



# TECHNICAL ASSIGNMENT 2

NORTHEAST HOSPITAL EXPANSION  
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October 17, 2014

# NORTHEAST HOSPITAL EXPANSION

## EXECUTIVE SUMMARY

Technical Assignment 2 provides an in-depth analysis of the Northeast Hospital Expansion project. The assignment utilizes the creation of a comprehensive project schedule and a detailed structural estimate partnered with assemblies estimates of the mechanical, electrical and plumbing systems for the new construction. In order to better understand the sequencing and phasing of the project, site logistic plans were created with a general conditions estimate. Finally this technical assignment allowed for a LEED evaluation.

## Project Schedule

The Northeast Hospital Expansion project received its notice to proceed on January 8<sup>th</sup>, 2013 and expects to undergo construction until complete for occupancy move in on the sixth floor September 6<sup>th</sup>, 2015. In the projects entirety, a total duration of 733 days need to occur. The hospital expansion begins with pre-construction activities until ground is broken on January 21<sup>st</sup>, 2013. Pouring the foundation quickly follows with the construction of the floors above not far behind. The building envelope works from the South clockwise toward the East. Once weather tight, the interior MEP systems and finishers work from the base of the structure towards the penthouse until complete for occupancy.

## Detailed Structural Estimate & MEP Assemblies Estimate

In order to fully understand all of the components involved in the design and construction of the new patient tower for the Northeast Hospital Expansion, a detailed structural estimate was conducted for the concrete superstructure. The structural estimate determined 4026 CY of concrete, 1065.3 tons of reinforcement, and 12 tons of post-tensioning tendons provide a \$6.8 million frame for the rest of the design to stand on.

Knowing that the buildings frame does not give an entire understanding, assemblies estimates of the mechanical, electrical, and plumbing systems provided a better grasp of the building's entire design. These estimates were done by picking apart each system for its primary components. The mechanical and plumbing systems came to \$8,685,173.55 and \$1,516,189.00 respectively. The electrical system fell between these two values at a cost of \$5,781,190.00.

## Site Layout Planning

Throughout the course of the new patient tower construction, the job site will undergo three primary phase changes in how the site functions. The first phase is excavation in which there will be an assembly line of dump trucks circling the hospital to haul dirt. The second is the construction of the superstructure. Here there will be a tower crane constructed and a material hoist to lift material to the guys working on the upper floors. The final phase change will occur when the building becomes fully enclosed and the lay down areas move to their specific floors within the structure.

## General Conditions Estimate

A general conditions estimate demonstrates the amount of resources necessary for the general contractor to manage the Northeast Hospital Expansion project. From the estimate one notices the allocation for \$1,504,500.00 in project staffing, \$86,766.00 for reimbursables, \$1,850,056.00 for the general requirements on the project and an additional \$314,509.52 for insurance and bonds. In total, an estimated \$2,164,565.52 is necessary to run the job.

## LEED Evaluation

The Northeast Hospital Expansion aims to achieve a rating of LEED Silver. This means the project team must receive 50 to 59 LEED points. These points primarily occur from location and transportation, water efficiency, material resources, and indoor environmental quality credits. The project team also intends to achieve additional bonus credits with an innovation credit.

Based on a LEED evaluation process developed by Penn State University, the LEED score for this project could increase slightly. The slight increase provides a total of 65 points which provide additional buffer points for obtaining LEED Silver or even the possibility of reaching LEED Gold.

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## TECHNICAL ASSIGNMENT 2

### Project Schedule

The Northeast Hospital Expansion project in total is scheduled to last 733 work days from the notice to proceed until the six floor is complete and ready for occupancy. The project commenced on January 8<sup>th</sup>, 2013 and expects to undergo construction until September 6<sup>th</sup>, 2015. Over the course the two and half year time period, more than 390 activities must occur prior to full occupancy. These activities and durations were derived from the assistance of the Whiting-Turner project team and have been assembled into Primavera6 for a more comprehensible format.

### Procurement and Coordination

Prior to breaking any ground on the actual site, the project team must first begin with the acquiring of permits, the procurement of materials and vendors, coordinating with the subcontractors, and submitting submittals. Throughout the majority of the project, materials will also need to be ordered and the necessary permits will need to be obtained. The project team must also have their subcontractors sign-off on coordinated drawings to ensure all trades are aware of their surrounding conditions and are able to install per the drawings and specifications.

### Site Work and Foundation

Work officially begins with the breaking of ground for the foundation of the new patient tower on January 21<sup>st</sup> of 2013 after a brief site demolition. While excavation occurs, sheeting and shoring pile are driven into the ground to restrain the soil walls from collapsing. With the area for the foundation cleared, the laying out of grade beams and the drill for the caissons take place. On another portion of the site a concrete pad for the tower crane commences. Once reinforcing and form work are in place for the caissons, grade beams, tower crane pad, and foundation walls concrete is poured and allowed to cure. All of the under slab mechanical and electrical is then placed followed by the framing and pouring of the slab on grade. With the tower crane pad cured, the crane is then erected. The foundation is complete with the addition of waterproofing and the removal of reshores. In all, this phase lasts from January 14, 2013 to September 10, 2013.

## Superstructure

With the foundation in place the patient tower's concrete structure can begin to rise from the ground up. First the ground floor slab is formed with reinforcement laid out. The slab is formed in three separate pours starting from the west and moving east. MEP sleeves are placed prior to any pour to avoid excessive core drills. Once the ground floor slab comes to strength the forming and reinforcing of the 1<sup>st</sup> floor columns begins on the west side of the ground floor slab and will again move eastward. Pouring will occur in the same pattern until the 1<sup>st</sup> floor slab is elevated above the ground floor. The first through seventh floor slabs all receive post tensioning. This means around the 15-20 day mark these slabs have their tendons pulled in order to create a stronger slab. This process continues the entire way up the building until topping out on the 20<sup>th</sup> of March 2014.

## Envelope

After the concrete has been allowed to cure, work on the skin of the building begins. First, metal studs are added to the West wall where they are then put up moving to the East, making sure to be placed everywhere on the North and South walls. After the studs have been placed the regular wall systems can be installed again from west to east moving from the base of the tower to the top. The curtain wall is then hung in a similar fashion. The metal cladding that attached to the regular wall type are the last to be laid out and installed.

On the roof, rain drains are set and connected with the application of air and vapor barriers. With the barriers applied, the built-up membrane roof system is added. Flashing and trim follow before the final covering with the green roof system on top for May 18, 15.

## Central Utility Plant

For the construction of the new utility plant, construction begins in the basement once the ground floor slab has been constructed. Hangers are the first parts to be placed followed by the main ducts and then mechanical system mains. The large equipment can then be laid out and set. The in-wall electrical and plumbing are the last to be installed with drywall following right behind. Once all penetrations have been fire stopped or caulked, work for the new central utility plant moves up to the penthouse. There the same cycle of trades occurs ending with a work complete list and the new central utility plant functional by March 9<sup>th</sup>, 2015.

### MEP and Finishes

Similar to the construction of the new central utility plant, work on the ground floors MEP systems starts with the rough-in of the mains followed by the branches moving from west to east from the bottom to the top. The stud walls are then constructed and blocking is placed. While in-wall med gas and electrical occur ducts receive insulation. The hard ceils then begin to go up while electrical wires are pulled through conduit and terminated. Drywall follows and the ceiling grid attached. Light fixtures and grills are then hung and sprinkler heads are cut in. During the final paint job, testing and balancing, and a final clean the next floor is already well underway. Once a floor is complete it is the owner's intention to begin immediately using the completed space. Unlike all the other floors, the 7<sup>th</sup> floor will remain just pipe and duct mains since it will remain unfinished until the hospital needs to expand with future growth.

### Detailed Structural Estimate & MEP Assemblies Estimate

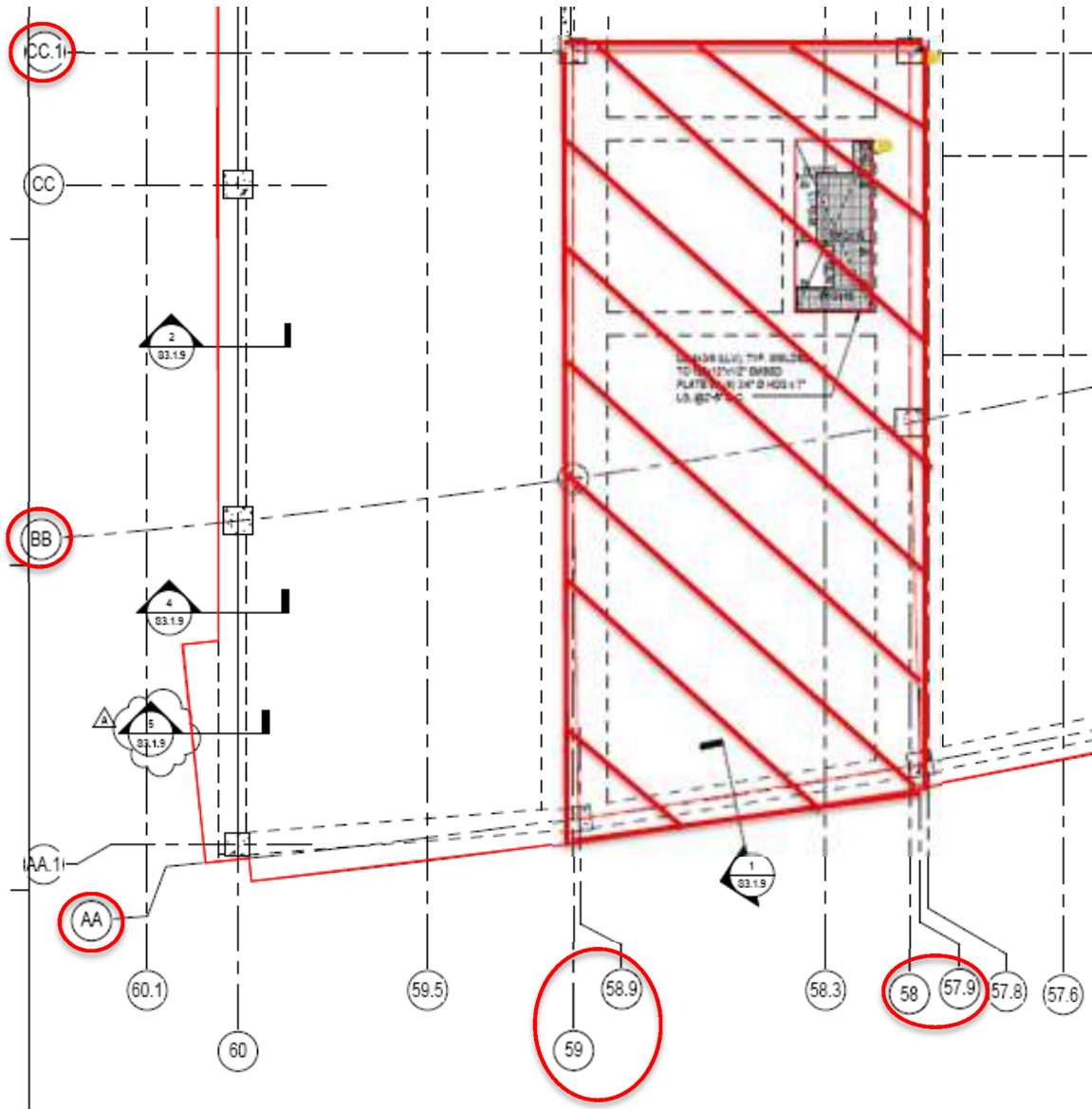
When conducting the detailed concrete estimate a few methods were applied to ease with the tedious take offs and calculations. The first was the modularization of a concrete bay. In order to receive a more accurate answer two different bays were taken into consideration. The first bay was the exterior bay between column lines AA and Bb and also between 58.9 and 57.9. The second bay was the adjacent interior bay between the column line CC.1 and BB and then 58 and 59. As see on the next page these two bays were chosen since they best represented the average sized columns in the entire building. Next, the amount of cubic yards in the two bays were calculated for on each floor. The cubic yards per bay on each floor were then summed together and average by the number of floors in the building, seven. This gives an average cubic yards per floor per bay. In order to make this number more useful it was converted into square footage based on the number of square feet in one bay. Finally the result was taken and multiplied by the square footage of all the floors that applied.

Since this calculation only generated results for the columns in the structure, it was then necessary to calculate concrete volumes by the different types of forms such as slabs, grade beams, caissons, foundation walls, and the concrete steps. Utilizing RSMMeans Cost Data 2015 and 2014 it was possible to associate pricing with the different types of concrete and concrete forms.

