Session 4:

FGI Works in the Developing World

HFG architecture

PEC
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

Oklahoma Association of Healthcare Engineers

2019 Fall Regional Event

October 11, 2019

FGI Works in the Developing World

AGENDA

1. BOMET, KENYA
   - Environment
   - Tenwek Hospital
   - Public Health Crises
2. THE BILLY GRAHAM MEMORIAL CARDIOTHORACIC CENTER AT TENWEK HOSPITAL
   - Overview
   - FGI Compliance
   - Unique Design Features

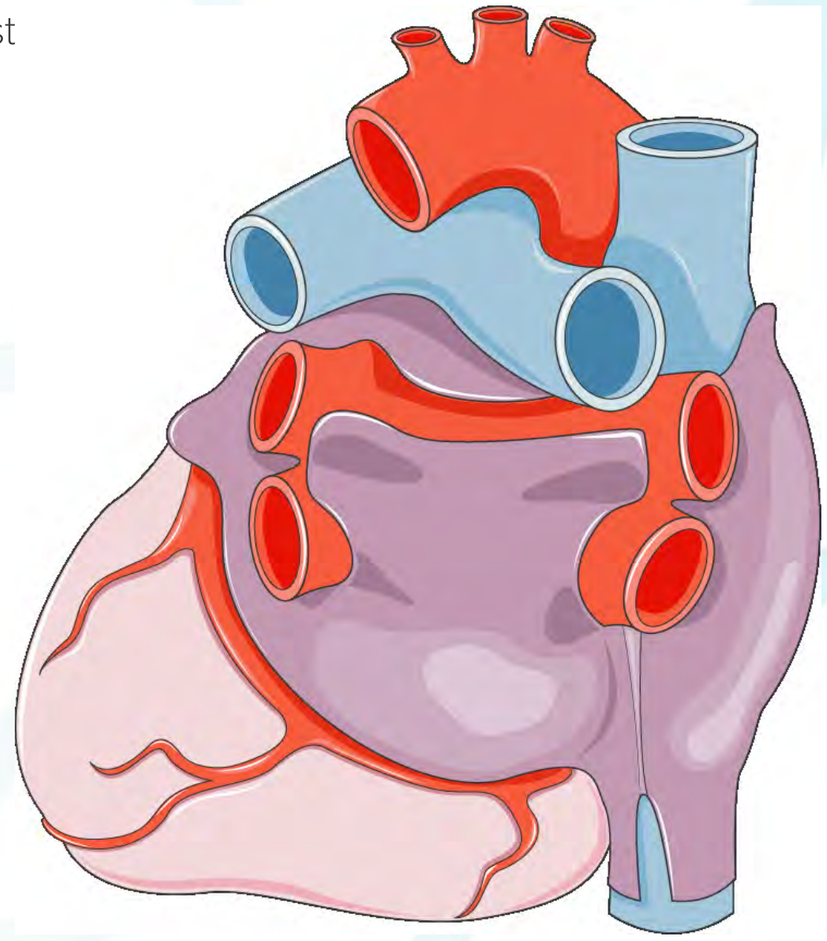
Bomet, Kenya

BOMET, KENYA

VIDEO TOUR

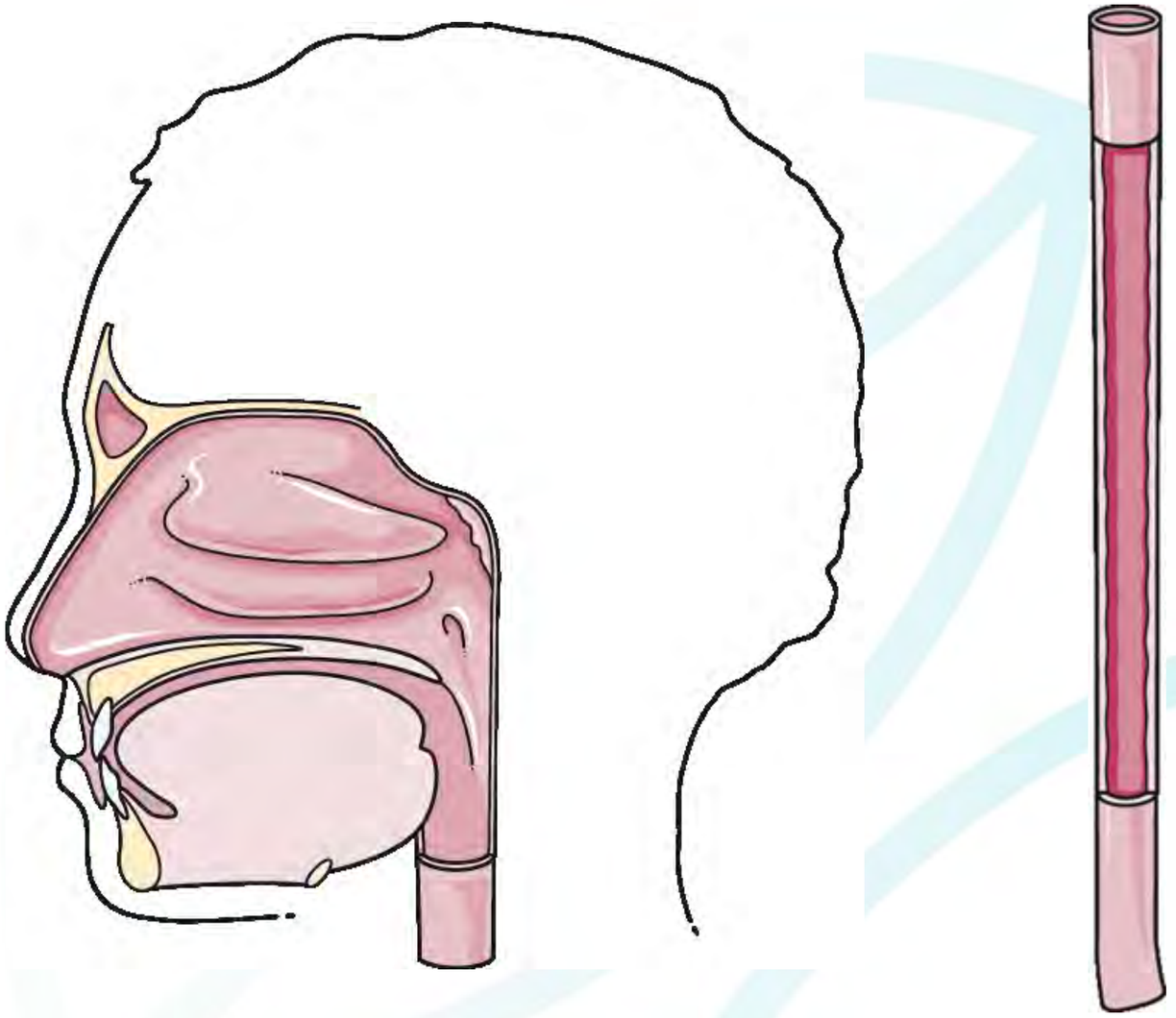
Rheumatic Heart Disease

- Caused by untreated and repeated Strep Throat infections
- Rheumatic Fever attacks the heart and causes Heart Valve damage
- Used to be more prevalent in the United States
- At Tenwek Hospital – 800 children and adolescents are on the waiting list
- Currently able to treat a limited number of cases



