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Tech 1

2007

St. Elizabeth's New Psychiatric Hospital
2700 Martin Luther King Jr. Ave., SE
Washington, DC 20032

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I. EXECUTIVE SUMMARY

The Project consists of a 2-story 448,000 square foot new mental hospital that includes a central mechanical plant, auditorium, gymnasium, and commercial kitchen.

Area Statistics

- Gross Area: 448,190 sq ft
- Assignable Area: 349,730 sq ft
- Amenities and Building Support: 99,460 sq ft

Occupancy Classification:

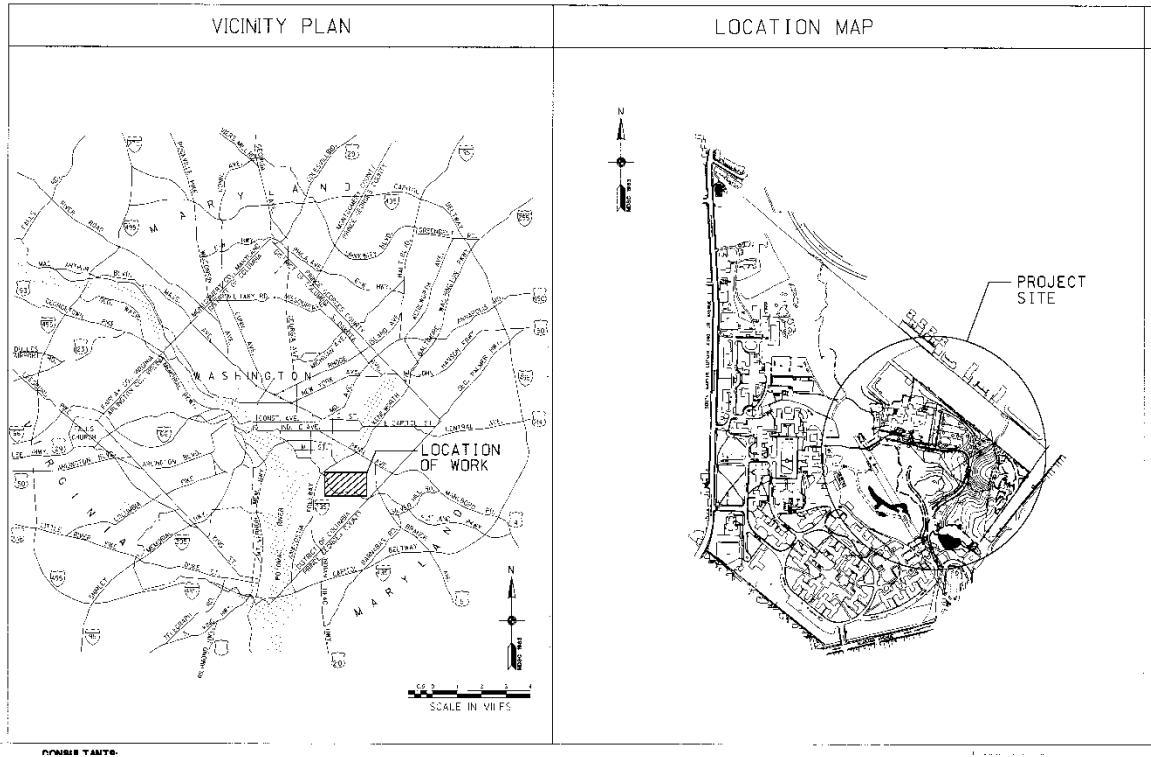
Mixed Occupancy building with dining, treatment malls, wards, and small area of Assembly occupancy on the first floor.

The project broke ground in December 2006 and has been progressing at scheduled speed. Presently, the new hospital is midway through the erection of the building superstructure and the on-site personnel count is at approximately 125.

With only two stories of occupiable space, the building footprint is extremely large in order accommodate the prescribed square footage. As a result, an extraordinary amount of site work was necessary to prepare the area for underground utilities and foundations. Of particular interest was the implementation of Geopiers, an engineered soil stiffening system that allowed for the omission of deep foundations due to poor soil conditions. These poor conditions are result of the site sitting atop of a civil war dumping ground which harbored a considerable amount of contaminated soil and possible unexploded ordinance. These issues made for an interesting site work phase and will be a definite area of focus for later research.

