

5.0 APPENDIX

5.1 Site Tours

As an initial step to updating the Space Criteria and Design Guide for the Surgical and Endovascular Services chapter, the team embarked on a series of site visits to understand models of care and surgical program design at leading Midwestern facilities on November 12-13, 2014.

In order to inform the 2016 Design Guide and Space Planning Criteria Chapter, the following facilities were toured:

- Elmhurst Memorial Hospital in Elmhurst, Illinois
- Advocate Sherman Hospital in Elgin, Illinois
- The Center for Care and Discovery in Chicago, Illinois
- Rush University Medical Center in Chicago, Illinois
- Edward Hines, Jr. VA Hospital in Hines, Illinois

The facility managers at each tour site supplied the team with floor plans which were colorized and formatted by the SmithGroupJJR consultants. Photographs of each facility were taken by the consultant team.

The team would like to thank the many facility staff members who took time out of their work day to tour the surgical program spaces with the VA and consultant teams and explain their models of patient care.

5.1.1 Elmhurst Memorial Hospital, Elmhurst, Illinois



Figure 5.1.1.1
Aerial of Elmhurst Memorial Hospital

Elmhurst Memorial Hospital	
Location	Elmhurst, Illinois
Total Area	866,000 sf
Floors	6
Beds	259
Operating Rooms	16
Project Cost	\$450 Million
Construction Cost	\$320 Million
Opening Date	June 2011
Owner	Elmhurst Memorial Healthcare
Architect	Albert Kahn Associates Pratt Design Studio



Figure 5.1.1.2
Main Entry of Elmhurst Memorial Hospital



Figure 5.1.1.3
Main Lobby



Figure 5.1.1.4
Operating Room



Figure 5.1.1.5
Operating Room

5.1.2. Advocate Sherman Hospital, Elgin, Illinois



Figure 5.1.2.1

Aerial of Advocate Sherman Hospital



Figure 5.1.2.2













Main Entry of Advocate Sherman Hospital















Figure 5.1.2.3
Exterior View of Advocate Sherman Hospital

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Legend:

- | | | | |
|---|--------------------------|---|---------------------------|
|  | Semi-Restricted Corridor |  | Public Area |
|  | Departmental Circulation |  | Staff Circulation |
|  | Elevators / Stairs |  | Sterile Core (Restricted) |
|  | Mech. / Elec. / Tele. |  | Support |
|  | Patient Room |  | Central Sterile |
|  | Procedure Room |  | Emergency Department |

Legend:

	Semi-Restricted Corridor		Public Area
	Departmental Circulation		Staff Circulation
	Elevators / Stairs		Sterile Core (Restricted)
	Mech. / Elec. / Tele.		Support
	Patient Room		Central Sterile
	Procedure Room		Emergency Department

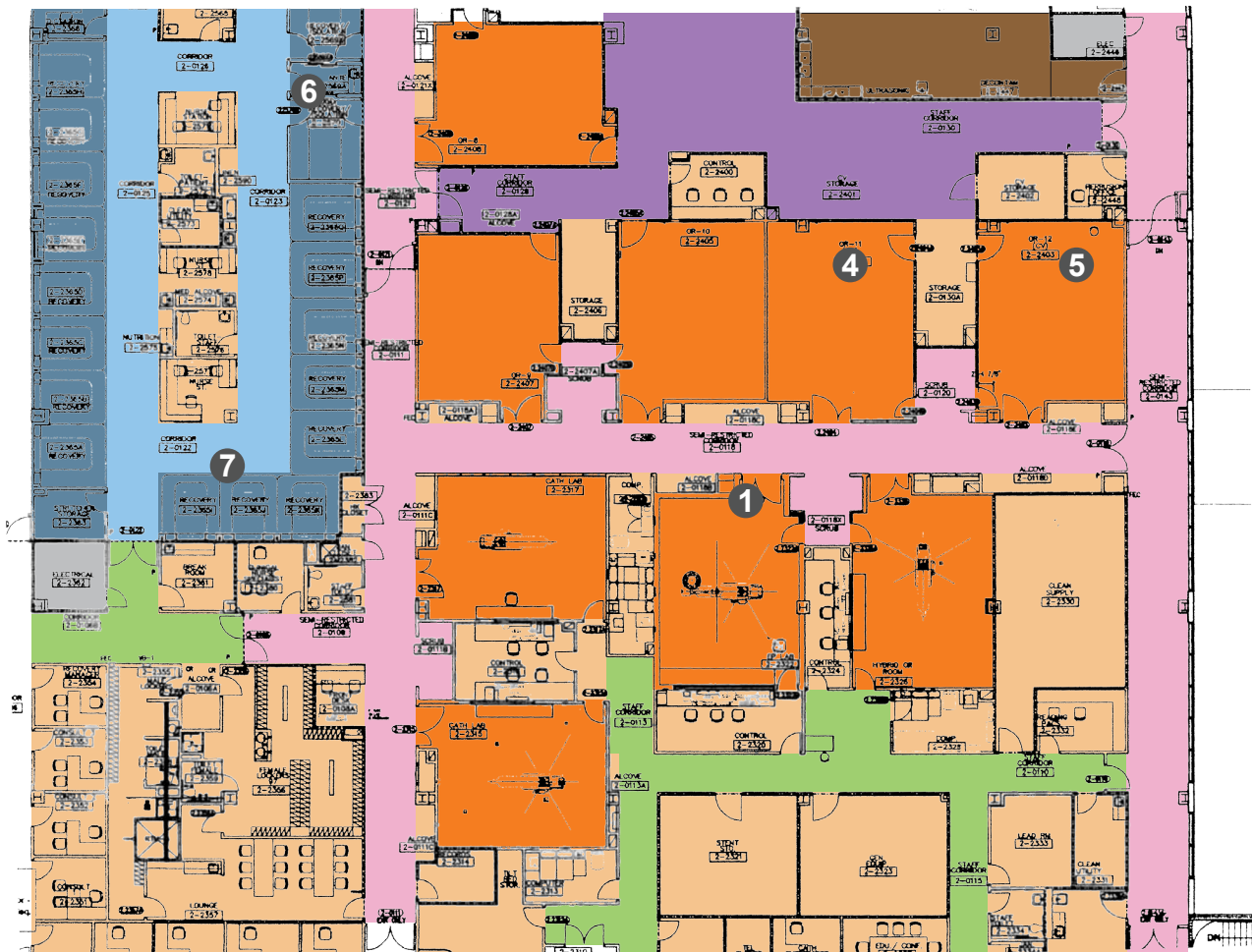


Figure 5.1.2.5
Partial Floor Plan-Surgery

Key Notes:

- ① Hybrid OR is 900 sf
- ② Cystoscopy OR is on the main surgical floor
- ③ Typical OR is less than 650 sf
- ④ Specialty Cardiothoracic ORs are only slightly larger than 650 sf
- ⑤ 2 Cardiothoracic ORs, only staffed for 1
- ⑥ 2 isolation rooms in PACU
- ⑦ PACU beds are bays, not 3-sided rooms
- ⑧ No soiled cart holding room in Central Sterile, carts are stored in the corridor prior to decontamination