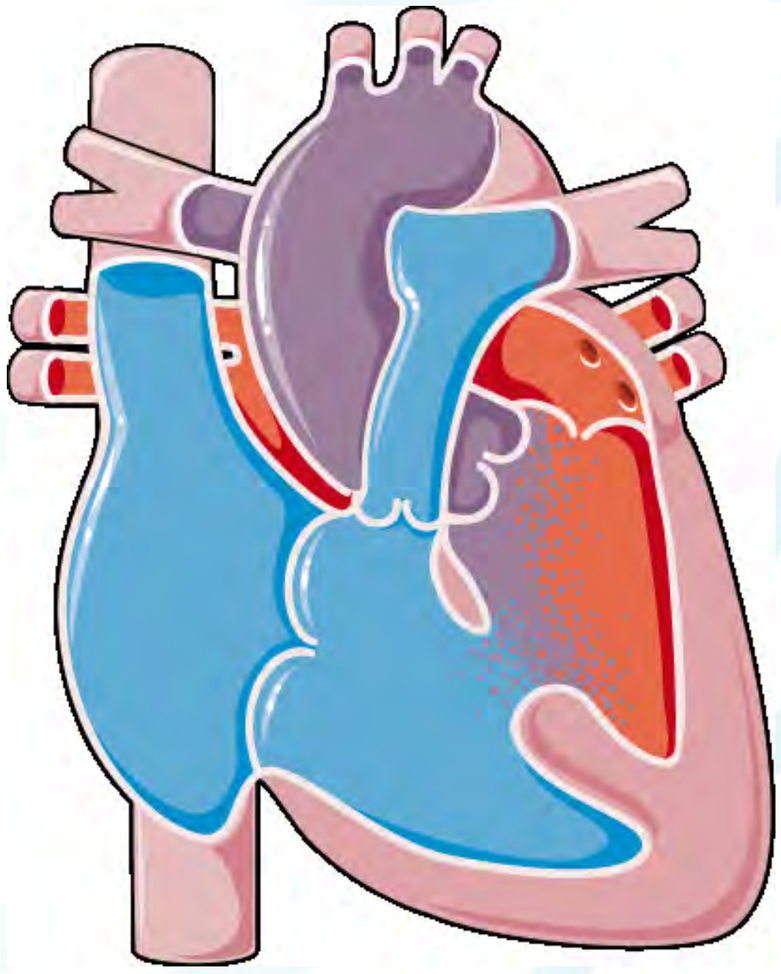
Esophageal Cancer

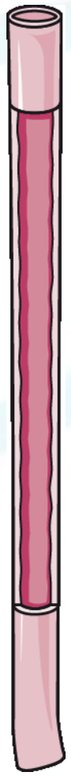
- The cause of the prevalence of Esophageal Cancer in Sub-Saharan Africa is not yet known
- 5 Patients a day are diagnosed at Tenwek Hospital
- Treatment involves placing stents and sometimes removing a large part of the Esophagus to treat and eliminate the cancer.

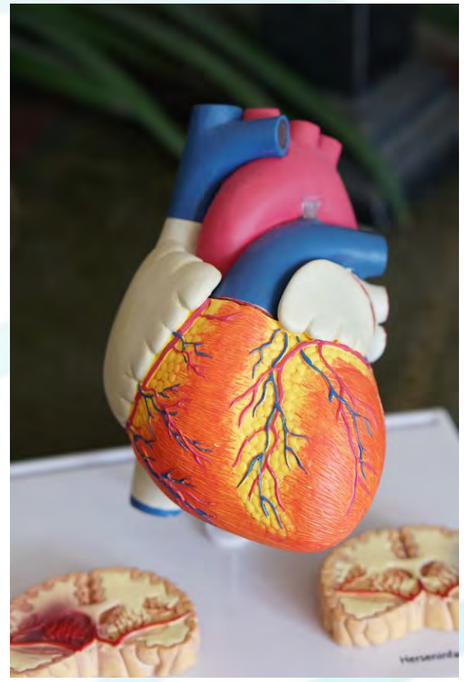


Congenital Heart Disease

- A variety of congenital heart defects exists in children and adolescents that require treatment and many times open heart surgery.
- Treatment changes the trajectory of a young person's life in Africa.







For me, healthcare has a name: Abigail

ABIGAIL

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ABIGAIL

BILLY GRAHAM CARDIOTHORACIC

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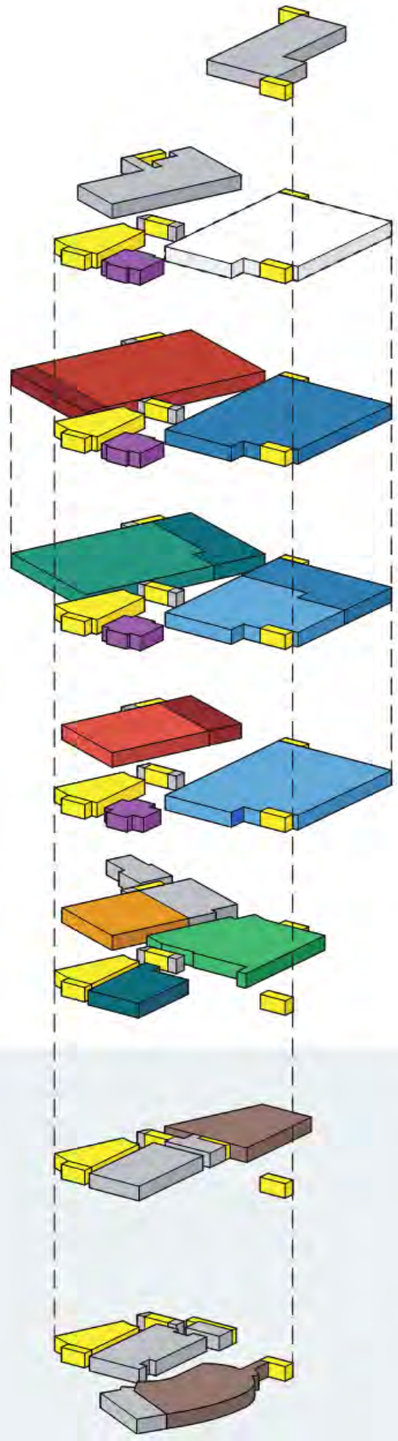
BILLY GRAHAM CANCER CENTER CARDIOTHORACIC

