ST. JOSEPH'S WOMEN'S HOSPITAL

Neonatal Intensive Care Unit (NICU)

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

Tampa, FL 33607

Technical Report One

October 4, 2010

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Construction Management

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Contents

Executive Summary

St. Joseph's Women's Hospital has been the premier location for women's health and neonatal care in the Tampa area. BayCare Health Systems has recently begun construction their latest addition to the St. Joseph's network of hospitals, with this 117,569 gross square foot addition known as the Neonatal Intensive Care Unit (NICU). When complete, Saint Joseph's will be able to offer 100% private rooms for all patients in the NICU, along with a host of other amenities, such as surgical suites, medical imaging, and a breast health center. This report is intended to familiarize you with the construction processes implemented on this particular project, such as a summary project schedule, a review of the major building systems, existing conditions, contractual obligations and delivery methods, project team staffing information, a basic comparative cost analysis, and more information on the client's background and expectations.

A major component of the success of this project will be maintaining full operational status of the existing hospital during the entire construction process. That being said, there is a large focus on the particulars in phasing that can make the difference in the successful delivery of this project. BIM models are used not only for clash detection on this project, but they also play a very active role in the conveyance of phasing information to the owner not just up front, but on a day-to-day basis as well.

St. Joseph's Women's Hospital NICU Expansion is also hoping to achieve a LEED Certified rating. Currently, there are a lot of points coming from Sustainable Sites and Indoor Environmental Quality sections. There may be more room for points in other areas, but a feasibility analysis may be in order before this assumption can be verified.

In the coming weeks, research will begin to shift to more of an in depth look at cost and schedule analysis, as well as controls that may be helping or hindering progress. This information and more can be found in Technical Report Two.

Summary Project Schedule

The summary schedule that can be found in appendix A reflects the general workflow and major milestones of the St. Joseph's NICU project. Figure 1 below shows the general phasing of the project as delineated in the schedule.

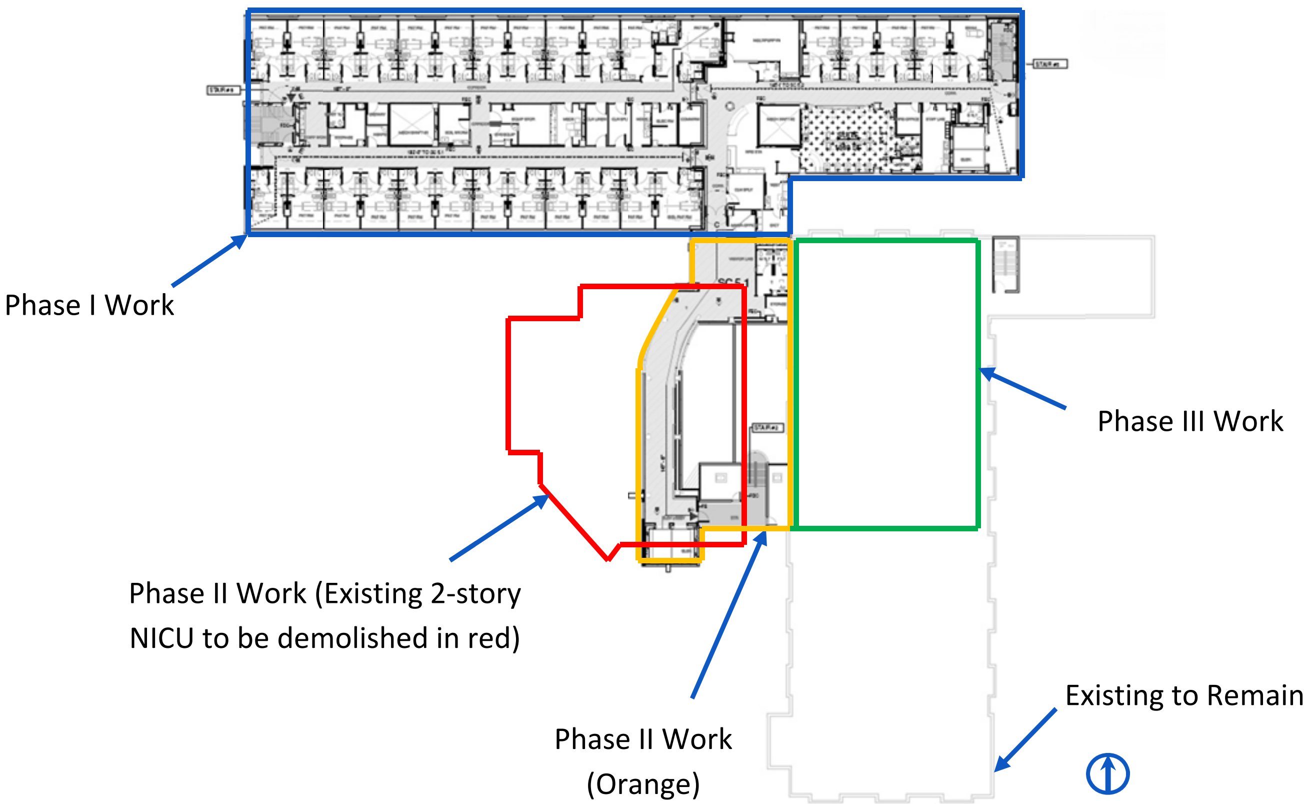


Figure 1. Basic Phasing Plan. ALS-51A from 100% CD's, Compliments of HKS, Inc.

A major benefit of this particular project that should be noted is the shallow foundation. The sandy soils in Florida provide a sound base for foundations to be built upon. This allows for less excavation, lower cost, and a significant time advantage. With limited site work necessary to transform the existing parking lot into a construction site, work on the superstructure could begin relatively early in comparison with a typical addition/renovation project in the middle of a city. Additional structural features that benefit the schedule are the architectural precast concrete panels. This holds a significant time savings over masonry, although there is additional time needed for procurement of these items. If procurement and coordination are done effectively, there will be a net savings in time as these panels are simply delivered and installed, often in the same day.

The issues that have a negative effect on the schedule will typically come from the tie-in to the existing building. There always tend to be difficulties when making the transition between new and old, making the Phase II work the most ambitious portion of the entire schedule. There are liquidated damages clauses in the contract, but fortunately Phase II does not include many patient rooms, so the owner may be more likely to forgive a day or two slip in this area. However, move-in to the main NICU tower will be a critical date. Additionally, mechanical tie-in to existing cooling towers and chillers, as well as electrical tie-in to existing switchgears and panels will require close coordination with hospital operations. Any shut-downs are to be scheduled well in advance to allow hospital staff proper time to review pre-task planning. Good logistics and organization will be required to maintain the schedule through these critical tasks.

Renovation work is difficult to schedule because predicting existing conditions is always very ambiguous. This too could hinder the schedule, but may be a less critical event than Phase II work. Additional time will be needed to properly utilize standards set forth in the ICRA (Infectious Control Risk Assessment), as vapor barriers, dust control, and acoustical barriers may be needed. For example, one area that is particularly sensitive to sound is the premature nursery, where the slightest sounds can frighten already small and frail babies. Acoustical studies were done and attenuators were designed to reduce noise entering this area. Again all of this takes time and the project team must be particularly attentive to items like this that, while small, can raise the "stop work" flag very quickly.

The beginning of Phase II requires the demolition of the existing NICU, which is a two-story structure. The team has only twenty days to sever and remove the entire structure. This may be the most critical point in the schedule. Exploratory work is in place to verify processes, procedures, and potential issues that may arise, such as the need for abatement, and areas of limited accessibility.

This project could be considered fast-track, although it was not as deeply implemented as the title might persuade one to believe. There were two permit releases, one for the main structure in May, and another for the rest of the building a month later. The structure permit would require a 100% CD release for structures by the permit submittal date, and likewise with the rest of the drawings for the final enclosure and interiors permit. That being said, the schedule is predicated upon the drawings being released on time, and a reasonable turn-around time from the municipality with the permits.

Also note that there is extensive involvement by the construction manager early in the design. This could be considered an integrated-project-delivery project. Refer to the Project Delivery System section.

Building Systems Summary

Superstructure

The new NICU tower will be composed of a structural concrete superstructure. The main load bearing elements will be cast-in-place columns, and a cast-in-place two-way flat plate slab. This system was likely chosen to minimize floor-to-floor height while maximizing above ceiling space. Due to FAA restrictions, there were several permitting issues that were found when evaluating the overall building height during the design development phase. The design called for the building to be approximately three feet taller than FAA restrictions would allow, due to the proximity of the hospital to Tampa International Airport. This concrete superstructure allows for more above ceiling space for the extensive MEP systems, when compared with a structural steel system.