The sequencing of masonry and steel erection was another unique topic. The General contractor awarded two masonry contracts to separate companies who started at opposite wings of the hospital. The two contractors were then put in competition for the contract for the center portion of work. This helped to accelerate the masonry schedule in order to stay ahead of steel erection and added incentive to finish first and on time. This contractual setup was unordinary but effective; however the exploration of an alternative system may offer improved options.

II. MAPS



III. CLIENT INFORMATION

The St. Elizabeth’s campus has centuries of history reaching back to the days of the civil war when injured troops were quartered there. The campus has taken care of American soldier’s through WWII, but the medical focus of the campus changed direction at the turn of the century when mental health exploration became paramount. The Department of Mental Health took over the property and began to use the campus structures as a research facilities dealing with the human brain.

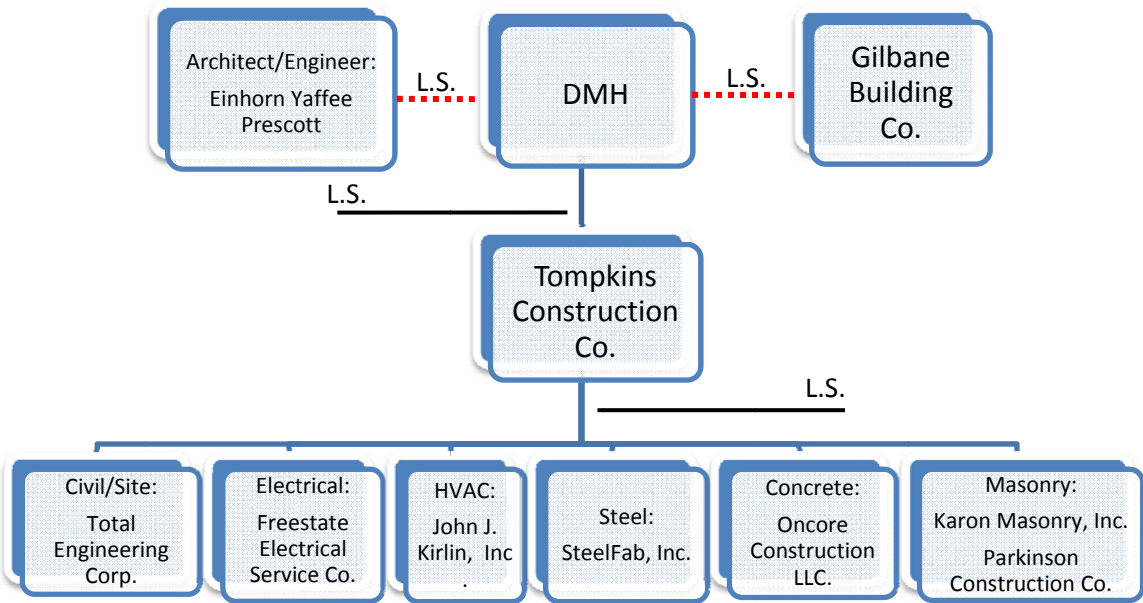
Unfortunately, decades of neglect left many of the existing facilities on the St. Elizabeth’s Campus to slowly become vacant and dilapidated. The buildings that are currently operational are extremely outdated and in dire need of rehabilitation. It was determined that renovating these existing structures would not sufficiently meet the needs of DMH and the idea of building a new hospital was explored. Presently, both civilly and criminally insane patients reside in the John Howard Pavilion, a facility that is both outdated structurally and technologically. This hospital is would need extensive renovations to be brought up to date, and even then would most likely fall short of the patients needs. Ultimately, the construction of a brand new hospital was decidedly the best route and DMH secured the monetary needs to begin the process.