BILLY GRAHAM CANCER CENTER CARDIOTHORACIC

BILLY GRAHAM CARDIOTHORACIC

BUILDING ORGANIZATION



LEVEL 5
- VERTICAL CIRCULATION
- MECHANICAL PENTHOUSE

LEVEL 4
- FUTURE EXPANSION
- MECHANICAL PENTHOUSE
- CHAPEL
- VERTICAL CIRCULATION
- BUILDING SERVICES

LEVEL 3
- PACU / CCU
- SURGERY
- CHAPEL
- VERTICAL CIRCULATION
- BUILDING SERVICES

LEVEL 2
- ICU
- GENERAL WARD
- ADMINISTRATION
- EDUCATION
- CHAPEL
- VERTICAL CIRCULATION
- BUILDING SERVICES

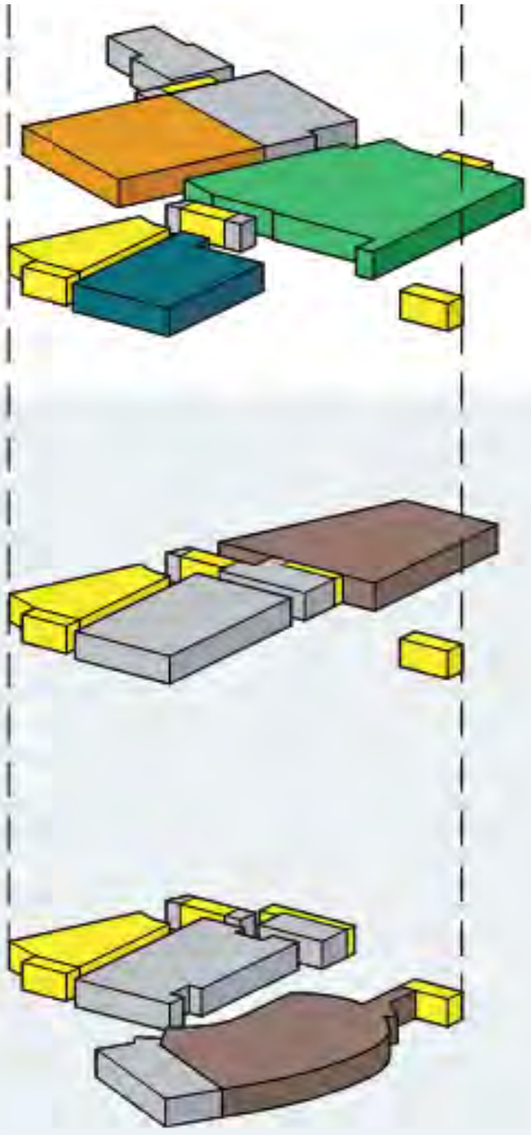
LEVEL 1
- GENERAL WARD
- ENDOSCOPY
- STAFF ON CALL / CHAPLAIN
- CHAPEL
- VERTICAL CIRCULATION
- BUILDING SERVICES

GROUND LEVEL
- CLINIC / DIAGNOSTIC
- REGISTRATION / BUSINESS OFFICE
- DIETARY
- VERTICAL CIRCULATION
- BUILDING SERVICES

BASEMENT 1
- STAFF PARKING
- VERTICAL CIRCULATION
- BUILDING SERVICES

BASEMENT 2
- STAFF PARKING
- VERTICAL CIRCULATION
- BUILDING SERVICES

HFG architecture



GROUND LEVEL

- CLINIC / DIAGNOSTIC
- REGISTRATION / BUSINESS OFFICE
- DIETARY
- VERTICAL CIRCULATION
- BUILDING SERVICES

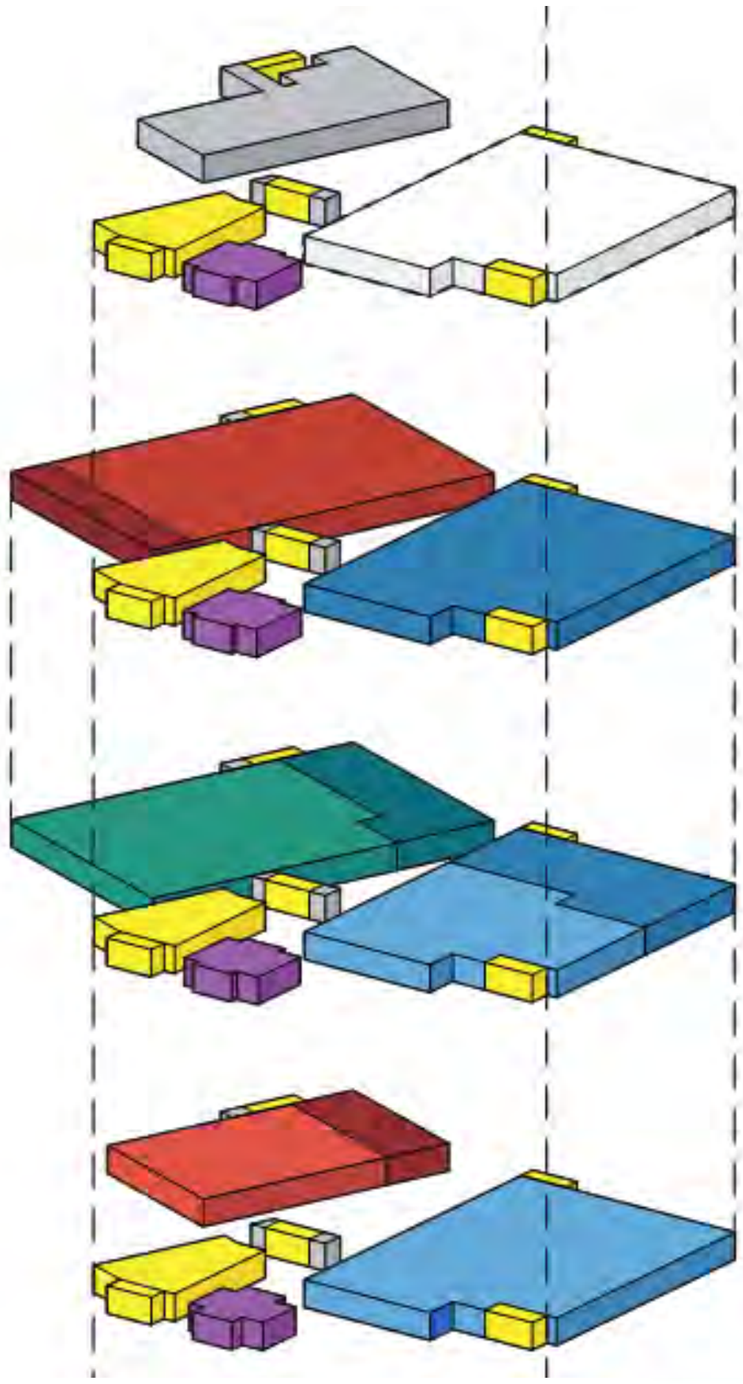
BASEMENT 1

- STAFF PARKING
- VERTICAL CIRCULATION
- BUILDING SERVICES

BASEMENT 2

- STAFF PARKING
- VERTICAL CIRCULATION
- BUILDING SERVICES

BUILDING ORGANIZATION



LEVEL 4

- FUTURE EXPANSION
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LEVEL 1

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- STAFF ON CALL / CHAPLAIN
- CHAPEL
- VERTICAL CIRCULATION
- BUILDING SERVICES

