# Saint Mary's Hospital

# Strategic Facility Master Plan: Final Report

# Overview of the Facility Master Plan Process

In April 2013, Saint Mary's Health System (SMHS) commissioned FreemanWhite to assist in the development of a Strategic Facility Master Plan for its main campus. Facilities included in this Study were the Saint Mary's Hospital (SMH), as well as the adjacent Holiday Inn campus.

FreemanWhite's comprehensive Strategic Facility Master Plan is composed of strategic, operational, and facility elements. The Planning Team was tasked to provide strategic, operational, and facility recommendations for each of the sites based on the community's needs and competitive market, projected future utilization, and the strategic goals and initiatives of the overall Saint Mary's Health System. These assumptions were used as the basis in which to distribute service line components and their associated facility recommendations. FreemanWhite used historical and projected volume and utilization trends to develop recommended strategic and facility initiatives.

Representatives from FreemanWhite used a team approach to the master planning process. The team focused on SMH's strategic priorities, tested these priorities using data driven models, produced alternative options and developed a focused scope of facility responses for each of the various sites. The options were refined and synthesized into the most appropriate solutions in order to meet financial feasibility estimates within SMHS' capital expectations. Although some of the recommendations still depend on external factors such as financial viability and the timing of capital funds, consensus was obtained from Administration regarding the overall strategic direction of the Strategic Facility Master Plan and the physical ramifications to the campus.

# Overview of the Facility Master Plan Process (continued)

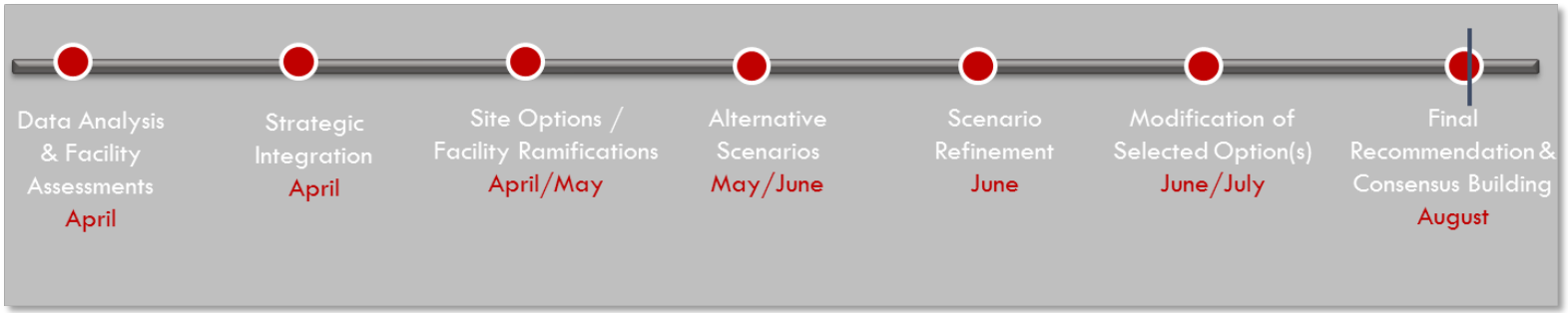
The overall process took approximately five months from initiation and included five focused on-site visits, outside of various Administrative presentations or conference calls.

The master planning process was comprised of four primary phases:

| Phase | | Description |
|---|---|---|
| Phase 1 | Baseline Assessment: Preplanning and Analysis for 2013 through 2023 | FCA, site & departmental assessment, historical volumes & throughput |
| Phase 2 | Initiate the Future: Define Best Practices | Projected departmental volumes & throughput & scenario planning |
| Phase 3 | Roadmap: Development of Master Plan | Option development and refinement |
| Phase 4 | Final Plan Development | Final recommendations |

# Overview of the Facility Master Plan Process (continued)

## Planning Process & Timeline (April – August 2013)




### Short -Term Plan

Next 24 months

Goal:

- Addressing the 'burning platforms'
- Priorities based approach as determined by Decision Matrix and fiscal capacity.

### Intermediate Plan

2015 - 2018

Goals:

- Short-Term Plan assumptions as baseline for the FMP's strategies
- Focused on top strategic priorities within the established fiscal limitations
- Interim option with an eye toward investment in the long-term vision

### Long-Term Vision

2019 - 2023

Goals:

- Plan for long-term reconfiguration and market success based on community need
- Create a flexible platform for growth to accommodate future new initiatives
- Implement as many of the strategic initiatives as necessary for success

# Overview of the Facility Master Plan Process (continued)

One of the first steps was to conduct a Facilities Conditions Assessment (FCA), which provided the foundation from which to develop corresponding infrastructure recommendations. The FCA phase was performed for Saint Mary's in order to evaluate existing infrastructure and estimate renewal or replacement costs based on perceived risk of failure and criticality to business continuity for each location.

Concurrent with the FCA investigation, the FMP team conducted an assessment of the hospital's existing conditions and facility operations. Baseline impressions from strategic, facilities, operational, as well as demographic and data perspectives, were reviewed. The Planning Team developed future utilization projections that informed potential Strategic Facility Master Plan options and projects. These criteria were based on a number of strategic, operational and facility initiatives, including the following:

- Maximize community hospital experience on the compact and urban site
- Consider smart demolition for maximum efficiency
- Consider the functionality of inpatient units with modern day care practices
- Determine highest and best use of facilities, particularly the Holiday Inn site
- Maintain energy/warmth/image at the front door
- Consider campus repositioning and right sizing within health care reform era
- Challenge of using existing capacity to solve future space needs
- Maximize ED space, with lean operations and right patient placement

As options were developed, high level schedules and cost estimates were prepared to assist in the Steering Committee's evaluation of the options relative to capital availability.

# System Service Line Distribution

As healthcare has continued to evolve with limited capital resources, service line distribution among health systems has become an essential component of the master planning process. Coupled with inpatient and outpatient market demand projections, the Planning Team was able to estimate anticipated service development and distribution across a few of their key service lines using a number of tools that provided rapid decision-making and prioritization of service line programs for the main campus as it relates to its on-campus ambulatory facilities. The process was based on multiple local impact factors including existing and future capacity, population projections, market demand forecasts, market share initiatives, payor mix, and anticipated healthcare utilization trends particularly in the era of reform.

Utilization projections for specific service areas were set up to reflect market specific dynamics of each service line and included volume projections based on service line analyses for Inpatient, ED, ORs, Imaging, and Cath Labs. These market projections, relative to healthcare reform and the industry's increasing push towards ambulatory environments, were the basis for projecting future facility needs for SMH and were utilized by the Planning Team to set up the strategic forecast for prioritization of facility projects and service line development from an implementation / timing perspective.

# System Service Line Distribution (continued)

In consultation with senior management, final plans for service line distribution for each department were determined based on potential market realities regarding inpatient and outpatient capacity, anticipated future reimbursement models, physician alignment, and the accessibility and timing of future capital. Once consensus was reached regarding the strategic forecast, on a global and service line level, the Planning team was then able to develop a facility response for the main hospital and its surrounding ambulatory facilities.

Due to capacity and configuration challenges present on the SMH campus, the Planning Team's most notable service line redistribution can be seen in ED and Inpatient Beds, including multiple building demolition recommendations and repurposing of the Holiday Inn site. The following slides recap the planning process, findings, and the proposed recommendations by the Planning Team for SMH.

# Key Strategic Initiatives

When the master facility planning process was initiated, the SMH Steering Committee was convened to help collect and prioritize campus, System and community needs. With Saint Mary's Hospital being a 347 licensed (188 staffed) bed community hospital in Waterbury, CT, one of the key master planning initiatives was to maintain and maximize quality of care through lean operations from a facility standpoint, as well as optimize capacity in departments with existing constraints for anticipated future volume to the highest and best use.

A few key initiatives of the Strategic Facility Master Plan include the following:

- *Put Patients First.* The primary driver for all decisions within the Master Facility Plan for the campus of Saint Mary's is the patient experience and quality of care. The Steering Committee is committed to treating the right patient, at the right time, in the right location. The evolution of the campus take into account the patient and family perspective, particularly as the needs of the patients evolve. In addition, the age of some of the Hospital units limits square footage associated with family and patient support space, and in some cases navigation for patient safety.

- *Take Care of Staff.* Saint Mary's Steering Committee is focused on maintaining and creating environments that work for the staff. The master planning process evaluated patient circulation within the departments and the impact on clinical staff. In addition, particularly in the older portions of the facility, support space was evaluated where applicable. Staff efficiency and safety is essential, particularly in the ED where patient volume is high with limited physical capacity, including a significant behavioral health population; public access points need to be secured.

# Key Strategic Initiatives (continued)

- *Create A More Efficient Footprint.* Saint Mary's Hospital is a large urban campus, with major buildings dating back to 1909. The master facility plan included an assessment of essential and non essential buildings and the potential reconfiguration of key assets. Additionally, a focus on navigating appropriate outpatients outside of the hospital, particularly the ED, would greatly improve access for outpatients in a more cost effective environment and allow for the consolidation of the remaining functions to better serve inpatients and more medically complex outpatients. This initiative would also allow the hospital to "buy back" ED space in order to reduce the amount of new, institutional construction required for incremental growth.

- *Improve Circulation and Way-finding.* The current site of the SMH campus presents challenges as it is located in an urban setting landlocked by cross streets, has multiple grade issues, including access at the front door, has multiple buildings that connect by long corridors and ramps, and has limited parking. Thus, the proposed master plan includes improving site access, circulation and parking for patients, visitors and staff where applicable.

- *Evaluate a Private Bed Model.* Due to limited capital availability and the uncertain industry forecast of future inpatient bed utilization, determining the right number of medical/surgical beds for Saint Mary's Hospital was important from a capital, efficiency and community need perspective. In addition, understanding and implementing the maximum number of private beds is a key element to the campus' redesign and positioning within the market. The need for private beds is balanced within the constraints of the building(s) and current vacant space.

# Key Strategic Initiatives (continued)

- *Reduce Overall Costs.* Aligned with creating a more efficient footprint, the Steering Committee and Planning Team understood that to be sustainable in the future, the modern health system will be required to reduce costs. With healthcare reform impacting reimbursement models and overall incentive structures, hospitals must be proactive to ensure lean operations, including moving non-essential functions out of the main campus to a more cost effective environment. The Master Plan demonstrates various strategic projects SMH can implement to reduce overall costs through alignment of low acuity patient needs with lower cost environments and through further bundling of non clinical functions off site.

# Facilities Conditions Assessment Overview

Saint Mary's Hospital engaged FreemanWhite, Inc. to perform an assessment of the built infrastructure of their campus in conjunction with the strategic facility master planning process. The purpose of this assessment was to identify and document existing engineering infrastructure conditions and capacities; document immediate capital renewal needs; identify recommended upgrades; and determine the additional infrastructure required to support a strategic facilities plan going forward. The degree of recommendations is dependent upon the age, condition, and capacity of existing infrastructure; current and intended occupancy, (e.g., acute care, research, business, outpatient); business continuity model for the occupancy; and the timeline of the strategic facilities plan. This executive summary attempts to capture the essence of that assessment. Detailed findings are attached in the Appendix of this document.

The facility assessment team spent two days documenting major components of the main building systems (chilled water, hot water, air handling units, normal power, emergency power, plumbing, medical gas, fire alarm system, etc.). This information was input into FreemanWhite's Building Symphony™ database and analyzed. The result of this analysis is a set of Facility Conditions Assessment (FCA) metrics that summarize the overall condition of the built infrastructure.

There are two main metrics use to determine the condition of a facility, the Average Age of Plant (AAP) and Facility Condition Index (FCI). The AAP is determined by averaging the ages of all the major pieces of equipment for the main building systems. This number should be around 15 years or less. AAP numbers above 25 years typically indicates a chronic lack of infrastructure

## Facilities Conditions Assessment Overview (continued)

investment or an intention to divest the asset (building). The second piece of information is the Facility Condition Index (FCI). This is determined by comparing the repair cost of a piece of equipment to its replacement cost. The index for the entire facility is a weighted average of the FCIs for all major pieces of equipment. The typical average FCI for a hospital is between 0.55 and 0.65, where 0 is new or like new and 1 indicates that the repair cost exceeds the replacement cost of the asset.

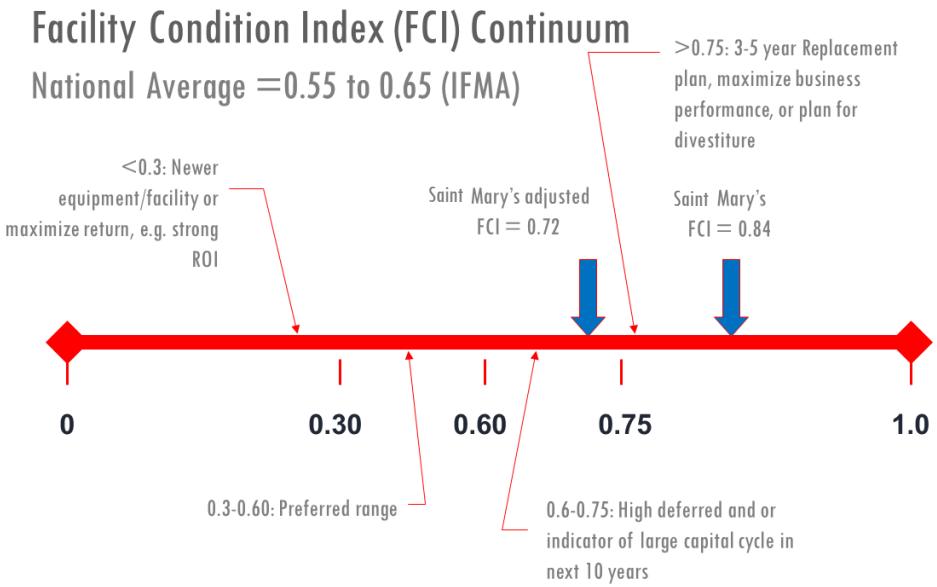
The original hospital at Saint Mary's was constructed in the early 1900s and expanded over the 20th century by adding buildings on the campus. The approximate construction dates of the buildings on campus are as follows: Slocum Building – **1909** | Xavier Building – **1922** | Sacred Heart Building – **1941** | Lawlor Building – **1953** | O'Brien Building – **1963** | Kenny Pavilion – **1982.**

Although much of the equipment that comprises the engineering systems in the facility has significant age, the equipment has been very well maintained. As a result, the life expectancy of these major systems has been extended. Through diligent maintenance efforts, anticipation of potential issues, and a concerted effort to upgrade energy inefficient systems to realize utility savings, the facility staff has achieved an impressive "bang for the buck" with their proactive approaches. However, given the age of the existing systems, failures are inevitable. As part of this assessment, we have identified and prioritized equipment that may be nearing failure, and included recommendations of how to implement upgrades and replacements as part of an overall master plan and/or part of a maintenance capital renewal investment. The following slides represent a portion of our findings; for detailed information, please see the Appendix.

# Facilities Conditions Assessment Overview (continued)

The Facility Condition Index is used to determine or establish maintenance/replacement budgets to aid in prioritizing equipment repair/replacement. The formula for determining the FCI is derived from dividing the current repair cost by the current replacement value. For example, equipment with a repair cost of $1,500 and a replacement value of $15,000 will have an FCI of 0.1. As a general rule of thumb, an FCI<0.6 can remain in service and FCI>0.6 should be targeted for replacement.

The value of the FCI for Saint Mary's is indicated in the Figure below. The "actual" value based on raw numbers is 0.84, indicating a greater portion of equipment in the facility needs replacement. However, given the extraordinary amount of quality maintenance being implemented to extend the life of the equipment, a more accurate adjusted FCI is 0.72. Even at the adjusted number, equipment replacement of major equipment is imminent.

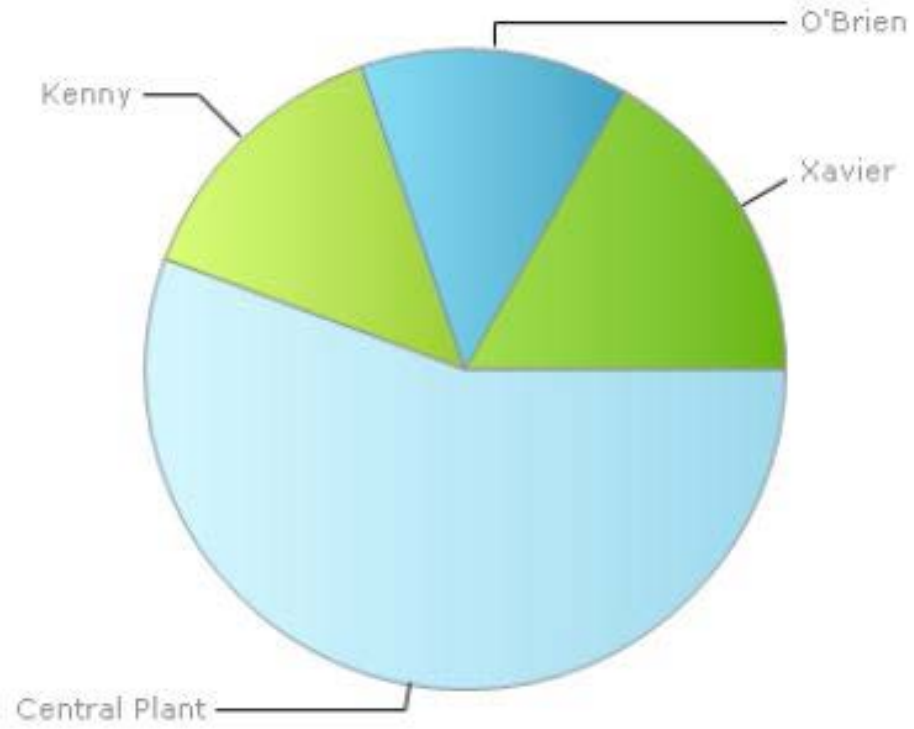


# Facilities Conditions Assessment Overview (continued)

## Deferred Maintenance

Deferred Maintenance is the total dollar amount of existing maintenance repairs and required replacements (capital renewal) of equipment that was not accomplished when they should have been because of the lack of capital. As noted in the figure below, the bulk of deferred maintenance is in the Central Plant.

*Deferred Maintenance Cost Summary by Facility*



# Facilities Conditions Assessment Overview (continued)

## Deferred Maintenance (continued)

The values of Deferred Maintenance through 2013, and for the next ten years, are noted below:

### FCA Equipment Baseline Comparison

| *Item* | *Campus Composite* | *Kenny* | *Xavier* | *O'Brien* | *Central Plant* |
|---|---|---|---|---|---|
| Total Number of Equipment Items | 151 | 24 | 27 | 39 | 61 |
| Total Replacement Value | $ 11.7M | $ 1.8M | $ 1.9M | $ 2.6M | $ 5.4M |
| Total Value of Deferred* (2013 & Prior) | $ 6.4M | $ 0.9M | $ 1.1M | $ 0.9M | $ 3.5M |
| Total Next 10 Years* (including deferred) | $ 10.2M | $ 1.6M | $ 1.3M | $ 2.1M | $ 5.2M |

# Facilities Conditions Assessment Overview (continued)

## Five Year Capital Renewal

Below is a list of prioritized capital renewal items that are recommended as part of the current master plan process. Each of these items are detailed above as part of the overall FCA.

### 5-Year Capital Renewal Baseline

| | | |
|---|---|---|
| 1 | Add Redundant Chiller | $800,000 |
| 2 | Upgrade Hospital Generator | $600,000 |
| 3 | Replace Fire Pump | $200,000 |
| 4 | Replace Old AHU (O'Brien 6th Floor) | $400,000 |
| 5 | Replace Vacuum Pump | $200,000 |
| 6 | Replace Nitrous Oxide Manifold | $25,000 |
| 7 | Replace Clean Agent Systems | $50,000 |
| 8 | Repair Chiller flow issue | $25,000 |

# Facilities Conditions Assessment Overview (continued)

## Long Term Goals

Looking forward to longer term capital infrastructure goals, there are a few recommended items that should be considered for upgrade as the overall master planning progresses in the coming years. These items include:

- Upgrading emergency power distribution to the required three branches of emergency power required by current code in areas of the hospital where they do not exist.
- Upgrading the high voltage distribution system to newer, safer equipment with appropriate clearances and implementing training for staff to be certified to operate.
- Upgrading major HVAC equipment to modern energy efficient models including high efficiency chillers, boilers, and cooling towers.
- Create a more accessible Central Plant.
- Upgrade Unit Substations to modern equipment, including replacing older automatic transfer switches with new closed transition, bypass isolation units.

# Facilities Conditions Assessment Overview (continued)

## Long Term Goals (continued)

- Replace older water piping during renovation projects or as incidents mandate.
- Upgrade medical gas systems to meet NFPA 99 requirements.
- Replace instantaneous steam water heaters.

