TECHNICAL ASSIGNMENT TWO

PENN STATE AE SENIOR THESIS

PENN STATE MILTON S. HERSHEY MEDICAL CENTER
CHILDREN'S HOSPITAL
HERSHEY, PA 17033

ABDULWAHAB HASAN
CONSTRUCTION MANAGEMENT
DR. CHIMAY ANUMBA
OCTOBER 27, 2010

PENNSTATE HERSHEY Milton S. Hershey Medical Center
L.F. Driscoll Co., LLC
PAYETTE
Gannett Fleming
BR+A

EXECUTIVE SUMMARY

Children's Hospital for the Penn State Hershey Medical Center was scheduled to mobilize on **3/8/2010**. The site closure plan would have taken place during the first **40** days to be ready for construction activities. Excavation and foundations commenced on **4/16/2010** upon completing the entire site closure plan. Structural steel erections would then follow the foundation stage with topping out occurring around **12/28/2010**. The Construction of the entire facility has been scheduled over a **31** month period. The project substantial completion date has been scheduled to occur on **8/20/2012**. The project schedule has been designed to enable many sequencing and phasing activities making it possible for project completion to take place on **10/2/2012**.

Besides the sequencing of structural steel erection as explained in Technical Report One, all other construction sequences will generally flow from project west to east in a top-down construction method.

This Technical report includes a **Detailed Project Schedule** of the top 200 activities, a **Site Layout Plan** for the superstructure phase of the project showing the location of major items on the jobsite, a **Detailed Structural Estimate** compromised of structural steel and concrete elements in the project, and a **General Conditions Estimate** summarizing the major general condition items associated with the project.

A detailed Structural system estimate of the building was divided into two categories. First category consists of Cast-in-Place concrete assemblies and was estimated to cost **$3.13** million at **$11.90/SF**. Second category consists of Structural Steel assemblies and was estimated to cost **$5.2** million at **$19.8/SF**. Material take-offs were efficiently extracted out of a Revit model and the unit costs developed using RS MEANS COSTWORKS. All unit costs have been adjusted for project time and location.

The general conditions estimate was derived from the L.F. Driscoll estimate. Major items have been selected as a basis for the estimate. The developed general conditions costs came out to be **$6.62** million just about **5.75%** of the total project cost of **$115** million. The primary use of this estimate will be utilized in later reports to estimate the cost savings associated with schedule acceleration methods.

This report will also discuss the events associated with the 19th annual PACE Roundtable that took place at the Penn Stater Conference Center Hotel. The PACE Roundtable kicked-off by the Construction Management faculty from the AE department highlighting the major events and research being conducted this year. A series of break-out sessions followed discussing issues related to sustainability, Technology Applications, and Process Innovation. The events gave the students the opportunity to develop new research topics to be studied in the spring semester of 2011. Numerous industry contacts have been made that will help out in the future with the senior thesis.

REPORT CONTENTS

DETAILED PROJECT SCHEDULE

**** See APPENDIX A for the Detailed Project Schedule***

The construction schedule for the Penn State Hershey Medical Center Children's Hospital is relatively straight forward despite the complexity of the project. L.F. Driscoll officially signed their GMP contract with the Penn State Hershey Medical Center on **3/8/2010** and broke ground on **4/5/2010** and is scheduled to be completed on **8/20/2012.** Having an almost complete set of drawings prior to construction has been a great success for L.F. Driscoll due to their ability to schedule activities and plan logistics early prior to breaking ground. This led the CM to not expect any major additions in the scope as they have already considered the new Bulletins to be issued with two new shell space fit-outs. Shortly after receiving an official Notice to Proceed on **3/17/2010,** L.F. Driscoll mobilized with three Construction Trailers at the Job Site's main gate access area.

The Children's Hospital contract dictates a 31 month period to construct the entire facility. Upon mobilizing the GC trailers and fencing the entire site, the initial excavation and shoring will take place making it possible for the foundation systems to be placed. Shortly upon completing the foundation systems, the structural steel crew will utilize the tower crane placed on site to erect the structural steel system. The project site will be divided into 24 sections to sequence the erection of the structural steel with a workflow from west to east as explained earlier in *Technical Report One*. Upon completing the first tier, the concrete crew will start pouring the slab on grade followed by elevated slabs as soon as each level of metal deck is prepared for concrete placement. The ultimate goal is to get the mechanical room on the 5th floor up and running as soon as the project reaches building watertight. Following the installation of the building skin, the interior fit-out process will commence starting from the 5th floor down to the ground floor with a workflow of east to west on each level.

The top-down fit-out process has been elected as the workflow to reduce the need of having to access finished floors to climb to upper floors. By doing so the GC would ultimately punchout an entire floor without the need of going back for additional rework due to possible damages that may occur. Upon completion of the building fit-out, sitework activities will take place prior to handing over the building to the owner. Finally, commissioning, L & I, and Department of Health inspections will take place prior to issuing the Certificate of Occupancy to the owner.

SITE LAYOUT PLANNING

*** See APPENDIX B for the Superstructure Site Logistics Plan***

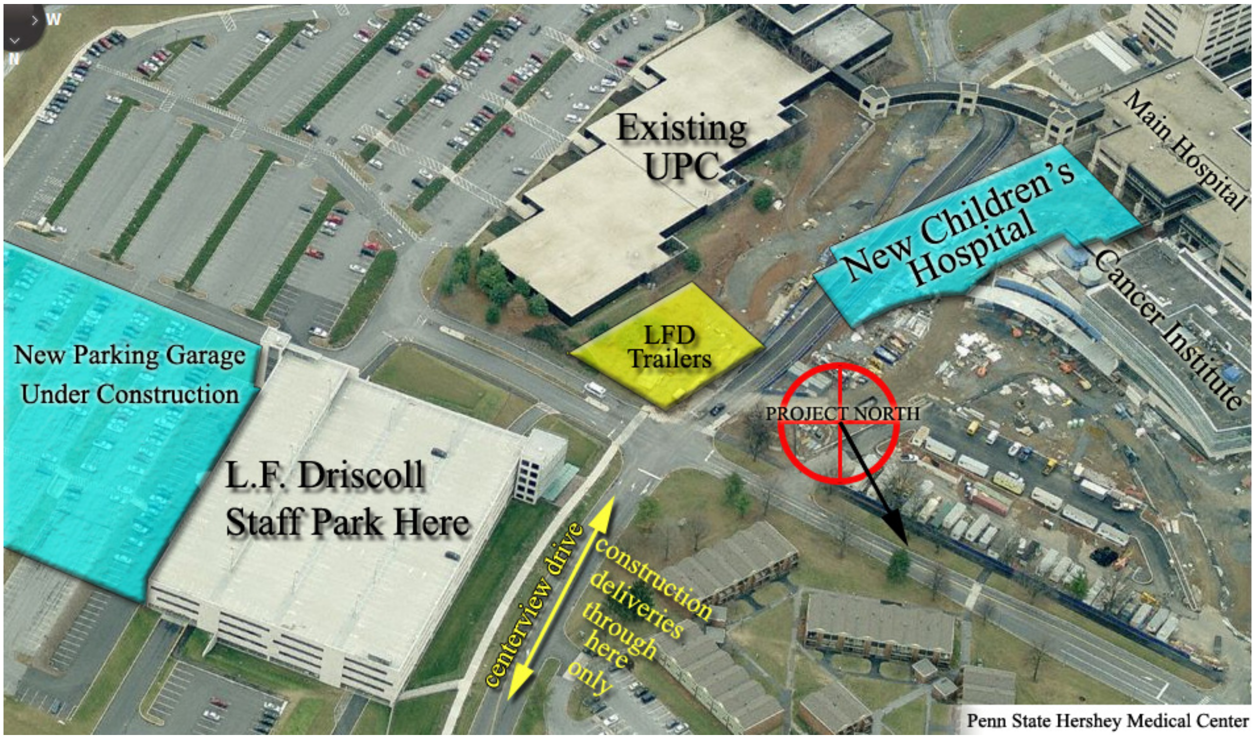


IMAGE 1 PSU HMC Campus Bird's Eye View (Courtesy of bing.com)

The Site for the New Children's Hospital at the Penn State Hershey Medical Center is located between the Cancer Institute Building and the Main Hospital Building. The new Children's Hospital is the latest addition to the expansion of the medical center's state of the art health care. The site has been disturbed during the construction of the Cancer Institute and some foundation elements have been already in place by the previous contractor. Among the major issues with the building site are vehicular access, tower crane operations, and the Main Hospital's Helicopter paths.

In general, all traffic enters the site via Center View Drive only. Due to the congestion of traffic and pedestrian flow throughout the campus on a daily basis, deliveries must be coordinated with the Office of Physical Plant to ensure all safety measures are in place and to reduce the risk of catastrophic accidents. The L.F. Driscoll's trailers will be located just outside the fencing area of the jobsite due to the site congestions. This location has also been chosen to provide safe access to Postal Service Deliveries as well as providing a clear landmark for all truck deliveries to locate the jobsite without having to drive around the campus roads.

Subcontractors have been assigned to set-up their trailers off-site just south of the existing parking garage to reduce the congestion on site. However, due to some unused site space, it would be recommended to have 4 trailers on site for the major subcontractors and 3rd party consultants that are on-site every day.

Material Laydown and staging areas have been strategically placed to be in the reach of the tower crane as well as the ability to easily use the hoist in the south-west area of the project. The two locations make it possible to utilize the two different gates very efficiently to reduce congested truck activity on-site.

Portable Toilets have been placed in two areas both close to the jobsite gate area. Those locations were chosen to reduce the risk of accidents that may develop if they were placed in a congested working area. Dumpsters are also spread out on the job-site to ensure that each subcontractor provides trash cans for their laborers to dispose the trash in the dumpsters leaving the jobsite clean and safe to work in.

The Structural steel system will be erected using a tower crane that overlooks the center and east portions of the building. The west side of the building will be erected early on during the foundation stage as it primarily supports the cantilevered section of the existing main hospital. The cantilevered section once sat on grade; however, due to utility tie-ins, the Children's Hospital will utilize the area below grade for that purpose hence the need for structural steel members replacing the grade beams. The west side will be erected during the foundation stage utilizing a mobile crane.

The tower crane on-site will be used by the structural steel subcontractor to erect the entire center and east side of the building. A portion of the east side will not be in the reach of the tower crane and will need to be erected separately by a mobile crane as shown on the site plan in the appendix.

Slabs will be placed using concrete pumps as well as the traditional crane and bucket for areas hard to reach with the concrete pump trucks.

Upon completing the Structural steel and the skin of the building, the trades involved with all MEP rough-ins and interior fit-outs will utilize the hoist located just south of the building to deliver their materials to the corresponding floors. Material storages are also located south-west of the building for trades that are not able to store materials out in the field. Toolboxes are available south-west as well as north of the building.

Evaluation of Contractor's Layout Plan

L.F. Driscoll has developed 6 different logistic plans for 6 different phases. Each phase was carefully planned out with input from the project managers as well as the superintendents. Initially, LFD had planned to have the subcontractor trailers on-site. However, OPP requested to have all subcontractor trailers in a designated off-site area that will house subcontractor trailers for all jobsites on campus. Although this allows for more space on-site, it is recommended that LFD tries to get some of the major subcontractors to have "mini" trailers on-site. By doing so, subcontractors can house some of their project managers that are needed to be on-site without the need of walking back on forth from the job-site to the subcontractor trailer's compound. Besides the subcontractor trailer locations, the current logistic plans developed by LFD are very well thought of and will work perfectly in each phase of construction. Along with the site logistics LFD has also developed a very safe jobsite disaster plan that will help get everybody into safe zones in case of an emergency on-site.

DETAILED STRUCTURAL SYSTEM ESTIMATE

**** See APPENDIX C for the complete Quantity Take-offs and Estimates***

The superstructure for the new Children's Hospital at the Penn State Hershey Medical Center is primarily a steel moment resisting frame with composite floor systems. The majority of the Cast-in-Place Concrete is concentrated in the foundation system of the building. An estimate for the structural system was developed using a Revit model that modeled the entire structural system. Quantity Take-Off (QTO) Schedules were developed in Revit to extract the entire structural system piece by piece with detailed descriptions including Type of Member, length, weights, reference levels, etc. Upon developing the schedules and organizing them in an excel sheet; RS MEANS COSTWORKS was used to develop a detailed Unit Price Estimate of the entire system (see *Table 1* for a comparison of the actual vs. estimated costs).

Table 1 : Estimated vs. Actual Cost Comparison

	RS MEANS COSTWORKS ESTIMATE		ACTUAL COSTS	
SYSTEM	**$/SF**	**TOTAL**	**$/SF**	**TOTAL**
CIP CONCRETE	$11.90	$3,127,400	$13.54	$3,555,788
STRUCTURAL STEEL	$19.81	$5,200,900	$21.31	$5,597,000

Counting reinforcing steel in concrete members was a very tedious task for this project. For the purpose of this assignment all rebar take-offs were omitted due to the long time associated with counting them all; however, WWF reinforcing was estimated in all slabs. A quick look at *Table 1* shows that the estimated concrete cost was 12% less than the actual cost. On the other hand the estimated structural steel estimate was 7.1% less than the actual cost.

The cast-in-place concrete system came shorter than the actual cost is justifiable. One aspect that significantly altered the estimate was omitting all concrete reinforcing steel. Have reinforcing been accounted for, the estimate would have been increased up to $750k-$1M assuming the project would include 500 tons of reinforcing steel at a unit price of $1500-$2000. Having included the exact number of rebars would have eventually caused my estimate to run approximately 9-16% higher than the actual cost. Some of the other items that were mentioned in the subcontractor's estimate however omitted in this estimate due to lack of information available include tower crane foundation, mockup concrete, shaft curbs, and caulking.

On the other hand the structural steel estimate cost came shorter than the actual cost due to many reasons of which RS MEANS had the largest impact. Using RS MEANS COSTWORKS many of the steel members that are used in the Children's Hospital were not available in the COSTWORKS

database. This led to many discrepancies since many members had to be priced under different members. For example members like (W21X101, W24X104, W27X94, W30X108) had to be grouped and priced as W18x106 since the lb/lf were very close. This was the case for many steel members including many HSS members that were not an exact match in the COSTWORKS database. Had there been exact costs for many of the members, the price would have slightly increased and matched up with the actual price. Besides the fact that RS MEANS lacked many member sizes, some other aspects that were included in the actual structural steel package were not estimated such as tower crane rental, undersigned structural steel allowance, spandrel steel allowance, as well as steel connections.

Table 2 will summarize the costs utilizing CSI Masterformat divisions.

