3.0 Existing Conditions

3.1 Architectural Description

The site the new medical center will sit on is sloped creating the first level to be below grade on one side of the building and on grade on the opposite side. The second level adds the administrative wing, or the "link", to the building footprint (See Appendix A for footprint reference plan). The link will attach directly into the existing Robinwood building creating a flow between the two facilities. The second level also carries the main part of the building through it. The link and the patient bed towers continue to the third level where the link stops and the three bed towers continue two more levels creating the main vertical elements of the building.

The building consists of three different types of veneer; brick, precast architectural panels, and exterior glazing. The brick is mainly located on the link to the existing facility and various other lower levels of the medical center. The precast panels are primarily located on the patient bed towers with the exterior glazing spread throughout all sections of the building. A typical wall cavity is used behind these veneers. It consists of rigid steel framing supported by the steel structure.

The roof system throughout all areas of the medical center is fairly consistent. It is made up of a ballasted single ply roof membrane on rigid insulation, all of which sits on metal roof deck supported by the steel structure. The roof also contains a helipad for the transportation and reception of patients flown by helicopter. This particular section of the roof is a 4" concrete slab on rigid insulation with a reinforced hot applied membrane as the cover. Also, a small section of the building contains a standing seam metal roof on rigid insulation and oriented strand board. This is located over the religious services section of the building and provides a distinct difference in the appearance to create a visually separate space.

3.2 Zoning and Codes

Zoning:

- Hospital: Use Group I-2 (Institutional Hospital)
- Administration Wing: Group B (Business)
- Industrial (Power Plant, Laundry, and Waste Holding): Use Group F-1 (Industrial)

Applicable Codes:

- 2003 International Building Code (IBC) (For total building except seismic design)
- 2006 International Building Code (IBC) (For seismic design)
- 2003 International Mechanical Code
- 2003 International Plumbing Code
- 2005 National Electric Code

- Maryland Accessibility Code
- Maryland Energy Code
- COMAR (Codes of Maryland) 10.07.01 Acute General Hospitals & Special Hospitals
- NFPA 101 2000 Life Safety Code

3.3 Insurance and Bonding

This project, unlike many, had no requirements for subcontractors to be bonded. Instead, the CM replaced several subcontractor bonds with their own Contractor Default Insurance (CDI). This insurance covers all the subcontractors and protects the CM if a subcontractor defaults on their contract. The benefits of the CDI is, if a subcontractor defaults on a contract, then the CM does not have to fight with surety companies for the money to cover the default. The CDI that the CM carries will immediately pick this up and hopefully allow for a smoother and more efficient solution to the problem so the project can continue to completion. The CDI only covers defaulting subcontractors. Therefore, the subcontractors must carry their own builder's risk and general liability insurance. The CM also carries both of these as an umbrella over the subcontractors and, as a final precaution, the owner also has both insurances.

3.4 Building Systems Summary

The following table, Table 3.1, and written information describe the main building systems of the medical center. The information describes the key design and construction issues of the project.

Table 3.1: Building Systems Summary

Work Scope Questions	Medical Center	
	Yes	No
Is Demolition Required?	**X**	
Is there a Structural Steel Frame?	**X**	
Is there Cast in Place Concrete?	**X**	
Is Precast Concrete used?	**X**	
Describe Mechanical System	**n/a**	**n/a**
Describe Electrical System	**n/a**	**n/a**
Is Masonry used?	**X**	
Is there a Curtain Wall?	**X**	
What supports the Excavation?	**n/a**	**n/a**

3.4.1 Demolition

There is very little demolition for this building since it is new construction on an empty site. With the new construction, a new information technologies (IT) room must be built. The existing Robinwood Medical Center adjacent to the new hospital has a room in the basement

that will be converted into an IT room for use by both the new medical center and the existing Robinwood complex. This room will need some interior partition demolition to convert it to an open IT room with an office and a bathroom.

3.4.2 Structural Steel Frame

The structural system is comprised of a steel frame of wide flange columns and beams. There are not too many typical sizes of steel because of the unique design; however, the bed towers are comprised mainly of three different sections. They are W21x44, W18x35, and W12x16. Some typical sizes throughout the other sections of building are W16x31, W14x22, and W16x26. There are also other areas of the building that use hollow steel sections for miscellaneous steel framing. There are two different primary bracing systems used in the steel frame. The first is a vertical chevron style brace. This style of bracing is used in the highest sections of the building that extend from the foundation through the vertical elements of the stair towers. The other type of bracing is a form of cross bracing. This type of brace has two elements. The first beam extends one full diagonal of the frame while a second only goes from one corner to the midpoint of the full diagonal piece.