*Closed Transition Automatic Transfer Switches with Isolation Bypass*

*Automatic Transfer Switches in Unit Substation*

# Site / Facility Existing Conditions Overview

## Saint Mary's Existing Campus – Benchmarks & Observations

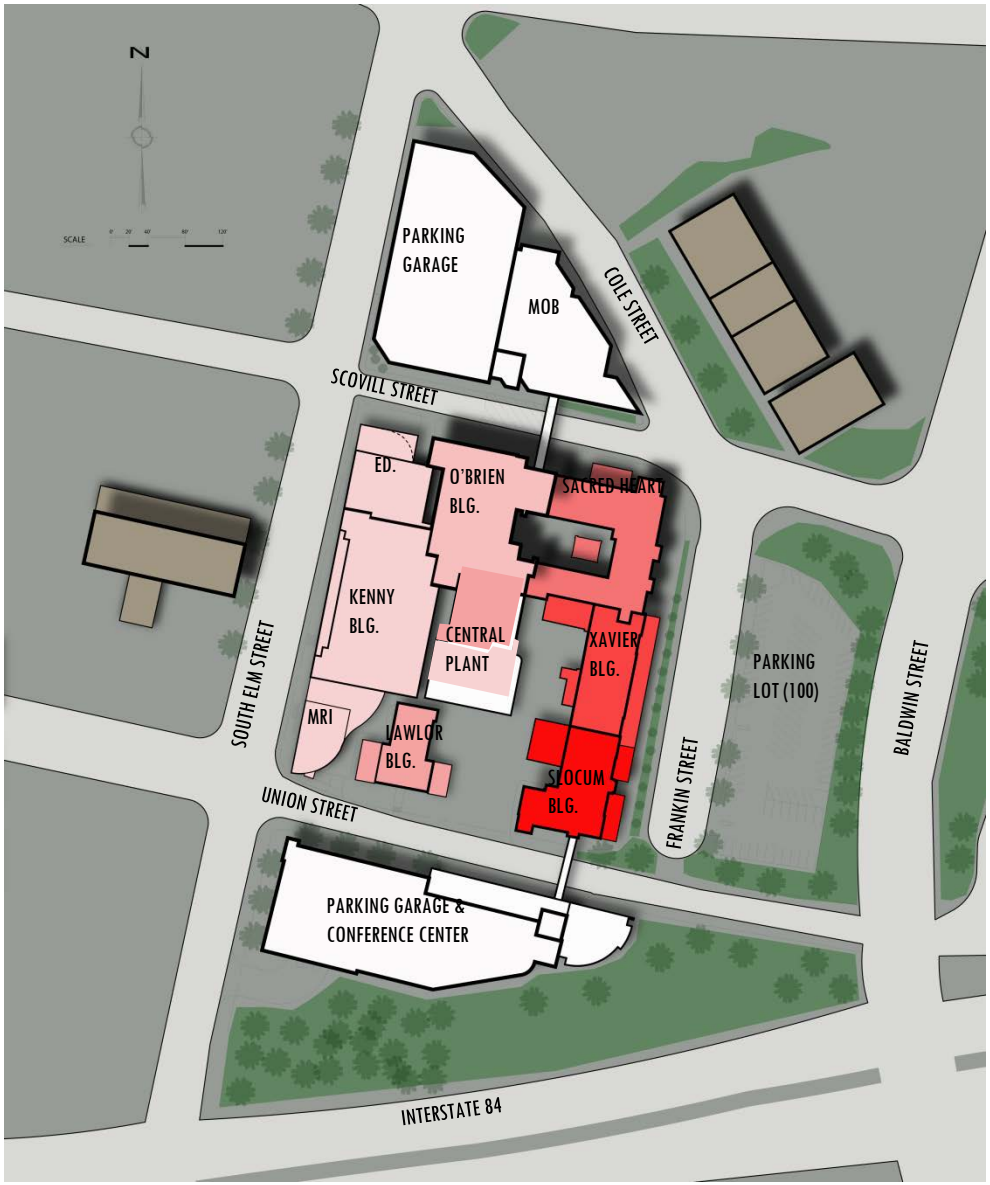
The existing campus at Saint Mary's Hospital is highly visible from Interstate 84; however it is a compact, highly urban site with limited avenues for growth. The main entrance is located on Franklin Street with limited parking and vertical circulation challenges. While limited, valet surface parking exists across the street, the majority of patients access the facility through the parking deck located on Scovill and navigate across the connecting bridge and through the facility to their destination.

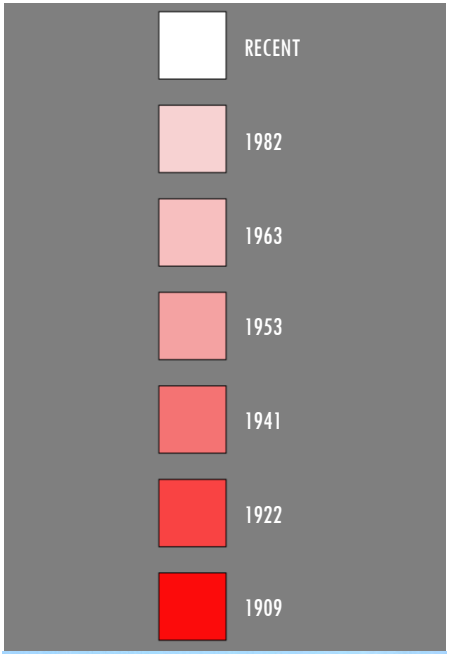
Overall the multiple entry points are challenging for patient navigation, circulation and create varying experiences upon entry into the facility. The ED access is under the Kenny building in a very tight area compounded by the presence of the ambulance entrance and turnaround; vertical circulation and access to the main front door is also a challenge from the ED, as well.

Due to the physical growth of the facility over the years, public destinations are not connected visually between floors, and access is confusing from bridge arrival sequences. Additionally the connection from O'Brien to Kenny is a challenge at multiple locations. The following slides depict these various issues and challenges across the campus and site.

# Site / Facility Existing Conditions Overview (continued)

## Site: Existing Building Dates





Sacred Heart Building

# Site / Facility Existing Conditions Overview (continued)

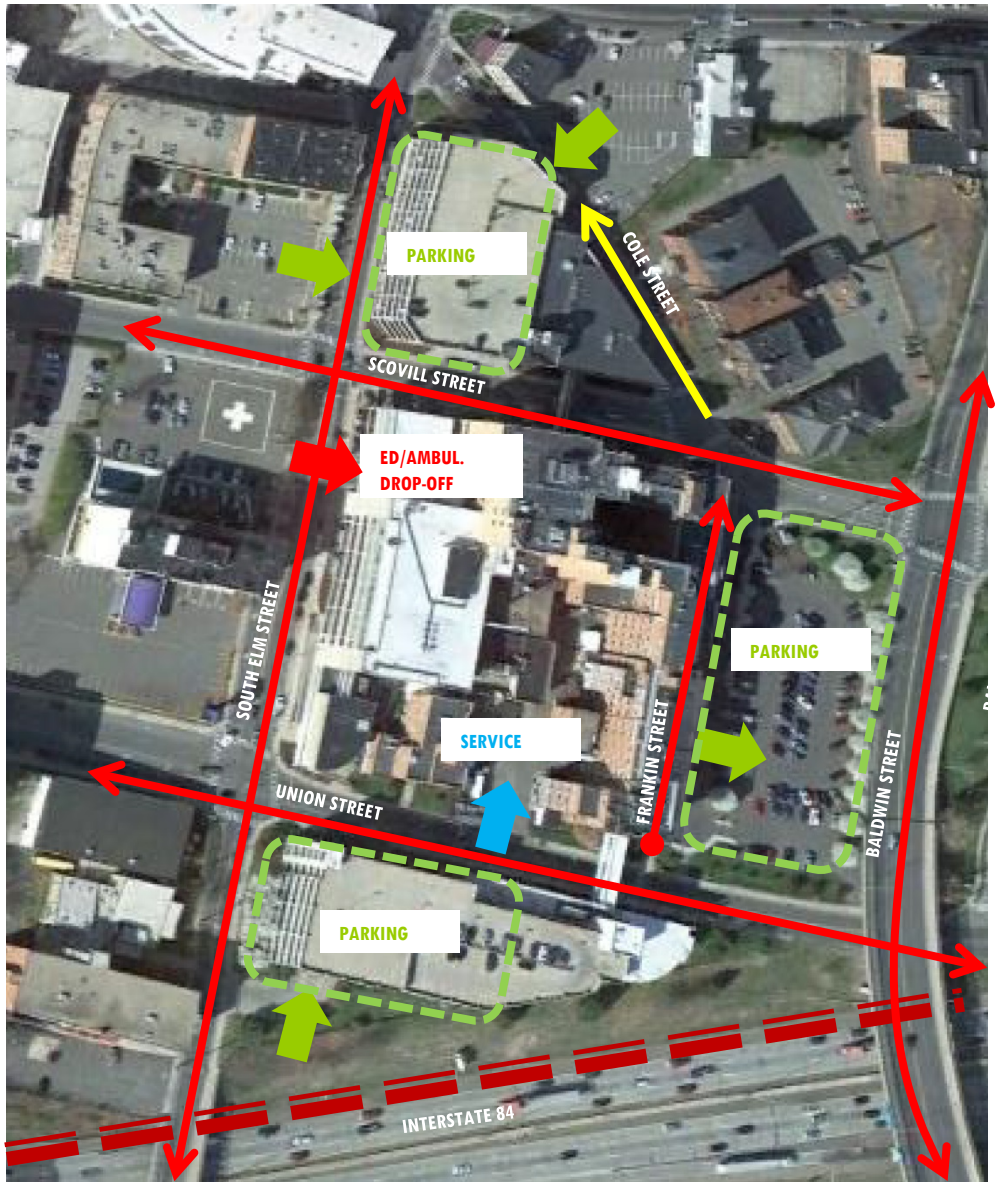
## Site: Existing Campus Zoning


- Traditional acute care zones surrounded by parking and MOB/ Support

Central Plant/ Dock

# Site / Facility Existing Conditions Overview (continued)

## Site: Existing Road Conditions & Parking

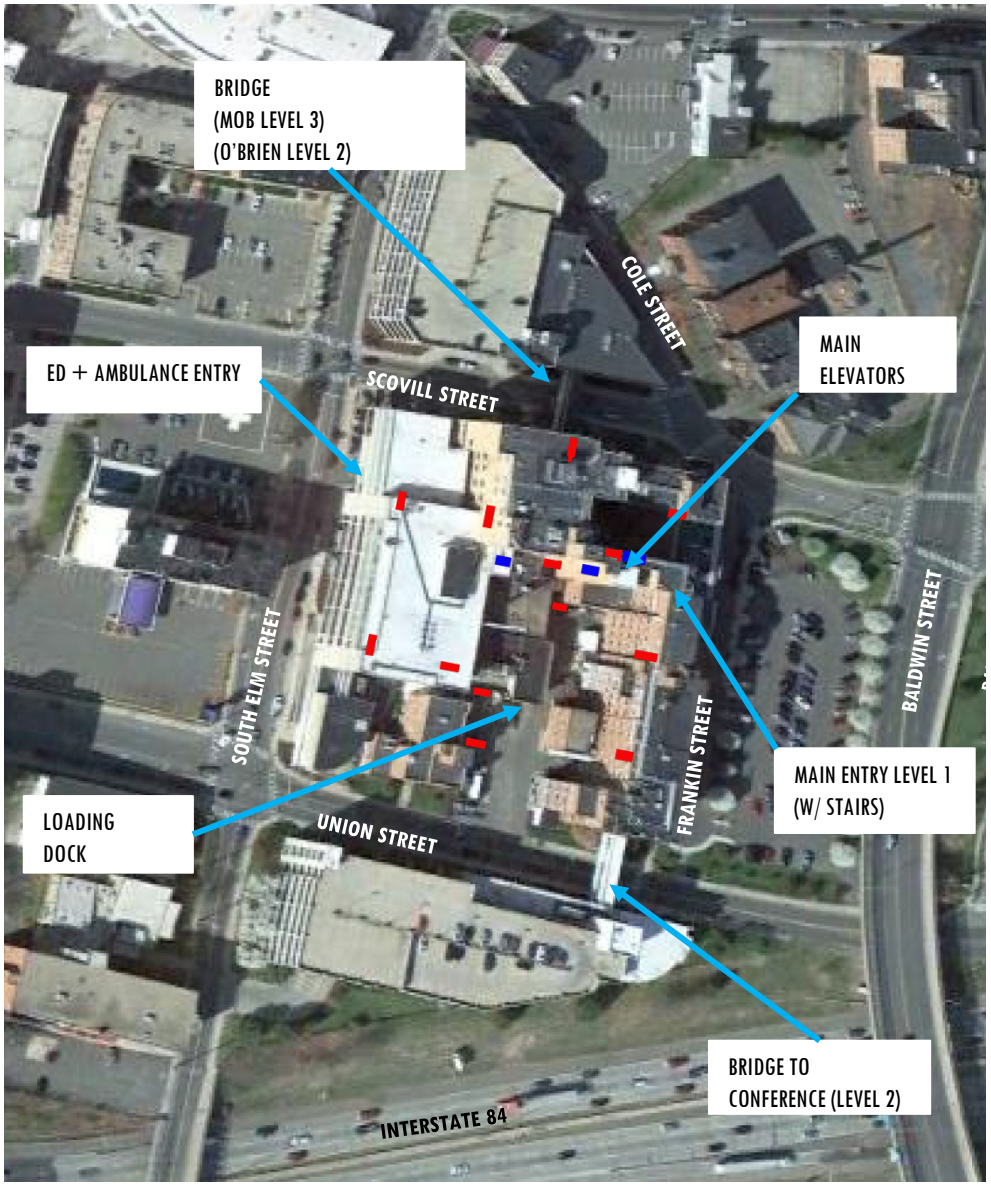



- Compact, Urban Site
- Separation of Staff / Service and Visitor / Patient Arrival
- Consider changes @ Franklin and/or Scovill Streets

ED AMBULANCE DROP-OFF

# Site / Facility Existing Conditions Overview (continued)

## Site: Existing Access Points

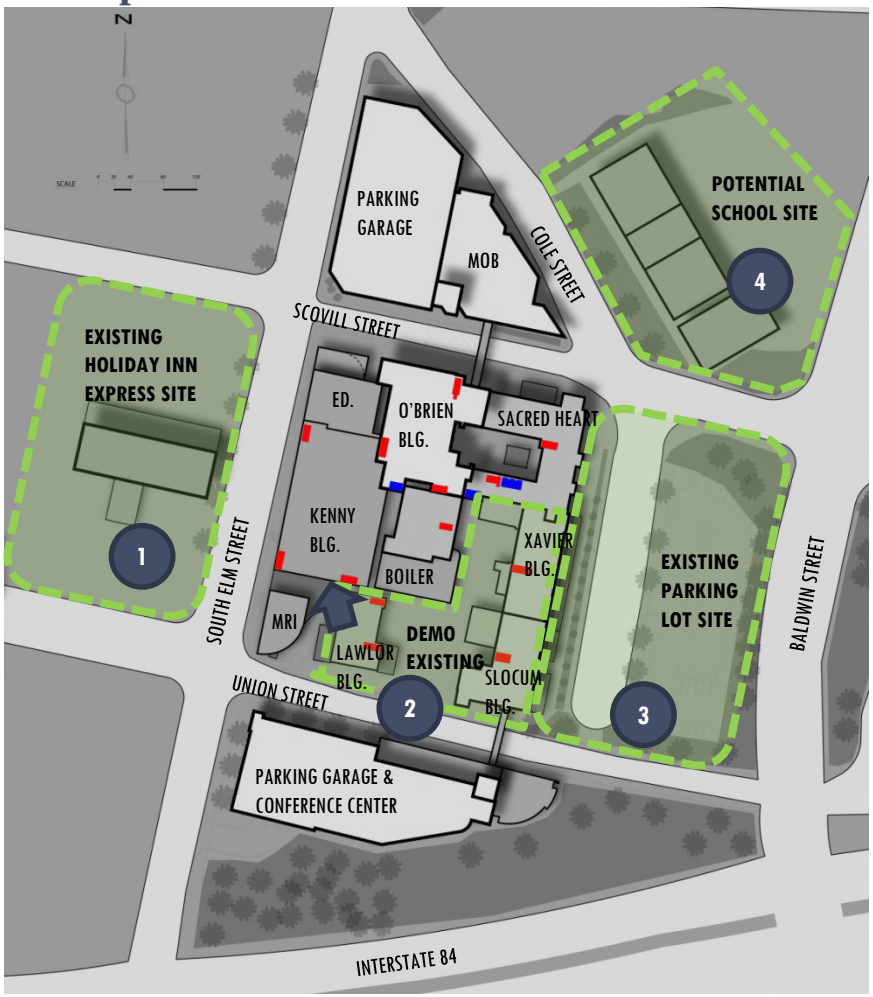



- Arrival via bridge(s) vs. valet in front
- Navigation of grade changes
- ED access under Kenny
- Multiple vertical circulation points

Main Entry & Canopy

# Site / Facility Existing Conditions Overview (continued)

## Site: Potential Expansion Zones




1. Existing Hotel Site
   Approx. 85,000 SF Site
   (owned by hospital)

2. Existing Dated Hospital
   Approx. 45,000 SF Site
   - Potential to feed both sides of ED with Lawlor demolition

3. Existing Parking Lot
   (Including Franklin St.)
   Approx. 80,000 SF Site

4. Acquire School Site
   Approx. 65,000 SF Site

*Evaluation of each location revealed that sites 1 and 2 provided the most opportunity to meet the prioritized goals without incurring more land costs or impacting parking negatively.*

# Site / Facility Existing Conditions Overview (continued)

## Stacking Diagram & Bed Locations: By Floor & Building

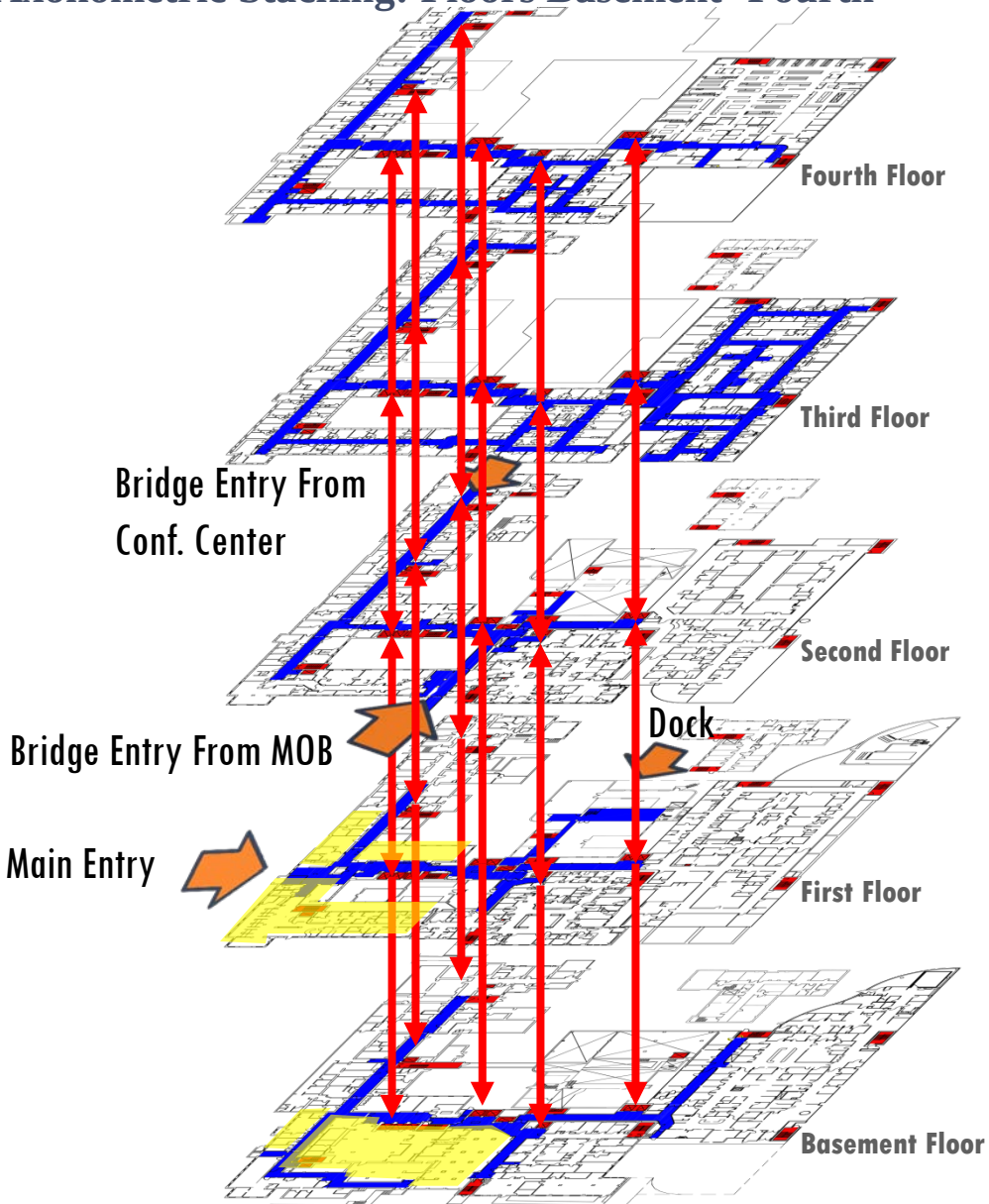
| | 1909 | 1922 | 1941 | 1963 | 1953 | 1953 | 1982 | |
|---|---|---|---|---|---|---|---|---|
| **Floor** | **Slocum Bldg.** | **Xavier Bldg.** | **Sacred Heart** | **O'Brien Bldg.** | **Central Plant** | **Lawlor Bldg.** | **Kenny Pavilion** | **Bed Total** |
| **8** | | | | Unassigned | | | | |
| **7** | | | | Med Surg 6 / 20 — 26 | | | | 6 / 20 — 26 |
| **6** | | | | Mechanical, Electrical, Facilities | | | | |
| **5** | Quality | Administration | Med Surg 4 / 18 — 22 | PT/OT, Support | | | | 4 / 18 — 22 |
| **4** | Unassigned | Vitas Hospice | CCMC Pediatric Child Center | Med Surg (+ 3-Bed Flex PT) 24 / 0 — 24 | | | LAB, Hospitalists, Clinical Engineering | 24 / 0 — 24 |
| **3** | Medical Oncology, Renal 4 / 4 — 8 | Medical Oncology, Renal 4 / 14 — 18 | Telemetry 20 / 0 — 20 | ICU/CVU 20 / 4 — 24 | | Unassigned | Women's (14) & Infant Center (9 NICU), Midwife Center (2) 34 / 0 — 34 | 82 / 22 — 104 |
| **2** | Wound Care Administration | Non-Invasive Cardiology Administration | Cardiology, Cath Labs | Endoscopy | Storage | Pre Reg, Scheduling | Surgery | |
| **1** | Administration / Data | Financial Counseling, Pastoral Care | Registration, PAT | Behavioral Health 6 / 6 — 12 | Linen Storage / Mechanical | Security | Imaging | 6 / 6 — 12 |
| **B** | Facilities / Rx | Pharmacy, Morgue, Admin | Dietary | ED Admin / I.T. | Mechanical | Unassigned | Emergency Dept, MRI | |
| **SB** | NA | NA | NA | Facilities, Mechanical, Elec | Mechanical/Elec | NA | Facilities, SPD | |
| **Area** | 49,683 BGSF | 52,272 BGSF | 57,658 BGSF | 174,703 BGSF | 41,593 BGSF | 19,907 BGSF | 156,167 BGSF | 502,300 BGSF |
| **Bed Summary** | 4 / 4 — 8 | 4 / 14 — 18 | 24 / 18 — 42 | 56 / 30 — 86 | 0 / 0 — 0 | 0 / 0 — 0 | 34 / 0 — 34 | 122 / 66 — 188 |
| Private % by Building | 50% Priv. | (33% Private Comb.) 22% Priv. | 57% Priv. | 65% Priv. | | | 100% Priv. | Staffed Beds 65% Private |

**Legend**

| | | |
|---|---|---|
| Private | X | Total Beds |
| Semi-Private | X | |

# Site / Facility Existing Conditions Overview (continued)

## Axonometric Stacking: Floors Basement- Fourth




Multiple Entry Points with very different patient/ visitor experiences.