UNIQUE DESIGN FEATURES

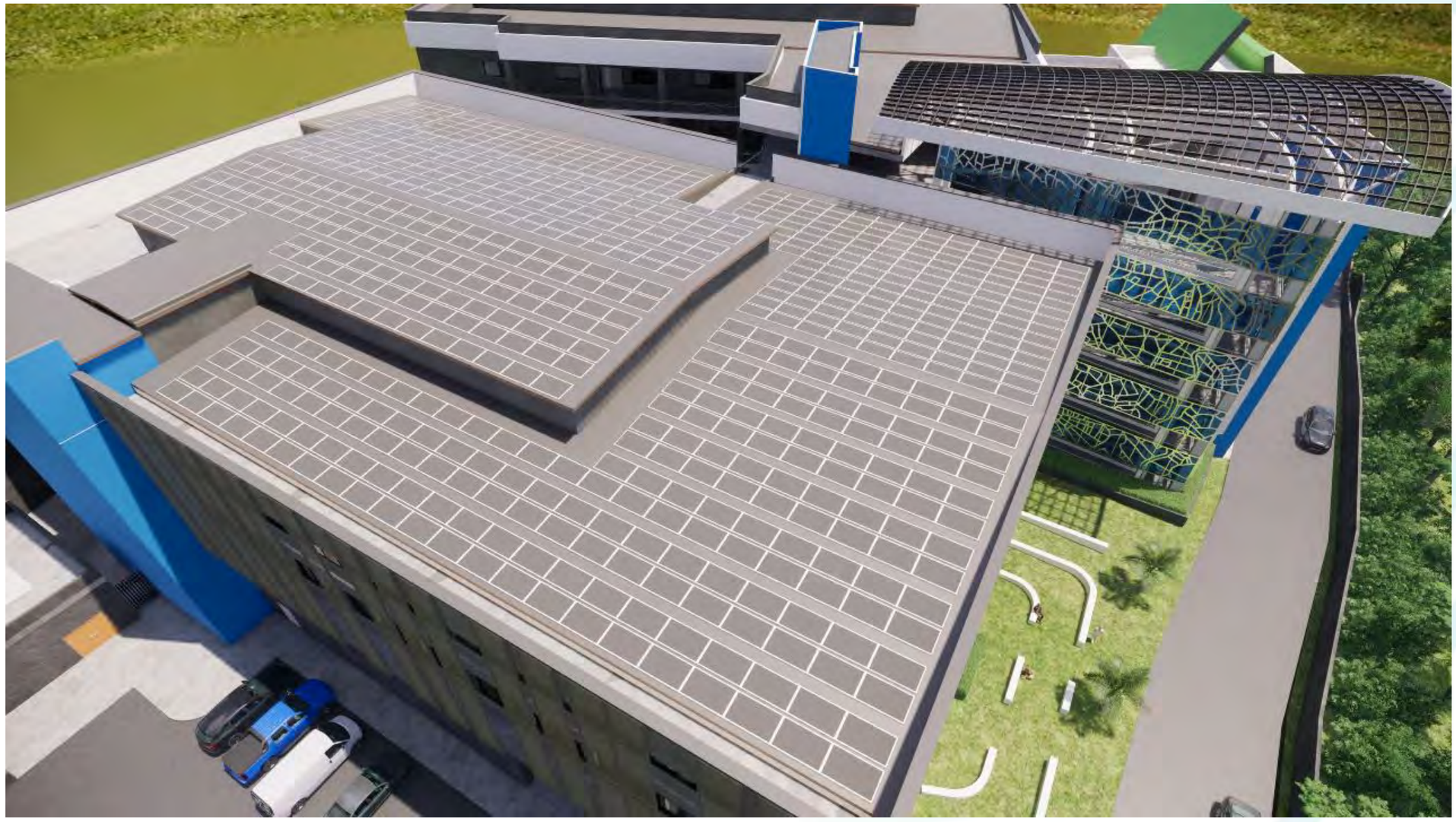
FGI / ASHRAE Compliance and Planning for Utilities

- Domestic Water
- Fire Protection
- Power
- Waste
- Ventilation and ASHRAE 170
- Common Utility Interruptions