Typical columns will be 24” x 24” reinforced 5,000psi f'_c concrete square columns, placed along five column lines in the main NICU tower. These columns will extend up to the roof. The foundation consists of 4,000psi f'_c concrete grade beams and spread footings that are occasionally shared by two columns. This can be seen in Figure 2 located below, which portrays the structural drawing for the North side First Floor of the new NICU tower. Tandem spread footings can be seen highlighted in blue.

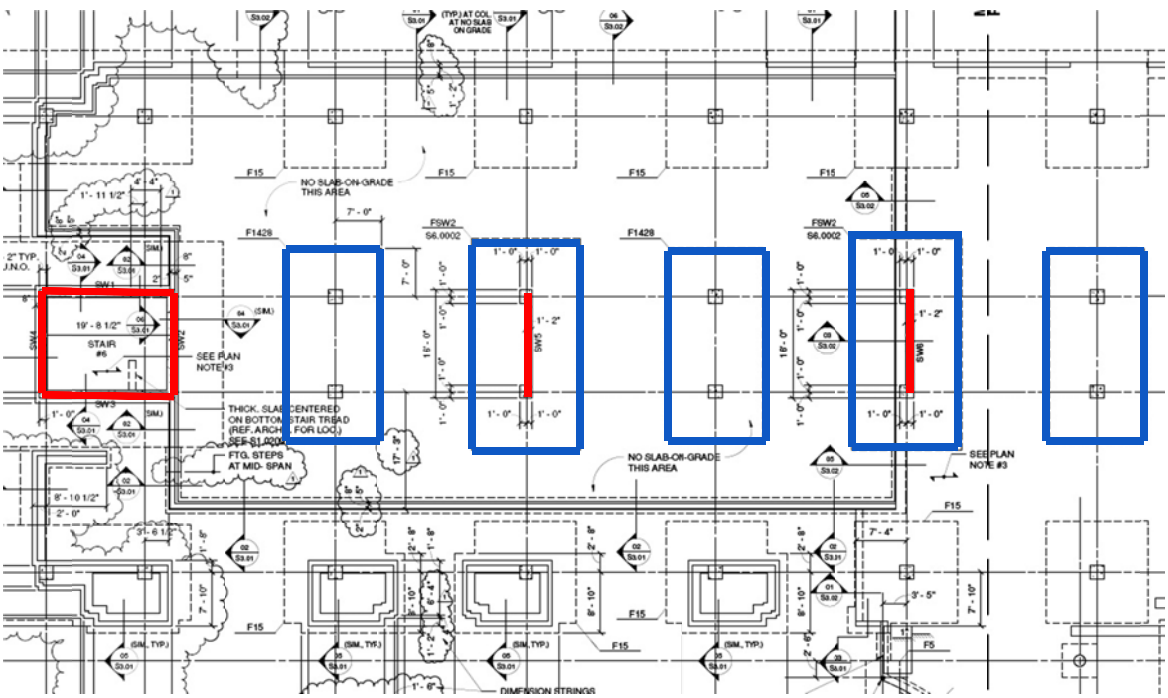


Figure 2. S2-11 from 100% CD’s. Compliments of HKS Inc.

To provide lateral support, seventeen 6,000psi f'_c concrete shear walls have been placed throughout the structure. Six of these can be seen highlighted in red in Figure 2 above. These walls extend from the foundation all the way to the 6th floor roof. In several cases, the opportunity was taken to use the elevator and stair shaft walls to discreetly place shear walls, while still minimizing loss of open floor space. The remainder of the shear walls can be identified below in Figure 3 and Figure 4, again highlighted in red.

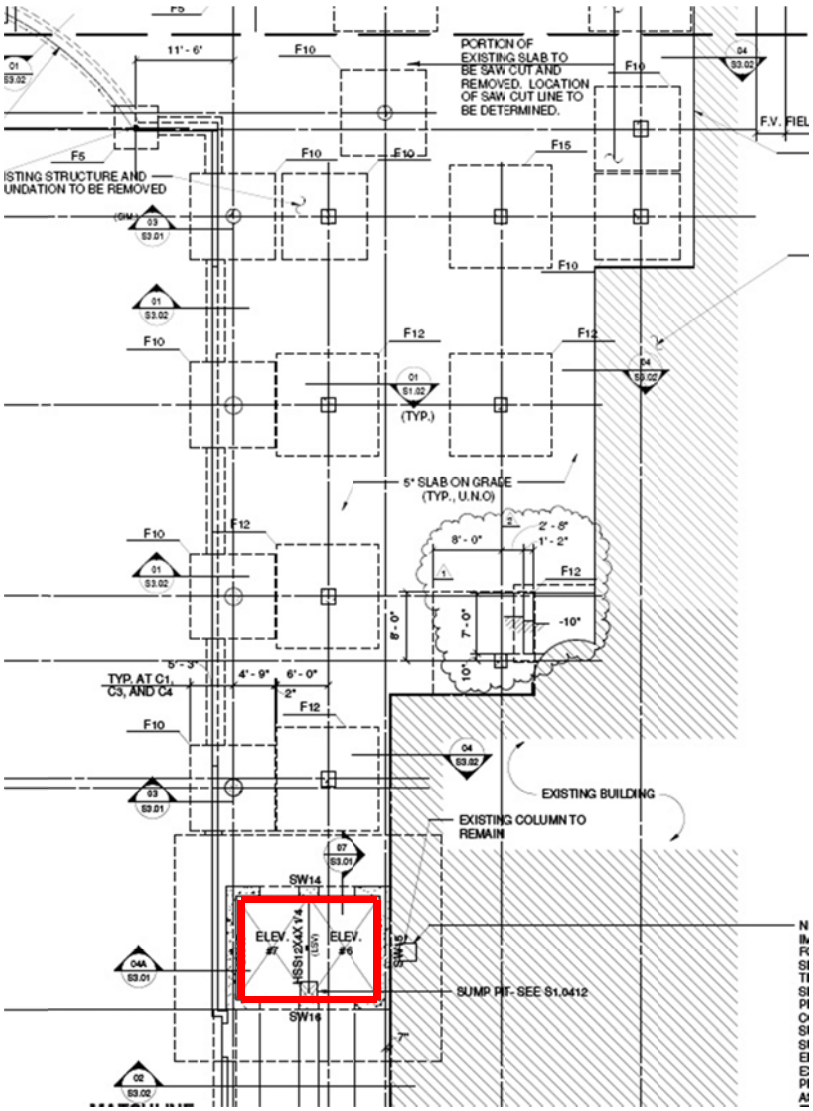


Figure 3. S2-13 – West Wing, from 100% CD's, Compliments of HKS, Inc.

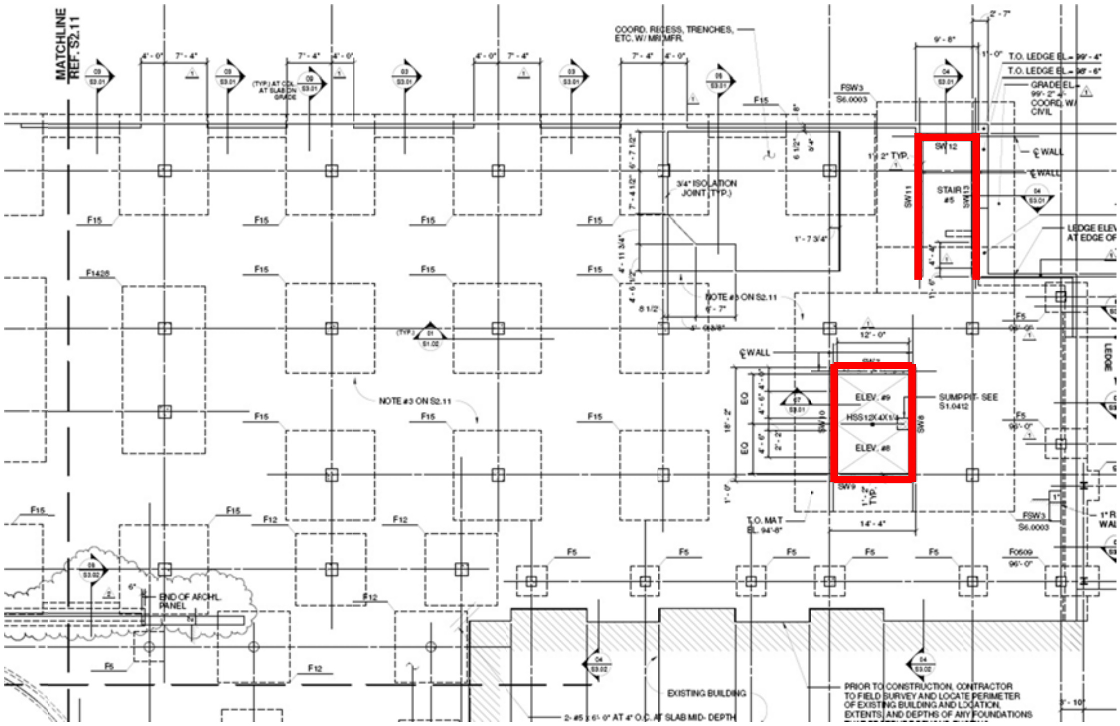


Figure 4. S2-12 – South side First Floor, Main NICU Tower - from 100% CD's, Compliments of HKS, Inc.