Multiple Vertical Circulation Points, some of which won't work for destination (Ex/ Access to WIC).

Public Destinations not connected visually between floors, access is confusing from bridge arrival sequences.

Connectivity to/ through Kenny is an issue on B, 3rd, 4th floors.

# Site / Facility Existing Conditions Overview (continued)

## Benchmarking Existing SF Against Industry Standards

Overall the total campus square footage of 2,672 building gross square feet per bed (BGSF/Bed) is above the benchmark of 2,100-2,500 BGSF per Bed. However, many units are significantly under the benchmark, as discussed in each of the following departmental sections. Additionally, room sizes are significantly below benchmark in a majority of the units.

| Acute Care Campus | Campus SF | Beds | SF/ Bed | Benchmark |
|---|---|---|---|---|
| Total Area | 502,300 BGSF | 188 Beds | 2,672 DGSF/Unit | 2,100-2,500 BGSF/ Bed |

# Site / Facility Existing Conditions Overview (continued)

## Benchmarking Summary: Room Sizes

| Room/ Space | Existing Room NSF | Benchmark | Difference | Comments |
|---|---|---|---|---|
| **Room Size Evaluation** | | | | |
| **Level B** | | | | |
| ED Typical Exam (4) | 97 NSF | 140 NSF | -31% | Room size varies greatly- 46 SF Ambulatory Care - 154 SF Exam 24 |
| ED Trauma (2) | 203 NSF | 300 NSF | -32% | First Trauma target is 350 NSF |
| **Level 2** | | | | |
| ORs- General (Rm 7) | 423 NSF | 600 NSF | -30% | |
| ORs- Specialty/ Ortho (Rm 2) | 490 NSF | 600 NSF | -18% | Open Heart is 680 SF |
| **Level 3- WIC** | | | | |
| LDR | 330 NSF | 425 NSF | -22% | Includes Toilet |
| C-Section | 380 NSF | 440 NSF | -14% | |
| Post Partum | 275 NSF | 275 NSF | 0% | Includes Toilet |
| NICU | 40 NSF | 120 NSF | -67% | |
| **Level 3** | | | | |
| O'Brien 3- ICU/CVU | 172 NSF | 325 DGSF | -47% | Varies. New code requires SU or Toilet |
| Sacred Heart 3- Telemetry | 177 NSF | 275 DGSF | -36% | Varies. Including Toilet |
| Xavier 3- Med Onc, Renal | 287 NSF | 375 DGSF | -23% | Varies. Including Toilet, Semi-Private |
| **Level 4** | | | | |
| O'Brien 4- Med/Surg | 170 NSF | 257 DGSF | -34% | Varies. Including Toilet |
| **Level 5** | | | | |
| Sacred Heart 5- Medical | 227 NSF | 375 DGSF | -39% | Varies. Including Toilet, Semi-Private |
| **Level 7** | | | | |
| O'Brien 7- Surgical + Overflow | 220 NSF | 375 DGSF | -41% | Varies. Including Toilet, Semi-Private |

# Data & Planning Parameters and Corridors of Growth

The Planning Team was tasked to provide strategic, operational, and facility recommendations for the campus based on the community's needs, projected future utilization, and SMH's strategic goals and initiatives. These guiding principles serve as the basis to distribute potential service lines and beds across the hospital. The following data summary provided the foundation to develop corresponding facility recommendations.

# Data & Planning Parameters and Corridors of Growth (continued)

## Demographics

Saint Mary's Hospital draws a large percentage of their patients from its primary service area (PSA), an area comprised of nine zip codes surrounding the hospital including Waterbury, Prospect, Wolcott, and Naugatuck (06770). In 2012, the PSA accounted for approximately 80% percent of inpatient admissions. This combined population is projected to decline almost one percent annually over the next 5 years, with declines across all population segments except 65+, which is growing significantly. This area is 58% White, followed by 25% Hispanic and 13% African American. The median household income for this area is $50,000.

Demographics Dashboard

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Bed Historical Data

SMH has 347 licensed beds, with 188 staffed beds. The average daily census is 135, with an average occupancy of 72 percent. Inpatient volume remained relatively flat between 2010 and 2012 with approximately 11,000 discharges. However, growth occurred in some service lines during this time period including Medicine and Neurology. Volume contracted in general surgery, spine, and obstetrics. Length of stay declined from 3.6 in 2010 to 3.4 in 2012.

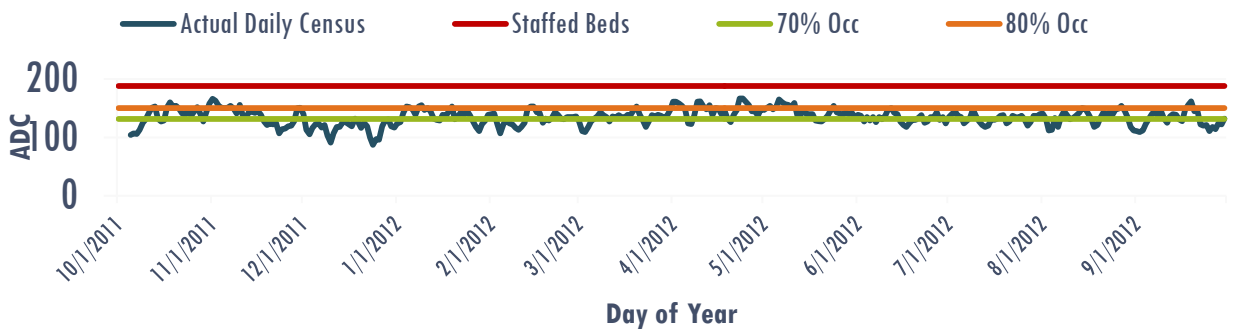
A majority of the general med/surg units operate at above 80 percent. In addition to the high utilization, the facility is currently at 65 percent private beds, compounding the space challenges in an aged facility. Additionally, during site interviews, common staff concerns beyond “germ and gender” issues were patient room visibility, lack of storage, room size, and inconsistencies across floors in terms of layout and aesthetics.

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds Historical Data (continued)

- **Saint Mary's Hospital (347 Licensed Beds)**

| Unit | Staffed Beds | Nursing Unit Discharges 2010 | 2011 | 2012 | Unit Patients 2010 | 2011 | 2012 | Unit ALOS 2010 | 2011 | 2012 | Unit ADC 2010 | 2011 | 2012 | 2012 % Occ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Critical Care (OB3) | 16 | 273 | 336 | 251 | 959 | 1,014 | 1,013 | 3.4 | 3.8 | 3.2 | 9.1 | 10.4 | 8.8 | 55% |
| CVU (OB3) | 8 | 389 | 389 | 317 | 423 | 413 | 464 | 3.4 | 3.6 | 3.0 | 3.9 | 4.0 | 3.8 | 47% |
| O'Brien Seven | 26 | 1,913 | 2,027 | 1,462 | 1,950 | 2,131 | 2,058 | 3.5 | 3.5 | 3.4 | 18.9 | 20.3 | 19.1 | 73% |
| O'Brien Four | 24 | 2,002 | 2,106 | 1,415 | 2,068 | 2,205 | 1,932 | 3.7 | 4.1 | 3.9 | 21.2 | 24.5 | 20.4 | 85% |
| Xavier Three | 26 | 1,686 | 1,787 | 1,277 | 1,766 | 1,871 | 1,807 | 4.4 | 4.7 | 4.5 | 21.5 | 23.9 | 22.1 | 85% |
| Sacred Heart Five | 22 | 1,519 | 1,483 | 1,152 | 1,610 | 1,596 | 1,671 | 3.9 | 4.2 | 3.9 | 17.2 | 18.6 | 18.1 | 82% |
| Telemetry (SH3) | 20 | 1,310 | 1,316 | 940 | 1,927 | 1,886 | 1,996 | 3.2 | 3.5 | 3.1 | 16.8 | 18.0 | 16.9 | 84% |
| Women & Infants | 25 | 1,154 | 1,210 | 764 | 1,206 | 1,259 | 1,115 | 2.7 | 2.5 | 2.6 | 8.8 | 8.7 | 8.0 | 32% |
| OB | | 1,037 | 1,067 | 712 | 1,084 | 1,110 | 1,037 | 2.8 | 2.6 | 2.7 | 8.3 | 8.0 | 7.6 | |
| GYN | | 103 | 138 | 47 | 106 | 141 | 72 | 1.7 | 1.5 | 1.6 | 0.5 | 0.6 | 0.3 | |
| Birth Center | | 14 | 5 | 5 | 16 | 8 | 6 | 1.1 | 0.9 | 1.0 | 0.0 | 0.0 | 0.0 | |
| NICU | 9 | 130 | 141 | 86 | 138 | 156 | 136 | 8.9 | 7.8 | 7.3 | 3.4 | 3.3 | 2.7 | 30% |
| O'Brien One (BH) | 12 | 643 | 598 | 454 | 642 | 600 | 628 | 6.3 | 6.7 | 6.3 | 11.1 | 11.0 | 10.8 | 90% |
| | | | | | | | | | | | - | - | - | |
| ***Subtotal*** | ***188*** | ***11,019*** | ***11,393*** | ***8,118*** | ***12,689*** | ***13,131*** | ***12,820*** | ***3.8*** | ***4.0*** | ***3.7*** | ***131.8*** | ***142.7*** | ***130.7*** | ***70%*** |
| Hold/Blanks | | 71 | 150 | 3,074 | 1,065 | 1,751 | 1,697 | 1.0 | 1.0 | 1.0 | 2.9 | 4.8 | 4.6 | |
| **Total** | **188** | **11,090** | **11,543** | **11,192** | **13,754** | **14,882** | **14,517** | **3.6** | **3.6** | **3.4** | **134.6** | **147.5** | **135.3** | ***72%*** |



# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Bed Benchmarking by Unit

| Department/ Space | Department Gross Area | Units / Spaces | DGSF / Unit | Benchmark | Difference | Comments |
|---|---|---|---|---|---|---|
| **Nursing Units** | | | | | | |
| **Level 1** | | | | | | |
| O'Brien 1 Behavioral Health | 11,007 DGSF | 12 | 917 DGSF/Unit | 650 DGSF/Unit | 41% | 6 private. 2 additional observation beds |
| **Level 3- WIC** | | | | | | |
| LDR + C-Section | 11,074 DGSF | 9 | 1,230 DGSF/Unit | 1,450 DGSF/Unit | -15% | LDRs use standard patient room |
| Post Partum + Well-Baby | 11,400 DGSF | 14 | 814 DGSF/Unit | 750 DGSF/Unit | 9% | |
| Birthing Center | 1,465 DGSF | 2 | 733 DGSF/Unit | 800 DGSF/Unit | -8% | Midwife Residential Delivery Area |
| NICU | 1,575 DGSF | 9 | 175 DGSF/Unit | 450 DGSF/Unit | -61% | |
| **Level 3** | | | | | | |
| O'Brien 3- ICU/CVU | 10,943 DGSF | 24 | 456 DGSF/Unit | 700 DGSF/Unit | -35% | 20 Private, 2 semi private rooms |
| Sacred Heart 3- Telemetry | 8,161 DGSF | 20 | 408 DGSF/Unit | 600 DGSF/Unit | -32% | All private |
| Xavier 3- Med Onc, Renal | 10,156 DGSF | 26 | 391 DGSF/Unit | 600 DGSF/Unit | -35% | 8 private. Extends into Slocum. |
| **Level 4** | | | | | | |
| O'Brien 4- Med/Surg | 12,227 DGSF | 24 | 509 DGSF/Unit | 600 DGSF/Unit | -15% | All private |
| Sacred Heart 4- CCMC | | | | | | Not evaluated, outside provider |
| Xavier 4- Vitas Hospice | | | | | | Not evaluated, outside provider |
| **Level 5** | | | | | | |
| O'Brien 5 | | | | | | PT/ Dialysis, Not being used for beds |
| Sacred Heart 5- Medical | 9,003 DGSF | 22 | 409 DGSF/Unit | 600 DGSF/Unit | -32% | 4 Private. 10 tele capable, not hard wired |
| **Level 7** | | | | | | |
| O'Brien 7- Surgical + Overflow | 9,460 DGSF | 26 | 364 DGSF/Unit | 600 DGSF/Unit | -39% | 6 private |
| **Level 8** | | | | | | |
| O'Brien 8- Vacant | 10,867 DGSF | 0 | 0 DGSF/Unit | 0 DGSF/Unit | 0% | Benchmark for 16 bed ICU or 18-20 bed M/S unit |
| Total Beds | | 188 | | | | |

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Existing Floor Plans: Third Floor

**Women's and Infants Center (W.I.C.)**
Total 24,049 DGSF

**LDR + C-Section**
11,074 DGSF
(9) Spaces
Existing 1,230 DGSF/Unit
Benchmark 1,450 DGSF/Unit
(-15%)

**Post Partum + Well-Baby**
11,400 DGSF
(14) Spaces
Existing 814 DGSF/Unit
Benchmark 750 DGSF/Unit
(+9%)

**Birthing Center**
1,465 DGSF
(2) Spaces
Exiting 733 DGSF/Unit
Benchmark 800 DGSF/Unit
(-8%)

**NICU**
1,575 DGSF
(9) Beds
Existing 175 DGSF/Bas
Benchmark 450 DGSF/Bas
(-61%)

@ 4 Beds
394 DGSF/Bas
(-13%)

**Xavier 3- Med Onc./ Renal**
10,156 DGSF

(26) Beds
(8 Private, 9 Semi-Private)
Existing 391 DGSF/Bed
Benchmark 600 GSF/Bed
(-35%)


Midwife Birthing Center
1,465 DGSF

**O'Brien 3- ICU/CVU**
10,943 DGSF

(24) Beds
(20 Private, 2 Semi-Private)
Existing 456 DGSF/Bed
Benchmark 700 DGSF/Bed
(-35%)

**Sacred Heart 3- Telemetry**
8,161 DGSF

(20) Beds
Existing 408 DGSF/Bed
Benchmark 600 DGSF/Bed
(-32%)

ICU is extremely small & busy
No connection-Kenny & O'Brien
Sacred Heart: poor nursing visibility, travel distance
Xavier/Slocum: compromised for modern care

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Existing Floor Plans: Fourth Floor

**Laboratory**
**Total 15,173 DGSF**

**(188) Beds**
**Existing 81 DGSF/Bed**
**Benchmark 30 DGSF/Bed**
**+169%**


Clinical Engineering
299 DGSF

Clinical Engineering
299 DGSF

Hospitalists
1,512 DGSF

**O'Brien 4- Med./Surg**
**12,227 DGSF**
**All Private**

**(24) Beds**
**Existing 509 DGSF/Unit**
**Benchmark 600 DGSF/Unit**
**(-15%)**

3-Bed Flex
Physical Therapy
476 SF

Unassigned

Vista Hospice
9,377 DGSF

CCMC Pediatric/Child Center
5,900 DGSF

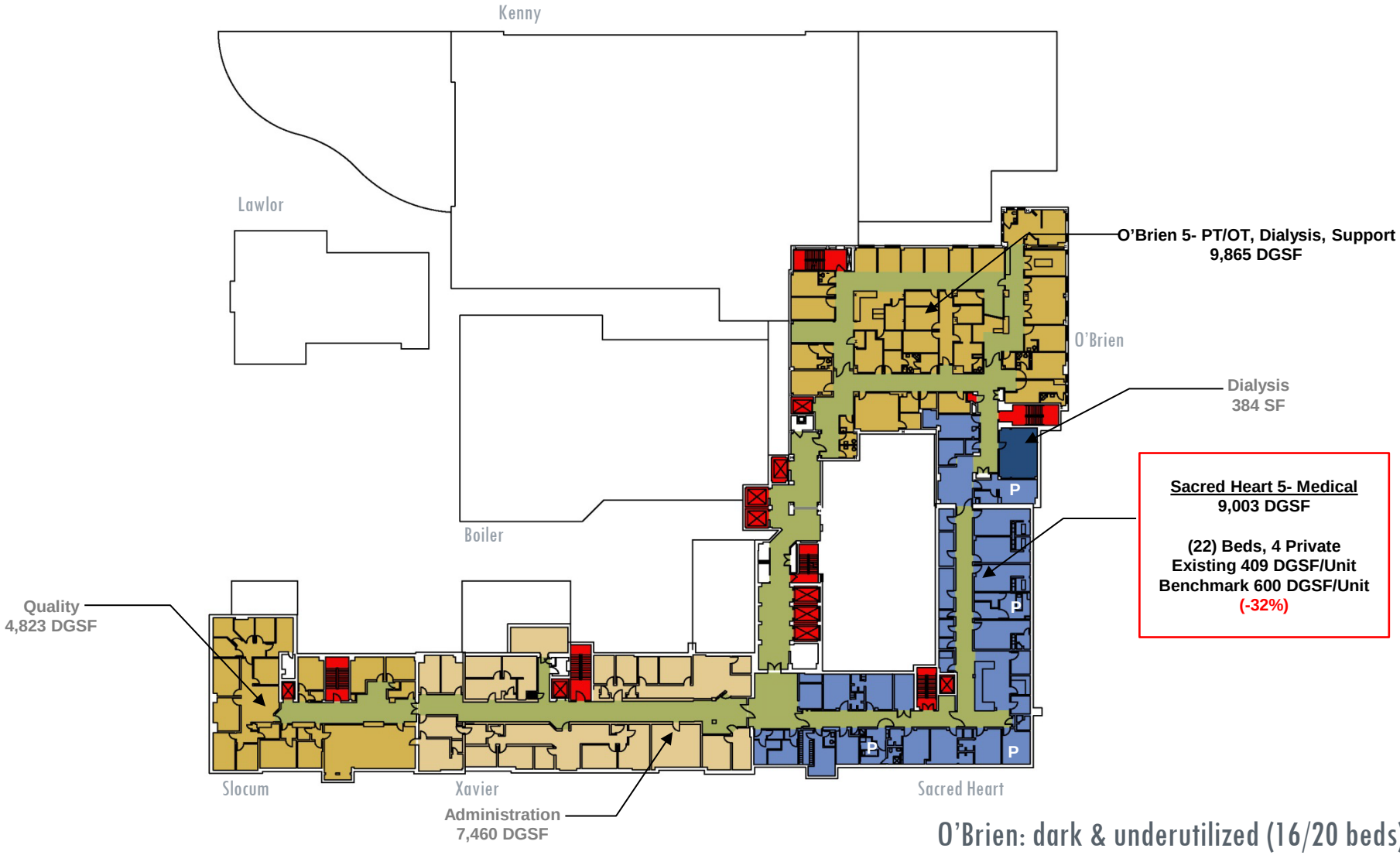
Lab is oversized for Lab function (+/-20 ICU beds)

Kenny: Public classrooms add to public/patient crossover

Ortho Service Line in decline

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Existing Floor Plans: Fifth Floor




O'Brien: dark & underutilized (16/20 beds)

Sacred Heart: extremely small, majority semi-private

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Existing Floor Plans: Seventh Floor


Nice views, good light

Nice staff corridor on tight unit

No real patient path

Small toilets with difficult "patient assist" situation

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Existing Floor Plans: Eighth Floor

**O'Brien 8- Vacant**
**10,867 DGSF**

**If Benchmarked for beds,**
**16 ICU Beds @ 679 DGSF/Bed**

**18 M/S Beds @ 603 DGSF/Bed**
**20 M/S Beds @ 544 DDGSF/ Bed**

Unassigned
351 DGSF

Good potential for beds (16/20)

Transfer from ED/ OR with public crossover challenging

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Future Need

The Planning Team developed a baseline forecast based on projected population growth, future service line use rates, SMH length of stay (LOS), and future market share assumptions. The baseline forecast was created using on-demand dashboard tools and thus several scenarios were developed and discussed during the planning phase.

Based on the service line level demand forecast, flat LOS and flat market share, the Planning Team and Steering Committee projected a total bed need of 173 at SMH in 2025, including 24 ICU Beds; however the general planning bookends are 173 to 178, with the latter based on slight market share growth in medicine, cardiology, and general surgery which are key service lines for SMH.

A sensitivity analysis was run at 173 beds, indicating a confidence level of over 90 percent with up to 0.5% annual growth at 173 beds. Additionally, a sensitivity analysis was performed for ICU bed need, which confirmed capacity at 24 beds.

