozer moves the removed soil around the site and can also be removed from the site along with the excavator.

The direct chute concrete truck is used for pouring the footings and pads of the substructure and can be removed from the site upon substructure completion.

Superstructure

The superstructure will only be using the crane and man power to complete construction. This phase will begin on September 1, 2009 and will be finished on December 25, 2009.

The framing of the building is done by hand and does not utilize any equipment until the third floor joists are being installed. A 125' reach crawler crane is used to install the third floor and roof of the hotel addition. The crane will begin at the south end of the addition near the west staircase and move towards the east staircase for the third floor and back for the roof installation. The crane can be removed from site after the roof is installed.

Detailed Structural System Estimate

The Holiday Inn Express addition has a minimum amount of structural steel and concrete. The first floor is the only floor with steel columns and there are a variety of steel beams throughout the building but not enough to give a decent structural estimate. The foundation and first floor slab is the only place where concrete is used. The floor joists are wood beams and the exterior walls are wood studs. In addition the stair cases are CMU masonry. Since the building is mainly constructed of wood and masonry I decided to also do a detailed estimate of those structural elements.

The steel estimate was determined by using structural drawings and counting the individual pieces. The concrete estimate was determined by using the first floor area for the slab and counting column footings and the length of the continuous footings to determine CY's. For the wood estimate the floor area and joist spacing were used to calculate the number of pieces at each different length to get a LF amount. The amount of stud pieces were determined by using the building perimeter and stud spacing. The masonry was also determined using the perimeter of the foundation wall and stair cases.

The Summary of the structural estimate shown below the assumptions gives a total of $232,161. This estimate may seem low but this does not include the pool area addition because the portion is designed by a manufacturer so determining structural elements is not possible using my drawing set. The detailed Structural Estimate can be found in Appendix III at the back of this assignment.

Assumptions

- R.S. Means 2009
- Location factor of 1.05 for Atlantic City used in structural estimate summary
- Overhead & Profit not included
- Used concrete slab (4" thk.) unreinforced
- Used closest R.S. Means values for unlisted column sizes

Detailed Structural Estimate		
Location Factor =	**1.05**	
Steel		
Columns		$10,437.00
Beams		$18,010.00
Wood		
Floor Joists		$72,701.00
Studs		$26,601.00
Concrete		
Floor Slab		$33,200.00
Foundation		$26,106.00
Masonry		
CMU's		$45,106.00
	Total =	$232,161.00

General Conditions Estimate

The general conditions estimate was broken up into four different categories of analysis. These categories consist of Personnel, Utilities/Facilities, Site Office Support, and General Requirements. The personnel cost were determined by speaking with the DRK Associates representative who gave me rough estimates of yearly salaries for each position. The rest of the sections were determined by using R.S. Means 2009 and also an early schedule of values prepared by DRK Associates. The final cost for the general conditions estimate which is in the summary below is $341,458. This calculates out to %8.5 of the original bid price. A reason for this unusually high percentage is because R.S. means typically deals with larger buildings causing some of the figures to be larger.

The detailed General Conditions Estimate can be found in Appendix IV at the back of this assignment.

General Conditions Summary		
Personnel		$293,800.00
Utilities/Facilities		$8,399.00
Site Office Support		$12,365.00
General Requirements		$26,894.00
	Total =	$341,458.00

Critical Industry Issues

The 18th annual Pace Roundtable Meeting was held on October 15th, 2009 at the Penn Stater Conference Center. This meeting consisted of an Industry Panel discussion on the Economic Downturn, followed by three Breakout Sessions, and finally a Student Panel discussion on New Age Communication Patterns.

The three Breakout Sessions consisted of a discussion on Energy and the Construction Energy, Business and Networking, and BIM Executive Planning. Although the Business Networking discussion would be interesting it would not help fuel any ideas for my thesis. The BIM Executive Planning discussion is also something I was interested in attending but I felt since my project is small there would be few coordination issues that BIM would help. So I elected to go to the Energy and the Construction Industry discussion which helped me gain many good ideas for a thesis proposal

Energy & the Construction Industry Review

The discussion was led by Dr. Riley who did a very good job of organizing information and the discussion itself. The discussion was broken up into two sessions. The first session was used to discuss reasons why we need to change energy consumption, corporations or organizations steering the change, and ideas to fix the energy issues. The second session was based around student thesis proposal ideas.