It is understood that orientation of these areas may be a bit ambiguous at this time. Please see the Site Plan of Existing Conditions section and Appendix D later in this report for complete site diagrams, phasing orientation, and relationship between the new and existing structures.

While the flat plate slabs are typically 12" thick reinforced with #5 and 6 bars top and bottom, there are some areas that required additional floor thickness, typically in the bathrooms. Since there is a need for a 2" recession in the slab for finishes, yet still a large dead load, the thickness is bumped up to 14" with #6 and 7 bars reinforcing these areas.

Although concrete dominates the design, the sixth floor penthouse provides a good opportunity to use lighter steel framing instead of concrete. Particularly because the mechanical penthouse is significantly smaller than the roof itself, about one-third the total building footprint, it would be superfluous to increase dead loads on the rest of the structure by using more concrete columns. Instead, W16 beams are framed into the steel columns that are anchored at the Level 5 Elevation (T.O. main roof). The simple structure is laterally supported by a semi-moment frame, where only a few W21 beams and girders have moment connections. The decking above is an 18 GA. composite metal deck with shear studs embedded in 7" of 4,000psi f'c concrete reinforced with W4.0 WWF.

Some other areas of the building offer some HSS or other steel framing, but these are mainly in regions such as the main entrance, where an external canopy is to be installed, or some Phase 3 work where the old structure must be retrofitted into the new structure.

Demolition

As noted in the phasing plan above, the existing NICU structure will have to be demolished in the middle of the project. This is necessary so that the Phase II Connector can be constructed in its place. Currently this structure not only houses the NICU, but also is the main administrative wing for the entire Women's Hospital. After the tenants are relocated to the new tower, the team will have to efficiently demolish the structure in twenty short days. There are two areas where abatement will be necessary. The first is on all pipe elbows which are wrapped in asbestos. This is the most hazardous item that will be encountered, but can be removed relatively easily by cutting the pipe on either end of the elbows and removing the entire part in one piece, never penetrating the insulation around the elbow itself. The second type is a chrysotile asbestos found in black mastic that had been used in years past for tile adhesive. While this is harmful, there is not really an airborne component to the hazard, so is not as big of an issue as the piping. Nonetheless abatement will still be necessary.

Mechanical System

The mechanical system will be partially tied-into the existing chillers and cooling towers on the current Women's Hospital. However, there are provisions to demolish one chiller, provide two new ones, along with an additional cooling tower. There will be a total of eight new air handler units in the main NICU tower, four cooling towers, four chillers, and two boilers. It will be an air and water system, with fan coil reheat units in each zone for control. The main mechanical room for the new NICU tower will be located on the 6th Floor Roof. All new direct digital controls will be installed, and linked into the Building Management System, giving specific feedback to any web based PC on energy management requirements, archived trends, and LEED Data. Energy recovery units will be added to the bed tower's AHUs, due to the extreme cooling loads that are associated with the Tampa region. This will play a part in the LEED Certification process as well, accounting for some of the Optimizing Energy Performance Credits under the Energy & Atmosphere section. Currently the projection is for a total of 14% energy use reduction for the new NICU tower and 7% in the existing hospital. Above ceiling plenum systems will bring return air to the ERV's after which it will be exhausted. The layout of the Mechanical Penthouse can be found below in Figure 4, outlined in orange.

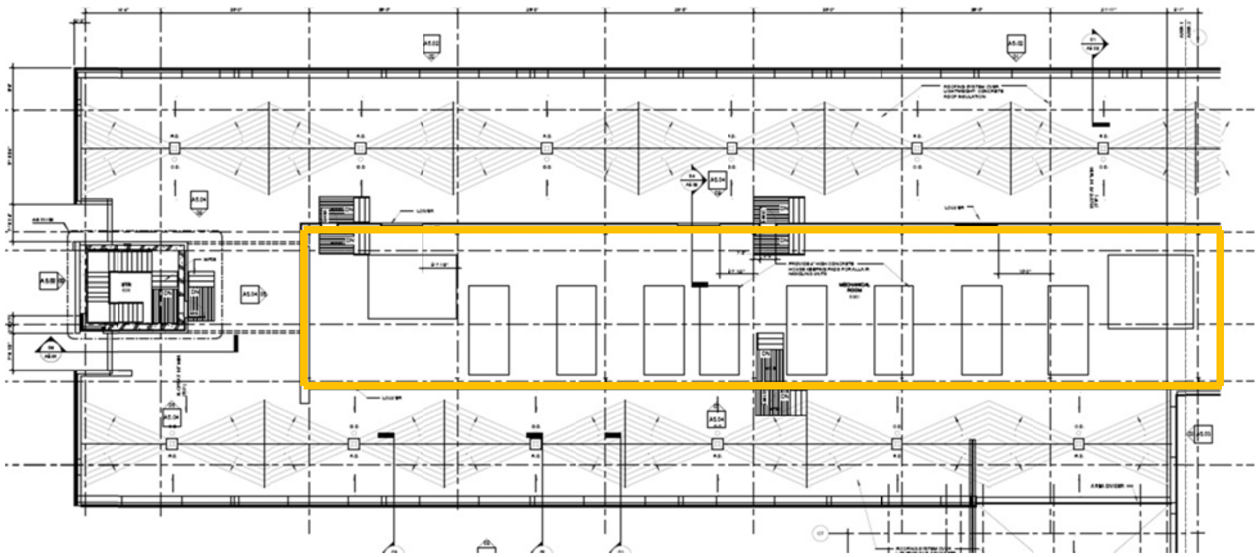


Figure 5. A-261 Sixth Floor Roof, Main NICU Tower – from 100% CD's, Compliments of HKS, Inc.

Due to the nature of the hospital, and the stringent requirements on indoor air quality, MERV 17 filters will be used in all AHU's. Although these filters are for permanent use in the system, there will be a brief time where the mechanical system will be running during construction activities. In this event, the ICRA document provides extra provisions for pre-filtering air that is going into the system. This is not a HEPA type filter, but instead is designed to provide general filtration of larger dust particles, and construction debris that may be in the vicinity of the AHU intake.

Additional systems include plumbed med gases, including oxygen, vacuum, and compressed air, along with pneumatic transfer tube systems to accommodate materials to and from nurse's stations, surgical suites, and the pharmacy. The oxygen, vacuum, and compressed air will be tied into the existing system in the main part of the hospital. The fire suppression system will be a wet type sprinkler system.

Electrical System

As with all hospitals there is a need for redundancy within the system. Electrical power must not be interrupted, especially in an intensive-care unit. A few years ago, the entire electrical switchgear, UPS, and emergency generator system had been upgraded. This project included provisions for extra switchgears, in case the current project was to happen. Essentially all new construction for this project will be downstream from the switchgears which are already in place. The two generators that will be tied into the new system produce 1.5MW each and are accompanied by bypass isolation type automatic transfer switches. The main emergency switchgear is a 6000A system, while the normal system consists of two 2000A switchgears. Additional 1200A switchgears can be found in the chiller room and will power the chillers and cooling towers.