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Future Need Dashboard

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Future Need (continued)

### Total Bed Need Sensitivity Analysis

| | 2012 | 2012-2025 Pt Day Annual Growth | | | | | |
|---|---|---|---|---|---|---|---|
| | | -1.0% | -0.5% | 0.0% | 0.5% | 1.0% | 1.5% |
| ADC | 135.1 | 118.6 | 126.6 | 135.1 | 144.1 | 153.8 | 164.0 |
| St. Dev | 12.9 | 12.0 | 12.9 | 13.7 | 14.6 | 15.6 | 16.7 |
| Conf Level @ 173 Beds | 100% | 100% | 100% | 100% | 98% | 89% | 71% |
| Avg Occ at 173 | 78% | 69% | 73% | 78% | 83% | 89% | 95% |

### ICU Bed Need Sensitivity Analysis

Total ICU

| 2012 Days | 2012 |
|---|---|
| Total Days | 49,388 |
| ICU Days | 4,608 |
| % ICU | 9% |

| | 2025 | | | | | |
|---|---|---|---|---|---|---|
| Patient Day CAGR | -1% | -0.50% | 0% | 0.50% | 1.0% | 1.5% |
| 2025 Patient Days | 43,339 | 46,272 | 49,388 | 52,696 | 56,208 | 59,935 |
| % ICU Days | 12% | 12% | 12% | 12% | 12% | 12% |
| ICU Days | 5,201 | 5,553 | 5,927 | 6,324 | 6,745 | 7,192 |
| ADC | 14.2 | 15.2 | 16.2 | 17.3 | 18.5 | 19.7 |
| Bed Need at 75% | 19.0 | 20.3 | 21.6 | 23.1 | 24.6 | 26.3 |

CCU

| 2012 Days | 2012 |
|---|---|
| Total Days | 49,388 |
| ICU Days | 3,226 |
| % ICU | 6.5% |

| Patient Day CAGR | -1% | -0.50% | 0% | 0.50% | 1.0% | 1.5% |
|---|---|---|---|---|---|---|
| 2025 Patient Days | 43,339 | 46,272 | 49,388 | 52,696 | 56,208 | 59,935 |
| % ICU Days | 8.5% | 8.5% | 8.5% | 8.5% | 8.5% | 8.5% |
| ICU Days | 3,684 | 3,933 | 4,198 | 4,479 | 4,778 | 5,094 |
| ADC | 10.1 | 10.8 | 11.5 | 12.3 | 13.1 | 14.0 |
| Bed Need at 75% | 13.5 | 14.4 | 15.3 | 16.4 | 17.5 | 18.6 |

CVU

| 2012 Days | 2012 |
|---|---|
| Total Days | 49,388 |
| ICU Days | 1,382 |
| % ICU | 2.8% |

| Patient Day CAGR | -1% | -0.50% | 0% | 0.50% | 1.0% | 1.5% |
|---|---|---|---|---|---|---|
| 2025 Patient Days | 43,339 | 46,272 | 49,388 | 52,696 | 56,208 | 59,935 |
| % ICU Days | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% |
| ICU Days | 1,517 | 1,620 | 1,729 | 1,844 | 1,967 | 2,098 |
| ADC | 4.2 | 4.4 | 4.7 | 5.1 | 5.4 | 5.7 |
| Bed Need at 75% | 5.5 | 5.9 | 6.3 | 6.7 | 7.2 | 7.7 |

# Data & Planning Parameters and Corridors of Growth (continued)

## Inpatient Beds: Future Need (continued)

While an incremental total  bed need was not found during the analysis, as shown in the facility benchmarking results, significant opportunity exists to right size rooms and departmental support, reduce semi-privates, and enhance the patient experience. During the site visit and departmental interviews, FreemanWhite documented facility and staff concerns, including original and small toilets in patient rooms, undersized patient rooms including semi-privates, poor nursing visibility and long travel distances (particularly SH3).

Additionally, a majority of rooms have hand washing sinks only in the patient bathroom. As options and recommendations were developed, there was a focus on balancing capital expense with areas of highest concern and utilizing the vacant space on the 8th floor as an open chair for its highest and best use.

# Data & Planning Parameters and Corridors of Growth (continued)

## Emergency Department (ED) / Trauma

Current annual volumes in the ED are approximately 70,000 with roughly 12% of these patients admitted to the Hospital. In 2012, January was the highest patient volume month (July the lowest) and Mondays were the busiest day of the week (Sunday least busy). There are long average lengths of stay for both admitted patients (6 hours and 40 minutes) and discharged patients (3 hours and 20 minutes), excluding psych patients.

Currently, there are 39 total treatment spaces in the ED, including 23 in the Main ED, 9 Fast Track and 7 Behavioral Health spaces. From a facility perspective, the ED is currently undersized with other challenges including visibility within the Department, limited parking, and an inefficient, fragmented design.

| Department/ Space | Department Gross Area | Units / Spaces | DGSF / Unit | Benchmark | Difference | Comments |
|---|---|---|---|---|---|---|
| Emergency Department | 19,802 DGSF | 39 | 508 DGSF/Unit | 650 DGSF/Unit | -22% | Excludes ED Admin area |
| ED- With Hallway Beds | 19,802 DGSF | 56 | 354 DGSF/Unit | 650 DGSF/Unit | -46% | Excludes ED Admin area but includes 14 hallway beds in main + 3 in Ambulatory |
| ED- Hallway Beds + Admin | 25,344 DGSF | 56 | 453 DGSF/Unit | 650 DGSF/Unit | -30% | Includes Admin + 17 Hallway beds |

# Data & Planning Parameters and Corridors of Growth (continued)

## Emergency Department (ED) / Trauma (continued)

The Planning Team developed baseline ED projections, based on projected population, projected use rates including the impact of health care reform, and market share growth. The baseline model was set up using interactive dashboard tools, which were then utilized for scenario planning including the concept of moving a percentage of low acuity patients (levels 4 & 5) out of the ED to a nearby urgent care setting. Additionally, the Planning Team developed scenarios for treatment space need with improved operations, both with and without rerouting patients to an urgent care.

*FreemanWhite recommends that SMH pursue the development of an urgent care near the hospital, with the belief that an urgent care will facilitate treating low acuity patients in a lower cost, more appropriate setting, thus decompressing the ED and reducing the amount of new construction required to right-size the existing ED and accommodate incremental growth.*

*FreemanWhite also recommends that the ED space requirements be based on the improved operations chassis, understanding that in the mist of healthcare reform, efficient operations will be a must for long term sustainability. Additionally, SMH had recently started to evaluate operational improvement opportunities.*

# Data & Planning Parameters and Corridors of Growth (continued)

## Emergency Department (ED) / Trauma (continued)

The following table summarizes the current design shortage in departmental space and the anticipated room requirements at various volume levels within the ED.

| | Input | Current Ops | Current Ops w UC Site | Improved Ops | Improved Ops w UC Site |
|---|---|---|---|---|---|
| | Growth Rate | 1.3% | 1.3% | 1.3% | 1.3% |
| | ALOS | 231 | 287 | 188 | 228 |
| | UC % Shift (4s & 5s) | | 50% (18k Visits) | | 50% (18k Visits) |
| ED | 2022 ED Volume | 71,741 | 51,262 | 71,741 | 51,262 |
| | 2022 Tx Space Need | 53 (44 + 9UC) | 46 | 44 (35 + 9 UC) | 38 |
| | Visits per Space | 1450* | 1114 | 1775* | 1349 |
| Psych (10%) | 2022 ED Volume | 7,971 | | 7,971 | |
| | ALOS | 536 | | 422 | |
| | 2022 TX Space Need | 12 | | 10 | |
| | Tx per Space | 664 | | 797 | |

*Approximate

Improved Ops Delta (approx): 9 Spaces;

UC Delta (approx): 6 Spaces

# Data & Planning Parameters and Corridors of Growth (continued)

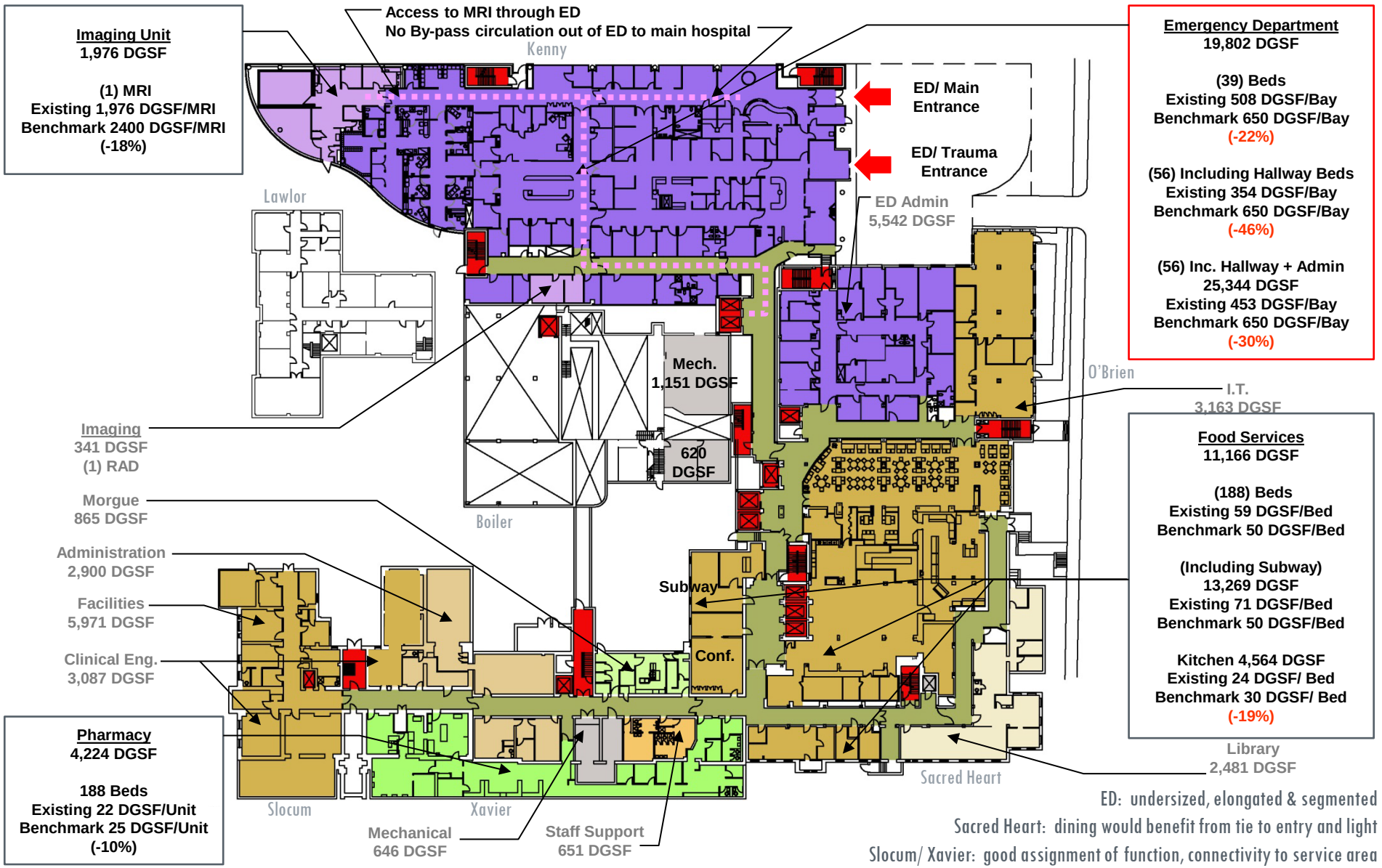
## ED Future Need Dashboard

# Data & Planning Parameters and Corridors of Growth (continued)

## ED Future Capacity Dashboard

# Data & Planning Parameters and Corridors of Growth (continued)

## ED: Existing Floor Plans: Basement




ED: undersized, elongated & segmented

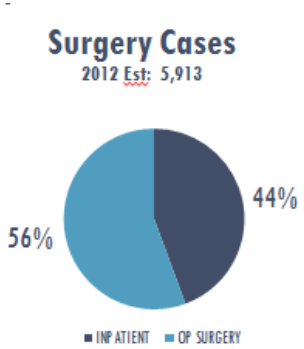
Sacred Heart: dining would benefit from tie to entry and light

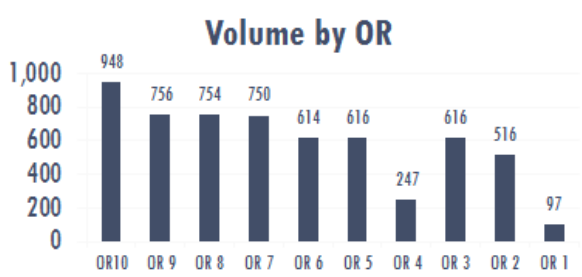
Slocum/ Xavier: good assignment of function, connectivity to service area

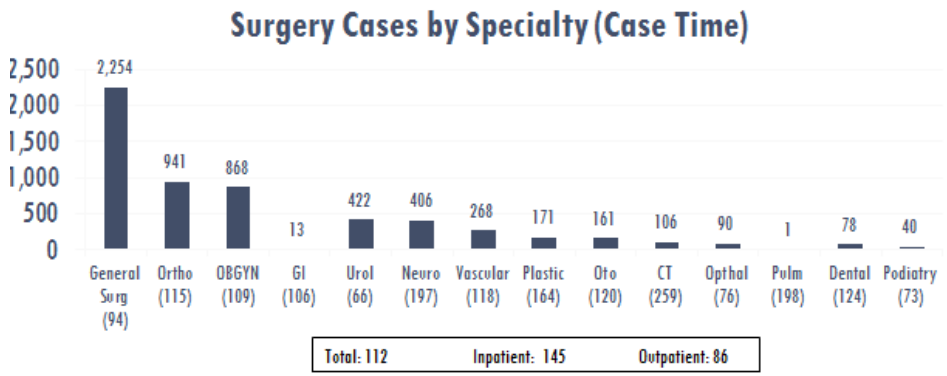
# Data & Planning Parameters and Corridors of Growth (continued)

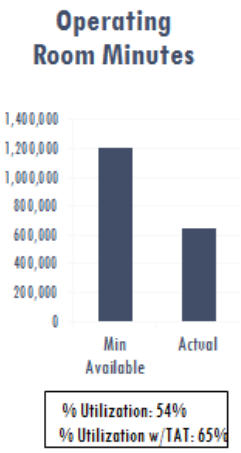
## Surgery Historical Data

There are a total of 10 ORs in the main surgical suite of the Hospital. Last year the Hospital performed approximately 6,000 surgical procedures of which 44% were outpatient cases. Inpatient procedures average 145 minutes wheels in to wheels out while outpatient case times average 82 minutes. Orthopedic and General Surgery cases make up over 50% of the total surgical patient minutes. The Hospital OR currently operates at an overall 65% utilization rate with OR 10 being the most highly utilized room. Most of the ORs are small (around 400 SF) with limited overall storage space.



# Data & Planning Parameters and Corridors of Growth (continued)

## Surgery Departmental Benchmarking

| Department/ Space | Department Gross Area | Units / Spaces | DGSF / Unit | Benchmark | Difference | Comments |
|---|---|---|---|---|---|---|
| Surgery Department | 30,579 DGSF | 10 | 3,058 DGSF/Unit | 3,800 DGSF/Unit | -20% | 10 ORs, 1 dedicated heart room, 2 daVinci, 17 PACU, 22 Prep/Recovery |
| Surgery ORs + PACU | 24,159 DGSF | 10 | 2,416 DGSF/Unit | 2,650 DGSF/Unit | -9% | 10 ORs, 1 dedicated heart room, 2 daVinci, 17 PACU |
| Prep- Stage II Recovery | 6,420 DGSF | 18 | 357 DGSF/Unit | 750 DGSF/Unit | -52% | Supports 10 ORs + 6 Endo + 2 Cath |
| Endoscopy | 3,623 DGSF | 6 | 604 DGSF/Unit | 1,650 DGSF/Unit | -63% | Shares Prep/Recovery with ORs |

The Prep and Recovery space is currently shared, supporting the OR, Endoscopy, as well as Cath Lab patients. Patient accessing Prep Recovery from Cath must cross a public corridor, which is not ideal.

# Data & Planning Parameters and Corridors of Growth (continued)

## Surgical Projections: Future Need

Surgical projections were developed based on historical volume and procedure times by specialty and projected surgical growth rates within the service area by service line. A dashboard was created to analyze future OR need and utilization based on current and future operational assumptions.

Future surgical volumes are projected to grow through 2022, reaching approximately 6,500 cases. However, this equates to approximately 9 ORs, including one held for Trauma and one held for Cardiac. *Thus, through scenario planning and discussion of future volumes, it was determined that there was not an overall incremental OR need.*

The planning team also discussed the existing space constraints of the individual OR rooms and general lack of support space. Even though an analysis was done to expand a few of the ORs in place, *FreemanWhite recommends that SMH not pursue OR expansion based on current priorities weighed against the benefit/expense of an OR renovation phased in place.*

# Data & Planning Parameters and Corridors of Growth (continued)

## Surgery Future Need Dashboard

# Data & Planning Parameters and Corridors of Growth (continued)

## Surgery: Existing Floor Plans: Second Floor

**Surgery**
Total 30,579 DGSF
(10) Operating Rooms
Existing 3,058 DGSF/OR
Benchmark 3,800 DGSF/OR
(-20%)

**(10) Surgery OR's + PACU**
24,159 DGSF
Existing 2,416 DGSF/OR
Benchmark 2,650 DGSF/ OR
(-9%)

**(22) Prep-Stage II Recovery**
6,420 DGSF
Supports 10 + 6 + 2 = 18 ORs
Existing 357 DGSF/Rm
Benchmark 750 DGSF/Rm
(-52%)
(1: 1.22)

If Supporting only 10 ORs
(1: 2.2)


**Endoscopy**
3,623 DGSF
(6) Procedure Rooms
Existing 604 DGSF/Unit
Benchmark
1,650 DGSF/Unit
(-63%)

**Cardiology**
5,276 DGSF
(2) Cath Labs
Existing 2,638 DGSF/ Lab
Benchmark 3,600 DGSF/Lab
(-27%)

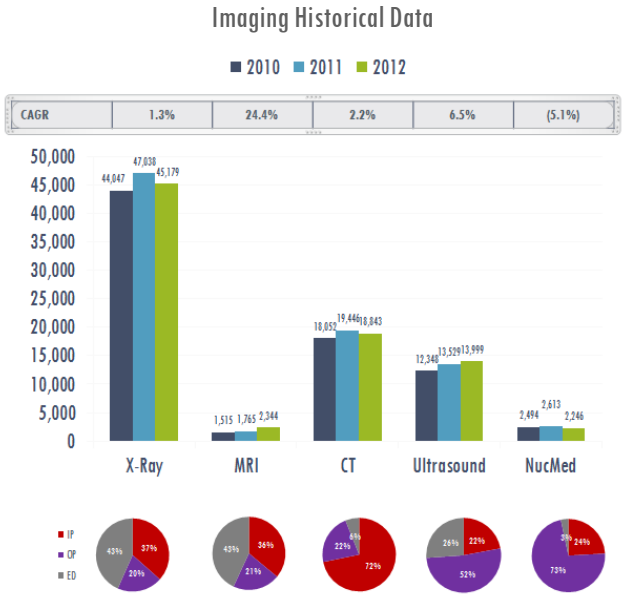
With Card. Rehab
6,439 DGSF
3,220 DGSF/Cath
(-11%)

"Pass-through" floor to garages
Wound Care tight/ public
Kenny: nice light, generally fine
Prep/Recovery- Good location and flow, tight pod layout
GI relocation creates opportunity for Prep/Recovery
Non-Invasive Cardiology lacks sense of arrival

# Data & Planning Parameters and Corridors of Growth (continued)

## Diagnostic Imaging

The Planning Team reviewed historical and projected imaging volumes by modality and location. Overall, the existing number of modalities should be able to accommodate future growth, with the exception of nuclear medicine which is showing a need of approximately 2.5; current supply is two. While an incremental MRI is not required, there are concerns surrounding the current location, as it is adjacent to the ED, with current travel patterns requiring all patients (inpatient and outpatient) to go through the ED for services. *Thus, the Planning Team recommends moving the existing MRI to a location that enables a more secure entrance.* While CT shows a need slightly over two with current operations, it was noted that the procedure time for outpatients was considered high and an opportunity for improvement.




| Department/ Space | Department Gross Area | Units / Spaces | DGSF / Unit | Benchmark | Difference | Comments |
|---|---|---|---|---|---|---|
| Level 1 | | | | | | |
| Imaging Department | 23,933 DGSF | 13 | 1,841 DGSF/Unit | 1,450 DGSF/Unit | 27% | First Floor Kenny. 5 Rad + 3 US + 2 CT + 1 Arterial + 1 Mammo + Rad in ED + 2 Nuc Med. Excludes Rad space in ED |
| Imaging With Women's Imaging | 23,933 DGSF | 15 | 1,596 DGSF/Unit | 1,450 DGSF/Unit | 10% | Assumes addition of 2 Women's Imaging Modalities |
| MRI Center | 1,976 DGSF | 1 | 1,976 DGSF/Unit | 2,400 DGSF/Unit | -18% | Basement Kenny, access through ED |

# Data & Planning Parameters and Corridors of Growth (continued)

## Diagnostic Imaging Future Need Dashboard

# Data & Planning Parameters and Corridors of Growth (continued)

## Diagnostic Existing Floor Plans: First Floor


**Imaging**
**23,933 DGSF**

**(13) Modalities**
**Existing 1,841DGSF/Unit**
**Benchmark 1,450 DGSF/Unit**
**(+27%)**

**(15) Modalities w/ Women's**
**Existing 1,596 DGSF/Unit**
**Benchmark 1,450 DGSF/Unit**
**(+10%)**

**O'Brien-1 (Behavioral Health)**
**11,007 DGSF**

**(12) Beds**
**(6 Private, 6 Semi-Private Beds)**
**Existing 917 DGSF/Unit**
**Benchmark 650 DGSF/Unit**
**(+41%)**

Kenny: Path from SH and Xavier beds difficult

O'Brien BH: nice example of Mission, but highest and best use?