The reinforcement and post tensioning tendons still need to be accounted for a long with the formwork and how the concrete was going to place in the first place. Reinforcement was calculated through the assumption that reinforcement will make up on average 4% of concretes volume. Using the density of steel and the total cubic yards of concrete a simplified method was enacted. Post tensioning was then calculated based on weight per linear foot which came from averaging the length of the shortest and longest post tensioning tendons. This length was multiplied by the number of tendons per floor and given a 10% increase in length since the tendons are snaked through the concrete and then pulled tight. With all concrete members accounted for the below quantities were obtained.

Total CY concrete	4026.27	CY
Weight of Rebar	1065.3	tons
Weight of Pt Tendons	12.0	tons





Above are the two bays utilized to simplify the column estimate.

	Detailed Estimate	Actual Contract Value
Concrete	\$ 6,832,273.47	\$ 9,286,120.00
GSF	193000	226640
\$/SF	\$ 35.40	\$ 40.97

The above table compares the cost of concrete according to the detailed estimate with the actual contract value. Unfortunately the cost per square foot does not fall within the 10% range with the actual contract value. It is possible this difference can be accounted for by the exclusion of renovation work in the detailed estimate. Another possible point of error may have come from the over simplification of the columns, reinforcement, and tendons. For a more detailed look at the calculations please refer below for the material, labor, and equipment breakdown and Appendix A for the concrete take offs.

Concrete RSMeans #	Description	QTY	UNIT	Material/UNIT	Material	Labor/UNIT	Labor	Equipment/UNIT	Equipment	Total Cost
<b>Caissons</b>										
316326133280 online	Caissons 4' diameter	12.0	ea	\$ 445.00	\$ 5,340.00	\$ 3,425.00	\$ 41,100.00	\$ 3,325.00	\$ 39,900.00	\$ 86,340.00
316326133300 online	Caissons 5' Diameter	25.0	ea	\$ 520.00	\$ 13,000.00	\$ 4,200.00	\$ 105,000.00	\$ 4,050.00	\$ 101,250.00	\$ 219,250.00
316326133320 online	Caissons 5.5' Diameter	1.0	ea	\$ 520.00	\$ 520.00	\$ 4,200.00	\$ 4,200.00	\$ 4,050.00	\$ 4,050.00	\$ 8,770.00
316326133320 online	Caissons 6' Diameter	11.0	ea	\$ 865.00	\$ 9,515.00	\$ 6,300.00	\$ 69,300.00	\$ 6,100.00	\$ 67,100.00	\$ 145,915.00
316326133340 online	Caissons 6.5' Diameter	6.0	ea	\$ 865.00	\$ 5,190.00	\$ 6,300.00	\$ 37,800.00	\$ 6,100.00	\$ 36,600.00	\$ 79,590.00
316326133340 online	Caissons 7' Diameter	3.0	ea	\$ 1,350.00	\$ 4,050.00	\$ 9,450.00	\$ 28,350.00	\$ 9,150.00	\$ 27,450.00	\$ 59,850.00
<b>Concrete in Place</b>										
033053.40.4900	SOG	12500.0	SF	\$ 3.92	\$ 49,000.00	\$ 1.10	\$ 13,750.00	\$ 0.01	\$ 125.00	\$ 62,875.00
033053.40.4260	Foundation Wall	516.1	CY	\$ 137.00	\$ 70,701.96	\$ 178.00	\$ 91,860.93	\$ 15.25	\$ 7,870.11	\$ 170,433.00
033053.40.0300	Grade Beams	435.4	CY	\$ 315.00	\$ 137,163.02	\$ 590.00	\$ 256,908.51	\$ 47.50	\$ 20,683.31	\$ 414,754.84
033053.40.6200	Retaining Wall Type A	175.4	CY	\$ 137.00	\$ 24,031.51	\$ 138.00	\$ 24,206.93	\$ 11.30	\$ 1,982.16	\$ 50,220.60
033053.40.6200	Retaining Wall Type B	79.1	CY	\$ 137.00	\$ 10,839.62	\$ 138.00	\$ 10,918.74	\$ 11.30	\$ 894.07	\$ 22,652.44
033053.40.1950	Foundation Columns	110.4	CY	\$ 210.00	\$ 23,181.71	\$ 273.00	\$ 30,136.22	\$ 22.00	\$ 2,428.56	\$ 55,746.48
033053.40.1900	Elevated G Floor Slab	25.7	CY	\$ 273.00	\$ 7,021.60	\$ 187.00	\$ 4,809.67	\$ 14.55	\$ 374.23	\$ 12,205.50
033053.40.1900	Elevated PT 10.5" Slabs	604.9	CY	\$ 273.00	\$ 165,148.15	\$ 187.00	\$ 113,123.46	\$ 14.55	\$ 8,801.85	\$ 287,073.46
033053.40.1900	Elevated PT 12.5" Slab	102.9	CY	\$ 273.00	\$ 28,086.42	\$ 187.00	\$ 19,238.68	\$ 14.55	\$ 1,496.91	\$ 48,822.02
033053.40.1000	Concrete Columns	158.1	CY	\$ 210.00	\$ 33,192.30	\$ 273.00	\$ 43,149.99	\$ 22.00	\$ 3,477.29	\$ 79,819.57
033053.40.7000	Stair Landings (free standing)	2016.0	SF	\$ 4.39	\$ 8,850.24	\$ 10.85	\$ 21,873.60	\$ 0.17	\$ 342.72	\$ 31,066.56
033053.40.0300	Concrete Beams	49.4	CY	\$ 315.00	\$ 15,575.00	\$ 590.00	\$ 29,172.22	\$ 47.50	\$ 2,348.61	\$ 47,095.83
033053.40.6200	Concrete Walls	987.3	CY	\$ 137.00	\$ 135,254.52	\$ 138.00	\$ 136,241.78	\$ 11.30	\$ 11,156.03	\$ 282,652.33
<b>Reinforcing</b>										
	Reinforcement take at (4% by Conc. Vol.)	1065.35	tons	\$ 970.00	\$ 1,033,389.40	\$ 625.00	\$ 665,843.69	\$ -	\$ -	\$ 1,699,233.09
032211.10.0200	WWF	25000.0	SF	\$ 17.20	\$ 430,000.00	\$ 28.00	\$ 700,000.00	\$ -	\$ -	\$ 1,130,000.00
032305.50.0300	PT Tendons	24047.3	lb	\$ 2.18	\$ 52,423.16	\$ 2.45	\$ 58,915.93	\$ 0.06	\$ 1,442.84	\$ 112,781.93
<b>Placing Concrete</b>										
033113.70.1450	Elevated slabs over 10" thick w/ Crane and Bucket	733.5	CY	\$ 31.24	\$ 22,915.76	\$ 13.41	\$ 9,836.76	\$ 44.65	\$ 32,752.52	\$ 65,505.04
033113.70.3300	Grade Beams w/ Crane and Bucket	435.4	CY	\$ 26.74	\$ 11,643.62	\$ 11.36	\$ 4,946.58	\$ 38.10	\$ 16,590.19	\$ 33,180.39
033113.70.4700	Slab On Grade Over 6" with Crane and bucket	42.9	CY	\$ 20.50	\$ 878.77	\$ 0.74	\$ 31.72	\$ 21.24	\$ 910.49	\$ 1,820.99
033113.70.1050	Concrete Columns with Crane and Bucket	268.4	CY	\$ 28.50	\$ 7,650.76	\$ 12.25	\$ 3,288.48	\$ 40.75	\$ 10,939.24	\$ 21,878.48
033113.70.5200	Walls 12" Thick with Crane and Bucket	1868.3	CY	\$ 32.00	\$ 59,784.15	\$ 13.60	\$ 25,408.27	\$ 45.60	\$ 85,192.42	\$ 170,384.84
015419.600100	Tower Crane	15.0	Months	\$ 9,100.00	\$ 136,500.00	\$ 24,800.00	\$ 372,000.00	\$ 33,900.00	\$ 508,500.00	\$ 1,017,000.00
<b>Form Work</b>										
031113.25.7150	Column formwork	8591	SFCA	\$ 0.75	\$ 6,443.39	\$ 5.70	\$ 48,969.75	\$ -	\$ -	\$ 55,413.13
031113.20.2650	Concrete Beam Formwork	1335	SFCA	\$ 0.84	\$ 1,121.40	\$ 5.55	\$ 7,409.25	\$ -	\$ -	\$ 8,530.65
031113.50.0020	Grade Beam Formwork	9923.71	SFCA	\$ 3.14	\$ 31,160.43	\$ 4.14	\$ 41,084.14	\$ -	\$ -	\$ 72,244.57
031113.85.4600	Retaining Wall Formwork	6398.65	SFCA	\$ 2.03	\$ 12,989.26	\$ 7.30	\$ 46,710.15	\$ -	\$ -	\$ 59,699.40
031113.35.4550	Stair Landings Formwork	732.00	SFCA	\$ 3.51	\$ 2,569.32	\$ 4.67	\$ 3,418.44	\$ -	\$ -	\$ 5,987.76
031113.35.4550	Forms Elevated Slabs	5453.17	SFCA	\$ 3.51	\$ 19,140.62	\$ 4.67	\$ 25,466.29	\$ -	\$ -	\$ 44,606.90
031113.65.3050	Form SOG	512.50	SFCA	\$ 0.79	\$ 404.88	\$ 3.28	\$ 1,681.00	\$ -	\$ -	\$ 2,085.88
031113.85.2450	Form Concrete Walls	5357.33	SFCA	\$ 3.03	\$ 16,232.72	\$ 7.85	\$ 42,055.07	\$ -	\$ -	\$ 58,287.79
<b>Finishing</b>										
	Bull float, manual float, and Broom finish	217000.00	SF	\$ -	\$ -	\$ 0.50	\$ 108,500.00	\$ -	\$ -	\$ 108,500.00
<b>TOTAL</b>										
										\$ 6,832,273.47
										226640 SF
										\$ 30.15 /SF

System	Assemblies Estimate	\$/SF	Actual Contract Value	\$/SF
GSF	186000	0	226640	0
Mechanical	\$ 8,685,173.55	\$ 46.69	\$ 39,260,743.00	\$ 173.23
Electrical	\$ 5,781,190.00	\$ 31.08	\$ 18,076,235.00	\$ 79.76
Plumbing	\$ 1,516,189.00	\$ 8.15	(INCLUDE IN MECH)	-

Along with the detailed concrete estimate an assemblies estimate was conducted for the mechanical, electrical and plumbing systems in the Northeast Hospital project for the new patient tower. From the numbers alone the two estimates seem to be entirely different buildings, but the actual contract takes into consideration the creation of a temporary central utility plant capable of sustaining the existing hospital while the new central utility plant undergoes construction. Also the actual contract value takes in to consideration all of the renovation work that was excluded from the assemblies estimates. Furthermore most of the values in RSMeans, the cost source for the assemblies estimate, did not have specific enough matches or even options that fit into the new patient tower. Most of the equipment was three to four times the size of the equipment listed in the books. Utilizing a resource that more closely matched the design equipment may have produced a much more accurate comparison. For a full breakdown of the assemblies and costs used for each system please review Appendix B.

## Site Layout Planning

### Excavation

Once mobilization occurs to the site. The first phase of the project is to excavate the foundation for the new patient tower. This involves the use of an excavator and numerous dump trucks to haul the soil away from the site. To accomplish this the site will use the road that wraps around the back of the existing hospital and conveniently parallels the site of the new patient tower. Dump trucks will enter the site at the Northeast entrance and drive to the excavation site. There the excavator will load their truck with dirt to haul away using the west side entrance. Soldier piles and lagging will need to be used at the excavator starts to dig down deeper. Along with the excavation a concrete pad must be formed for the tower crane that will be on site. To do this a concrete mixing station will be setup just south of the tower crane pad location.

### Superstructure

Once the foundation is complete and the pad for the tower crane has been poured and cured, it is time for the superstructure to commence building. For this phase of the project a tower crane is erected on top of its concrete pad where it can begin to place concrete with a bucket. All of the concrete work will flow from west to east on the structure. The lay down areas are all located near the base of the crane with the exception of the one on the west side of the site. This lay down area is meant for work that takes place with the utilities feeding the new patient tower and the temporary central utility. A material hoist is also constructed to the north of the tower crane for an easier way to transport materials to the higher floors and to loosen the constraints with material being supplied to the upper floors.

### MEP & Finishes

After the new patient tower is fully enclosed and all materials have been distributed to their appropriate floors, the finalizing of the MEP systems and finishes phase can commence. In this phase the lay down areas are now inside the patient tower and are located on the floors where the material is most needed. Work in flows in a zigzag pattern from north to south moving from the west to the east. At this point in time there is no longer a need for the tower crane since the building is fully enclosed and all of the heavy lifts have been completed. The material hoist has also been dismantled

since the elevators in the building are now operational. All of the large equipment is already in place.