The main reasons we need change the energy consumption are to protect the environment, cut down on the limited amount of natural gasses left, and increasing energy cost. We all know that green house gasses are ruining our ozone but many don't know that a large portion of those gasses are produced by building usage which is why more focus needs to shift from the auto industry to the building industry. The limited amount of natural gasses has caused a lot of problems as well. This supply problem is causing energy cost spikes and can eventually cause war. These issues need to be dealt with and we listed a few ways they are.

With the whole world shifting to an energy efficient status many organizations have been used to grade building efficiency. LEED Certification and global green awards are some of these grading systems. Although these are effective systems there are still issues with them. One main issue we discussed was green washing. Green washing is when a building is not designed to be energy efficient but they use these certifications to stamp there building for marketing purposes. This does not help encourage owners to go green and is being used incorrectly.

Some of the ideas that we discussed to help decrease energy consumption are mandates, incentives, alternative energy sources, and energy efficient equipment and materials. Mandates or laws can be used to enforce the industry to go green. If laws like PA's Act 129 enforce owners to make energy efficient decisions we can see a large increase in new efficient buildings but a better way to encourage owners would be incentives. Since owners usually decide against energy efficient ideas based on cost issues stimulus packages for energy efficient construction can help the owner make the right decision. With the decrease in energy usage over time the country can save money on purchasing natural gasses from other countries.

Finally we can implement energy efficiency in many ways. Solar, wind, and geothermal are the main alternative energy sources we can use. Other ideas are cutting back on occupancy usage with the implementation of Building Automotive Systems and motion sensors.

Impact on Thesis Research

Some ideas that I took from the energy discussion are alternative materials, BAS systems, wireless controls, and the use of solar energy. We discussed a type of insulation that is thinner, cheaper, and quicker to install. This could help my project get constructed faster and can also give more interior space which is a plus for the owner. The Building Automotive Systems are very useful in a hotel due to the separate facilities used by occupants. Cutting back on occupancy usage can save on energy cost for the owner over time.

In addition to these systems wireless controls can be very beneficial. With wireless controls we can cut back on construction time by installing fewer conduits. Also since my