Figure 5.1.2.6
Cath Lab

1



Figure 5.1.2.7
Hybrid Operating Room

2



Figure 5.1.2.8
Phase I Recovery Nurse Station

3



Figure 5.1.2.9
Operating Room

4

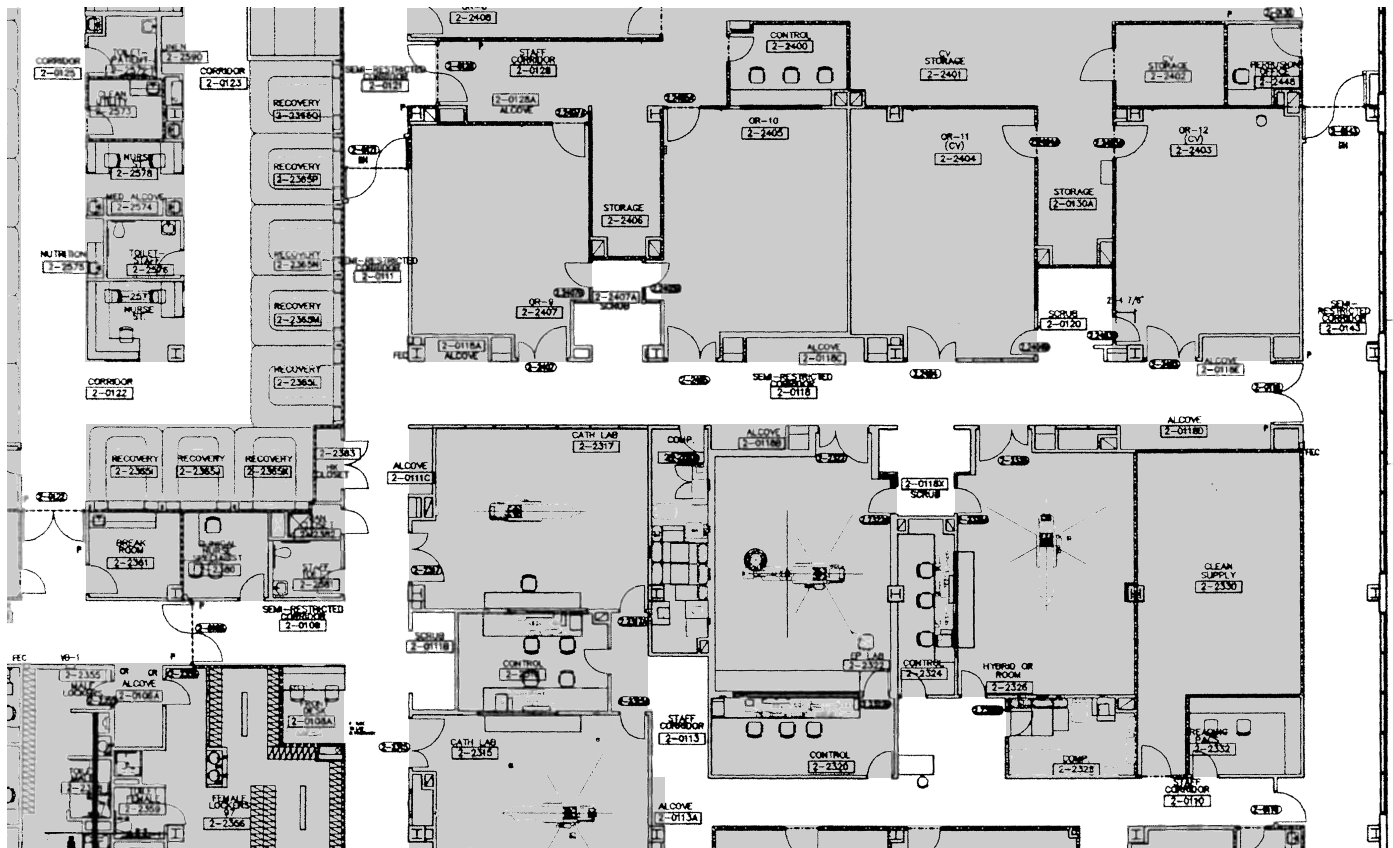


Figure 5.1.2.10
Enlarged Intraoperative Floor Plan

5.1.3. Center for Care and Discovery, Chicago, Illinois

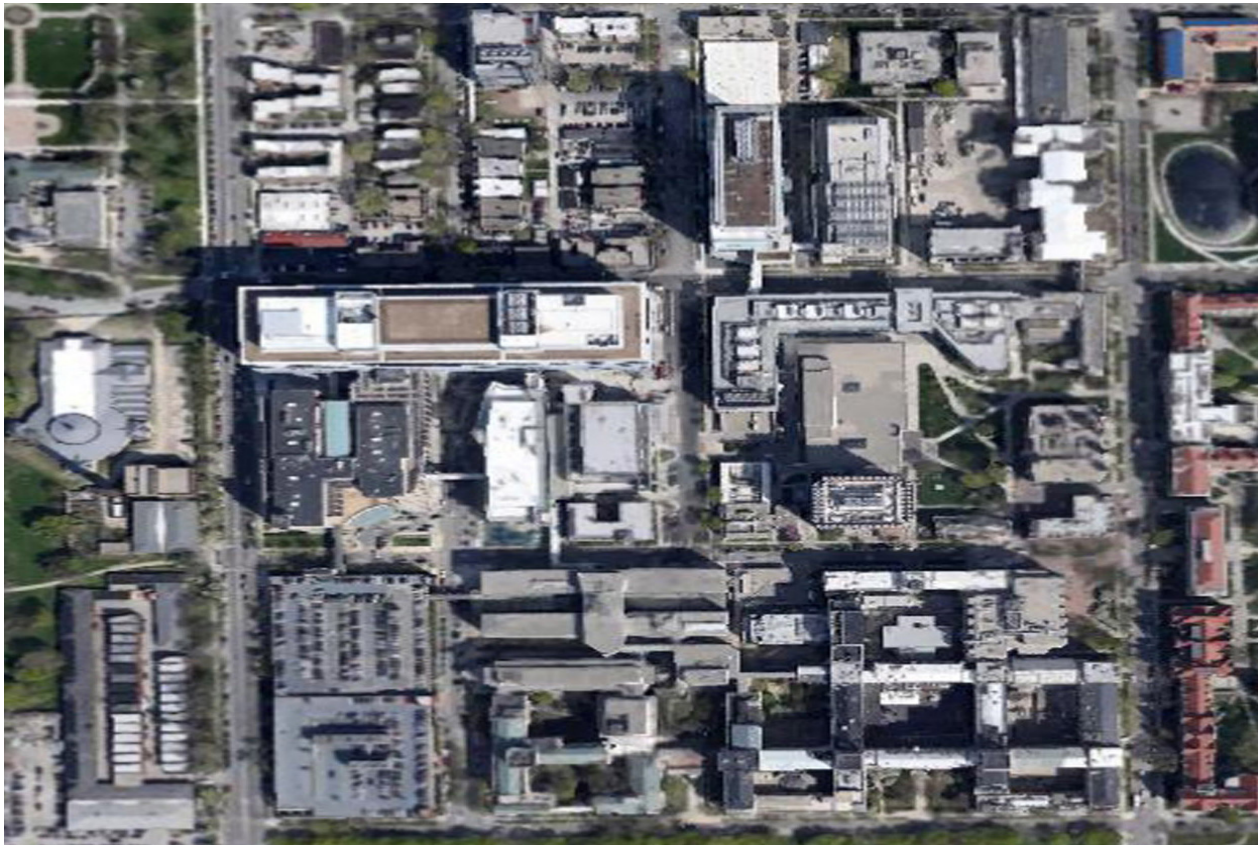


Figure 5.1.3.1
Aerial of the University of Chicago Medicine

Center for Care and Discovery	
Location	Chicago, Illinois
Total Area	1.2 Million sf
Floors	10
Beds	240
Operating Rooms	28 (including Hybrid ORs, not including GI/ENDO suites) 7 Cath/EP/IR labs
Project Cost	\$700 Million
Construction Cost	\$470 Million
Opening Date	February 2013
Owner	University of Chicago Medicine
Architect	Rafael Viñoly Architects Cannon Design