## General Conditions Estimate

General Conditions Estimate										
RSMeans	Description	Qty	Units	Mat.	Total Mat.	Labor	Total Labor	Equip.	Total Equip.	Total
<b>Project Staff</b>										
13113.200180	Sr. Project Manager	68	Weeks	\$ -	\$ -	\$ 2,600.00	\$ 176,800.00	\$ -	\$ -	\$ 176,800.00
13113.200180	Project Manager	136	Weeks	\$ -	\$ -	\$ 2,275.00	\$ 309,400.00	\$ -	\$ -	\$ 309,400.00
13113.200180	Project Manager	68	Weeks	\$ -	\$ -	\$ 2,275.00	\$ 154,700.00	\$ -	\$ -	\$ 154,700.00
13113.200240	Superintendent	136	Weeks	\$ -	\$ -	\$ 2,125.00	\$ 289,000.00	\$ -	\$ -	\$ 289,000.00
13113.200240	Superintendent	68	Weeks	\$ -	\$ -	\$ 2,125.00	\$ 144,500.00	\$ -	\$ -	\$ 144,500.00
13113.200240	Superintendent	68	Weeks	\$ -	\$ -	\$ 2,125.00	\$ 144,500.00	\$ -	\$ -	\$ 144,500.00
13113.200100	Project Engineer	136	Weeks	\$ -	\$ -	\$ 1,400.00	\$ 190,400.00	\$ -	\$ -	\$ 190,400.00
13113.200100	Project Engineer	68	Weeks	\$ -	\$ -	\$ 1,400.00	\$ 95,200.00	\$ -	\$ -	\$ 95,200.00
									Subtotal:	\$ 1,504,500.00
<b>Reimbursables</b>										
15213.200450	Trailer Rental	32	Months	\$ 340.00	\$ 10,880.00	\$ 1,300.00	\$ 1,300.00	\$ -	\$ -	\$ 12,180.00
15213.200700	Trailer Utilities	32	Months	\$ 300.00	\$ 9,600.00	\$ -	\$ -	\$ -	\$ -	\$ 9,600.00
15213.400120	Office Supplies	32	Months	\$ 250.00	\$ 8,000.00	\$ -	\$ -	\$ -	\$ -	\$ 8,000.00
13233.501500	Camera Time Lapse Equipment	2	EA	\$ 2,650.00	\$ 5,300.00	\$ -	\$ -	\$ -	\$ -	\$ 5,300.00
13233.501720	Cameraman and film - Color	2	Days	\$ 1,425.00	\$ 2,850.00	\$ -	\$ -	\$ -	\$ -	\$ 2,850.00
	Computers and Tablets	8	EA	\$ 900.00	\$ 7,200.00	\$ -	\$ -	\$ -	\$ -	\$ 7,200.00
	Software	32	Months	\$ 600.00	\$ 19,200.00	\$ -	\$ -	\$ -	\$ -	\$ 19,200.00
	Copier and Plotter	2	EA	\$ 3,500.00	\$ 7,000.00	\$ -	\$ -	\$ -	\$ -	\$ 7,000.00
	Shipping and postage	136	Weeks	\$ 100.00	\$ 13,600.00	\$ -	\$ -	\$ -	\$ -	\$ 13,600.00
	Two Way Radios	4	EA	\$ 209.00	\$ 836.00	\$ -	\$ -	\$ -	\$ -	\$ 836.00
									Subtotal:	\$ 85,766.00
<b>General Requirements</b>										
	Portable Toilets	30	Months	\$ 1,325.00	\$ 39,750.00	\$ -	\$ -	\$ -	\$ -	\$ 39,750.00
	Jobsite Dumpsters/ Trash removal	110	Weeks	\$ 720.00	\$ 79,200.00	\$ -	\$ -	\$ -	\$ -	\$ 79,200.00
024119.190106	Trash Chute 30" Diameter	1	EA	\$ 320.00	\$ 320.00	\$ 59.50	\$ 59.50	\$ 30.50	\$ 30.50	\$ 410.00
	Jobsite Safety	32	Months	\$ 1,000.00	\$ 32,000.00	\$ -	\$ -	\$ -	\$ -	\$ 32,000.00
030513850710	Winter Protection	3000	SF	\$ 0.46	\$ 1,380.00	\$ 1.20	\$ 3,600.00	\$ -	\$ -	\$ 4,980.00
	Barricades and Railing	2500	LF	\$ 3.12	\$ 7,800.00	\$ 2.36	\$ 5,900.00	\$ -	\$ -	\$ 13,700.00
015616100100	Dust Partitions	2500	SF	\$ 0.30	\$ 750.00	\$ 0.38	\$ 950.00	\$ -	\$ -	\$ 1,700.00
	Sticky Mats	30	EA	\$ 960.00	\$ 28,800.00	\$ -	\$ -	\$ -	\$ -	\$ 28,800.00
017613200020	Temporary Protection of Installed Construction	5000	SF	\$ 0.38	\$ 1,900.00	\$ 0.32	\$ 1,600.00	\$ -	\$ -	\$ 3,500.00
	Final Project Clean-up	1	EA	\$ 40,000.00	\$ 40,000.00	\$ -	\$ -	\$ -	\$ -	\$ 40,000.00
015813.500200	Signage	500	SF	\$ 31.50	\$ 15,750.00	\$ -	\$ -	\$ -	\$ -	\$ 15,750.00
									Subtotal:	\$ 259,790.00
<b>Subtotal</b>										
	Insurance	12%								\$ 222,006.72
	Bonds	5%								\$ 92,502.80
									<b>Total:</b>	<b>\$ 2,164,565.52</b>

As seen at on the first page of this section the general conditions for the Northeast Hospital Expansion were estimated at \$1,504,500.00 in project staffing, \$86,766.00 for reimbursables, \$1,850,056.00 for the general requirements on the project and an additional \$314,509.52 for insurance and bonds. The total cost comes to \$2,164,565.52. The actual contract cost for the general conditions is \$13 million. This vast contrast in cost can be attributed to the number of people Whiting-Turner is staffing on the job and the lack of people staffed in the general conditions estimate. Staff is the most expensive resource in the general conditions.

When formulating the costs for the general conditions estimate it was taken into consideration that six dumpster and 5 portable toilets would be need on the job site. Along with each staff member was scaled back in time charge to this project as this project would near its turnover date.

## LEED Evaluation

The Northeast Hospital Expansion aims to achieve a rating of LEED Silver. This means the project team must receive 50 to 59 LEED points. These points primarily occur from location and transportation, water efficiency, material resources, and indoor environmental quality credits. The project team also intends to achieve additional bonus credits with an innovation credit

In their attempt to achieve LEED Silver, the project team will test and balance the HVAC equipment to verify compliance with ASHRAE 62.1 and 90.1, use regional materials and recycle construction waste. The use of composite woods that do not contain any urea formaldehyde and insulation and that may adhere only by solvent cements and adhesive primers helps achieve the sourcing of raw materials credit. The domestic water pumps must comply with ASHRAE/IESNA 90.1 and healthcare plumbing fixtures must consume water in compliance with credits WE 1 and WE 3 for water use reduction. A green roof is also planned to cover the top of the building to reduce the heat island effect and aid in storm water treatment. Finally by implementing single door pharmacy refrigerators with high efficiency top mounted refrigeration, the project team aims for an innovation credit.

Based on a LEED evaluation process developed by Penn State University, the LEED score for this project obtain more points. The additional points could allow the building to total 65 points which can provide plenty of additional buffer points for obtaining LEED Silver or even reaching LEED Gold.

To order to reach further from just achieving LEED Siler the project team will need to tap into unapproached credits. These credits include the indoor air quality assessment. Water metering, and the surrounding density and diverse uses.

The indoor air quality assessment credit has the ability gain 2 point, but going for both points seems as though it would be rather expensive. Instead the single point option is just a matter of documenting and flushing the HVAC system prior to start up. This action only needs to be done once and gives the team one additional point.



The water metering credit has the potential to be another rather simple point that appears as though it would not consume too much time or money to obtain. This credit requires that a permanent water be installed on two specific pieces of equipment from a rather long list. Two piece of equipment on that list are a boiler and a domestic water heater. Both of these units exist in the current building design and would not take much to add a water meter to them.

The final LEED credit that may be worth chasing after is the surrounding density and diverse uses credit. This credit requires that the site for the building be picked within 0.5 mile walking distance to a number of different businesses as well as meet a population density factor. Based on the location of the current site there at least two shopping centers within walking distance and hospital is placed in the middle of a dense residential neighborhood.

The project appears to be on the right track for achieve a LEED accreditation, but the goals of the project could be bumped a slight bit higher to obtain an even more popular rating of LEED Gold.

## Appendix A: Concrete Take-Offs

PT Tendons

Assume an average length of tendon

Longest Tendon            115 ft  
 Shortest Tendon            49 ft  
 Average Length            82 ft

"Frank Haas's "How to Estimate the Cost of a Post-

I  
 V

Level	# of PT	Total Length	Adj for Stretch	Avg lb/Ft	total lbs	
Level 1	48	3936	4329.6	0.62	2684.352	
Level 2	54	4428	4870.8	0.62	3019.896	
Level 3	57	4674	5141.4	0.62	3187.668	
Same as Level 3	Level 4	57	4674	5141.4	0.62	3187.668
Level 5	54	4428	4870.8	0.62	3019.896	
Same as Level 5	Level 6	54	4428	4870.8	0.62	3019.896
Same as Level 5	Level 7	54	4428	4870.8	0.62	3019.896
Level 8	52	4264	4690.4	0.62	2908.048	
					24047.32	

Concrete Beams

TYPE	Qty/FI	Floors	Width	Depth	Length	CY/CB	total CY	SFCA/Beam	Total SFCA
CB11	3	9	16	18	11	0.81	22	22	594
CB33	1	9	14	24	25	2.16	19.44	58.3333333	525
CB34	1	9	12	24	12	0.89	8	24	216
total							49.44		1335

Slab	QTY	AREA (SF)	Perimeter	Depth (in)	CY	total CY	SFCA	total SFCA
SOG 10"	1	12500	615	10	42.86694	42.86694	512.5	512.5
SOMD 6"	1	12500	615	6	25.72016	25.72016	307.5	307.5
PT Slabs 10.5"	7	24000	718	10.5	86.41975	604.9383	628.25	4397.75
PT Slabs 12.5"	1	24000	718	12.5	102.8807	102.8807	747.9167	747.9167

Stair Landing

Qty	Width	length	SF/ea	total SF	SFCA/ea	SFCA total
36	7	8	56	2016	20.33333	732

WWF	SF
SOG	12500

Retaining Wall Concrete

TYPE	Height	Length	A	B	C	D	E	CY	SFCA
A1	4	279	1.5	1	2.5	1.33	0	75.7	2234
A2	5	45.5	2.5	1	3.5	1.33	0	16.3	457
A3	6	32.25	3.5	1	4.5	1.33	1	15.5	389
A4	7	57.75	4	1	5	1.33	1	31.3	810.5
A5	8.5	50.75	6.5	1	7.5	1.33	1	36.6	864.75
Total A								175.4	4755.25
B1	3	9.5	1	1	3	1	0	2.1	59
B2	4	39	1.25	1	4	1	0	11.6	314
B3	5	35.5	1.5	1	4.5	1.33	1	15.8	357
B4	6	75.95	2	1	7	1.5	1.167	49.7	913.4
Total B								79.1	1643.4

Foundation

Wall	Width (ft)	Length (ft)	Height (ft)	CY	SFCA
East					
E1	1.5	76	12	50.7	1860
E2	1.5	36.75	12	24.5	918
E3	1.5	11.25	12	7.5	306
E4	2	36	12	32.0	912
E5	1.5	37.5	12	25.0	936
E6	1.5	9.27	12	6.2	258.48
North					
N1	1.5	134.5	12	89.7	3264
N2	1.5	2	12	1.3	84
N3	1.5	21	12	14.0	540
Elevators					
Elev1	1	18	12	8.0	456
Elev2	1	14.5	12	6.4	372
Elev3	1	18	12	8.0	456
Elev4	0.5	11.5	12	2.6	288
Elev5	1	21.5	12	9.6	540
Elev6	1	14.5	12	6.4	372
Elev7	1	21.5	12	9.6	540
West					
W1	1.5	43.5	12	29.0	1080
W2	1.5	17.5	12	11.7	456
W3	0.833	17.5	12	6.5	439.992
W4	0.833	19	12	7.0	475.992
South					
S1	1.5	16.5	12	11.0	432
S2	1.5	22	12	14.7	564
S3	1.5	30	12	20.0	756
S4	1.167	29.5	12	15.3	736.008
S5	1.167	32.5	12	16.9	808.008
S6	1.5	62	12	41.3	1524
S7	1.5	62	12	41.3	1524
total				516.1	20898.48