Building Façade

St. Joseph's Women's hospital will be wrapped in a combination of aluminum framed glazing and architectural precast concrete. The Main NICU tower will reflect a somewhat balanced mixture of the two, while the Phase II and III work, which will renovate the existing entrance and part of the west wing, will showcase a large glass curtain wall. This curtain wall will be the 1600 Series model from Kawneer, and will extend continually from the second through the fifth floors. Below is a rendering of the North and West Facades from Martin Luther King, Jr. Blvd.

Figure 7. Rendering Compliments of HKS, Inc. October 1,2010

PROJECT COST EVALUATION

Cost Type	Total Cost	Cost/SF
Construction Costs	$40,817,498	$347.19
Total Project Cost	$49,537,235	$421.35
Mechanical/Plumbing Systems	$9,524,184	$81.01
Electrical Systems	$6,927,918	$58.93
Structural System	$5,097,092	$43.35
Façade	$5,873,907	$49.96

Figure 6. Table of Construction Costs per Square Foot (Based on 117,569SF New Construction)

Please refer to Appendix B for the CostWorks Square Foot Cost Estimate Report. This utility was used based on RS Means 2010 (3rd Quarter) and has been adjusted for the Tampa location. Some items that were not addressed by this report are:

- → Demolition of existing NICU structure, approximately 30,000 SF
- → The perimeter measured includes approximately 140 LF that is to be tied into the existing hospital
- → There were no provisions for the glass curtain wall that will be installed on the North façade.
- → The concrete used in the estimate was on average 1,000 psi weaker than what is actually installed
- → There was no inclusion of a Building Automation System which will be installed
- → There is no reference to LEED practices that will be implemented on the project
- → There is no provision for the renovation work
- → There is no contingency

These items will all add cost to the project, however the GMP is almost double what the estimate has predicted.

A D4 Cost Utility parametric estimate was also created. This analysis was based on a six story hospital constructed in West Palm Beach, FL in 1993. After customizing the project, a projected cost of $25 million was found. D4 Cost also does not address any of the items mentioned above. A large amount of custom finishes and exterior curtain wall seems to be the largest portion of both estimates that have been overlooked, along with the demolition and renovation work. Please see Appendix C for the D4 Cost Utility Parametric Estimate Breakdown.

Overall, these two estimates are consistent, but not accurate. These utilities would be accurate from a parametric standpoint, with only a conceptual design. Once the design has evolved past that point, detailed estimates are the only way to provide accurate cost projections.

Existing Conditions and Site Plan

Figure 6. Bing Maps Aerial View of NICU Site

Although St. Joseph's is in downtown Tampa, the geography is not as intense as a high rise locality where site logistics become a full time job. The area here is a bit more spread out, and the hospital is the tallest building in the vicinity. To the West lies the Tampa Bay Buccaneers Training Facility and Raymond James Stadium. To the South and East is more of a residential area and of course to the North is St. Joseph's Hospital. Martin Luther King, Jr. Blvd provides quick access to Interstate 4, which is just under three miles east of the project site.

There are challenges involved with working within the site. It is fairly tight on that particular block, and while there is plenty of room on side streets to queue deliveries, access into the site itself is rather limited. In particular, once the superstructure begins, about 85% of the lot will be covered in structure, leaving little room for staging and the like. Note the location of the parking garage in the South West corner of the map. This is where hospital employees park, and access must be maintained in and out of this area at all time. A common access point to this garage is from W. Virginia Ave., located on the east side of the site. Please refer to the site plan in Appendix D for a detailed layout of the site itself.

Fortunately the main NICU tower will be situated on an existing parking lot. The only utilities under this area are storm drainage, which will be demolished. All utilities for the project will be routed from existing locations in the Women's Hospital, so they have not been identified on the site plan in Appendix D.

When designing the building, HKS Architects had learned that local FAA restrictions prohibited the height of the building to exceed 90' above ground. The design was altered and the building permit was approved. The next challenge was finding a crane that would also fit within these parameters. This was a bit more of a challenge, especially because the table system being used to form the slabs requires a crane to lift them to the next level. There was not a crane capable of making the pick while extended across the entire building with a jib. Therefore two cranes had to be used, and even at that, a special permit was required as the jibs still exceeded the height allowed by FAA requirements.

Local Conditions

The subsurface soil conditions in Florida are ideal for shallow spread footing and grade beam type foundations, which is what we have on the St. Joseph's project. The water table tends to be fairly high in this region, but at this particular site it was not high enough for dewatering to be necessary. Structural concrete superstructures are very common in the Florida area, and especially in the healthcare field where above ceiling space is at a premium for all of the mechanical and electrical systems. Baker Concrete is the concrete subcontractor for this project, and they have employed the table method of constructing the concrete decks. This allows for faster construction as prefabricated tables are only assembled once, then simply moved from floor to floor for the duration of the structure's construction.

Barton Malow plans to implement a LEED recycling system for the project, requiring multiple dumpsters to be on site at various times during the project. This will affect some of the staging space, but is a necessary part of achieving LEED Certified. Fortunately, there is some space for onsite parking, particularly for superintendents, and can be seen in Appendix D. The rest of the worker parking will be across Martin Luther King, Jr. Blvd., where the St. Joseph's Children's Hospital parking deck is located. This is only a half of a block from the site, and is where all non-company vehicles are to be parked. For deliveries, a gate has been installed in the construction fence along N MacDill Ave., allowing drivers to pull directly into the site for unloading. There is only room for one truck at a time, but this is a much better option than unloading from the street.

Client Information

BayCare Health System is the largest health care system in the Tampa Bay area and is composed of eleven non-profit hospitals. They manage the entire St. Joseph's network of Hospitals as well as many other sectors of healthcare, from home assistance, to medical imaging, and laboratory work. BayCare started in 1997 and has prided themselves on individualized care in a community-based system.

BayCare has embraced a semi-IPD approach to this project. The main focus is to maintain full operational status of the hospital while construction occurs. BayCare has asked Barton Malow to provide early constructability reviews and phasing analyses that will do just this. Between Phase I and Phase II, there will be a two week period in which all administrative staff, medical staff, and patients will be relocated from the current NICU to the new NICU tower. This is probably the most critical part of the schedule and has been given an intense amount of focus by both the BayCare project management team and the Barton Malow project management team.

Phasing aside, maintaining egress, safety, and preventing interruption to current activities will be an ongoing battle. As aforementioned, noise attenuators are needed for the NICU to protect premature babies. This is one example of many challenges that must be overcome. Things that are intrinsic to construction, like noise and vibration, must be nearly eliminated. BayCare has high expectations when it comes to this, and Barton Malow will have to recognize that as a top priority, even above cost and schedule, to successfully complete this job.

Project Delivery System

The NICU project can be viewed as a semi-IPD delivery method. Although design and construction teams are contracted separately, there was a constructability review occurring early on by the construction team. The original contract was only to perform preconstruction services, while the construction contract had not yet been put out to bid. This provided Barton Malow with an opportunity to use their fee for preconstruction as an advantage over most competitors, by lowering their construction price. Needless to say Barton Malow won the project. The project organizational chart can be found in Appendix E.

Form a contractual standpoint, Barton Malow is considered a CM at risk, and holds their contract directly with BayCare Health Systems. This document is an AIA-A121 CMc, which considers the construction manager as the constructor. HKS Architects is also contracted directly under BayCare Health systems, while all engineering consultants are contracted through HKS. There are several different division of HKS, although each is considered a different company and HKS Architects holds a separate contract with each of its subsidiaries, i.e. HKS Structures, HKS Medical Planning, etc. Other consultants such as Smith Seckman Reid are also contracted individually under HKS Architects. From an operations side, Barton Malow holds contracts directly with all subcontractors.

BayCare Health Systems has chosen to implement an Owner Controlled Insurance Program (OCIP). This will cover all parties, aside from suppliers, vendors, delivery personnel, abatement and hazardous materials contractors, technical consultants, and incidental operations personnel on the following:

- Worker's Compensation
- Employers' Liability
- Commercial General Liability
- Excess Liability
- Builders' Risk

Every contractor must still carry the remaining balance of insurance, such as vehicle insurance, offsite worker's compensation, equipment, and any other requirements that may be set forth by the construction manager or subcontractors, but not required by the owner. If the contract value of a particular subcontractor is less than $5,000, they are exempt from the OCIP program, but must still be legally insured. It is important to note that the owner does not cover bonding, as this is the responsibility of the contractor.