UNIQUE DESIGN FEATURES

Microgrid: Solar and Hydroelectric

- Power Quality and Cost



UNIQUE DESIGN FEATURES

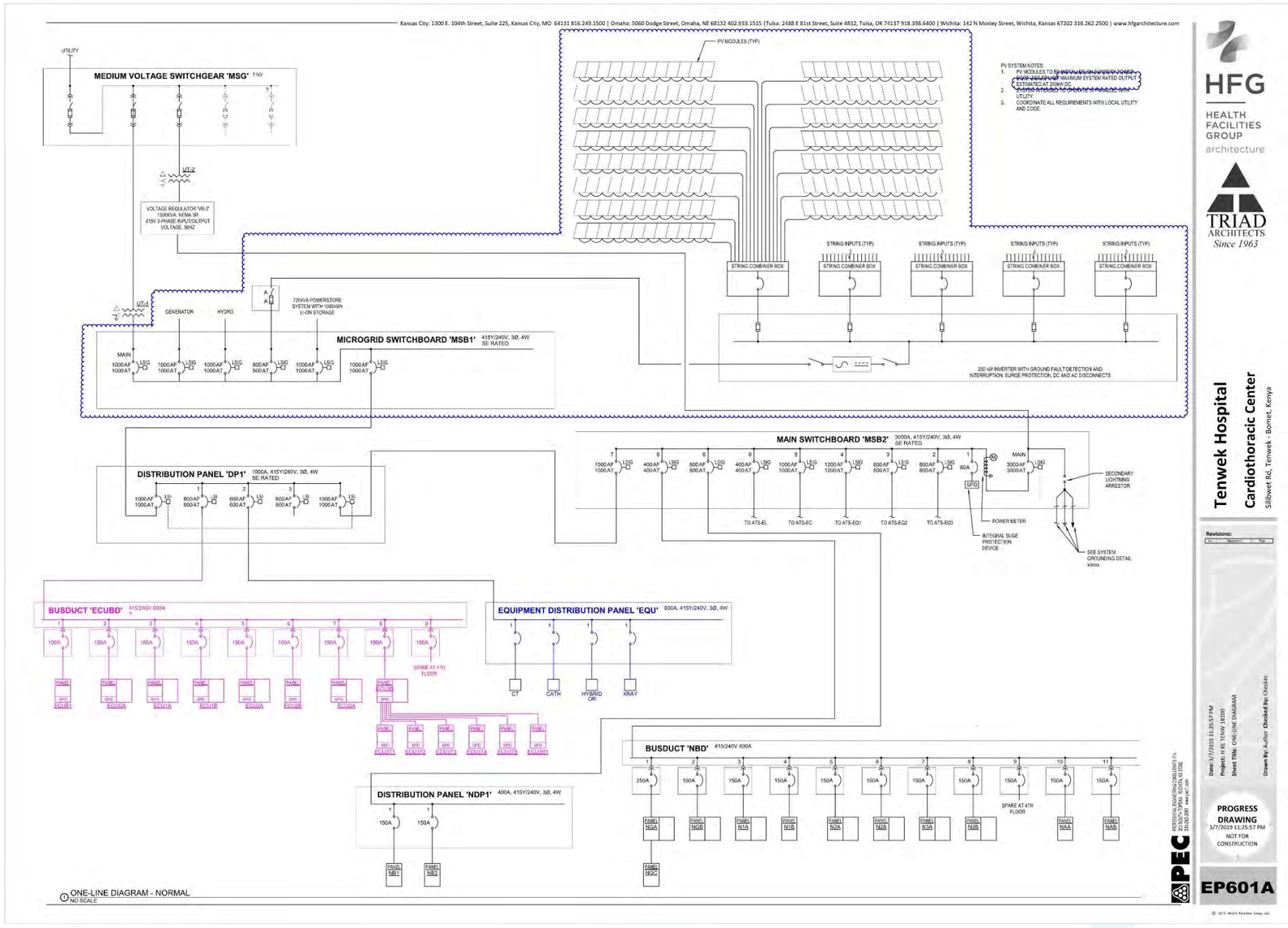
Microgrid: Solar and Hydroelectric

- Power Quality and Cost

UNIQUE DESIGN FEATURES

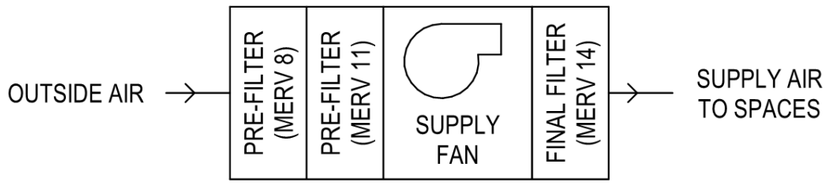
Microgrid: Solar and Hydroelectric

- Microgrid Online Diagram

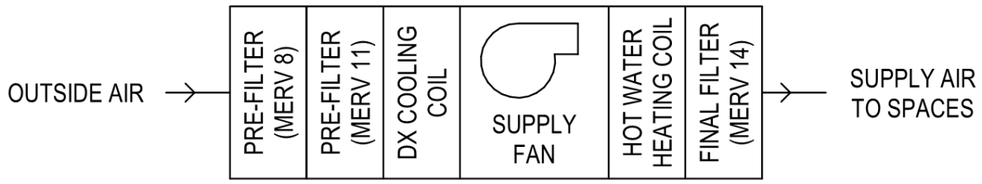


Mechanically Assisted, Natural Ventilation

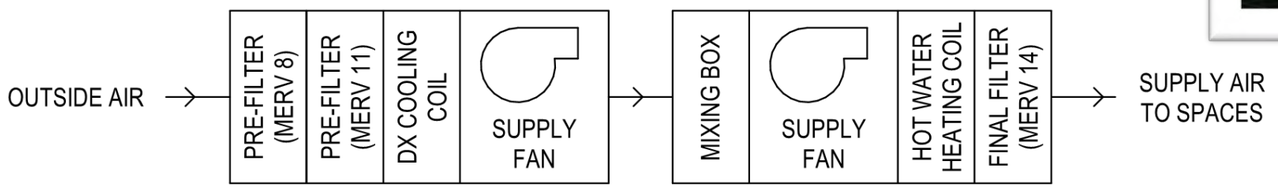
100% OUTSIDE AIR UNIT



100% OUTSIDE AIR UNIT, COOLING, HEATING, NO RECIRCULATION



100% OUTSIDE AIR UNIT, COOLING, HEATING, WITH RECIRCULATION



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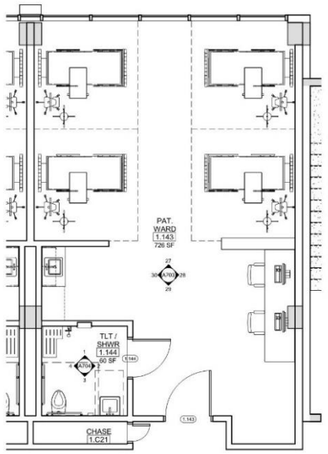
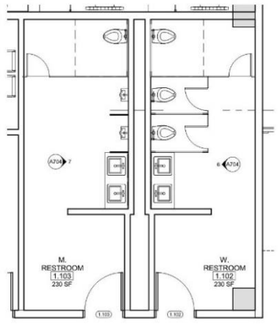
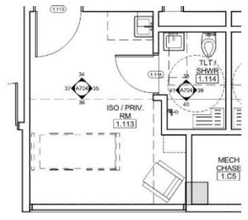