IV. LOCAL CONDITIONS

- Preferred regional construction methods: Cast-in-Place Concrete, Masonry, Light Steel
- Construction Parking: Downtown area is very tight, outlying boroughs better but not ideal.
- Construction recycling services are available locally for most materials.
- Midwest average tipping fee: \$34.96/ton (2004) (NSWMA)
- Regional Soil Types: Clay, Sands, Gravel, Silts
- Subsurface Conditions: Low lying areas encounter a high water table stemming from the nearby Potomic River. However, St. Elizabeth’s @ 270ft. above sea level did not encounter any such issues.

V. PROJECT DELIVERY SYSTEM

The Department of Mental Health, as with a lot of government agencies, opted to hire a Construction Manager to deliver the new hospital. Bringing on a CM agent alleviated the pressure on DMH to single-handedly get the project off the ground. As a result, Gilbane took the reins at a very early stage and provided insight into construction decisions that DMH may not be qualified to make. Lining up all the necessary steps to put the construction of the new hospital in motion is an intricate chain of events that the Government of the District of Columbia felt would be best handled by a professional firm.



V.I CONTRACTUAL AGREEMENTS

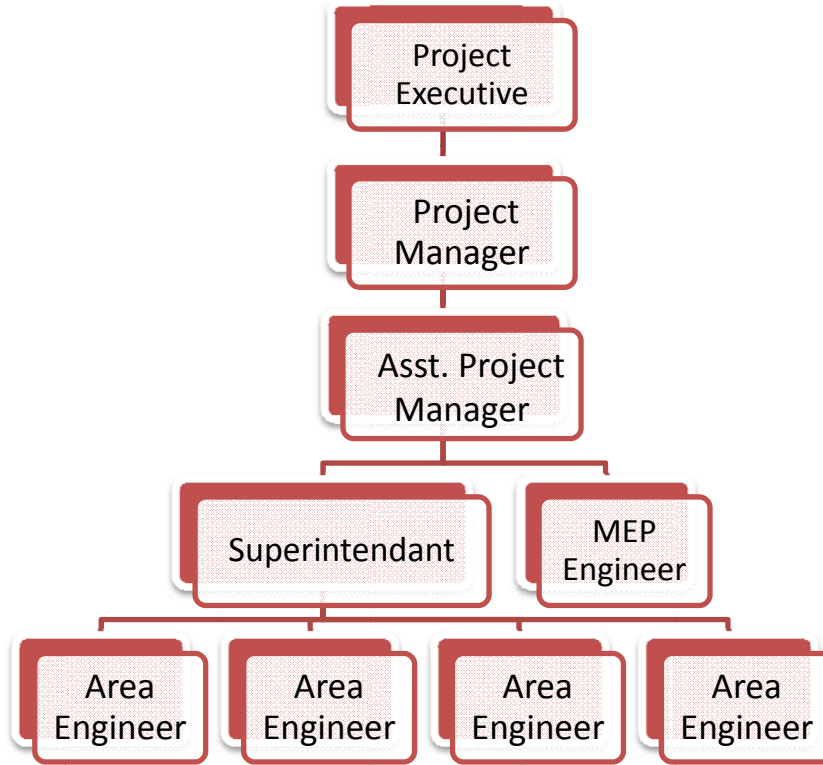
The Department of Mental Health decided on rather simple contractual arrangements. They employed the A/E and CM with Lump Sum contracts and decided on a tradition design-bid-built delivery system. Tompkins Constructions Co. was then awarded a Lump Sum contract to perform as the GC. They then bid out construction packages and employed subcontractors under the same Lump Sum contract type. The contract types and delivery system selected are a rather appropriate match for this project. DMH was under no real time pressure to get the new hospital constructed and the government is traditionally most comfortable with Lump Sum agreements. Also, the lowest bidder award system is common in the government arena and St. Elizabeth's was no exception. Accordingly, a fixed price contract setup and an overall extended construction process was an acceptable means for delivery and contracting.

(See Appendix for bonding and insurance requirements.)