Barton Malow uses a program known as Subguard, which allows the contractor to control the bonding for all subcontracts. There is a prequalification process involved with using Subguard, which helps mitigate the risk of default by assessing a subcontractor's financial status prior to selection. This program allows Barton Malow to recover more quickly from a default situation by a subcontractor because there is no need to deal with a subcontractor's bonding agency. Furthermore, there is a significant cost savings by purchasing mass bonding capacity, rather than incurring mark up on subcontracts from their smaller bonding policy, which is likely to have a higher unit cost.

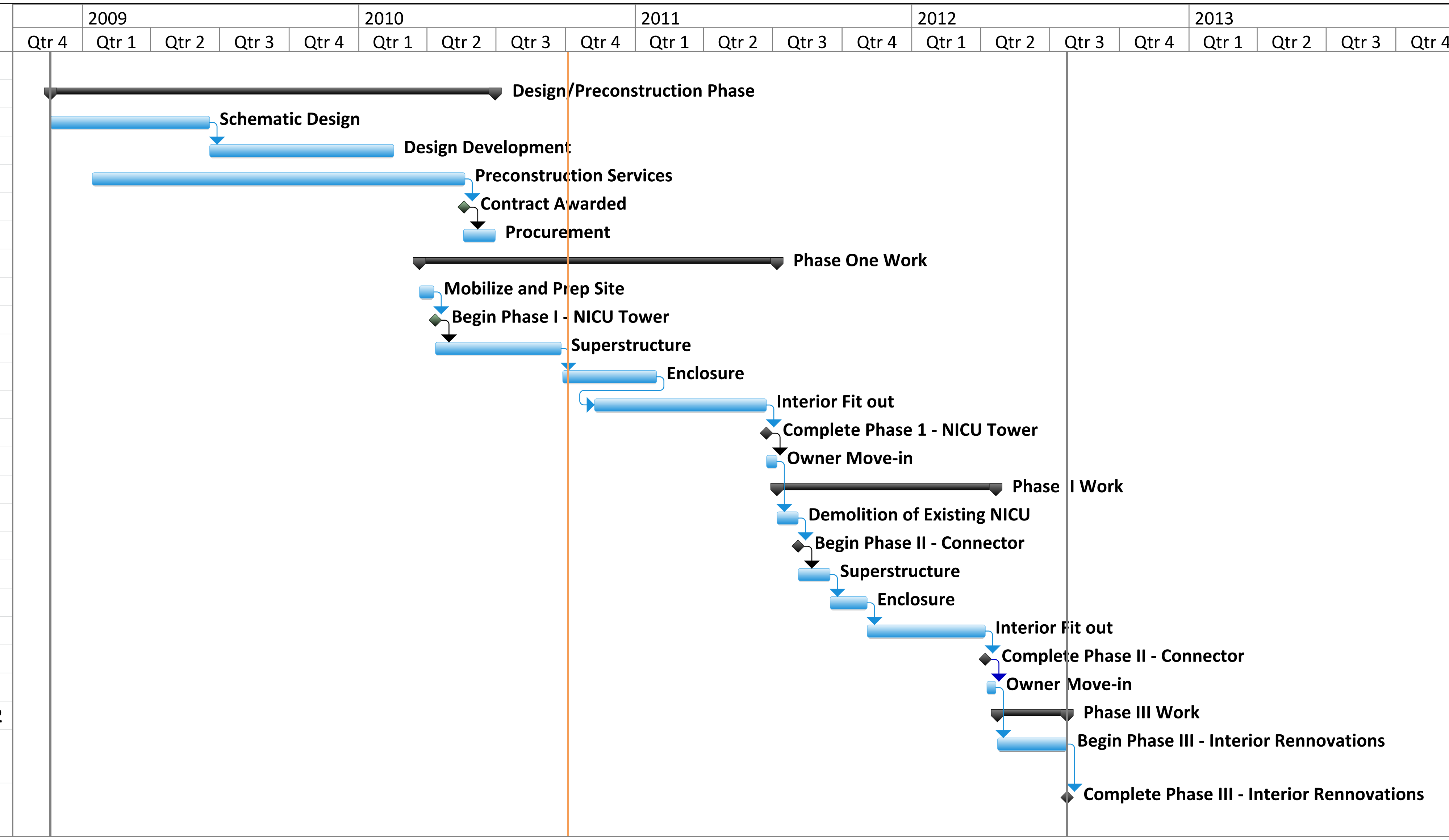
For the most part, I feel that the contracts and delivery system chosen are as effective as they could be. While using a design/build approach may be more effective, teaming HKS with Barton Malow to create a Design/Build firm will probably not be any more effective than the current set up. There will still be a sense of division between the two parties although they are under the same contract. It is an intrinsic characteristic of human nature, to feel that sense of division because at the end of the day they are still two separate companies. The only way that design build would be effective for this job, or any job for that matter, would be if the design/build firm was one complete company that could provide all services so as to avoid the feeling of disunion.

Staffing Plan

Barton Malow had acquired a team of people from Bovis late in 2008. This team had been heavily involved with healthcare and had all worked together on previous projects. Corporate management took the opportunity to have this team work together because they were all familiar with each other, and the synergy would prove to benefit Barton Malow more than spreading the team thin throughout the company, so as to get each member acclimated to Barton Malow processes and procedures. The team consists of a large amount of project managers. This often suggests a very horizontal approach to the management of work, but Sr. Project Manager Wayne Wright has allowed each person to assume a hybrid of responsibilities that may often be performed by a project engineer, such as submittals, RFIs and BIM usage onsite. The result is a somewhat vertical structure. Due to the economic situation, there is the ability to overstaff jobs. This may be the reason for such a large number of project managers to be on this project, but one should not expect to see this behavior in the future should the economy recover.

Appendix A – Summary Baseline Schedule

ID	Task Name	Duration	Start	Finish
1				
2	**Design/Preconstruction Phase**	**419 days**	**Thu 11/20/08**	**Tue 6/29/10**
3	Schematic Design	150 days	Thu 11/20/08	Wed 6/17/09
4	Design Development	173 days	Thu 6/18/09	Mon 2/15/10
5	Preconstruction Services	352 days	Wed 1/14/09	Thu 5/20/10
6	Contract Awarded	0 days	Thu 5/20/10	Thu 5/20/10
7	Procurement	30 days	Wed 5/19/10	Tue 6/29/10
8	**Phase One Work**	**338 days**	**Mon 3/22/10**	**Wed 7/6/11**
9	Mobilize and Prep Site	15 days	Mon 3/22/10	Fri 4/9/10
10	Begin Phase I - NICU Tower	0 days	Mon 4/12/10	Mon 4/12/10
11	Superstructure	120 days	Mon 4/12/10	Fri 9/24/10
12	Enclosure	90 days	Mon 9/27/10	Fri 1/28/11
13	Interior Fit out	163 days	Mon 11/8/10	Wed 6/22/11
14	Complete Phase 1 - NICU Tower	0 days	Wed 6/22/11	Wed 6/22/11
15	Owner Move-in	10 days	Thu 6/23/11	Wed 7/6/11
16	**Phase II Work**	**207 days**	**Thu 7/7/11**	**Fri 4/20/12**
17	Demolition of Existing NICU	20 days	Thu 7/7/11	Wed 8/3/11
18	Begin Phase II - Connector	0 days	Wed 8/3/11	Wed 8/3/11
19	Superstructure	30 days	Thu 8/4/11	Wed 9/14/11
20	Enclosure	35 days	Thu 9/15/11	Wed 11/2/11
21	Interior Fit out	112 days	Thu 11/3/11	Fri 4/6/12
22	Complete Phase II - Connector	0 days	Fri 4/6/12	Fri 4/6/12
23	Owner Move-in	10 days	Mon 4/9/12	Fri 4/20/12
24	**Phase III Work**	**66 days**	**Mon 4/23/12**	**Mon 7/23/12**
25	Begin Phase III - Interior Rennovations	66 days	Mon 4/23/12	Mon 7/23/12
26	Complete Phase III - Interior Rennovations	0 days	Mon 7/23/12	Mon 7/23/12



Project: Tech One Baseline.mpp
Date: Mon 10/4/10

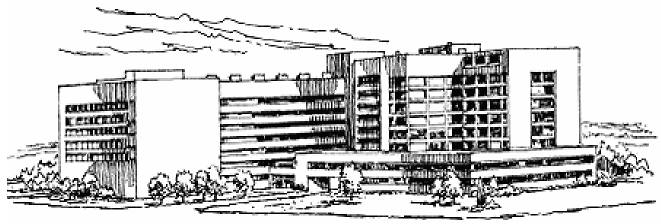
Task, Split, Milestone, Summary, Project Summary, External Tasks, External Milestone, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, Deadline, Progress

Appendix B – CostWorks SF Estimate

Square Foot Cost Estimate Report

Estimate Name: **Untitled**

Building Type:	**Hospital, 4-8 Story with Precast Concrete Panels With Exposed Aggregate / R/Conc. Frame**
Location:	TAMPA, FL
Stories Count (L.F.):	**5.00**
Stories Height	**12.67**
Floor Area (S.F.):	**117,569.00**
LaborType	**Union**
Basement Included:	No
Data Release:	**Year 2010 Quarter 3**
Cost Per Square Foot	**$214.98**
Total Building Cost	**$25,274,500**



Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.