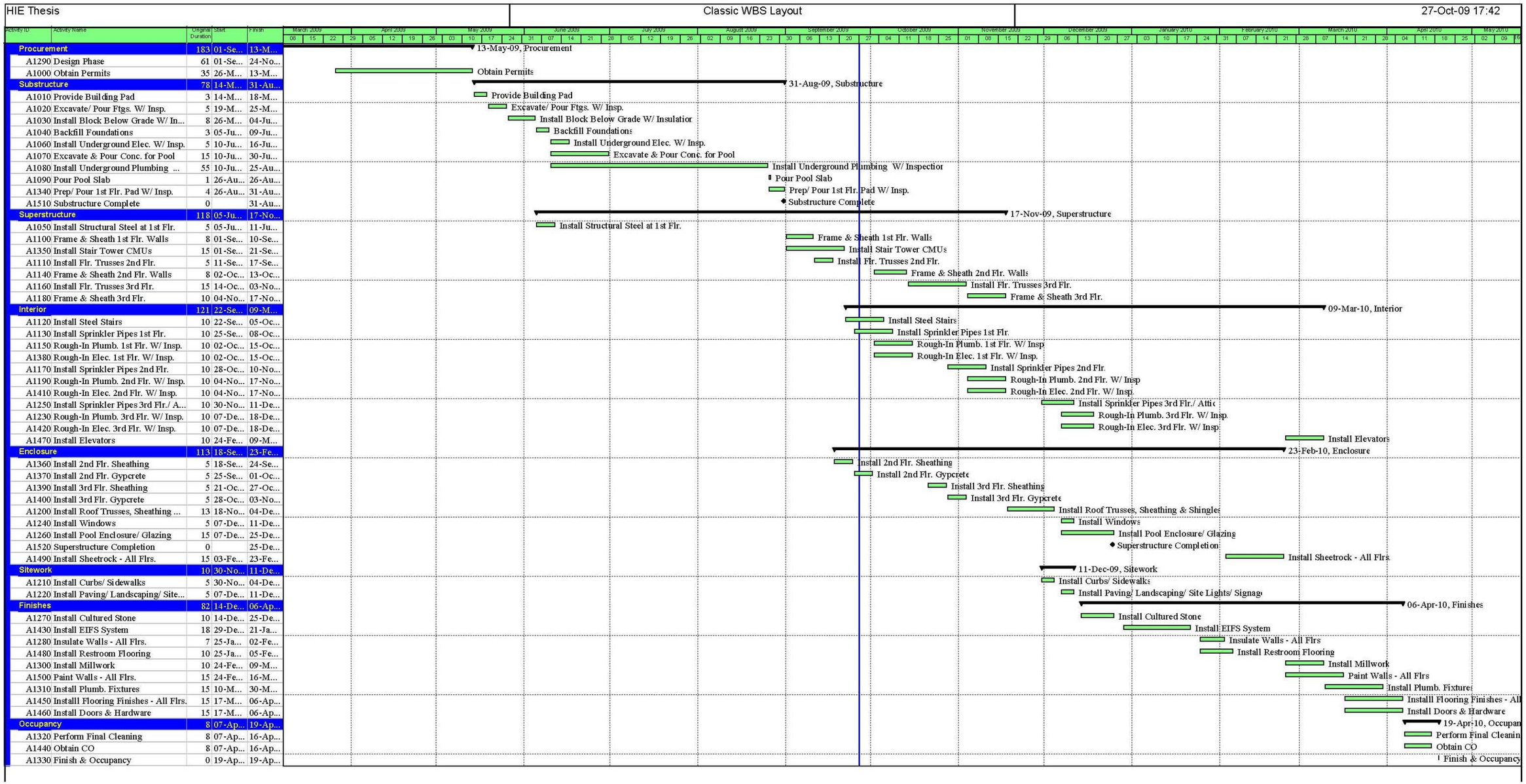
project is an addition and the owner intends to control the entire building as a whole, wireless controls will make this a simple task.

The last idea is to use a solar product called Solyndra which is cylindrical solar panels that use a reflective roof and the increased surface area to gain more solar power. I would use this product for water heating which is used a lot in hotels for showering and other bathroom facilities.