Typical on 7 Floors

Location	width	Length	Height	CY	SCFA
stair E	12	39	14	20.22	119.0
	12	42	14	21.78	126.0
Central	12	32	14	16.59	102.7
	12	31	14	16.07	100.3
	12	22	14	11.41	79.3
Stair W	18	10	14	7.78	65.3
	18	24	14	18.67	98.0
	18	14	14	10.89	74.7
total/FL				123.41	765.3
Total CY				987.26	5357.3

Floor 3 Column Bay

Bay Area	1976 SF
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Floor	Height (ft)	Width (in)	Length (in)	Diameter (in)	CY	SFCA
G						
CC.1-58	12	28	28		2.42	112
BB-58	12	30	30		2.78	120
AA-57.8	12			34	3.95	34
AA-58.9	12			34	3.95	34
BB-59	12	32	32		3.16	128
CC.1-59	12	28	28		2.42	112
1st						0
CC.1-58	20	28	28		4.03	186.6667
BB-58	20	30	30		4.63	200
AA-57.9	20	26	26		3.48	173.3333
AA-58.9	20	26	26		3.48	173.3333
BB-59	20	32	32		5.27	213.3333
CC.1-59	20	28	28		4.03	186.6667
2nd						0
CC.1-58	14	26	26		2.43	121.3333
BB-58	14	30	30		3.24	140
AA-57.9	14	26	26		2.43	121.3333
AA-58.9	14	26	26		2.43	121.3333
BB-59	14			32	4.34	37.33333
CC.1-59	14	26	26		2.43	121.3333
3rd						0
CC.1-58	14	26	26		2.43	121.3333
BB-58	14	30	30		3.24	140
AA-57.9	14	26	26		2.43	121.3333
AA-58.9	14	26	26		2.43	121.3333
BB-59	14			32	4.34	37.33333
CC.1-59	14	26	26		2.43	121.3333
4th						0
CC.1-58	14	26	26		2.43	121.3333
BB-58	14	30	30		3.24	140
AA-57.9	14	26	26		2.43	121.3333
AA-58.9	14	26	26		2.43	121.3333
BB-59	14			28	3.80	32.66667
CC.1-59	14	26	26		2.43	121.3333
5th						0
CC.1-58	14	26	26		2.43	121.3333
BB-58	14	30	30		3.24	140
AA-57.9	14	26	26		2.43	121.3333
AA-58.9	14	26	26		2.43	121.3333
BB-59	14			28	3.80	32.66667
CC.1-59	14	26	26		2.43	121.3333

6th						0
CC.1-58	14	26	26		2.43	121.3333
BB-58	14	30	30		3.24	140
AA-57.9	14	26	26		2.43	121.3333
AA-58.9	14	26	26		2.43	121.3333
BB-59	14			28	3.80	32.66667
CC.1-59	14	26	26		2.43	121.3333
7th						0
CC.1-58	14	26	26		2.43	121.3333
BB-58	14	30	30		3.24	140
AA-57.9	14	26	26		2.43	121.3333
AA-58.9	14	26	26		2.43	121.3333
BB-59	14			28	3.80	32.66667
CC.1-59	14	26	26		2.43	121.3333
Bay Total					20.76	703.8333
Total					0.01	0.4

<-Avg by # of floors  
<-divide by Bay area

Floor	SF	Adj. Column CY	Adj. SFCA
G	12500	10.9	4452.4
1	24000	21.0	8548.6
2	24000	21.0	8548.6
3	24000	21.0	8548.6
4	24000	21.0	8548.6
5	24000	21.0	8548.6
6	24000	21.0	8548.6
7	24000	21.0	8548.6
Total		158.1	64292.47

Grade Beams

Mark	Total Length	Width	Depth	O'	SFCA
GB1	32	3	3	10.7	288.0
GB2	30.5	3	3	10.2	274.5
GB3	30.5	3	3	10.2	274.5
GB4	31	3	3	10.3	279.0
GB5	46.5	3	3	15.5	418.5
GB6	14.5	4	4	8.6	174.0
GB7	18	3	4	8.0	180.0
GB8	14	3	3	4.7	126.0
GB9	30	3	4	13.3	300.0
GB10	26	3	4	11.6	260.0
GB11	37.5	4	4	22.2	450.0
GB12	17.5	3	4	7.8	175.0
GB13	10.75	4	4	6.4	129.0
GB14	69	4	5	51.1	897.0
GB15	10.5	4	4	6.2	126.0
GB16	12.5	4	4.5	8.3	156.3
GB17	16	4	4.5	10.7	200.0
GB18	18	4	4.5	12.0	225.0
GB19	10	4	4.5	6.7	125.0
GB20	30	3	3	10.0	270.0
GB21	28	3	3	9.3	252.0
GB22	13	3	3	4.3	117.0
GB23	23	4	5	17.0	299.0
GB24	12.5	4	5	9.3	162.5
GB25	0	4	6	0.0	0.0
GB26	22.5	3	4.5	11.3	236.3
GB27	42	3	4	18.7	420.0
GB28	0	3	4	0.0	0.0
GB29	0	3	4.5	0.0	0.0
GB30	51.5	2	4.5	17.2	437.8
GB31	13.5	2	3	3.0	94.5
GB32	51	2	3	11.3	357.0
GB33	15.5	2	3	3.4	108.5
GB34	30.5	2	3	6.8	213.5
GB35	12	2	3	2.7	84.0
GB36	0	4	4.5	0.0	0.0
GB37	28.5	4	4.5	19.0	356.3
GB38	11.25	4	4.5	7.5	140.6
GB39	22.5	3	4	10.0	225.0
GB40	7	2	3	1.6	49.0
GB41	0	2	3	0.0	0.0
GB42	13.5	2	3	3.0	94.5
GB43	10.25	3	3	3.4	92.3
GB44	24.87	3	3	8.3	223.8
GB45	11.5	3	3	3.8	108.5
GB46	10	2	3	2.2	70.0
GB47	13.5	5	3	7.5	175.5
GB48	11	3	3	3.7	99.0
GB49	20.5	3	3	6.8	184.5
GB50	0	4	5	0.0	0.0
Total				435.4	9923.7

Grade Beam Take off	
Mark	Length (ft)
GB20	30
GB21	28
GB22	13
GB23	11.5
GB23	11.5
GB24	12.5
GB37	28.5
GB38	11.25
GB39	11.25
GB39	11.25
GB40	7
GB42	13.5
GB51	13.5
GB32	14.5
GB26	22.5
GB32	11.5
GB27	21
GB27	21
GB32	15.5
GB30	25.75
GB32	9.5
GB30	25.75
GB33	15.5
GB14	34.5
GB34	30.5
GB35	12
GB14	34.5
GB11	37.5
GB10	26
GB9	30
GB12	17.5
GB6	14.5
GB7	18
GB8	14
GB15	10.5
GB13	10.75
GB5	16.5
GB5	30
GB18	18
GB19	10
GB17	16
GB16	12.5
GB4	31
GB3	30.5
GB2	30.5
GB1	32
GB43	10.25
GB44	24.87
GB47	13.5
GB49	20.5
GB46	10
GB48	11
GB45	11.5

Caissons

Mark	diameter	V Rebar	V Qty	Ties	Tie Spacing	Dowels	D Qty
C4	4	#10	8	#4	1.33	#10	4
C5	5	#11	10	#4	1.33	#11	6
C5.5	5.5	#11	12	#4	1.33	#11	8
C6	6	#11	14	#4	1.33	#11	10
C6.5	6.5	#11	16	#4	1.33	#11	12
C7	7	#11	18	#4	1.33	#11	14

Type	Diameter	Qty	Avg Depth	LVF (tot Depth)
C4	4	12	28.6	343
C5	5	25	35.0	874.0
C5.5	5.5	1	25.5	25.5
C6	6	11	33.8	372
C6.5	6.5	6	32.0	192
C7	7	3	30.5	91.5

Caisson #	Mark	Depth	CY
1	C4	12	5.58
2	C4	12	5.58
3	C6	18	12.56
4	C4	12	5.58
5	C7	17	13.84
6	C5	14	8.14
7	C5	15	8.72
8	C4	15.5	7.21
9	C6	15.5	10.82
10	C5	15	8.72
11	C5	15	8.72
12	C4	15	6.98
13	C5	15	8.72
14	C5	15	8.72
15	C4	16.5	7.68
16	C5	16	9.30
17	C5	21	12.21
18	C5	21	12.21
19	C5	17	9.89
20	C5.5	25.5	16.31
21	C6	35.5	24.77
22	C4	41.5	19.31
23	C5	62.666	36.44
24	C5	62.666	36.44
25	C4	46.5	21.63
26	C5	60.5	35.18
27	C7	49	39.89
28	C6	46.5	32.45
29	C6	46.5	32.45
30	C4	36.5	16.98
31	C4	41.5	19.31
32	C6.5	41.5	31.37
33	C5	41.5	24.13
34	C6.5	35.5	26.84
35	C6.5	25.5	19.28
36	C6.5	26	19.65
37	C6	26	18.14
38	C6	31	21.63
39	C6.5	36	27.21
40	C6	32.5	22.68
41	C7	25.5	20.76
42	C6	27.5	19.19
43	C6.5	27.5	20.79
44	C5	22.5	13.08
45	C5	18	10.47
46	C5	18	10.47

47	C4	45	20.93
48	C5	49.5	28.78
49	C5	49	28.49
50	C5	48.833	28.40
51	C5	53.666	31.21
52	C5	58.5	34.02
53	C5	53.5	31.11
54	C5	48.5	28.20
55	C5.0	38.5	22.39
56	C5.0	38.5	22.39
57	C5.0	38.5	22.39
58	C5.0	38.5	22.39
59	C5.0	38.5	22.39
60	C5.0	38.5	22.39
61	C6	46.5	32.45
62	C4	49	22.79
63	C6	46.5	32.45
64	C5	62.666	36.44
Total		2129	1297.60



Foundation to Ground Floor

Column #	Height (ft)	Width (in)	Length (in)	Diameter	CY	SFCA
AA-52.1	8	34	34	0	2.38	90.67
AA-53.1, AA-54.9	8	0	0	34	2.64	22.67
AA-54.1	8	0	0	34	2.64	22.67
AA-55.9	8	0	0	34	2.64	22.67
AA-56.9	8	0	0	34	2.64	22.67
AA-57.8	8	0	0	34	2.64	22.67
AA-58.9	7	0	0	34	2.31	19.83
AA. 1-60	6.5	0	0	34	2.14	18.42
BB-54	20	28	30	0	4.32	193.33
BB-55	16	30	30	0	3.70	160.00
BB-56	16	36	28	0	4.15	170.67
BB-57	18.5	26	26	0	3.22	160.33
BB-58	18.5	30	30	0	4.28	185.00
BB-59	19	32	32	0	5.00	202.67
BB-60, CC-60	19	30	30	0	4.40	190.00
CC. 1-57	16	30	30	0	3.70	160.00
CC. 1-58, CC. 1-59	16	32	32	0	4.21	170.67
CC. 2-50	7.5	0	0	18	1.31	11.25
CC.3-54	19	28	30	0	4.10	183.67
CC.3-55	16	30	30	0	3.70	160.00
CC.3-56	16	36	28	0	4.15	170.67
CC. 4-53	8	32	32	0	2.11	85.33
DD-60	19	26	26	0	3.30	164.67
DD. 1-56.6, DD. 1-57, DD. 2-58.3	16	24	12	0	1.19	96.00
DD. 1-59	16	30	30	0	3.70	160.00
DD. 2-57.6	21	24	12	0	1.56	126.00
DD. 2-57.8	21	24	24	0	3.11	168.00
DD. 3-59, EE-59	16	30	30	0	3.70	160.00
DD. 4-52	7.5	26	26	0	1.30	65.00
DD. 5-55, DD. 5-56	17	20	36	0	3.15	158.67
EE. 1-56.6, EE. 1-57	16.5	24	24	0	2.44	132.00
EE. 1-57.6, EE. 1-57.8	21	24	24	0	3.11	168.00
EE. 1-58.3	16.5	24	30	0	3.06	148.50
EE. 1-59.5, EE. 1-60.1	16.5	12	24	0	1.22	99.00
EE. 2-51	7.5	26	26	0	1.30	65.00
EE. 2-52	7.5	26	26	0	1.30	65.00
EE. 2-53	6.5	20	36	0	1.20	60.67
EE. 2-53.7, EE. 2-54.2	16	24	34	0	3.36	154.67
EE. 2-54	0	0	0	0	0.00	0.00
			total		110.39	4437.00