Table 2: Estimate Summary by CSI Divisions

COMPONENT	COST
031100 – Concrete Formwork	$850,442.90
032100 – Concrete Reinforcing Steel (WWF)	$166,914.00
033000 – CIP Concrete	$891,900.00
053100 – Steel Decking	$683,700.00
051223 – Steel Columns	$1,215,888.65
051223 – Steel Beams	$3,985,010.60

This estimate was developed utilizing RS MEANS COSTWORKS online tool for all material, labor and equipment unit costs. The pricing data was released in quarter 3 of 2010, which is about 3 quarters newer than the data that was available when the subcontractors were pricing the systems; which might have been another factor impacting the overall estimate. The location factor was set to Harrisburg, Pa since COSTWORKS doesn't have factors for the actual city of Hershey, Pa. Although Harrisburg and Hershey are about 10-20 miles apart, costs could have been impacted especially due to the fact that the majority of the laborers had to commute on a daily basis to Hershey.

In conclusion, this estimate has shown that should have all pricing data been available for all member sizes, costs could have been much closer to the actual costs. In addition to the lack of cost data in COSTWORKS, additional time for this assignment would have helped to precisely estimate all the reinforcing steel incorporated in the concrete work. Overall, COSTWORKS has proven to be a very user-friendly online tool that helps setup a very organized estimate. However, one should watch out that this tool is good for a preliminary estimate but not for actual final pricing to be submitted to a client.

GENERAL CONDITIONS ESTIMATE

**** See APPENDIX D for the complete General Conditions Estimates***

The General Conditions estimate was developed with four primary categories in mind. The four categories consist of: Supervision and Personnel, Field Office Expense, Temporary Facilities, and Miscellaneous Costs. Supervision and Personnel includes the entire L.F. Driscoll staff for the Children's Hospital Project which consists of primary positions such as the Project Executive, Project Managers, and Superintendents. Second category Field Office Expense includes items such as office trailers setup and rentals, trailer alarm systems, mobile phone plans for the general staff, furniture, and office supplies. Third category Temporary Facilities includes items such as Porta-Potties, temporary storage trailers, and temporary fire extinguishers, etc. The fourth and final category Miscellaneous Costs includes items such as tool rentals, meeting expenses, housing and travelling expenses, etc.

Note that many temporary items such as temporary water, electricity, lighting, etc have been transferred to be included in the scope of works of the different trades. This way, the GC will not be sending high bills to the owner as well as helping the GC transfer some of the risks of self-performing some of the general conditions items.

Table 3 Summarizes the Project's General Conditions costs based on the four given categories. The developed costs do not represent the actual amounts contracted between L.F. Driscoll and Penn State Hershey Medical Center. This estimate was developed to calculate the effect of schedule acceleration scenarios on general condition costs in later reports.

Table 3: GENERAL CONDITIONS SUMMARY

ITEM	QUANTITY	UNIT	UNIT RATE	COST
SUPERVISION AND PERSONNEL	31 MOS	1	$ 170,772.31	$ 5,293,941.68
FIELD OFFICE EXPENSE	31 MOS	1	$ 15,056.71	$ 466,758.00
TEMPORARY FACILITIES	31 MOS	1	$ 2,782.48	$ 86,257.00
MISCELLANEOUS COSTS	31 MOS	1	$ 24,954.29	$ 773,583.00
TOTAL	**31 MOS**	**1**	**$ 213,565.79**	**$ 6,620,539.68**

As Shown in Table 3, the Supervision and Personnel costs account for about 79% of the total General Conditions which is fairly typical on a project of this scale. The total general conditions costs of $6.62 million is about 5.75% of the total project cost of $115 million.

CRITICAL INDUSTRY ISSUES

The 19th annual PACE Roundtable took place on Wednesday, October 27th and Thursday, October 28th at the Penn Stater Conference Center Hotel. On Wednesday, Students, AE faculty, and Industry members gathered over a very delicious dinner giving the opportunity for attending members to discuss issues related to the AEC Industry in a very casual atmosphere. Students were able to make key contacts with top industry leaders as well.

On Thursday morning the PACE Roundtable was Kicked-off by Professors Riley, Messner, and Leicht. The theme this year was "Building a Collaboration Culture". Prof. Riley updated the panel with the latest activities in the AE department including the recent $129 million Department of Energy Grant for research on building energy efficient buildings. Prof. Messner followed by introducing the latest innovations in the field of Building Information Modeling.

Following the Kick-off by the Construction Management Faculty, three main break-out sessions pertaining to the following issues came up next:

- **Sustainability/ Green Building:**
    - Educating a future workforce for delivering high performance buildings.
    - The Smart Grid: Energy Impacts in the building industry.
- **Technology Applications:**
    - Transformation: What are the innovations that will transform our industry?
    - Carrying BIM to the field: new roles, responsibilities and competencies.
- **Process Innovations:**
    - IPD: Exploring the drivers behind highly integrated delivery of projects.
    - Operations and maintenance process integration in new and retrofit projects.

While Sustainability and Process Innovation are two important issues in the construction industry, the topic of technology applications has been a very challenging issue in our industry. BIM has been the new piece of the puzzle that everybody is interested in; however, applications and uses of BIM have not been utilized to the max limits. While all break-out sessions had very important issues to discuss, the Technology Applications break-out session showed a great presence of industry leaders and students.

The Technology Applications Break-out session was organized in a way to have an open discussion by all attendees. Many issues and problems were identified of which the major concern was how to carry out BIM into the field. For several years BIM has been utilized in project planning and coordination. The process has been proven to be very effective yet extremely time consuming. Due to the front end loading of resources early on in the project, the management team believes that there shall be a very effective business case for BIM so that owners buy into the idea and be able to understand the effective uses of such innovative techniques to efficiently deliver their projects. Another issue was how to effectively make use of BIM on the field side where many superintendents lack the knowledge of utilizing virtual technologies. Finally an important note was made that during the entire process, even the end-user of the building shall be put into account when using building information modeling.

With every new innovative idea comes the struggle of developing a business case. Many industry professionals stressed that although BIM has been a good tool on some projects that they have worked on, amateur owners seem to be put off by the time and costs associated with it. The industry has been struggling to get BIM uses out the door due to many owners not buying into the idea wishing to keep overhead costs low. Developing a business case to utilize BIM on projects has been very critical to general contractors. Different companies have different strategies of embracing BIM on their projects by presenting the successes they previously had with new owners. However, the industry suggests that owners need to be educated on this ever developing technology to help efficiently deliver the jobs. By developing a clear business case, owners will embrace the tool and help develop it even more. Architects and Engineers also need to cooperate with General Contractors to be able to have an integrated project delivery. With many risks associated with utilizing BIM, a very specific contract language needs to be developed to encourage all parties to get on board.

Building Information Modeling has been quickly developing over the past couple years. Project Managers have primarily utilized the tool to plan logistics, coordinate MEP systems, as well as 4D Modeling. The primary focus has been in the office for the most part. Superintendents believe that this tool can be also efficiently used in the field just like it has been used in the office. The challenges associated with implementing BIM uses in the field circle around the fact that superintendents have not used much technology during their 20-30 years of experience. With that in mind, educating a huge workforce of superintendents shall be necessary. Tablet PC's such as VELA and LATISTA have

proven to be powerful tools in the field. Many companies utilize those systems to create punchlists, RFI's, productivity monitoring, and daily logging all on site. During the PACE roundtable, industry leaders questioned the possibility of implementing BIM usage in such devices on-site. Interestingly, Dr. Messner claimed that software developers have been working on ways to effectively run huge models on tablets with slower processors than those in the field. Yet again the question primarily raised was how to breakdown the BIM models so that superintendents can easily be trained to extract specific information needed on-site.

BIM has been centered primarily for uses during construction; however, many industry professionals believe that it should be carried down all the way to facility management but even aim at the end user. Dr. Messner showed how on one project, a gaming software was developed based on a BIM model showing how nurses would occupy a hospital wing and how they would operate their day to day activities. This new technique provided an insight at where technology is driving the industry and the likelihood to eventually eliminate the need of costly mock-ups when everything can be virtually tested. One idea that I proposed was the need for industry leaders and researchers to utilize software developers to design softwares that Construction Managers can solely use for their discipline. My question was how hard is it for this industry to develop softwares that could eliminate the need of creating costly performance mock-ups? Software developers have been going beyond the limits in their softwares, is it really hard to develop software that can calculate and project the damages caused by hurricane and earthquake loads on a building? If such an idea were to be possible, can we potentially say that performance mock-ups can be eliminated in the near future? If so, then many other softwares can probably help this industry to efficiently build buildings.

The Children's Hospital Project is utilizing BIM to coordinate all MEP systems ensuring no clashes occur on the field. Besides this usage, L.F. Driscoll was not aiming at utilizing it any further due to no additional contract obligations. An idea that sparked an interest for my thesis project came up at some point in the discussion. John Bechtel from the Office of Physical Plant spoke taking BIM to the limits and even outside the box. In an example he explained, an Ohio Hospital has recently prefabricated the entire corridor MEP systems as well as identical patient rooms. By doing so the Project team was able to cut down schedule time and costs. Prefabricating many labor intensive elements of the Children's Hospital project will be an interesting thesis research topic to pursue.

As the afternoon came to an end, Dr. Riley proposed a game for the attendees to participate in. the main objective was to have each group create as many roads as possible going north-south and east-west. Specific rules were given to follow as well as obstacles to watch out for. Lessons learned from the game include: learning how to negotiate team interests with different parties, selecting a final goal and trying to convince everybody to pursue the same goals as yours, be able to calculate and share profits with the other parties helping you out on-board. The final session was a very crucial discussion pertaining to the current job market conditions. Although many industry leaders made it seem like things are getting better, others seemed to be very harsh on their process of job offerings. Overall, the state of the job market session was very discouraging from many industry professionals.

All of the attending industry leaders at the PACE Roundtable have been big supporters of the Penn State AE Department, they were very proactive and were glad to share their experiences with all the students pertaining to issues associated with the construction industry. Many people including Chris Magent from Alexander Building Construction, Bill Moyer from Davis Construction, and John Bechtel from the Office of Physical Plant at PSU attended the Technology Applications break-out sessions and will be available for giving insight and useful information pertaining to research topics in BIM as discussed previously.