Figure 5.1.3.2
Exterior View of the Center for Care and Discovery

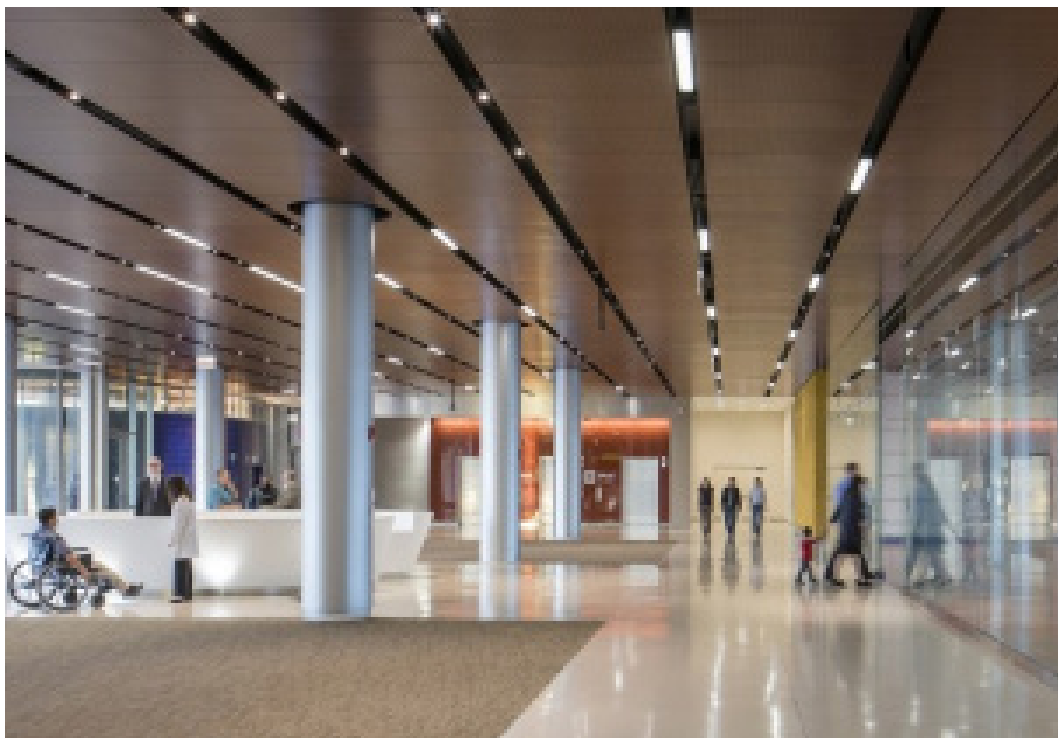
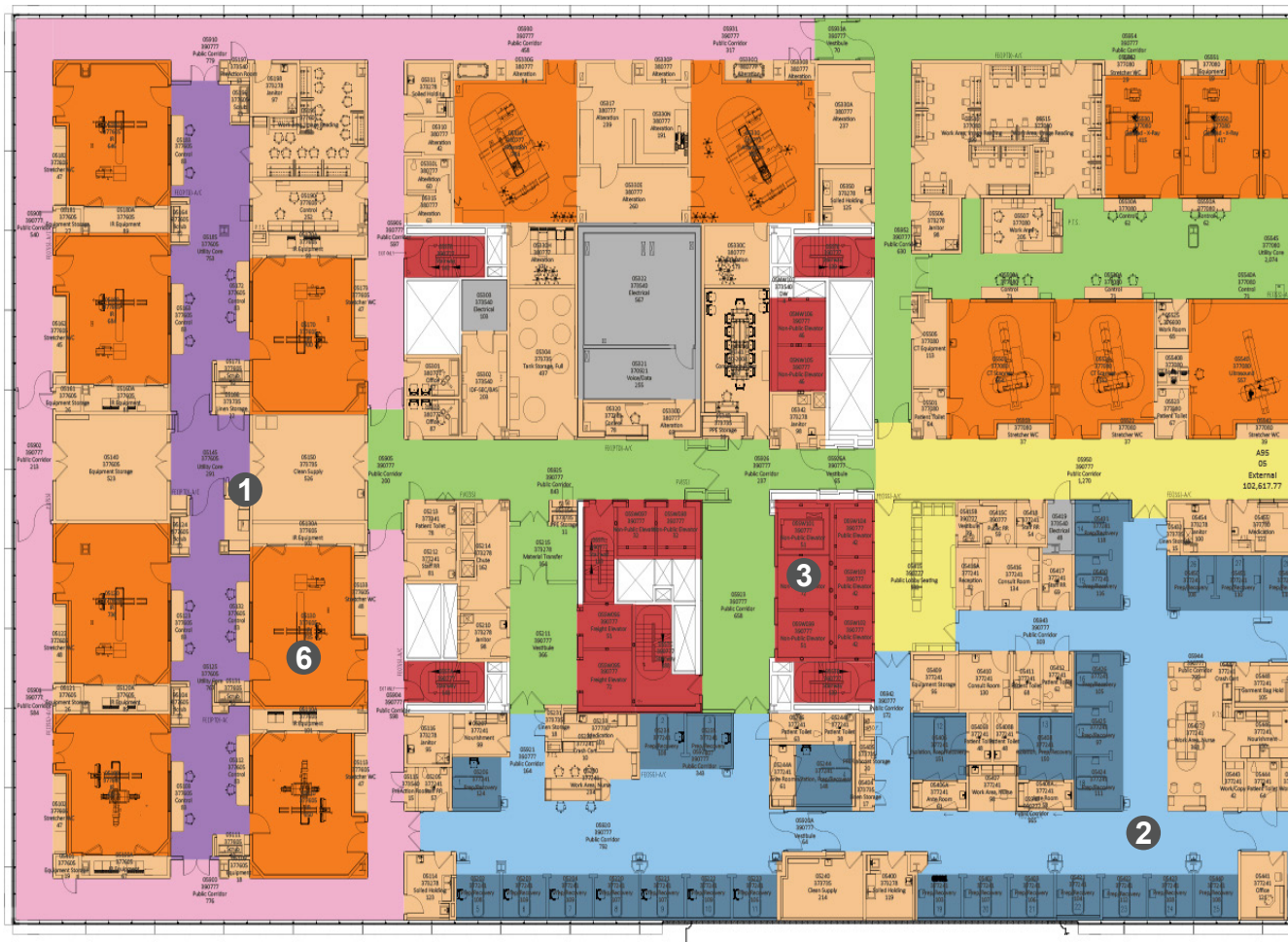


Figure 5.1.3.3
Center of Care and Discovery

Intraoperative Floor 5



Legend:

 Semi-Restricted Corridor	 Public Area
 Departmental Circulation	 Staff Circulation
 Elevators / Stairs	 Sterile Core (Restricted)
 Mech. / Elec. / Tele.	 Support
 Patient Room	 Central Sterile
 Procedure Room	 Emergency Department















Key Notes:

- 1** Adequate storage for procedure rooms
- 2** Flexible Pre-Recovery Phase 2 unit
- 3** Ample vertical transportation to patient care units
- 4** Prep-Recovery for Procedure zone
- 5** Adjacent MRI
- 6** Interventional Radiology rooms

Intraoperative Floor 6



Legend:

	Semi-Restricted Corridor		Public Area
	Departmental Circulation		Staff Circulation
	Elevators / Stairs		Sterile Core (Restricted)
	Mech. / Elec. / Tele.		Support
	Patient Room		Central Sterile
	Procedure Room		Emergency Department



Key Notes:

- | | |
|---|----------------------|
| ① Hybrid OR | ④ Clean storage |
| ② Future expansion capability | ⑤ Typical 625 nsf OR |
| ③ Decentralized clean and soiled workroom with cart storage | ⑥ GI Hybrid OR |
| | ⑦ Staff locker areas |



