St. Joseph's Women's Hospital

Neonatal Intensive Care Unit (NICU)

3030 W. Dr. Martin Luther King, Jr. Blvd.

Tampa, FL 33607

Technical Report Two

October 27, 2010

BayCare Health System

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Construction Management

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Executive Summary

Technical Assignment Two will focus on detailed aspects of executing the St. Joseph's Women's Hospital NICU Expansion project in a successful manner. Items in this report include a general project schedule sorted by contractor, phase, and floor. Also a detailed estimate of the superstructure, a general conditions estimate, and a two phase site layout plan are provided.

Creating the schedule required a broad approach in order to effectively communicate the progress of the three phase, twenty-seven month project duration. The majority of the work on this project will be in completing the superstructure and MEP installations. These were the tasks that were focused on. The detailed estimate also focuses on the superstructure for this same reason. Although the detailed estimate was 23% lower than the actual cost of the concrete package denoted in the GMP, there are sufficient areas that this discrepancy can be logically attributed to. The General Conditions Estimate provides a very basic assessment of temporary facilities and staffing costs reported in a unit rate. Staffing accounted for the largest portion of general conditions at 78%. Schedule acceleration will clearly allow for monumental savings between staffing and temporary facilities alone. Other items were accounted for, but typically as lump sum items. The two site phasing plans show that effective management of space will be crucial to the success of this project. There is not much room to work with, and maintaining full operational status of the hospital makes the challenge even greater.

The technical aspects of phasing and scheduling are two areas that deserve further evaluation. While phasing alone may not be altered under the current design, a different construction type may facilitate logistics, and result in a time and cost savings. Also a summary of current industry issues will be forthcoming, pending the PACE Roundtable seminar on October 28, 2010.

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Detailed Project Schedule

The detailed project schedule found in Appendix A was created based on the milestone schedule produced in Technical Assignment One. The idea was to expand upon key sequencing issues, particularly within Phases I and II, where most of the work will occur. The primary focus was directed toward activities for building the superstructure and installing MEP in the new NICU tower. The assignment requests that these activities be grouped by trade. While this brings some convenience to viewing only one particular set of activities at a time, it somewhat inhibits recognition of the overall project progress due to an inability to customize and sort fields in Microsoft Project. Therefore, the gaps in between phasing may deceive the viewer into believing that a particular contractor is onsite for longer than they actually are. Second mobilizations will likely be necessary, however this gap is not recognized in the Gantt Chart. Furthermore, the links between different trades were not created so as to preserve the organization of the Gantt Chart. The dates do however reflect the interdependencies between tasks of different trades, there is simply no visual line connecting them.

Phase I work was separated into two sequences, North and South. Breaking up the structure into two pieces allows a particular crew to constantly be working. For example, one set of carpenters and rod busters will be able to continually reinforce, form, and pour columns, while another crew will constantly be dealing with elevated slab formwork. The crew can simply move back to the South sequence once they are finished with the North, and begin the process all over again.

The dry-in date will be dependent upon not just the precast, but more so the windows. Windows will be installed from the top level down. If they were installed from the bottom, the building would not be water tight until the top level was dry anyway, due to water seeping down from the openings. Crane phasing will also be important to minimizing cost. The precast sequence was set up so that the crane on the Southeast corner could be removed as soon as possible. The crane on the North side will likely remain for the duration of both Phase I and Phase II.

Finishes were somewhat overlooked to maintain the maximum number of tasks on the schedule. Two line items for FF&E were included at the end as a blanket item. Interiors reflects the entire framing, drywall, and finishing process. Due to MEP rough-in, the durations for interior work have been extended, as the tasks are interrelated, and constant coordination is necessary. This issue also arises with miscellaneous and ornamental metals. These tasks tend to occur sporadically throughout the project, and that level of detail was not attained in this exercise. For repetitive work, only one set of tasks may have been developed to establish the logic. After that, a total duration for that particular sequence of work was just repeated as needed. One example of this would be the MEP work in Phase II. Level 1 tasks were separated, but Levels 2 through 5 were listed as one task per floor, with the total durations reflecting the sum of the tasks in Level 1.

Site Layout Planning

St. Joseph's Hospital is located about two miles from I-4, one of the main corridors connecting the central Florida region. In fact I-4, I-75, and I-275 all meet within a few miles of each other. Below is a satellite image of the job site in relation to two of these major highways, through which most deliveries will travel.

Figure 1. Access Highways to Project, courtesy Bing Maps

From the project schedule, it is known that there are three phases to the work. The first will be to erect the new NICU Tower, and eventually move all administration and patients into this tower prior to demolition and the construction of the connector. This has created the need for two major site plan phases of the project. The third phase is renovation, which will be ongoing with the second phase, and require little site logistics attention. Both site plans can be found in Appendix B. The Phase I site plan shows all construction area within the fence represented by the brown color. The tight site will require that a fair amount of storage trailers, office trailers, and parking be located in the lot along N Gomez. While this is inconvenient for carrying tools onto the site, it will be necessary to accommodate the staging and cranes that will use every bit of the space to the North side of the building. Due to these space restrictions, two cranes will be used with oversized jibs. The crane on the North side will have some mobility, and will need to use it in order for both cranes to lap coverage of the entire building. The crane on the Southeast side will not have the ability to crawl more than a few feet.

Unfortunately, there is no ability to create one way traffic through the site. This would require making a gate in the middle of W. Martin Luther King, Jr. Blvd., approximately one hundred fifty feet from N Macdill. This is directly where the crane will need to sit, and will create a difficult merge onto the busy street. There is however the ability to queue trucks along the side of N Macdill. Additionally, pedestrian traffic will be able to circulate on all sidewalks in the Phase I plan. A corridor of fencing will still allow pedestrian access to the existing NICU structure from N Macdill.

The end of the Phase I logistics plan will encompass the beginning of Phase II work. Demolition will require the entire area and a great deal of coordination to keep trucks cycling through the site. On the East side of the site, the buck-hoist and Southeast crane will be broken down (reflected in the Appendix A Schedule), and some fencing will begin to be removed. Once demolition is complete, the Phase II site logistics plan will go into effect.

Phase II presents the opportunity to give some space back to the public. This can be seen most notably in the large grass area that is located on the North side of the building. This will allow the Northern most side of the new NICU Tower to be the main entrance until the Phase II connector and true main entrance is completed. It should also be noted that all operations on the Southeast side of the building are complete, making the storage trailers on that side less accessible.

Overall the site is very tight and will require constant coordination for all deliveries and crane moves. At this time, the actual site logistics plan created by the project team is not available for critique. Some of the items on the site plans provided in Appendix B were however based on actual locations of equipment during a site visit in early June 2010.

Detailed Structural Estimate

The concrete superstructure was the system chosen for analysis in this detailed estimate. In addition, the small amount of steel framing on the Level 6 Mechanical Penthouse was also considered in this exercise. A modular approach was not taken due to the various locations of shear walls, sporadic column layout, and differing foundation sizes. Therefore, all takeoffs were completed by hand and the resultant costs as reported using RS Means CostWorks 2010, can be found in Table 1 below. These numbers are compared to a design development estimate performed by the Barton Malow project team in late 2009. For the purposes of this assignment, we will assume that this design development price is the actual cost, even though revisions may have been made since this estimate. A detailed estimate breakdown can be found in Appendix D.

Building System	CostWorks Estimate		Project Team Estimate	
	Total Price	Price/ SF	Total Price	Price/SF
Structural Concrete	$3,480,224	$29.60	$4,526,927	$38.50
Structural Steel	$110,740	$0.94	$224,965	$1.91

Table 1. Comparison of Detailed Estimate to Actual DD Estimate

It is evident that there is a considerable difference in both values for steel and concrete. The estimated concrete value is 23% lower than the actual cost, and the estimated steel costs are only half that of the actual cost. There are several reasons for this inconsistency that will be discussed shortly, but an understanding of the assumptions made during this estimate will first be necessary.

Formwork calculations were the largest area of ambiguity. The volume of formwork that would need to be rented would only be about one-fifth of the total job volume for most parts of the structural system. Obviously it is impossible to pour the entire structure at once, however since erecting, bracing, and stripping costs are included with the formwork costs in RS Means, it made sense to enter the entire volume of formwork that would be necessary to complete the job. For the concrete shear wall forming, there were a fair amount of block outs necessary for the doorway openings in elevator and stair shafts. In lieu of running a takeoff on these quantities as deducting from the concrete and steel values, then having to add more money for block out formwork and labor, the walls were calculated as continuous. The assumption is that the money saved in steel and concrete would negate the additional cost of formwork and labor. No formwork was included for foundations; it is assumed that these will be earth formed footers. Takeoff values can be found in Appendix C, and reflect the way in which each component of the structural system was broken out to accommodate RS Mean input values.

The second area that may be the source of some error is the calculation of rebar density in concrete. Rebar in columns were the only area that was not calculated using a broad density, but rather exact bar weight values. The rest of the structure was based on average rebar density ratios, which can also be found in the takeoff charts in Appendix C. These densities were an average of samples of that particular system component. For example, shear wall rebar density was calculated separately from elevated structural slab density. An additional 10% waste factor was added to rebar values for columns, slabs, and shear walls, which is to account for not only waste, but bar splice lapping. A 12% addition was added to foundation rebar, as there tends to be more waste and a need for rebar chairs and bolsters between mats in foundations.

Excluded from the estimate were the following:

- Below slab vapor barriers
- Site concrete (sidewalk, etc)
- Cutting, patching, and rubbing
- Curing and sealing
- Steel embeds for connections
- Ornamental metals and pan stairs
- Housekeeping pads
- Curbs
- Moment connection welds
- Surveying
- Safety and supervision provisions
- Concrete admixtures
- Fuel surcharges
- Material escalation fees
- Mud slabs
- Fireproofing/painting of steel

In comparison with the design development estimate, there were several items that attributed to the difference between estimates. It is important to keep in mind that this was a GMP project, therefore all additional variables are usually accounted for, so these values are expected to be significantly different than a cost plus fee or lump sum project. Items such as safety provisions for the concrete work totaled to over $100,000 in the design development estimate. Furthermore blanket items such as a $75,000 clean-up and dumping fee line item, an $85,000 allowance for surveying crews, $40,000 allowance for miscellaneous reinforcing, a $4,000 allowance for finishing footing tops, a $10,000 allowance for finishing generator slabs, and several other items amount quickly to create additional value toward the concrete package, which was not accounted for in the Detailed CostWorks Estimate. RS Means also had deduction values for heavy steel density jobs. Any job over with over 100 tons of reinforcing steel was to take an additional 15% off the material costs. It is highly unlikely that such deductions would be included in an estimate for this project. Additionally, there is no mark-up for the CM in the CostWorks estimate, even though this work will be sub-contracted. An additional 3-5% could be added to the total cost to bring this value a bit higher, but was left out for this exercise.

Regarding the structural steel estimate, rule of thumb multipliers were used to produce the values in the design developments estimate. 12 lbs/SF was the multiplier, which caused the extreme over estimate of the structural steel system. A more detailed look into RS Means allowed for each item to be calculated individually. This too had some error involved, as beam sizes required were not always provided in RS Means. In such instances, the next largest size was used.

Overall, the estimate provided by RS Means CostWorks is a fair representation of the costs of the structural system. Using an internal historical database would have likely provided the values for all of the miscellaneous items and soft costs that would not be covered by RS Means.

General Conditions Estimate

General Conditions costs were computed for the St. Joseph's NICU project, and were based on a general project template provided by Barton Malow. When compared to the actual estimated value of $3,270,637, an error of -6.3% was discovered. In comparison with the total project cost, general conditions accounts for 5.8%. A summary of the general conditions can be found below in Table 2, which has been broken out into four major categories.

Total General Conditions Summary		
Item	**Total Cost**	**Percentage of Total GC**
Staffing	$2,413,600.00	78.8%
Temporary Facilities and Controls	$303,200.00	9.9%
Temporary Utilities	$156,100.00	5.1%
Miscellaneous Items	$191,900.00	6.3%
Total	**$3,064,800.00**	

Table 2. Summary of General Conditions Costs

Further clarification of the items contained in each category is outlined in Appendix E. One important item that is missing from this estimate is insurance costs. BayCare Health System has elected to enroll in the Owner Controlled Insurance Program (OCIP). This relieves the construction manager from most insurance coverage, although items like vehicle and equipment insurance is still necessary. In this case, vehicle insurance is covered under the jobsite vehicle line item, and the construction manager will likely not have any equipment onsite that would not already be insured through a rental agency or subcontractor.

The construction manager was heavily involved in preconstruction feasibility studies and logistics planning, however, this work was performed under a separate contract. This allows for estimating to essentially be eliminated from the budget, because these costs were already picked up under the preconstruction services contract. Overhead items were also eliminated, aside from project executive involvement, which was based on 25% total dedication to this project.

It is clear that staffing costs have the largest impact on the general conditions. Future analyses of value engineering options should heavily consider staffing costs. A reduction in schedule by one month can yield a savings of over $98,000 in staffing alone.