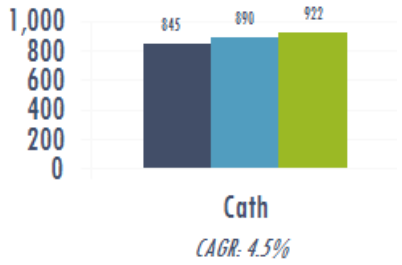
Nice improvements for entry, registration

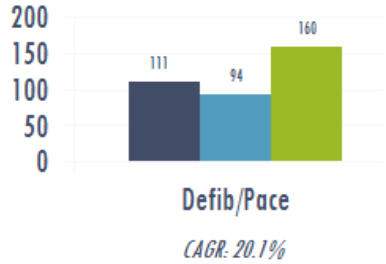
# Data & Planning Parameters and Corridors of Growth (continued)

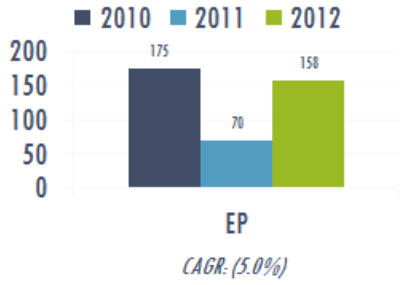
## Cardiac Cath

The Planning Team reviewed the historical cath volumes by service line and developed projected volumes through an interactive dashboard. The projection showed a need of 2.4 cath labs, which is in excess of the existing two cath labs; however, services currently operate on a 3 day per week model. *Future volumes may require additional capacity through increased scheduling.*

Cath Historical Data




| Department/ Space | Department Gross Area | Units / Spaces | DGSF / Unit | Benchmark | Difference | Comments |
|---|---|---|---|---|---|---|
| Cath Labs | 5,276 DGSF | 2 | 2,638 DGSF/Unit | 3,600 DGSF/Unit | -27% | Shares Prep/Recovery with ORs |
| Cath Labs with Card Rehab | 6,439 DGSF | 2 | 3,220 DGSF/Unit | 3,600 DGSF/Unit | -11% | With Card. Rehab Area added |

*Additionally, the currently planned relocation of cardiac rehab will create space adjacent to the cath labs to addresses patient prep and recovery internal to the Department, without having to take patients across a public corridor.*

# Data & Planning Parameters and Corridors of Growth (continued)

## Cardiac Cath Future Need Dashboard

# Data & Planning Parameters and Corridors of Growth (continued)

## Support Services

Each support function was also benchmarked against the number of units each serves at SMH. Overall, most of the services were above the benchmark per DGSF. However, FreemanWhite noted that based on SMH's strategic goals, including focusing on staff and patient experience, the dining/servery area became a higher priority for renovation including investigating opportunities to add natural light to the dining area.

| Department/ Space | Department Gross Area | Units / Spaces | DGSF / Unit | Benchmark | Difference | Comments |
|---|---|---|---|---|---|---|
| **Support Services** | | | | | | |
| Pharmacy | 4,224 DGSF | 188 Beds | 22 DGSF/Unit | 25 DGSF/Unit | -10% | Basement, Xavier Building, Min. 1250 DGSF |
| Laboratory | 15,173 DGSF | 188 Beds | 81 DGSF/Unit | 30 DGSF/Unit | 169% | Level 4, Kenny Building (or 80-120 billable tests/ DGSF). Min core lab area 1200 DGSF. |
| SPD | 4,261 DGSF | 12 ORs | 355 DGSF/Unit | 550 DGSF/Unit | -35% | Sub Basement, Kenny - 10 ORs + 2 C-Sect |
| Housekeeping | 7,259 DGSF | 188 Beds | 39 DGSF/Unit | 10 DGSF/Unit | 286% | Sub Basement, O'Brien + 6th fl (6783 + 476) |
| Materials Management | 7,072 DGSF | 188 Beds | 38 DGSF/Unit | 30 DGSF/Unit | 25% | Sub Basement, O'Brien + space on nursing units. |
| Storeroom | 6,240 DGSF | 188 Beds | 33 DGSF/Unit | 20 DGSF/Unit | 66% | Sub Basement, OBrien. Target 20 NSF Central Storage bed/ for on-site stor. |
| BioMed Eng | 4,277 DGSF | 188 Beds | 23 DGSF/Unit | 10 DGSF/Unit | 128% | Basement Slocum, 2L + 4th Kenny |
| Food Service | 11,166 DGSF | 188 Beds | 59 DGSF/Unit | 50 DGSF/Unit | 19% | Basement, Kenny/ Sacred Heart. Kitchen area min. 1200 NSF and 30 DGSF/bed- Without Subway/Conference or 1st Coffee |
| Food Service & Subway | 13,269 DGSF | 188 Beds | 71 DGSF/Unit | 50 DGSF/Unit | 41% | Basement, Kenny/ Sacred Heart. Kitchen area min. 1200 NSF and 30 DGSF/bed. With Subway/ Conf. |
| Kitchen | 4,564 DGSF | 188 Beds | 24 DGSF/Unit | 30 DGSF/Unit | -19% | Back of House Kitchen only |

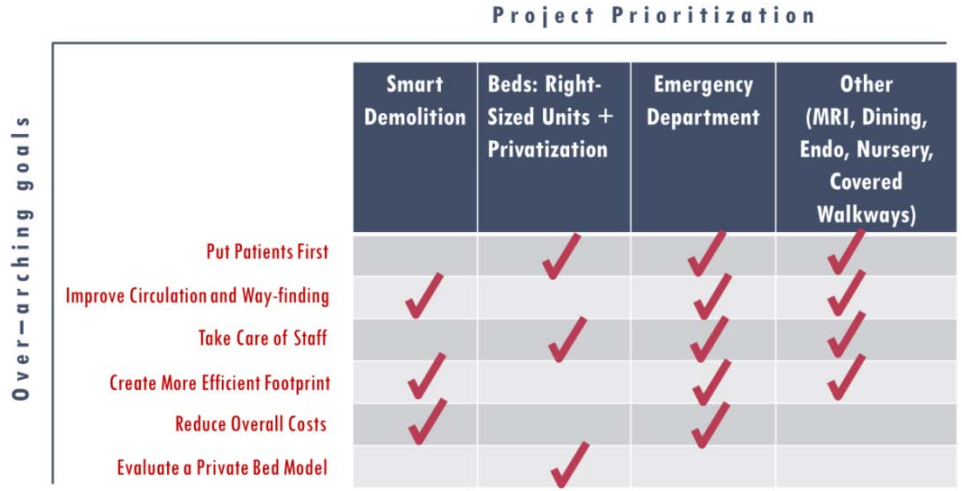
# Data & Planning Parameters and Corridors of Growth (continued)

## Recommendation Summary

Based on data analytics and scenario planning, aligned with the Steering Team's overarching goals, the Planning Team prioritized the facility needs and recommended responses.

- The Planning Team recommends "smart demolition" for Lawlor, Slocum, and Xavier to reduce the footprint of the campus and create a more lean and efficient environment.
- Additionally, the Team recommends relocating and renovating select inpatient units to increase privatization and move towards right sizing.
- Renovation and potential expansion of the ED was also a strong priority based on patient expectations, staffing needs, and efficiency.
- Finally, several other priorities were identified through the master planning process, including a dining renovation/expansion, MRI relocation, Endo expansion, Nursery expansion, and exterior campus improvements for patient and staff navigation.

Options for all of these priorities were developed, discussed, and vetted prior to final selection and recommendations.



# Data & Planning Parameters and Corridors of Growth (continued)

## Recommendation Summary: Department Needs

| Service | Need/ Recommendation Summary | Comments |
|---|---|---|
| ED | • Main ED: 38 spaces<br>• Psych: 10 spaces | • Bookend is 38-54 spaces depending on operations and urgent care model. |
| IP | • 173 Beds (inc. 24 ICU beds) | • Bookend is 173-178 beds depending on LOS and market share assumptions. |
| ORs | • 8-9 ORs<br>• Renovation is cost prohibitive. | • Current available ORs is 10; however size is a concern for staff and scheduling. |
| Imaging | • Xray: 3<br>• CT: 2<br>• MRI: 1<br>• Ultrasound: 3<br>• Nuc Med: 2.5 | • Overall a need does not exist in Imaging; however, Nuc Med may reach the need for 3.<br>• Move 1 CT to main ED.<br>• The location of the MRI is a concern due to the need to pass through the ED for all patients. Recommend moving to ED admin area. |
| Cath | • 2.4 Cath Labs | • 2.4 is based on existing operations of 3 days per week. Future need may require additional scheduling capacity. |

# Facility Options Development

## Scenarios / Option Summary

The following Scope / Programmatic Summary per Option graphically illustrates the various options that were explored through the master planning process. Options were developed “a la carte” so that the Steering Committee could align the facility response with final priorities and capital availability. The Planning Team discussed the benefits and costs of each option before a final scenario was recommended to SMH. Additionally, phasing and timing of each option was also presented and discussed.

# Facility Options Development (continued)

## Scenarios / Option Summary (continued)

| | Option A | Option B | Option C |
|---|---|---|---|
| Beds | **Demolition, Renovate ICU in place, New Units 8 & 5 O'Brien, Bridge to Kenny, Reduction to Women's**<br>• 177 beds, 89% Private, **35,000 SF impact** | **Demolition, Relocate ICU, New Unit 8 O'Brien, 3 O'Brien reno, Bridge to Kenny, Reduction to Women's**<br>• 175 beds, 91% Private, **52,230 SF impact** | **Demolition, Relocate ICU, New Unit 8 O'Brien, 3 O'Brien reno**<br>• 178 beds, 87% Private, **33,800 SF impact** |
| ED | **Improved Ops with UCC Nearby**<br>• Move Behavioral Health (BH) to ED Admin Area, with exterior expansion (triggers Dining Expansion)<br>• 38 Treatment Spaces + 10 Behavioral Health<br>• 1,900 SF new, 29,760 SF renovated (13,000 Aesthetics only) | **Improved Ops with UCC on Same Site**<br>• Move BH to ED Admin Area, with exterior expansion (triggers Dining Expansion)<br>• New UCC Drop-off at Union St.<br>• 38 Treatment Spaces + 10 Behavioral Health + 6 UCC bays<br>• 7,600 SF new, 30,000 SF renovated (15,000 Aesthetics only) | **Current Operations**<br>• New Addition on Lawlor site for 18 new treatment rooms<br>• Behavioral Health splits between ED Admin area (no new construction) and existing 4-bed area<br>• 65 Total Treatment Spaces (53 + 12 Behavioral Health)<br>• 14,000 SF new, 27,300 SF renovated (19,000 Aesthetics only) |
| Admin/ Non Clinical | **Renovate Holiday Inn to relocate displaced non-clinical and administrative functions and develop Urgent Care Site** | **Demolition of Holiday Inn**<br>**Construction of POB to relocate displaced non-clinical and administrative functions and potentially develop Urgent Care Site** | |
| Infra-structure | **Required Maintenance**<br>• Replace Xavier unit substation, Upgrade emergency generator system , Replace O'Brien 6th floor air handling unit | **Additive and elective to Option A**<br>• Replace vacuum pump, Replace clean agent systems , Repair chiller flow issue, Add new chiller (for redundancy) | |
| Imaging | **Imaging Renovation in ED: MRI Relocation and CT addition** | | |
| NICU | **NICU & Newborn Nursery Combined Workroom** | | |
| Surgery /Endo | **Expand 3 ORs with minor new construction** | **Endo Suite Reduction for Waiting Relocation or Prep/Recovery Expansion** | |
| Dining | **Associated with ED Option A& B**<br>• 10,700 SF, 2-story addition with entry canopy, new servery | | |

# Facility Options Development (continued)

## Bed Test Fit & Initial Cost Estimates:

- ICU Renovates in place on 3rd
- Bridge to 3 Kenny, addition 8 ICU beds
- Reduction to Women's Dept.
- New Units 8th and 5th O'Brien
- No updates to 7 O'Brien, 5 SH, 3 SH, 1 O'Brien
- Total of 177 beds, 89% Private, **35,000 SF impact**

**$16.3 Million**

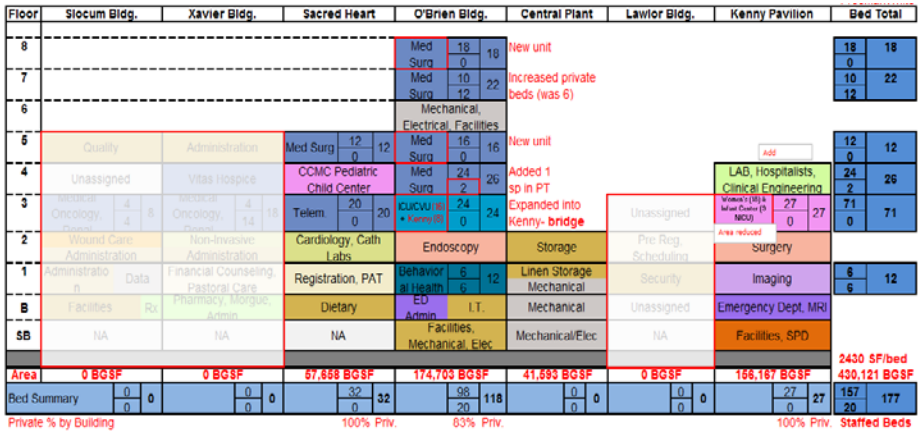
- ICU Moves to 5 O'Brien + 5 Kenny
- 3rd Floor O'Brien renovates fro M/S
- Bridge to 3 Kenny for 8 additional M/S beds
- Reduction to Women's Dept.
- New Unit 8th O'Brien
- No Updates to 7 O'Brien, 3 SH, 1 O'Brien
- Total of 175 beds, 91% Private, **39,800 SF impact**

**$18.1 Million**

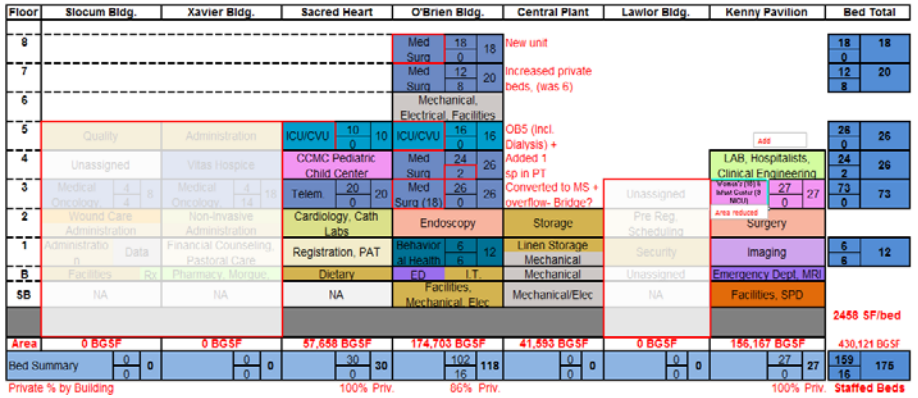
- ICU Moves to 5 O'Brien + 5 Kenny
- 3rd Floor O'Brien renovates fro M/S
- No bridge; Women's unchanged
- New Unit 8th O'Brien
- No Updates to 7 O'Brien, 3 SH, 1 O'Brien
- Total of 178 beds, 87% Private, **33,800 SF impact**

**$15.1 Million**

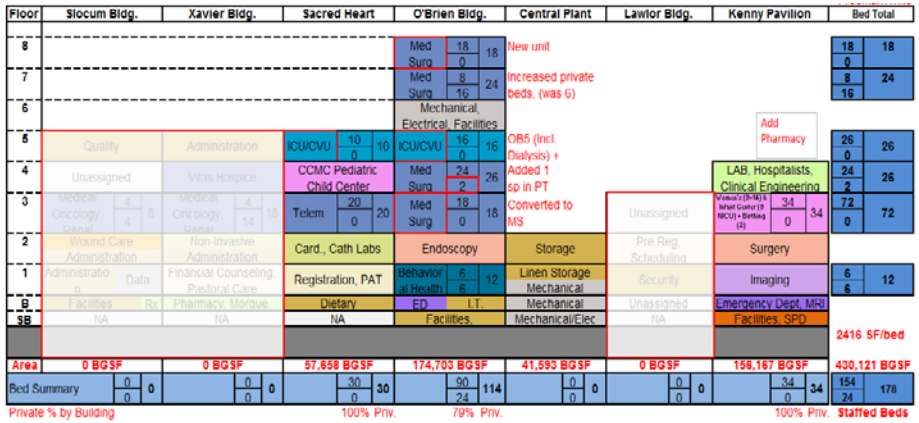
**Test Fit 1, 177 Beds, 89% Private**




**Test Fit 2, 175 Beds, 91% Private**




**Test Fit 3, 178 Beds, 87% Private**



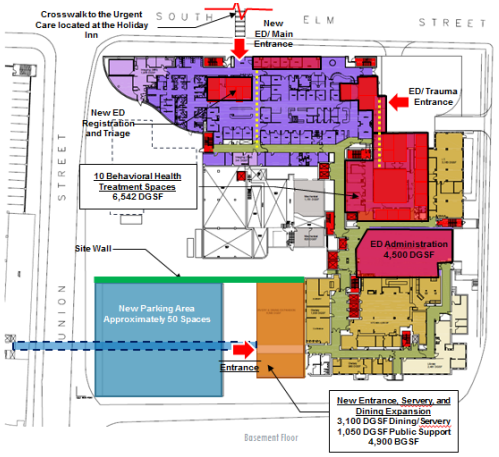
# Facility Options Development (continued)

## ED Options & Initial Cost Estimates:

- Move BH to ED Admin Area, with exterior expansion
- ED Admin move triggers Dining Expansion (separate cost)
- Portion of UCC volume is siphoned across street (separate cost)
- New Front Entry aligned with UCC across street, new Triage, new Resusc. room
- **38 Treatment Spaces + 10 Behavioral Health**
- **1,700 SF new, 31,500 SF renovated (15,00 Aesthetics only)**

**Improved Ops with UCC Across the Street**

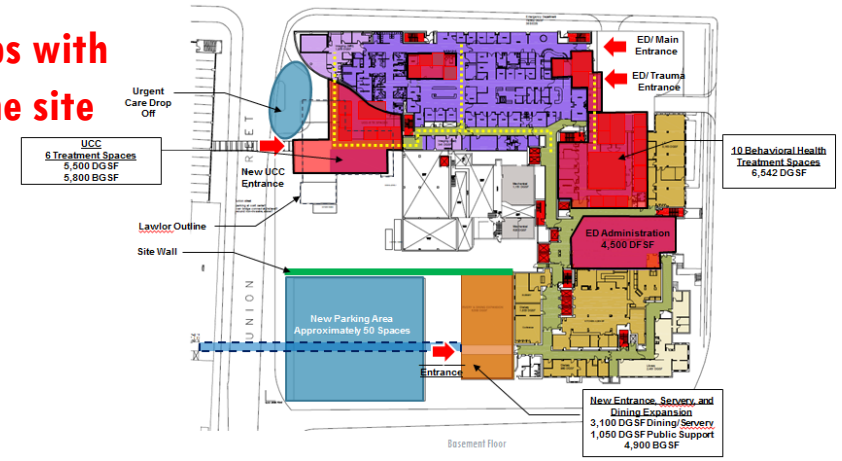
$10.4 Million (Excludes UCC costs)




- Move BH to ED Admin Area, with exterior expansion
- ED Admin move triggers Dining Expansion (separate cost)
- Portion of UCC volume is siphoned off to separate entry off Union St.
- New UCC Drop-off
- **38 Treatment Spaces + 10 Behavioral Health + 6 UCC bays**
- **7,600 SF new, 30,000 SF renovated (15,000 Aesthetics only)**

**Improved Ops with UCC on same site**

$14.1 Million ($3.8 m for UCC new construction)



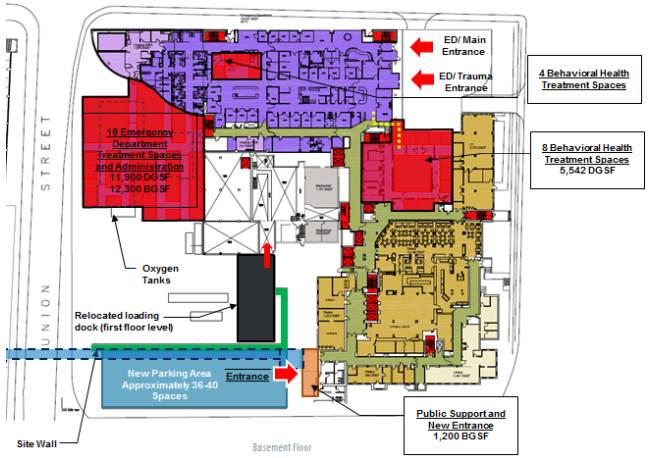
# Facility Options Development (continued)

## ED Options & Initial Cost Estimates: (continued)

- New Addition at Lawlor site for 18 new treatment rooms
- Behavioral health splits between ED Admin area (no new construction) and existing 4-bed area
- Requires new dock, can not support option with new dining expansion
- **65 Total Treatment Spaces (53 + 12 Behavioral Health)**
- **14,000 SF new, 27,300 SF renovated (19,000 Aesthetics only)**

$17.1 Million (no UCC in this option)

**Current Operations**




***FreemanWhite quantified the cost of <u>not</u> making operational improvements and identified $6.7 million in facility investments that would be necessary to accommodate projected ED need if no operational changes are implemented.***

# Facility Options Development (continued)

## Additional Associated Master Plan Efforts & Initial Cost Estimates:

**Demolition**

- Demolition (approx. 122,000 SF @ $35/SF construction) $6.5 Million

AND

- Collateral Impacts from Demolition $5.4 Million
  - Data Center, Pharmacy, Morgue, Admin, Pastoral Care, oxygen tank relocation, Approx. 11,000 SF

**Holiday Inn Site**

- Holiday Inn Renovations $18.5 Million

OR

- New Admin Building in lieu of renovating Holiday Inn $32 Million
  - Includes Demolition and 72,000 BGSF new Construction for Admin and light outpatient functions

**Xavier/Slocum Site**

- New Dining Expansion with Surface Parking at Slocum/Xavier Site $4.4 Million
  - Includes 7,500 SF, 2-story addition with entry canopy, new servery and dining

OR

- New Entry with Surface parking and New Dock (ED Current Ops) $3.2 Million

# Facility Options Development (continued)

## Additional Associated Master Plan Efforts & Initial Cost Estimates: (continued)

**Bridges**

- Bridge from Conference Center to new Dining Expansion (200-300 LF) $4-6 Million
  - Length dependent on if Dining Expansion Option is selected

Elective: AND/ OR

- Bridge from Kenny to Holiday Inn (120 LF + 71 LF walkway) $4-5 Million

**Other**

- Surgery- Expand 3 ORs with minor new construction $2.6 Million

Elective: AND/OR

- Endo Suite Reduction for Waiting or Prep/Recovery $800k

Elective: AND/OR

- Imaging Renovation in ED: MRI Relocation and CT addition $2 Million
  - Includes estimate to relocate CT, but equipment purchase prices excluded

Elective: AND/OR

- NICU & Newborn Nursery Combined Workroom $400k

# Facility Options Development (continued)

## Additional Master Plan Considerations from FCA & Initial Cost Estimates:

**Engineering**

- Replace Xavier unit substation $600 Thousand
  - Remove high voltage (13.8-kv) substations located in Xavier during demolition. (one emergency power substation and one normal power substation).
  - Install new 480-volt transformers and switchgear (normal and emergency power) for new addition.