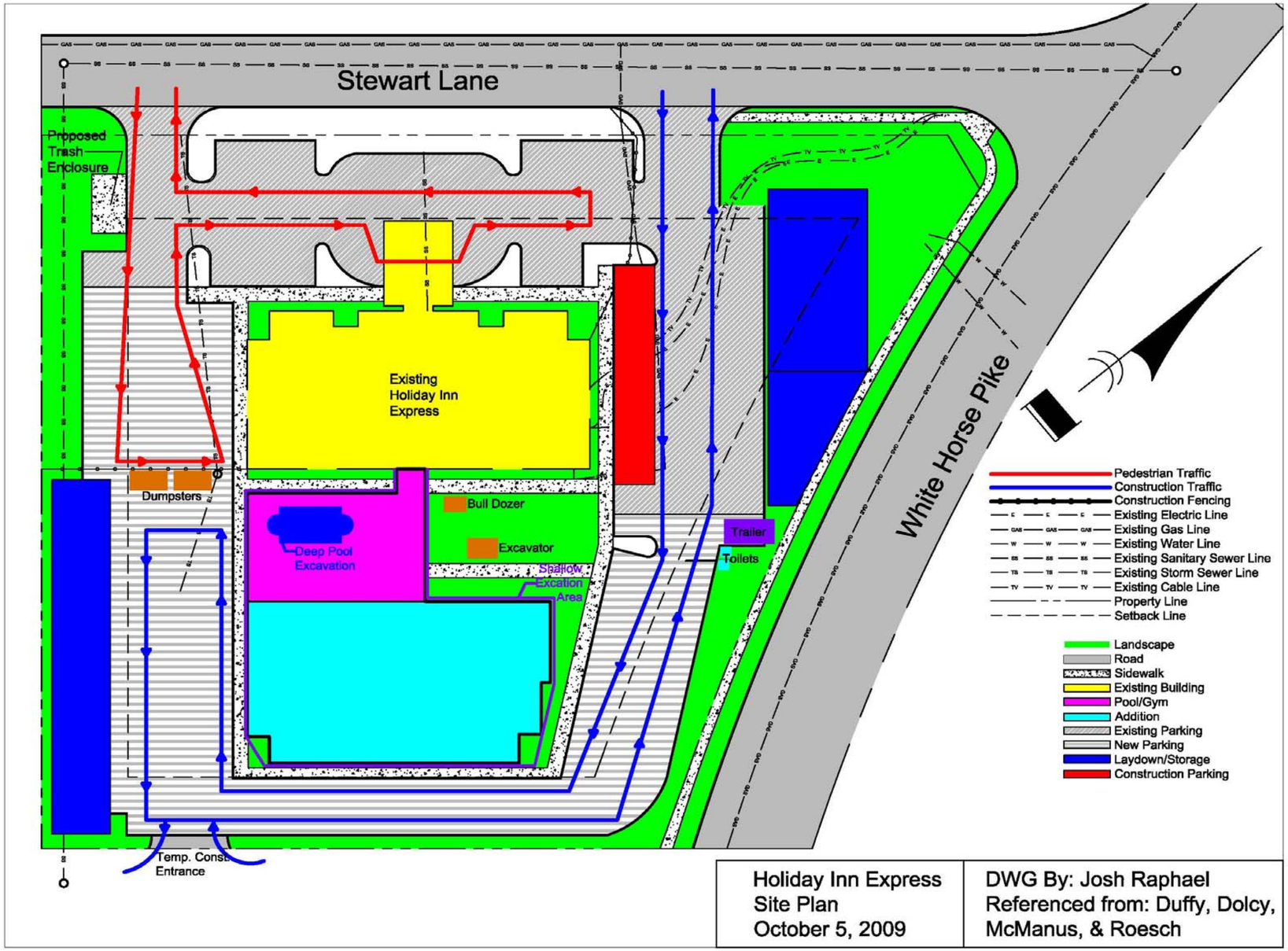
Surprising Fact

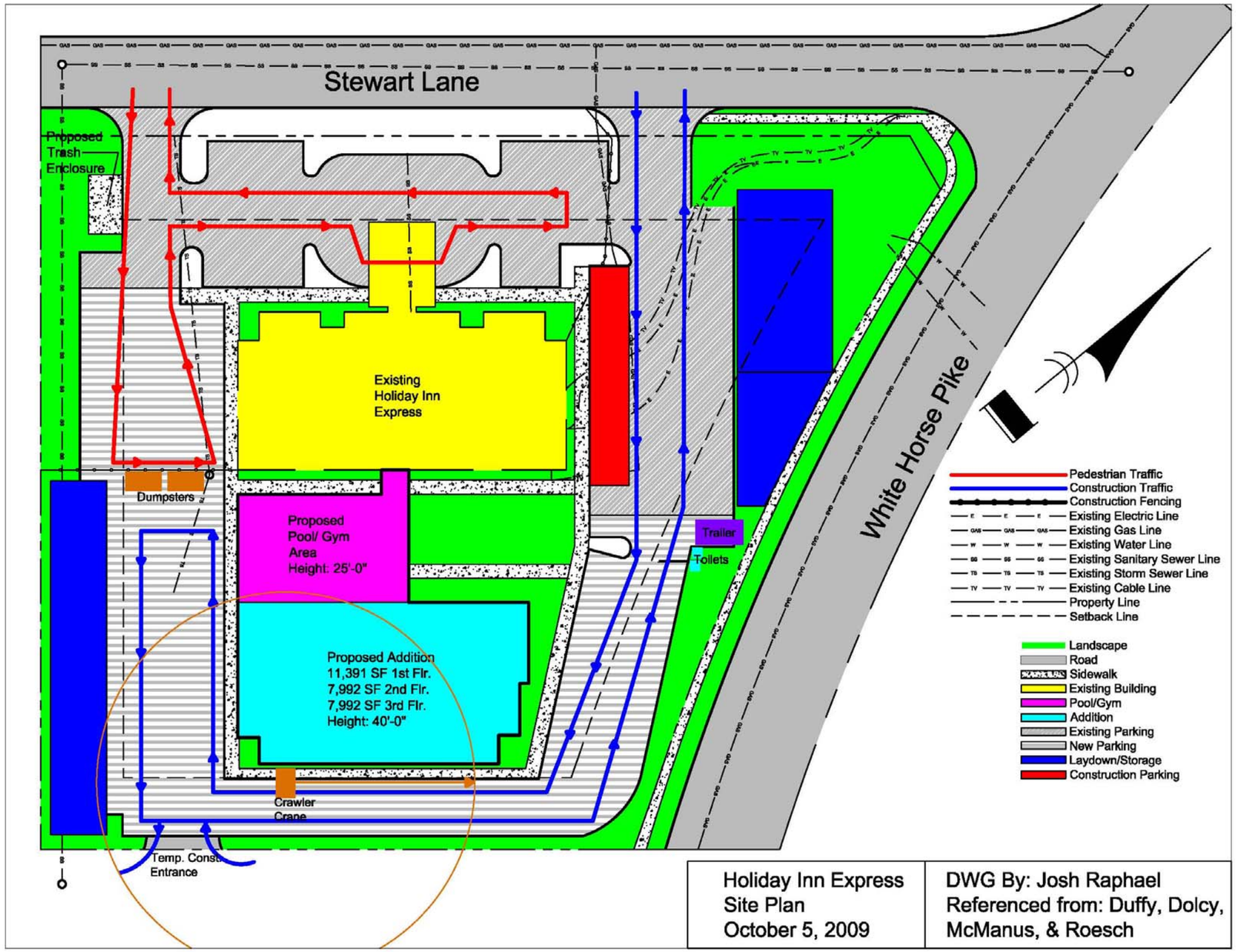
The most surprising facts I received were from the Industry Panel discussion on the Economic Downturn. I was surprised to hear how the construction industry was affected in more ways than just cost by the economy and also the affects politics have. The economy has caused firms to go outside their scope of work and look for different projects, areas, and sizes they aren't used to constructing. This has caused projects to get multiple bidders in the 20's from unknown companies when they are used to only 3-4 bids from known companies. Some larger firms have decided to bid projects together with competitors to win bids, which I thought was very interesting. In respect to the political influences I thought it was interesting that because health and education are big political issues in the US there is an increase in health and education related projects.