There was a fair amount of ambiguity with calculating some of the numbers. General conditions is another area of estimating that would benefit immensely from past experience and historical data. Items such as LEED Efforts tend to go overlooked in the beginning of a project, but are recognized only when the budget is exceeded for the project engineer or project manager's staffing allowance.

PACE Roundtable Discussions

On Thursday October 28, 2010, the Partnership for Achieving Construction Excellence hosted and event for construction industry professionals, Penn State Students, and research faculty to gather at the Penn Stater Hotel and Conference Center in State College, PA. The topic: current industry issues. The session provided a good opportunity to discuss not only technological advances within the industry, but get several viewpoints on the economic downturn, how it is affecting the job market, and also how it is affecting the focus of construction itself.

Discussion on Integrated Project Delivery

After receiving general status updates of the PACE Chapter, there were two separate breakout sessions, both of which offered three separate topics that one could attend. In the first session, I joined Dr. Robert Leicht's discussion of Integrated Project Delivery. There were approximately thirty people present, and the discussion started with a focus on barriers to IPD. While the overall intent of the discussion may have been to promote IPD and find out how it will benefit projects, it focused much more on the extensive barriers, as IPD is not yet a common construction practice. Integrated Project Delivery itself is characterized by a unified organizational structure, but most notably by a tri-party contract which the owner, designer, and construction manager all sign. This contract was the hot item in the discussion and it seems that most issues arise from the reluctance of owners to sign such an agreement. In their eyes, this contract causes them to inherit the most risk. Particularly errors and omissions are shifted from the designer to the owner, which has the potential to financially disable the owner.

The reluctance also comes from the fact that this process has not really been proven on a large scale. There are too few public projects out there that have embraced IPD to create the true success stories that owners want to hear before they themselves take the leap. From a legal perspective, everyone really wants to see an IPD project fail, and learn of the legal repercussions. This contract document has not been tested in the legal system yet, so no one really knows to what extent of risk they are exposed. The economy is also not helping the situation by inducing the environment in which competitive bid prevails. Bob Grottenthaler from Barton Malow identified that a GMP is not utilized for IPD, but rather target pricing. The bottom line is that cost becomes a bit more ambiguous under this contract type, and the true price of work is identified further into the process than traditional delivery methods offer. Therefore an owner will not want to expose themselves to this risk.

With the industry wide inexperience of IPD, owners do not approach the idea with success in mind. Rather they are on guard and are too quick to revert back to a traditional method when the first problem arises. There is no way for the project to be successful unless all parties in the agreement remove the predisposition of failure from their mindset. Additionally, the construction industry has become very comfortable with finger-pointing. IPD does not allow any room for this behavior, and there is a shock factor involved when everyone realizes that when one party does not succeed, nobody makes money.

The second half of the discussion named opportunities for IPD to be effective. Unfortunately the discussion tended to revert back to the negatives, suggesting that there is still much more work to be done before this delivery method is accepted. Nonetheless there were some positives. The opportunity to embrace IPD is not restricted to projects where the tri-party agreement is signed. There are still some characteristics of IPD that can be implemented on nearly every type of project. One prime example is the design-assist subcontractor. Involving subcontractors earlier in the preconstruction process has been commonplace in recent years. The steel industry is a great example of the value of these services. The advancements in modeling from the steel subcontractors allows the procurement time of steel and coordination to be severely reduced and simplified. Embracing services like this appeals to owners.

The process itself is designed to promote the success of the project, and not just one particular firm. By forcing everyone to enter the agreement on the same level, the finger-pointing is eliminated, and common goals are set. Each entity is more likely to own their work when issues arise, because they know that they will have the support of the entire team in getting the issue resolved. Of course team building is crucial to success, and often times team building becomes part of the procurement process. A case study was mentioned regarding joint venture design. A particular owner hosted a conference that allowed them to see how effective the teamwork between different entities was. Several tables were set up, all of which had an architect, engineer, construction manager, and owners representative. A small project was developed and the synergy of each team was noted by the owner's reps, then compared to the rest of the field. This allowed the owner to distinguish which teams truly wanted to engage in this type of project, and allowed them to be comfortable in their selection. Basically the teams were competing on quality, not just price, which is where the focus needs to shift for a successful project to occur.

In short, the philosophy of IPD is beginning to be embraced by more people, but the contract document itself is still not a generally accepted item. For success to happen, the system must first be tested by the US Court System, then refined to a point in which owners are comfortable signing the contract and inheriting the extra risk.

Discussion on the Smart Grid

The second session I attended was presented by Dr. Riley and focused on a relatively new and underexplored topic known as the Smart Grid. Being that the material of this subject matter is still being developed, the session was more informational than a give and take discussion. There were less than twenty attendees and few had any knowledge of the topic.

Dr. Riley started out by listing the key sub topics of the Smart Grid:

1. Advanced metering
2. Cyber security
3. Distributed energy generation
4. Energy efficiency and controls
5. Power purchasing agreements

Advanced metering provides the users of the building with the feedback necessary to manage their energy output. This does not need to be an automated system that totally redefines the use of power in a building, but rather simple human decisions that allow energy to be cheaper, and better distributed. For example, knowing that the peak rate for electricity on a summer afternoon is about 30 cents/kWhr, versus 15 cent/kWhr in the morning, would encourage a homeowner to do their laundry in the morning when energy is cheaper. The idea is to flatten the energy consumption vs. time bell curve, to create a lower mean energy price, regardless of the market value. The light blue line below is directly proportional to energy cost. Simple laws of supply demand allow for the educated consumer to take advantage of this information.

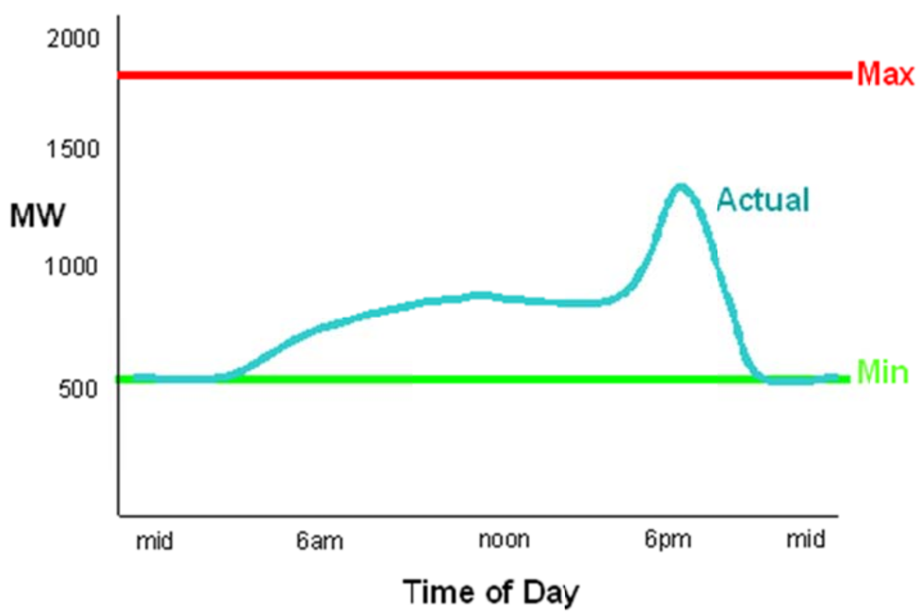


Figure 2. Energy Demand Curve. Oahu, HI. Compliments of
http://code.google.com/p/openmicrosmartgrid/wiki/SmartConsumers

In addition to these behavioral energy reductions, increased efficiency and tighter controls will amplify the energy savings. This technology is advancing every day, and we should strive to integrate such items into the construction and renovation of buildings. Advanced metering also determines the direction of energy flow. If there is energy being generated by a building through either solar BIPVs or wind turbines, and the excess is being rejected back to the grid, then the meter will be able to track this value.

While cyber security was an offshoot of the discussion, it should still be noted that the grid is susceptible to attack, as well as our personal privacy. It is possible to monitor energy usage of someone's home and know when they are not around, as well as cut power to their home or business. This is a completely different field of research, but one that we should all be aware of.

Energy distribution is the next topic. Over the summer of 2010, Penn State organized a campus wide energy reduction movement. All students and faculty were encouraged to use as little energy as possible on a particular day, and all emergency generators were strategically tested and run at the same time. This allowed for enough energy savings that the electricity provider gave Penn State a $700,000 check. Why is that so? The energy that was saved during the operation here on campus allowed the energy provider to better distribute energy to meet the demands of higher demand density areas. Doing so helped eliminate the possibility of rolling brown outs. Energy demand increases very rapidly in the afternoon, particularly in the summer when cooling loads are the greatest. Since demand increases, so does cost. Understanding the financial side of the energy market allows a great amount of money to be made by producing energy in the morning and selling it in the afternoon. The distribution of traditional power from nuclear and coal fired plants is taxed greatly during the afternoon, however BIPVs see an increase in productivity during these peak hours, making the value of energy coming from these systems relatively constant while the market value is not. A great opportunity exists for energy produced to be pushed back into the grid where it can be redistributed to areas of higher demand at a higher price. Essentially when coordinated properly, money can be made by selling power back to the energy supplier.

This is where the power purchasing agreement can come into play. The BIPV market allows for a win-win agreement to be set up. A manufacturer can approach a building owner to install BIPVs on the building at a discounted cost to the owner, then agree to pay the owner's power bill, which will be at a fraction of the rate of the market value. The owner would be a fool to reject, and the manufacturer now owns the rights to all income produced by the power put back into the grid. Even on a smaller scale, day ahead pricing can allow home owners to effectively level their consumption curve as mentioned before. Not only does this reduce their electric costs, but it gives the energy provider the extra power during peak hours, that would normally have been expended by that household.

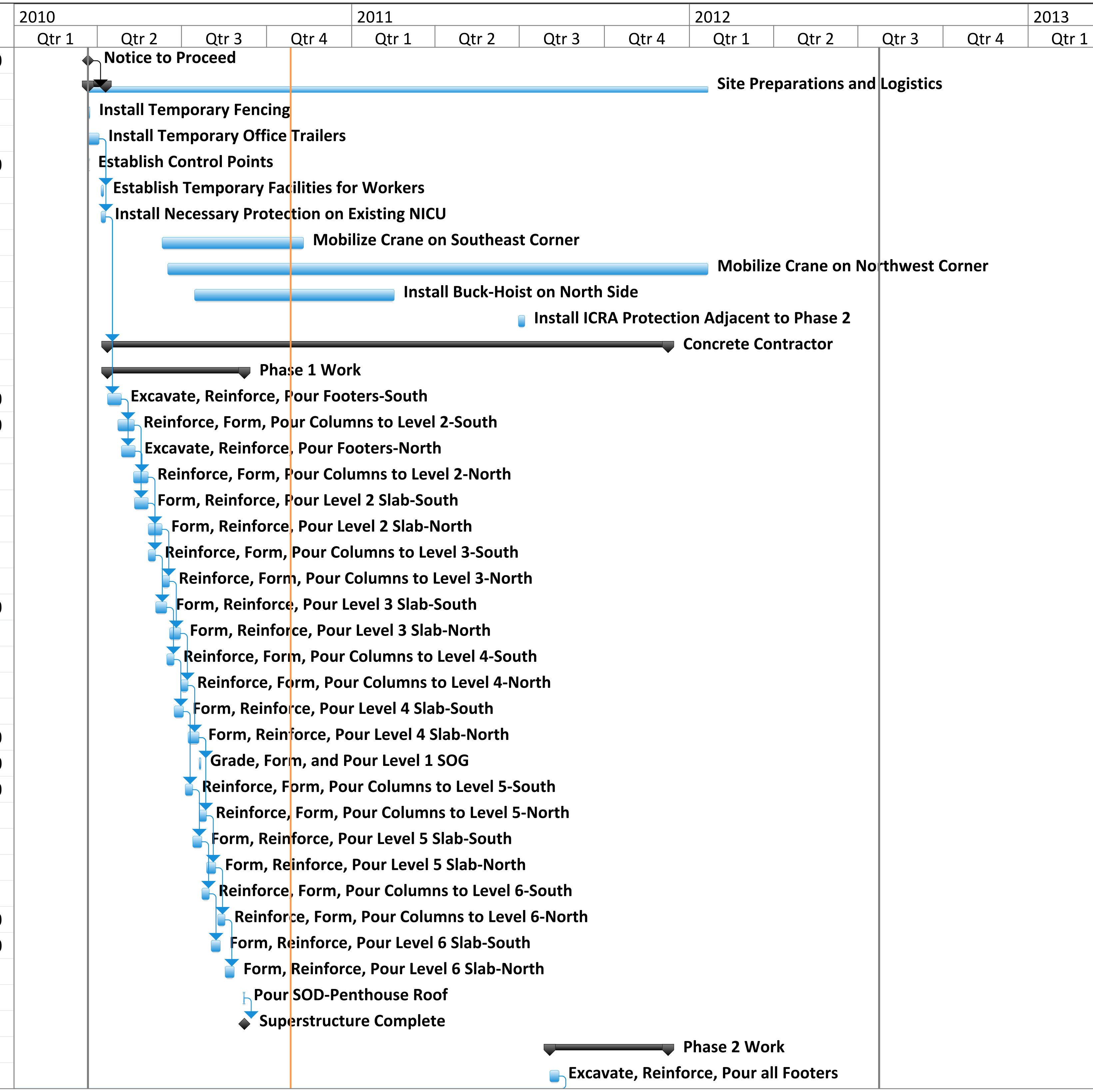
Afternoon Sessions

After lunch, a brief negotiations exercise was created to break up the lectures and give professionals and students some time to interact. Following this, a panel discussion on finding a job in a diminishing market took place. Several students, grad students, and one member from the research faculty each shared their views on the struggle to find their place in the professional world. Some were more positive than others, but the general consensus was that most companies are truly looking for quality talent. While the work may not yet be available, hiring quality talent early, then grooming them for the turnaround in the market is a strategy that many large firms are relying on to maintain strength. The biggest lesson to be learned was to differentiate yourself to induce interest in your skills from companies. This can be done by taking a leadership role in student organizations, taking on tasks that not many people do such as BIM thesis, and most importantly to hone communication skills. The construction industry thrives on solid communication and relationships between companies and individuals.