Figure 5.1.3.4
Cath Lab



1 **Figure 5.1.3.5**
Phase I Recovery

2



Figure 5.1.3.6
Nurse Station



3 **Figure 5.1.3.7**
Control Room

4

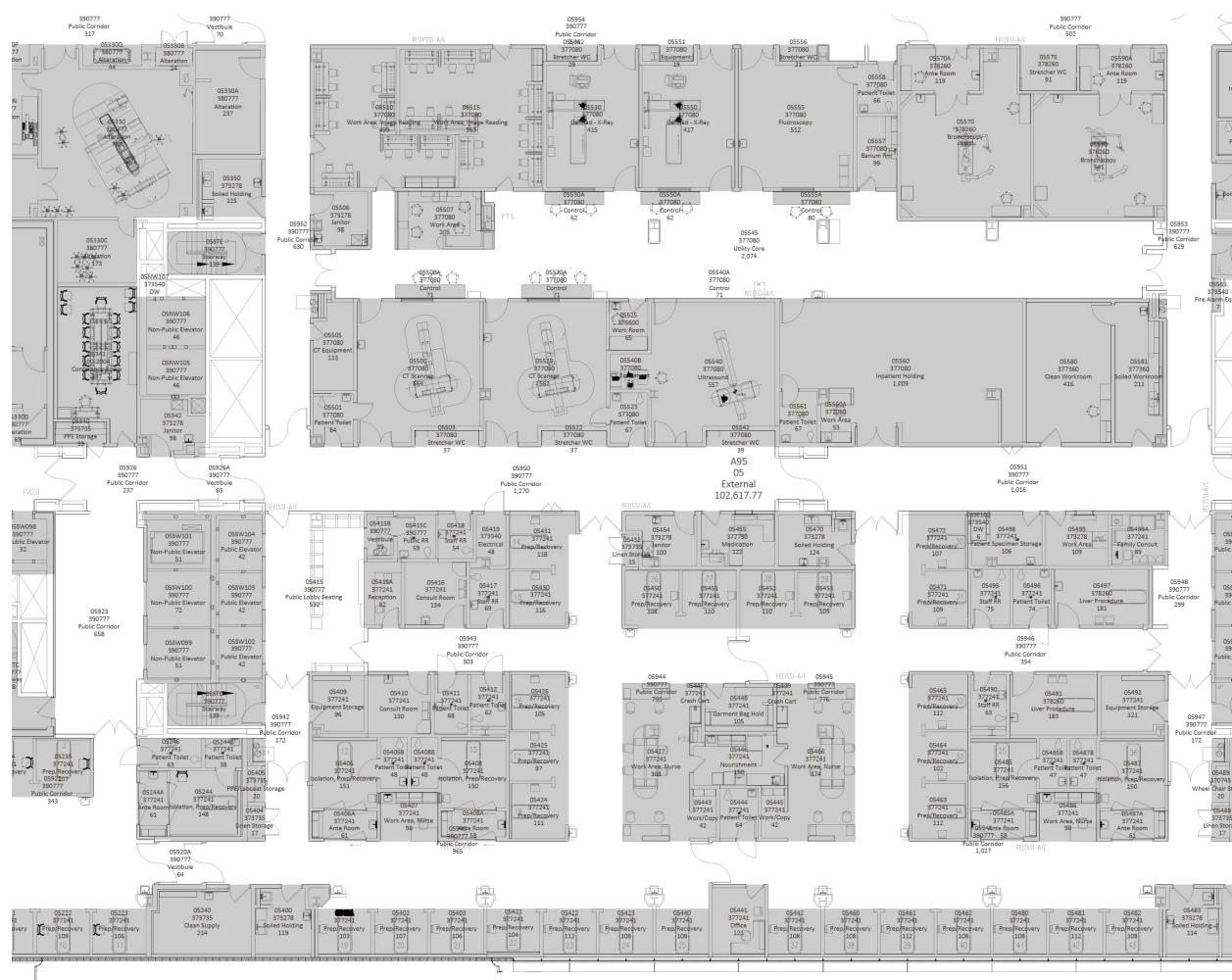




Figure 5.1.3.9
Hybrid OR



1 **Figure 5.1.3.10**
Clean Core

2



Figure 5.1.3.11
Patient Prep / Phase II Recovery



3 **Figure 5.1.3.12**
Patient Prep / Phase II Recovery

4

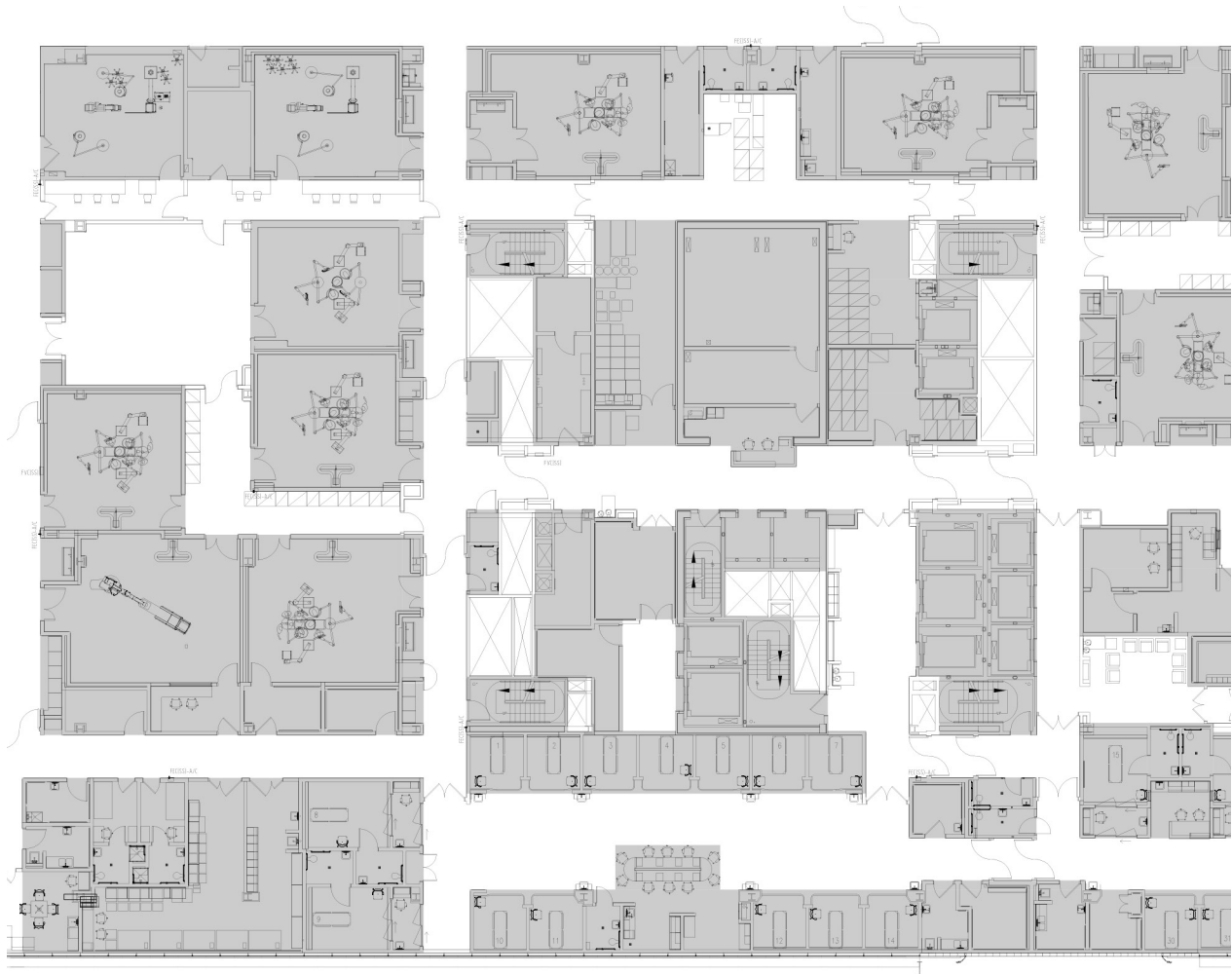


Figure 5.1.3.13
Enlarged Level 6 Intraoperative Floor Plan

5.1.4. Rush University Medical Center, Chicago, Illinois

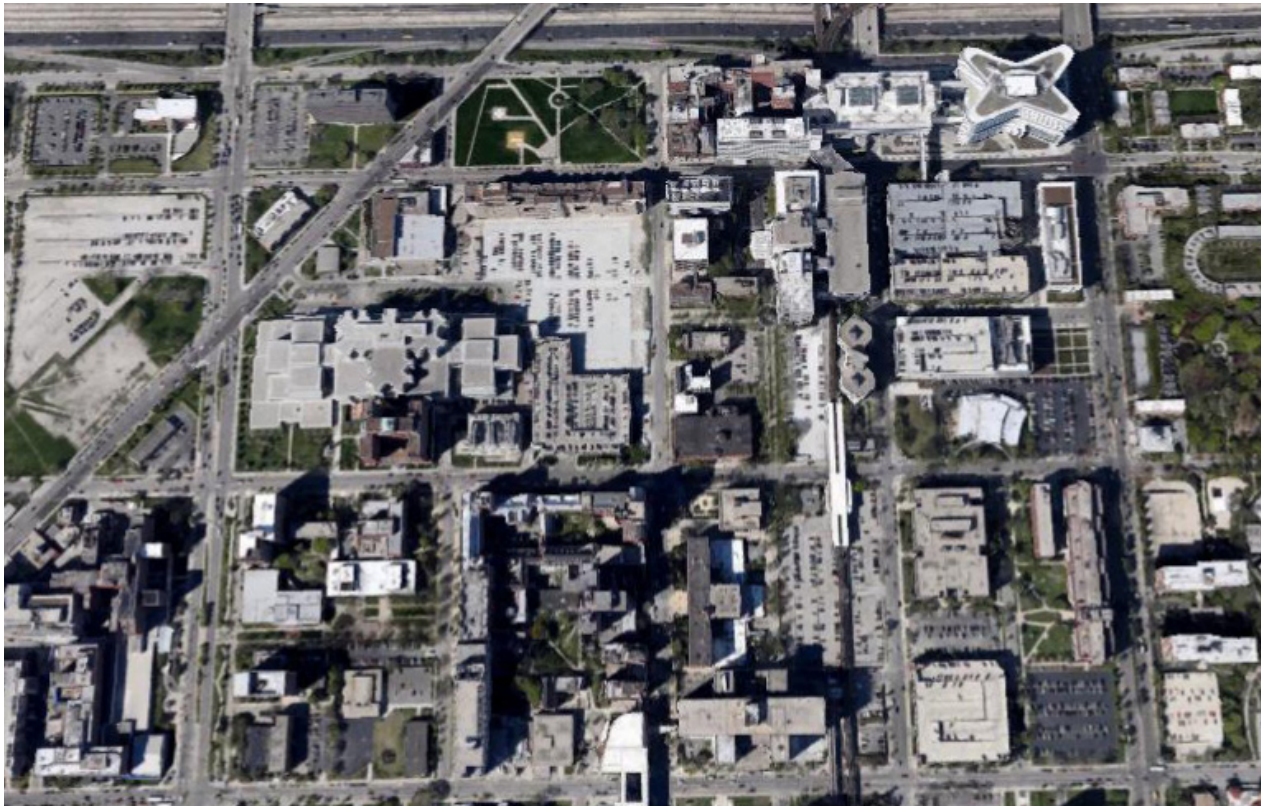


Figure 5.1.4.1
Aerial of Rush University Medical Center

Rush University Medical Center	
Location	Chicago, Illinois
Total Area	830,000 sf
Floors	14
Beds	304
Operating Rooms	28 (including Hybrid ORs, not including GI/ENDO suites) 12 Cath/EP/IR labs
Project Cost	\$654 Million
Construction Cost	\$398 Million
Opening Date	January 2012
Owner	Rush University Medical Center
Architect	Perkins + Will