Appendix I


HIE Thesis
Classic WBS Layout
27-Oct-09 17:42
Activity ID
Activity Name
Original Duration
Start
Finish
Procurement 183 01-Se... 13-M...
A1290 Design Phase 61 01-Se... 24-No...
A1000 Obtain Permits 35 26-M... 13-M...
Substructure 78 14-M... 31-Au...
A1010 Provide Building Pad 3 14-M... 18-M...
A1020 Excavate/ Pour Ftgs. W/ Insp. 5 19-M... 25-M...
A1030 Install Block Below Grade W/ In... 8 26-M... 04-Ju...
A1040 Backfill Foundations 3 05-Ju... 09-Ju...
A1060 Install Underground Elec. W/ Insp. 5 10-Ju... 16-Ju...
A1070 Excavate & Pour Conc. for Pool 15 10-Ju... 30-Ju...
A1080 Install Underground Plumbing ... 55 10-Ju... 25-Au...
A1090 Pour Pool Slab 1 26-Au... 26-Au...
A1340 Prep/ Pour 1st Flr. Pad W/ Insp. 4 26-Au... 31-Au...
A1510 Substructure Complete 0 31-Au...
Superstructure 118 05-Ju... 17-No...
A1050 Install Structural Steel at 1st Flr. 5 05-Ju... 11-Ju...
A1100 Frame & Sheath 1st Flr. Walls 8 01-Se... 10-Se...
A1350 Install Stair Tower CMUs 15 01-Se... 21-Se...
A1110 Install Flr. Trusses 2nd Flr. 5 11-Se... 17-Se...
A1140 Frame & Sheath 2nd Flr. Walls 8 02-Oc... 13-Oc...
A1160 Install Flr. Trusses 3rd Flr. 15 14-Oc... 03-No...
A1180 Frame & Sheath 3rd Flr. 10 04-No... 17-No...
Interior 121 22-Se... 09-M...
A1120 Install Steel Stairs 10 22-Se... 05-Oc...
A1130 Install Sprinkler Pipes 1st Flr. 10 25-Se... 08-Oc...
A1150 Rough-In Plumb. 1st Flr. W/ Insp. 10 02-Oc... 15-Oc...
A1380 Rough-In Elec. 1st Flr. W/ Insp. 10 02-Oc... 15-Oc...
A1170 Install Sprinkler Pipes 2nd Flr. 10 28-Oc... 10-No...
A1190 Rough-In Plumb. 2nd Flr. W/ Insp. 10 04-No... 17-No...
A1410 Rough-In Elec. 2nd Flr. W/ Insp. 10 04-No... 17-No...
A1250 Install Sprinkler Pipes 3rd Flr./ A... 10 30-No... 11-De...
A1230 Rough-In Plumb. 3rd Flr. W/ Insp. 10 07-De... 18-De...
A1420 Rough-In Elec. 3rd Flr. W/ Insp. 10 07-De... 18-De...
A1470 Install Elevators 10 24-Fe... 09-M...
Enclosure 113 18-Se... 23-Fe...
A1360 Install 2nd Flr. Sheathing 5 18-Se... 24-Se...
A1370 Install 2nd Flr. Gypcrete 5 25-Se... 01-Oc...
A1390 Install 3rd Flr. Sheathing 5 21-Oc... 27-Oc...
A1400 Install 3rd Flr. Gypcrete 5 28-Oc... 03-No...
A1200 Install Roof Trusses, Sheathing ... 13 18-No... 04-De...
A1240 Install Windows 5 07-De... 11-De...
A1260 Install Pool Enclosure/ Glazing 15 07-De... 25-De...
A1520 Superstructure Completion 0 25-De...
A1490 Install Sheetrock - All Flrs. 15 03-Fe... 23-Fe...
Sitework 10 30-No... 11-De...
A1210 Install Curbs/ Sidewalks 5 30-No... 04-De...
A1220 Install Paving/ Landscaping/ Site... 5 07-De... 11-De...
Finishes 82 14-De... 06-Ap...
A1270 Install Cultured Stone 10 14-De... 25-De...
A1430 Install EIFS System 18 29-De... 21-Ja...
A1280 Insulate Walls - All Flrs. 7 25-Ja... 02-Fe...
A1480 Install Restroom Flooring 10 25-Ja... 05-Fe...
A1300 Install Millwork 10 24-Fe... 09-M...
A1500 Paint Walls - All Flrs. 15 24-Fe... 16-M...
A1310 Install Plumb. Fixtures 15 10-M... 30-M...
A1450 Installl Flooring Finishes - All Flrs. 15 17-M... 06-Ap...
A1460 Install Doors & Hardware 15 17-M... 06-Ap...
Occupancy 8 07-Ap... 19-Ap...
A1320 Perform Final Cleaning 8 07-Ap... 16-Ap...
A1440 Obtain CO 8 07-Ap... 16-Ap...
A1330 Finish & Occupancy 0 19-Ap... 19-Ap...
March 2009
April 2009
May 2009
June 2009
July 2009
August 2009
September 2009
October 2009
November 2009
December 2009
January 2010
February 2010
March 2010
April 2010
May 2010
13-May-09, Procurement
Obtain Permits
31-Aug-09, Substructure
Provide Building Pad
Excavate/ Pour Ftgs. W/ Insp.
Install Block Below Grade W/ Insulation
Backfill Foundations
Install Underground Elec. W/ Insp.
Excavate & Pour Conc. for Pool
Install Underground Plumbing W/ Inspection
Pour Pool Slab
Prep/ Pour 1st Flr. Pad W/ Insp.
Substructure Complete
17-Nov-09, Superstructure
Install Structural Steel at 1st Flr.
Frame & Sheath 1st Flr. Walls
Install Stair Tower CMUs
Install Flr. Trusses 2nd Flr.
Frame & Sheath 2nd Flr. Walls
Install Flr. Trusses 3rd Flr.
Frame & Sheath 3rd Flr.
09-Mar-10, Interior
Install Steel Stairs
Install Sprinkler Pipes 1st Flr.
Rough-In Plumb. 1st Flr. W/ Insp.
Rough-In Elec. 1st Flr. W/ Insp.
Install Sprinkler Pipes 2nd Flr.
Rough-In Plumb. 2nd Flr. W/ Insp.
Rough-In Elec. 2nd Flr. W/ Insp.
Install Sprinkler Pipes 3rd Flr./ Attic
Rough-In Plumb. 3rd Flr. W/ Insp.
Rough-In Elec. 3rd Flr. W/ Insp.
Install Elevators
23-Feb-10, Enclosure
Install 2nd Flr. Sheathing
Install 2nd Flr. Gypcrete
Install 3rd Flr. Sheathing
Install 3rd Flr. Gypcrete
Install Roof Trusses, Sheathing & Shingles
Install Windows
Install Pool Enclosure/ Glazing
Superstructure Completion
Install Sheetrock - All Flrs.
11-Dec-09, Sitework
Install Curbs/ Sidewalks
Install Paving/ Landscaping/ Site Lights/ Signage
06-Apr-10, Finishes
Install Cultured Stone
Install EIFS System
Insulate Walls - All Flrs.
Install Restroom Flooring
Install Millwork
Paint Walls - All Flrs
Install Plumb. Fixtures
Installl Flooring Finishes - All
Install Doors & Hardware
19-Apr-10, Occupan
Perform Final Cleanin
Obtain CO
Finish & Occupancy