In conclusion, the day provided insight to current topics, but also an opportunity to interact with industry professionals, who we don't always get to probe with these questions. The knowledge learned may have shaped my interests looking to the future. Dr. Riley's Smart Grid discussion certainly got the wheels turning to explore more in depth the ways to enter the energy market. I am curious to see the advancements in this field come this time next year.

Appendix A – Detailed Project Schedule

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	0 days	Mon 3/22/10	Mon 3/22/10
2	**Site Preparations and Logistics**	**15 days**	**Mon 3/22/10**	**Fri 4/9/10**
3	Install Temporary Fencing	2 days	Mon 3/22/10	Tue 3/23/10
4	Install Temporary Office Trailers	10 days	Mon 3/22/10	Fri 4/2/10
5	Establish Control Points	1 day	Mon 3/22/10	Mon 3/22/10
6	Establish Temporary Facilities for Workers	3 days	Mon 4/5/10	Wed 4/7/10
7	Install Necessary Protection on Existing NICU	5 days	Mon 4/5/10	Fri 4/9/10
8	Mobilize Crane on Southeast Corner	109 days	Thu 6/10/10	Tue 11/9/10
9	Mobilize Crane on Northwest Corner	418 days	Wed 6/16/10	Fri 1/20/12
10	Install Buck-Hoist on North Side	154 days	Thu 7/15/10	Tue 2/15/11
11	Install ICRA Protection Adjacent to Phase 2	5 days	Thu 6/30/11	Wed 7/6/11
12	**Concrete Contractor**	**434 days**	**Mon 4/12/10**	**Thu 12/8/11**
13	**Phase 1 Work**	**106 days**	**Mon 4/12/10**	**Tue 9/7/10**
14	Excavate, Reinforce, Pour Footers-South	11 days	Mon 4/12/10	Mon 4/26/10
15	Reinforce, Form, Pour Columns to Level 2-South	12 days	Fri 4/23/10	Mon 5/10/10
16	Excavate, Reinforce, Pour Footers-North	11 days	Tue 4/27/10	Tue 5/11/10
17	Reinforce, Form, Pour Columns to Level 2-North	12 days	Mon 5/10/10	Tue 5/25/10
18	Form, Reinforce, Pour Level 2 Slab-South	11 days	Tue 5/11/10	Tue 5/25/10
19	Form, Reinforce, Pour Level 2 Slab-North	11 days	Wed 5/26/10	Wed 6/9/10
20	Reinforce, Form, Pour Columns to Level 3-South	6 days	Wed 5/26/10	Wed 6/2/10
21	Reinforce, Form, Pour Columns to Level 3-North	6 days	Thu 6/10/10	Thu 6/17/10
22	Form, Reinforce, Pour Level 3 Slab-South	8 days	Thu 6/3/10	Mon 6/14/10
23	Form, Reinforce, Pour Level 3 Slab-North	8 days	Fri 6/18/10	Tue 6/29/10
24	Reinforce, Form, Pour Columns to Level 4-South	6 days	Tue 6/15/10	Tue 6/22/10
25	Reinforce, Form, Pour Columns to Level 4-North	6 days	Wed 6/30/10	Wed 7/7/10
26	Form, Reinforce, Pour Level 4 Slab-South	8 days	Wed 6/23/10	Fri 7/2/10
27	Form, Reinforce, Pour Level 4 Slab-North	8 days	Thu 7/8/10	Mon 7/19/10
28	Grade, Form, and Pour Level 1 SOG	2 days	Tue 7/20/10	Wed 7/21/10
29	Reinforce, Form, Pour Columns to Level 5-South	6 days	Mon 7/5/10	Mon 7/12/10
30	Reinforce, Form, Pour Columns to Level 5-North	6 days	Tue 7/20/10	Tue 7/27/10
31	Form, Reinforce, Pour Level 5 Slab-South	8 days	Tue 7/13/10	Thu 7/22/10
32	Form, Reinforce, Pour Level 5 Slab-North	8 days	Wed 7/28/10	Fri 8/6/10
33	Reinforce, Form, Pour Columns to Level 6-South	6 days	Fri 7/23/10	Fri 7/30/10
34	Reinforce, Form, Pour Columns to Level 6-North	6 days	Mon 8/9/10	Mon 8/16/10
35	Form, Reinforce, Pour Level 6 Slab-South	8 days	Mon 8/2/10	Wed 8/11/10
36	Form, Reinforce, Pour Level 6 Slab-North	8 days	Tue 8/17/10	Thu 8/26/10
37	Pour SOD-Penthouse Roof	1 day	Mon 9/6/10	Mon 9/6/10
38	Superstructure Complete	0 days	Tue 9/7/10	Tue 9/7/10
39	**Phase 2 Work**	**92 days**	**Wed 8/3/11**	**Thu 12/8/11**
40	Excavate, Reinforce, Pour all Footers	8 days	Wed 8/3/11	Fri 8/12/11



Project: St. Joseph's NICU Expansi
Date: Wed 10/27/10

Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
Split		External Tasks		Inactive Summary		Manual Summary		Progress	
Milestone		External Milestone		Manual Task		Start-only			
Summary		Inactive Task		Duration-only		Finish-only			

ID	Task Name	Duration	Start	Finish
41	Reinforce, Form, Pour Columns to Level 2	12 days	Mon 8/15/11	Tue 8/30/11
42	Form, Reinforce, Pour Level 2 Slab	11 days	Wed 8/31/11	Wed 9/14/11
43	Reinforce, Form, Pour Columns to Level 3	6 days	Thu 9/15/11	Thu 9/22/11
44	Form, Reinforce, Pour Level 3 Slab	8 days	Fri 9/23/11	Tue 10/4/11
45	Reinforce, Form, Pour Columns to Level 4	6 days	Wed 10/5/11	Wed 10/12/11
46	Form, Reinforce, Pour Level 4 Slab	8 days	Thu 10/13/11	Mon 10/24/11
47	Reinforce, Form, Pour Columns to Level 5	6 days	Tue 10/25/11	Tue 11/1/11
48	Form, Reinforce, Pour Level 5 Slab	8 days	Wed 11/2/11	Fri 11/11/11
49	Reinforce, Form, Pour Columns to Level 6	6 days	Mon 11/14/11	Mon 11/21/11
50	Form, Reinforce, Pour Level 6 Slab	8 days	Tue 11/22/11	Thu 12/1/11
51	Clean Up and Demobilization	5 days	Fri 12/2/11	Thu 12/8/11
52	**Steel Subcontractor**	**365 days**	**Mon 7/19/10**	**Fri 12/9/11**
53	**Phase 1 Work**	**70 days**	**Mon 7/19/10**	**Fri 10/22/10**
54	Shop Drawings and Fabrication	30 days	Mon 7/19/10	Fri 8/27/10
55	Erect Columns, Joists, and Metal Decking-Level 6 Penthouse	6 days	Fri 8/27/10	Fri 9/3/10
56	Erect Pan Stairs and Hoist Beams	15 days	Mon 9/6/10	Fri 9/24/10
57	Installation of Miscellaneous/Ornamental Metals	20 days	Mon 9/27/10	Fri 10/22/10
58	**Phase 2 Work**	**35 days**	**Mon 10/24/11**	**Fri 12/9/11**
59	Install Canopy Cantilever Over Main Entrance	5 days	Mon 10/24/11	Fri 10/28/11
60	Install Pan Stairs and Hoist Beams	10 days	Mon 10/31/11	Fri 11/11/11
61	Installation of Miscellaneous/Ornamental Metals	20 days	Mon 11/14/11	Fri 12/9/11
62	**Precast Subcontractor**	**340 days**	**Mon 8/23/10**	**Fri 12/9/11**
63	**Phase 1 Work**	**101 days**	**Mon 8/23/10**	**Mon 1/10/11**
64	Fabrication	40 days	Mon 8/23/10	Fri 10/15/10
65	Installation on East Face	25 days	Tue 9/7/10	Mon 10/11/10
66	Installation on South Face	20 days	Tue 10/12/10	Mon 11/8/10
67	Installation on North Face	20 days	Tue 11/9/10	Mon 12/6/10
68	Installation on West Face	25 days	Tue 12/7/10	Mon 1/10/11
69	**Phase 2 Work**	**5 days**	**Mon 12/5/11**	**Fri 12/9/11**
70	Install Precast on North Face	5 days	Mon 12/5/11	Fri 12/9/11
71	**Glazing Contractor**	**293 days**	**Mon 12/6/10**	**Thu 1/19/12**
72	**Phase 1 Work**	**67 days**	**Mon 12/6/10**	**Wed 3/9/11**
73	Install Glazing Level 5	15 days	Mon 12/6/10	Fri 12/24/10
74	Install Glazing Level 4	15 days	Thu 12/23/10	Wed 1/12/11
75	Install Glazing Level 3	15 days	Tue 1/11/11	Mon 1/31/11
76	Install Glazing Level 2	15 days	Fri 1/28/11	Thu 2/17/11
77	Install Glazing Level 1	15 days	Wed 2/16/11	Tue 3/8/11
78	Phase 1 Dried-In	0 days	Wed 3/9/11	Wed 3/9/11
79	**Phase 2 Work**	**58 days**	**Mon 10/31/11**	**Thu 1/19/12**
80	Submittals and Fabrication of Curtain Wall	30 days	Mon 10/31/11	Fri 12/9/11

Project: St. Joseph's NICU Expansi
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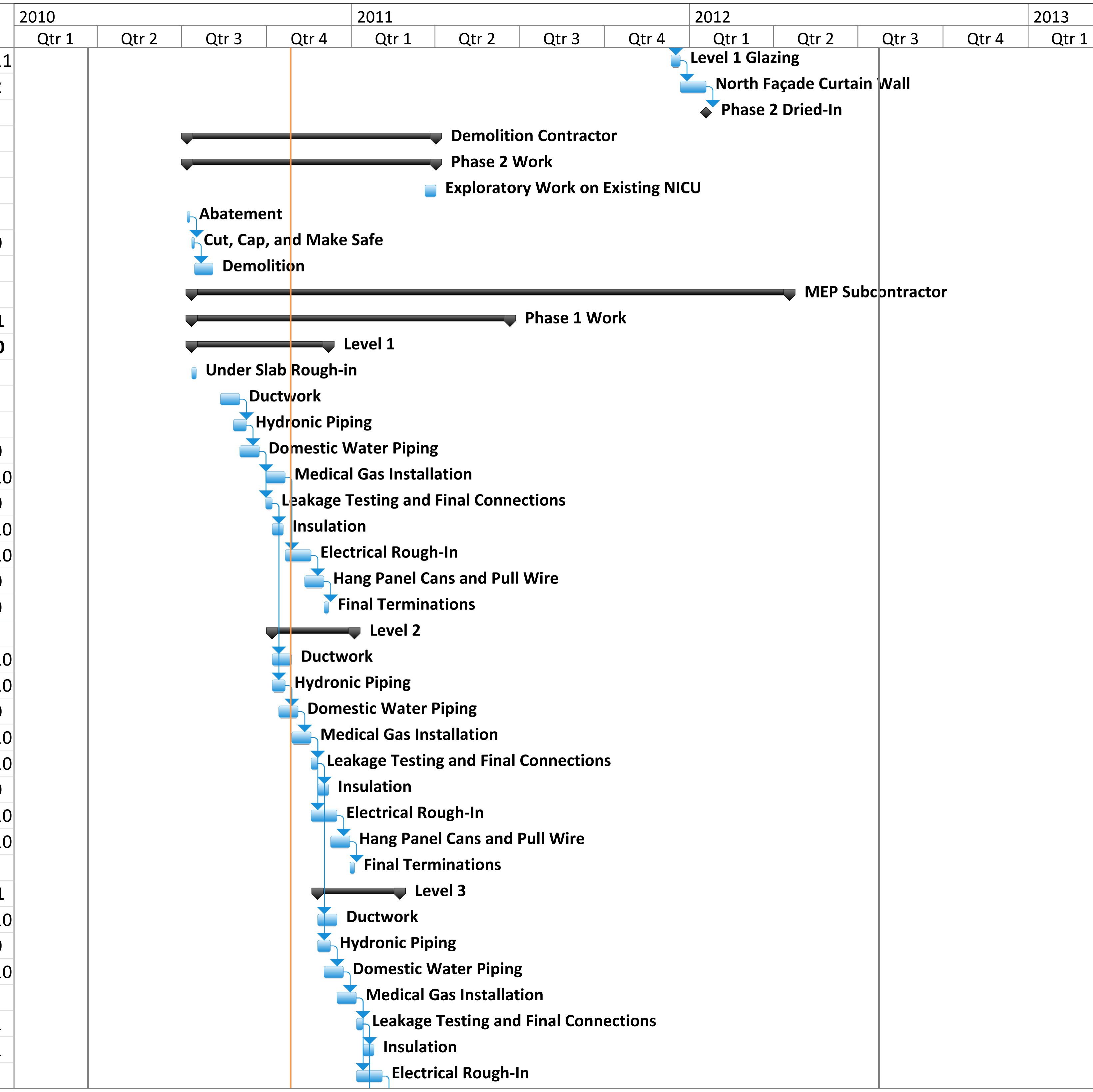
Task · Split · Milestone · Summary · Project Summary · External Tasks · External Milestone · Inactive Task · Inactive Milestone · Inactive Summary · Manual Task · Duration-only · Manual Summary Rollup · Manual Summary · Start-only · Finish-only · Deadline · Progress