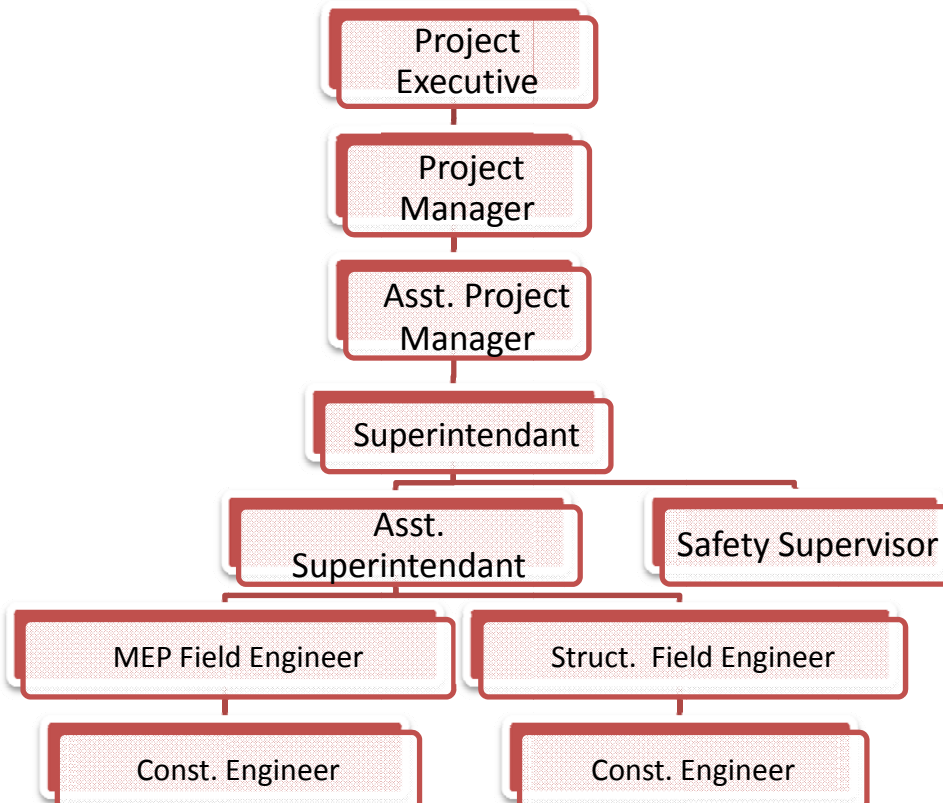
VI. PROJECT MANAGEMENT OVERVIEW

Gilbanes' staff was brought on to the project in the very early stages. They provided estimating, scheduling, and budgeting services to DMH in order to get the project off the ground. The staff also offered constructability reviews and took the project to bid. As Tompkins was brought on, the management effort combined and the two companies readied to mobilize. When construction began Gilbanes' team continued its' advisory role with schedule and budget updates, document management and field reports. Tompkins staff began to focus on subcontractor management and more specific construction issues such as material acquisition. However, both PMs shifted their efforts towards budget control, cost reporting and monthly progress reports. The Asst. PMs focused on schedule updates and progress tracking and the superintendants were mainly in charge of quality control and safety reporting. For Gilbanes staff, each area engineer is responsible for a given number of CSI sections. They each deal with RFI's, PCO's, submittals and product samples for their respective sections and report to their superintendant accordingly. In addition to this basic staff, a MEP supervisor was also hired. Because of the hospitals complex MEP systems, Gilbane felt it would be beneficial to have an expert onboard for submittal reviews, RFIs, etc. Tompkins lower ranks are organized around a looser version of a CSI breakdown. Two main engineers, structural and MEP respectively, cover these areas with the assistance of field engineers who focus mainly on document control. Tompkins also opted to employ a full-time safety supervisor who patrols the site daily and produces reports that end up on the desk of the Gilbane superintendant for review.