		% of Total	Cost Per SF	Cost
A Substructure		**2.3%**	**4.61**	**$542,000**
A1010	**Standard Foundations**		**2.69**	**$316,500**
	Strip footing, concrete, reinforced, load 44.0 KLF, soil bearing capacity 6 KSF, 24" deep x 96" wide			
	Spread footings, 3000 PSI concrete, load 400K, soil bearing capacity 6 KSF, 8' - 6" square x 27" deep			
	Spread footings, 3000 PSI concrete, load 500K, soil bearing capacity 6 KSF, 9' - 6" square x 30" deep			
	Spread footings, 3000 PSI concrete, load 600K, soil bearing capacity 3 KSF, 16' - 0" square x 35" deep			
	Spread footings, 3000 PSI concrete, load 600K, soil bearing capacity 6 KSF, 10' - 6" square x 33" deep			
	Spread footings, 3000 PSI concrete, load 800K, soil bearing capacity 3 KSF, 18' - 0" square x 39" deep			
A1030	**Slab on Grade**		**1.38**	**$162,000**
	Slab on grade, 6" thick, light industrial, reinforced			
A2010	**Basement Excavation**		**0.03**	**$3,500**
	Excavate and fill, 30,000 SF, 4' deep, sand, gravel, or common earth, on site storage			
A2020	**Basement Walls**		**0.51**	**$60,000**
	Foundation wall, CIP, 4' wall height, direct chute, .148 CY/LF, 7.2 PLF, 12" thick			
B Shell		**19.6%**	**38.71**	**$4,551,000**
B1010	**Floor Construction**		**17.20**	**$2,022,000**
	Cast-in-place concrete column, 20" square, tied, 600K load, 12' story height, 394 lbs/LF, 4000PSI			
	Waffle slab, cast-in-place concrete, 12" deep rib, 18" column, 30'x30' bay, 75 PSF superimposed load, 204 PSF tota			
B1020	**Roof Construction**		**3.90**	**$458,000**
	Floor, concrete, beam and slab, 35'x35' bay, 40 PSF superimposed load, 16" deep beam, 14" slab, 174 PSF total loa			
B2010	**Exterior Walls**		**11.06**	**$1,300,000**
	Exterior wall, precast concrete, flat, 8" thick, 10' x 10', white face, 2" rigid insulation, low rise			
B2020	**Exterior Windows**		**4.55**	**$535,500**
	Windows, aluminum, sliding, insulated glass, 5' x 3'			
B2030	**Exterior Doors**		**0.65**	**$76,500**
	Door, aluminum & glass, with transom, full vision, double door, hardware, 6'-0" x 10'-0" opening			
	Door, aluminum & glass, with transom, non-standard, double door, hardware, 6'-0" x 10'-0" opening			
	Door, steel 18 gauge, hollow metal, 1 door with frame, no label, 3'-0" x 7'-0" opening			

		% of Total	Cost Per SF	Cost
B3010	**Roof Coverings**		**1.33**	**$156,500**
	Roofing, single ply membrane, reinforced, PVC, 48 mils, fully adhered, adhesive			
	Insulation, rigid, roof deck, composite with 2" EPS, 1" perlite			
	Roof edges, aluminum, duranodic, .050" thick, 6" face			
	Flashing, copper, no backing, 16 oz, < 500 lbs			
B3020	**Roof Openings**		**0.02**	**$2,500**
	Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 3'-0", galvanized steel, 165 lbs			
C Interiors		**21.5%**	**42.60**	**$5,008,000**
C1010	**Partitions**		**6.75**	**$794,000**
	Metal partition, 5/8" vinyl faced gypsum board face, 5/8"fire rated gypsum board base, 3-5/8" @ 24",s ame opposite			
	Gypsum board, 1 face only, 5/8" with 1/16" lead			
C1020	**Interior Doors**		**11.03**	**$1,297,000**
	Door, single leaf, kd steel frame, hollow metal, commercial quality, flush, 3'-0" x 7'-0" x 1-3/8"			
	Door, single leaf, kd steel frame, metal fire, commercial quality, 3'-0" x 7'-0" x 1-3/8"			
C1030	**Fittings**		**0.96**	**$113,000**
	Partitions, hospital curtain, ceiling hung, poly oxford cloth			
C2010	**Stair Construction**		**1.26**	**$148,500**
	Stairs, steel, cement filled metal pan & picket rail, 12 risers, with landing			
C3010	**Wall Finishes**		**6.76**	**$794,500**
	Glazed coating			
	Painting, interior on plaster and drywall, walls & ceilings, roller work, primer & 2 coats			
	Vinyl wall covering, fabric back, medium weight			
	Ceramic tile, thin set, 4-1/4" x 4-1/4"			
C3020	**Floor Finishes**		**9.10**	**$1,069,500**
	Composition flooring, epoxy terrazzo, maximum			
	Terrazzo, maximum			
	Vinyl, composition tile, maximum			
	Tile, ceramic natural clay			
C3030	**Ceiling Finishes**		**6.73**	**$791,500**
	Plaster ceilings, 3 coat prl, 3.4# metal lath, 3/4" crc, 12"OC furring, 1-1/2" crc, 36" OC support			
	Acoustic ceilings, 3/4"mineral fiber, 12" x 12" tile, concealed 2" bar & channel grid, suspended support			
D Services		**47.5%**	**94.06**	**$11,059,000**
D1010	**Elevators and Lifts**		**6.63**	**$779,000**
	Traction, geared hospital, 6000 lb, 6 floors, 12' story height, 2 car group, 200 FPM			
D2010	**Plumbing Fixtures**		**11.67**	**$1,371,500**
	Water closet, vitreous china, bowl only with flush valve, wall hung			
	Urinal, vitreous china, wall hung			
	Lavatory w/trim, wall hung, PE on CI, 19" x 17"			
	Kitchen sink w/trim, raised deck, PE on CI, 42" x 21" dual level, triple bowl			
	Laundry sink w/trim, PE on CI, black iron frame, 48" x 21" double compartment			
	Service sink w/trim, PE on CI,wall hung w/rim guard, 22" x 18"			
	Bathtub, recessed, PE on CI, mat bottom, 5'-6" long			
	Shower, stall, baked enamel, terrazzo receptor, 36" square			
	Water cooler, electric, wall hung, wheelchair type, 7.5 GPH			
D2020	**Domestic Water Distribution**		**6.95**	**$817,500**
	Electric water heater, commercial, 100< F rise, 1000 gal, 480 KW 1970 GPH			
D2040	**Rain Water Drainage**		**0.52**	**$61,000**
	Roof drain, CI, soil,single hub, 5" diam, 10' high			
	Roof drain, CI, soil,single hub, 5" diam, for each additional foot add			
D3010	**Energy Supply**		**3.43**	**$403,500**