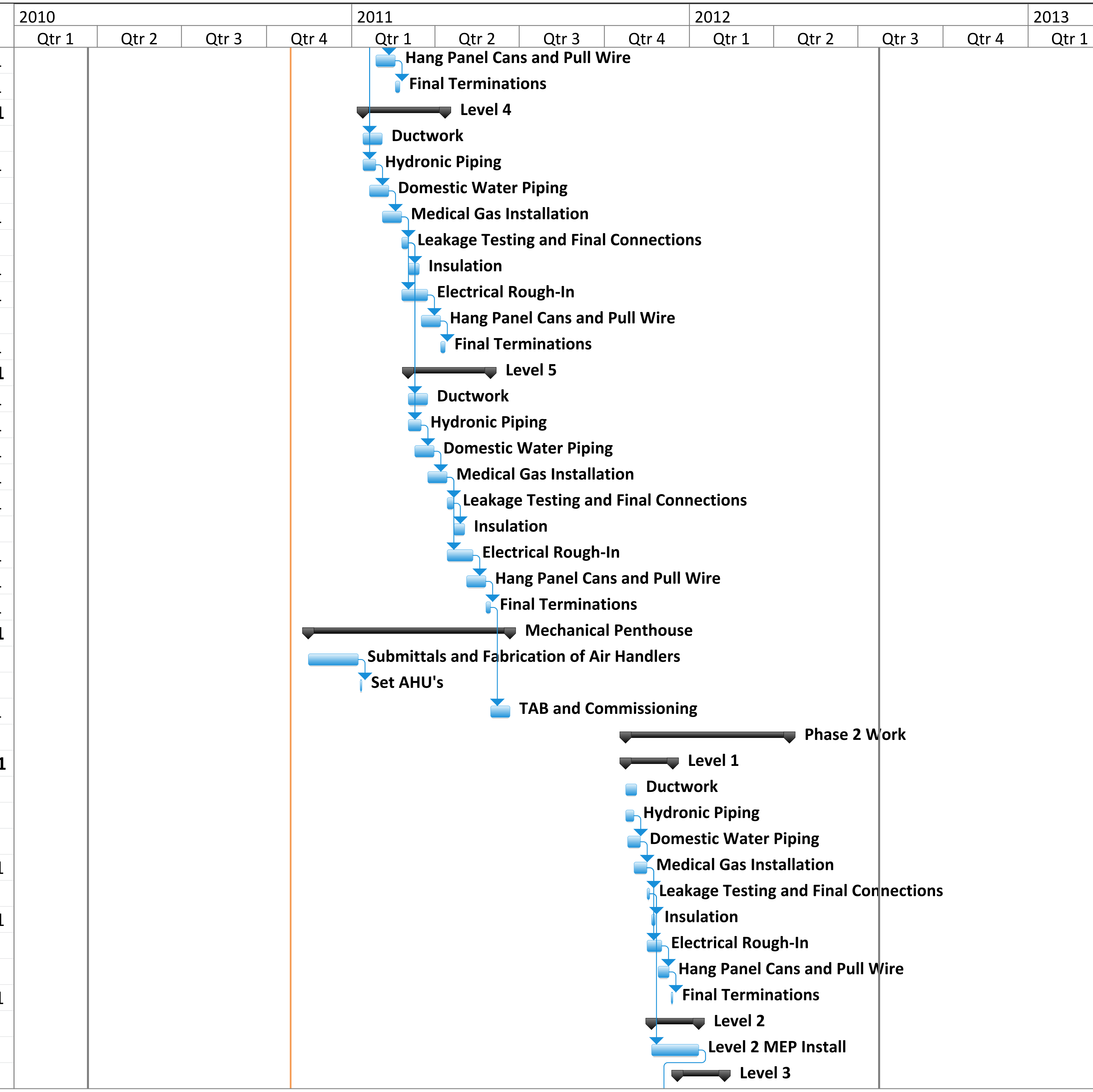
ID	Task Name	Duration	Start	Finish
81	Level 1 Glazing	8 days	Mon 12/12/11	Wed 12/21/11
82	North Façade Curtain Wall	20 days	Thu 12/22/11	Wed 1/18/12
83	Phase 2 Dried-In	0 days	Thu 1/19/12	Thu 1/19/12
84	**Demolition Contractor**	**193 days**	**Wed 7/7/10**	**Fri 4/1/11**
85	**Phase 2 Work**	**193 days**	**Wed 7/7/10**	**Fri 4/1/11**
86	Exploratory Work on Existing NICU	10 days	Mon 3/21/11	Fri 4/1/11
87	Abatement	3 days	Wed 7/7/10	Fri 7/9/10
88	Cut, Cap, and Make Safe	3 days	Mon 7/12/10	Wed 7/14/10
89	Demolition	14 days	Thu 7/15/10	Tue 8/3/10
90	**MEP Subcontractor**	**462 days**	**Mon 7/12/10**	**Tue 4/17/12**
91	**Phase 1 Work**	**246 days**	**Mon 7/12/10**	**Mon 6/20/11**
92	**Level 1**	**106 days**	**Mon 7/12/10**	**Mon 12/6/10**
93	Under Slab Rough-in	5 days	Mon 7/12/10	Fri 7/16/10
94	Ductwork	15 days	Thu 8/12/10	Wed 9/1/10
95	Hydronic Piping	10 days	Thu 8/26/10	Wed 9/8/10
96	Domestic Water Piping	15 days	Thu 9/2/10	Wed 9/22/10
97	Medical Gas Installation	15 days	Thu 9/30/10	Wed 10/20/10
98	Leakage Testing and Final Connections	5 days	Thu 9/30/10	Wed 10/6/10
99	Insulation	8 days	Thu 10/7/10	Mon 10/18/10
100	Electrical Rough-In	20 days	Thu 10/21/10	Wed 11/17/10
101	Hang Panel Cans and Pull Wire	15 days	Thu 11/11/10	Wed 12/1/10
102	Final Terminations	3 days	Thu 12/2/10	Mon 12/6/10
103	**Level 2**	**63 days**	**Thu 10/7/10**	**Mon 1/3/11**
104	Ductwork	15 days	Thu 10/7/10	Wed 10/27/10
105	Hydronic Piping	10 days	Thu 10/7/10	Wed 10/20/10
106	Domestic Water Piping	15 days	Thu 10/14/10	Wed 11/3/10
107	Medical Gas Installation	15 days	Thu 10/28/10	Wed 11/17/10
108	Leakage Testing and Final Connections	5 days	Thu 11/18/10	Wed 11/24/10
109	Insulation	8 days	Thu 11/25/10	Mon 12/6/10
110	Electrical Rough-In	20 days	Thu 11/18/10	Wed 12/15/10
111	Hang Panel Cans and Pull Wire	15 days	Thu 12/9/10	Wed 12/29/10
112	Final Terminations	3 days	Thu 12/30/10	Mon 1/3/11
113	**Level 3**	**63 days**	**Thu 11/25/10**	**Mon 2/21/11**
114	Ductwork	15 days	Thu 11/25/10	Wed 12/15/10
115	Hydronic Piping	10 days	Thu 11/25/10	Wed 12/8/10
116	Domestic Water Piping	15 days	Thu 12/2/10	Wed 12/22/10
117	Medical Gas Installation	15 days	Thu 12/16/10	Wed 1/5/11
118	Leakage Testing and Final Connections	5 days	Thu 1/6/11	Wed 1/12/11
119	Insulation	8 days	Thu 1/13/11	Mon 1/24/11
120	Electrical Rough-In	20 days	Thu 1/6/11	Wed 2/2/11



Project: St. Joseph's NICU Expansi
Date: Wed 10/27/10

Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Deadline
Progress

ID	Task Name	Duration	Start	Finish
121	Hang Panel Cans and Pull Wire	15 days	Thu 1/27/11	Wed 2/16/11
122	Final Terminations	3 days	Thu 2/17/11	Mon 2/21/11
123	**Level 4**	**63 days**	**Thu 1/13/11**	**Mon 4/11/11**
124	Ductwork	15 days	Thu 1/13/11	Wed 2/2/11
125	Hydronic Piping	10 days	Thu 1/13/11	Wed 1/26/11
126	Domestic Water Piping	15 days	Thu 1/20/11	Wed 2/9/11
127	Medical Gas Installation	15 days	Thu 2/3/11	Wed 2/23/11
128	Leakage Testing and Final Connections	5 days	Thu 2/24/11	Wed 3/2/11
129	Insulation	8 days	Thu 3/3/11	Mon 3/14/11
130	Electrical Rough-In	20 days	Thu 2/24/11	Wed 3/23/11
131	Hang Panel Cans and Pull Wire	15 days	Thu 3/17/11	Wed 4/6/11
132	Final Terminations	3 days	Thu 4/7/11	Mon 4/11/11
133	**Level 5**	**63 days**	**Thu 3/3/11**	**Mon 5/30/11**
134	Ductwork	15 days	Thu 3/3/11	Wed 3/23/11
135	Hydronic Piping	10 days	Thu 3/3/11	Wed 3/16/11
136	Domestic Water Piping	15 days	Thu 3/10/11	Wed 3/30/11
137	Medical Gas Installation	15 days	Thu 3/24/11	Wed 4/13/11
138	Leakage Testing and Final Connections	5 days	Thu 4/14/11	Wed 4/20/11
139	Insulation	8 days	Thu 4/21/11	Mon 5/2/11
140	Electrical Rough-In	20 days	Thu 4/14/11	Wed 5/11/11
141	Hang Panel Cans and Pull Wire	15 days	Thu 5/5/11	Wed 5/25/11
142	Final Terminations	3 days	Thu 5/26/11	Mon 5/30/11
143	**Mechanical Penthouse**	**156 days**	**Mon 11/15/10**	**Mon 6/20/11**
144	Submittals and Fabrication of Air Handlers	40 days	Mon 11/15/10	Fri 1/7/11
145	Set AHU's	2 days	Mon 1/10/11	Tue 1/11/11
146	TAB and Commissioning	15 days	Tue 5/31/11	Mon 6/20/11
147	**Phase 2 Work**	**127 days**	**Mon 10/24/11**	**Tue 4/17/12**
148	**Level 1**	**37 days**	**Mon 10/24/11**	**Tue 12/13/11**
149	Ductwork	10 days	Mon 10/24/11	Fri 11/4/11
150	Hydronic Piping	7 days	Mon 10/24/11	Tue 11/1/11
151	Domestic Water Piping	10 days	Wed 10/26/11	Tue 11/8/11
152	Medical Gas Installation	10 days	Wed 11/2/11	Tue 11/15/11
153	Leakage Testing and Final Connections	3 days	Wed 11/16/11	Fri 11/18/11
154	Insulation	4 days	Mon 11/21/11	Thu 11/24/11
155	Electrical Rough-In	12 days	Wed 11/16/11	Thu 12/1/11
156	Hang Panel Cans and Pull Wire	10 days	Mon 11/28/11	Fri 12/9/11
157	Final Terminations	2 days	Mon 12/12/11	Tue 12/13/11
158	**Level 2**	**37 days**	**Mon 11/21/11**	**Tue 1/10/12**
159	Level 2 MEP Install	37 days	Mon 11/21/11	Tue 1/10/12
160	**Level 3**	**37 days**	**Mon 12/19/11**	**Tue 2/7/12**