Appendix II


Stewart Lane
Proposed Trash Enclosure
Existing Holiday Inn Express
Dumpsters
Bull Dozer
Excavator
Deep Pool Excavation
Shallow Excation Area
Trailer
Toilets
White Horse Pike
Temp. Const. Entrance
Pedestrian Traffic
Construction Traffic
Construction Fencing
Existing Electric Line
Existing Gas Line
Existing Water Line
Existing Sanitary Sewer Line
Existing Storm Sewer Line
Existing Cable Line
Property Line
Setback Line
Landscape
Road
Sidewalk
Existing Building
Pool/Gym
Addition
Existing Parking
New Parking
Laydown/Storage
Construction Parking
Holiday Inn Express
Site Plan
October 5, 2009
DWG By: Josh Raphael
Referenced from: Duffy, Dolcy, McManus, & Roesch


Stewart Lane
Proposed Trash Enclosure
Existing Holiday Inn Express
Dumpsters
Proposed Pool/ Gym Area Height: 25'-0"
Proposed Addition 11,391 SF 1st Flr. 7,992 SF 2nd Flr. 7,992 SF 3rd Flr. Height: 40'-0"
Crawler Crane
Temp. Const. Entrance
Trailer
Toilets
White Horse Pike
Pedestrian Traffic
Construction Traffic
Construction Fencing
Existing Electric Line
Existing Gas Line
Existing Water Line
Existing Sanitary Sewer Line
Existing Storm Sewer Line
Existing Cable Line
Property Line
Setback Line
Landscape
Road
Sidewalk
Existing Building
Pool/Gym
Addition
Existing Parking
New Parking
Laydown/Storage
Construction Parking
Holiday Inn Express
Site Plan
October 5, 2009
DWG By: Josh Raphael
Referenced from: Duffy, Dolcy, McManus, & Roesch