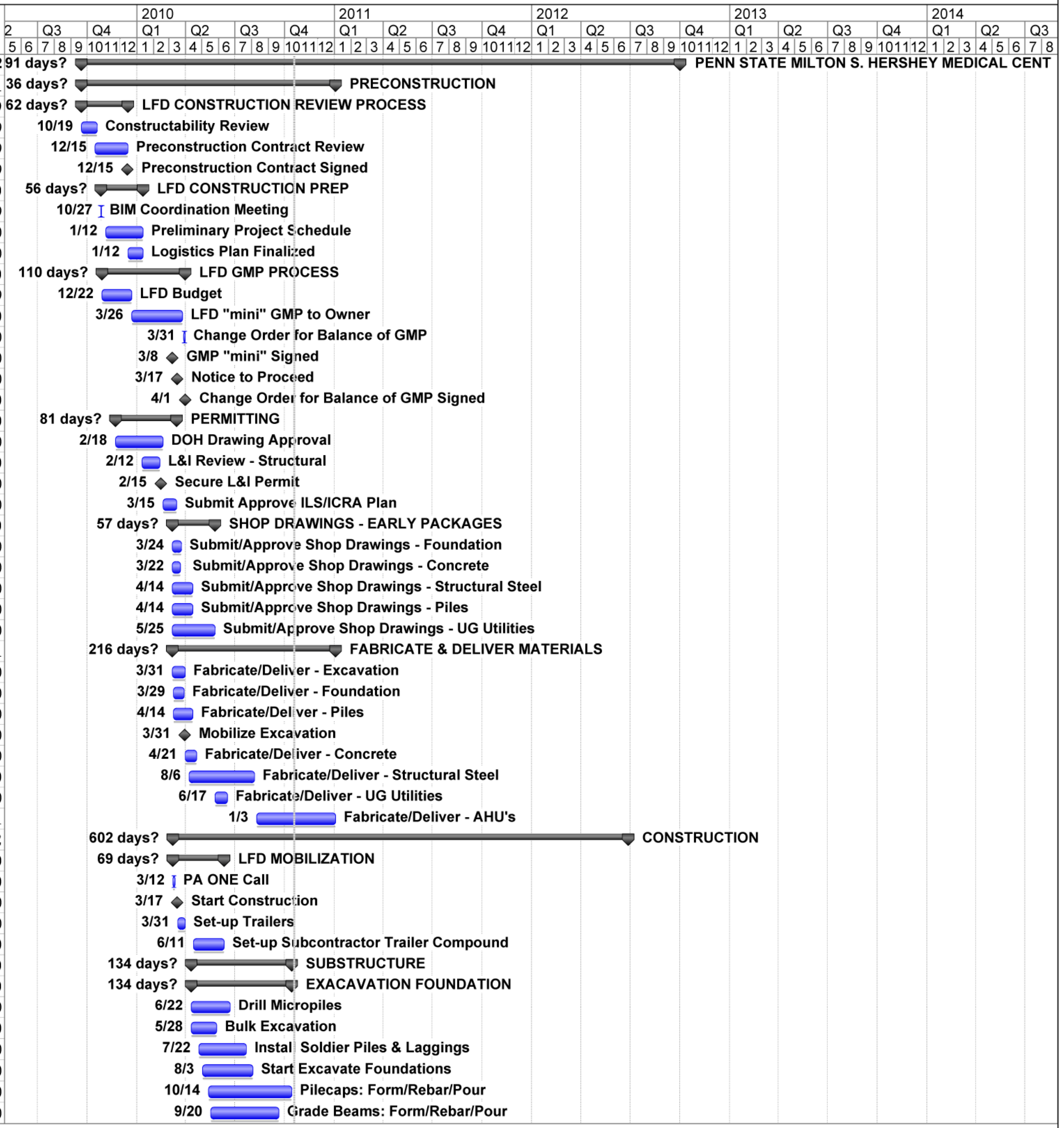
APPENDIX A: DETAILED PROJECT SCHEDULE

PENN STATE MILTON S. HERSHEY MEDICAL CENTER CHILDREN'S HOSPITAL
Dr. Chimay Anumba

ABDULWAHAB HASAN
CONSTRUCTION MANAGEMENT

TECHNICAL REPORT TWO
October 27, 2010

ID	ℹ	Task Name	Duration	Start	Finish
1		**PENN STATE MILTON S. HERSHEY MEDICAL CENTER CHILDREN'S HOSPITAL**	**791 days?**	**Mon 9/21/09**	**Tue 10/2/12**
2		**PRECONSTRUCTION**	**336 days?**	**Mon 9/21/09**	**Mon 1/3/11**
3		**LFD CONSTRUCTION REVIEW PROCESS**	**62 days?**	**Mon 9/21/09**	**Tue 12/15/09**
4	▦	Constructability Review	21 days?	Mon 9/21/09	Mon 10/19/09
5	▦	Preconstruction Contract Review	43 days?	Fri 10/16/09	Tue 12/15/09
6	▦	Preconstruction Contract Signed	0 days	Tue 12/15/09	Tue 12/15/09
7		**LFD CONSTRUCTION PREP**	**56 days?**	**Tue 10/27/09**	**Tue 1/12/10**
8	▦	BIM Coordination Meeting	1 day?	Tue 10/27/09	Tue 10/27/09
9	▦	Preliminary Project Schedule	49 days?	Thu 11/5/09	Tue 1/12/10
10	▦	Logistics Plan Finalized	20 days?	Wed 12/16/09	Tue 1/12/10
11		**LFD GMP PROCESS**	**110 days?**	**Thu 10/29/09**	**Thu 4/1/10**
12	▦	LFD Budget	39 days?	Thu 10/29/09	Tue 12/22/09
13	▦	LFD "mini" GMP to Owner	68 days?	Wed 12/23/09	Fri 3/26/10
14	▦	Change Order for Balance of GMP	3 days?	Mon 3/29/10	Wed 3/31/10
15	▦	GMP "mini" Signed	0 days	Mon 3/8/10	Mon 3/8/10
16	▦	Notice to Proceed	0 days	Wed 3/17/10	Wed 3/17/10
17	▦	Change Order for Balance of GMP Signed	0 days	Thu 4/1/10	Thu 4/1/10
18		**PERMITTING**	**81 days?**	**Mon 11/23/09**	**Mon 3/15/10**
19	▦	DOH Drawing Approval	64 days?	Mon 11/23/09	Thu 2/18/10
20	▦	L&I Review - Structural	25 days?	Mon 1/11/10	Fri 2/12/10
21	▦	Secure L&I Permit	0 days	Mon 2/15/10	Mon 2/15/10
22	▦	Submit Approve ILS/ICRA Plan	17 days?	Fri 2/19/10	Mon 3/15/10
23		**SHOP DRAWINGS - EARLY PACKAGES**	**57 days?**	**Mon 3/8/10**	**Tue 5/25/10**
24	▦	Submit/Approve Shop Drawings - Foundation	13 days?	Mon 3/8/10	Wed 3/24/10
25	▦	Submit/Approve Shop Drawings - Concrete	11 days?	Mon 3/8/10	Mon 3/22/10
26	▦	Submit/Approve Shop Drawings - Structural Steel	28 days?	Mon 3/8/10	Wed 4/14/10
27	▦	Submit/Approve Shop Drawings - Piles	28 days?	Mon 3/8/10	Wed 4/14/10
28	▦	Submit/Approve Shop Drawings - UG Utilities	57 days?	Mon 3/8/10	Tue 5/25/10
29		**FABRICATE & DELIVER MATERIALS**	**216 days?**	**Mon 3/8/10**	**Mon 1/3/11**
30	▦	Fabricate/Deliver - Excavation	18 days?	Mon 3/8/10	Wed 3/31/10
31	▦	Fabricate/Deliver - Foundation	14 days?	Wed 3/10/10	Mon 3/29/10
32	▦	Fabricate/Deliver - Piles	26 days?	Wed 3/10/10	Wed 4/14/10
33	▦	Mobilize Excavation	0 days	Wed 3/31/10	Wed 3/31/10
34	▦	Fabricate/Deliver - Concrete	15 days?	Thu 4/1/10	Wed 4/21/10
35	▦	Fabricate/Deliver - Structural Steel	87 days?	Thu 4/8/10	Fri 8/6/10
36	▦	Fabricate/Deliver - UG Utilities	17 days?	Wed 5/26/10	Thu 6/17/10
37	▦	Fabricate/Deliver - AHU's	104 days?	Wed 8/11/10	Mon 1/3/11
38		**CONSTRUCTION**	**602 days?**	**Tue 3/9/10**	**Wed 6/27/12**
39		**LFD MOBILIZATION**	**69 days?**	**Tue 3/9/10**	**Fri 6/11/10**
40	▦	PA ONE Call	4 days?	Tue 3/9/10	Fri 3/12/10
41	▦	Start Construction	0 days	Wed 3/17/10	Wed 3/17/10
42	▦	Set-up Trailers	10 days?	Thu 3/18/10	Wed 3/31/10
43	▦	Set-up Subcontractor Trailer Compound	41 days?	Fri 4/16/10	Fri 6/11/10
44		**SUBSTRUCTURE**	**134 days?**	**Mon 4/12/10**	**Thu 10/14/10**
45		**EXACAVATION FOUNDATION**	**134 days?**	**Mon 4/12/10**	**Thu 10/14/10**
46	▦	Drill Micropiles	52 days?	Mon 4/12/10	Tue 6/22/10
47	▦	Bulk Excavation	35 days?	Mon 4/12/10	Fri 5/28/10
48	▦	Install Soldier Piles & Laggings	64 days?	Mon 4/26/10	Thu 7/22/10
49	▦	Start Excavate Foundations	67 days?	Mon 5/3/10	Tue 8/3/10
50	▦	Pilecaps: Form/Rebar/Pour	110 days?	Fri 5/14/10	Thu 10/14/10
51	▦	Grade Beams: Form/Rebar/Pour	90 days?	Tue 5/18/10	Mon 9/20/10



Project: DETAILED PROJECT SCHEI
Date: Mon 10/18/10

Task ▬
Progress ▬
Milestone ◆
Summary ▬
Rolled Up Task ▬
Rolled Up Milestone ◇
Rolled Up Progress ▬
Split
External Tasks ▬
Project Summary ▬
Group By Summary ▬
Deadline ⇩

Page 1

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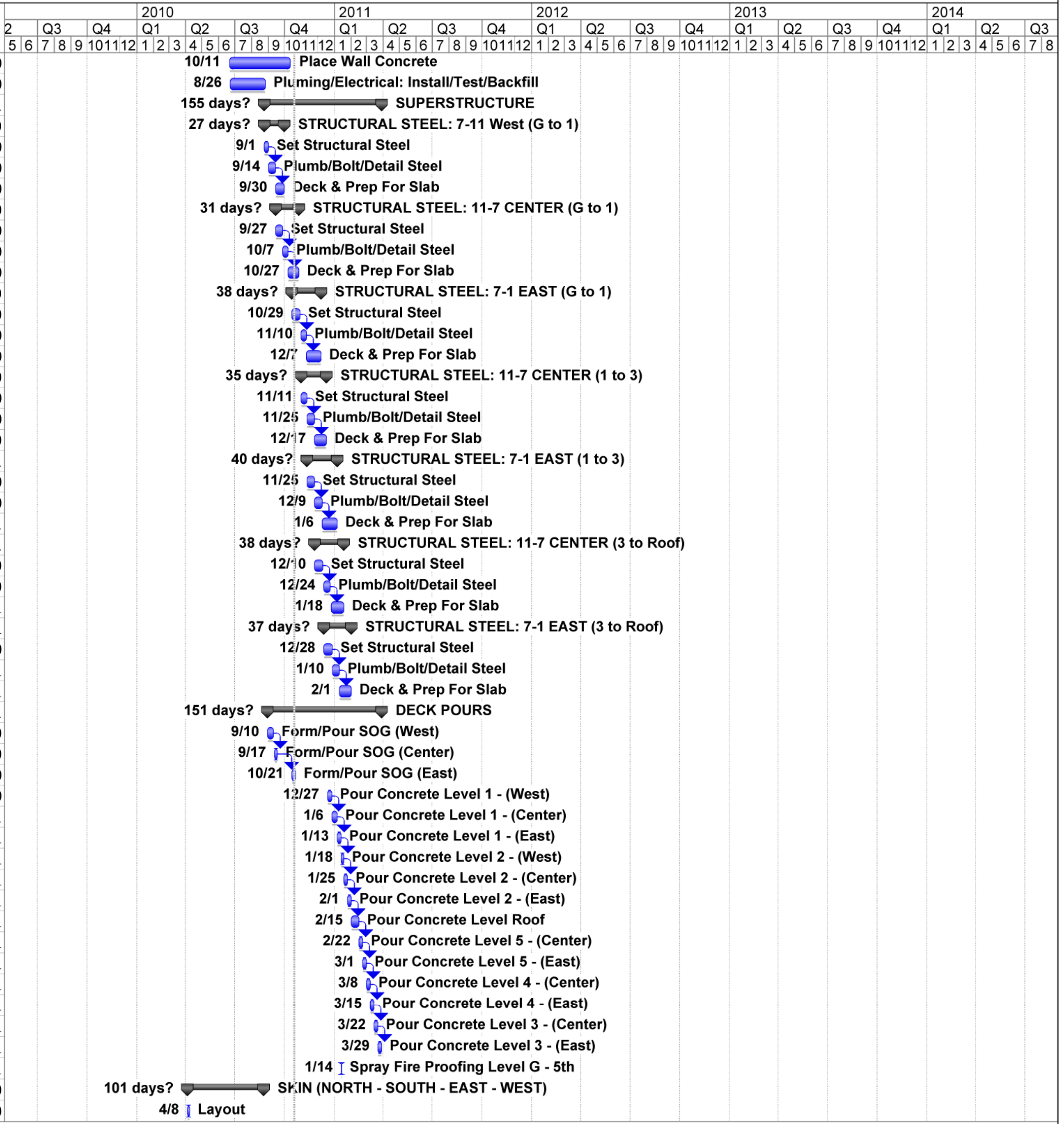
October 27, 2010

ID	ℹ	Task Name	Duration	Start	Finish
52	▦	Place Wall Concrete	80 days?	Tue 6/22/10	Mon 10/11/10
53	▦	Pluming/Electrical: Install/Test/Backfill	47 days?	Wed 6/23/10	Thu 8/26/10
54		**SUPERSTRUCTURE**	**155 days?**	**Wed 8/25/10**	**Tue 3/29/11**
55		**STRUCTURAL STEEL: 7-11 West (G to 1)**	**27 days?**	**Wed 8/25/10**	**Thu 9/30/10**
56	▦	Set Structural Steel	6 days?	Wed 8/25/10	Wed 9/1/10
57	▦	Plumb/Bolt/Detail Steel	9 days?	Thu 9/2/10	Tue 9/14/10
58	▦	Deck & Prep For Slab	12 days?	Wed 9/15/10	Thu 9/30/10
59		**STRUCTURAL STEEL: 11-7 CENTER (G to 1)**	**31 days?**	**Wed 9/15/10**	**Wed 10/27/10**
60	▦	Set Structural Steel	9 days?	Wed 9/15/10	Mon 9/27/10
61	▦	Plumb/Bolt/Detail Steel	8 days?	Tue 9/28/10	Thu 10/7/10
62	▦	Deck & Prep For Slab	14 days?	Fri 10/8/10	Wed 10/27/10
63		**STRUCTURAL STEEL: 7-1 EAST (G to 1)**	**38 days?**	**Fri 10/15/10**	**Tue 12/7/10**
64	▦	Set Structural Steel	11 days?	Fri 10/15/10	Fri 10/29/10
65	▦	Plumb/Bolt/Detail Steel	8 days?	Mon 11/1/10	Wed 11/10/10
66	▦	Deck & Prep For Slab	19 days?	Thu 11/11/10	Tue 12/7/10
67		**STRUCTURAL STEEL: 11-7 CENTER (1 to 3)**	**35 days?**	**Mon 11/1/10**	**Fri 12/17/10**
68	▦	Set Structural Steel	9 days?	Mon 11/1/10	Thu 11/11/10
69	▦	Plumb/Bolt/Detail Steel	10 days?	Fri 11/12/10	Thu 11/25/10
70	▦	Deck & Prep For Slab	16 days?	Fri 11/26/10	Fri 12/17/10
71		**STRUCTURAL STEEL: 7-1 EAST (1 to 3)**	**40 days?**	**Fri 11/12/10**	**Thu 1/6/11**
72	▦	Set Structural Steel	10 days?	Fri 11/12/10	Thu 11/25/10
73	▦	Plumb/Bolt/Detail Steel	10 days?	Fri 11/26/10	Thu 12/9/10
74	▦	Deck & Prep For Slab	20 days?	Fri 12/10/10	Thu 1/6/11
75		**STRUCTURAL STEEL: 11-7 CENTER (3 to Roof)**	**38 days?**	**Fri 11/26/10**	**Tue 1/18/11**
76	▦	Set Structural Steel	11 days?	Fri 11/26/10	Fri 12/10/10
77	▦	Plumb/Bolt/Detail Steel	10 days?	Mon 12/13/10	Fri 12/24/10
78	▦	Deck & Prep For Slab	17 days?	Mon 12/27/10	Tue 1/18/11
79		**STRUCTURAL STEEL: 7-1 EAST (3 to Roof)**	**37 days?**	**Mon 12/13/10**	**Tue 2/1/11**
80	▦	Set Structural Steel	12 days?	Mon 12/13/10	Tue 12/28/10
81	▦	Plumb/Bolt/Detail Steel	9 days?	Wed 12/29/10	Mon 1/10/11
82	▦	Deck & Prep For Slab	16 days?	Tue 1/11/11	Tue 2/1/11
83		**DECK POURS**	**151 days?**	**Tue 8/31/10**	**Tue 3/29/11**
84	▦	Form/Pour SOG (West)	9 days?	Tue 8/31/10	Fri 9/10/10
85	▦	Form/Pour SOG (Center)	5 days?	Mon 9/13/10	Fri 9/17/10
86	▦	Form/Pour SOG (East)	5 days?	Fri 10/15/10	Thu 10/21/10
87	▦	Pour Concrete Level 1 - (West)	6 days?	Mon 12/20/10	Mon 12/27/10
88	▦	Pour Concrete Level 1 - (Center)	8 days?	Tue 12/28/10	Thu 1/6/11
89	▦	Pour Concrete Level 1 - (East)	5 days?	Fri 1/7/11	Thu 1/13/11
90	▦	Pour Concrete Level 2 - (West)	3 days?	Fri 1/14/11	Tue 1/18/11
91	▦	Pour Concrete Level 2 - (Center)	5 days?	Wed 1/19/11	Tue 1/25/11
92	▦	Pour Concrete Level 2 - (East)	5 days?	Wed 1/26/11	Tue 2/1/11
93	▦	Pour Concrete Level Roof	10 days?	Wed 2/2/11	Tue 2/15/11
94	▦	Pour Concrete Level 5 - (Center)	5 days?	Wed 2/16/11	Tue 2/22/11
95	▦	Pour Concrete Level 5 - (East)	5 days?	Wed 2/23/11	Tue 3/1/11
96	▦	Pour Concrete Level 4 - (Center)	5 days?	Wed 3/2/11	Tue 3/8/11
97	▦	Pour Concrete Level 4 - (East)	5 days?	Wed 3/9/11	Tue 3/15/11
98	▦	Pour Concrete Level 3 - (Center)	5 days?	Wed 3/16/11	Tue 3/22/11
99	▦	Pour Concrete Level 3 - (East)	5 days?	Wed 3/23/11	Tue 3/29/11
100	▦	Spray Fire Proofing Level G - 5th	1 day?	Fri 1/14/11	Fri 1/14/11
101		**SKIN (NORTH - SOUTH - EAST - WEST)**	**101 days?**	**Mon 4/5/10**	**Mon 8/23/10**
102	▦	Layout	4 days?	Mon 4/5/10	Thu 4/8/10