VI.1 GILBANE BUILDING CO. (CM) PROJECT TEAM



TOMPKINS CONSTRUCTION CO. (GC) PROJECT TEAM



VIII. BUILDING SYSTEMS SUMMARY

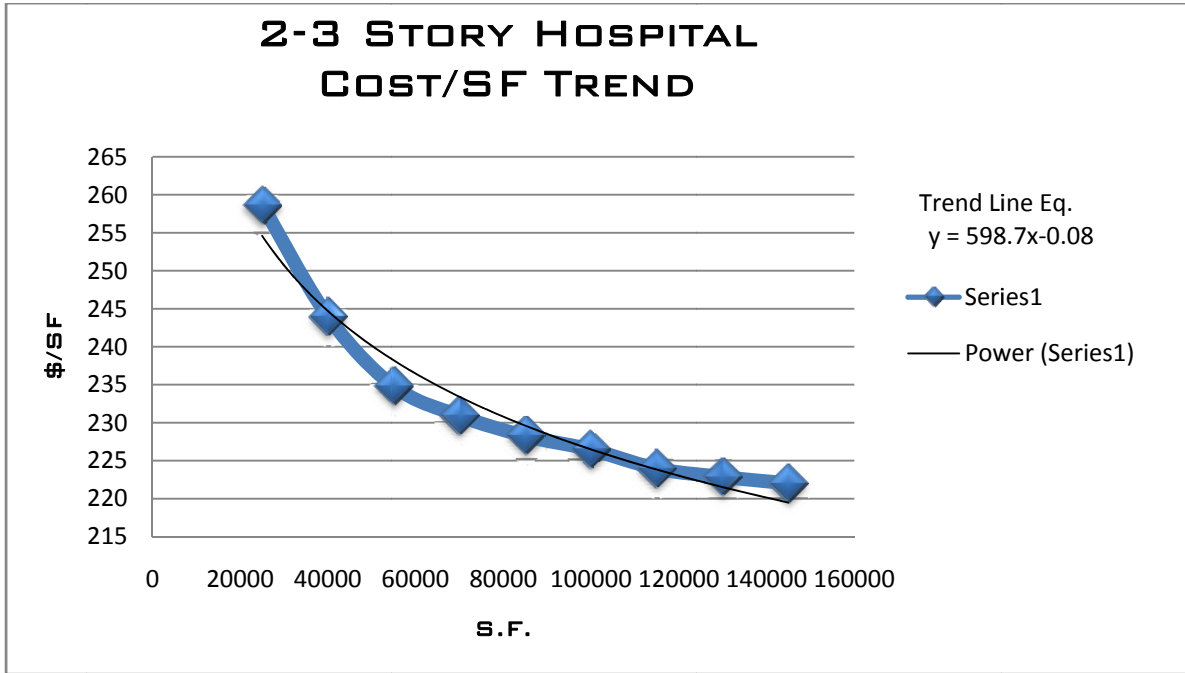
YES	NO	Work Scope	Information
	X	Demolition	~
X		Structural Steel	<ul style="list-style-type: none"> ▪ No bracing. The interior steel frame is a simple design supported by load bearing masonry and short columns. ▪ There is composite deck and slab throughout structure for the 2nd floor and roof. ▪ A 75 ton Manitowoc Mobile Track Crane is being used on site.
X		Cast in Place Concrete	<ul style="list-style-type: none"> ▪ There is CIP concrete for shallow footings, SOG and SOMD. ▪ The only vertical CIP concrete is in the retaining wall at the NE corner of the site. ▪ The formwork for all CIP on site, both vertical and horizontal, is built on site using typical wood framing practices. ▪ A pump truck was used for placement on all major pours.
	X	Precast Concrete	~
X		Mechanical System	<ul style="list-style-type: none"> ▪ There is one main mechanical plant located between the two wings at the west end of the building. ▪ The HVAC system consists of constant volume AHUs that distribute through rigid metal duct and terminate with VAV units. ▪ The chilled water system consists of two (2) water cooled centrifugal chillers, two (2) cooling towers, three (3) primary chilled water pumps, two (2) secondary chilled water pumps, and three (3) condenser water pumps. ▪ Entire building will be completely sprinklered. Main switchboard room, medium voltage room, telecom room and Verizon room shall be protected by a double interlock pre-action fire sprinkler system. Walk-in coolers and freezers and cook chill coolers in the kitchen area will be protected by dry pendent sprinklers from the heated area of wet pipe sprinkler system.
X		Electrical System	<ul style="list-style-type: none"> ▪ The hospital distribution system is rated 13.2 kV, 3-phase, 3 Wire and is solidly grounded. ▪ Demand load estimate 6,624 kVA ▪ Normal power for Substations 2-4 are fed by single ended substations and do not have redundant power sources. Redundancy is provided with emergency power generation.
X		Masonry	<ul style="list-style-type: none"> ▪ There are load bearing interior and exterior walls throughout the structure and red brick veneer covers most of the exterior of the building. ▪ The exterior wall assembly is a typical masonry cavity wall outfit with beam pockets containing bearing plates for steel connections. ▪ A typical pipe staging system was used throughout the job.
	X	Curtin Wall	~
X		Support of Excavation	<ul style="list-style-type: none"> ▪ There was no excavation that required a major support system. ▪ Trench boxes were used where necessary when excavating for footings and underground utilities. ▪ Displaced soils were benched or piled at a 1:1 slope depending on space restrictions. ▪ No dewatering was necessary.