Project: St. Joseph's NICU Expansi
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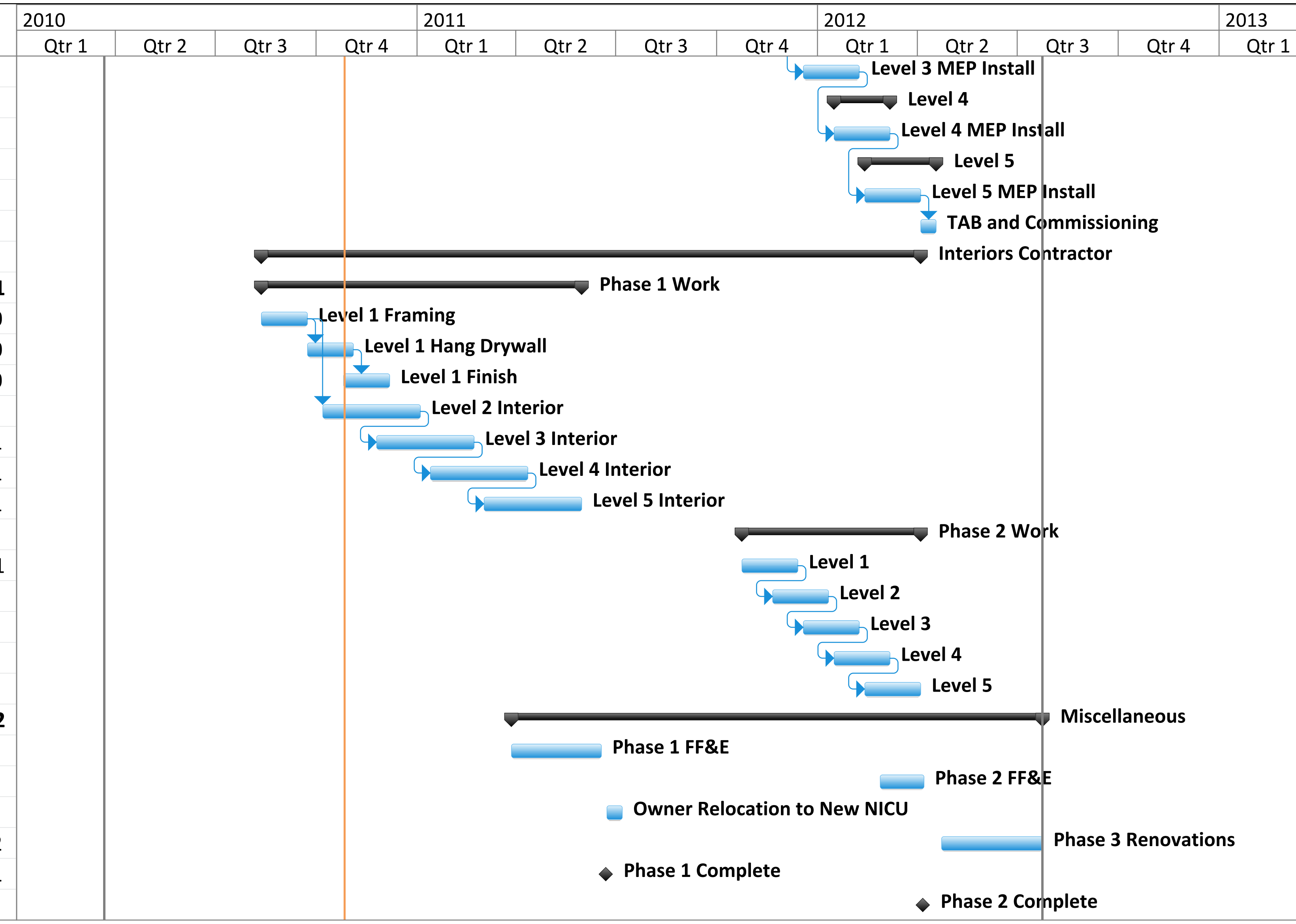
Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | Deadline | Progress

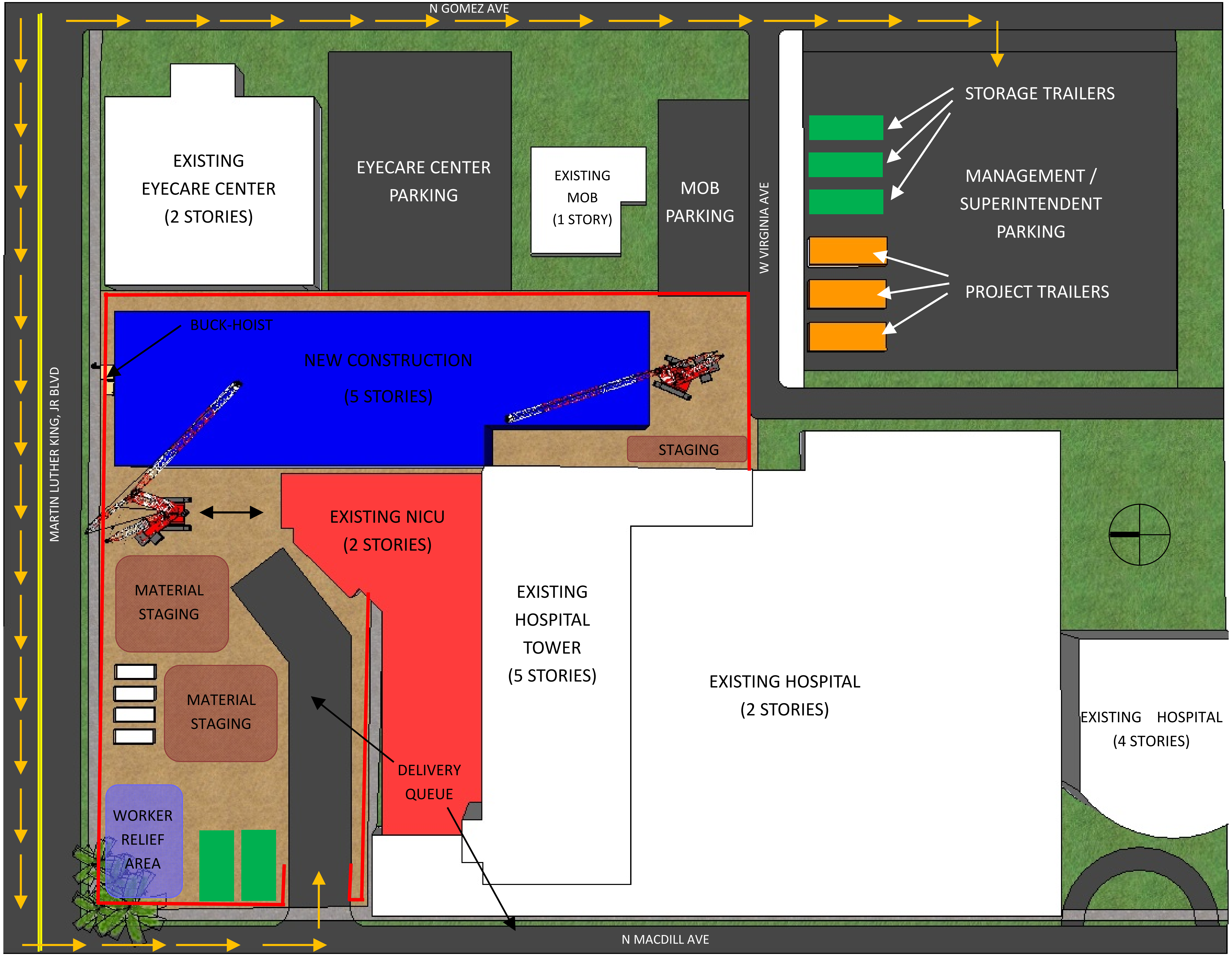
ID	Task Name	Duration	Start	Finish
161	Level 3 MEP Install	37 days	Mon 12/19/11	Tue 2/7/12
162	**Level 4**	**37 days**	**Mon 1/16/12**	**Tue 3/6/12**
163	Level 4 MEP Install	37 days	Mon 1/16/12	Tue 3/6/12
164	**Level 5**	**47 days**	**Mon 2/13/12**	**Tue 4/17/12**
165	Level 5 MEP Install	37 days	Mon 2/13/12	Tue 4/3/12
166	TAB and Commissioning	10 days	Wed 4/4/12	Tue 4/17/12
167	**Interiors Contractor**	**429 days**	**Thu 8/12/10**	**Tue 4/3/12**
168	**Phase 1 Work**	**208 days**	**Thu 8/12/10**	**Mon 5/30/11**
169	Level 1 Framing	30 days	Thu 8/12/10	Wed 9/22/10
170	Level 1 Hang Drywall	30 days	Thu 9/23/10	Wed 11/3/10
171	Level 1 Finish	30 days	Tue 10/26/10	Mon 12/6/10
172	Level 2 Interior	63 days	Thu 10/7/10	Mon 1/3/11
173	Level 3 Interior	63 days	Thu 11/25/10	Mon 2/21/11
174	Level 4 Interior	63 days	Thu 1/13/11	Mon 4/11/11
175	Level 5 Interior	63 days	Thu 3/3/11	Mon 5/30/11
176	**Phase 2 Work**	**117 days**	**Mon 10/24/11**	**Tue 4/3/12**
177	Level 1	37 days	Mon 10/24/11	Tue 12/13/11
178	Level 2	37 days	Mon 11/21/11	Tue 1/10/12
179	Level 3	37 days	Mon 12/19/11	Tue 2/7/12
180	Level 4	37 days	Mon 1/16/12	Tue 3/6/12
181	Level 5	37 days	Mon 2/13/12	Tue 4/3/12
182	**Miscellaneous**	**346 days**	**Mon 3/28/11**	**Mon 7/23/12**
183	Phase 1 FF&E	60 days	Mon 3/28/11	Fri 6/17/11
184	Phase 2 FF&E	30 days	Mon 2/27/12	Fri 4/6/12
185	Owner Relocation to New NICU	10 days	Thu 6/23/11	Wed 7/6/11
186	Phase 3 Renovations	66 days	Mon 4/23/12	Mon 7/23/12
187	Phase 1 Complete	0 days	Wed 6/22/11	Wed 6/22/11
188	Phase 2 Complete	0 days	Fri 4/6/12	Fri 4/6/12



Project: St. Joseph's NICU Expansi
Date: Wed 10/27/10

Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
Split		External Tasks		Inactive Summary		Manual Summary		Progress	
Milestone	◆	External Milestone	◆	Manual Task		Start-only	[		
Summary		Inactive Task		Duration-only		Finish-only	]		

Appendix B – Site Layout Plans



St. Joseph's Women's Hospital

NICU Expansion

3030 W. Martin Luther King, Jr. Blvd.

Tampa, FL 33607

- Construction Traffic
- Storage Trailers
- Dumpsters
- Office Trailers
- Construction Fencing
- New Construction
- Structure to be Demolished

*Please refer to the Site Layout Planning Narrative in Technical Report Two for specific details not included, but pertinent to the execution of the logistics plan shown in this image.