1 TYP. PATIENT WARD
1 : 50



2 ENLARGED PLAN
1 : 50



3 ENLARGED PLAN
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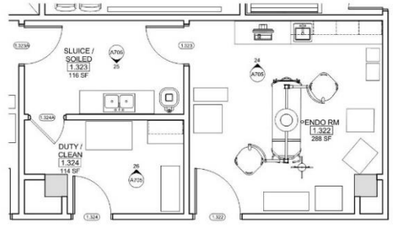

4 ENLARGED PLAN
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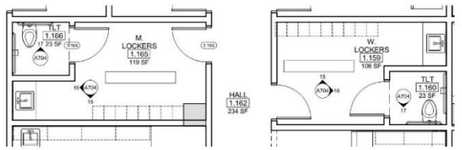

5 ENLARGED PLAN
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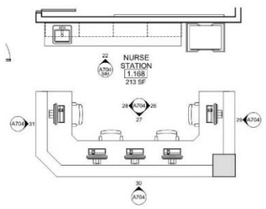

6 ENLARGED PLAN
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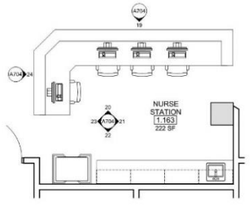

7 ENLARGED PLAN
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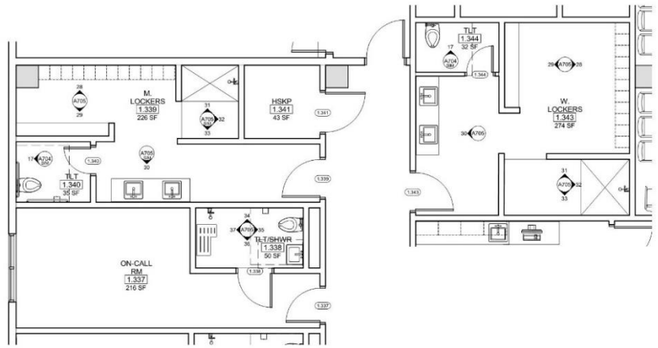
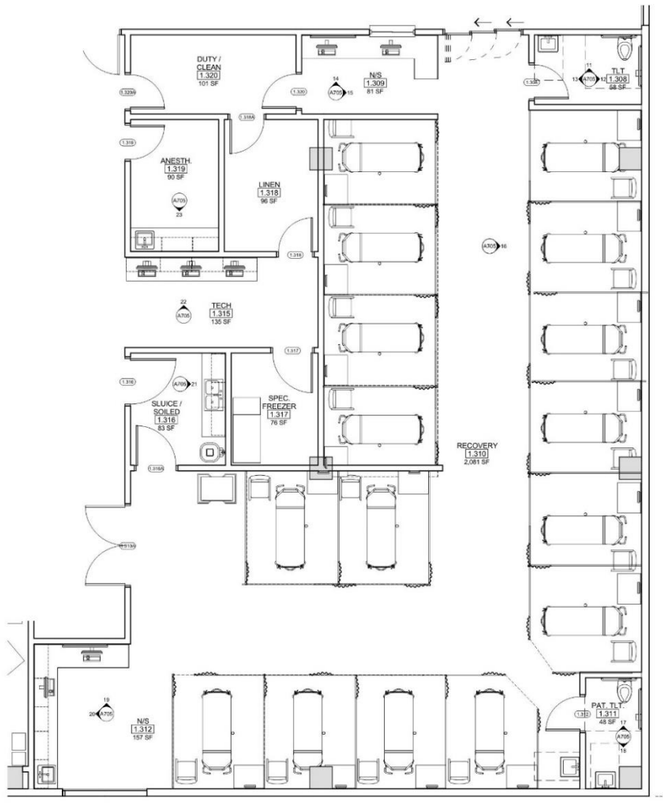


8 ENLARGED PLAN
1 : 50



9 ENLARGED PLAN
1 : 50

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Revisions:

No.	Description	Date

Date: 3/1/2019 8:07:16 AM
Project: H KE TENW 18100
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Checked By: CC

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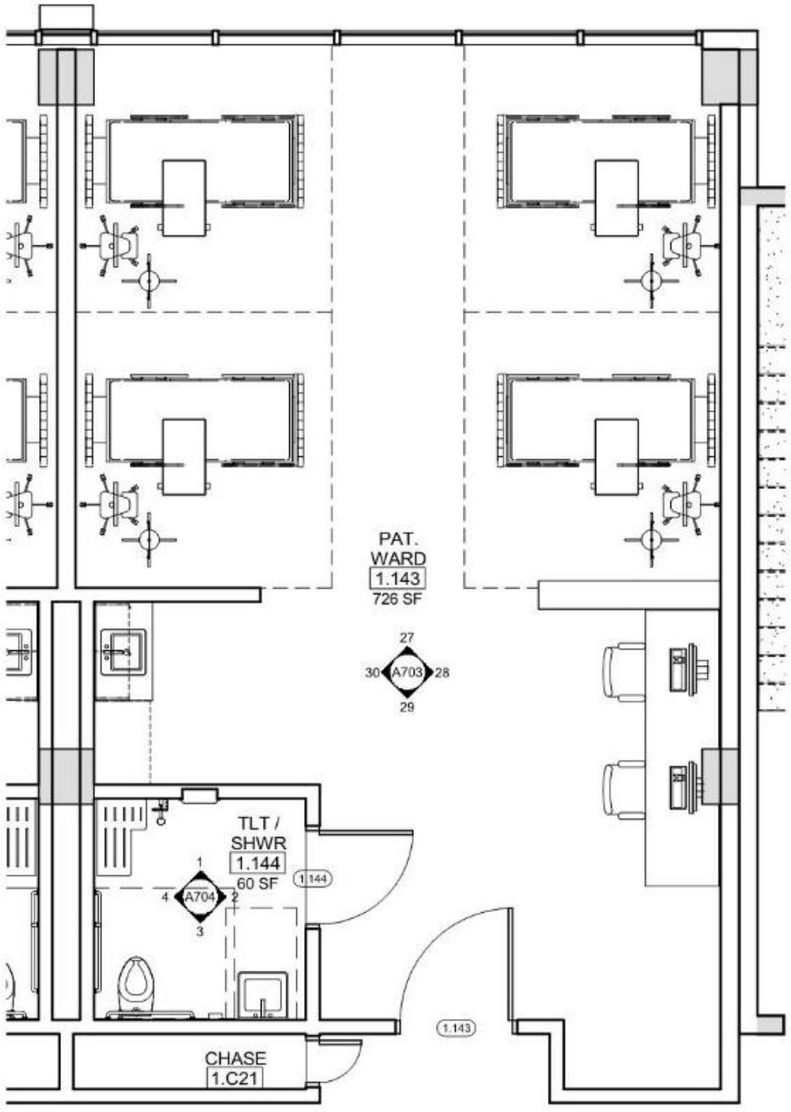
FGI COMPLIANCE



1 TYP. PATIENT WARD
1 : 50

*2.2-2.2 Medical/Surgical Nursing Unit

2.2-2.2.1 Reserved

2.2-2.2.2 Patient Room

See Section 2.1-2.2 (Patient Room) for requirements in addition to those in this section.

2.2-2.2.2.1 Capacity

(1) The maximum number of beds per room in a medical/surgical nursing unit shall be one unless the necessity of a two-bed arrangement has been demonstrated in the functional program. Two beds per room shall be permitted when approved by the authority having jurisdiction.

(2) Where renovation work is undertaken and the present capacity is more than one patient in each room, maximum room capacity shall be no more than the present capacity, with a maximum of four patients in each room.

2.2-2.2.2.2 Space requirements

*(1) Area

(a) Patient rooms shall be sized to accommodate the needs of the clinical services provided.

(b) Patient rooms shall have a minimum clear floor area of 120 square feet (11.15 square meters) in single-bed rooms and 100 square feet (9.29 square meters) per bed in multiple-bed rooms.

(2) Clearances (See "bed size" in the glossary.)

(a) The dimensions and arrangement of rooms shall provide a minimum clearance of 3 feet (91.44 centimeters) between the sides and foot of the bed and any wall or any other fixed obstruction.

(b) In multiple-bed rooms, a minimum clearance of 4 feet (1.22 meters) shall be available at the foot of each bed to permit the passage of equipment and beds.

(3) Where renovation work is undertaken and it is not possible to meet the above minimum standards, authorities having jurisdiction shall be permitted to grant approval to deviate from this requirement. In such cases, patient rooms shall have a minimum clear floor area of 100 square feet (9.29 square meters) in single-bed rooms and 80 square feet (7.43 square meters) per bed in multiple-bed areas.

2.2-2.2.2.3 Windows. See Section 2.1-7.2.2.5 (Windows in patient rooms) for requirements.

2.2-2.2.2.4 Patient privacy. See Section 2.1-2.2.4 (Patient Privacy) for requirements.

2.2-2.2.2.5 Hand-washing stations. See Section 2.1-2.2.5 (Hand-Washing Station in the Patient Room) for requirements.

2.2-2.2.2.6 Patient toilet room. See Section 2.1-2.2.6 (Patient Toilet Room) for requirements.

2.2-2.2.2.7 Patient bathing facilities

(1) Access shall be provided to bathing facilities in the toilet room directly accessed from each patient room or in a central bathing facility.