AND

- Upgrade emergency generator system (new 750-kw) $600 Thousand
  - Replace two smaller old generators with one large 750-kw and synch with (2) existing 750-kw units.
  - Achieves N+1 scenario, better reliability, centralized control, and ability to load shed.

Elective: AND

- Replace O'Brien 6th floor air handling unit $400 Thousand
  - Old unit has reached end of useful life.
- Replace vacuum pump $200 Thousand
  - Old Pump has reached end of useful life.
- Replace nitrous oxide manifold $25 Thousand
  - Old manifold has reached end of useful life.
- Replace clean agent systems $50 Thousand (per room x5)
  - FM200 extinguishing agent will eventually become prohibited. Recommend newer, safer extinguishing agent Novec 1230.
- Repair chiller flow issue $25 Thousand
  - O'Brien is not achieving optimal flow. Diagnostics and repair recommended.
- Add new chiller (for redundancy) $800 Thousand
  - Achieves N+1 scenario. Current chilled water system near capacity.
  - Provides backup cooling in the event of a primary chiller failure.

**Total Elective FCA Items: $1.7 Million**

**Total Elective Additional Master Plan Considerations (FCA + Bridges + Other) = $14.4 Million**

# Final Recommendations & Costs

Assessing service area demographics, future service line needs, current Hospital operational and space challenges, and the Steering Committee's strategic priorities and goals, FreemanWhite developed final recommendations for the optimal facility response, again in balance with fiscal responsibility. The areas highlighted below represent the recommended path that Saint Mary's Hospital pursue in developing its plan and priorities over the next 10 years.

| | Recommendation | Option B | Option C |
|---|---|---|---|
| Beds | **Demolition, Renovate ICU in place, New Units 8 & 5 O'Brien, Bridge to Kenny, Reduction to women's**<br>• Total of 177 beds, 89% Private, **35,000 SF impact** | **Demolition, Relocate ICU, New Unit 8 O'Brien, 3 O'Brien reno, Bridge to Kenny, reduction to women's**<br>• Total of 175 beds, 91% Private, **52,230 SF impact** | **Demolition, Relocate ICU, New Unit 8 O'Brien, 3 O'Brien reno,**<br>• Total of 178 beds, 87% Private, **33,800 SF impact** |
| Emergency Department | **Improved Ops with UCC Nearby**<br>• Move BH to ED Admin Area, with exterior expansion (triggers Dining Expansion)<br>• 38 Treatment Spaces + 10 Behavioral Health<br>• 1,900 SF new, 29,760 SF renovated (13,000 Aesthetics only) | **Improved Ops with UCC on same site**<br>• Move BH to ED Admin Area, with exterior expansion (triggers Dining Expansion)<br>• New UCC Drop-off at Union St.<br>• 38 Treatment Spaces + 10 Behavioral Health + 6 UCC bays<br>• 7,600 SF new, 30,000 SF renovated (15,000 Aesthetics only) | **Current Operations**<br>• New Addition at Lawlor site for 18 new treatment rooms<br>• Behavioral health splits between ED Admin area (no new construction) and existing 4-bed area<br>• 65 Total Treatment Spaces (53 + 12 Behavioral Health)<br>• 14,000 SF new, 27,300 SF renovated (19,000 Aesthetics only) |
| Admin/Non Clinical | **Renovate Holiday Inn to:**<br>**Relocate displaced nonclinical and administrative functions, and develop Urgent Care Site** | **Demolition of Holiday Inn**<br>**Construction of POB to: relocate displaced nonclinical and administrative functions, and potentially develop Urgent Care Site, 20,000 SF footprint** | |
| Infrastructure | **Required Maintenance**<br>• Replace Xavier unit substation, Upgrade emergency generator system , Replace O'Brien 6th floor air handling unit | **Additive and elective to Option A**<br>• Replace vacuum pump, Replace clean agent systems , Repair chiller flow issue, Add new chiller (for redundancy) | |
| Imaging | **Imaging Renovation in ED: MRI Relocation and CT addition** | | |
| NICU | **NICU & Newborn Nursery Combined Workroom** | | |
| Surgery/Endo | **Expand 3 ORs with minor new construction** | **Endo Suite Reduction for Waiting or Prep/Recovery** | |
| Dining | **Associated with ED Option A& B**<br>• 10,700 SF, 2-story addition with entry canopy, new servery | | |

# Final Recommendations & Costs (continued)

A schedule was developed as depicted below to demonstrate proposed phasing and estimated costs. In the planning discussions, it was noted that ED operational improvement could begin immediately and that ED Admin could be temporarily relocated in Lawlor to facilitate the renovation/move of behavioral health treatment spaces.

Thus, Lawlor was anticipated to be demolished last in terms of phasing, after ED renovations/ expansions were complete. Urgent Care volumes might be shifted out of the ED more quickly if the Urgent Care were targeted to move into existing real estate instead of waiting for demolition and construction at the Holiday Inn site. It was further noted that inpatient bed plans would benefit from the "open chair" of vacant space on the 8th floor of O'Brien, and thus phasing would include completion of that unit first. These assumptions became part of the overall recommended options and estimates.

| Recommended Options & Notes | Total Cost | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Demolition (Xavier/Slocum then Lawlor)**<br>121,862 SF Demoltion<br>*Includes New 7-Story wall at Sacred Heart* | **$6.7** | | $0.4 | $3.0 | $3.3 | | | | | | | |
| **Beds**<br>New Bridge to Kenny + 51,500 SF Renov.<br>*Includes OB3 & K3, K4, OB4, SH5 & OB5, OB8* | **$19.2** | | $1.0 | $13.5 | $4.7 | | | | | | | |
| **Collateral Impacts & FCA Recommendations**<br>6,700 SF Renovation, FCA totals $1.25M<br>*Pharmacy, Morgue, Data Switch relcoation* | **$5.8** | | $2.0 | $3.8 | | | | | | | | |
| **ED- Improved Operations**<br>(Note $6.7 premium for renovations without Improved Ops)<br>1,700 SF New, + 27,560 SF Renovation<br>*New + BH + 8,300 SF Phased Renov., Admin, Aethetics* | **$9.4** | | $3.1 | $6.3 | | | | | | | | |
| **Urgent Care- Tenant Improvement**<br>4,200 SF UCC assumed in existing storefront<br>*6 Treatment Spaces* | **$1.5** | | $1.5 | | | | | | | | | |
| **Dining Expansion, Front Lawn**<br>10,700 SF New (on 2 floors), 4,300 SF Renovations<br>*Dining + Servery Level B, Admin/Pastoral Care on L1* | **$7.7** | | | | $3.6 | $4.1 | | | | | | |
| **Bridge/ Covered Walkways**<br>750 SF New elevator/Stair for CC Existing bridge<br>*260 LF of covered walkway (to Dining & Kenny) & Canopy @ Main Entry* | **$1.6** | | | | | $1.0 | $0.5 | | | | | |
| **Other: Endo, ED Imaging (CT & MRI), Nursery Workroor**<br>6,100 SF Renovations<br>*Excludes cost for new MRI equip.* | **$2.8** | | | | | $0.7 | $2.1 | | | | | |
| *Total* | ***$54.7*** | *$0.0* | *$7.9* | *$26.6* | *$11.6* | *$5.9* | *$2.6* | *$0.0* | *$0.0* | *$0.0* | *$0.0* | *$0.0* |

Plus $9.2M Total FCA Deferred Maintenance in next 10 years, $920,000 Additional per year

| "Below the Line" Off-Site POB | Total Cost | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Admin POB (Design Build)**<br>40,000 SF Total (2 floors of 20,000 SF)<br>*Demo, Parking + 13,200 SF OP Clinical, 26,800 SF Admin* | **$19.2** | | $12.7 | $6.5 | | | | | | | | |

# Final Recommendations & Costs (continued)

A rendering was developed to depict the potential change in hospital landscape as implementation of the master plan evolves. The Hospital maintains its presence from the highway, but now includes a more open environment to enhance the staff and patient experience. Additionally, the footprint in terms of buildings and annual cost and maintenance has been reduced significantly, allowing opportunity for greater efficiencies and a more lean approach to future health care delivery.

**Existing Union Street View**

**Proposed Union Street View:**

**with Demolition of Slocum & Xavier, Dining Addition Building**

# Final Recommendations & Costs (continued)

## Inpatient Recommendation Detail: Replacing Demolished Units, Right Sizing & Privatizing

### Proposed Stacking Diagram

| Floor | Slocum Bldg. | Xavier Bldg./Dining | Sacred Heart | O'Brien Bldg. | Central Plant | Lawlor Bldg. | Kenny Pavilion | Bed Total |
|---|---|---|---|---|---|---|---|---|
| 8 | | | | Med Surg 18 / 0 — 18 | New unit | | | 18 / 0 — 18 |
| 7 | | | | Med Surg 12 / 8 — 20 | Increased private beds, (was 6) | | | 12 / 8 — 20 |
| 6 | Demolished | Demolished & New Dning Expansion | Peds moves to OB4, Vitas Shifts to SH | Mechanical, Electrical, Facilities | | | | |
| 5 | Quality | Administration | ICU/CVU 10 / 0 — 10 | ICU/CVU 16 / 0 — 16 | OB5 (Incl. Dialysis) + SH5 to Added 1 sp, "tail" on OB4 for Peds Convert to MS + bridge to MS | Demolished, but in later phase. Use as interim location for demolition staging. | Add Pharmacy to | 26 / 0 — 26 |
| 4 | Unassigned | Vitas Hospice | Vitas Hospice | Med Surg 24 / 2 — 26 | | | Lab, Hospitalists, Clinical Engineering | 24 / 2 — 26 |
| 3 | Med Onc., Renal 4 / 4 — 8 | Med Onc., Renal 4 / 14 — 18 | Telem. 20 / 0 — 20 | Med Surg 18 + 8: 26 / 0 — 26 | | Unassig | LDR Area reduced; Women's (18) & Infant Center (9 NICU) 27 / 0 — 27 | 73 / 0 — 73 |
| 2 | Wound Care Administration | Non-Invasive Administration | Cardiology, Cath Labs | Endoscopy | Storage | Pre Reg, Scheduling | Surgery | |
| 1 | Administration / Data | Financial Counseling; Pastoral Care/ Admit | Registration, PAT | Behav. Health 6 / 6 — 12 | Linen Storage / Mechanical | Security | Imaging | 6 / 6 — 12 |
| B | Facilities / Rx | Pharmacy; Dietary | Dietary; ED Admin | ED - BH; MRI; IT | Mechanical | Unassigned | Emergency Dept. | |
| SB | NA | New construction | NA | Facilities, Mechanical, Elec | Mechanical/Elec | NA | Facilities, SPD | |
| | | | | | | | | 2458 SF/bed |
| Area | 0 BGSF | 0 BGSF | 57,658 BGSF | 174,703 BGSF | 41,593 BGSF | 0 BGSF | 156,167 BGSF | 430,121 BGSF |
| Bed Summary | 0 / 0 — 0 | 0 / 0 — 0 | 30 / 0 — 30 | 102 / 16 — 118 | 0 / 0 — 0 | 0 / 0 — 0 | 27 / 0 — 27 | 159 / 16 — 175 |
| Private % by Build | | | 100% Priv. | 86% Priv. | | | 100% Priv. | Staffed Beds 91% Private |

### Renovate OB 8 & OB 3 to create MS Units

- OB 8 (Vacant) + OB 3 (was ICU) renovated, 603 DGSF/ bed 610 DGSF/ bed

### Bridge to Kenny 3, reduce WIC beds

- Reduce WIC to 5-6 LDRS, 18-19 PP + NICU
- Use 5,500 SF to create 8-bed M/S expansion into Kenny 3

### New ICU on 5th Floor

- Use OB 5 + SH 5 for ICU/ CVU + Dialysis, 687 DGSF/ bed

### Bed Count & % Private

- Reduce beds from 188 to 175
- 91% private

# Final Recommendations & Costs (continued)

## Inpatient Bed Recommendation Detail: Third Floor Plan: "Bridge" to Kenny with 8 new Med-Surg Beds

**Women's and Infants Center (W.I.C.)**
Total 20,060 DGSF

**LDR + C-Section**
9,000 DGSF
(5-6) Spaces
1,500 DGSF/Unit
Benchmark 1,450 DGSF/Unit

**Post Partum + Well-Baby**
9,505 DGSF
(12) Spaces
792 DGSF/Unit
Benchmark 750 DGSF/Unit

**NICU**
1,575 DGSF
(9) Beds
Existing 175 DGSF/Bas
Benchmark 450 DGSF/Bas
(-61%)

@ 4 Beds
394 DGSF/Bas
(-13%)

**New M/S Unit**
Total 16,000 DGSF
26 beds

**Kenny3 M/S**
5200 DGSF
8 Spaces
650 DGSF/Unit
Benchmark 600-650 DGSF/Unit

**O'Brien 3 M/S**
10,800 DGSF
600 DGSF/Unit
Benchmark 600-650 DGSF/Unit


Notes:

- Birthing Center is eliminated.
- Opportunity to create staffing synergies between NICU and Nursery with shared workroom.
- New bridge created to traverse 40" floor to floor difference between Kenny and O'Brien 3.

# Final Recommendations & Costs (continued)

## Inpatient Bed Recommendation Detail: Fifth Floor Plan: ICU Relocates to O'Brien 5

- Total of 26 ICU Rooms co-located with minimal through-traffic
- 16 ICU Rooms- O'Brien 5 :
  - 11,110 DGSF
  - 694 DGSF/Bed (700-750 DGSF/Bed target)
- 10 ICU Rooms- Sacred Heart 5:
  - 7,500 DGSF
  - 750 DGSF/Bed (700-750 DGSF/Bed target)
- Complex Renovations:
  - Convert PT/OT to patient rooms
  - Corridor shift in O'Brien
  - New Patient Room Windows, depending on placement
  - New Support Core
  - New Nurse Station

# Final Recommendations & Costs (continued)

## Inpatient Bed Recommendation Detail: Fourth Floor Plan: Consider Vitas Shifting to SH4, Peds to OB "Tail"

- Peds becomes absorbed in M/S Unit
- With demolition of Xavier/Slocum, if relocation of Vitas is necessary, consider dislocating CCMC Pediatric Unit on SH4.
  - Shift to "tail" of OB4,
  - Maximize security (end of unit/ corridor doors to seclude)
  - Flex with widely varying pediatric census.
  - Assume aesthetic-only upgrades for both areas
  - Assume lease arrangement with CCMC is absorbed into Saint Mary's total bed count, as part of the 175 Bed complement.

# Final Recommendations & Costs (continued)

## Inpatient Recommendation Detail: Eighth Floor Plan: Alternative Option for CCMC Peds

- If CCMC Pediatrics requires dedicated, leasable space, a secured area near entry doors & elevator could be created on 8th floor as part of planned Med-Surg renovation.
  - 4 Rooms
  - 2,140 DGSF (535 DGSF/Room)
- Remainder of unit would be Med-Surg
  - 14 beds
  - 8,700 DGSF (621 DGSF/Room)

This option would require 6 semi-private beds be added to the proposed bed model to keep the overall bed count at 175 Saint Mary's beds. % semi-private would adjust from 91% to 88%.

# Final Recommendations & Costs (continued)

## Inpatient Bed Recommendation Detail: Demolition: Relocation and Push Strategy

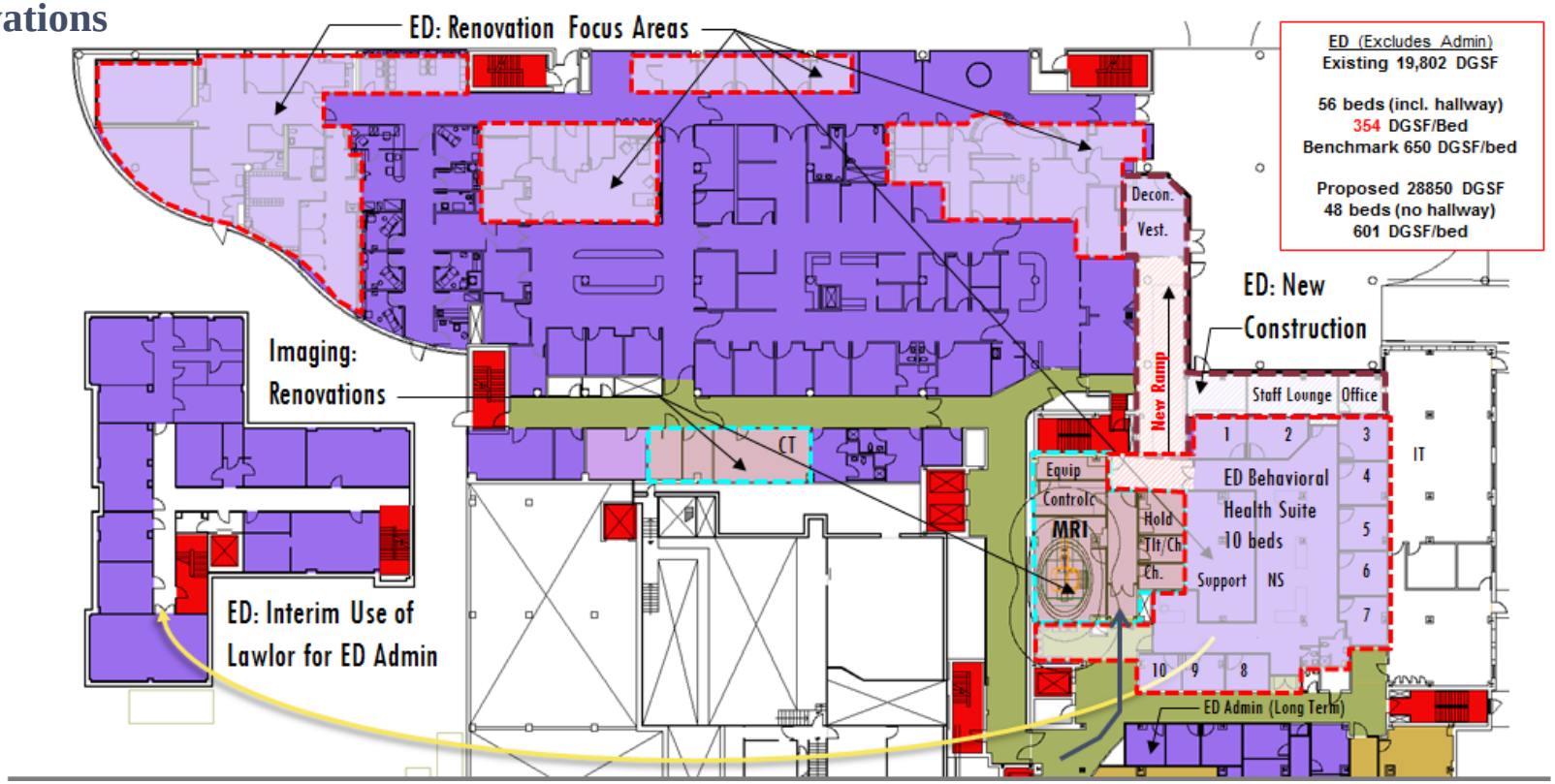
### Identified Collateral Impacts from Xavier, Slocum and Lawlor at the Detail Level

- Working with Senior Administration, FW identified opportunities for relocation within the hospital, in future expansion plans, or in existing ambulatory and office sites.

| Department Affected | Size | Potential Locations | STM Comments/Concerns | FWI Recommendation, if in hospital |
|---|---|---|---|---|
| Pharmacy | 4185 | TBD | Consider decentralization | Decentralize and move inpatient pharmacy to 4th Floor Kenny, reduce Lab. |
| Pastoral care | 2804 | TBD | Needs fluid building access | Interim Lawlor or other, with LT location on first floor of Dining Addition |
| ED | 199 | TBD | Not sure what this is @199 sqft | Include in ED admin area, if necessary. Interim Lawlor, LT in existing dining area. |
| Morgue | 767 | TBD | Needs to be in building. Need to consider F/D egress | Consider either O'Brien Basement in existing dining/servery or sub basement |
| Xavier 3 | 7756 | OB8 | Creates issues with VITAS | |
| Wound Care | 2922 | Off site | O2 farm needed | |
| Cardiac Rehab | 1090 | East main, MOB, POB | Needs under roof MD coverage | |
| VITAS | 9234 | CCMC Unit? | ? Minimum Pedi unit requirement | Consider shifting Vitas to SH4 (Peds) and Peds to M/S “tail” of OB4 or OB8 |
| Communication | 1307 | Offsite, switch relocated | Switch relocation doable but no small project | |
| EKG | 535 | Looking to d/c | Move EKG work into units. Reads into full IT system | |
| EEG | 416 | TBD | Small area ?MOB | |
| HR | 3087 | Offsite | Maybe Croft | |
| Security | 1426 | MOB 1st or 3rd floor | Need fluid campus access | |
| Med Residents (Lawlor) | 3954 | TBD | ?RRC requirements | Lawlor with LT location in POB, if RRC "adequate sleep facility" |
| Med Residents (Xavier) | ? | TBD | Probably needs to be within building | Consider interim Lawlor with LT location in POB, if RRC "adequate sleep facility" |
| HIM | 5975 | Croft | Needs to aggressively pursue downsizing and WFH | Central Plant Laundry |
| C/E | 826 | Central Plant Laundry | | Central Plant Laundry |
| Plant Ops | 4597 | Central Plant Laundry | | |
| accounting | 1431 | relocate into pt access | | |
| Foundation | 1220 | Croft | Could go anywhere | |
| Resp therapy | 441 | main buildings | Small workroom | Consider O'Brien 8 at elevators or O'Brien 6 at EVS overflow |
| Dept. of Med/IC | 1112 | MOB 1st or 3rd floor | | |
| Admitting office | 552 | TBD but Small office | | Include in first floor of Dining Addition |
| PSO | 1695 | Offsite | Maybe Croft as space permits | |
| IC/ID | 574 | MOB 1st or 3rd floor | Needs fluid building access | |
| QM | 1910 | Croft | | |
| Admin | 3298 | Croft | | |
| FNS (Lockers and B/Rs) | 660 | Relocate | | Include in basement level of O'Brien in vacated dining/servery space |
| Central Sched | 213 | Small office, relocate | | Include in first floor of Dining Addition |
| Volunteer services | 123 | Small office, relocate | | Include in first floor of Dining Addition |
| Nursing Services | 2401 | Croft? | Need to research needs | |
| Med Staff office | 406 | Croft | | |

# Final Recommendations & Costs (continued)

## ED Recommendation Detail: Basement Plan: ED Addition & Renovation, Imaging Renovations




### Emergency Department:

- Interim relocation of ED Admin to Lawlor. Long-term location in Dining Area.
- Renovate 4,700 SF of ED Admin to create 10-bed dedicated Behavioral Health Area
- Create 1,900 SF new Addition to connect ED with Behavioral Health, add new ramp, decon.
- Renovate Emergency Department, with focus on key areas
- Improve operations to eliminate need for hallway beds, siphon UCC volumes to nearby site
- Total ED Treatment Spaces with assumed UCC site and improved operations: 38+ 10 BH = 48

### Imaging, Basement Level:

- Add CT for ED patients adjacent to ED Rad, with shared control room
- Relocate MRI to portion of ED Admin area, accessible from public corridor. MRI includes 4 levels of security. Can be phased with interim Admin relocation to Lawlor.