Figure 5.1.4.2
Main Entry of the Rush University Medical Center



Figure 5.1.4.3
Aerial View of Rush University Medical Center

Level 4 Intraoperative Floor



Legend:

 Semi-Restricted Corridor	 Public Area
 Departmental Circulation	 Staff Circulation
 Elevators / Stairs	 Sterile Core (Restricted)
 Mech. / Elec. / Tele.	 Support
 Patient Room	 Central Sterile
 Procedure Room	 Emergency Department

Level 7 Intraoperative Floor



Key Notes:

- ① Family waiting area
- ② Pre-op/Recovery Phase 2 beds
- ③ PACU area
- ④ Larger Ortho and Neuro ORs
- ⑤ Typical approximate 650nsf OR
- ⑥ Vertical transportation to patient care units
- ⑦ Central Sterile dedicated elevators



Figure 5.1.4.4
Hybrid OR

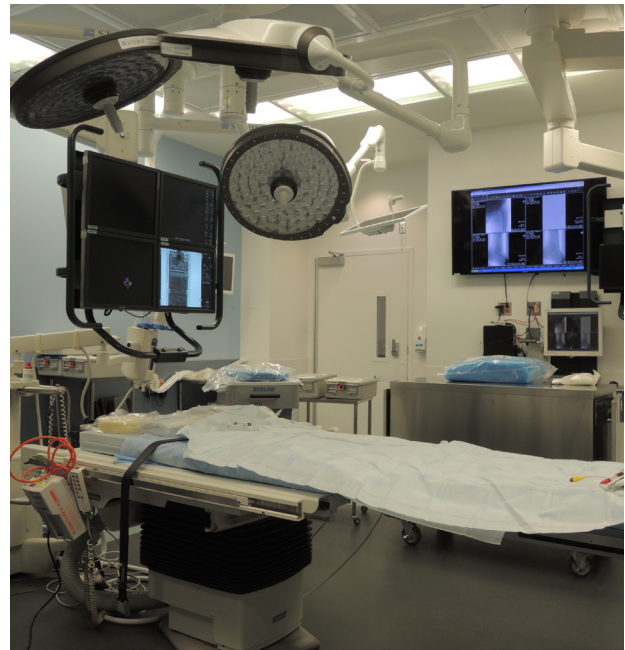


1 **Figure 5.1.4.5**
Clean Core

2



Figure 5.1.4.6
Public Corridor



3 **Figure 5.1.4.7**
Hybrid OR

4

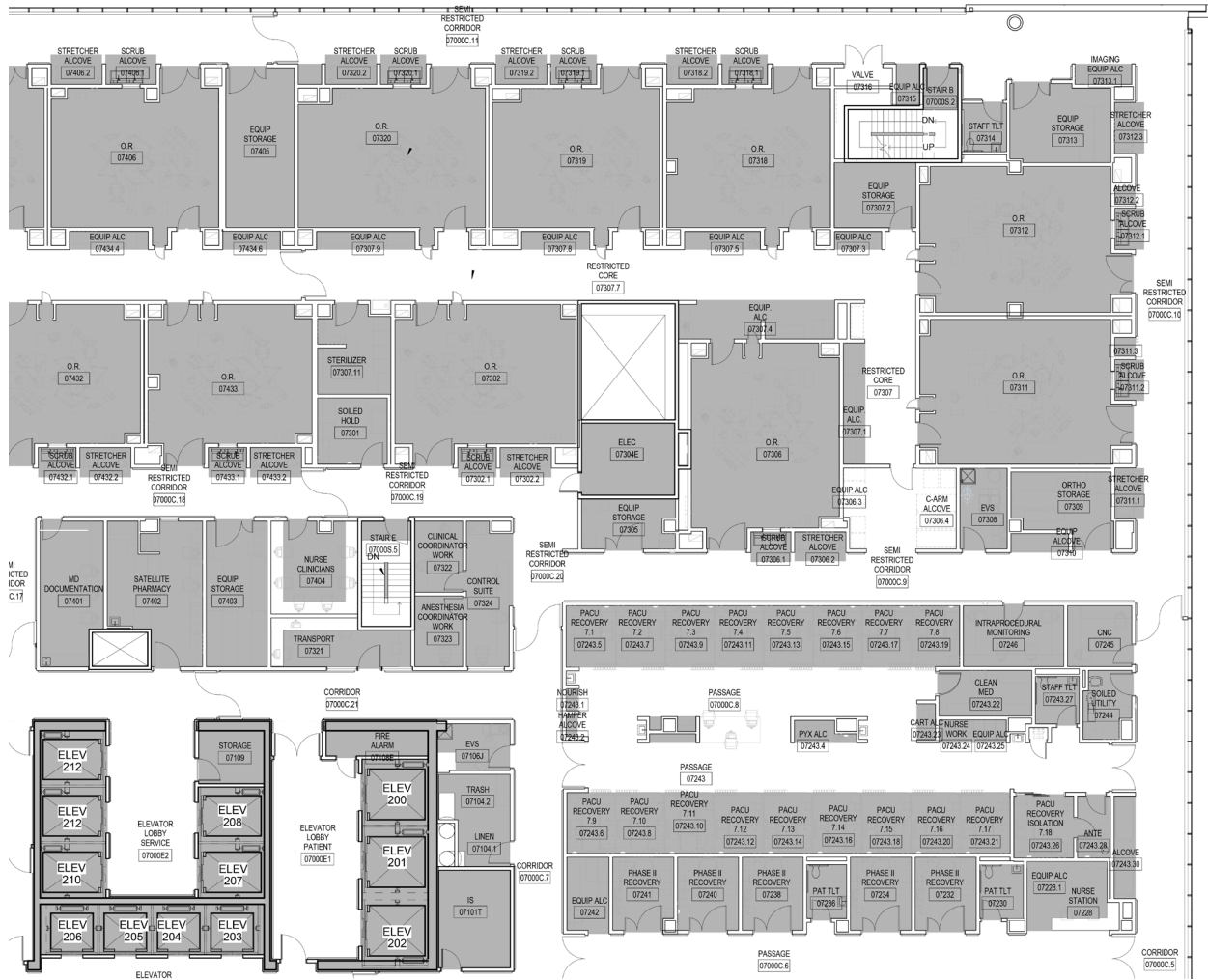


Figure 5.1.4.8
Enlarged Level 7 Intraoperative Floor Plan

5.1.5. Edward Hines Jr. VA Hospital Hines Illinois



Figure 5.1.5.1
Aerial of Edward Hines, Jr. VA Hospital

Edward Hines, Jr. VA Hospital	
Location	Hines, Illinois
Beds	471
Operating Rooms	9