(2) Central bathing facilities

(a) General

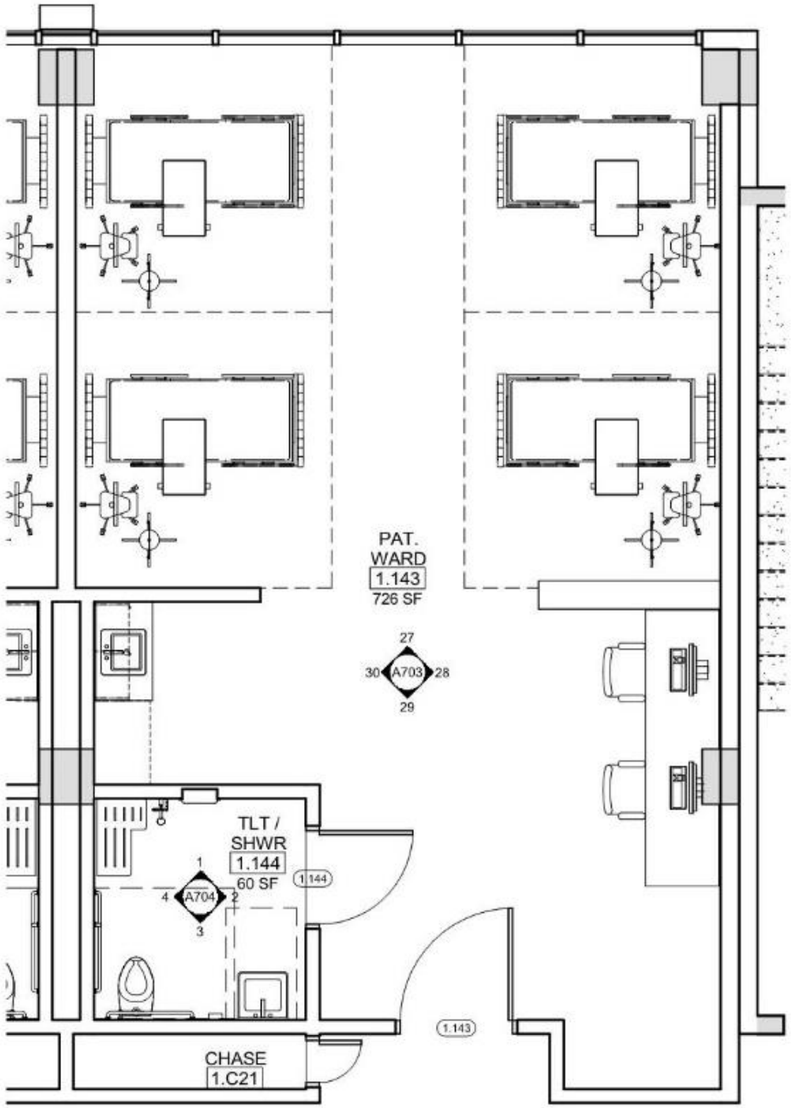
(i) Each bathtub or shower shall be in an individual room or enclosure that provides privacy for bathing, drying, and dressing.

(ii) Location of bathing facilities with space for an attendant for patients on stretchers, carts, and wheelchairs on a floor separate from the nursing unit shall be permitted.

APPENDIX

A2.2-2.2 Patient mobility considerations for nursing unit design. See appendix section A2.1-2.1 (Accommodations to encourage patient mobility) for mention of this aspect of nursing unit design.

A2.2-2.2.2.2 (1) In new construction, single-bed rooms should be at least 12 feet (3.66 meters) wide by 13 feet (3.96 meters) deep (156 square feet, or 14.86 square meters) exclusive of toilet rooms, closets, lockers, wardrobes, alcoves, or vestibules. These spaces should accommodate comfortable furniture for family members (one or two) without blocking staff members' access to patients. Movable seating to support visitation and teaming around the patient should be available in quantities sufficient to meet the needs described in the functional program. Efforts should be made to provide the patient with some control of the room environment.