The structural steel will be erected with two different cranes. A 300 ton crawler crane will erect the three bed towers in the first three sequences. For the next sequences a smaller, 150 ton crawler crane will be used. This will allow the steel erector to get rid of the larger, more expensive crane and switch to a smaller, less expensive crane to finish the erection.

3.4.3 Cast in Place Concrete

All the structural concrete on the project will be cast in place. These items include the foundation walls, footings, grade beams, and the slab on grade and slab on decks. A steel formwork system is used for foundation walls and a stick-built plywood forming system is used for the footings and grade beams. The decks are formed using the composite metal decking with shoring on the deck below. The edges and pour stops are formed with different sizes of lumber.

The concrete for the foundation work will be placed by a crane and bucket method. A 175 ton crawler crane will be used for the concrete and will only have to make one crucial move after the initial mobilization. The same crane used to erect the forms and place the rebar cages will be used to swing the concrete to the proper place.

3.4.4 Precast Architectural Concrete

The precast concrete on the project only consists of architectural panels used as a façade. These panels vary in size across the building and are located primarily on the bed towers. They will be supported by the steel frame and connected to the columns with steel angles or "C" channel. A 250 ton crawler crane will be used to erect the precast panels and will have to move to complete the erection.

3.4.5 Mechanical System

The mechanical system is comprised of three different elements and they are as follows:

- Central Utility Plant (CUP)
- Two Dedicated Mechanical Rooms
- Various Roof Top Units

The CUP is located in the service section of the building (first floor, plan south; see Appendix A for reference plan). It houses two, 1000 ton chillers and two, 3000 GPM cooling towers. The area also contains three high pressure steam boilers for hot water. The CUP has various pumps for the fire protection system as well as the mechanical system. The location of the CUP allows for ease of maintenance, service, and installation of the major systems.

The first, and larger, of two dedicated mechanical rooms is located on the third floor of the south bed tower. There are three Air Handling Units (AHUs) located in this room of sizes 90,000, 100,000, and 110,000 CFM. These units serve separate sections of the building from the second through the fifth floors.

The second of two dedicated mechanical rooms is located on the first floor, (plan) west side of the building. This room holds two more AHUs of 40,000 and 90,000 CFM. These AHUs serve various sections of the first floor departments.

There are three other smaller AHUs located on different sections of the roof that serve dedicated spaces.

3.4.6 Electrical System

The electrical system starts with service to the CUP where the main feed comes into the building. The electrical service feeds three separate electrical substations in the CUP. These substations are all 13.2 kV at 480Y/277V delivering 4,000 amps. The substations feed into different switchgear which then services separate sections of the building. The CUP location, as previously discussed, allows for easy maintenance and service for all the electrical switchgear and systems located there. There is redundancy built into the electrical system with two emergency generators, at 480Y/277 delivering 2,000 amps each, supplying key areas and emergency lighting in the medical center.

The luminaries throughout the main areas of the building are fluorescent luminaries. However, there are also many different types of unique lighting in the operating rooms and other special procedures areas.

3.4.7 Masonry

The masonry on the project consists of a brick veneer. This veneer is located on the lower levels of the building and the link. The brick will be supported by the steel frame with steel

angles and will be erected with scaffolding moving around the building. It is also tied into the steel with masonry wall ties.

3.4.8 Curtain Wall

There is curtain wall on various lower portions of the building. It is an aluminum curtain wall system with ½" mullions and 1" insulated glass. Erection will start with the framing system of the curtain wall. After the frame is set, the windows are placed from the exterior of the building using an aerial platform lift. Any field modifications can then be made to the frame so the system works as a unit. The finishing caps are then placed over the framing.

3.4.9 Excavation Support

The excavation is supported by seven permanent retaining walls ranging from 1'-0" to 1'-7. The retaining walls are located at the loading docks in the service area and at an outdoor dining terrace outside the cafeteria. These walls contain no "tie-backs" into the soil. Other excavated earthwork is retained in stockpiles located on the site. Soil is retained from these other excavated areas using the slope set back tolerances specified by OSHA.