** Floor to Floor height & structural limitations in this area need to be field verified and coordinated with vendor.

# Final Recommendations & Costs (continued)

## ED Recommendation Detail: Second Floor Plan: Endoscopy Renovations


**Endoscopy**
3,623 DGSF Existing
(6) Procedure Rooms
Existing 604 DGSF/Unit
Benchmark
1,650 DGSF/lab
(-63%)

If reduced to 2 Endo Rooms
1,885 DGSF
943 DGSF/ lab

If Endo reduces, opportunity for net add of 4 Prep/Recovery bays or More private surgery waiting area off corridor

**MOB Bridge**

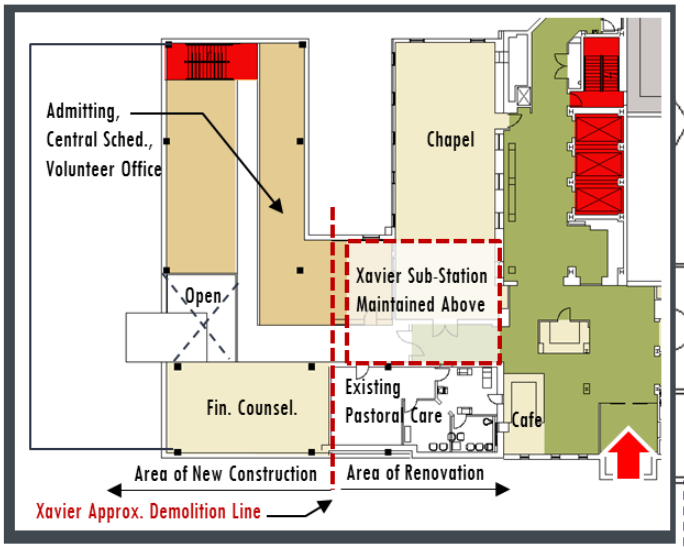
Cath traffic crosses public entry, but potential to relocate Card Rehab opens possibility to recovery Cath patients in same area.

# Final Recommendations & Costs (continued)

## Dining Recommendation Detail: Proposed Site Plan

# Final Recommendations & Costs (continued)

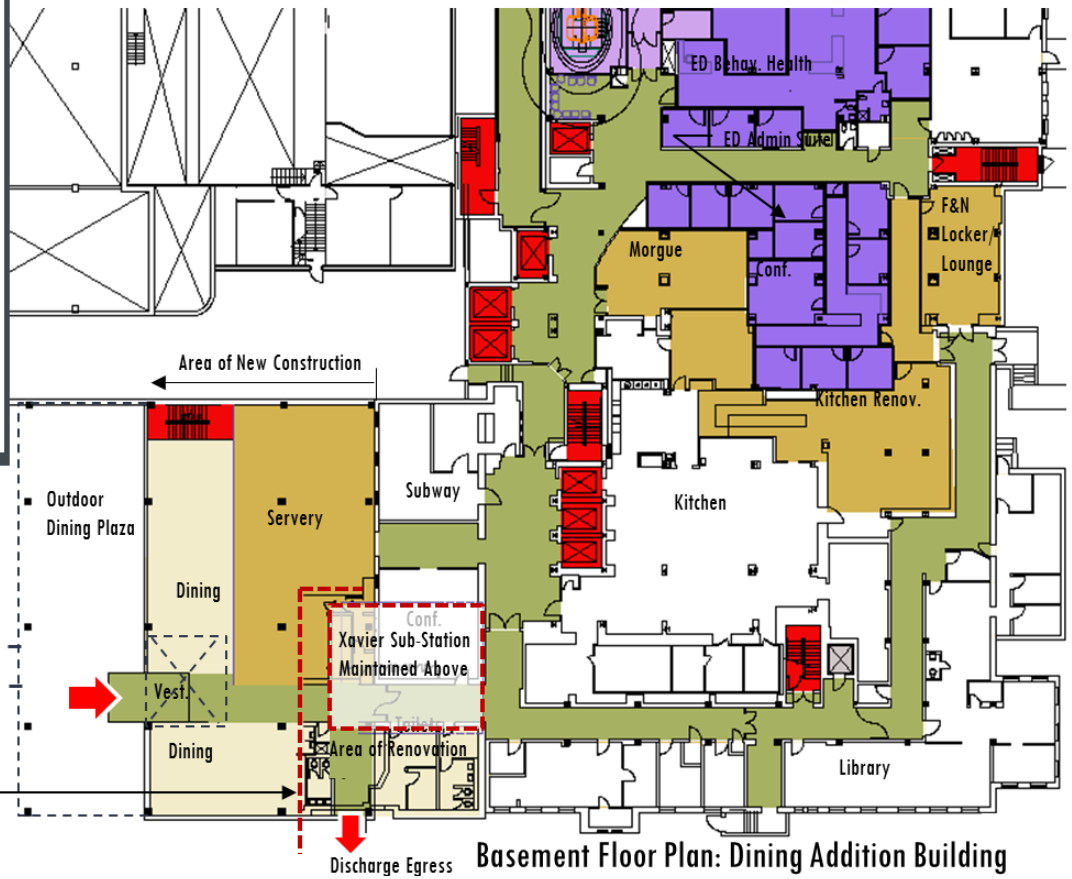
## Dining Recommendation Detail: Dining Addition Basement Floor




First Floor Plan: Dining Addition Building

Maintain Xavier Sub-Station, Shift demolition line, pending structural coordination

(Xavier stair & morgue demolished, but sub-station & Pastoral Care remain)




Basement Floor Plan: Dining Addition Building

Maintenance of Xavier Sub-Station savings estimated at $300-$400,000 (equipment only) plus associated phasing costs to NOT demolish that portion of Xavier.

**Dining Addition Building:** Two-story addition (Basement and First Floors) totaling approx. 10,700 SF

- Basement Level includes relocation of servery and public/staff dining with opportunity for natural light/ outdoor dining area. ED Admin suite and additional support services spaces to be located in backfill of existing dining/servery area. Morgue to relocate, but Xavier sub-station on roof to be maintained.
- First Floor includes relocation of public support office space that was displaced in Xavier demolition.

# Final Recommendations & Costs (continued)

## Recommendations Detail: Optional Bridge/Walk Connections

- Ambulatory ED entrance to Holiday Inn
  - In lieu of bridge: partially close South Elm Street and create a traffic circle with pedestrian cross walk in order to minimize traffic and provide safe access.
  - 115 LF (covered walk) from POB

- Main hospital entrance to parking garage
  - Span over street (existing bridge) and connect down with a covered walkway to the new entry.
    - 1,000 SF (V. circ.) + 148 LF (covered walk) with dining expansion

# Final Recommendations & Costs (continued)

## Cost Estimating Approach

High level cost estimates were developed to provide Saint Mary's Hospital with an order of magnitude for each master facility plan component. As previously shown, the recommended options were then combined for a final cost estimate for the complete project ($55M excluding the POB). FreemanWhite then estimated the payback period based on the cost of the project compared to maintaining operations and facilities as is. The payback period was estimated at 6-7 years, within the master planning calendar.

- Major Components
  - Beds + ED
  - Additional Associated Master Plan Efforts
  - Demolition, Collateral Impacts & FCA
  - Holiday Inn Site (New POB)
  - Dining Expansion
- Additional Considerations
  - Bridge/ Covered Walkways
  - Other (Endo, Imaging, Nurseries)

**General CT Regional Construction Cost Assumptions**

- Demolition $35-55/SF (No asbestos)
- Aesthetics Only $70/SF
- Light Renovation $150-175/ SF
- Heavy Clinical Renovations $250/SF
- Non Clinical New Construction $300/SF
- Heavy Clinical New Construction $365/SF
- Bridge $850-1100/ SF

- **Total Project Cost = Construction Cost + Associated Soft Costs (Escalation, Contingencies, Fees & Equipment)**

# Final Recommendations & Costs (continued)

## Annual Operating & Maintenance/ Demolition Comparison

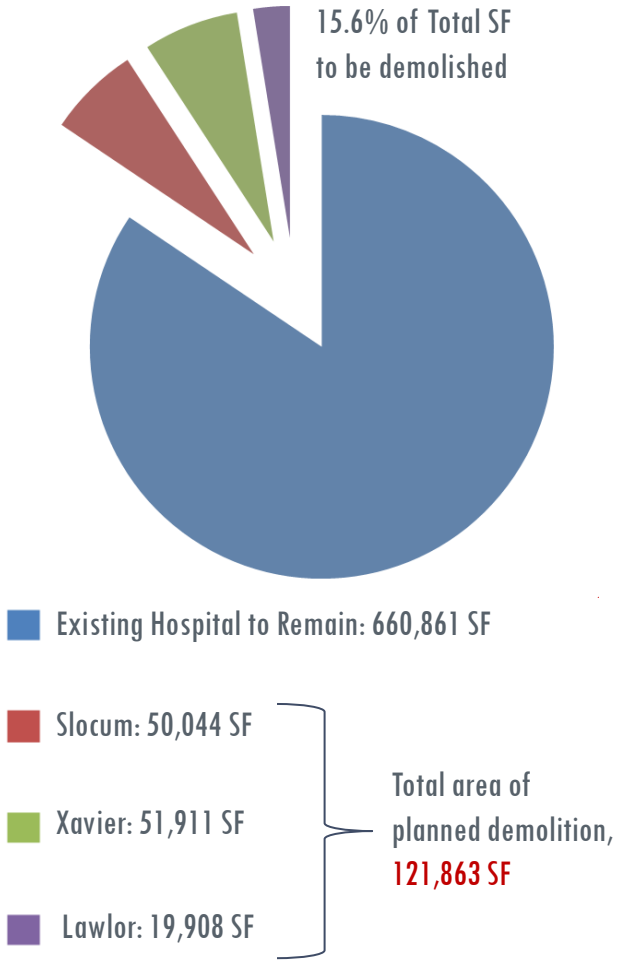
### Annual Operating & Maintenance

| **Operating Costs*** | |
|---|---|
| Facilities Department Labor | $ 1,077,300 |
| Facilities Departmental Material/Fees/Sodexho** | $ 2,344,160 |
| Electrical | $ 1,504,000 |
| Gas/Sewer/Water | $ 1,304,000 |
| | $ 6,229,460 |
| Total Existing Area Served | 782,724 |
| Total Cost/ SF Operating Cost | $7.96 |
| **Total Deferred Operating Cost for Demolition @ $7.96/SF** | **$ 969,870** |

* Depreciation not included.

** 20% of Facilities Department Materials/fees/Sodexho was excluded from calculation as fixed cost.

*** Assume no asbestos abatement required.




Estimated Total Demolition Cost for 121,863 SF (Xavier, Slocum & Lawlor) , $6.7m ($54/SF Total Project Cost Estimate***)

Estimated Break-Even Period: **6-7 years**

# Final Recommendations & Costs (continued)

**Final Master Plan Recommendations from FCA:**

Engineering

- Replace O'Brien 6th floor air handling unit $400,000
  - Old unit has reached end of useful life and new beds are being added to building

AND

- Upgrade emergency generator system (new 750-kw) $600,000
  - Replace two smaller old generators with one large 750-kw and synch with (2) existing 750-kw units.
  - Achieves N+1 scenario, better reliability, centralized control, and ability to load shed.

AND

- Replace vacuum pump $200,000
  - Old Pump has reached end of useful life.
- Replace Nitrous Oxide Manifold $25,000
- Repair Chiller Flow Issue $25,000

(Unit Substation in Xavier removed from list due to recommended demolition. )

# Final Recommendations & Costs (continued)

## Summary of Recommendations by Phase with Associated Estimated Costs

| Recommended Options & Notes | Total Cost | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Demolition (Xavier/Slocum then Lawlor)**<br>121,862 SF Demoltion<br>*Includes New 7-Story wall at Sacred Heart* | **$6.7** | | $0.4 | $3.0 | $3.3 | | | | | | | |
| **Beds**<br>New Bridge to Kenny + 51,500 SF Renov.<br>*Includes OB3 & K3, K4, OB4, SH5 & OB5, OB8* | **$19.2** | | $1.0 | $13.5 | $4.7 | | | | | | | |
| **Collateral Impacts & FCA Recommendations**<br>6,700 SF Renovation, FCA totals $1.25M<br>*Pharmacy, Morgue, Data Switch relcoation* | **$5.8** | | $2.0 | $3.8 | | | | | | | | |
| **ED- Improved Operations**<br>(Note $6.7 premium for renovations without Improved Ops)<br>1,700 SF New, + 27,560 SF Renovation<br>*New + BH + 8,300 SF Phased Renov., Admin, Aethetics* | **$9.4** | | $3.1 | $6.3 | | | | | | | | |
| **Urgent Care- Tenant Improvement**<br>4,200 SF UCC assumed in existing storefront<br>*6 Treatment Spaces* | **$1.5** | | $1.5 | | | | | | | | | |
| **Dining Expansion, Front Lawn**<br>10,700 SF New (on 2 floors), 4,300 SF Renovations<br>*Dining + Servery Level B, Admin/Pastoral Care on L1* | **$7.7** | | | | $3.6 | $4.1 | | | | | | |
| **Bridge/ Covered Walkways**<br>750 SF New elevator/Stair for CC Existing bridge<br>*260 LF of covered walkway (to Dining & Kenny) & Canopy @ Main Entry* | **$1.6** | | | | | $1.0 | $0.5 | | | | | |
| **Other: Endo, ED Imaging (CT & MRI), Nursery Workroor**<br>6,100 SF Renovations<br>*Excludes cost for new MRI equip.* | **$2.8** | | | | | $0.7 | $2.1 | | | | | |
| *Total* | ***$54.7*** | *$0.0* | *$7.9* | *$26.6* | *$11.6* | *$5.9* | *$2.6* | *$0.0* | *$0.0* | *$0.0* | *$0.0* | *$0.0* |

Plus $9.2M Total FCA Deferred Maintenance in next 10 years, $920,000 Additional per year

| "Below the Line" Off-Site POB | Total Cost | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Admin POB (Design Build)**<br>40,000 SF Total (2 floors of 20,000 SF)<br>*Demo, Parking + 13,200 SF OP Clinical, 26,800 SF Admin* | **$19.2** | | $12.7 | $6.5 | | | | | | | | |

# Final Recommendations & Costs (continued)

## Long-Term Future Bed Tower Options

As the Master Plan Recommendations were finalized, FreemanWhite also considered the facility trajectory in the long term, outside of the 10 year master facility planning horizon. As the Saint Mary's campus continues to age and the Steering Committee continues to balance operational efficiencies, the patient experience, and capital resources, FreemanWhite identified two options for a future replacement bed tower. Understanding the trajectory of the campus will further enable the Steering Committee to prioritize future needs and envision the transformation of its campus.

- **Option 1: Holiday Inn Express Site**
  - Positions future beds near D&T core
  - 32 beds/floor with helipad on roof, structured parking below
  - Requires Bridge Connection
  - Circulation/connection through Kenny not ideal
  - Disrupts MOB zoning along campus perimeter

- **Option 2: MRI/Lawlor Site**
  - Located on contiguous campus
  - Near D&T core but actual connectivity to O'Brien a challenge
  - Creates new front door
  - Requires Demolition- Lawlor + MRI
  - Smaller footprint (24 beds/floor)
  - Disrupts and relocates loading and any CEP expansion

# Appendix

# Appendix -Detailed FCA Report

- The Saint Mary's Hospital facility was built over the last century from the early 1900's through the 1980's and much of the infrastructure is beyond the normal recommend standard for useful life. The facility maintenance staff has done an outstanding job maintaining and upgrading the existing systems to create a facility which even though old by industry standards is quite functional and operates with little down time. The existing boilers are almost 60 years old but are very well maintained and very efficient even by current standards. The chillers and larger air handlers are 20-30 years old which is nearing the typically useful lifespan, but again through good maintenance and upgrades most of the equipment should function well for the next 10 years or so if the level of care is maintained.

- The two air handlers in the O'Brien building serving the 5th, 7th and 8th floors are one exception. While they have been well maintained, their original construction was not as robust as many of the other air handlers and they are in need of replacement. It is recommended to replace these AHUs as soon as possible preferably in conjunction with any major renovations of the spaces served. The older small AHUs serving the Sacred Heart, Xavier and Slocum should be replaced (or removed if demolition is considered) in conjunction with any renovation of the space served.

- The boiler plant and chiller annex are somewhat "land locked" making replacement of large equipment like chillers and especially the boilers almost impossible. Future planning should include means to allow for future replacement of this equipment.

# Appendix -Detailed FCA Report (continued)

## Kenny Loop

- A chiller plant annex adjacent to the boiler plant houses three water cooled chillers and the associated pumps and accessories. The associated cooling towers are located on the roof. The chillers are piped into one chilled water loop which serves the Kenny building including surgery as well as one air handler in the lower level of Xavier.
- A Trane 300 ton water cooled centrifugal chiller was installed in 1990 and is reaching the recommend end of its useful life. The chiller appears to be well maintained and functioning properly. With continued proper maintenance they can continue to be used for several more years.
- A 300 ton York water cooled centrifugal chiller was installed in 1995 and overhauled in 2010. A VFD was added at that time. It is in very good condition and should have many more years of useful life with continued maintenance.
- A second 300 ton York water cooled centrifugal chiller was also installed in 1995 and is approaching the end of its recommend useful life. It is in good condition and appears to have been well maintained. It should have a number of years of useful life with continued maintenance.
- Each chiller has a dedicated cooling tower located on the roof. Two are manufactured by Marley and were installed in 1996. They are reaching the end of their recommended useful life, but have been well maintained and could be used for many more years with continued maintenance and cleaning. One cooling tower is manufactured by BAC was just installed in 2013. This tower has many more years of useful life. Each tower is sized for 300 nominal tons of cooling.

# Appendix -Detailed FCA Report (continued)

## Kenny Loop (continued)

- Condenser water is pumped to each chiller by a dedicated Bell and Gossett condenser water pump sized for the required flow. These pumps were installed in 1990 and have reached the end of their recommended useful life; however they are working well now and could continue to be used for several more years with continued maintenance.
- Each chiller has a dedicated primary chilled water pump each sized for the appropriate flow. One is manufactured by Bell and Gossett and was installed in 1995. The other two are manufactured by Weinman and were installed in 1990. All appear to be in good shape and functioning properly even though the Weinman pumps are beyond their expected useful life.
- Three Bell & Gossett secondary chilled water pumps of various sizes distribute chilled water to the Kenny building and associated air handlers and other loads. These pumps are sizes such that the loss of one pump will not impact the delivery of chilled water from the plant. These pumps were installed in 1992 and 1995 and are reaching the end of their expected useful life but are in good condition and functioning properly.