Project: DETAILED PROJECT SCHEI
Date: Mon 10/18/10

Task	▬	Milestone	◆	Rolled Up Task	▬	Rolled Up Progress	▬	External Tasks	▬	Group By Summary	▬
Progress	▬	Summary	▬	Rolled Up Milestone	◇	Split	┈	Project Summary	▬	Deadline	⇩

Page 2

APPENDIX A: DETAILED PROJECT SCHEDULE

PENN STATE MILTON S. HERSHEY MEDICAL CENTER CHILDREN'S HOSPITAL
Dr. Chimay Anumba

ABDULWAHAB HASAN
CONSTRUCTION MANAGEMENT

TECHNICAL REPORT TWO
October 27, 2010

ID	ℹ	Task Name	Duration	Start	Finish
103	▦	Exterior Drywall	51 days?	Tue 4/13/10	Tue 6/22/10
104	▦	Block Backup	36 days?	Tue 5/11/10	Tue 6/29/10
105	▦	Air & Vapor Barrier	37 days?	Tue 5/18/10	Wed 7/7/10
106	▦	Stone Granite	42 days?	Tue 5/25/10	Wed 7/21/10
107	▦	Stone Limestone	42 days?	Tue 5/25/10	Wed 7/21/10
108	▦	Metal Panels	52 days?	Tue 5/25/10	Wed 8/4/10
109	▦	Curtain Wall	36 days?	Wed 6/23/10	Wed 8/11/10
110	▦	Windows	41 days?	Mon 6/28/10	Mon 8/23/10
111	▦	Roofing	15 days?	Tue 4/6/10	Mon 4/26/10
112	▦	Building Water Tight	0 days	Tue 4/27/10	Tue 4/27/10
113		**VERTICAL TRANSPORATION**	**281 days?**	**Tue 8/24/10**	**Tue 9/20/11**
114	▦	Erect Tower Crane	115 days?	Tue 8/24/10	Mon 1/31/11
115	▦	Install Hoist	140 days?	Mon 1/3/11	Fri 7/15/11
116	▦	Dismantle Hoist	16 days?	Tue 8/30/11	Tue 9/20/11
117	▦	Dismantle Tower Crane	10 days?	Tue 2/1/11	Mon 2/14/11
118	▦	Install Elevators (ALL 5)	207 days?	Fri 11/12/10	Mon 8/29/11
119		**INTERIOR FITOUT**	**332 days?**	**Tue 1/25/11**	**Thu 5/3/12**
120		**LEVEL G - FITOUT**	**208 days?**	**Tue 1/25/11**	**Fri 11/11/11**
121	▦	Layout	15 days?	Tue 1/25/11	Mon 2/14/11
122	▦	Overhead Rough-Ins	47 days?	Mon 2/7/11	Tue 4/12/11
123	▦	Studs and Frames	32 days?	Wed 3/23/11	Thu 5/5/11
124	▦	MEP in Wall Rough-Ins	46 days?	Thu 3/31/11	Thu 6/2/11
125	▦	Install Drywall	41 days?	Thu 6/9/11	Thu 8/4/11
126	▦	Install Flooring	53 days?	Wed 7/27/11	Fri 10/7/11
127	▦	Ceiling Grid/Tiles	46 days?	Wed 7/20/11	Wed 9/21/11
128	▦	Install Casework	43 days?	Wed 8/3/11	Fri 9/30/11
129	▦	Wall Finishing	58 days?	Wed 8/17/11	Fri 11/4/11
130	▦	Level G Fitout Complete	0 days	Fri 11/11/11	Fri 11/11/11
131		**LEVEL 1 - FITOUT**	**231 days?**	**Tue 2/15/11**	**Wed 1/4/12**
132	▦	Layout	15 days?	Tue 2/15/11	Mon 3/7/11
133	▦	Overhead Rough-Ins	50 days?	Wed 3/16/11	Tue 5/24/11
134	▦	Studs and Frames	47 days?	Thu 4/28/11	Fri 7/1/11
135	▦	MEP in Wall Rough-Ins	57 days?	Thu 5/12/11	Fri 7/29/11
136	▦	Install Drywall	47 days?	Fri 7/22/11	Mon 9/26/11
137	▦	Install Flooring	53 days?	Wed 9/7/11	Fri 11/18/11
138	▦	Ceiling Grid/Tiles	50 days?	Tue 8/30/11	Mon 11/7/11
139	▦	Install Casework	39 days?	Tue 9/20/11	Fri 11/11/11
140	▦	Wall Finishing	61 days?	Tue 10/4/11	Tue 12/27/11
141	▦	Level 1 Fitout Complete	0 days	Wed 1/4/12	Wed 1/4/12
142		**LEVEL 2 - FITOUT**	**224 days?**	**Fri 4/8/11**	**Thu 2/16/12**
143	▦	Layout	15 days?	Fri 4/8/11	Thu 4/28/11
144	▦	Overhead Rough-Ins	52 days?	Wed 4/27/11	Thu 7/7/11
145	▦	Studs and Frames	27 days?	Fri 6/24/11	Mon 8/1/11
146	▦	MEP in Wall Rough-Ins	46 days?	Mon 7/11/11	Mon 9/12/11
147	▦	Install Drywall	40 days?	Tue 9/13/11	Mon 11/7/11
148	▦	Install Flooring	59 days?	Mon 10/24/11	Thu 1/12/12
149	▦	Ceiling Grid/Tiles	47 days?	Mon 10/17/11	Tue 12/20/11
150	▦	Install Casework	43 days?	Tue 11/1/11	Thu 12/29/11
151	▦	Wall Finishing	58 days?	Tue 11/22/11	Thu 2/9/12
152	▦	Level 2 Fitout Complete	0 days	Thu 2/16/12	Thu 2/16/12
153		**LEVEL 3 - FITOUT**	**240 days?**	**Fri 5/13/11**	**Fri 4/13/12**

Project: DETAILED PROJECT SCHEI
Date: Mon 10/18/10

Task	▬	Milestone	◆	Rolled Up Task	▬	Rolled Up Progress	▬	External Tasks	▬	Group By Summary	▼▬▼
Progress	▬	Summary	▼▬▼	Rolled Up Milestone	◇	Split	┈	Project Summary	▽▬▽	Deadline	⇩

Page 3

PENN STATE MILTON S. HERSHEY MEDICAL CENTER CHILDREN'S HOSPITAL
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ABDULWAHAB HASAN
CONSTRUCTION MANAGEMENT

TECHNICAL REPORT TWO
October 27, 2010

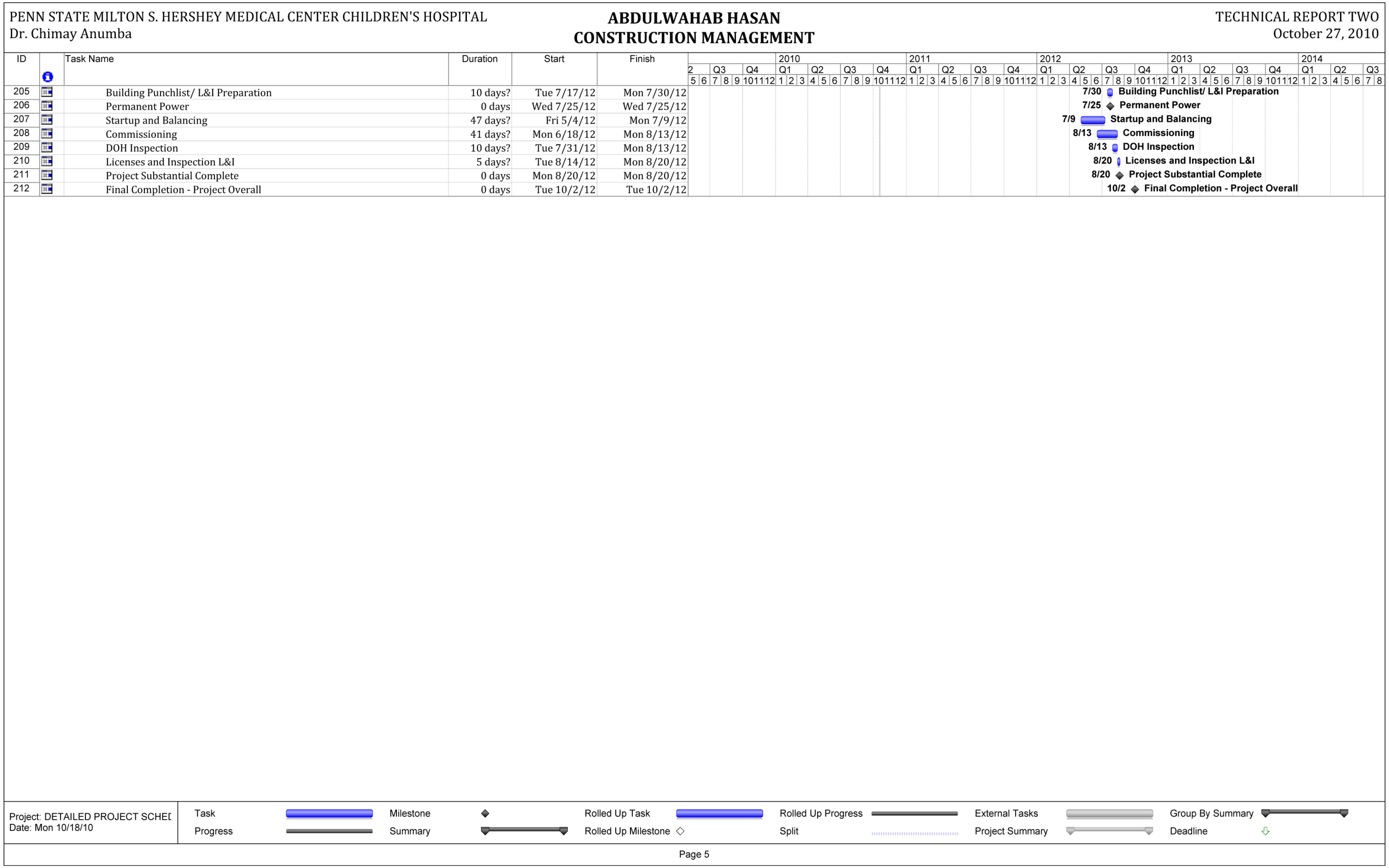
ID	ℹ	Task Name	Duration	Start	Finish
154	▦	Layout	10 days?	Fri 5/13/11	Thu 5/26/11
155	▦	Overhead Rough-Ins	31 days?	Fri 7/29/11	Fri 9/9/11
156	▦	Studs and Frames	23 days?	Fri 9/2/11	Tue 10/4/11
157	▦	MEP in Wall Rough-Ins	28 days?	Tue 9/20/11	Thu 10/27/11
158	▦	Install Drywall	31 days?	Tue 11/22/11	Tue 1/3/12
159	▦	Install Flooring	43 days?	Fri 1/6/12	Tue 3/6/12
160	▦	Ceiling Grid/Tiles	32 days?	Thu 12/29/11	Fri 2/10/12
161	▦	Install Casework	31 days?	Thu 1/19/12	Thu 3/1/12
162	▦	Wall Finishing	46 days?	Fri 2/3/12	Fri 4/6/12
163	▦	Level 3 Fitout Complete	0 days	Fri 4/13/12	Fri 4/13/12
164		**LEVEL 4 - FITOUT**	**258 days?**	**Tue 3/15/11**	**Thu 3/8/12**
165	▦	Layout	10 days?	Fri 4/29/11	Thu 5/12/11
166	▦	Overhead Rough-Ins	27 days?	Wed 7/6/11	Thu 8/11/11
167	▦	Studs and Frames	30 days?	Wed 7/27/11	Tue 9/6/11
168	▦	MEP in Wall Rough-Ins	29 days?	Mon 8/22/11	Thu 9/29/11
169	▦	Install Drywall	29 days?	Tue 10/25/11	Fri 12/2/11
170	▦	Install Flooring	24 days?	Wed 12/7/11	Mon 1/9/12
171	▦	Ceiling Grid/Tiles	21 days?	Wed 11/30/11	Wed 12/28/11
172	▦	Install Casework	33 days?	Fri 12/16/11	Tue 1/31/12
173	▦	Wall Finishing	45 days?	Fri 1/6/12	Thu 3/8/12
174	▦	Level 4 Fitout Complete	0 days	Tue 3/15/11	Tue 3/15/11
175		**LEVEL 5 - FITOUT**	**244 days?**	**Fri 5/27/11**	**Thu 5/3/12**
176	▦	Layout	5 days?	Fri 5/27/11	Thu 6/2/11
177	▦	Overhead Rough-Ins	38 days?	Fri 8/5/11	Tue 9/27/11
178	▦	Studs and Frames	10 days?	Tue 9/27/11	Mon 10/10/11
179	▦	MEP in Wall Rough-Ins	15 days?	Tue 10/18/11	Mon 11/7/11
180	▦	Install Drywall	17 days?	Wed 12/21/11	Thu 1/12/12
181	▦	Install Flooring	34 days?	Fri 2/3/12	Wed 3/21/12
182	▦	Ceiling Grid/Tiles	17 days?	Fri 1/27/12	Mon 2/20/12
183	▦	Install Casework	15 days?	Mon 2/20/12	Fri 3/9/12
184	▦	Wall Finishing	31 days?	Thu 3/15/12	Thu 4/26/12
185	▦	Level 5 Fitout Complete	0 days	Thu 5/3/12	Thu 5/3/12
186		**LEVEL 5 - MECHANICAL FITOUT**	**121 days?**	**Fri 3/25/11**	**Mon 9/12/11**
187	▦	Set AHU # 1-6	6 days?	Fri 3/25/11	Fri 4/1/11
188	▦	Set Electrical Gear	4 days?	Fri 3/25/11	Wed 3/30/11
189	▦	Laundry Chute	10 days?	Tue 4/5/11	Mon 4/18/11
190	▦	Rough-In P-Tube	5 days?	Wed 6/8/11	Tue 6/14/11
191	▦	Mechanical Piping	45 days?	Mon 3/28/11	Fri 5/27/11
192	▦	Electrical Rough-In	46 days?	Mon 4/4/11	Mon 6/6/11
193	▦	Plumbing Equipment Piping	21 days?	Fri 5/6/11	Fri 6/3/11
194	▦	Testing	5 days?	Tue 7/19/11	Mon 7/25/11
195	▦	Level 5 Mechanical Complete	0 days	Mon 9/12/11	Mon 9/12/11
196		**SITE WORK**	**96 days?**	**Wed 2/15/12**	**Wed 6/27/12**
197	▦	Fence Removal	5 days?	Wed 2/15/12	Tue 2/21/12
198	▦	Site Prep	5 days?	Wed 2/22/12	Tue 2/28/12
199	▦	Clean Site	5 days?	Wed 2/29/12	Tue 3/6/12
200	▦	Side Walks	5 days?	Wed 5/9/12	Tue 5/15/12
201	▦	Canopy	5 days?	Wed 5/16/12	Tue 5/22/12
202	▦	Walkways	5 days?	Thu 5/31/12	Wed 6/6/12
203	▦	Plantings	5 days?	Thu 6/21/12	Wed 6/27/12
204		**COMPLETIONS**	**107 days?**	**Fri 5/4/12**	**Tue 10/2/12**