DRAWN: Dennis Gibson

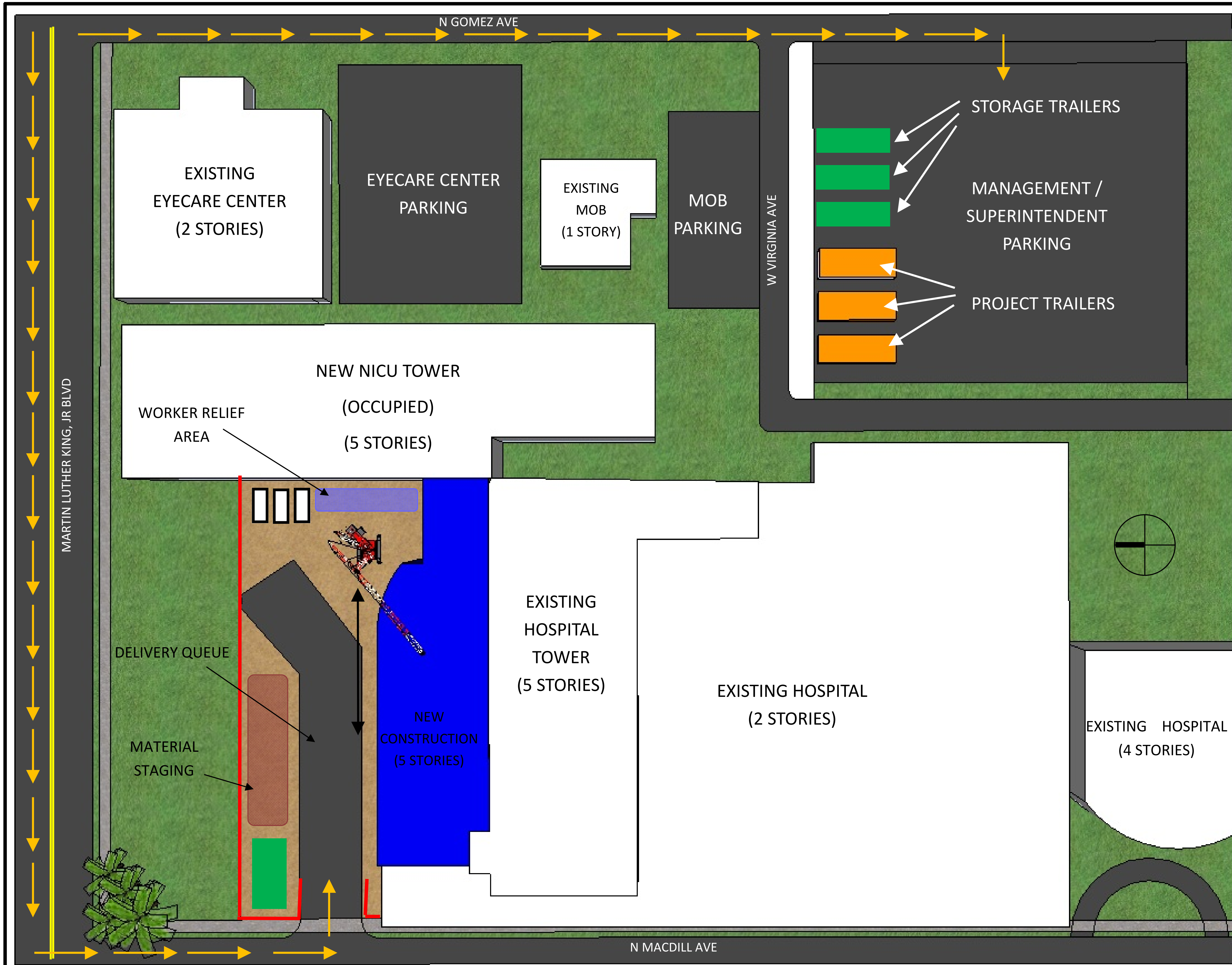
OPTION: Construction Management

ADVISOR: Dr. Robert Leicht

DATE: October 27, 2010

Phase I Site Logistics Plan

SLP-02



St. Joseph's Women's Hospital

NICU Expansion

3030 W. Martin Luther King, Jr. Blvd.

Tampa, FL 33607

- Construction Traffic
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*Please refer to the Site Layout Planning Narrative in Technical Report Two for specific details not included, but pertinent to the execution of the logistics plan shown in this image.

DRAWN: Dennis Gibson

OPTION: Construction Management

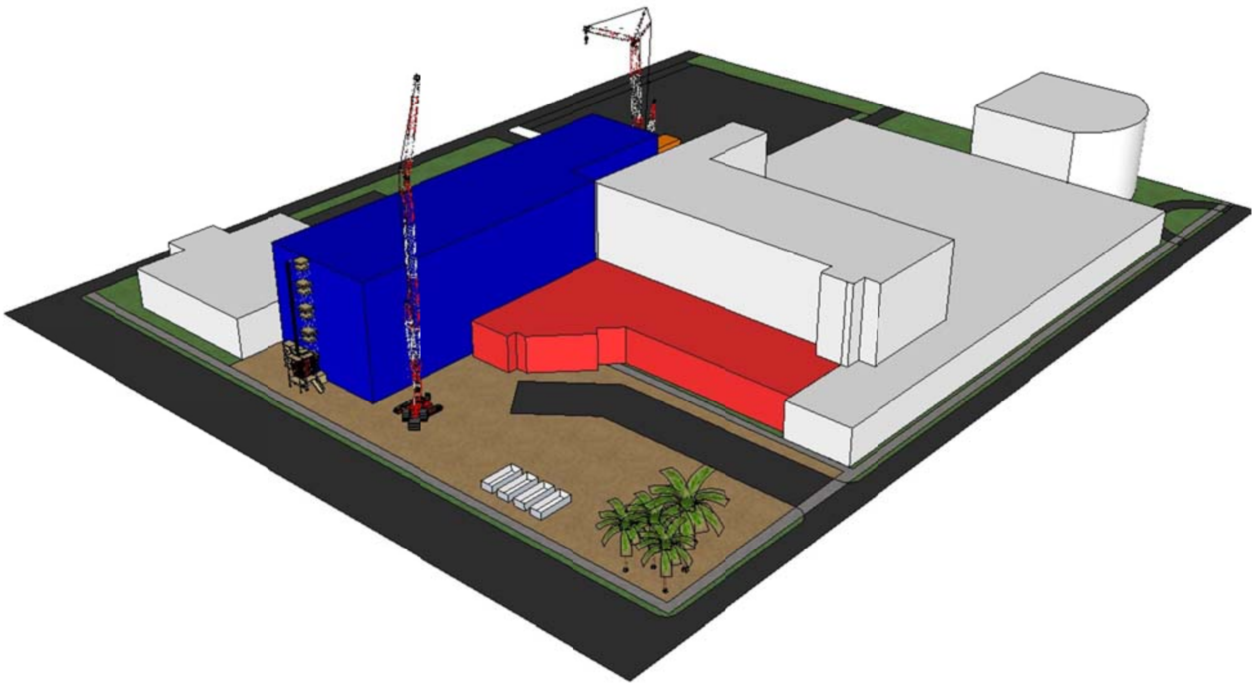
ADVISOR: Dr. Robert Leicht

DATE: October 27, 2010

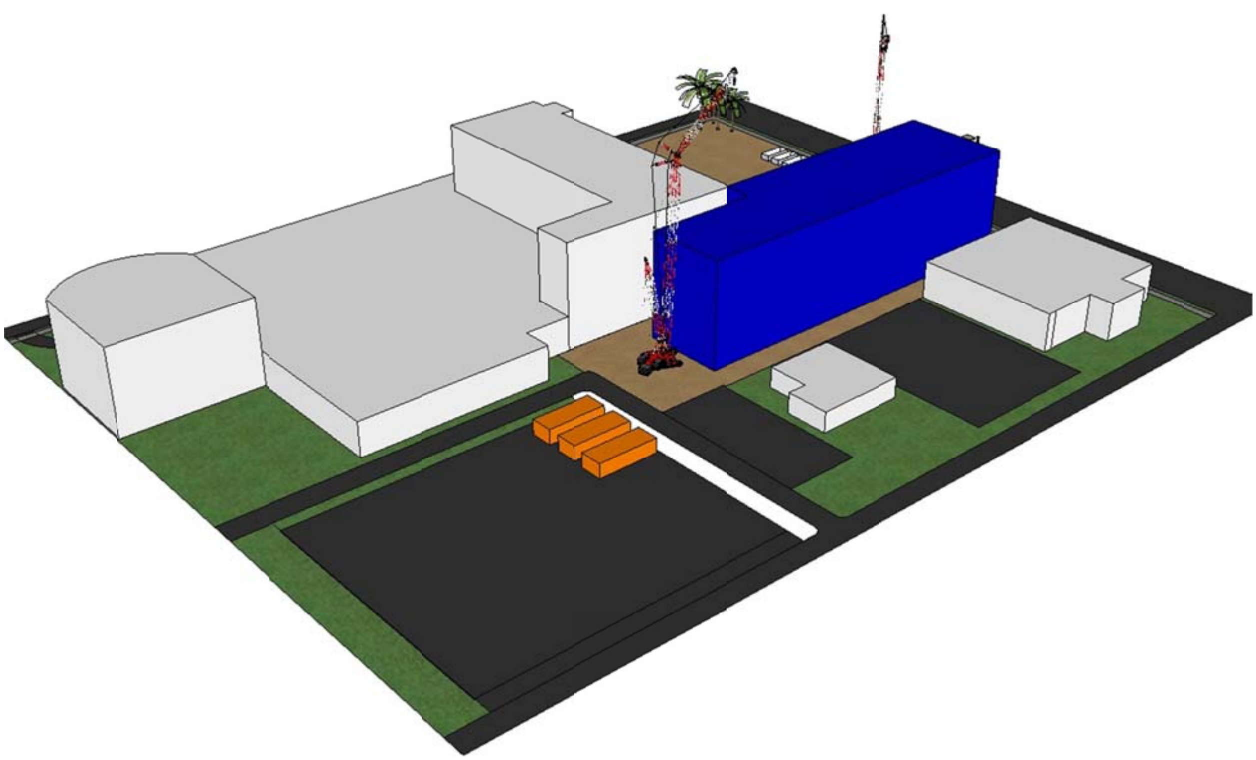
Phase II Site Logistics Plan

SLP-03

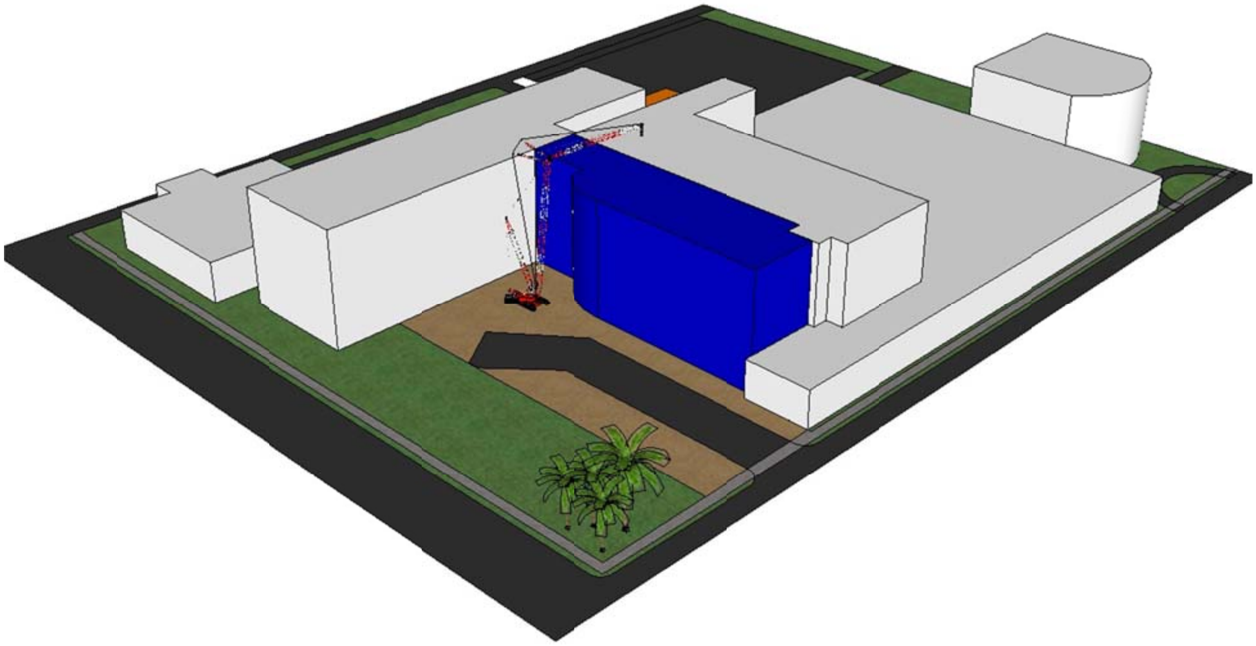
Phase I Northwest Isometric View



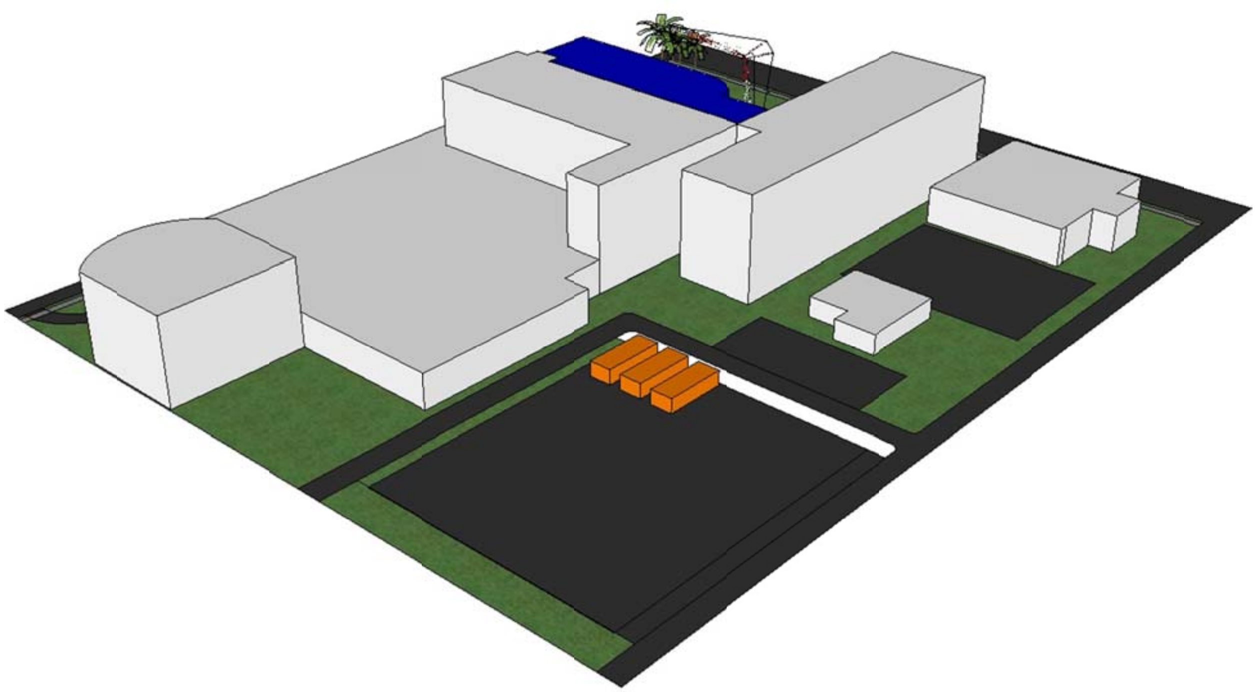
Phase I Southeast Isometric View



Phase II Northwest Isometric View



Phase II Southeast Isometric View



Appendix C – Takeoff Quantities for Detailed Estimate

Concrete Footer Takeoffs								
System	Item	Quantity	Units	Level	Volume (CY)	Steel (lbs)	Total Volume (CY)	Total Steel (Tons)
Footers	F1428	5	EA	Sub	38.76	4074	194	10.185
	F15	21	EA	Sub	22.25	1479	467	15.530
	F12	9	EA	Sub	10.67	737	96	3.317
	F10	8	EA	Sub	7.41	507	59	2.028
	F509	1	EA	Sub	2.50	422	3	0.211
	F5	15	EA	Sub	1.39	95	21	0.713
Shear Wall Foundations (Rebar Ratio - 124.7 lbs/CY)	FSW1	1	EA	Sub	114.80	14315	115	7.158
	FSW2	2	EA	Sub	58.18	7255	116	7.255
	FSW3	1	EA	Sub	272.50	33979	273	16.990
	FSW4	1	EA	Sub	38.46	4796	38	2.398
Sub-Total		**64**					**1382**	**65.783**
Waste Factor							5.0%	12.0%
Totals		**64**					**1451**	**74**

*Note the yellow highlighted foundation mat design is pending survey of existing conditions after demolition, so this item is subject to change.