Appendix III

Structural Steel							
	Quantity	Unit	Mat. Cost	Labor Cost	Equip. Cost	Total Unit Cost	Total
Columns							
4" x 4" x 3/16" x 12'	5	LF	248	42	30	320	1600
5" x 5" x 1/4" x 12'	15	LF	326.5	43.5	31	401	6015
W10 x 68	20	LF	112	2.48	1.77	116.25	2325
Beams							
W12 x 22	14	LF	36.5	2.77	1.98	41.25	577.5
W12 x 26	44	LF	43	2.77	1.98	47.75	2101
W14 x 30	55	LF	49.5	2.71	1.93	54.14	2977.7
W16 x 26	26	LF	43	2.44	1.74	47.18	1226.68
W16 x 40	84	LF	66	3.05	2.18	71.23	5983.32
W24 x 76	33	LF	125	3.18	1.69	129.87	4285.71
						Total =	27091.91

Structural Wood							
	Quantity	Unit	Mat. Cost	Labor Cost	Equip. Cost	Total Unit Cost	Total
Floor Joists							
16" L65 TJI 1st Flr.	6.524	M.B.F.	3250	820		4070	26552.68
16" L65 TJI 2nd Flr.	5.244	M.B.F.	3250	820		4070	21343.08
16" L65 TJI 3rd Flr.	5.244	M.B.F.	3250	820		4070	21343.08
Studs							
2" x 6" 1st Flr.	7.32	M.B.F.	520	640		1160	8491.2
2" x 6" 2nd & 3rdFlr.	14.52	M.B.F.	520	640		1160	16843.2
						Total =	94573.24

Concrete							
	Quantity	Unit	Mat. Cost	Labor Cost	Equip. Cost	Total Unit Cost	Total
Floor Slab							
Slab on Grade (4")	11391	SF	1.36	0.75	0.28	2.39	27224.49
6x6 WWF W1.4 x 1.4	114	C.S.F.	18.05	20.5		38.55	4394.7
Foundation							
Cont. Footings	99	C.Y.	144	80.5	0.5	225	22275
Column Footings	22	C.Y.	104	13.2	0.43	117.63	2587.86
						Total =	56482.05

Masonry							
	Quantity	Unit	Mat. Cost	Labor Cost	Equip. Cost	Total Unit Cost	Total
CMU's							
Stair Twr. 8" CMU's	3720	SF	3.65	4.13		7.78	28941.6
Fnd. Wall 8" CMU's	2268	SF	2.68	3.5		6.18	14016.24
						Total=	42957.84

Appendix IV

General Conditions Estimate				
Total Project Weeks	52			
Total Project Months	13			

Personnel	% of Time on Project	Total Billable Weeks	Cost/Week	Total Cost
Project Manager	100%	52	$1,450.00	$75,400.00
Site Supervisor	100%	52	$1,200.00	$62,400.00
Sevice Manager	100%	52	$1,200.00	$62,400.00
Safety Inspector	100%	52	$1,100.00	$57,200.00
Office Manager	100%	52	$700.00	$36,400.00
			Total =	**$293,800.00**

Utillities/Facilities	Frequency	Duration	Cost/Unit Time	Total Cost
Electric/Water	Monthly	13	$100.00	$1,300.00
Utility Hook-Up	Lum-Sum			$300.00
Internet	Monthly	13	$40.00	$520.00
Port-O-Potty	Weekly	52	$60.00	$3,120.00
Telephone	Monthly	13	$80.00	$1,040.00
Trailer	Monthly	13	$163.00	$2,119.00
			Total =	**$8,399.00**

Site Office Support	Frequency	Duration	Cost/Unit Time	Total Cost
Office Supplies	Monthly	13	$85.00	$1,105.00
Cell Phone	Monthly	13	$40.00	$520.00
Computer	Lump-Sum			$1,250.00
Trailer Janitorial Services	Monthly	13	$30.00	$390.00
Job Vehicle Fuel	Monthly	13	200	$2,600.00
Job Auto Allowance	Monthly	13	500	$6,500.00
			Total =	**$12,365.00**

General Requirements	Frequency	Duration	Cost/Unit Time	Total Cost
Temp Fencing	Lump-Sum			$3,864.00
Signage	Lump-Sum			$2,000.00
Dumpsters	Weekly	52	$350.00	$18,200.00
Survey and Layout	Lump-Sum			$1,280.00
Final Clean Up	Lump-Sum			$1,550.00
			Total =	**$26,894.00**