## Appendix B: MEP Take Offs

Mechanical								
FCU's								
Quantity of units: 24								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D30301153560	FCU-1, FCU-4, FC-5	280	SF	\$ 9.10	\$ 2,548.00	\$ 9.50	\$ 2,660.00	\$ 5,208.00
							Total for single room:	\$ 5,208.00
							Total for all rooms:	\$ 124,992.00
AHU's								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D30501603320	AHU-18S	1375	SF	\$ 15.10	\$ 20,762.50	\$ 9.75	\$ 13,406.25	\$ 34,168.75
D30501603320	AHU-19S	2650	SF	\$ 15.10	\$ 40,015.00	\$ 9.75	\$ 25,837.50	\$ 65,852.50
D30501603320	AHU-20S	3900	SF	\$ 15.10	\$ 58,890.00	\$ 9.75	\$ 38,025.00	\$ 96,915.00
D30501603320	AHU-21S	5650	SF	\$ 15.10	\$ 85,315.00	\$ 9.75	\$ 55,087.50	\$ 140,402.50
D30501603320	AHU-22S	1375	SF	\$ 15.10	\$ 20,762.50	\$ 9.75	\$ 13,406.25	\$ 34,168.75
D30501603320	AHU-23S	6585	SF	\$ 15.10	\$ 99,433.50	\$ 9.75	\$ 64,203.75	\$ 163,637.25
D30501603320	AHU-24S	84000	SF	\$ 15.10	\$ 1,268,400.00	\$ 9.75	\$ 819,000.00	\$ 2,087,400.00
D30501603320	AHU-25S	84000	SF	\$ 15.10	\$ 1,268,400.00	\$ 9.75	\$ 819,000.00	\$ 2,087,400.00
D30501603320	AHU-26S	2000	SF	\$ 15.10	\$ 30,200.00	\$ 9.75	\$ 19,500.00	\$ 49,700.00
								\$ 4,759,644.75
Boiler's								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D30201061140	BLR-1, BLR-2, BLR-3	3	EA	\$81,500.00	\$ 244,500.00	\$19,000.00	\$ 57,000.00	\$ 301,500.00
								\$ 301,500.00
Chillers								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D30201061140	CH-1, CH-2, CH-3, CH-4	4	EA	\$81,500.00	\$ 326,000.00	\$19,000.00	\$ 76,000.00	\$ 402,000.00
								\$ 402,000.00
Unit Heaters								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
	UH-1	345	SF	\$ 8.01	\$ 2,763.45	\$ 3,511.35	\$ 1,211,415.75	\$ 1,214,179.20
	UH G-1S	535	SF	\$ 8.01	\$ 4,285.35	\$ 3,511.35	\$ 1,878,572.25	\$ 1,882,857.60
								\$ 3,097,036.80
							<b>Total Mechanical:</b>	<b>\$ 8,685,173.55</b>

Lighting and Electrical								
<b>Lighting</b>								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D50202080880	Recessed Fluorescent, 11 fixture per 400 SF	196000	SF	\$ 5.25	\$ 1,029,000.00	\$ 10.50	\$ 2,058,000.00	\$ 3,087,000.00
D50202950800	Lighting ON/Off Controls	196000	SF	\$ 0.52	\$ 101,920.00	\$ 0.40	\$ 78,400.00	\$ 180,320.00
D50201250600	Recepticals	1260	EA	\$ 72.00	\$ 90,720.00	\$ 225.00	\$ 283,500.00	\$ 374,220.00
								\$ 3,641,540.00
<b>Generators</b>								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D50902100960	EGS-1	2000	Cost/kW	\$ 174.00	\$ 348,000.00	\$ 25.50	\$ 51,000.00	\$ 399,000.00
D50902100960	EGS-2	2000	Cost/kW	\$ 174.00	\$ 348,000.00	\$ 25.50	\$ 51,000.00	\$ 399,000.00
D50902100960	EGS-3	2000	Cost/kW	\$ 174.00	\$ 348,000.00	\$ 25.50	\$ 51,000.00	\$ 399,000.00
								\$ 1,197,000.00
<b>Substations</b>								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D50902100960	Substation 1S - 4000A	1	EA	\$ 83,600.00	\$ 83,600.00	\$ 11,925.00	\$ 11,925.00	\$ 95,525.00
D50902100960	Substation 2S - 4000A	1	EA	\$ 83,600.00	\$ 83,600.00	\$ 11,925.00	\$ 11,925.00	\$ 95,525.00
D50902100960	Substation 3S - 4000A	1	EA	\$ 83,600.00	\$ 83,600.00	\$ 11,925.00	\$ 11,925.00	\$ 95,525.00
D50902100960	Substation CHILLERS -3000A	1	EA	\$ 62,700.00	\$ 62,700.00	\$ 10,925.00	\$ 10,925.00	\$ 73,625.00
D50902100960	Emg. Generator Switchgear - 4000A	1	EA	\$ 83,600.00	\$ 83,600.00	\$ 11,925.00	\$ 11,925.00	\$ 95,525.00
								\$ 455,725.00
<b>Distribution Panels</b>								
RSMeans	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D50902100960	100A Panelboards	56	EA	\$ 3,375.00	\$ 189,000.00	\$ 2,500.00	\$ 140,000.00	\$ 329,000.00
D50902100960	225A Panelboards	15	EA	\$ 5,675.00	\$ 85,125.00	\$ 3,400.00	\$ 51,000.00	\$ 136,125.00
D50902100960	600A Panelboard	1	EA	\$ 14,400.00	\$ 14,400.00	\$ 7,400.00	\$ 7,400.00	\$ 21,800.00
								\$ 486,925.00
								<b>Total Lighting and Electrical: \$ 5,781,190.00</b>

Plumbing Assemblies								
<b>Patient room</b> Quantity of room: 210								
RSMean	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20101102160	Fl Mount WC w/ ADA	1	EA	\$ 790.00	\$ 790.00	\$ 835.00	\$ 835.00	\$ 1,625.00
D20103102300	Wall Hung Lav. Handicap	1	EA	\$ 1,475.00	\$ 1,475.00	\$ 920.00	\$ 920.00	\$ 2,395.00
D20104301960	Counter Single Bowl Sink	1	EA	\$ 395.00	\$ 395.00	\$ 840.00	\$ 840.00	\$ 1,235.00
Total for single room:								\$ 5,255.00
Total for all rooms:								\$ 1,103,550.00
<b>Autopsy room</b> Quantity of room: 1								
RSMean	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20101102160	Fl Mount WC w/ ADA	1	EA	\$ 790.00	\$ 790.00	\$ 835.00	\$ 835.00	\$ 1,625.00
D20103102300	Wall Hung Lav. Handicap	1	EA	\$ 1,475.00	\$ 1,475.00	\$ 920.00	\$ 920.00	\$ 2,395.00
D20104202160	Double Compartment Sink	1	EA	\$ 615.00	\$ 615.00	\$ 855.00	\$ 855.00	\$ 1,470.00
D20107101600	Shower, stall ,baked enamel	1	EA	\$ 1,550.00	\$ 1,550.00	\$ 880.00	\$ 880.00	\$ 2,430.00
Total for single room:								\$ 7,920.00
Total for all rooms:								\$ 7,920.00
<b>G Floor Work Area</b> Quantity of room: 1								
RSMean	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20104202160	Double Compartment Sink	1	EA	\$ 615.00	\$ 615.00	\$ 855.00	\$ 855.00	\$ 1,470.00
D20107101960	Emergency Eye Wash Station	1	EA	\$ 112.00	\$ 112.00	\$ 325.00	\$ 325.00	\$ 437.00
Total for single room:								\$ 1,907.00
Total for all rooms:								\$ 1,907.00
<b>Dirty Linens Room</b> Quantity of room: 1								
RSMean	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20104202160	Double Compartment Sink	1	EA	\$ 615.00	\$ 615.00	\$ 855.00	\$ 855.00	\$ 1,470.00
D20107101960	Emergency Eye Wash Station	1	EA	\$ 112.00	\$ 112.00	\$ 325.00	\$ 325.00	\$ 437.00
Total for single room:								\$ 1,907.00
Total for all rooms:								\$ 1,907.00
<b>Central Office Area</b> Quantity of room: 7								
RSMean	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20101102160	Fl Mount WC w/ ADA	4	EA	\$ 790.00	\$ 3,160.00	\$ 835.00	\$ 3,340.00	\$ 6,500.00
D20103102300	Wall Hung Lav. Handicap	4	EA	\$ 1,475.00	\$ 5,900.00	\$ 920.00	\$ 3,680.00	\$ 9,580.00
D20104202160	Double Compartment Sink	4	EA	\$ 615.00	\$ 2,460.00	\$ 855.00	\$ 3,420.00	\$ 5,880.00
D20104202080	Single Compartment Sink	5	EA	\$ 460.00	\$ 2,300.00	\$ 795.00	\$ 3,975.00	\$ 6,275.00
Total for single room:								\$ 28,235.00
Total for all rooms:								\$ 197,645.00
<b>Corridor</b> Quantity of room: 7								
RSMean	Fixtures	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20108201920	Floor Mounted Water Cooler	1	EA	\$ 1,200.00	\$ 1,200.00	\$ 640.00	\$ 640.00	\$ 1,840.00
Total for single room:								\$ 1,840.00
Total for all rooms:								\$ 12,880.00
<b>Domestic Water Heater</b>								
RSMean	Equipment	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20202502260	600 MBH input, 576GPH	3	EA	\$ 24,100.00	\$ 72,300.00	\$ 4,050.00	\$ 12,150.00	\$ 84,450.00
Total:								\$ 84,450.00
<b>Roof Drains</b> Quantity of Roof Drains: 18								
RSMean	Equipment	Qty	Units	Mat.	Tot. Mat	Inst.	Tot. Inst.	Total
D20402102040	4" diam., 10' high	1	EA	\$ 455.00	\$ 455.00	\$ 930.00	\$ 930.00	\$ 1,385.00
D20402102080	For each additional foot	120	EA	\$ 11.00	\$ 1,320.00	\$ 26.50	\$ 3,180.00	\$ 4,500.00
Total for single roof drain:								\$ 5,885.00
Total for all Roof Drains:								\$ 105,930.00
<b>Total Plumbing:</b>								<b>\$ 1,516,189.00</b>

## Appendix C: LEED Evaluation Penn State Approach

**LEED Evaluation**

Abbrev.	Credit	Effort Level	Points
<b>Integrative Process</b>			
IP	Integrative Process	MANDATORY	1
<b>Location &amp; Transportation</b>			
LT	LEED for Neighborhood Development Location	MINIMAL	16
LT	Sensitive Land Protection	MANDATORY	1
LT	High Priority Site	NOT	2
LT	Surrounding Density and Diverse Uses	MANDATORY	5
LT	Access to Quality Transit	SIGNIFICANT	5
LT	Bicycle Facilities	MANDATORY	1
LT	Reduced Parking Footprint	MINIMAL	1
LT	Green Vehicles	NOT	1
<b>Suitable Site</b>			
SS	Site Assessment		1
SS	Site Selection	MINIMAL	1
SS	Development Density and Community Connectivity	SIGNIFICANT	5
SS	Brownfield Redevelopment	NOT	1
SS	Alt. Transportation: Public Transportation Access	MINIMAL	6
SS	Alt. Trans.: Bicycle Storage & Changing Rooms	MINIMAL	1
SS	Alt. Trans.: Low Emitting and Fuel Efficient Vehicles	MINIMAL	3
SS	Alt. Transportation: Parking Capacity	MINIMAL	2
SS	Site Development: Protect or Restore Habitat	MINIMAL	2
SS	Maximize Open Space	NOT	1
SS	Stormwater Design: Quantity Control	MINIMAL	1
SS	Stormwater Design: Quality Control	MINIMAL	1
SS	Heat Island Effect: Non-Roof	MINIMAL	1
SS	Heat Island Effect: Roof	MANDATORY	1
SS	Light Pollution Reduction	MANDATORY	1
<b>Water Efficiency</b>			
WE	Outdoor Water Use Reduction		0
WE	Indoor Water Use Reduction		0
WE	Building-level Water Metering		0
WE	Outdoor Water Use Reduction	MINIMAL	2
WE	Indoor Water Use Reduction	MANDATORY	6
WE	Cooling Tower Water Use	MINIMAL	2
WE	Water Metering	MANDATORY	1
<b>Energy &amp; Atmosphere</b>			
EA	Fundamental Commissioning and Verification		0
EA	Minimum Energy Performance		0
EA	Building-Level Energy Metering		0
EA	Fundamental Refrigerant Management		0
EA	Optimize Energy Performance	SIGNIFICANT	18
EA	Advanced Energy Metering	MINIMAL	1