Concrete Structural Slab Takeoffs										
System	Item	Quantity	Units	Level	Formwork (SFCA or LF)	Volume (CY)	Steel (lbs)	Total Volume (CY)	Total Steel (Tons)	Total Formwork (SFCA or LF)
Slabs (Rebar Ratio for Structural CIP Slabs = 213 lbs/CY)	Slab-on-Grade	23370	SF	1	812.00	361	9815.4	361	4.908	812
	Level 2 Structural Slab	26660	SF	2	1735.00	987	210318	987	105.159	1735
	Level 3 Structural Slab	22493	SF	3	1829.00	833.07	177445	833	88.722	1829
	Level 4 Structural Slab	23250	SF	4	1638.00	861.11	183417	861	91.708	1638
	Level 5 Structural Slab	23250	SF	5	1638.00	861.11	183417	861	91.708	1638
	Level 6 Structural Slab	23250	SF	6	1638.00	861.11	183417	861	91.708	1638
	Level 7-Penthouse Roof Slab	7401	SF	7	280.00	205.58	119	206	0.060	280
Sub-Total		**149674**						**4970**	**474**	**9570**
Waste-Factor								2.0%	10.0%	5.0%
Totals		**149674**						**5069**	**521.37**	**10049**

Concrete Column Takeoff Quantities													
System	Item	Quantity	Level	Length (vert. ft)	Column Dimensions	Formwork (SFCA or LF)	Volume (CY)	Steel (lbs)	Total Volume (CY)	Total Steel (Tons)	Total Formwork 24" x 24" (SFCA)	Total Formwork 20" x 20" (SFCA)	Total Formwork 20" DIA. (LF)
Level 1 Columns	M-11, L.2-11, M-7, L.2-7	4	1	16.583	24" X 24"	132.66	2.46	622	9.83	1.244	531		
	C-11, D-11, D-10, D-8, E-8, E-10, E-11, F-11, F-10, F-8, F-7, E.2-7, G-7, G-9, G-10, G-11, H-11, H-7, K-7, K-9, K-10, K-11, J-7, J-11, I-11, I-10, I-9, I-7	28	1	15	24" X 24"	120.00	2.22	571	62.22	7.994	3360		
	A-10.6, A-8.5, A-6.9	3	1	17	20" X 20"	113.56	1.76	318	5.27	0.477		341	
	B-10, B-8, C-10	3	1	18.33	24" X 24"	146.64	2.72	326	8.15	0.489	440		
	B-6.9, C-6.9, C.4-6.9, D.1-6.9, D.8-6.9	5	1	15	20" X 20"	100.20	1.55	673	7.75	1.683		501	
	CA-C7, CC-C7, CC-C6, CF-C4, CF-C3, CF-C1	6	1	15	20" DIA.	15.00	1.21	274	7.27	0.822			90
	CF-C7	1	1	15	20" DIA.	15.00	1.21	349	1.21	0.175			15
	CA-C5.8, CA-C5, CB-C5, CE-C4, CE-C3. CB-C4, CB-C2, CE-C1.1	8	1	15	20" X 20"	100.20	1.55	444	12.40	1.776		802	
	CE-C5	1	1	15	20" X 20"	100.20	1.55	474	1.55	0.237		100	
	CF-C5	1	1	15	20" DIA.	15.00	1.21	460	1.21	0.230			15
Sub-Total		**60**							**116.85**	**15.13**	**4330.58**	**1743.48**	**120.00**
Level 2 Columns	C-11, D-11, D-10, D-8, E-8, E-10, E-11, F-11, F-10, F-8, F-7, E.2-7, G-7, G-9, G-10, G-11, H-11, H-7, K-7, K-9, K-10, K-11, J-7, J-11, I-11, I-10, I-9, I-7	28	2	12.67	24" X 24"	101.36	1.88	393	52.56	5.502	2838		
	CA-C7, CC-C7, CC-C6, CF-C4, CF-C3, CF-C1, CE.3-C5	7	2	12.67	20" DIA.	12.67	1.02	295	7.14	1.033			89
	CA-C5.8, CA-C5, CB-C5, CE-C4, CE-C3, CB-C4, CB-C2, CE-C1.1	8	2	12.67	20" X 20"	67.40	0.83	319	6.64	1.276		539	
Sub-Total		**43**							**66.34**	**7.81**	**2838.08**	**539.20**	**88.69**
Level 3 Columns	C-11, D-11, D-10, D-8, E-8, E-10, E-11, F-11, F-10, F-8, F-7, E.2-7, G-7, G-9, G-10, G-11, H-11, H-7, K-7, K-9, K-10, K-11, J-7, J-11, I-11, I-10, I-9, I-7	28	3	12.67	24" X 24"	101.36	1.88	393	52.56	5.502	2838		
	CA-C7, CC-C7, CC-C6, CF-C4, CF-C3, CF-C1, CE.3-C5	7	3	12.67	20" DIA.	12.67	1.02	295	7.14	1.033			89
	CA-C5.8, CA-C5, CB-C5, CE-C4, CE-C3, CB-C4, CB-C2, CE-C1.1	8	3	12.67	20" X 20"	67.40	0.83	319	6.64	1.276		539	
Sub-Total		**43**							**66.34**	**7.81**	**2838.08**	**539.20**	**88.69**
Level 4 Columns	C-11, D-11, D-10, D-8, E-8, E-10, E-11, F-11, F-10, F-8, F-7, E.2-7, G-7, G-9, G-10, G-11, H-11, H-7, K-7, K-9, K-10, K-11, J-7, J-11, I-11, I-10, I-9, I-7	28	4	12.67	24" X 24"	101.36	1.88	313	52.56	4.382	2838		
	CA-C7, CC-C7, CC-C6, CF-C4, CF-C3, CF-C1, CE.3-C5	7	4	12.67	20" DIA.	12.67	1.02	232	7.14	0.812			89
	CA-C5.8, CA-C5, CB-C5, CE-C4, CE-C3, CB-C4, CB-C2, CE-C1.1	8	4	12.67	20" X 20"	67.40	0.83	239	6.64	0.956		539	
Sub-Total		**43**							**66.34**	**6.15**	**2838.08**	**539.20**	**88.69**
Level 5 Columns	C-11, D-11, D-10, D-8, E-8, E-10, E-11, F-11, F-10, F-8, F-7, E.2-7, G-7, G-9, G-10, G-11, H-11, H-7, K-7, K-9, K-10, K-11, J-7, J-11, I-11, I-10, I-9, I-7	28	5	14	24" X 24"	112.00	2.07	341	58.07	4.774	3136		
	CA-C7, CC-C7, CC-C6, CF-C4, CF-C3, CF-C1, CE.3-C5	7	5	14	20" DIA.	12.67	1.13	257	7.91	0.900			89
	CA-C5.8, CA-C5, CB-C5, CE-C4, CE-C3, CE-C1.1	6	5	14	20" X 20"	93.52	1.45	319	8.70	0.957		561	
Sub-Total		**41**							**74.68**	**6.63**	**3136.00**	**561.12**	**88.69**
Net Sub-Total		**230**							**390.54**	**43.53**	**15980.82**	**3922.20**	**474.76**
Waste Factor									3.0%	10.0%	10.0%	10.0%	2.0%
Total		**230**							**402**	**47.88**	**17579**	**4314**	**484**

Concrete Shear Wall Takeoffs								
System	Item	Quantity	Formwork (SFCA or LF)	Volume (CY)	Steel (lbs)	Total Volume (CY)	Total Steel (Tons)	Total Formwork (SFCA)
Concrete Shear Walls (Rebar Ratio = 137 lb/CY)	SW1	1	2566	55.4	7590	55.4	3.795	2566
	SW2	1	2415	58.8	8056	58.8	4.028	2415
	SW3	1	2521	49.6	6795	49.6	3.398	2521
	SW4	1	2305	49.9	6836	49.9	3.418	2305
	SW5	1	2357	69.3	9494	69.3	4.747	2357
	SW6	1	2357	69.3	9494	69.3	4.747	2357
	SW7	1	2431	52.6	7206	52.6	3.603	2431
	SW8	1	2664	57.6	7891	57.6	3.946	2664
	SW9	1	2431	52.6	7206	52.6	3.603	2431
	SW10	1	2664	57.6	7891	57.6	3.946	2664
	SW11	1	4108	88.8	12166	88.8	6.083	4108
	SW12	1	1246	26.9	3685	26.9	1.843	1246
	SW13	1	4108	88.8	12166	88.8	6.083	4108
	SW14	1	3300	71.3	9768	71.3	4.884	3300
	SW15	1	2436	52.6	7206	52.6	3.603	2436
	SW16	1	3300	71.3	9768	71.3	4.884	3300
	SW17	1	2436	52.6	7206	52.6	3.603	2436
Sub-Total		**17**				**1025**	**70.2125**	**45645**
Waste Factor						0.0%	10.0%	4.0%
Total		**17**				**1025**	**77.23**	**47471**

Penthouse Steel Frame Takeoffs						
System	Item	Quantity	Length (ft)	Unit Weight (lbs/LF)	Total Length (LF)	Total Weight (Tons)
Structural Steel Columns	W12 X 30	19	14	30	266	3.99
Structural Steel Joists and Girders	W24 X 84	4	28	84	112	4.70
	W16 X 26	29	28	26	812	10.56
	W16 X 26	1	10	26	10	0.13
	W21 X 44	4	28	44	112	2.46
	W14 X 22	3	9	22	27	0.30
	W12 X 19	3	10	19	30	0.29
	W18 X 35	1	28	35	28	0.49
Shear Studs	3/4" x 4"	607				
Metal Decking	2" 18GA. Composite	7401				
Total						**22.92**