IX. COST EVALUATION

DIVISIONAL COST BREAKDOWN		TC (\$)	CC (\$)	Cost/SF (\$)
Division 1	General Requirements	800,000	~	
Division 2	Site Construction	14,105,918	~	
Division 3	Concrete	8,670,973	8,670,973	19.00
Division 4	Masonry	23,425,473	23,425,473	52.00
Division 5	Metals	10,296,446	10,296,446	
Division 6	Woods and Plastics	2,700,000	2,700,000	
Division 7	Thermal and Moisture Protection	6,850,000	6,850,000	
Division 8	Doors and Windows	6,436,000	6,436,000	
Division 9	Finishes	6,960,000	6,960,000	16.00
Division 10	Specialties	661,700	661,700	
Division 11	Equipment	2,737,500	2,737,500	
Division 12	Furnishings	122,000	122,000	
Division 13	Special Construction	6,820,000	6,820,000	
Division 14	Conveying Systems	1,089,000	1,089,000	
Division 15	Mechanical	26,000,000	26,000,000	58.00
Division 16	Electrical	22,240,500	22,240,500	50.00
Totals		139,915,510	125,009,592	
Building Size: 448,190 ft²				
Cost/SF		312.00	279.00	

***Major Building Systems Considered**

IX.I RS MEANS ESTIMATE



IX.II D4COST 2002 ESTIMATE

IX.III COST COMPARISONS

Since St. Elizabeth’s is a psychiatric hospital with a high security criminal wing, comparing it to a traditional hospitals historical data may not be a fair practice. As expected, the RS Means estimate fell short of the actual project cost by a significant amount (\$45M). Additionally, the square footage of the building fell well outside the listed values offered by RS Means. This left the cost/s.f. to be forecasted and most likely skewed the final value even further. The D4 estimate however seemed, to produce much more realistic data coming within 10% of the actual cost.