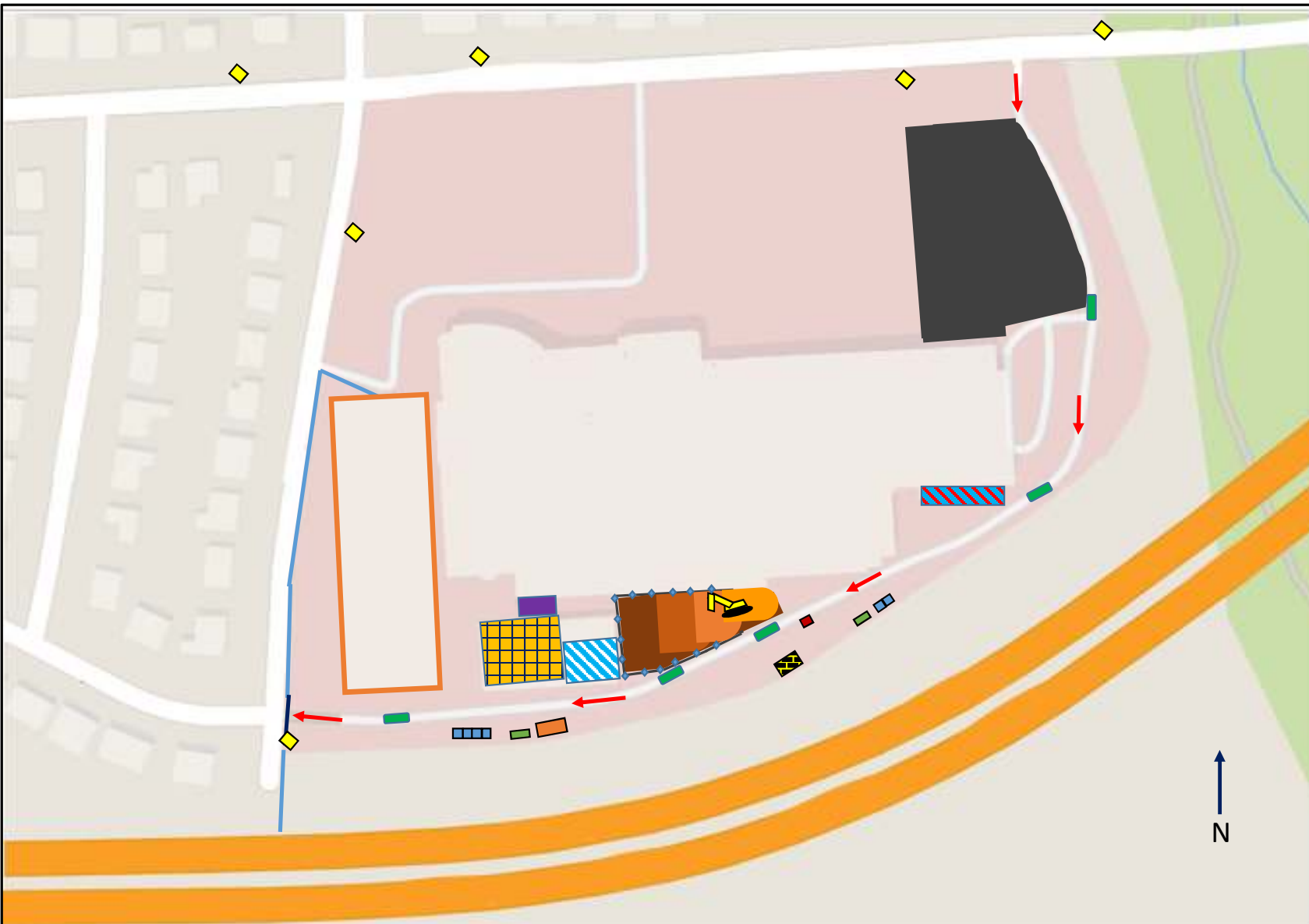
EA	Demand Response	NOT	2
EA	Renewable Energy Production	MINIMAL	3
EA	Enhanced Commissioning	NOT	2
EA	Enhanced Refrigerant Management	SIGNIFICANT	2
EA	Green Power and carbon offsets	NOT	2
<b>Materials &amp; Resources</b>			
MR	Construction and Demolition Waste Management Planning		0
MR	Building Life-Cycle Impact Reduction	NOT	5
MR	BPD&O - Environmental Product Declarations	MANDATORY	2
MR	BPD&O - Sourcing of Raw Materials	MANDATORY	2
MR	Construction Waste Management	MINIMAL	2
MR	Regional Materials	SIGNIFICANT	2
MR	Certified Wood	MANDATORY	1
<b>Indoor Environmental Quality</b>			
IEQ	Construction Indoor Air Quality Management Plan	MANDATORY	1
IEQ	Enhanced Indoor Air Quality Strategies	MINIMAL	2
IEQ	Low Emitting Materials	SIGNIFICANT	3
IEQ	Indoor Air Quality Assessment	SIGNIFICANT	2
IEQ	Thermal Comfort	MANDATORY	1
IEQ	Interior Lighting	MINIMAL	2
IEQ	Daylighting	NOT	3
<b>Innovation &amp; Design Process</b>			
ID	Innovation	SIGNIFICANT	5
ID	Accredited Professional	MANDATORY	1
<b>Regional Priority</b>			
RP	Regional Priority	MINIMAL	4

MANDATORY	25
SIGNIFICANT	40
MINIMAL	53
NOT	19

ATTAINABLE = 65



## Appendix D: Site Logistics Plans

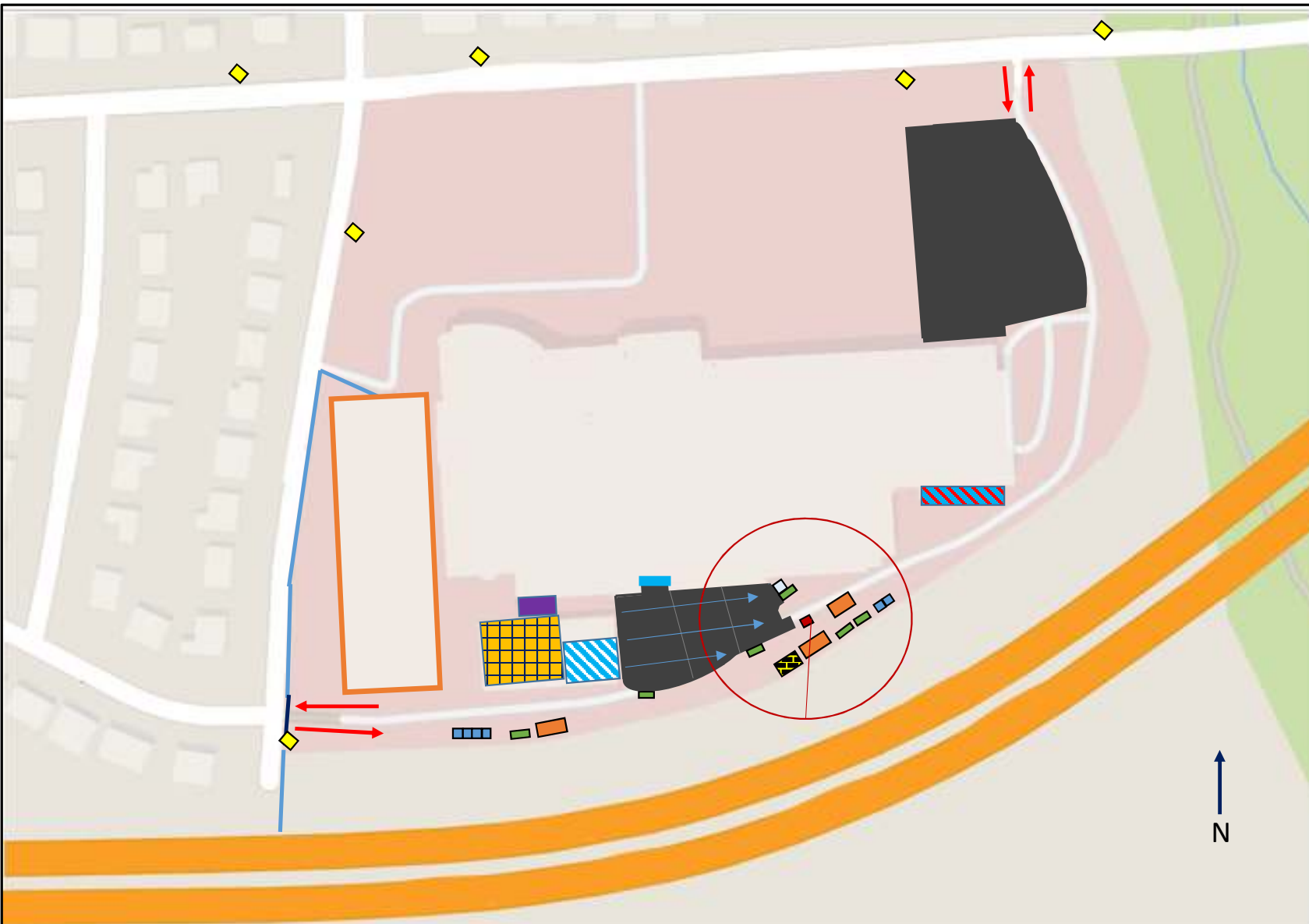


# Northeast Hospital Expansion

Phase: Excavation

## LEGEND

- Construction Foot Print
- Temporary CUP
- Parking Deck
- Whiting-Turner's Offices
- Subcontractor Offices
- Portable Toilet
- Dumpsters
- Signage
- Fence
- Delivery entrances/exits
- Tower Crane Pad
- Laydown areas
- Ambulance Emergency Entrance
- Concrete mixing station
- Dump Truck
- Excavator
- Soldier Piles and Lagging



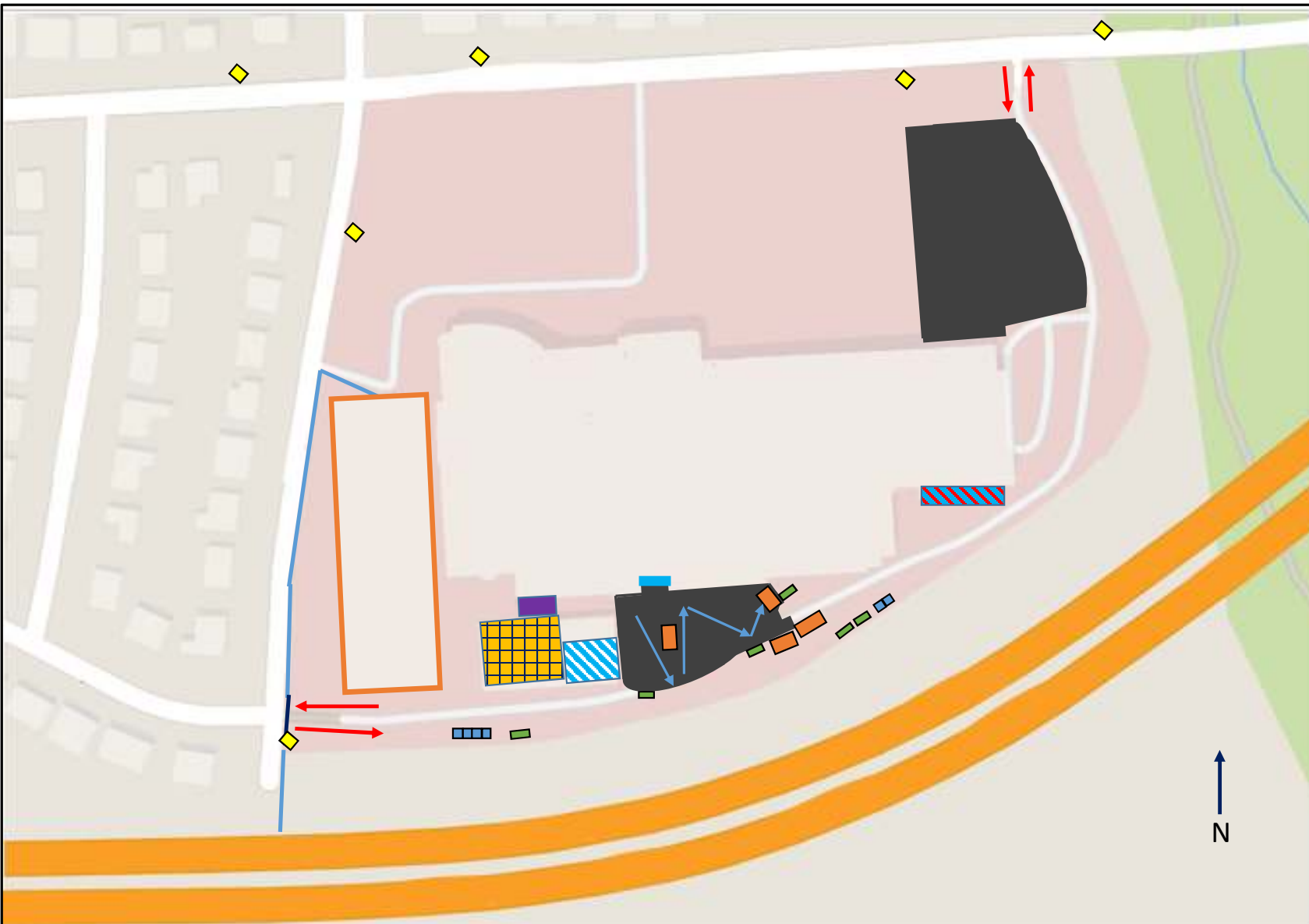
Northeast Hospital  
Expansion

Phase:  
Superstructure

LEGEND

- Construction Foot Print
- Temporary CUP
- Parking Deck
- Whiting-Turner's Offices
- Subcontractor Offices
- Portable Toilet
- Dumpsters
- Signage
- Fence
- Delivery entrances/exits
- Flow of Trades
- Sticky Mats/Dust Partition
- Material Hoist
- Tower Crane
- Laydown areas
- Ambulance Emergency Entrance
- Concrete mixing station