Project: DETAILED PROJECT SCHEI
Date: Mon 10/18/10

Task	▬	Milestone	◆	Rolled Up Task	▬	Rolled Up Progress	▬	External Tasks	▬	Group By Summary	▬
Progress	▬	Summary	▬	Rolled Up Milestone	◇	Split	┈	Project Summary	▬	Deadline	⇩

Page 4

APPENDIX A: DETAILED PROJECT SCHEDULE



PENN STATE MILTON S. HERSHEY MEDICAL CENTER CHILDREN'S HOSPITAL
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CONSTRUCTION MANAGEMENT

TECHNICAL REPORT TWO
October 27, 2010

ID	ⓘ	Task Name	Duration	Start	Finish
205	▦	Building Punchlist/ L&I Preparation	10 days?	Tue 7/17/12	Mon 7/30/12
206	▦	Permanent Power	0 days	Wed 7/25/12	Wed 7/25/12
207	▦	Startup and Balancing	47 days?	Fri 5/4/12	Mon 7/9/12
208	▦	Commissioning	41 days?	Mon 6/18/12	Mon 8/13/12
209	▦	DOH Inspection	10 days?	Tue 7/31/12	Mon 8/13/12
210	▦	Licenses and Inspection L&I	5 days?	Tue 8/14/12	Mon 8/20/12
211	▦	Project Substantial Complete	0 days	Mon 8/20/12	Mon 8/20/12
212	▦	Final Completion - Project Overall	0 days	Tue 10/2/12	Tue 10/2/12

Project: DETAILED PROJECT SCHE
Date: Mon 10/18/10

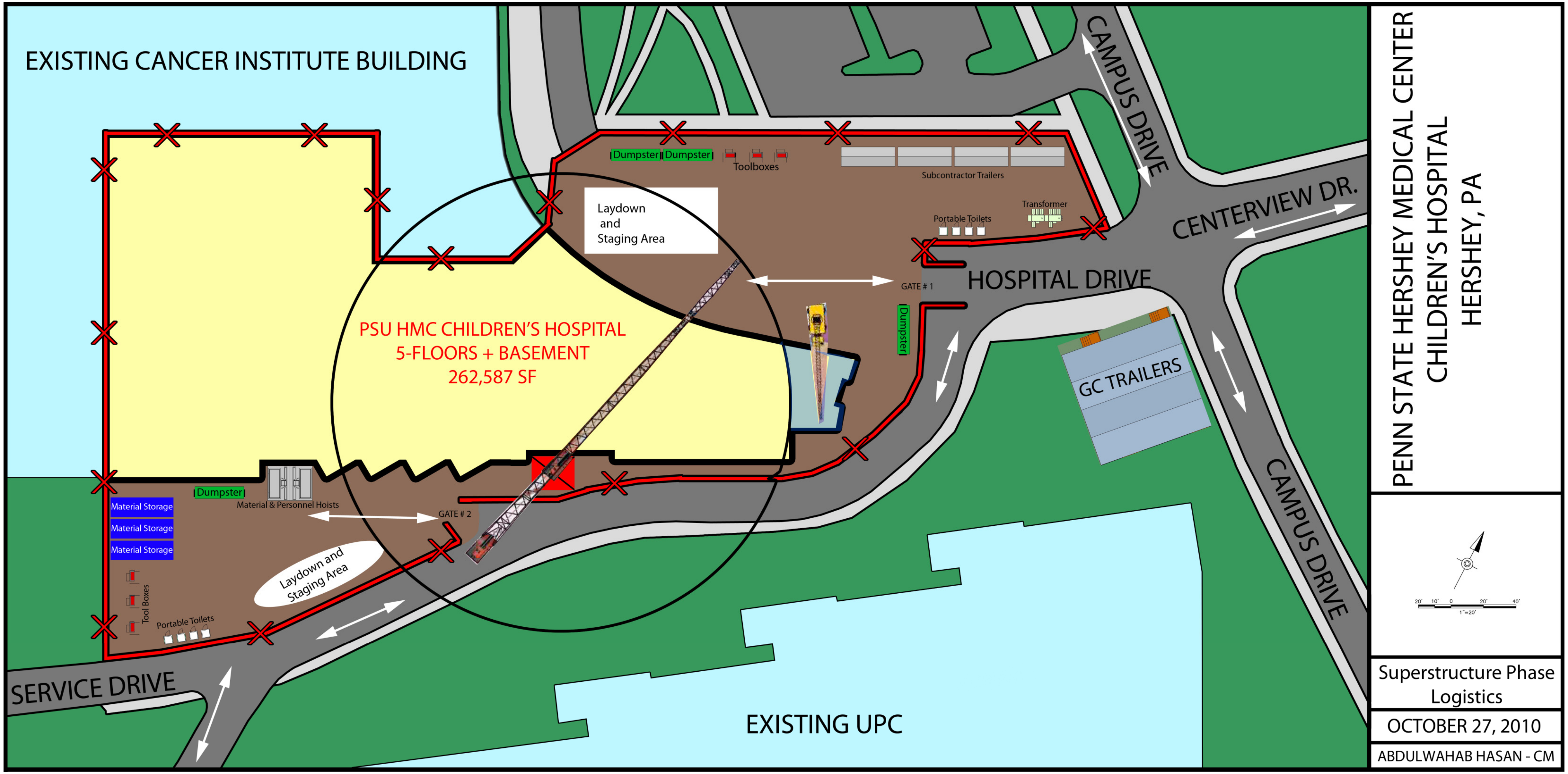
Task	▬	Milestone	◆	Rolled Up Task	▬	Rolled Up Progress	▬	External Tasks	▬	Group By Summary	▬
Progress	▬	Summary	▬	Rolled Up Milestone	◇	Split	┈	Project Summary	▬	Deadline	⇩

Page 5

APPENDIX A: DETAILED PROJECT SCHEDULE

APPENDIX B: SUPERSTRUCTURE PHASE - SITE LOGISTICS PLAN

APPENDIX B: SUPERSTRUCTURE PHASE – SITE LOGISTICS PLAN



APPENDIX C: QUANTITY TAKE-OFFS & COSTWORKS REPORTS

LineNumber	Quantity	Unit	Description	Crew	Daily Output	Labor Hours	Material	Labor	Equipment	Total	Ext. Mat.	Ext. Labor	Ext. Equip.	Ext. Total	Mat. O&P	Labor O&P	Equip. O&P	Total O&P	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
033105000000			Normal Weight Structural Concrete																			
033105350012			Structural concrete, ready mix, normal weight																			
033105350300	9000	C.Y.	Structural concrete, ready mix, normal weight, 4000 PSI, includes local aggregate, sand, Portland cement and water, delivered, excludes all additives and treatments				$ 90.33	$ -	$ -	$ 90.33	$ 812,970.00	$ -	$ -	$ 812,970.00	$ 99.10	$ -	$ -	$ 99.10	$ 891,900.00	$ -	$ -	$ 891,900.00
033105700020			Structural concrete placing, includes labor and equipment to place, strike off and consolidate, excludes material																			
033105701400	3500	C.Y.	Structural concrete, placing, elevated slab, pumped, less than 6" thick, includes strike off & consolidation, excludes material	C20	140	0.457	$ -	$ 15.68	$ 6.59	$ 22.27	$ -	$ 54,880.00	$ 23,065.00	$ 77,945.00	$ -	$ 23.72	$ 7.28	$ 31.00	$ -	$ 83,020.00	$ 25,480.00	$ 108,500.00
033105701950	310	C.Y.	Structural concrete, placing, continuous footing, shallow, pumped, includes strike off & consolidation, excludes material	C20	150	0.427	$ -	$ 14.62	$ 6.18	$ 20.80	$ -	$ 4,532.20	$ 1,915.80	$ 6,448.00	$ -	$ 22.26	$ 6.76	$ 29.02	$ -	$ 6,900.60	$ 2,095.60	$ 8,996.20
033105703250	130	C.Y.	Structural concrete, placing, grade beam, pumped, includes strike off & consolidation, excludes material	C20	180	0.356	$ -	$ 12.20	$ 5.13	$ 17.33	$ -	$ 1,586.00	$ 666.90	$ 2,252.90	$ -	$ 18.59	$ 5.65	$ 24.24	$ -	$ 2,416.70	$ 734.50	$ 3,151.20
033105703750	110	C.Y.	Structural concrete, placing, pile caps, pumped, under 5 CY, includes strike off & consolidation, excludes material	C20	110	0.582	$ -	$ 19.84	$ 8.38	$ 28.22	$ -	$ 2,182.40	$ 921.80	$ 3,104.20	$ -	$ 30.49	$ 9.25	$ 39.74	$ -	$ 3,353.90	$ 1,017.50	$ 4,371.40
033105703900	110	C.Y.	Structural concrete, placing, pile caps, pumped, 6 C.Y. to 10 C.Y., includes strike off & consolidation, excludes material	C20	200	0.32	$ -	$ 10.99	$ 4.62	$ 15.61	$ -	$ 1,208.90	$ 508.20	$ 1,717.10	$ -	$ 16.70	$ 5.09	$ 21.79	$ -	$ 1,837.00	$ 559.90	$ 2,396.90
033105704050	820	C.Y.	Structural concrete, placing, pile caps, pumped, over 10 CY, includes strike off & consolidation, excludes material	C20	240	0.267	$ -	$ 9.15	$ 3.85	$ 13.00	$ -	$ 7,503.00	$ 3,157.00	$ 10,660.00	$ -	$ 13.94	$ 4.23	$ 18.17	$ -	$ 11,430.80	$ 3,468.60	$ 14,899.40
033105704300	1000	C.Y.	Structural concrete, placing, slab on grade, direct chute, up to 6" thick, includes strike off & consolidation, excludes material	C6	110	0.436	$ -	$ 14.57	$ 0.64	$ 15.21	$ -	$ 14,570.00	$ 640.00	$ 15,210.00	$ -	$ 22.26	$ 0.71	$ 22.97	$ -	$ 22,260.00	$ 710.00	$ 22,970.00
031113350010			FORMS IN PLACE, ELEVATED SLABS																			
031113357000	9600	L.F.	C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	C1	500	0.064	$ 0.11	$ 2.24	$ -	$ 2.35	$ 1,056.00	$ 21,504.00	$ -	$ 22,560.00	$ 0.12	$ 3.46	$ -	$ 3.58	$ 1,152.00	$ 33,216.00	$ -	$ 34,368.00
031113650010			FORMS IN PLACE, SLAB ON GRADE																			
031113653000	1500	L.F.	C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	C1	600	0.053	$ 0.26	$ 1.87	$ -	$ 2.13	$ 390.00	$ 2,805.00	$ -	$ 3,195.00	$ 0.29	$ 2.88	$ -	$ 3.17	$ 435.00	$ 4,320.00	$ -	$ 4,755.00
031113653050	50	SFCA	C.I.P. concrete forms, slab on grade, edge, wood, 7" to 12" high, 4 use, includes erecting, bracing, stripping and cleaning	C1	435	0.074	$ 0.56	$ 2.58	$ -	$ 3.14	$ 28.00	$ 129.00	$ -	$ 157.00	$ 0.62	$ 3.97	$ -	$ 4.59	$ 31.00	$ 198.50	$ -	$ 229.50
031113450010			FORMS IN PLACE, FOOTINGS																			
031113450020	14900	SFCA	C.I.P. concrete forms, footing, continuous wall, plywood, 1 use, includes erecting, bracing, stripping and cleaning	C1	375	0.085	$ 5.01	$ 3.00	$ -	$ 8.01	$ 74,649.00	$ 44,700.00	$ -	$ 119,349.00	$ 5.49	$ 4.62	$ -	$ 10.11	$ 81,801.00	$ 68,838.00	$ -	$ 150,639.00
031113453000	17500	SFCA	C.I.P. concrete forms, pile cap, square or rectangular, plywood, 1 use, includes erecting, bracing, stripping and cleaning	C1	290	0.11	$ 2.05	$ 3.87	$ -	$ 5.92	$ 35,875.00	$ 67,725.00	$ -	$ 103,600.00	$ 2.25	$ 5.96	$ -	$ 8.21	$ 39,375.00	$ 104,300.00	$ -	$ 143,675.00
031113454000	1770	SFCA	C.I.P. concrete forms, pile cap, triangular or hexagonal plywood, 1 use, includes erecting, bracing, stripping and cleaning	C1	225	0.142	$ 2.39	$ 4.98	$ -	$ 7.37	$ 4,230.30	$ 8,814.60	$ -	$ 13,044.90	$ 2.63	$ 7.69	$ -	$ 10.32	$ 4,655.10	$ 13,611.30	$ -	$ 18,266.40
031113500010			FORMS IN PLACE, GRADE BEAM																			
031113500020	5750	SFCA	C.I.P. concrete forms, grade beam, plywood, 1 use, includes erecting, bracing, stripping and cleaning	C2	530	0.091	$ 2.20	$ 3.26	$ -	$ 5.46	$ 12,650.00	$ 18,745.00	$ -	$ 31,395.00	$ 2.42	$ 5.02	$ -	$ 7.44	$ 13,915.00	$ 28,865.00	$ -	$ 42,780.00
031113850010			FORMS IN PLACE, WALLS																			
031113854200	33000	SFCA	C.I.P. concrete forms, wall, radial, smooth curved, below grade, job built plywood, to 8' high, 1 use, includes erecting, bracing, stripping and cleaning	C2	225	0.213	$ 1.80	$ 7.69	$ -	$ 9.49	$ 59,400.00	$ 253,770.00	$ -	$ 313,170.00	$ 1.99	$ 11.82	$ -	$ 13.81	$ 65,670.00	$ 390,060.00	$ -	$ 455,730.00
033923130010			CHEMICAL COMPOUND MEMBRANE CONCRETE CURING																			
033923130300	3500	C.S.F.	Concrete surface treatment, curing, sprayed membrane compound	2 Clab	95	0.168	$ 5.35	$ 5.37	$ -	$ 10.72	$ 18,725.00	$ 18,795.00	$ -	$ 37,520.00	$ 5.92	$ 8.32	$ -	$ 14.24	$ 20,720.00	$ 29,120.00	$ -	$ 49,840.00
033500000000			Concrete Finishing																			
033529000000			Tooled Concrete Finishing																			
033529300015			Concrete finishing, floors, basic finishing for unspecified flatwork, excludes placing, striking off & consolidating																			
033529300200	310000	S.F.	Concrete finishing, floors, basic finishing for unspecified flatwork, bull float, manual float & manual steel trowel, excludes placing, striking off & consolidating	C10	1265	0.019	$ -	$ 0.69	$ -	$ 0.69	$ -	$ 213,900.00	$ -	$ 213,900.00	$ -	$ 1.03	$ -	$ 1.03	$ -	$ 319,300.00	$ -	$ 319,300.00
053100000000			Steel Decking																			
053113505300	265000	S.F.	Metal floor decking, steel, non-cellular, composite, galvanized, 2" D, 20 gauge	E4	3600	0.009	$ 1.47	$ 0.52	$ 0.05	$ 2.04	$ 389,550.00	$ 137,800.00	$ 13,250.00	$ 540,600.00	$ 1.62	$ 0.91	$ 0.05	$ 2.58	$ 429,300.00	$ 241,150.00	$ 13,250.00	$ 683,700.00
032200000000			Welded Wire Fabric Reinforcing																			
032205500050			Welded wire fabric, sheets																			
032205500200	2700	C.S.F.	Welded wire fabric, sheets, 6 x 6 - W2.1 x W2.1 (8 x 8) 30 lb. per C.S.F., A185	2 Rodm	31	0.516	$ 18.98	$ 25.30	$ -	$ 44.28	$ 51,246.00	$ 68,310.00	$ -	$ 119,556.00	$ 20.71	$ 41.11	$ -	$ 61.82	$ 55,917.00	$ 110,997.00	$ -	$ 166,914.00
			Total								$ 1,460,769.30	$ 943,460.10	$ 44,124.70	$ 2,448,354.10					$ 1,604,871.10	$ 1,475,194.80	$ 47,316.10	$ 3,127,382.00