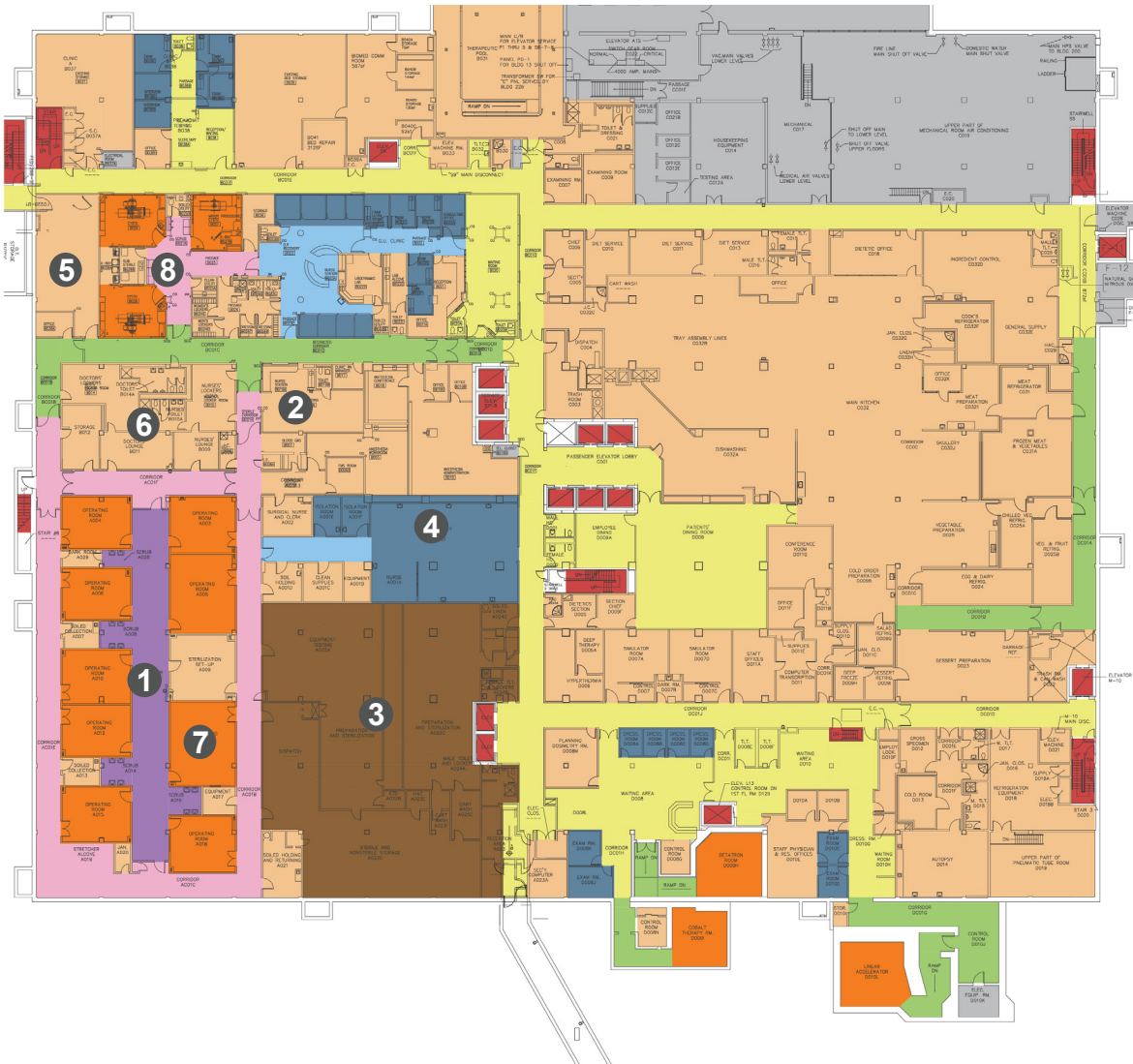
Figure 5.1.5.2



Figure 5.1.5.3

View of Edward Hines, Jr. VA Hospital

Intraoperative Floor



Legend:

 Semi-Restricted Corridor	 Public Area
 Departmental Circulation	 Staff Circulation
 Elevators / Stairs	 Sterile Core (Restricted)
 Mech. / Elec. / Tele.	 Support
 Patient Room	 Central Sterile
 Procedure Room	 Emergency Department



Key Notes:

- | | |
|------------------------------|----------------------|
| ① OR zone | ⑤ Anesthesia support |
| ② Patient holding | ⑥ Staff support |
| ③ Central Sterile department | ⑦ Hybrid room |
| ④ Patient Prep-Recovery area | ⑧ Cysto suite |
| | ⑨ Cardiac Cath |



Figure 5.1.5.4
Hybrid OR

1



Figure 5.1.5.5
Patient Prep / Phase II Recovery

2



Figure 5.1.5.6
Nurse Station

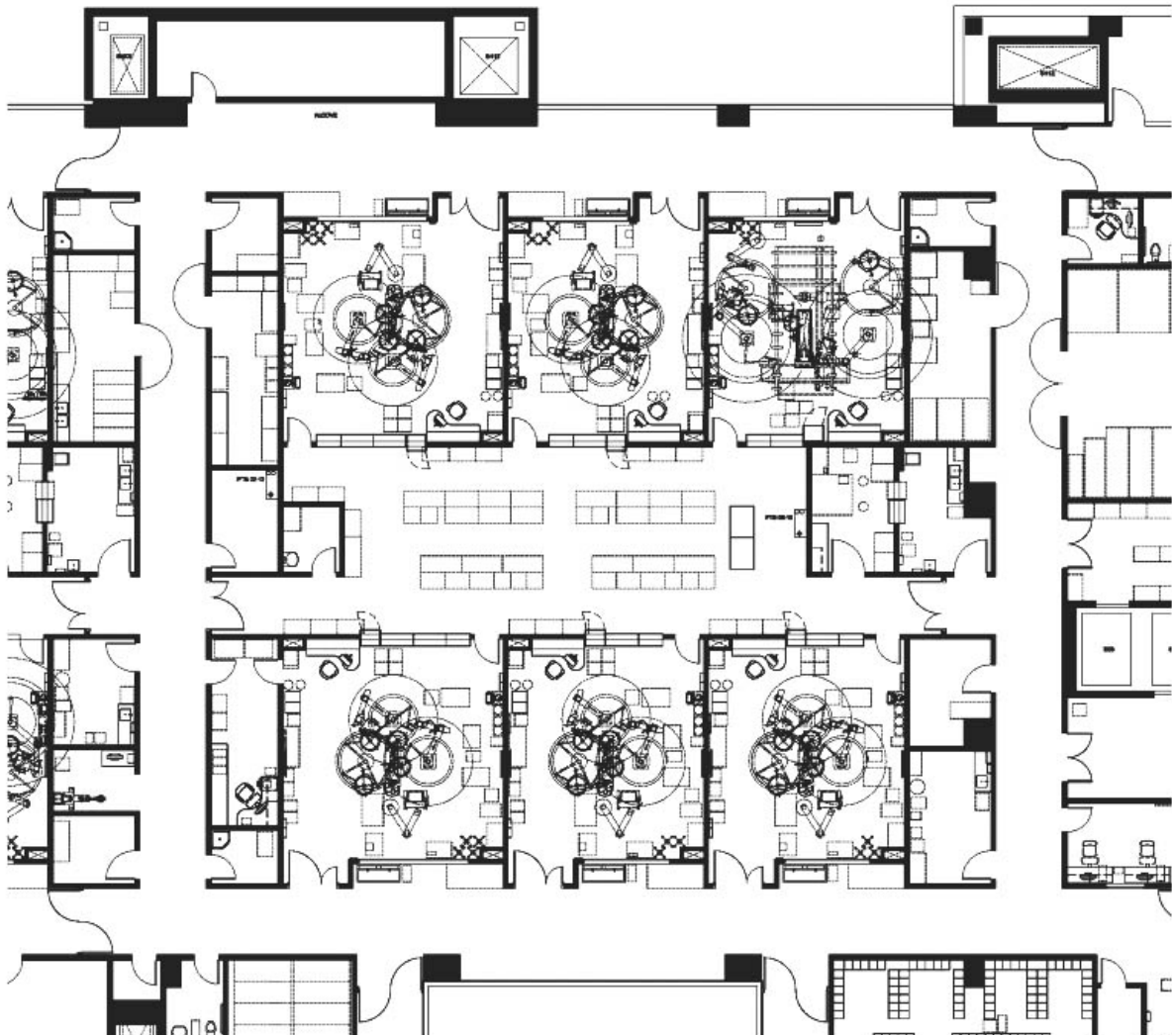
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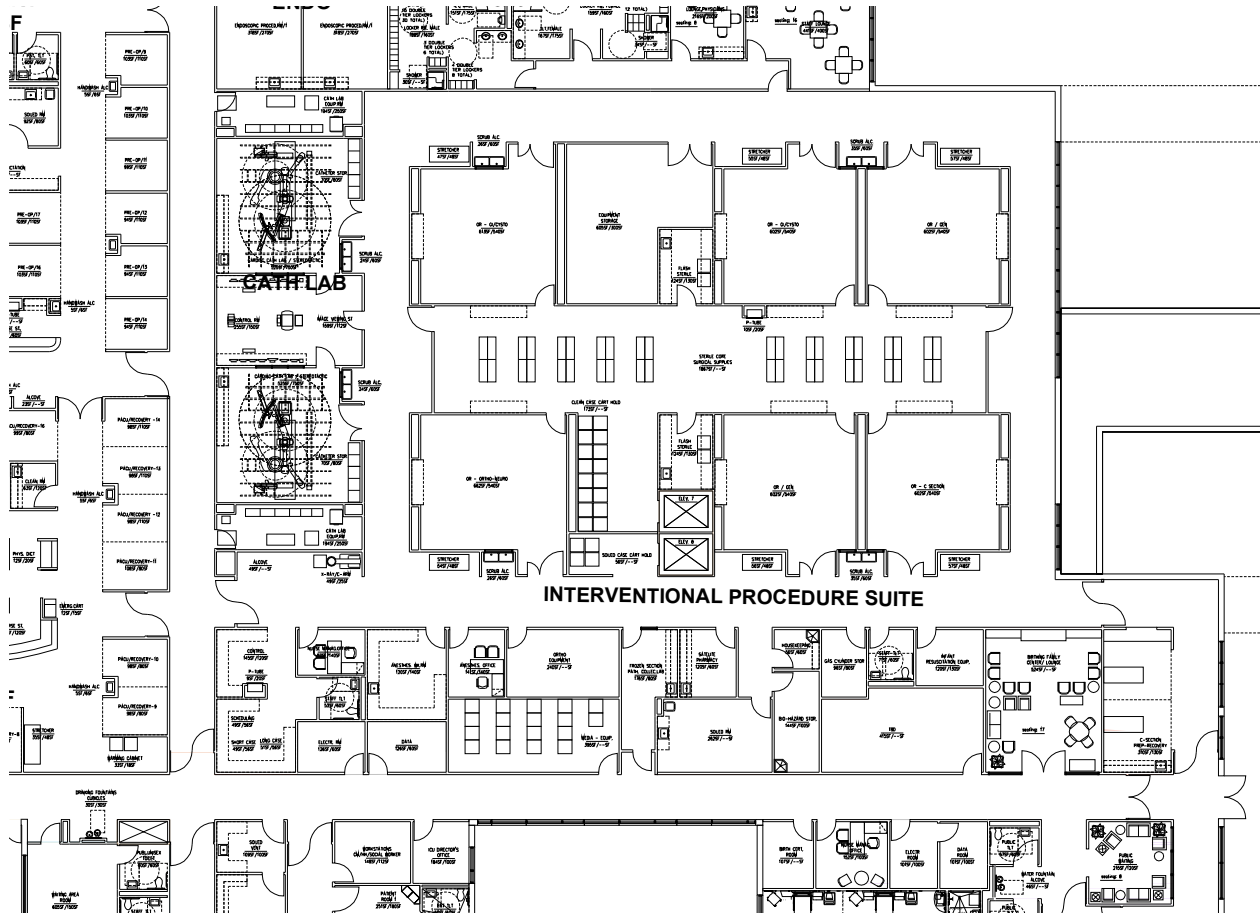