Northeast Hospital  
Expansion

Phase: MEP &  
Finishes

LEGEND

- Construction Foot Print
- Temporary CUP
- Parking Deck
- Whiting-Turner's Offices
- Subcontractor Offices
- Portable Toilet
- Dumpsters
- Signage
- Fence
- Delivery entrances/exits
- Flow of Trades
- Sticky Mats/Dust Partition
- Laydown areas
- Ambulance Emergency Entrance



## Appendix E: Primavera Project Schedule

Activity ID	Activity Name	Original Duration	Start	Finish	Classic Schedule Layout																																											
					Qtr 4, 2012		Qtr 1, 2013			Qtr 2, 2013			Qtr 3, 2013			Qtr 4, 2013			Qtr 1, 2014			Qtr 2, 2014			Qtr 3, 2014			Qtr 4, 2014			Qtr 1, 2015			Qtr 2, 2015			Qtr 3, 2015			Qtr 4, 2015			Qtr 1, 2016			Qtr 2, 2016		
					Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
<b>NE Hosp Northeast Hospital I</b> 733 12-Dec-12 09-Sep-15					09-Sep-15, NE Hosp Northeast Hospital Exp																																											
1	Notice to Proceed	0	08-Jan-13		◆ Notice to Proceed, 08-Jan-13																																											
2	Submittals and Permits	511	08-Jan-13	23-Dec-14	Submittals and Permits																																											
<b>NE Hosp.3 &lt;Procurement&gt;</b> 657 12-Dec-12 18-Jun-15					18-Jun-15, NE Hosp.3 <Procurement>																																											
10	Procurement - Finishes	532	14-Jan-13	27-Jan-15	Procurement - Finishes																																											
11	Procurement - elevators	615	23-Jan-13	02-Jun-15	Procurement - elevators																																											
12	Procurement - fire suppress	563	14-Jan-13	11-Mar-15	Procurement - fire suppression																																											
13	Procurement - Plumbing	624	14-Jan-13	04-Jun-15	Procurement - Plumbing																																											
14	Procurement - HVAC	624	14-Jan-13	04-Jun-15	Procurement - HVAC																																											
15	Procurement - Electrical	657	12-Dec-12	18-Jun-15	Procurement - Electrical																																											
16	Procurement - Earthwork	491	12-Dec-12	29-Oct-14	Procurement - Earthwork																																											
4	Procurement - concrete	91	14-Jan-13	20-May-13	Procurement - concrete																																											
5	Procurement - masonry	227	01-Mar-13	13-Jan-14	Procurement - masonry																																											
6	Procurement - steel	363	14-Jan-13	04-Jun-14	Procurement - steel																																											
7	Procurement - wood & corr	272	31-Aug-13	16-Sep-14	Procurement - wood & composites																																											
8	Procurement - thermal & m	630	14-Jan-13	12-Jun-15	Procurement - thermal & moisture																																											
9	Procurement - curtain wall,	450	14-Jan-13	03-Oct-14	Procurement - curtain wall, glazing, louvers, and doors																																											
<b>NE Hosp.4 &lt;Coordination and Sign-Off&gt;</b> 173 14-Jan-13 11-Sep-13					11-Sep-13, NE Hosp.4 <Coordination and Sign-Off>																																											
18	Coordination and Sign Off -	25	14-Jan-13	15-Feb-13	Coordination and Sign Off - Below grade and Foundation																																											
19	Coordination and Sign Off -	63	14-Jan-13	10-Apr-13	Coordination and Sign Off - tower crane foundation																																											
20	Coordination and Sign Off -	46	11-Mar-13	13-May-13	Coordination and Sign Off - Basement																																											
21	Coordination and Sign Off -	25	08-Apr-13	10-May-13	Coordination and Sign Off - Ground Floor																																											
22	coordination and sign Off -	25	22-Apr-13	24-May-13	coordination and sign Off - MEP risers																																											
23	Coordination and Sign Off -	77	15-Apr-13	30-Jul-13	Coordination and Sign Off - Floors 1-4																																											
24	Coordination and Sign Off -	56	11-Jun-13	27-Aug-13	Coordination and Sign Off - Floors 5-7																																											
25	Coordination and Sign Off -	41	17-Jul-13	11-Sep-13	Coordination and Sign Off - Penthouse																																											
<b>NE Hosp.5 &lt;Construction&gt;</b> 710 14-Jan-13 09-Sep-15					09-Sep-15, NE Hosp.5 <Construction>																																											
<b>NE Hosp.5.1 &lt;Site Work&gt;</b> 682 14-Jan-13 25-Aug-15					25-Aug-15, NE Hosp.5.1 <Site Work>																																											
29	Site Demo	4	14-Jan-13	17-Jan-13	Site Demo																																											
30	Excavate Haul foundation	15	21-Jan-13	08-Feb-13	Excavate Haul foundation																																											
31	Install Lagging and tie-Back	15	21-Jan-13	08-Feb-13	Install Lagging and tie-Backs																																											
32	Sheeting and Shoring Piles	15	21-Jan-13	08-Feb-13	Sheeting and Shoring Piles (South)																																											
33	Sheeting and Shoring Piles	27	15-Apr-14	21-May-14	Sheeting and Shoring Piles (CUP)																																											
34	Form, Rebar and Pour Nor	55	04-Feb-14	21-Apr-14	Form, Rebar and Pour North West Retaining Wall																																											
35	Form, Rebar and Pour Sou	14	14-Jul-14	31-Jul-14	Form, Rebar and Pour South West Retaining Wall																																											
36	Install West Sewer Line	61	17-Mar-14	09-Jun-14	Install West Sewer Line																																											
37	Install Storm, fuel, Gas and	124	01-Aug-14	21-Jan-15	Install Storm, fuel, Gas and Water Piping south of CUP																																											
38	Decommissioning Existing C	27	12-Mar-15	17-Apr-15	Decommissioning Existing CUP																																											
39	Demo Existing CUP	34	09-Apr-15	26-May-15	Demo Existing CUP																																											
40	Form, Rebar and Pour Loa	13	05-Jun-15	23-Jun-15	Form, Rebar and Pour Loading Dock																																											
41	Install Loading dock stairs, i	6	19-Jun-15	26-Jun-15	Install Loading dock stairs, ramp, and trench drains																																											
42	Excavate existing 40,000 gal	6	26-Jun-15	03-Jul-15	Excavate existing 40,000 gal Fuel Tank																																											
43	Install Medical Gas Piping	35	05-Jun-15	23-Jul-15	Install Medical Gas Piping																																											
44	Install new 40,000 gal Fuel	11	13-Jul-15	27-Jul-15	Install new 40,000 gal Fuel Tank																																											
45	Finalize utilities	6	18-Aug-15	25-Aug-15	Finalize utilities																																											
<b>NE Hosp.5.2 &lt;Structure&gt;</b> 651 13-Mar-13 09-Sep-15					09-Sep-15, NE Hosp.5.2 <Structure>																																											

Activity ID	Activity Name	Original Duration	Start	Finish	Classic Schedule Layout																																											
					Qtr 4, 2012		Qtr 1, 2013			Qtr 2, 2013			Qtr 3, 2013			Qtr 4, 2013			Qtr 1, 2014			Qtr 2, 2014			Qtr 3, 2014			Qtr 4, 2014			Qtr 1, 2015			Qtr 2, 2015			Qtr 3, 2015			Qtr 4, 2015			Qtr 1, 2016			Qtr 2, 2016		
					Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
<b>NE Hosp.5.5.2.5.2.1 &lt;Basement&gt;</b>		130	13-Mar-13	10-Sep-13	10-Sep-13, NE Hosp.5.5.2.5.2.1 <Basement>																																											
48	Layout Grade Beam	1	26-Mar-13	26-Mar-13	Layout Grade Beam																																											
49	Form, Rebar, Pour Tower (	5	27-Mar-13	02-Apr-13	Form, Rebar, Pour Tower Crane Foundation																																											
50	Cure Tower Crane Founda	3	01-Apr-13	03-Apr-13	Cure Tower Crane Foundation																																											
51	Erect tower Crane	2	05-Apr-13	08-Apr-13	Erect tower Crane																																											
52	Form, rebar, pour Grade B	75	28-Mar-13	10-Jul-13	Form, rebar, pour Grade Beams and Columns																																											
53	Place Rebar and install Cai	36	13-Mar-13	01-May-13	Place Rebar and install Caissons																																											
54	Excavate and F/R/P Elevat	26	21-Mar-13	25-Apr-13	Excavate and F/R/P Elevator Pits																																											
55	Form, rebar and pour four	73	09-Apr-13	18-Jul-13	Form, rebar and pour foundation walls																																											
56	Install Wall braces	22	07-Jun-13	08-Jul-13	Install Wall braces																																											
57	Waterproof North Foundat	7	19-Apr-13	29-Apr-13	Waterproof North Foundation Wall																																											
58	Install Underslab Mechanic	29	20-May-13	27-Jun-13	Install Underslab Mechanical																																											
59	Form, Rebar and Pour SO	25	03-Jun-13	05-Jul-13	Form, Rebar and Pour SOG																																											
60	Waterproof West and Sout	22	10-Jun-13	09-Jul-13	Waterproof West and South Foundation Walls																																											
61	Water proof East foundatio	8	24-Jun-13	03-Jul-13	Water proof East foundation wall																																											
62	Remove reshores	1	10-Sep-13	10-Sep-13	Remove reshores																																											
63	Foundation compete	0	10-Sep-13	10-Sep-13	◆ Foundation complete, 10-Sep-13																																											
<b>NE Hosp.5.5.2.5.2.2 &lt;Ground Floor&gt;</b>		589	07-Jun-13	09-Sep-15	09-Sep-15, NE Hosp.5.5.2.5.2.2 <Ground Floor>																																											
65	Form and rebar west portic	12	07-Jun-13	24-Jun-13	Form and rebar west portion Ground floor Slab																																											
66	Install west portion MEP sle	5	14-Jun-13	20-Jun-13	Install west portion MEP sleeves and Openings																																											
67	Pour west portion Ground f	1	20-Jun-13	20-Jun-13	Pour west portion Ground floor slab																																											
68	Form and rebar central por	6	29-Jun-13	08-Jul-13	Form and rebar central portion Ground floor Slab																																											
69	Install central portion MEP :	1	02-Jul-13	02-Jul-13	Install central portion MEP sleeves and Openings																																											
70	Pour central portion Groun	1	08-Jul-14	08-Jul-14	Pour central portion Ground floor slab																																											
71	Form and rebar east portio	6	09-Jul-13	16-Jul-13	Form and rebar east portion Ground floor Slab																																											
72	Install east portion MEP sle	1	16-Jul-13	16-Jul-13	Install east portion MEP sleeves and Openings																																											
73	Pour east portion Ground fl	8	18-Jul-13	29-Jul-13	Pour east portion Ground floor slab																																											
74	remove reshores	1	30-Sep-13	30-Sep-13	remove reshores																																											
75	Ground Slab Complete	0	30-Sep-13	30-Sep-13	◆ Ground Slab Complete, 30-Sep-13																																											
76	Install shoring posts for elev	30	01-Nov-13	12-Dec-13	Install shoring posts for elevated deck																																											
77	Trench/Install/Backfill electr	50	30-Jun-14	05-Sep-14	Trench/Install/Backfill electrical Ductbanks																																											
78	Trench/Install/Backfill 8" Wa	7	22-Sep-14	30-Sep-14	Trench/Install/Backfill 8" Water Line from east to west																																											
79	trench/Install/cover 8" NG a	2	30-Sep-14	01-Oct-14	trench/Install/cover 8" NG and fuel lines																																											
80	Backfill and compact drivew	3	03-Oct-14	07-Oct-14	Backfill and compact driveway aisle																																											
81	Stone/compact driveway ais	3	26-Dec-14	30-Dec-14	Stone/compact driveway aisle readying for pavement																																											
82	Pave driveway aisle base cr	1	19-May-15	19-May-15	Pave driveway aisle base coat																																											
83	Pave driveway aisle top coe	1	09-Sep-15	09-Sep-15	Pave driveway aisle top coat																																											
<b>NE Hosp.5.5.2.5.2.3 &lt;Level 1&gt;</b>		81	21-Jun-13	11-Oct-13	11-Oct-13, NE Hosp.5.5.2.5.2.3 <Level 1>																																											
86	Form, rebar and pour west	26	21-Jun-13	26-Jul-13	Form, rebar and pour west level 1 columns and slab																																											
87	Install west MEP Sleeves	10	05-Jul-13	18-Jul-13	Install west MEP Sleeves																																											
88	Stress west PT Tendons	1	20-Jul-13	22-Jul-13	Stress west PT Tendons																																											
89	Form, rebar and pour cent	17	09-Jul-13	31-Jul-13	Form, rebar and pour central level 1 columns and slab																																											
90	Install central MEP sleeves	6	18-Jul-13	25-Jul-13	Install central MEP sleeves																																											
91	Stress central PT Tendons	1	30-Jul-13	30-Jul-13	Stress central PT Tendons																																											
92	Form, rebar and pour east	11	27-Jul-13	12-Aug-13	Form, rebar and pour east level 1 columns and slab																																											
93	Install east MEP sleeves	4	01-Aug-13	06-Aug-13	Install east MEP sleeves																																											
94	Stress east PT Tendons	1	10-Aug-13	12-Aug-13	Stress east PT Tendons																																											