STRUCTURAL STEEL – RS MEANS COSTWORKS REPORT (1/2)

LineNumber	Quantity	Unit	Description	Crew	Daily Output	Labor Hours	Material	Labor	Equipment	Total	Ext. Mat.	Ext. Labor	Ext. Equip.	Ext. Total	Mat. O&P	Labor O&P	Equip. O&P	Total O&P	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
051223170010			COLUMNS, STRUCTURAL																			
051223174550	155	Ea.	Column, structural tubing, 6" x 6" x 1/4" x 12'-0", incl shop primer, cap & base plate, bolts	E2	54	1.037	$ 277.40	$ 57.33	$ 34.68	$ 369.41	$ 42,997.00	$ 8,886.15	$ 5,375.40	$ 57,258.55	$ 303.55	$ 96.56	$ 37.57	$ 437.68	$ 47,050.25	$ 14,966.80	$ 5,823.35	$ 67,840.40
051223174600	54	Ea.	Column, structural tubing, 8" x 8" x 3/8" x 14'-0", incl shop primer, cap & base plate, bolts	E2	50	1.12	$ 602.43	$ 61.56	$ 36.99	$ 700.98	$ 32,531.22	$ 3,324.24	$ 1,997.46	$ 37,852.92	$ 663.14	$ 104.41	$ 41.04	$ 808.59	$ 35,809.56	$ 5,638.14	$ 2,216.16	$ 43,663.86
051223175700	2	Ea.	Column, structural tubing, 12" x 8" x 1/2" x 16'-0", incl shop primer, cap & base plate, bolts	E2	48	1.167	$ 1,120.80	$ 63.97	$ 38.73	$ 1,223.50	$ 2,241.60	$ 127.94	$ 77.46	$ 2,447.00	$ 1,214.20	$ 108.63	$ 42.77	$ 1,365.60	$ 2,428.40	$ 217.26	$ 85.54	$ 2,731.20
051223177000	331	L.F.	Column, structural, 2-tier, W10x45, A992 steel, incl shop primer, splice plates, bolts	E2	1032	0.054	$ 50.90	$ 2.98	$ 1.80	$ 55.68	$ 16,847.90	$ 986.38	$ 595.80	$ 18,430.08	$ 56.04	$ 5.05	$ 1.98	$ 63.07	$ 18,549.24	$ 1,671.55	$ 655.38	$ 20,876.17
051223177150	96	L.F.	Column, structural, 2-tier, W12x50, A992 steel, incl shop primer, splice plates, bolts	E2	1032	0.054	$ 56.51	$ 2.98	$ 1.80	$ 61.29	$ 5,424.96	$ 286.08	$ 172.80	$ 5,883.84	$ 62.11	$ 5.05	$ 1.98	$ 69.14	$ 5,962.56	$ 484.80	$ 190.08	$ 6,637.44
051223177350	2458	L.F.	Column, structural, 2-tier, W14x74, A992 steel, incl shop primer, splice plates, bolts	E2	984	0.057	$ 83.59	$ 3.14	$ 1.88	$ 88.61	$ 205,464.22	$ 7,718.12	$ 4,621.04	$ 217,803.38	$ 92.00	$ 5.30	$ 2.08	$ 99.38	$ 226,136.00	$ 13,027.40	$ 5,112.64	$ 244,276.04
051223177400	1601	L.F.	Column, structural, 2-tier, W14x120, A992 steel, incl shop primer, splice plates, bolts	E2	960	0.058	$ 135.43	$ 3.21	$ 1.93	$ 140.57	$ 216,823.43	$ 5,139.21	$ 3,089.93	$ 225,052.57	$ 149.44	$ 5.43	$ 2.13	$ 157.00	$ 239,253.44	$ 8,693.43	$ 3,410.13	$ 251,357.00
051223177450	2554	L.F.	Column, structural, 2-tier, W14x176, A992 steel, incl shop primer, splice plates, bolts	E2	912	0.061	$ 198.94	$ 3.38	$ 2.03	$ 204.35	$ 508,092.76	$ 8,632.52	$ 5,184.62	$ 521,909.90	$ 218.56	$ 5.71	$ 2.24	$ 226.51	$ 558,202.24	$ 14,583.34	$ 5,720.96	$ 578,506.54
051223750010			STRUCTURAL STEEL MEMBERS																			
051223750140	52	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W6x20, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	$ 22.42	$ 5.14	$ 3.10	$ 30.66	$ 1,165.84	$ 267.28	$ 161.20	$ 1,594.32	$ 24.75	$ 8.69	$ 3.41	$ 36.85	$ 1,287.00	$ 451.88	$ 177.32	$ 1,916.20
051223750300	305	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W8x10, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	$ 11.30	$ 5.14	$ 3.10	$ 19.54	$ 3,446.50	$ 1,567.70	$ 945.50	$ 5,959.70	$ 12.42	$ 8.69	$ 3.41	$ 24.52	$ 3,788.10	$ 2,650.45	$ 1,040.05	$ 7,478.60
051223750350	111	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W8x21, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	$ 23.82	$ 5.14	$ 3.10	$ 32.06	$ 2,644.02	$ 570.54	$ 344.10	$ 3,558.66	$ 26.15	$ 8.69	$ 3.41	$ 38.25	$ 2,902.65	$ 964.59	$ 378.51	$ 4,245.75
051223750360	12	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W8x24, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	550	0.102	$ 27.09	$ 5.60	$ 3.38	$ 36.07	$ 325.08	$ 67.20	$ 40.56	$ 432.84	$ 29.89	$ 9.47	$ 3.71	$ 43.07	$ 358.68	$ 113.64	$ 44.52	$ 516.84
051223750500	54	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W8x31, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	550	0.102	$ 35.03	$ 5.60	$ 3.38	$ 44.01	$ 1,891.62	$ 302.40	$ 182.52	$ 2,376.54	$ 38.76	$ 9.47	$ 3.71	$ 51.94	$ 2,093.04	$ 511.38	$ 200.34	$ 2,804.76
051223750600	185	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W10x12, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	$ 13.54	$ 5.14	$ 3.10	$ 21.78	$ 2,504.90	$ 950.90	$ 573.50	$ 4,029.30	$ 14.90	$ 8.69	$ 3.41	$ 27.00	$ 2,756.50	$ 1,607.65	$ 630.85	$ 4,995.00
051223750620	26	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W10x15, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	$ 16.95	$ 5.14	$ 3.10	$ 25.19	$ 440.70	$ 133.64	$ 80.60	$ 654.94	$ 18.63	$ 8.69	$ 3.41	$ 30.73	$ 484.38	$ 225.94	$ 88.66	$ 798.98
051223750700	3010	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W10x22, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	600	0.093	$ 24.75	$ 5.14	$ 3.10	$ 32.99	$ 74,497.50	$ 15,471.40	$ 9,331.00	$ 99,299.90	$ 27.55	$ 8.69	$ 3.41	$ 39.65	$ 82,925.50	$ 26,156.90	$ 10,264.10	$ 119,346.50
051223750740	106	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W10x33, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	550	0.102	$ 37.36	$ 5.60	$ 3.38	$ 46.34	$ 3,960.16	$ 593.60	$ 358.28	$ 4,912.04	$ 41.10	$ 9.47	$ 3.71	$ 54.28	$ 4,356.60	$ 1,003.82	$ 393.26	$ 5,753.68
051223750900	57	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W10x49, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	550	0.102	$ 55.57	$ 5.60	$ 3.38	$ 64.55	$ 3,167.49	$ 319.20	$ 192.66	$ 3,679.35	$ 60.71	$ 9.47	$ 3.71	$ 73.89	$ 3,460.47	$ 539.79	$ 211.47	$ 4,211.73
051223751100	1621	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W12x16, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	880	0.064	$ 18.07	$ 3.50	$ 2.12	$ 23.69	$ 29,291.47	$ 5,673.50	$ 3,436.52	$ 38,401.49	$ 20.08	$ 5.93	$ 2.32	$ 28.33	$ 32,549.68	$ 9,612.53	$ 3,760.72	$ 45,922.93
051223751300	133	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W12x22, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	880	0.064	$ 24.75	$ 3.50	$ 2.12	$ 30.37	$ 3,291.75	$ 465.50	$ 281.96	$ 4,039.21	$ 27.55	$ 5.93	$ 2.32	$ 35.80	$ 3,664.15	$ 788.69	$ 308.56	$ 4,761.40
051223751500	705	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W12x26, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	880	0.064	$ 29.42	$ 3.50	$ 2.12	$ 35.04	$ 20,741.10	$ 2,467.50	$ 1,494.60	$ 24,703.20	$ 32.22	$ 5.93	$ 2.32	$ 40.47	$ 22,715.10	$ 4,180.65	$ 1,635.60	$ 28,531.35
051223751520	233	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W12x35, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	810	0.069	$ 39.70	$ 3.80	$ 2.29	$ 45.79	$ 9,250.10	$ 885.40	$ 533.57	$ 10,669.07	$ 43.43	$ 6.46	$ 2.52	$ 52.41	$ 10,119.19	$ 1,505.18	$ 587.16	$ 12,211.53
051223751560	32	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W12x50, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	750	0.075	$ 56.51	$ 4.12	$ 2.47	$ 63.10	$ 1,808.32	$ 131.84	$ 79.04	$ 2,019.20	$ 62.11	$ 6.94	$ 2.73	$ 71.78	$ 1,987.52	$ 222.08	$ 87.36	$ 2,296.96
051223751700	17	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W12x72, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	640	0.088	$ 81.26	$ 4.82	$ 2.90	$ 88.98	$ 1,381.42	$ 81.94	$ 49.30	$ 1,512.66	$ 89.66	$ 8.15	$ 3.19	$ 101.00	$ 1,524.22	$ 138.55	$ 54.23	$ 1,717.00
051223751900	3580	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W14x26, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	990	0.057	$ 29.42	$ 3.11	$ 1.87	$ 34.40	$ 105,323.60	$ 11,133.80	$ 6,694.60	$ 123,152.00	$ 32.22	$ 5.26	$ 2.07	$ 39.55	$ 115,347.60	$ 18,830.80	$ 7,410.60	$ 141,589.00
051223752100	133	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W14x30, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	900	0.062	$ 34.09	$ 3.43	$ 2.07	$ 39.59	$ 4,533.97	$ 456.19	$ 275.31	$ 5,265.47	$ 37.36	$ 5.79	$ 2.27	$ 45.42	$ 4,968.88	$ 770.07	$ 301.91	$ 6,040.86
051223752300	48	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W14x34, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	810	0.069	$ 38.29	$ 3.80	$ 2.29	$ 44.38	$ 1,837.92	$ 182.40	$ 109.92	$ 2,130.24	$ 42.50	$ 6.46	$ 2.52	$ 51.48	$ 2,040.00	$ 310.08	$ 120.96	$ 2,471.04
051223752320	40	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W14x43, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	810	0.069	$ 48.57	$ 3.80	$ 2.29	$ 54.66	$ 1,942.80	$ 152.00	$ 91.60	$ 2,186.40	$ 53.24	$ 6.46	$ 2.52	$ 62.22	$ 2,129.60	$ 258.40	$ 100.80	$ 2,488.80
051223752340	139	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W14x53, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	800	0.07	$ 59.78	$ 3.85	$ 2.32	$ 65.95	$ 8,309.42	$ 535.15	$ 322.48	$ 9,167.05	$ 65.85	$ 6.52	$ 2.55	$ 74.92	$ 9,153.15	$ 906.28	$ 354.45	$ 10,413.88
051223752700	13466	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W16x26, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	1000	0.056	$ 29.42	$ 3.08	$ 1.86	$ 34.36	$ 396,169.72	$ 41,475.28	$ 25,046.76	$ 462,691.76	$ 32.22	$ 5.21	$ 2.05	$ 39.48	$ 433,874.52	$ 70,157.86	$ 27,605.30	$ 531,637.68
051223752900	6517	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W16x31, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	900	0.062	$ 35.03	$ 3.43	$ 2.07	$ 40.53	$ 228,290.51	$ 22,353.31	$ 13,490.19	$ 264,134.01	$ 38.76	$ 5.79	$ 2.27	$ 46.82	$ 252,598.92	$ 37,733.43	$ 14,793.59	$ 305,125.94
051223753100	1040	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W16x40, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	800	0.07	$ 45.30	$ 3.85	$ 2.32	$ 51.47	$ 47,112.00	$ 4,004.00	$ 2,412.80	$ 53,528.80	$ 49.50	$ 6.52	$ 2.55	$ 58.57	$ 51,480.00	$ 6,780.80	$ 2,652.00	$ 60,912.80
051223753120	102	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W16x50, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	800	0.07	$ 56.51	$ 3.85	$ 2.32	$ 62.68	$ 5,764.02	$ 392.70	$ 236.64	$ 6,393.36	$ 62.11	$ 6.52	$ 2.55	$ 71.18	$ 6,335.22	$ 665.04	$ 260.10	$ 7,260.36

STRUCTURAL STEEL – RS MEANS COSTWORKS REPORT (2/2)