		% of Total	Cost Per SF	Cost
	Hot water reheat system for 200,000 SF hospital			
D3020	**Heat Generating Systems**		**0.38**	**$45,000**
	Boiler, electric, steel, steam, 510 KW, 1,740 MBH			
D3030	**Cooling Generating Systems**		**2.71**	**$318,500**
	Chiller, reciprocating, water cooled, standard controls, 100 ton			
	Chiller, reciprocating, water cooled, standard controls, 150 ton			
	Chiller, reciprocating, water cooled, standard controls, 200 ton			
D3090	**Other HVAC Systems/Equip**		**32.14**	**$3,778,500**
	Ductwork for 200,000 SF hospital model			
	Boiler, cast iron, gas, hot water, 2856 MBH			
	Boiler, cast iron, gas, hot water, 320 MBH			
	AHU, rooftop, cool/heat coils, VAV, filters, 5,000 CFM			
	AHU, rooftop, cool/heat coils, VAV, filters, 10,000 CFM			
	AHU, rooftop, cool/heat coils, VAV, filters, 20,000 CFM			
	VAV terminal, cooling, hot water reheat, with actuator / controls, 200 CFM			
	AHU, rooftop, cool/heat coils, VAV, filters, 30,000 CFM			
	Roof vent. system, power, centrifugal, aluminum, galvanized curb, back draft damper, 1500 CFM			
	Roof vent. system, power, centrifugal, aluminum, galvanized curb, back draft damper, 2750 CFM			
	Commercial kitchen exhaust/make-up air system, rooftop, gas, 5000 CFM			
	Plate heat exchanger, 400 GPM			
D4010	**Sprinklers**		**2.56**	**$300,500**
	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 10,000 SF			
	Wet pipe sprinkler systems, steel, light hazard, each additional floor, 10,000 SF			
	Standard High Rise Accessory Package 8 story			
D4020	**Standpipes**		**0.57**	**$67,500**
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, 1 floor			
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, additional floors			
	Cabs, hose rack assembly, & extinguisher, 2-1/2" x 1-1/2" valve & hose, steel door & frame			
	Alarm, electric pressure switch (circuit closer)			
	Escutcheon plate, for angle valves, polished brass, 2-1/2"			
	Fire pump, electric, with controller, 5" pump, 100 HP, 1000 GPM			
	Fire pump, electric, for jockey pump system, add			
	Siamese, with plugs & chains, polished brass, sidewalk, 4" x 2-1/2" x 2-1/2"			
	Valves, angle, wheel handle, 300 lb, 2-1/2"			
	Cabinet assembly, includes. adapter, rack, hose, and nozzle			
D5010	**Electrical Service/Distribution**		**6.06**	**$713,000**
	Service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4 wire, 120/208 V, 2000 A			
	Feeder installation 600 V, including RGS conduit and XHHW wire, 2000 A			
	Switchgear installation, incl switchboard, panels & circuit breaker, 2000 A			
D5020	**Lighting and Branch Wiring**		**14.61**	**$1,718,000**
	Receptacles incl plate, box, conduit, wire, 20 per 1000 SF,2.4 W per SF, with transformer			
	Wall switches, 5.0 per 1000 SF			
	Miscellaneous power, 1.2 watts			
	Central air conditioning power, 4 watts			
	Motor installation, three phase, 460 V, 15 HP motor size			
	Motor feeder systems, three phase, feed to 200 V 5 HP, 230 V 7.5 HP, 460 V 15 HP, 575 V 20 HP			
	Fluorescent fixtures recess mounted in ceiling, 0.8 watt per SF, 20 FC, 5 fixtures @32 watt per 1000 SF			
D5030	**Communications and Security**		**1.96**	**$231,000**
	Communication and alarm systems, fire detection, addressable, 100 detectors, includes outlets, boxes, conduit and			
	Fire alarm command center, addressable with voice, excl. wire & conduit			

		% of Total	Cost Per SF	Cost
	Internet wiring, 8 data/voice outlets per 1000 S.F.			
D5090	**Other Electrical Systems**		**3.87**	**$454,500**
	Generator sets, w/battery, charger, muffler and transfer switch, diesel engine with fuel tank, 100 kW			
	Generator sets, w/battery, charger, muffler and transfer switch, diesel engine with fuel tank, 400 kW			
	Uninterruptible power supply with standard battery pack, 15 kVA/12.75 kW			
E Equipment & Furnishings		**9.0%**	**17.88**	**$2,102,500**
E1020	**Institutional Equipment**		**13.58**	**$1,596,500**
	Architectural equipment, laboratory equipment glassware washer, distilled water, economy			
	Architectural equipment, sink, epoxy resin, 25" x 16" x 10"			
	Architectural equipment, laboratory equipment eye wash, hand held			
	Fume hood, complex, including fixtures and ductwork			
	Architectural equipment, medical equipment sterilizers, floor loading, double door, 28"x67"x52"			
	Architectural equipment, medical equipment, medical gas system for large hospital			
	Architectural equipment, kitchen equipment, commercial dish washer, semiautomatic, 50 racks/hr			
	Architectural equipment, kitchen equipment, food warmer, counter, 1.65 KW			
	Architectural equipment, kitchen equipment, kettles, steam jacketed, 20 gallons			
	Architectural equipment, kitchen equipment, range, restaurant type, burners, 2 ovens & 24" griddle			
	Architectural equipment, kitchen equipment, range hood, including CO2 system, economy			
	Special construction, refrigerators, prefabricated, walk-in, 7'-6" high, 6' x 6'			
	Architectural equipment, darkroom equipment combination, tray & tank sinks, washers & dry tables			
E1090	**Other Equipment**		**0.00**	**$0**
E2020	**Moveable Furnishings**		**4.30**	**$506,000**
	Furnishings, hospital furniture, patient wall system, no utilities, deluxe , per room			
F Special Construction		**0.0%**	**0.00**	**$0**
G Building Sitework		**0.0%**	**0.00**	**$0**
Sub Total		**100%**	**$197.86**	**$23,262,500**
Contractor's Overhead & Profit		**2.5%**	**$4.95**	**$581,500**
Architectural Fees		**6.0%**	**$12.17**	**$1,430,500**
User Fees		**0.0%**	**$0.00**	**$0**
Total Building Cost			**$214.98**	**$25,274,500**

Appendix C – D4 Cost Reports

St. Joseph's NICU Project Parameters	
Case Number	002
Project Name	St. Joe's Thesis
Project Cost	12990928
Site Size	0
Building Use	Medical
Bid Date	8/1/1993
Num Floors	5
Read Only	False
Historic	False
Base Month	Aug
Base Year	1993
Base Location	FL - West Palm Beach
Projected Month	Apr
Projected Year	2010
Projected Location	FL - Tampa
Building Size	117569
Auto Calc	True
Num Buildings	1
Project Height	90
1st Floor Height	12.67
1st Floor Size	34192
Foundation	CON
Exterior Wall	PRE
Interior Wall	GYP
RoofType	MEM
Floor Type	VCT
Project Type	ADD/REN