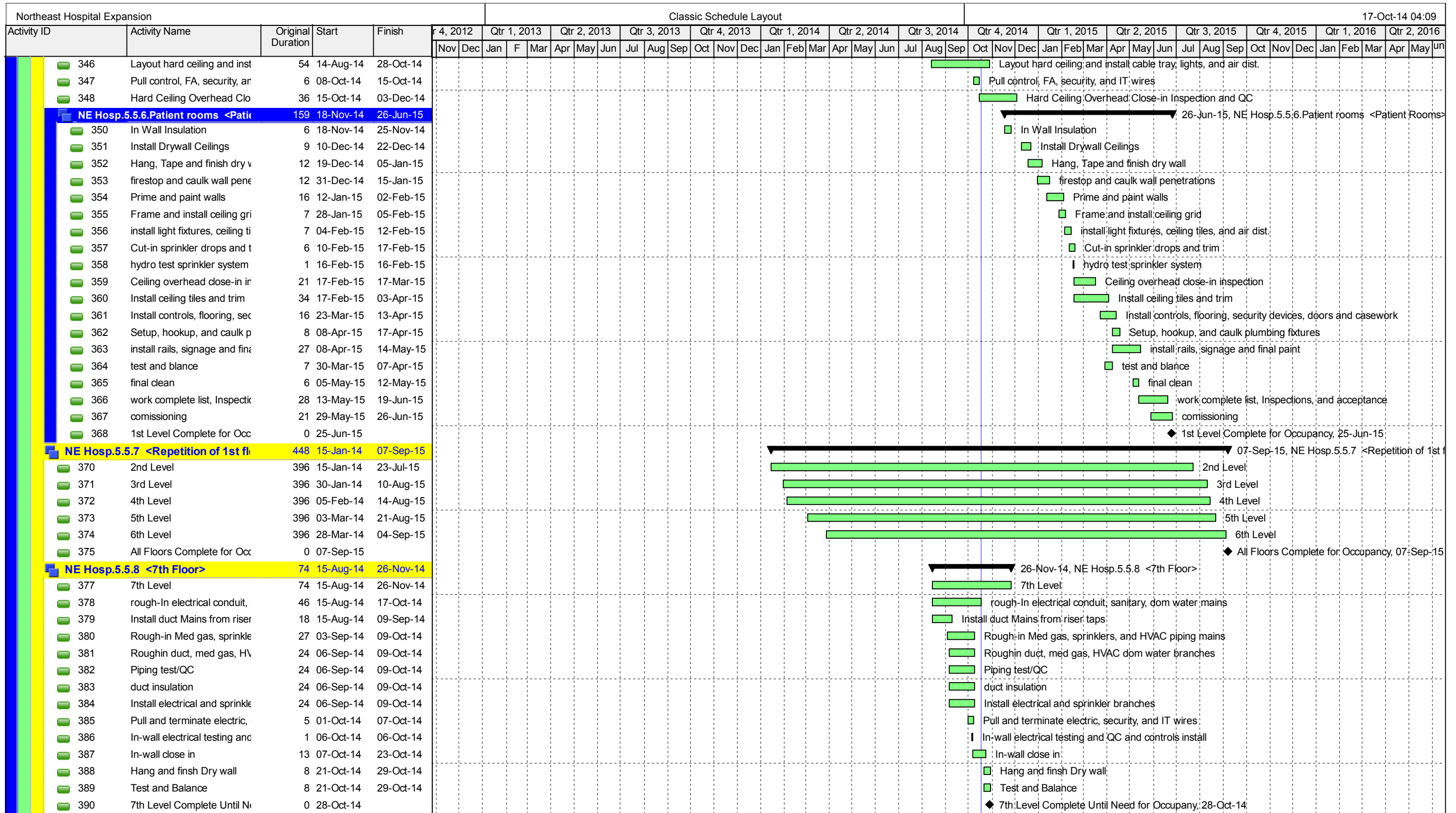
Table with columns for Activity ID, Activity Name, Original Duration, Start, Finish, and a monthly grid from Q4 2012 to Q2 2016. It contains task bars and milestones for various construction activities like 'Stress west PT Tendons', 'Form, rebar and pour east', etc.

Legend for activity bars: Actual Level of Effort (blue), Remaining Work (green), Actual Work (yellow), Critical Remaining Work (red), Milestone (diamond), summary (arrow).

Activity ID	Activity Name	Original Duration	Start	Finish	Classic Schedule Layout																																							
					Qtr 4, 2012		Qtr 1, 2013			Qtr 2, 2013			Qtr 3, 2013			Qtr 4, 2013		Qtr 1, 2014			Qtr 2, 2014			Qtr 3, 2014			Qtr 4, 2014		Qtr 1, 2015			Qtr 2, 2015			Qtr 3, 2015			Qtr 4, 2015		Qtr 1, 2016			Qtr 2, 2016	
					Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
197	mobilize and layout	1	18-Nov-13	18-Nov-13	mobilize and layout																																							
198	Install curtainwall anchors fi	4	28-Feb-14	05-Mar-14	Install curtainwall anchors from L2 to L4																																							
199	Install Curtainwall anchors i	13	06-Mar-14	24-Mar-14	Install Curtainwall anchors from L5 to penthouse																																							
200	Install Metal studs L1	51	18-Feb-14	29-Apr-14	Install Metal studs L1																																							
201	Install regular wall units L1	7	11-Apr-14	21-Apr-14	Install regular wall units L1																																							
202	Install regular wall membra	5	09-May-14	15-May-14	Install regular wall membranes L1																																							
203	Install curtainwall units start	37	24-Apr-14	13-Jun-14	Install curtainwall units starting at L2 to L7																																							
204	Install curtainwall membran	3	13-Jun-14	17-Jun-14	Install curtainwall membrane																																							
205	Layout and install metal par	105	14-Jul-14	05-Dec-14	Layout and install metal panels																																							
206	Layout and install soffits	14	04-Nov-14	20-Nov-14	Layout and install soffits																																							
<b>NE Hosp.5.5.3.5.3.2 &lt;West Elevation&gt;</b>					<b>03-Aug-15, NE Hosp.5.5.3.5.3.2 &lt;West Elevation&gt;</b>																																							
209	Install Metal Studs L1 to L4	62	21-Nov-13	14-Feb-14	Install Metal Studs L1 to L4																																							
210	Install Metal Studs L5 to L7	62	04-Feb-14	30-Apr-14	Install Metal Studs L5 to L7																																							
211	Place regular wall starter si	17	04-Feb-14	26-Feb-14	Place regular wall starter sills L1 to L4																																							
212	Place regular wall starter si	13	25-Mar-14	10-Apr-14	Place regular wall starter sills L5 to L7																																							
213	Install regular Wall units L1	77	18-Dec-13	03-Apr-14	Install regular Wall units L1 to L4																																							
214	install regular wall units L5 i	9	31-Mar-14	10-Apr-14	install regular wall units L5 to L7																																							
215	Layout and Install Metal Pa	83	17-Apr-14	11-Aug-14	Layout and Install Metal Panels																																							
216	Layout and Install Soffits	11	20-Jul-15	03-Aug-15	Layout and Install Soffits																																							
<b>NE Hosp.5.5.3.5.3.2.10 &lt;North Eleva</b>					<b>29-Dec-14, NE Hosp.5.5.3.5.3.2.10 &lt;North Elevation&gt;</b>																																							
219	Install Metal Studs L1 to L4	140	11-Dec-13	24-Jun-14	Install Metal Studs L1 to L4																																							
220	Install Metal Studs L5 to L7	66	28-Feb-14	30-May-14	Install Metal Studs L5 to L7																																							
221	Install Curtainwall anchors i	54	02-May-14	16-Jul-14	Install Curtainwall anchors at L4 to Penthouse																																							
222	Install both regular wall anc	20	02-May-14	29-May-14	Install both regular wall and curtainwall starter sills																																							
223	Install regular wall units L1	79	01-Mar-14	19-Jun-14	Install regular wall units L1 to L4																																							
224	Install regular wall units L5	19	09-May-14	04-Jun-14	Install regular wall units L5 to L7																																							
225	Install regular wall membra	29	02-May-14	11-Jun-14	Install regular wall membrane																																							
226	Install curtainwall units	2	26-Jun-14	27-Jun-14	Install curtainwall units																																							
227	Install curtainwall membran	57	19-May-14	05-Aug-14	Install curtainwall membrane																																							
228	Layout and place metal par	161	19-May-14	29-Dec-14	Layout and place metal panels																																							
<b>NE Hosp.5.5.3.5.3.3 &lt;East Elevator</b>					<b>14-Jan-15, NE Hosp.5.5.3.5.3.3 &lt;East Elevation&gt;</b>																																							
231	Install Curtainwall anchors i	1	03-Jun-14	03-Jun-14	Install Curtainwall anchors L5 to L7																																							
232	Install curtainwall units	11	06-Jun-14	20-Jun-14	Install curtainwall units																																							
233	Install curtainwall membran	3	30-Jun-14	02-Jul-14	Install curtainwall membrane																																							
234	Material hoist removal	10	09-Sep-14	22-Sep-14	Material hoist removal																																							
235	Install Metal studs L5 to L7	7	22-Sep-14	30-Sep-14	Install Metal studs L5 to L7																																							
236	Install metal studs L1 to L4	8	30-Sep-14	09-Oct-14	Install metal studs L1 to L4																																							
237	Install regular wall unit L1 to	32	09-Oct-14	21-Nov-14	Install regular wall unit L1 to L4																																							
238	Install regular wall unit L5 to	7	11-Nov-14	19-Nov-14	Install regular wall unit L5 to L7																																							
239	Install regular wall sills	20	09-Oct-14	05-Nov-14	Install regular wall sills																																							
240	Layout and install metal par	39	07-Nov-14	30-Dec-14	Layout and install metal panels L1 to L4																																							
241	Layout and install metal par	22	16-Dec-14	14-Jan-15	Layout and install metal panels L5 to L7																																							
<b>NE Hosp.5.5.3.5.3.4 &lt;Penthouse Rc</b>					<b>18-May-15, NE Hosp.5.5.3.5.3.4 &lt;Penthouse Roof&gt;</b>																																							
244	Install Temporary Roofing e	28	21-Apr-14	28-May-14	Install Temporary Roofing and Wall Tarping																																							
245	Set and connect roof drains	26	25-May-14	30-Jun-14	Set and connect roof drains																																							
246	Air and vapor barrier	33	25-May-14	09-Jul-14	Air and vapor barrier																																							
247	Built-up Membrane roof	7	30-Jun-14	08-Jul-14	Built-up Membrane roof																																							







█ Actual Level of Effort   
 █ Remaining Work   
 █ Actual Work   
 █ Critical Remaining Work   
 ◆ Milestone   
 ▼ summary