3.5 Local Conditions

3.5.1 Local Soil Conditions

The project is located just outside of the city of Hagerstown, MD. The large site allows for many freedoms when it comes to contractor parking, available lay-down areas, dumpster space, and other storage spaces. The site is underlain by the Conococheague Limestone formation and the site soil is primarily composed of silty clay, clayey silt, and silt with various amounts of sand and rock fragments. The soil located on the site takes an abnormally long time to dry out and becomes saturated easily. The subsurface testing concluded that there was no real concern with subsurface water condition because the test borings performed without rock coring were dry both during drilling and at the completion of the drilling operations.

3.5.2 Special Local Site Conditions

The site contains several sinkholes from previous construction projects including the existing Robinwood Medical Center. One significant sinkhole was noted and not remedied previously due to an abandoned project and the hole was subsequently filled. The sinkholes could cause problems if not handled properly; however, the sinkholes are not under the proposed building footprint and can easily be fixed. Therefore, no extra bearing foundation systems were developed to handle these areas.

As stated previously in the report, the new medical center will be joining an existing outpatient procedures building. This facility will continue to serve the community during construction.

Many considerations need to be taken when working this close to an active medical establishment.

3.5.3 Local Weather Conditions

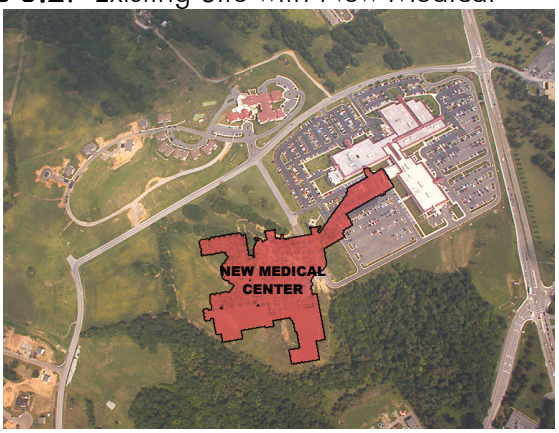
The weather conditions have a big impact on any construction project. Hagerstown Maryland is located in the northeast region of the United States and experiences hot and humid summers and moderately cold winters. Hagerstown averages 37.2 inches in rainfall and 21 inches of snowfall a year. The yearly average high is 64°F and the yearly average low is 43°F.

3.6 Site Plan of Existing Conditions

The new location for the Washington County Regional Medical Center has a site that is large and very open which will allow for adequate laydown area, storage, parking, and many other luxuries a tight, congested site can not have. The following two figures, Figure 3.1 and Figure 3.2, show aerial photographs of the existing site. Included are the Robinwood Medical Center and its existing parking lots. Figure 3.2 has a superimposed footprint of the new medical center on it to show the relationship of the site, the medical center, and the existing facility.