*York Chiller*

*Trane Chiller*

# Appendix -Detailed FCA Report (continued)

## O'Brien Loop

- The 7th floor of the O'Brien building houses a chiller plant with two water cooled chillers, a flat plate heat exchanger as well as the required pumps and accessories. There are also two air cooled chillers on the adjacent Sacred Heart roof. All four chillers are piped into one chilled water loop which serves the O'Brien, Sacred Heart, Xavier and Slocum buildings.
- The air cooled chillers are both manufactured by Trane and are approximately 150 and 170 tons nominal capacity. They were both installed in 1984 and are past the recommend useful life for this type of equipment. They both appear to be well maintained and are functioning properly at this time. With continued proper maintenance they can continue to be used for several more years.
- A Trane 275 ton water cooled screw chiller was installed in 1990 and is reaching the recommend end of its useful life. This unit has also be the source of noise issues in the spaces adjacent to the mechanical room. The chiller appears to be well maintained and functioning properly. With continued proper maintenance they can continue to be used for several more years.

# Appendix -Detailed FCA Report (continued)

## O'Brien Loop (continued)

- A 300 ton York water cooled centrifugal chiller was installed in 2001. It is in good condition and should have many more years of useful life with continued maintenance. The maintenance staff indicated this chiller does not load properly so the full capacity cannot be obtained. This is possibly due to water flow issues.
- A flat plate heat exchanger was also installed in 2001 which can be used to produce chilled water when the outdoor conditions are cool enough. It is designed for 720 GPM which equates to approximately 240 tons depending on conditions. The heat exchanger has many years of useful life with continued maintenance and cleaning.
- An 1800 GPM induced draft cooling tower manufactured by Marley is located on the roof of the O'Brien building. At a nominal 3 GPM per ton the cooling tower has 600 tons of capacity. Installed in 2001, this cooing tower has many more years of useful life with continued maintenance and cleaning.
- Condenser water is pumped to the chillers by a pair of Bell and Gossett condenser water pumps each rated for 800 GPM. These pumps are connected by a pipe header so one pump could act as a back-up for the other if only one chiller is operating.
- Chilled water is pumped through the chillers by a pair of Taco primary chilled water pumps. One rated for 660 and 720 GPM. These pumps are sized for their respective chillers but are connected by a pipe header so one pump could act as a back-up for the other if only one chiller is operating.

# Appendix -Detailed FCA Report (continued)

## O'Brien Loop (continued)

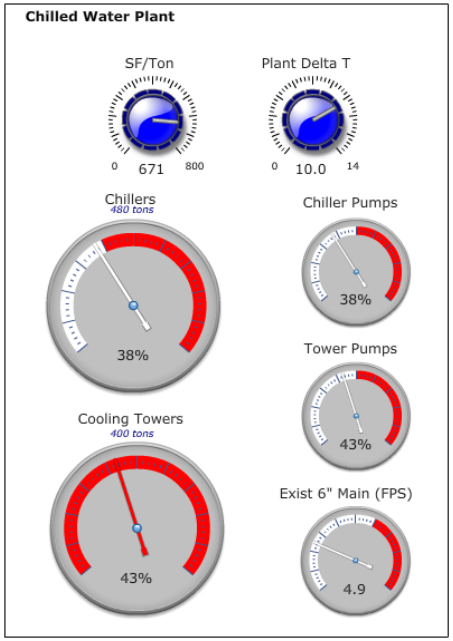
- Two 2400 GPM secondary chilled water pumps are manufactured by TACO. These pumps circulate chilled water through a 10" loop to air handler and other cooling equipment. These pumps have VFDs to regulate the water flow to the cooling load.
- A pair of primary chilled water pumps, located in a penthouse on the Xavier building roof, pump water through the air cooled chillers into the secondary loop. These pumps are manufactured by Bell & Gossett and are rated for 375 and 410 GPM.

# Appendix -Detailed FCA Report (continued)

## OR Chiller

- In addition to the two main chilled water systems, there is a 110 Ton York air cooled chiller on the Kenny Building roof dedicated to the OR air handling unit. All associated pumps are located in the mechanical room adjacent to the OR air handler. The Chiller was installed in 2004 and should have a good bit of remaining life with continued maintenance. In the event this chiller fails the OR air handling unit can be run on building chilled water from the Kenney loop by operating manual valves.

Chilled Water Plant Capacities



# Appendix -Detailed FCA Report (continued)

## Boilers

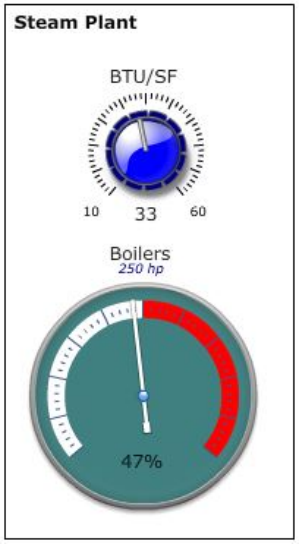
- The boiler plant was built in 1954 and houses three Bigelow duel fuel gas and oil fire boilers of the same vintage.
- The three boilers are connected to a pipe header which provides steam for the entire building heating loads. The header is divided into two sections with isolation valves as well as a by-pass. This allows valves and other components connected to the header to be maintained while keeping the system in operation.
- While the boilers are well beyond their recommend life, they have been well maintained and upgraded over time to keep them functioning very well. Upgrades include new burners and controls allowing them to run at very high efficiency levels. The boiler output is rated at 650 boiler horsepower (BHP) for boilers 1 and 3 and 550 BHP for boiler 2. The boiler plant was originally designed for a laundry facility which is no longer in use, so the hospital can easily operate with one boiler off line even in extremely cold weather.

# Appendix -Detailed FCA Report (continued)

## Boilers (continued)

- Condensate returning to the boiler plant is captured and stored in a surge tank and then transferred to a deaerator tank where excess oxygen is removed and the water is treated in preparation to be returned to the boiler. The surge tank and deaerator are both the same age as the boiler plant (1955) but have been well maintained and appear to be functioning well.
- A pair of Grundfos feed-water pumps was installed in 2008 along with a new boiler feed-water control system. These pumps transfer water from the deaerator tank to the boilers. The pumps have VFDs to regulate the rate water is injected into the boilers while conserving energy.

Steam Plant Capacity



# Appendix -Detailed FCA Report (continued)

## Air Handling Units

- There are a number of air handling units (AHUs) which provide heating and cooling for the various areas of the facility. They range in size from small modular units serving part of a floor to large custom built-up units serving several floors via VAV air distribution systems.
- The Kenney building has 4 main AHUs installed in 1982. They are large built-up unit by Semco. Each is 100% Outside Air with an energy recovery wheel for improved energy efficiency. These AHUs range in size from 14,600 to 22,300 CFM. Due to their age they are beyond their recommended useful life, but have been well maintained with major components including the heat wheels replaced recently. These units are very well constructed with high quality wall systems and cabinet frames. This construction and high level of maintenance of these four AHUs should keep them operational for many more years.
- Two AHUs on the roof of the Kenny building serve the Lab and Women's Center. These units were installed in 1992 and have an enclosed maintenance space between the two air handlers. These AHUs are 30,200 and 32,400 CFM each. These units have heavy duty casings. They are well maintained and can be maintained operational for many more years.
- A large built in place AHU in the basement of the O'Brien building serves the basement and 1st level via a dual duct air distribution system. This unit has a supply air section and a separate return air section fit into the mechanical space available. This AHU is rated at 30,000 CFM

# Appendix -Detailed FCA Report (continued)

## Air Handling Units (continued)

- The 6th floor of the O'Brien building is an interstitial floor housing several AHUs and other mechanical equipment. A 14,500 CFM AHU manufactured by Carrier and installed in 1979 serves the 5th floor. The unit has been well maintained but is beyond its recommend useful life. This unit is a factory built modular type air handler and is not as well constructed as the units listed above. It is operating properly at this time.
- A similar 22,000 CFM unit provides 100% outside air for the Kitchen
- There is also an 8300 CFM York AHU which provides 100% outside air for the kitchen cooking hoods. This unit was also installed in 1997.
- The remainder of the air handling units serve the older building of the facility: Sacred Heart, Xavier and Slocum. These AHUs are fairly small 4 -10,000 CFM units which serve a fairly small portion of the building. They fall into two basic categories: Units that were installed over 30 years ago and are beyond their recommended useful life and units which have been replaced within the last 5-10 years and have a great deal of useful life remaining.

# Appendix -Detailed FCA Report (continued)

## Air Handling Units (continued)

- AHU-6 serves the 7th and 8th floors of the O'Brien building and was installed in 1963. The construction of this unit is also not as robust as the others listed above. It has been well maintained, with outside air dampers replaced this year, but the maintenance staff indicates it struggles to maintain conditions in the spaces even though the 8th floor is unoccupied at this time
- A mechanical room on the roof of the dining area between the O'Brien building and the Sacred Heart building houses several AHUs. A 14,600 CFM Trane modular unit was installed in 1999 and serves the Cath Lab area.
- A 25,000 CFM Niagara Blower AHU was installed in 1997 and serves the 2nd and 3rd levels of the O'Brien building.

*AHU-6 in O'Brien Building*

# Appendix -Detailed FCA Report (continued)

## Plumbing & Fire Protection Analysis

### General Impressions

- Domestic water piping in most areas of the hospital is past its normal life expectancy. Piping shall be replaced in areas of renovation.
- Instantaneous steam hot water equipment serving hospital is approaching the end of their normal life expectancy. Provisions shall be made to replace equipment as part of a long term capital renewal plan. Hot water heat exchanger serving Lawlor building is well past it normal life expectancy and needs replaced. Domestic hot water heater serving Conference Center is within its normal life expectancy.
- Sanitary and storm drain piping in most areas of the hospital is past its normal life expectancy. Piping shell be replaced in areas of renovation.
- Medical gas manifolds serving hospital are within their normal life expectancy.
- Medical gas air compressors serving hospital are within their normal life expectancy.
- Medical vacuum pumps serving hospital are at the end of normal life expectancy. Provisions shall be made to replace as part of a 5-year capital renewal program.

Water Heaters

# Appendix -Detailed FCA Report (continued)

## Plumbing & Fire Protection Analysis (continued)

### Domestic Water

- The hospital has three city water feeds with redundant backflow preventers. A 10” water service enters the hospital and serves the O’Brien, Kenny, Sacred Heart and Xavier buildings. A 2” water service enters the hospital and serves the Lawlor building. A 3” water service enters the hospital and serves the Slocum building. The water mains are interconnected within the hospital which does allow back-up supply should one system fail.
- Interior piping systems consists of mostly Type “L” copper. Piping systems are old in most areas of the facility. Deteriorating piping and fittings are causing occasional leaks.
- This facility does not require a domestic booster pump. Incoming water pressure at 120 psig and reduced to 90 psig.
- Domestic hot water for the hospital is generated by three steam instantaneous water heaters located at the sub- basement Kenny building. Domestic hot water for the Conference Center is generated by a gas fired storage tank type heater.
- Deionized water is produced from a system located on the fourth floor Kenny building serving Lab area.

Water Heaters

# Appendix -Detailed FCA Report (continued)

## Plumbing & Fire Protection Analysis (continued)

### Sanitary/Storm Water

- Piping systems consist of mainly cast iron. Sanitary and Storm piping within the hospital has deteriorated, causing occasional leaks.
- The grease traps are located above the floor at the kitchen equipment it is serving in the kitchen.
- Semi-annual cleaning of the waste mains is required.

# Appendix -Detailed FCA Report (continued)

## Plumbing & Fire Protection Analysis (continued)

### Medical Gas

- Medical Vacuum for the hospital is provided from a central system located in the sub - basement level of the Kenny building. This vacuum pump is a duplex, 20 hp unit. There is an older 10 hp unit located in the sub-basement level of the O'Brien building. This unit is not operational. The operational vacuum pump is connected to the master alarm panels. The non-operational pump unit does not meet current NFPA 99 code requirements. Deficiencies include no lag alarms or receiver bypass.
- Medical Air for the hospital is provided from a central system located on the 6th floor level of the O'Brien building. The medical air compressor is a duplex, 15 hp unit. The medical air compressor is connected to the master alarm panels.
- Nitrogen is provided from 4x4 manifold systems, located in the sub-basement of the central plant. Nitrogen serves OR's, Gastro and Labor-Delivery. The nitrogen manifold is connected to the master alarm panels.
- Nitrous oxide is provided from 4x4 manifold systems, located in the sub-basement of the central plant. Nitrous oxide serves OR's and Lab. The nitrous oxide manifold is connected to the master alarm panels.

# Appendix -Detailed FCA Report (continued)

## Plumbing & Fire Protection Analysis (continued)

### Medical Gas (continued)

- Carbon dioxide is provided from two locations. First location is the second floor Kenny building. It is provided from a 2x2 manifold system serving OR room 1 and Open heart surgery. The 2x2 carbon dioxide manifold is connected to the master alarm panels.
- Second location is the fourth floor Kenny building. It is provided from a 1x1 manifold system serving Lab. The 1x1 carbon dioxide manifold is not connected to the master alarm panels.
- Medical oxygen is provided by a 6000 gallon liquid bulk tank and a 350 gallon liquid reserve. Oxygen tanks are exterior and located at medical gas park. The oxygen main and reserve tanks are connected to the master alarm panels. Capacity appears to be sufficient for current use.
- Master alarm panels are located at maintenance (adjacent to the boiler room) and telecom.

# Appendix -Detailed FCA Report (continued)

## Plumbing & Fire Protection Analysis (continued)

### Fire Protection

- The hospital is fully sprinkled.
- A 6” fire line supplies a 50 hp electric fire pump located in the sub-basement of the O’Brien building. The fire pump serves the entire hospital. Fire pump is past its normal life expectancy. Provisions shall be made to replace as part of a 5-year capital renewal program.
- Dry pipe systems serving hospital area is within its normal life expectancy.
- Dry pipe sprinkler systems are installed within areas of the hospital mainly serving attached canopies, conference center stairwells, parking deck-lower level, employee and visitor garages.
- Clean agent fire suppression systems are installed to protect the main electrical room, telecom, and main computer room. The most recent clean agent systems are FM200. As part of the 5-year capital renewal plan, we recommend upgrading clean agent systems to modern, safer extinguishing systems, such as Sapphire.
- Fire sprinkler and standpipe mains appear to be in reasonably good condition.

Fire Pump Controller

# Appendix -Detailed FCA Report (continued)

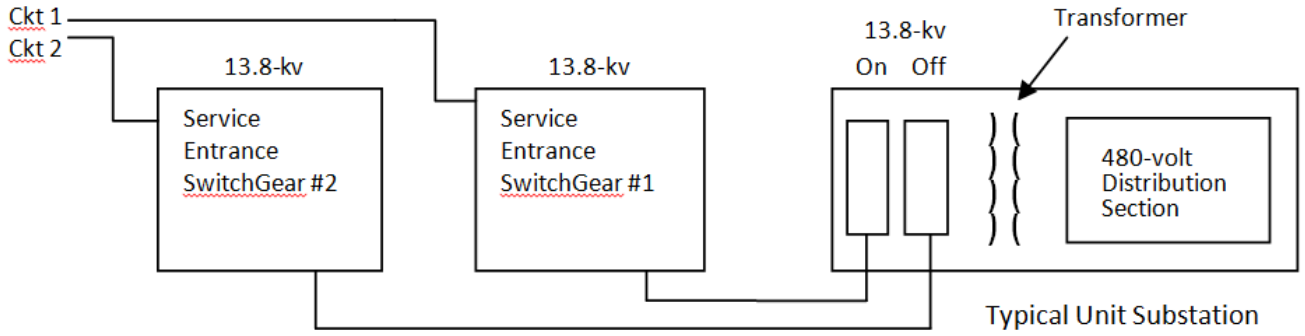
## Fuel & Electricity

### Natural Gas

- Natural gas piping is limited in the hospital. Usage is mainly for the kitchen and boiler plant areas, which is not uncommon.

### Fuel Oil-Diesel Storage Tanks

- There are two underground fuel tanks that were installed in 1997. The fuel oil tank is a buried 20,000 gallon tank that serves boilers. The diesel fuel tank is a buried 5,000 gallon tank that serves the generators. Both buried tanks are monitored by leak detection. The tanks can be connected together if required to supply additional fuel to the generators.



# Appendix -Detailed FCA Report (continued)

## Fuel & Electricity (continued)

### Utility Power (Normal)

- The hospital is served with two utility circuits from Connecticut Light and Power. The two circuits each serve a dedicated 13.8-kv medium voltage switchgear lineup. The lineups are 100% redundant. If one utility circuit is lost, the remaining circuit can maintain utility service to the hospital by way of multiple unit substations throughout the facility that are all served from each of the two service entrance switchgear lineups.
- This connection scheme requires a strict descriptive sequence of operation for transfer to the second utility service. A number of switches in both the service entrance gear and multiple unit substations will need to be operated in a specific sequence to avoid dangerous back feeding. All 13.8-kv switches should only be operated by qualified medium voltage technicians.

*13.8-kv Service Entrance Switchgear*

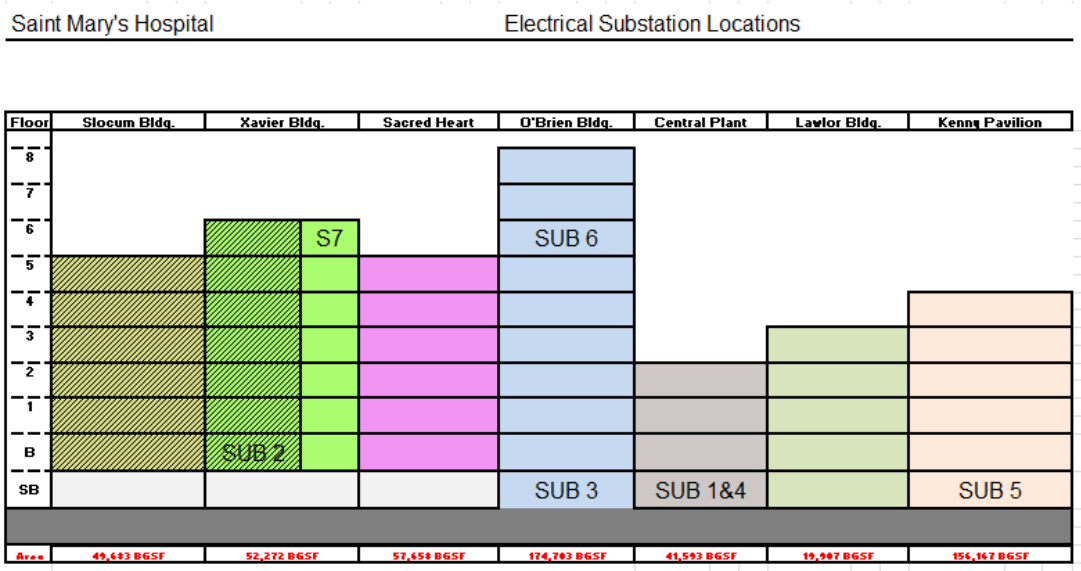

*High Voltage Switchgear*

# Appendix -Detailed FCA Report (continued)

## Fuel & Electricity (continued)

### Utility Power (Normal) (continued)

- The location of Unit Substation 2, in the Basement of the Xavier Building, poses a potential hazard. This electric room is located beneath the floor level in a pit area. The 13.8-kv switchgear in this room is located adjacent to the main sprinkler riser pipe entrance. This potential for a water hazard, in addition to poor working clearances, is a major safety concern.




- DEMOLITION: If it is determined to demolish both Slocum and Xavier, Unit Substation #2 can be removed, and the safety concerns associated with it are no longer an issue. Demolition of Xavier would only occur up to a point that maintains Unit Substation #7 located in a Penthouse. This gear is fairly new and serves the three require branches of emergency power for the remaining portion of Xavier and Sacred Heart.

# Appendix -Detailed FCA Report (continued)

## Fuel & Electricity (continued)

### Generator Power (Emergency)

- There are currently four existing generators serving the facility. Two of these (Generator #3 and Generator #4) are 750-kw and are in good working order. Generator #1, 300-kw, and Generator #2, 250-kw, are greater than 30-years old. Although generators #1 and #2 are well maintained, they are due for replacement before ultimate failure occurs.

- The larger, newer, generators #3 and #4 are connected to existing paralleling gear. The paralleling gear combines the generator capacities and distributes the loads to required separate emergency branches of power, life safety, critical, and equipment.

*Newer Generator*

*Aged Generator*

*Emergency Generators Paralleling Gear*

# Appendix -Detailed FCA Report (continued)

## Fuel & Electricity (continued)

### Generator Power (Emergency) (continued)

- As part of the 5-year capital renewal plan, it is recommended that Generators #1 and #2 be replaced with a third 750-kw generator. The new generator would match the capacities of the two remaining generators, and can be configured to operate on the same paralleling system to take advantage of the combined capacities and distribution to required branches of essential power.
- There are a total of 19 automatic transfer switches in the facility, including switches integral to the Unit Substations and more modern closed transition, bypass isolation units.

**Lighting System**

- The hospital lighting system is well maintained and in good working condition. The facility staff has taken a proactive approach to upgrading older inefficient lighting fixtures to newer energy efficient type. Lighting upgrades are a wise investment, as the return on investment from utility savings is within two or three years. As part of the replacement strategy underway, the facility staff is considering using LED fixtures and replacements. The value gained from LED includes longer lamp life, which reduces maintenance time, and significant energy savings.

# Appendix -Detailed FCA Report (continued)

## Fuel & Electricity (continued)

### Communications System

- The existing fire alarm system is manufactured by Simplex. The system in is good working order. The maintenance staff ensures the system remains clear of “trouble” signals, which are an indication of faulty wiring or connections. The system is tested annually per NFPA requirements.
- The teledata system in is good working order. The primary head end equipment is connected to uninterruptible power supplies (UPS), which maintains hospital connectivity in the event of a power glitch or outage. The UPS system is sized with adequate capacity.
- The hospital paging system is controlled from a central rack and is connect to battery backup.
- The hospital security system consists of security cameras and access control devices at select locations. The security system and cameras are monitored from an on-site security office.
- The primary Nurse Call system installed throughout the hospital is a Rauland Responder system. The maintenance staff has plans to upgrade all Rauland Responder Model 3 systems to Responder Model 4.