Figure 5.1.5.7
Staff Corridor

4

5.2. Hines Interventional Suite





Surgical and Endovascular Requirements for Operative and Interventional Procedures

The fundamental precept of requiring Surgical and Endovascular Procedure Room Checklist is to ensure safe, high-quality, care on patients undergoing operative procedures, irrespective of the specific physical location of the designated Lab. This includes anticipating the unforeseen events that may occur during a surgical and invasive procedure such as surgical implantations, etc. This check list was developed by the VA CFM (Office of Construction and Facilities Management).

Surgical and Endovascular Procedure Room Checklist

1. EGRESS, ACCESS AND TRAFFIC PATTERNS	Yes	No
A. Egress: Surgical and Endovascular Laboratories shall be designed and perform as Surgical Operating Rooms as operative procedures are performed, and egress to these rooms shall meet the following traffic patterns standards which should be designated to clearly define specific areas. The separation of “unrestricted”, “semi-restricted”, and “restricted” space is required and defined as follows:		
B. Unrestricted Area: Street clothes are permitted and traffic is not limited		
C. Semi-restricted Area: This area includes the peripheral support areas of the Laboratories. This includes the corridors leading to the restricting area and is limited to personnel wearing surgical attire. Cover all head and facial hair (you may wear a jumpsuit designed to totally cover outside apparel).		
D. Restricted Area: This includes the Surgeries and Endovascular Laboratories where operative procedures will occur. Surgical attire, shoe covers, masks, and hair coverings are required.		
E. Staff Traffic: Ideally there are two approved patterns of traffic flow for the staff. One pattern is from the staff lockers/lounge through the semi-restricted corridor to the Scrub Stations and then into the individual Surgeries and Endovascular Laboratories with exit through the semi-restricted corridor. The second pattern of staff traffic is from the staff lockers/lounge directly into the clean core area to the Scrub Stations and then into the individual Laboratories. Possible exceptions to the flow are the “circulators”, who retrieve supplies and equipment from the clean core.		
F. Patient Traffic: The patients are brought into the Surgery Suites and Endovascular Laboratories from the Preparation Area on a gurney. Patients entering the Laboratories should have a clean gown, clean linens, and their hair covered. After the procedure the patient are transported through the semi-restricted corridor and taken to a Recovery Area.		

1. EGRESS, ACCESS AND TRAFFIC PATTERNS	Yes	No
G. Traffic Patterns: Traffic pattern policies and procedures shall be clearly defined and traffic control practices enforced. The Laboratories should be made secure. Movement of personnel should be kept at a minimum during the invasive procedure. Clean and sterile supplies should be separated from contaminated supplies, equipment and waste. Staff must have a clear understanding of equipment range of motion and possible collision points.		

2. MOVEABLE EQUIPMENT AND CARTS EGRESS, ACCESS AND TRAFFIC PATTERNS	Yes	No
A. Case Carts: Case carts are to be utilized in operative procedures (implantations) and brought to the Laboratories via the clean core area on a dedicated cart lift or transferred to a clean case cart where the procedure is completed. These carts are returned to SPS (SPD) in a closed fashion. In the event that SPS (SPD) is not located below the Laboratories, an alternative traffic pattern for the case carts must be established that isolates the clean and soiled case cart traffic.		
B. Linens: Linens are brought into the Laboratory area by way of the semi-restricted corridor. Soiled linen is bagged and removed from the Laboratories via the semi-restricted corridor.		
C. Heart Pumps: When performing TAVR/TAVI and other cardiac procedures a Cardiopulmonary bypass (CPB) pump shall be readily available for use. Normally the pump is staged within the procedure room however in some instances it is located in the restricted corridor just outside the procedure room.		

3. POLICIES AND PROCEDURES	Yes	No
A. Policies and procedures for Surgical Attire: Policies and procedures should be developed, reviewed periodically and readily available for all Surgery Suites and Endovascular Laboratories where surgical attire must be worn, appropriate attire within the defined areas and cover apparel outside the all Surgery Suites and Endovascular Laboratories. This also includes the selection and use of surgical gowns and drapes for the operative procedure.		
B. FDA-compliant Surgical Hand Antiseptic Agent: The surgical hand antiseptic agent must be approved by the facility's Infection Control Personnel and used for all surgical scrubs in all Surgery Suites and Endovascular Laboratories.		
C. Policies and Procedures for Surgical Hand Antisepsis: Policies and procedures should be developed, reviewed periodically and readily available in the Surgery Suites and Endovascular Laboratories.		

3. POLICIES AND PROCEDURES	Yes	No
D. <u>Policies and Procedures for Maintaining a Sterile Field:</u> Policies and procedures should be developed, reviewed periodically and readily available in the Surgery Suites and Endovascular Laboratories. Included are policies for scrubbed persons functioning within the sterile field, sterile draping transfer methods of items for the sterile field and constant surveillance of the sterile field.		
E. <u>Electrosurgery:</u> Policies and procedures should be developed, reviewed periodically and readily available in the Surgery Suites and Endovascular Laboratories for electrosurgical units. Proper care, training, competency, exposure to smoke plume generated should be minimized (smoke evacuation system utilizes) and tracking of the unit.		
F. <u>Policies and Procedures for Sponge, Sharps and Instrument Counts:</u> Policies and procedures should be developed, reviewed periodically and readily available in the Surgery Suites and Endovascular Laboratories.		
G. <u>Waste Disposal:</u> Hazardous waste must be identified and disposed of in a manner consistent with federal laws in the Surgery Suites and Endovascular Laboratories.		
H. <u>Quality Control Program:</u> A Quality Assurance/Performance Improvement Program must be in place for the Surgery Suites and Endovascular Laboratories procedures.		
I. <u>Environmental Cleaning and Disinfection:</u> The environmental cleaning and disinfection of the Laboratories is consistent with AORN Standards (after each case and terminal cleaning at the end of the day) with policies and procedures written, reviewed periodically, and readily available in the Surgery Suites and Endovascular Laboratories practice setting.		
J. <u>Patient Skin Antisepsis:</u> Patients undergoing open Class I surgical procedures below the chin should have two preoperative showers with chlorahexidine gluconate (CHG) before the procedure (when appropriate). Hair removal should follow AORN Guidelines. Personnel should receive education and competency of skin preparation, application and skin assessment. Policies and procedures should be in place for skin preparation and readily available in the Surgery Suites and Endovascular Laboratories setting.		
K. <u>Skin Quality Management Program:</u> A Quality Management Program should be in place to evaluate skin care and identify any problems or areas for improvement in the Laboratories.		
L. <u>Anesthesia Equipment:</u> The Cardiac Catheterization and Electrophysiology Laboratories utilizing anesthesia equipment should follow the Occupational Safety and Health Administration for the use of anesthesia gases and equipment. This includes the removal of gases from the environment (anesthesia scavenging system is required).		