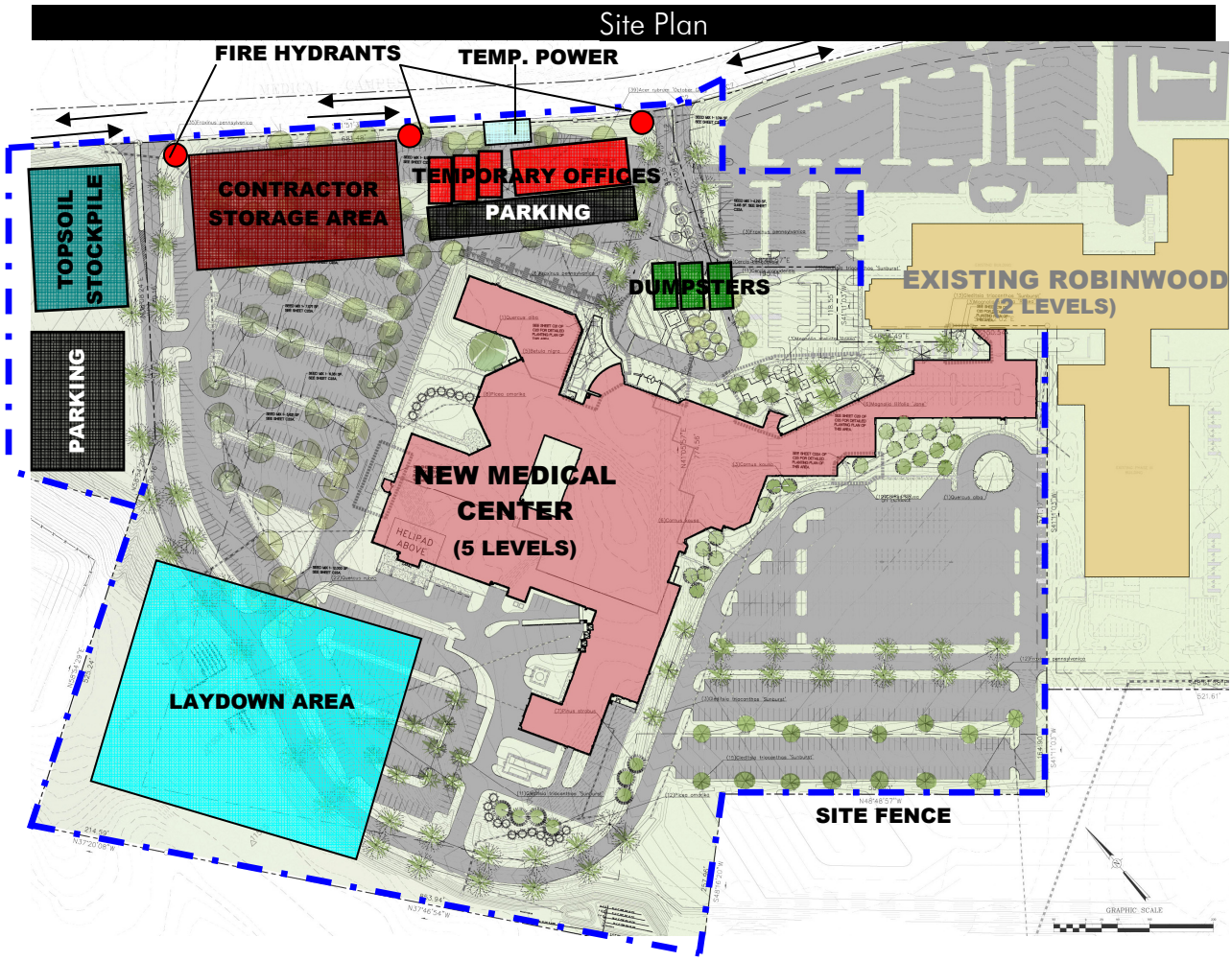
Figure 3.1: Existing Site

Figure 3.2: Existing Site with New Medical



The drawing over page, Figure 3.3, shows a site utilization plan, finished site plan, and an existing site plan all overlaid on each other. Temporary facilities, parking, and site waste are only a few of the things to consider when planning for construction on the site. Also make note of the existing Robinwood Medical Center and where the new medical center will tie into this outpatient facility.

Figure 3.3: Site Plan



3.7 Site Logistics Plans

The site logistics plans created, as shown in Appendix B, are a combination of a final site layout and a site logistics plan. This is useful to show the relationship of each item relative to the final landscaping and site plan.

3.7.1 Common Items

As previously stated, the site is very open; therefore, many temporary facilities, storage areas, and other items do not have to move through out construction. Traffic around the site will need to be maintained throughout construction for Robinwood employees; thus, traffic patterns will not change or be affected. The following is a list of such items that are common among all the logistics plans.

- All temporary offices
- Majority of site fencing
- Contractor parking
- Office parking
- Topsoil stockpile
- Dumpsters
- Contractor storage area
- Fire hydrants
- Toilets
- Entries
- Temporary power and sewer connections

3.7.2 Foundation Site Logistics Plan

The foundation site logistics plan shows many key features of the foundation construction. Included with the aforementioned common items, are components related to the crucial deep foundation and foundation wall work. These items are on site simultaneously, but are not performed by the same contractor. The plan shows a 175 ton crawler crane used by the concrete contractor as they begin their work on the foundation walls below the South Tower and progressing toward the Service Area. The deep foundation drilling rigs are also shown as they do work on the caissons that support the three large bed towers. There is also space shown for each contractor to store their materials to be used.

3.7.3 Superstructure Site Logistics Plan

The superstructure site logistics plan mainly shows the work of the steel contractor because the steel is vital to the project schedule at this point of construction. Two cranes are shown. The large crane, a 300 ton crawler crane, is shown twice since it will have to make a critical move during erection. A smaller, 150 ton crawler crane that will be used after the large steel of the towers is erected, is also shown. This will be used to erect the remaining parts of the building so the larger, more expensive crane, can be removed from the site. The other interesting feature of this site plan is the road that has been developed around the majority of the building. This allows for access to all parts of the erection sequence.

3.7.4 Interiors / Finishes Site Logistics Plan

The interiors/finishes site logistics plan has a few additions to help complete the building. A trash chute and material hoist have been added. Also, laydown area for the mechanical contractor and the temporary heating system has been sectioned off near the service area of the building. There is also extra storage space in the north end of the building as well as near the hoist and trash chute.