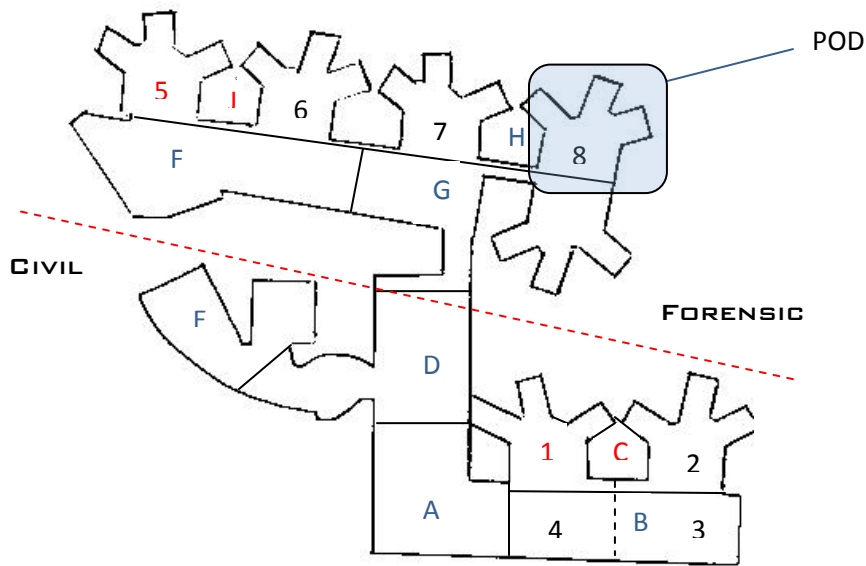
ST. ELIZABETH'S SCHEDULE SUMMARY

ID	Task Name	Duration	Start	Finish	2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2			
					tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	
1	Early Planning/Funding for Project	730 days	Tue 3/5/02	Mon 12/20/04																										
2	Design Documents	392 days	Thu 10/21/04	Fri 4/21/06																										
3	Bid	60 days	Mon 4/24/06	Fri 7/14/06																										
4	Award	0 days	Mon 7/17/06	Mon 7/17/06																										
5	Procurement	60 days	Tue 7/18/06	Mon 10/9/06																										
6	NTP	0 days	Tue 10/10/06	Tue 10/10/06																										
7	Mobilize/Secure Site	30 days	Mon 10/9/06	Sun 11/19/06																										
8	Sitework	85 days	Mon 11/20/06	Fri 3/16/07																										
9	Underground Utilities	116 days	Fri 4/6/07	Fri 9/14/07																										
10	Foundations	91 days	Tue 4/3/07	Tue 8/7/07																										
11	Super Structure Civil	232 days	Wed 6/6/07	Thu 4/24/08																										
12	Super Structure Forensic	234 days	Wed 6/6/07	Mon 4/28/08																										
13	Structural Steel Top Out	0 days	Mon 4/28/08	Mon 4/28/08																										
14	Interior CMU Partitions	198 days	Mon 7/30/07	Wed 4/30/08																										
15	Building Envelope Civil	322 days	Thu 8/2/07	Fri 10/24/08																										
16	Building Envelope Forensic	258 days	Wed 8/8/07	Fri 8/1/08																										
17	Enclosure	0 days	Mon 10/27/08	Mon 10/27/08																										
18	MEP Civil	411 days	Mon 7/30/07	Mon 2/23/09																										
19	MEP Forensic	320 days	Mon 9/10/07	Fri 11/28/08																										
20	Permanent Power	0 days	Wed 4/2/08	Wed 4/2/08																										
21	Interior Finishes	273 days	Thu 3/13/08	Mon 3/30/09																										
22	Substantial Completion	0 days	Tue 3/31/09	Tue 3/31/09																										
23	Commission	113 days	Wed 4/1/09	Fri 9/4/09																										
24	Demobilization	39 days	Wed 4/1/09	Mon 5/25/09																										
25	Beneficial Occupancy	0 days	Mon 9/7/09	Mon 9/7/09																										
26	Final Punchlist	20 days	Mon 9/7/09	Fri 10/2/09																										
27	Final Completion/Occupancy	0 days	Fri 10/2/09	Fri 10/2/09																										

Project: (A) Schedule Date: Fri 10/5/07	Task		Summary		Rolled Up Progress		Project Summary	
	Progress		Rolled Up Task		Split		Group By Summary	
	Milestone		Rolled Up Milestone		External Tasks		Deadline	

XI.1 SEQUENCING

The hospital is separated into two wings, civil and forensic, and each wing has a number of “pods.” Each pod and nearby area is assigned a sequence number and a lettered phase designation. The hospital is cut into phases A-H and sequences 1-37(see figure below). Each sequence is of similar square footage, designed so that steel erection can complete a sequence a week. Foundations, slabs and load bearing masonry began simultaneously in section 1C and 5J and are progressing in a circular motion around the building until each side meets in the middle. Steel erection started in 1C and is following the masonry closely as it is completed on the same circular path. Interior finishes are slated to begin at opposite wings as well and wrap in the same fashion following the work progression.



APPENDIX

D4Cost 2002 Print Out.....1-2

Insurance and Bonds.....3-4

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