3. POLICIES AND PROCEDURES	Yes	No
M. Instrument Care: Contaminated instruments must be contained during transport from the Laboratories and should be transported in a timely manner to a designated area for decontamination. Appropriate case carts and metal transportation carts should be provided that prevent contaminated instruments from being carried by hand through an open corridor.		
N. Fire Safety: A written fire prevention and management plan should be developed. A pre-procedure fire risk assessment must be completed and documented prior to any operative procedures.		
O. Waste Disposal: Hazardous waste must be identified and disposed of in a manner consistent with federal laws in the Laboratories		
P. The Clinical Interventionalist should be consulted with prior to the design concept phase so that the type imaging modality can be identified and test fitted into the proposed room together with a reflected ceiling layout to identify any conflict.		

4. THE BUILT ENVIRONMENT	Yes	No
<p>A. Design Criteria Guidelines:</p> <ol style="list-style-type: none"> 1. New Construction: Operating Room Guidelines shall comply with and follow Industry Accepted Practice (such as FGI Guidelines) for all Surgery Suites and Endovascular Laboratories. For Transfemoral Aortic Valve Replacement (TAVR) procedures in Endovascular Laboratories, Cardiothoracic Surgery Room specifications are required. 2. Renovation Projects: Surgery Suites and Endovascular Laboratories will be evaluated on an individual case by case basis. 3. MEP and Electrical requirements shall be pursuant to the NEC and AHJ 4. Minimum 25 air changes per hour with four low returns, (three absolute minimum, waiver required). 		
B. Provide laminar flow to extend 5'-0" beyond the perimeter of the entire surgical procedure table which equates to a minimum area of 12'-0" x 18'-0".		
<p>C. Specific Architectural Requirements:</p> <ol style="list-style-type: none"> 1. Cardiac Procedure Hybrid Room: <ul style="list-style-type: none"> • Absolute Minimum for Existing Facilities*: 810 net square feet (75.25 net square meters) (24'-0" x 33'-9"), 24'-0" min dimension • New and Existing Facilities*: 900 net square feet (83.61 net square meters) (29'-0" x 31'-0"), 28'-8" min dimension for Philips Flexmove Modality. • Interstitial space above the finished ceiling line (3'-6" min clear) is a must to adequately install and distribute MEP infrastructure. • Reconstructed sites will be evaluated on an individual basis. 2. Control Room: 220 net square feet preferred, 150 NSF minimum 		

4. THE BUILT ENVIRONMENT	Yes	No
<p>3. Equipment Room: Minimum 150 net square feet and accessible from the Control Room or the restricted corridor and not accessible from the procedure room.</p> <p>4. Lead-lined walls, doors and window frames including leaded glass vision view panels. Physicist shielding report shall be submitted and approved by VAMC Chief Facilities Engineer prior to installation.</p> <p>5. Scrub station located adjacent to the entry door of the Laboratory</p> <p>6. Clean section (supply space) for surgical supplies, equipment, case carts, etc.</p> <p>7. Area under the procedure table is restricted space and cannot be used to store equipment</p> <p>8. Area at the end of the table is restricted space due to table movement</p> <p>9. Ceiling Access Panels: Minimum two foot by two foot for installation and maintenance of medical gases, electrical and data utilities to ceiling mounted booms, except in facilities having interstitial floor construction.</p> <p>10. The finished ceiling height minimum of 9'-6" feet clear. The ceiling shall be sealed, washable and homogeneous.</p> <p>11. HVAC ductwork shall be fabricated of stainless steel</p> <p>12. Flooring: Seamless membrane with minimum six inch high flash coving, sealed at intersection with wall surface.</p> <p>13. Imaging equipment, ceiling booms, ceiling mounted lights, ceiling mounted utilities, hanging lead facial shield must be coordinated to prevent collision</p> <p>14. Minimum 25 air changes per hour with four low returns preferable, three absolute minimum.</p> <p><i>* Note: The Philips Flexmove FD 20 Imaging Modality requires a minimum 28'-8" surgical procedure room width so as to provide sufficient room for the circulator to pass by when the C-Arm is positioned perpendicular to the procedure table.</i></p>		
<p>D. Surgical Lighting: Lighting should be in working order and adequate for illumination of the invasive field. General lighting and specialty lighting should be on separate circuits. Surgical lights must have a critical feature of reaching across the procedure table. General room lighting can be LED, incandescent or fluorescent and must have the ability to dim.</p>		
<p>E. Anesthetic Gases: Potential hazards associated with the use of anesthetic gases in all Surgery Suites and Endovascular Laboratories should be identified and safe practices should be established. Anesthesia gases should be located at the head of the patient with enough swing to accommodate a room switch. WAGD systems must be provided.</p>		
<p>F. Booms: Anesthesia; Utilities; Documentation (preferred); Display Monitor Booms. Booms must be either: electro-magnetic (preferred); pneumatically operated booms are acceptable. If pneumatic, provide air compressor and air storage tank in proximal soundproof room</p>		

4. THE BUILT ENVIRONMENT	Yes	No
<p>G. Medical Gas and Electrical Outlets: (Minimum)-Oxygen (2), Med Air (2), Vacuum (5), Nitrous Oxide (1), Nitrogen (1) Electrical Receptacles (24) must be present in each Surgery Suite and Endovascular Laboratory</p>		
<p>H. HVAC Criteria: Proper air quality, air volume changes and air flow direction in all Surgery Suites and Endovascular Laboratories must meet the most current version of AORN Standards, VA HVAC Design Manual for Operative Surgical and Endovascular Suites. Ideally this includes the visual monitoring of temperature, humidity, and positivity in all Surgery Suites and Endovascular Laboratories. Room readiness should be documented prior to case start. The following are required for operative procedures to be performed:</p> <ol style="list-style-type: none"> 1. Unidirectional Air Flow Ceiling providing Laminar Air Flow (CFD Modeling if requested) 2. Low Return Air (4 required) 3. Room Pressure (+) Positive 4. Noise Criteria (35-45) 5. Comply with requirements of the VA HVAC Design Manual. 6. Total Air Exchanges: 20 air changes per hour minimum, (25 air changes per hour preferred). 7. Minimum Outside Air: four (4) air changes per hour minimum (five (5) air changes per hour preferred). 8. During an operative procedure (implants, etc.), all the space from the floor itself to a distance of 15" (380 mm) above is considered contaminated. Therefore, all exhaust/return grills positioned low on the wall approximately 8" (460 mm) above the floor. The Laboratory room exhaust system should include a minimum of three (four best) low exhaust/return air grills located in opposite corners to minimize recirculation of contaminated air within the room. 		
<p>I. Power Systems: Line-isolation monitors should be provided for each isolated power system (preferred but not required). All Surgery Suites and Endovascular Laboratories should be on an un-interrupted power supply (UPS). The power requirements for an operative procedure in the Endovascular Laboratory's must exceed routine Catheterization Laboratories. Electrical feeders for the main distribution point may be required to boost the power needs.</p> <ol style="list-style-type: none"> 1. Minimum One 208-volt outlet is required for surgical laser 2. "Code Blue" system is required in the event of a cardiac arrest summoning designated staff 3. Follow requirements of National Electrical Code NFPA 70 and NFPA 99. 		
<p>J. Procedural Table: Capable to swing 90 degrees (preferred) radiolucent with "Slope-saddle" column design that allows for a maximum Trendelenburg/Reverse Trendelenburg of ≤80 degrees and simultaneous lateral tilt of ≤45 degrees in positioning support on the surgical table top.</p>		

FUNCTIONAL DIAGRAM - INTERVENTIONAL ENDOVASCULAR PLATFORM