Appendix D – RS Means CostWorks Detailed Estimate Breakdown

Total Costs - St. Jospeh's NICU Superstructure												
RS Means Cost Code	Item	Quantity	Unit	Material Unit	Labor Unit	Equipment Unit	Total Unit	Material Total	Labor Total	Equipment Total	Total Unit Including O&P	Total Cost
031113253100	20" Dia. Round Column Forms	484	L.F.	$ 16.07	$ 7.40	$ -	$ 23.47	$ 7,777.88	$ 3,581.60	$ -	$ 30.11	$ 14,573.24
031113256650	24" x 24" Column Forms	21893	SFCA	$ 0.70	$ 3.27	$ -	$ 3.97	$ 15,325.10	$ 71,590.11	$ -	$ 6.27	$ 137,269.11
031113351150	Elevated Flat Plate Slab Forms	149674	S.F.	$ 1.25	$ 2.10	$ -	$ 3.35	$ 187,092.50	$ 314,315.40	$ -	$ 4.90	$ 733,402.60
031113852550	Shear Wall Forms	47471	SFCA	$ 0.56	$ 2.98	$ -	$ 3.54	$ 26,583.76	$ 141,463.58	$ -	$ 5.60	$ 265,837.60
Total	**Formwork**							**$ 236,779.24**	**$ 530,950.69**	**$ -**		**$ 1,151,082.55**
032110600250	Column Reinforcing Steel	47.88	Ton	$ 632.00	$ 511.56	$ -	$ 1,143.56	$ 30,260.16	$ 24,493.49	$ -	$1,587.82	$ 76,024.82
032110600250	Large Project Reinforcing Deduction	-47.88	Ton	$ 94.80	$ -	$ -	$ 94.80	$ (4,539.02)	$ -	$ -	$ 104.28	$ (4,992.93)
032110600400	Elevated Flat Plate Slab Reinforcing	521.37	Ton	$ 671.50	$ 401.94	$ -	$ 1,073.44	$ 350,099.96	$ 209,559.46	$ -	$1,448.57	$ 755,240.94
032110600400	Large Project Reinforcing Deduction	-521.37	Ton	$ 67.15	$ -	$ -	$ 67.15	$ (35,010.00)	$ -	$ -	$ 73.86	$ (38,508.39)
032110600500	Foundation Reinforcing	74	Ton	$ 600.40	$ 558.54	$ -	$ 1,158.94	$ 44,429.60	$ 41,331.96	$ -	$1,635.79	$ 121,048.46
032110600500	Large Project Reinforcing Deduction	-74	Ton	$ 90.06	$ -	$ -	$ 90.06	$ (6,664.44)	$ -	$ -	$ 98.95	$ (7,322.30)
032110600700	Shear Wall Reinforcing	77.23	Ton	$ 600.40	$ 391.50	$ -	$ 991.90	$ 46,368.89	$ 30,235.55	$ -	$1,343.47	$ 103,756.19
032110600700	Large Project Reinforcing Deduction	-77.23	Ton	$ 60.04	$ -	$ -	$ 60.04	$ (4,636.89)	$ -	$ -	$ 65.96	$ (5,094.09)
032110602210	Crane Handling Addition for Reinforcement	720.48	Ton	$ -	$ 17.49	$ 8.10	$ 25.59	$ -	$ 12,601.20	$ 5,835.89	$ 38.65	$ 27,846.55
Total	**Reinforcement**							**$ 420,308.26**	**$ 318,221.65**	**$ 5,835.89**		**$ 1,027,999.26**
033105350300	4000 psi Foundation Concrete	1451	C.Y.	$ 106.81	$ -	$ -	$ 106.81	$ 154,981.31	$ -	$ -	$ 117.18	$ 170,028.18
033105350300	4000 psi SOG/SOD Concrete	578	C.Y.	$ 106.81	$ -	$ -	$ 106.81	$ 61,736.18	$ -	$ -	$ 117.18	$ 67,730.04
033105350400	5000 psi Column Concrete	402	C.Y.	$ 113.03	$ -	$ -	$ 113.03	$ 45,438.06	$ -	$ -	$ 124.44	$ 50,024.88
033105350400	5000 psi Elevated Flat Plate Slab Concrete	4492	C.Y.	$ 113.03	$ -	$ -	$ 113.03	$ 507,730.76	$ -	$ -	$ 124.44	$ 558,984.48
033105350411	6000 psi Shear Wall Concrete	1025	C.Y.	$ 128.59	$ -	$ -	$ 128.59	$ 131,804.75	$ -	$ -	$ 142.07	$ 145,621.75
Total	**Ready-Mix Concrete**							**$ 901,691.06**	**$ -**	**$ -**		**$ 992,389.33**
033105700800	Pumping Structural Column Concrete	402	C.Y.	$ -	$ 14.55	$ 8.65	$ 23.20	$ -	$ 5,849.10	$ 3,477.30	$ 33.56	$ 13,491.12
033105701400	Pumping Penthouse Slab Concrete	210	C.Y.	$ -	$ 9.55	$ 5.67	$ 15.22	$ -	$ 2,005.50	$ 1,190.70	$ 22.30	$ 4,683.00
033105701600	Pumping Elevated Flat Plate Slab Concrete	4492	C.Y.	$ -	$ 7.45	$ 4.41	$ 11.86	$ -	$ 33,465.40	$19,809.72	$ 17.24	$ 77,442.08
033105701900	Placing Small Footing Concrete	25	C.Y.	$ -	$ 8.17	$ 0.51	$ 8.68	$ -	$ 204.25	$ 12.75	$ 14.16	$ 354.00
033105702600	Placing Footing Concrete	163	C.Y.	$ -	$ 8.17	$ 0.51	$ 8.68	$ -	$ 1,331.71	$ 83.13	$ 14.16	$ 2,308.08
033105702900	Placing Foundation Mat Concrete	1236	C.Y.	$ -	$ 2.80	$ 0.17	$ 2.97	$ -	$ 3,460.80	$ 210.12	$ 4.85	$ 5,994.60
033105704300	Placing SOG Concrete, Direct Chute	368	C.Y.	$ -	$ 8.90	$ 0.55	$ 9.45	$ -	$ 3,275.20	$ 202.40	$ 15.47	$ 5,692.96
033105705350	Pumping Shear Wall Concrete	1025	C.Y.	$ -	$ 11.15	$ 6.61	$ 17.76	$ -	$ 11,428.75	$ 6,775.25	$ 26.03	$ 26,680.75
Total	**Concrete Placing**							**$ -**	**$ 61,020.71**	**$ 31,761.37**		**$ 136,646.59**
033529300300	Concrete Floor Finishing, Troweled	149674	S.F.	$ -	$ 0.22	$ 0.05	$ 0.27	$ -	$ 32,928.28	$ 7,483.70	$ 0.41	$ 61,366.34
Total	**Concrete Finishing**							**$ -**	**$ 32,928.28**	**$ 7,483.70**		**$ 61,366.34**
050523871010	Shear Studs	607	Ea.	$ 0.69	$ 0.92	$ 0.45	$ 2.06	$ 418.83	$ 558.44	$ 273.15	$ 2.98	$ 1,808.86
051223751300	W12 X 22	30	L.F.	$ 22.66	$ 2.03	$ 1.82	$ 26.51	$ 679.80	$ 60.90	$ 54.60	$ 30.99	$ 929.70
051223751300	Small Steel Project (10-24 Ton) Additional Cost	30	L.F.	$ 11.33	$ 0.51	$ -	$ 11.84	$ 339.90	$ 15.30	$ -	$ 13.55	$ 406.50
051223751520	W12 X 35	266	L.F.	$ 36.34	$ 2.21	$ 1.97	$ 40.52	$ 9,666.44	$ 587.86	$ 524.02	$ 46.03	$ 12,243.98
051223751520	Small Steel Project (10-24 Ton) Additional Cost	266	L.F.	$ 18.17	$ 0.55	$ -	$ 18.72	$ 4,833.22	$ 146.30	$ -	$ 20.90	$ 5,559.40

Total Costs - St. Jospeh's NICU Superstructure												
RS Means Cost Code	Item	Quantity	Unit	Material Unit	Labor Unit	Equipment Unit	Total Unit	Material Total	Labor Total	Equipment Total	Total Unit Including O&P	Total Cost
051223751900	W14 X 26	27	L.F.	$ 26.93	$ 1.80	$ 1.61	$ 30.34	$ 727.11	$ 48.60	$ 43.47	$ 34.63	$ 935.01
051223751900	Small Steel Project (10-24 Ton) Additional Cost	27	L.F.	$ 13.46	$ 0.45	$ -	$ 13.91	$ 363.42	$ 12.15	$ -	$ 15.59	$ 420.93
051223752700	W16 X 26	822	L.F.	$ 26.93	$ 1.79	$ 1.60	$ 30.32	$ 22,136.46	$ 1,471.38	$ 1,315.20	$ 34.58	$ 28,424.76
051223752700	Small Steel Project (10-24 Ton) Additional Cost	822	L.F.	$ 13.46	$ 0.45	$ -	$ 13.91	$ 11,064.12	$ 369.90	$ -	$ 15.58	$ 12,806.76
051223753300	W18 X 35	28	L.F.	$ 36.34	$ 2.79	$ 1.82	$ 40.95	$ 1,017.52	$ 78.12	$ 50.96	$ 46.98	$ 1,315.44
051223753300	Small Steel Project (10-24 Ton) Additional Cost	28	L.F.	$ 18.17	$ 0.70	$ -	$ 18.87	$ 508.76	$ 19.60	$ -	$ 21.18	$ 593.04
051223754100	W21 X 44	112	L.F.	$ 45.32	$ 2.52	$ 1.64	$ 49.48	$ 5,075.84	$ 282.24	$ 183.68	$ 56.53	$ 6,331.36
051223754100	Small Steel Project (10-24 Ton) Additional Cost	112	L.F.	$ 22.66	$ 0.63	$ -	$ 23.29	$ 2,537.92	$ 70.56	$ -	$ 26.19	$ 2,933.28
051223755700	W24 X 84	112	L.F.	$ 87.21	$ 2.48	$ 1.61	$ 91.30	$ 9,767.52	$ 277.76	$ 180.32	$ 102.18	$ 11,444.16
051223755700	Small Steel Project (10-24 Ton) Additional Cost	112	L.F.	$ 43.60	$ 0.62	$ -	$ 44.22	$ 4,883.20	$ 69.44	$ -	$ 49.04	$ 5,492.48
053113505400	2" 18GA. Composite Metal Decking	7401	S.F.	$ 1.68	$ 0.36	$ 0.04	$ 2.08	$ 12,433.68	$ 2,664.36	$ 296.04	$ 2.58	$ 19,094.58
Total	**Structural Steel**							**$ 86,453.74**	**$ 6,732.91**	**$ 2,921.44**		**$ 110,740.24**
Total								**$ 1,645,232.30**	**$ 949,854.24**	**$48,002.40**		**$ 3,480,224.31**

*Note that the Material, Labor, and Equipment Totals are before overhead and profit. The Total Cost includes Overhead and Profit.

Appendix E – General Conditions Estimate Breakdown

Management Team Costs				
Item	**Quantity**	**Unit**	**Rate**	**Total Cost**
Project Executive	640	Hr.	$105.00	$67,200.00
Senior Project Manager	3680	Hr.	$89.00	$327,520.00
Project Manager	7360	Hr.	$74.00	$544,640.00
Project Accountant	4320	Hr.	$39.00	$168,480.00
Project Secretary	4320	Hr.	$26.00	$112,320.00
General Superintendent	4160	Hr.	$101.00	$420,160.00
Superintendent	4320	Hr.	$68.00	$293,760.00
Assistant Superintendent	4320	Hr.	$59.00	$254,880.00
Safety Manager	4320	Hr.	$52.00	$224,640.00
Total			**$613.00**	**$2,413,600.00**

Temporary Facilities and Controls				
Item	**Quantity**	**Unit**	**Rate**	**Total Cost**
Field Engineering	1	LS	$10,000.00	$10,000.00
Fencing	25	Mo.	$900.00	$22,500.00
ICRA Controls	1	LS	$75,000.00	$75,000.00
Office Trailer Rental	25	Mo.	$1,100.00	$27,500.00
Office Trailer Setup/Breakdown	2	Ea.	$2,500.00	$5,000.00
Temporary Egress and Partitions	1	LS	$8,000.00	$8,000.00
Buck-Hoist Rental	12	Mo.	$2,100.00	$25,200.00
Buck-Hoist Setup/Breakdown	2	Ea.	$4,000.00	$8,000.00
Temporary Toilets	324	Ea./Mo.	$100.00	$32,400.00
Temporary Lighting	8	Mo.	$1,200.00	$9,600.00
Dumpsters	100	Ea.	$600.00	$60,000.00
Temporary Storage Trailers	50	Mo.	$400.00	$20,000.00
Total				**$303,200.00**

Temporary Utilities				
Item	**Quantity**	**Unit**	**Rate**	**Total Cost**
Internet	27	Mo.	$1,000.00	$27,000.00
Wireless Communications	216	Mo.	$100.00	$21,600.00
Temporary Electric for Trailers	25	Mo.	$3,000.00	$75,000.00
Temporary Water for Trailers	25	Mo.	$800.00	$20,000.00
Temporary Sanitary for Trailers	25	Mo.	$500.00	$12,500.00
Total			**$5,400.00**	**$156,100.00**

Miscellaneous Items				
Item	**Quantity**	**Unit**	**Rate**	**Total Cost**
Safety	1	LS	$40,000.00	$40,000.00
Reproprinting	1	LS	$15,000.00	$15,000.00
Software and Support	1	LS	$12,000.00	$12,000.00
LEED Efforts	1	LS	$25,000.00	$25,000.00
Schedule Consulting	25	Mo.	$800.00	$20,000.00
Jobsite Vehicle	1	LS	$38,000.00	$38,000.00
Small Tools and Equipment	1	LS	$5,000.00	$5,000.00
Office Supplies and Logistics	1	LS	$18,000.00	$18,000.00
Cleaning and Trash Removal	27	Mo.	$300.00	$8,100.00
Aerial Photographs and Progress Reports	27	Mo.	$400.00	$10,800.00
Total				**$191,900.00**

Total General Conditions Summary		
Item	**Total Cost**	**Percentage of Total GC**
Staffing	$2,413,600.00	78.8%
Temporary Facilities and Controls	$303,200.00	9.9%
Temporary Utilities	$156,100.00	5.1%
Miscellaneous Items	$191,900.00	6.3%
Total	**$3,064,800.00**	