LineNumber	Quantity	Unit	Description	Crew	Daily Output	Labor Hours	Material	Labor	Equipment	Total	Ext. Mat.	Ext. Labor	Ext. Equip.	Ext. Total	Mat. O&P	Labor O&P	Equip. O&P	Total O&P	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
051223753140	7	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W16x67, A992 steel, shop fabricated, incl shop primer, bolted connections	E2	760	0.074	$ 75.65	$ 4.06	$ 2.44	$ 82.15	$ 529.55	$ 28.42	$ 17.08	$ 575.05	$ 83.13	$ 6.88	$ 2.69	$ 92.70	$ 581.91	$ 48.16	$ 18.83	$ 648.90
051223753300	3142	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x35, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	960	0.083	$ 39.70	$ 4.65	$ 2.12	$ 46.47	$ 124,737.40	$ 14,610.30	$ 6,661.04	$ 146,008.74	$ 43.43	$ 7.97	$ 2.32	$ 53.72	$ 136,457.06	$ 25,041.74	$ 7,289.44	$ 168,788.24
051223753500	1455	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x40, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	960	0.083	$ 45.30	$ 4.65	$ 2.12	$ 52.07	$ 65,911.50	$ 6,765.75	$ 3,084.60	$ 75,761.85	$ 49.50	$ 7.97	$ 2.32	$ 59.79	$ 72,022.50	$ 11,596.35	$ 3,375.60	$ 86,994.45
051223753520	1859	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x46, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	960	0.083	$ 51.84	$ 4.65	$ 2.12	$ 58.61	$ 96,370.56	$ 8,644.35	$ 3,941.08	$ 108,955.99	$ 56.97	$ 7.97	$ 2.32	$ 67.26	$ 105,907.23	$ 14,816.23	$ 4,312.88	$ 125,036.34
051223753700	2609	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x50, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	912	0.088	$ 56.51	$ 4.89	$ 2.22	$ 63.62	$ 147,434.59	$ 12,758.01	$ 5,791.98	$ 165,984.58	$ 62.11	$ 8.39	$ 2.44	$ 72.94	$ 162,044.99	$ 21,889.51	$ 6,365.96	$ 190,300.46
051223753900	1973	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x55, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	912	0.088	$ 62.11	$ 4.89	$ 2.22	$ 69.22	$ 122,543.03	$ 9,647.97	$ 4,380.06	$ 136,571.06	$ 68.18	$ 8.39	$ 2.44	$ 79.01	$ 134,519.14	$ 16,553.47	$ 4,814.12	$ 155,886.73
051223753920	1453	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x65, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	900	0.089	$ 73.32	$ 4.96	$ 2.25	$ 80.53	$ 106,533.96	$ 7,206.88	$ 3,269.25	$ 117,010.09	$ 80.79	$ 8.51	$ 2.47	$ 91.77	$ 117,387.87	$ 12,365.03	$ 3,588.91	$ 133,341.81
051223753940	2676	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x76, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	900	0.089	$ 85.93	$ 4.96	$ 2.25	$ 93.14	$ 229,948.68	$ 13,272.96	$ 6,021.00	$ 249,242.64	$ 94.33	$ 8.51	$ 2.47	$ 105.31	$ 252,427.08	$ 22,772.76	$ 6,609.72	$ 281,809.56
051223753960	850	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x86, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	900	0.089	$ 97.14	$ 4.96	$ 2.25	$ 104.35	$ 82,569.00	$ 4,216.00	$ 1,912.50	$ 88,697.50	$ 106.48	$ 8.51	$ 2.47	$ 117.46	$ 90,508.00	$ 7,233.50	$ 2,099.50	$ 99,841.00
051223753980	3154	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W18x106, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	900	0.089	$ 119.55	$ 4.96	$ 2.25	$ 126.76	$ 377,060.70	$ 15,643.84	$ 7,096.50	$ 399,801.04	$ 131.69	$ 8.51	$ 2.47	$ 142.67	$ 415,350.26	$ 26,840.54	$ 7,790.38	$ 449,981.18
051223754780	170	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W21x122, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1000	0.08	$ 138.23	$ 4.47	$ 2.02	$ 144.72	$ 23,499.10	$ 759.90	$ 343.40	$ 24,602.40	$ 151.31	$ 7.60	$ 2.23	$ 161.14	$ 25,722.70	$ 1,292.00	$ 379.10	$ 27,393.80
051223755780	95	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W24x146, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1050	0.076	$ 165.32	$ 4.25	$ 1.93	$ 171.50	$ 15,705.40	$ 403.75	$ 183.35	$ 16,292.50	$ 181.20	$ 7.24	$ 2.13	$ 190.57	$ 17,214.00	$ 687.80	$ 202.35	$ 18,104.15
051223755940	43	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W27x146, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1150	0.07	$ 165.32	$ 3.87	$ 1.76	$ 170.95	$ 7,108.76	$ 166.41	$ 75.68	$ 7,350.85	$ 181.20	$ 6.64	$ 1.94	$ 189.78	$ 7,791.60	$ 285.52	$ 83.42	$ 8,160.54
051223756520	116	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W30x132, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1160	0.069	$ 149.44	$ 3.85	$ 1.75	$ 155.04	$ 17,335.04	$ 446.60	$ 203.00	$ 17,984.64	$ 164.38	$ 6.58	$ 1.92	$ 172.88	$ 19,068.08	$ 763.28	$ 222.72	$ 20,054.08
051223756560	1388	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W30x173, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1120	0.071	$ 195.21	$ 3.98	$ 1.81	$ 201.00	$ 270,951.48	$ 5,524.24	$ 2,512.28	$ 278,988.00	$ 214.82	$ 6.82	$ 1.99	$ 223.63	$ 298,170.16	$ 9,466.16	$ 2,762.12	$ 310,398.44
051223756700	151	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W33x118, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1176	0.068	$ 133.56	$ 3.79	$ 1.72	$ 139.07	$ 20,167.56	$ 572.29	$ 259.72	$ 20,999.57	$ 146.64	$ 6.52	$ 1.90	$ 155.06	$ 22,142.64	$ 984.52	$ 286.90	$ 23,414.06
051223756900	152	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W33x130, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1134	0.071	$ 146.64	$ 3.93	$ 1.79	$ 152.36	$ 22,289.28	$ 597.36	$ 272.08	$ 23,158.72	$ 161.58	$ 6.76	$ 1.97	$ 170.31	$ 24,560.16	$ 1,027.52	$ 299.44	$ 25,887.12
051223757100	30	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W33x141, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1134	0.071	$ 159.71	$ 3.93	$ 1.79	$ 165.43	$ 4,791.30	$ 117.90	$ 53.70	$ 4,962.90	$ 175.59	$ 6.76	$ 1.97	$ 184.32	$ 5,267.70	$ 202.80	$ 59.10	$ 5,529.60
051223757120	30	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W33x169, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1100	0.073	$ 190.54	$ 4.06	$ 1.84	$ 196.44	$ 5,716.20	$ 121.80	$ 55.20	$ 5,893.20	$ 210.15	$ 6.94	$ 2.02	$ 219.11	$ 6,304.50	$ 208.20	$ 60.60	$ 6,573.30
051223757140	43	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W33x201, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1100	0.073	$ 226.96	$ 4.06	$ 1.84	$ 232.86	$ 9,759.28	$ 174.58	$ 79.12	$ 10,012.98	$ 250.31	$ 6.94	$ 2.02	$ 259.27	$ 10,763.33	$ 298.42	$ 86.86	$ 11,148.61
051223757300	28	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W36x135, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1170	0.068	$ 152.24	$ 3.81	$ 1.73	$ 157.78	$ 4,262.72	$ 106.68	$ 48.44	$ 4,417.84	$ 168.12	$ 6.52	$ 1.91	$ 176.55	$ 4,707.36	$ 182.56	$ 53.48	$ 4,943.40
051223757500	74	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W36x150, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1170	0.068	$ 169.99	$ 3.81	$ 1.73	$ 175.53	$ 12,579.26	$ 281.94	$ 128.02	$ 12,989.22	$ 186.80	$ 6.52	$ 1.91	$ 195.23	$ 13,823.20	$ 482.48	$ 141.34	$ 14,447.02
051223757700	82	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W36x194, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1125	0.071	$ 219.49	$ 3.96	$ 1.80	$ 225.25	$ 17,998.18	$ 324.72	$ 147.60	$ 18,470.50	$ 240.97	$ 6.76	$ 1.98	$ 249.71	$ 19,759.54	$ 554.32	$ 162.36	$ 20,476.22
051223757900	1346	L.F.	Structural steel member, 100-ton project, 1 to 2 story building, W36x231, A992 steel, shop fabricated, incl shop primer, bolted connections	E5	1125	0.071	$ 261.52	$ 3.96	$ 1.80	$ 267.28	$ 352,005.92	$ 5,330.16	$ 2,422.80	$ 359,758.88	$ 284.87	$ 6.76	$ 1.98	$ 293.61	$ 383,435.02	$ 9,098.96	$ 2,665.08	$ 395,199.06
051223175550	19	Ea.	Column, structural tubing, 6" x 4" x 5/16" x 12'-0", incl shop primer, cap & base plate, bolts	E2	54	1.037	$ 256.85	$ 57.33	$ 34.68	$ 348.86	$ 4,880.15	$ 1,089.27	$ 658.92	$ 6,628.34	$ 284.87	$ 96.56	$ 37.57	$ 419.00	$ 5,412.53	$ 1,834.64	$ 713.83	$ 7,961.00
051223175600	31	Ea.	Column, structural tubing, 8" x 4" x 3/8" x 12'-0", incl shop primer, cap & base plate, bolts	E2	54	1.037	$ 373.60	$ 57.33	$ 34.68	$ 465.61	$ 11,581.60	$ 1,777.23	$ 1,075.08	$ 14,433.91	$ 410.96	$ 96.56	$ 37.57	$ 545.09	$ 12,739.76	$ 2,993.36	$ 1,164.67	$ 16,897.79
051223175700	21	Ea.	Column, structural tubing, 12" x 8" x 1/2" x 16'-0", incl shop primer, cap & base plate, bolts	E2	48	1.167	$ 1,120.80	$ 63.97	$ 38.73	$ 1,223.50	$ 23,536.80	$ 1,343.37	$ 813.33	$ 25,693.50	$ 1,214.20	$ 108.63	$ 42.77	$ 1,365.60	$ 25,498.20	$ 2,281.23	$ 898.17	$ 28,677.60
051223201200	54	L.F.	Curb edging, structural steel channel w/ anchors, on concrete forms, 8.2 plf, 6", shop fabricated	E4	255	0.125	$ 10.69	$ 7.18	$ 0.66	$ 18.53	$ 577.26	$ 387.72	$ 35.64	$ 1,000.62	$ 11.77	$ 12.61	$ 0.73	$ 25.11	$ 635.58	$ 680.94	$ 39.42	$ 1,355.94
051223201500	569	L.F.	Curb edging, structural steel channel w/ anchors, on concrete forms, 20.7 plf, 12", shop fabricated	E4	140	0.229	$ 26.15	$ 13.10	$ 1.20	$ 40.45	$ 14,879.35	$ 7,453.90	$ 682.80	$ 23,016.05	$ 28.95	$ 22.99	$ 1.33	$ 53.27	$ 16,472.55	$ 13,081.31	$ 756.77	$ 30,310.63
			Total								$ 4,182,778.63	$ 265,509.31	$ 140,104.97	$ 4,588,392.91					$ 4,594,987.01	$ 451,932.51	$ 153,979.73	$ 5,200,899.25

STRUCTURAL CONCRETE – QUANTITY TAKE-OFFS

MICROPILES

DIAMETER	AVG LENGTH, (LF)	VOLUME, (CY)	COUNT	TOTAL VOLUME
7"	55	0.54	431	234.64

PILECAPS

PILECAPS	DIMENSIONS	COUNT	VOLUME, (CF)	VOLUME, (CY)	TOTAL VOLUME, (CY)	FORMWORK, (SFCA)	TOTAL FORMWORK, (SFCA)
P1	3'x3'x3.5'	5	31.50	1.17	5.83	51	255
P2	3'x6'4"x3.5'	39	66.47	2.46	96.01	84	3289
P3	Triangular 6' DEEP	14	198.07	7.34	102.70	126	1763
P4	7.5'x7.5'x6'	20	337.50	12.50	250.00	236	4725
P5	6.5'x9'x6'	17	351.00	13.00	221.00	245	4157
P6	7'x11'x6'	5	462.00	17.11	85.56	293	1465
P8	10'x11'x6'	5	660.00	24.44	122.22	362	1810
P10	10'x15'x6'	4	900.00	33.33	133.33	450	1800

STRUT BEAMS

STRUT BEAM	DIMENSIONS	LENGTH, (LF)	VOLUME, (CF)	TOTAL VOLUME, (CY)	FORMWORK, (SFCA)	TOTAL FORMWORK, (SFCA)
1	1.5'x2'8"	2052	8208.1026	304.00	145	14843

*ASSUMPTION: FORMWORK PER 20FT SECTIONS 102.6 SECTIONS

GRADE BEAMS

GRADE BEAM	DIMENSIONS	LENGTH, (LF)	VOLUME, (CF)	TOTAL VOLUME, (CY)	FORMWORK, (SFCA)	TOTAL FORMWORK, (SFCA)
SGB-1	1'x1.5'	108	162	6.00	83	448
SGB-2	1.5'x2'	504	1512	56.00	116	2923
SGB-3	2'x3'	276	1656	61.33	172	2374

*ASSUMPTION: FORMWORK PER 20FT SECTIONS

FOUNDATION WALLS

THICKNESS	AREA, (SF)	VOLUME, (CF)	VOLUME, (CY)	TOTAL FORMWORK, (SFCA)
12"	684	684	25.33	1573
16"	13209	17612	652.30	30381
20"	408	680	25.19	938

*ASSUMPTION: TOOK TOTAL SF AND MULTIPLIED BY 2 FOR THE TWO FACES OF THE WALL IN ADDITION TO 15% WASTE FACTOR

SLAB ON GRADE (SOG)

THICKNESS	AREA	VOLUME (CF)	VOLUME (CY)	PERIMETER, (LF)	TOTAL FORMWORK, (SFCA)
5"	38288	15,953.33	590.86	800	333
6"	21992	10,996.00	407.26	650	325
8"	54	36.00	1.33	65	43
			999.46		

ELEVATED SLABS

LEVEL	THICKNESS	AREA	VOLUME (CF)	VOLUME (CY)	PERIMETER, (LF)	TOTAL FORMWORK, (SFCA)
1	4-1/2"	56,785.00	21,294.38	788.68	1800	675
2	4-1/2"	40,594.00	15,222.75	563.81	1600	600
3	4-1/2"	38,071.00	14,276.63	528.76	1550	581
4	4-1/2"	38,136.00	14,301.00	529.67	1550	581
5	4-1/2"	37,052.00	13,894.50	514.61	1550	581
ROOF	4-1/2"	37,052.00	13,894.50	514.61	1550	581