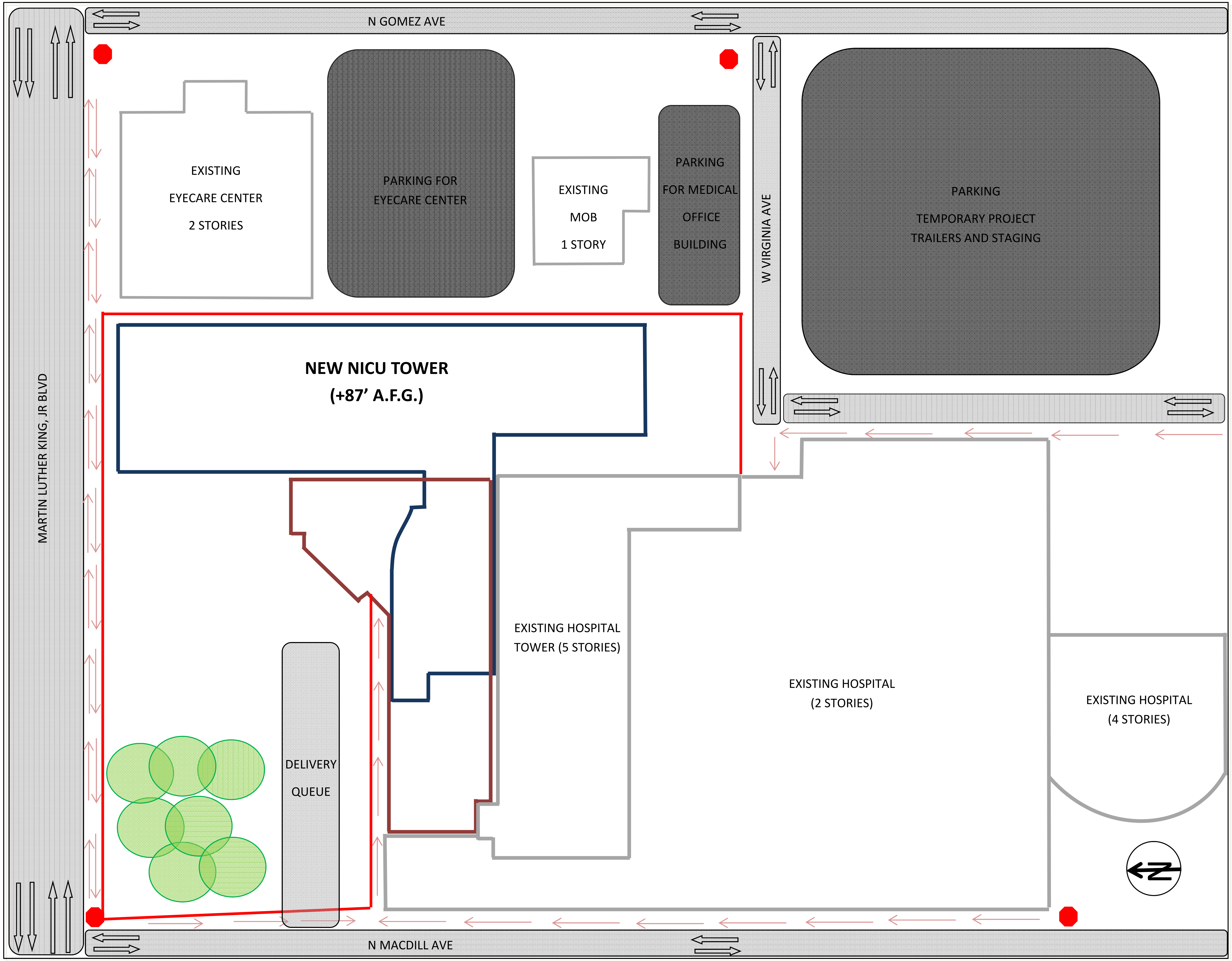
Building Costs

Code	Division Name	%	Sq. Cost	Projected
01	General Requirements	1.40	2.88	338,712
	Field Engineering	1.40	2.88	338712.26
03	Concrete	19.31	39.73	4,670,636
	Concrete	19.31	39.73	4670635.98
05	Metals	5.45	11.21	1,317,486
	Metals	5.45	11.21	1317485.96
06	Wood & Plastics	6.99	14.38	1,690,955
	Architectural Woodwork	2.46	5.07	595569.31
	Rough Carpentry	4.53	9.32	1095385.64
07	Thermal & Moisture Protection	6.86	14.12	1,659,630
	Exterior Wall Assemblies	2.38	4.89	575035.90
	Fireproofing	0.63	1.29	152242.90
	Firestopping	1.71	3.51	412650.15
	Joint Sealers	0.46	0.94	110301.84
	Membrane Roofing	1.69	3.48	409398.88
08	Doors & Windows	5.76	11.85	1,392,955
	Glazing	2.88	5.92	696477.66
	Hardware	2.40	4.95	581491.36
	Special Windows	0.48	0.98	114986.30
09	Finishes	13.20	27.17	3,194,435
	Carpet	0.63	1.29	151831.38
	Gypsum Board	7.94	16.34	1921578.62
	Painting	1.26	2.59	304094.75
	Special Ceiling Surfaces	1.89	3.89	456882.27
	Stone Flooring	1.49	3.06	360048.25
14	Conveying Systems	0.34	0.69	81,548
	Conveying Systems	0.34	0.69	81548.10
15	Mechanical	30.13	62.01	7,289,968
	Mechanical	30.13	62.01	7289967.78
16	Electrical	10.57	21.75	2,557,427
	Communications	0.34	0.70	81961.67
	Electrical	10.23	21.06	2475464.83
	Total Building Costs	100.00	205.78	24,193,752

Non-Building Costs

Code	Division Name	%	Sq. Cost	Projected
02	Site Work	100.00	0.00	1,058,417
	Landscaping	39.04	0.00	413223.61
	Paving & Surfacing	60.96	0.00	645193.28
	Total Non-Building Costs	100.00	0.00	1,058,417

Appendix D – Site Logistics Plan



St. Joseph's Women's Hospital

NICU Expansion

3030 W. Martin Luther King, Jr. Blvd.

Tampa, FL 33607

Dennis Gibson—CM

Dr. Robert Leicht

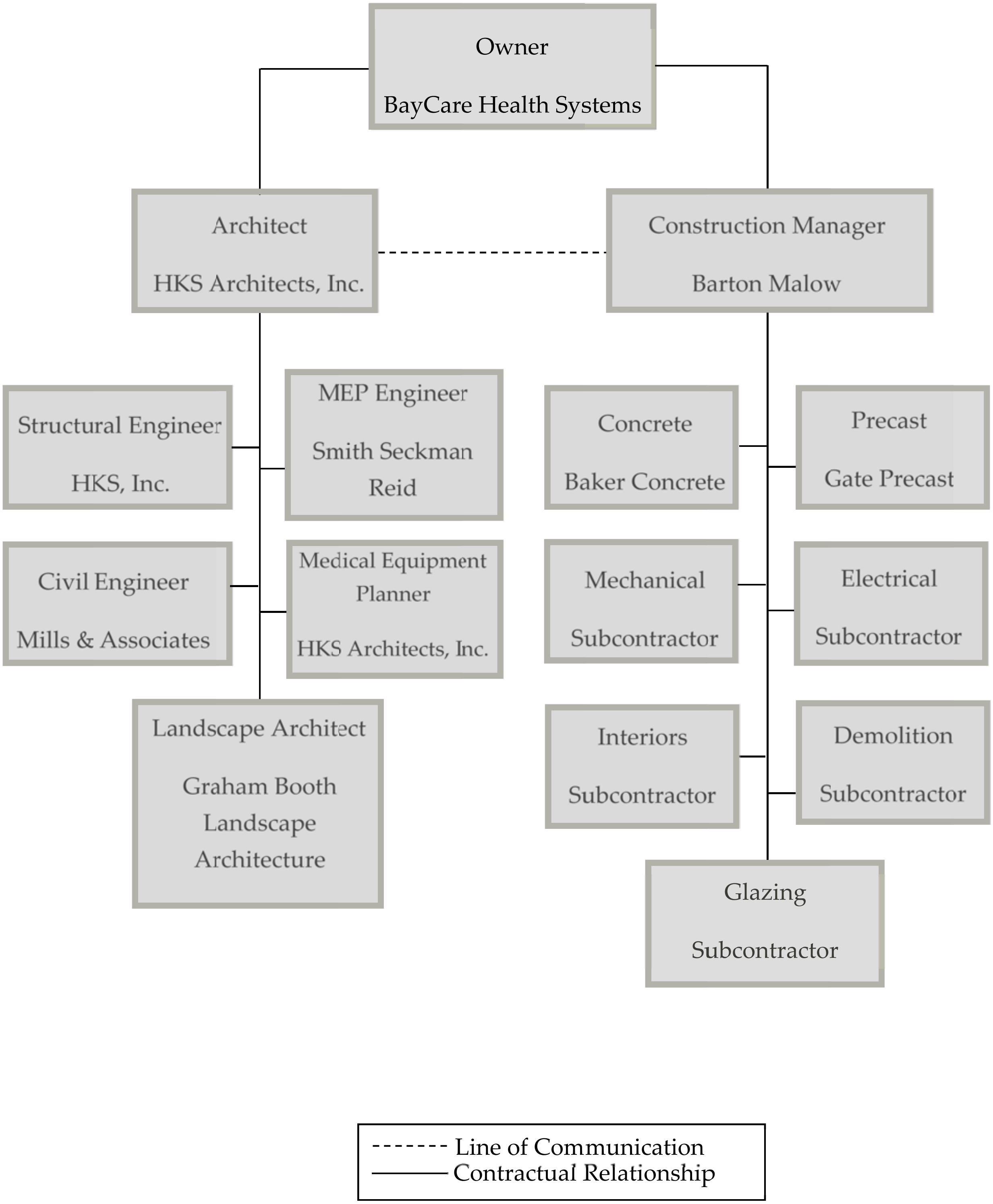
- Pedestrian Traffic
- Construction Fencing
- Fire Hydrant
- Parking Lot
- Roadway
- Trees
- Structure to be Demolished
- Structure to Remain
- New Construction

Site Logistics Plan

SLP-01

Appendix E – Project Delivery Organizational Chart

St. Joseph's NICU Project Delivery Team



Appendix F – Barton Malow Staffing Plan