	TOTAL
FORMWORK	77045 SFCA
CONCRETE	6,821.04 CY

STRUCTURAL STEEL COLUMNS – QUANTITY TAKE-OFFS

FAMILY	TYPE	COUNT	lb/LF	LF	TONS	COSTWORK	QUANTITY
HSS	HSS12X6X5/16	1	36.00	31.15	0.56	12x8x1/2	1.95
HSS	HSS4X4X1/2	2	21.63	7.88	0.09	6x6x1/4	154.23
HSS	HSS4X4X3/8	35	17.27	82.46	0.71	6x6x1/4	
HSS	HSS5X5X1/2	43	28.43	1460.43	20.76	6x6x1/4	
HSS	HSS5X5X3/8	7	22.37	100.21	1.12	6x6x1/4	
HSS	HSS6X6X3/8	15	27.48	199.76	2.74	6x6x1/4	
HSS	HSS7X7X1/2	13	42.05	263.88	5.55	8x8x3/8	53.80
HSS	HSS8X6X1/4	10	22.40	175.71	1.97	8x8x3/8	
HSS	HSS8X6X5/8	4	50.60	65.52	1.66	8x8x3/8	
HSS	HSS8X8X5/8	16	59.32	248.14	7.36	8x8x3/8	
W-Wide Flange	W10X33	17	33.00	257.94	4.26	W10X45	331
W-Wide Flange	W10X45	7	45.00	73.19	1.65	W10X45	
W-Wide Flange	W12X40	4	40.00	33.27	0.67	W12X50	96
W-Wide Flange	W12X65	2	65.00	62.30	2.02	W12X50	
W-Wide Flange	W14X109	18	109.00	281.46	15.34	W14X120	1601
W-Wide Flange	W14X120	30	120.00	422.50	25.35	W14X120	
W-Wide Flange	W14X132	20	132.00	243.46	16.07	W14X120	
W-Wide Flange	W14X145	20	145.00	276.42	20.04	W14X120	
W-Wide Flange	W14X159	2	159.00	19.00	1.51	W14X176	2554
W-Wide Flange	W14X176	8	176.00	122.87	10.81	W14X176	
W-Wide Flange	W14X211	18	211.00	326.96	34.49	W14X176	
W-Wide Flange	W14X283	32	283.00	592.00	83.77	W14X176	
W-Wide Flange	W14X311	16	311.00	252.00	39.19	W14X176	
W-Wide Flange	W14X342	72	342.00	1115.25	190.71	W14X176	
W-Wide Flange	W14X398	8	398.00	125.75	25.02	W14X176	
W-Wide Flange	W14X43	11	43.00	178.88	3.85	W14X74	2458
W-Wide Flange	W14X53	5	53.00	142.50	3.78	W14X74	
W-Wide Flange	W14X61	17	61.00	293.42	8.95	W14X74	
W-Wide Flange	W14X68	10	68.00	204.25	6.94	W14X74	
W-Wide Flange	W14X74	6	74.00	103.92	3.84	W14X74	
W-Wide Flange	W14X82	2	82.00	30.96	1.27	W14X74	
W-Wide Flange	W14X90	96	90.00	1503.76	67.67	W14X74	
W-Wide Flange	W14X99	22	99.00	377.46	18.68	W14X120	

STRUCTURAL STEEL FRAMING – QUANTITY TAKE-OFFS (1/2)

FAMILY	TYPE	COUNT	lb/LF	LF	TONS	COSTWORKS	QUANTITY
W-Wide Flange	W10X112	20	112.00	396.61	22.21	W18X106	3154
W-Wide Flange	W10X12	18	12.00	185.45	1.11	W10X12	185
W-Wide Flange	W10X15	2	15.00	26.00	0.20	W10X15	26
W-Wide Flange	W10X22	297	22.00	3009.77	33.11	W10X22	3010
W-Wide Flange	W10X33	10	33.00	105.93	1.75	W10X33	106
W-Wide Flange	W10X45	4	45.00	57.00	1.28	W10X49	57
W-Wide Flange	W10X88	27	88.00	575.23	25.31	W18X86	850
W-Wide Flange	W12X14	87	14.00	1375.91	9.63	W12X16	1621
W-Wide Flange	W12X16	12	16.00	244.95	1.96	W12X16	
W-Wide Flange	W12X19	8	19.00	133.04	1.26	W12X22	133
W-Wide Flange	W12X26	44	26.00	705.13	9.17	W12X26	705
W-Wide Flange	W12X30	26	30.00	233.29	3.50	W12X35	233
W-Wide Flange	W12X40	2	40.00	32.00	0.64	W12X50	32
W-Wide Flange	W12X65	1	65.00	16.50	0.54	W12X72	17
W-Wide Flange	W14X22	235	22.00	3561.37	39.18	W14X26	3580
W-Wide Flange	W14X26	1	26.00	19.09	0.25	W14X26	19
W-Wide Flange	W14X30	10	34.00	133.36	2.27	W14X30	133
W-Wide Flange	W14X34	2	34.00	47.70	0.81	W14X34	48
W-Wide Flange	W14X43	3	43.00	40.48	0.87	W14X43	40
W-Wide Flange	W14X53	4	53.00	138.65	3.67	W14X53	139
W-Wide Flange	W16X26	472	26.00	13465.85	175.06	W16X26	13466
W-Wide Flange	W16X31	211	31.00	6517.39	101.02	W16X31	6517
W-Wide Flange	W16X36	22	36.00	495.56	8.92	W16X40	1040
W-Wide Flange	W16X40	20	40.00	544.52	10.89	W16X40	
W-Wide Flange	W16X45	4	45.00	70.65	1.59	W16X50	102
W-Wide Flange	W16X50	1	50.00	31.10	0.78	W16X50	
W-Wide Flange	W16X67	1	67.00	7.23	0.24	W16X67	7
W-Wide Flange	W18X35	128	35.00	3141.50	54.98	W18X35	3142
W-Wide Flange	W18X40	42	40.00	1455.46	29.11	W18X40	1455
W-Wide Flange	W18X46	5	46.00	179.84	4.14	W18X46	1859
W-Wide Flange	W18X50	6	50.00	80.49	2.01	W18X50	2609
W-Wide Flange	W18X55	1	55.00	6.76	0.19	W18X55	1973
W-Wide Flange	W18X60	3	60.00	86.50	2.60	W18X65	1453
W-Wide Flange	W21X101	25	101.00	622.38	31.43	W18X106	
W-Wide Flange	W21X111	4	111.00	170.50	9.46	W21X122	170
W-Wide Flange	W21X44	54	44.00	1679.14	36.94	W18X46	
W-Wide Flange	W21X48	8	48.00	177.84	4.27	W18X50	
W-Wide Flange	W21X50	75	50.00	2350.20	58.75	W18X50	
W-Wide Flange	W21X55	1	55.00	24.76	0.68	W18X55	
W-Wide Flange	W21X57	3	57.00	71.79	2.05	W18X65	
W-Wide Flange	W21X62	15	62.00	289.92	8.99	W18X65	
W-Wide Flange	W24X104	6	104.00	167.28	8.70	W18X106	
W-Wide Flange	W24X131	1	131.00	32.83	2.15	W24X146	95

STRUCTURAL STEEL FRAMING – QUANTITY TAKE-OFFS (2/2)

FAMILY	TYPE	COUNT	lb/LF	LF	TONS	COSTWORKS	QUANTITY
W-Wide Flange	W24X146	2	146.00	62.19	4.54	W24X146	
W-Wide Flange	W24X176	41	176.00	1387.84	122.13	W30X173	1388
W-Wide Flange	W24X229	39	229.00	1345.50	154.06	W36X231	1346
W-Wide Flange	W24X55	79	55.00	1941.29	53.39	W18X55	
W-Wide Flange	W24X62	39	62.00	1004.75	31.15	W18X65	
W-Wide Flange	W24X68	34	68.00	1021.25	34.72	W18X76	2676
W-Wide Flange	W24X76	65	76.00	1654.98	62.89	W18X76	
W-Wide Flange	W24X84	13	84.00	274.92	11.55	W18X86	
W-Wide Flange	W24X94	8	94.00	215.91	10.15	W18X106	
W-Wide Flange	W27X129	2	129.00	29.60	1.91	W30X132	116
W-Wide Flange	W27X146	1	146.00	42.83	3.13	W27X146	43
W-Wide Flange	W27X94	42	94.00	1154.57	54.26	W18X106	
W-Wide Flange	W30X108	1	108.00	30.29	1.64	W18X106	
W-Wide Flange	W30X124	2	124.00	60.58	3.76	W30X132	
W-Wide Flange	W30X132	1	132.00	26.00	1.72	W30X132	
W-Wide Flange	W30X90	18	90.00	459.32	20.67	W18X106	
W-Wide Flange	W30X99	5	99.00	108.00	5.35	W18X106	
W-Wide Flange	W33X118	5	118.00	151.00	8.91	W33X118	151
W-Wide Flange	W33X130	5	130.00	152.29	9.90	W33X130	152
W-Wide Flange	W33X141	1	141.00	30.29	2.14	W33X141	30
W-Wide Flange	W33X169	2	169.00	30.21	2.55	W33X169	30
W-Wide Flange	W36X135	2	135.00	27.54	1.86	W36X135	28
W-Wide Flange	W40X149	2	149.00	74.08	5.52	W36X150	74
W-Wide Flange	W40X183	3	183.00	81.75	7.48	W36X194	82
W-Wide Flange	W40X199	1	199.00	42.83	4.26	W33X201	43
W-Wide Flange	W6X16	5	16.00	52.20	0.42	W6X20	52
W-Wide Flange	W8X10	50	10.00	305.12	1.53	W8X10	305
W-Wide Flange	W8X18	20	18.00	110.77	1.00	W8X21	111
W-Wide Flange	W8X24	1	24.00	12.00	0.14	W8X24	12
W-Wide Flange	W8X31	4	31.00	53.51	0.83	W8X31	54

C-Channel	C10X20	33	20.00	569.28	5.69	C12X20.7	569
C-Channel	C5X6.7	15	6.70	54.35	0.18	C6X8.2	54
HSS	HSS14X6X3/8	3	47.80	38.50	0.92	12X8X1/2	327
HSS	HSS16X8X5/8	3	93.10	66.00	3.07	12X8X1/2	
HSS	HSS20X12X1/2	1	103.00	24.76	1.28	12X8X1/2	
HSS	HSS20X12X5/8	1	127.00	11.29	0.72	12X8X1/2	
HSS	HSS20X8X5/16	6	57.30	164.60	4.72	12X8X1/2	
HSS	HSS20X8X5/8	1	110.00	22.00	1.21	12X8X1/2	
HSS	HSS5X3X3/8	3	17.20	19.52	0.17	6X4X5/16	228
HSS	HSS6X6X3/8	9	27.40	208.31	2.85	6X4X5/16	
HSS	HSS8X6X1/4	30	22.40	369.93	4.14	8X4X3/8	370

APPENDIX D: GENERAL CONDITIONS ESTIMATE

TABLE A: GENERAL CONDITIONS : SUPERVISION AND PERSONNEL

ITEM	QUANTITY	UNIT	Hrs/Week	UNIT RATE	COST
Project Executive	135	WKS	8	$ 140.95	$ 152,226.00
Sr. Project Manager	135	WKS	40	$ 121.56	$ 656,424.00
General Superintendent	135	WKS	40	$ 107.75	$ 581,850.00
Superintendent	122	WKS	40	$ 100.95	$ 492,636.00
Assistant Superintendent	132	WKS	40	$ 91.25	$ 481,800.00
Project Manager	135	WKS	40	$ 88.95	$ 480,330.00
Project Manager	129	WKS	40	$ 88.95	$ 458,982.00
Project Manager	135	WKS	40	$ 88.95	$ 480,330.00
MEP Coordinator	139	WKS	40	$ 88.95	$ 494,562.00
Assistant Project Manager	141	WKS	40	$ 55.65	$ 313,866.00
Cost Engineer	116	WKS	16	$ 88.00	$ 163,328.00
Project Scheduler	131	WKS	24	$ 100.97	$ 317,449.68
Project Accountant	135	WKS	24	$ 67.95	$ 220,158.00
	TOTAL				$ 5,293,941.68

TABLE B: GENERAL CONDITIONS : FIELD OFFICE EXPENSE

ITEM	QUANTITY		UNIT	UNIT RATE	COST
Office Trailers - Set-Up	1	LS	1	$ 12,500.00	$ 12,500.00
Office Trailers - Rental	31	MOS	1	$ 2,400.00	$ 74,400.00
Electric - Consumption	31	MOS	1	$ 600.00	$ 18,600.00
Water & Sanitary Consum.	31	MOS	1	$ 250.00	$ 7,750.00
Alarm - Set-up	1	LS	1	$ 1,500.00	$ 1,500.00
Alarm - Monthly	31	MOS	1	$ 200.00	$ 6,200.00
Telephones - Monthly	31	MOS	1	$ 1,125.00	$ 34,875.00
Mobile/Cellular	31	MOS	19	$ 100.00	$ 58,900.00
Furniture	1	LS	1	$ 20,000.00	$ 20,000.00
Stationary & Supplies	31	MOS	1	$ 1,150.00	$ 35,650.00
Copier - (Purchase)	1	LS	1	$ 52,500.00	$ 52,500.00
Fax Machine - Purchase	1	LS	1	$ 2,500.00	$ 2,500.00
Business Machine Maint.	31	MOS	1	$ 250.00	$ 7,750.00
Computer Equipment	31	MOS	1	$ 3,108.00	$ 96,348.00
Progress Photos	30	MOS	1	$ 625.00	$ 18,750.00
Personal Protective Equip.	1	LS	1	$ 11,250.00	$ 11,250.00
Safety Supplies	31	MOS	1	$ 235.00	$ 7,285.00
	TOTAL				$ 466,758.00

TABLE C: GENERAL CONDITIONS : TEMPORARY FACILITIES

ITEM	QUANTITY	UNIT	UNIT RATE	COST
Porta-Potties - On Grade	30 MOS	1	$ 1,450.00	$ 43,500.00
Office Trailer Removal	1 LS	1	$ 23,257.00	$ 23,257.00
Temp. Storage Trailers	30 MOS	1	$ 500.00	$ 15,000.00
Temp. Fire Extinguishers	30 MOS	1	$ 150.00	$ 4,500.00
	TOTAL			$ 86,257.00

TABLE D: GENERAL CONDITIONS : MISCELLANEOUS COSTS

ITEM	QUANTITY	UNIT	UNIT RATE	COST
Project Signs	30 MOS	1	$ 1,200.00	$ 36,000.00
Tool Rentals	31 MOS	1	$ 500.00	$ 15,500.00
Housing Expenses	31 MOS	1	$ 6,647.00	$ 206,057.00
Travel Expenses	31 MOS	1	$ 5,996.00	$ 185,876.00
Automobile Mileage	31 MOS	1	$ 10,125.00	$ 313,875.00
Meeting Expenses	31 MOS	1	$ 525.00	$ 16,275.00
	TOTAL			$ 773,583.00

TABLE E: GENERAL CONDITIONS SUMMARY

ITEM	QUANTITY	UNIT	UNIT RATE	COST
SUPERVISION AND PERSONNEL	31 MOS	1	$ 170,772.31	$ 5,293,941.68
FIELD OFFICE EXPENSE	31 MOS	1	$ 15,056.71	$ 466,758.00
TEMPORARY FACILITIES	31 MOS	1	$ 2,782.48	$ 86,257.00
MISCELLANEOUS COSTS	31 MOS	1	$ 24,954.29	$ 773,583.00
TOTAL	**31 MOS**	**1**	**$ 213,565.79**	**$ 6,620,539.68**