1 TYP. PATIENT WARD
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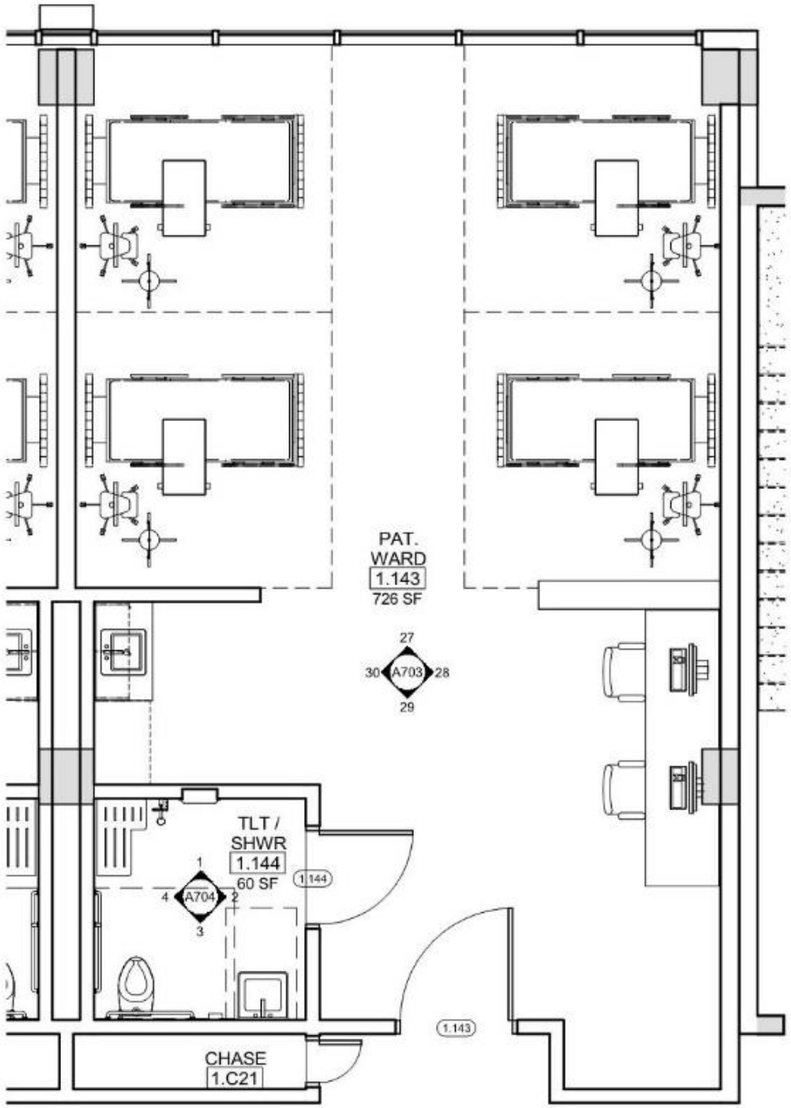

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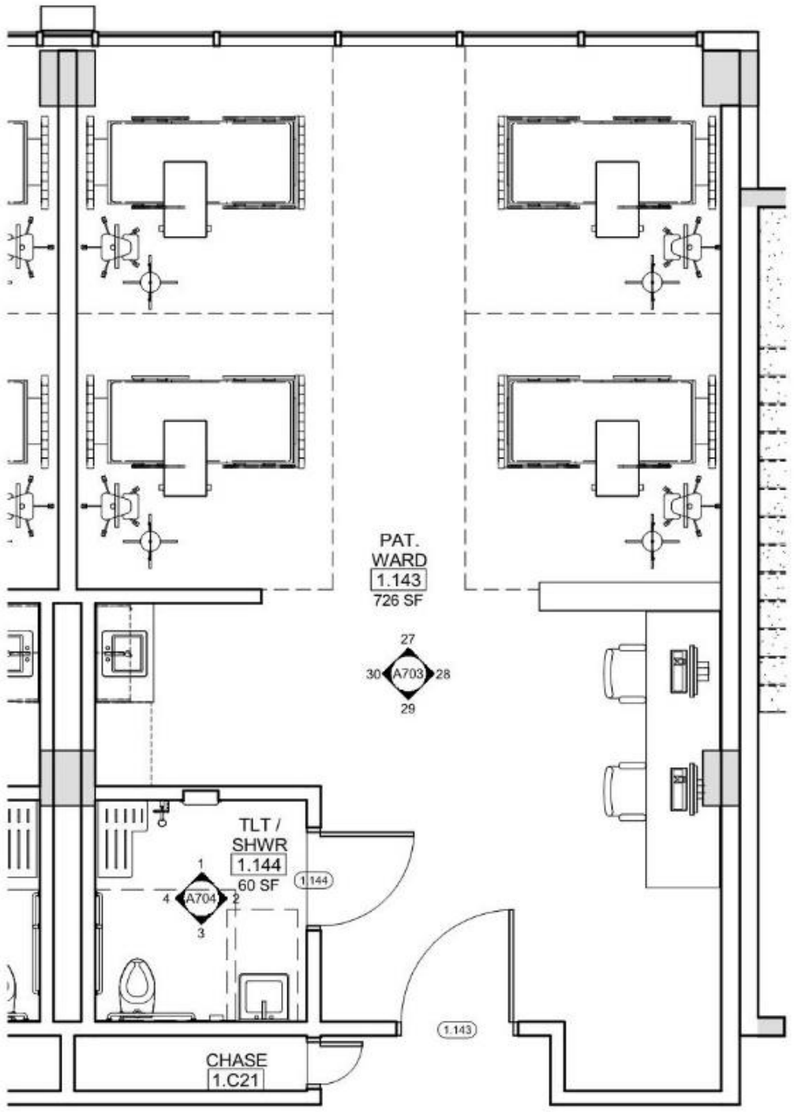
(b) In multiple-bed rooms, a minimum clearance



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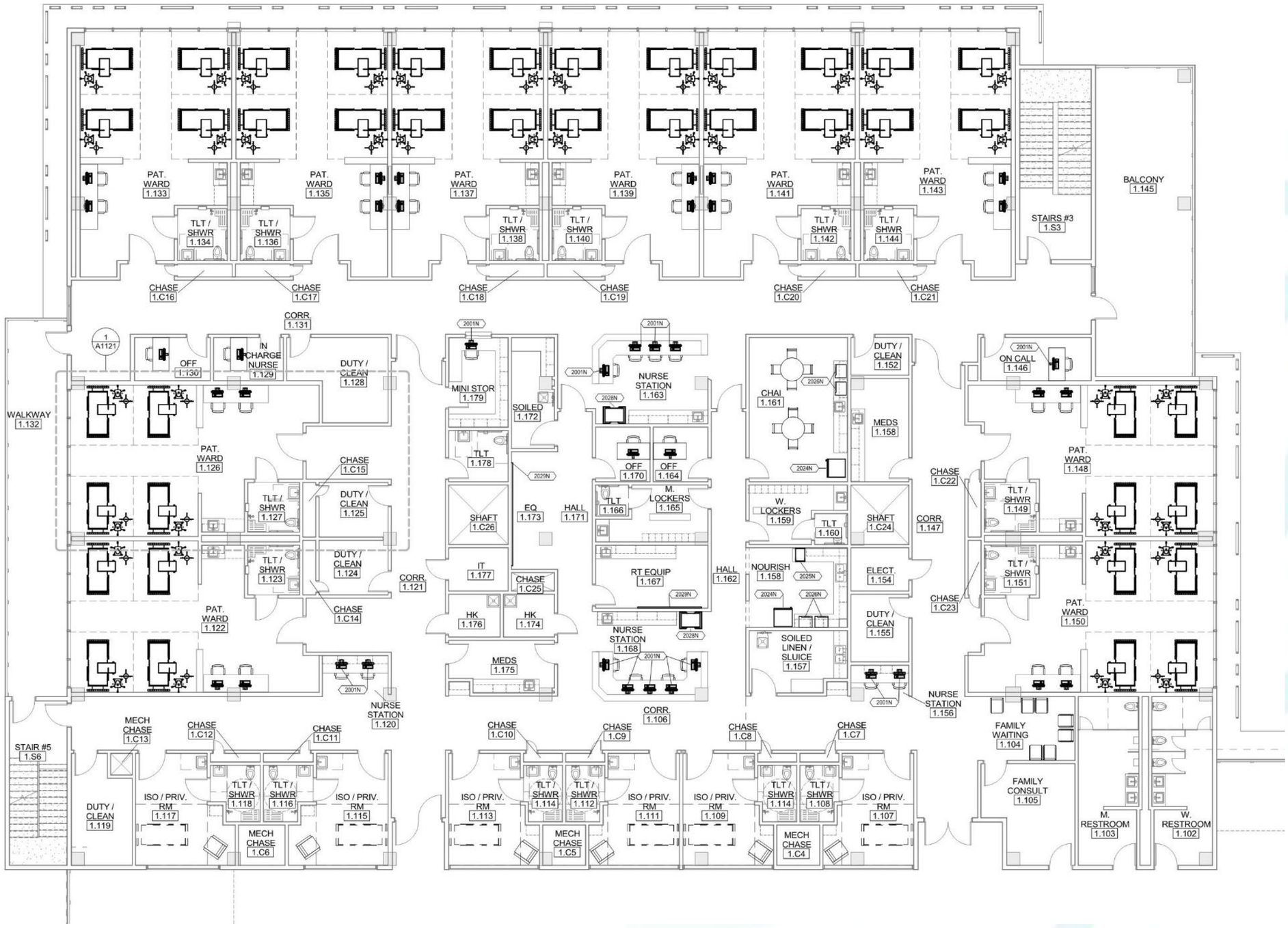
FLYMODE
PRESS SPACE TO WALK ON THE GROUND
W
A S D
Move
E
Q
Fly Up / Down
Fast
Faster
Ctrl
Toggle Fly / Walk
Space
Show / Hide Map
M
Hide Instructions
H
Look Around
Orbit
+
Shift
Time of Day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CHASE 1.C16
CHASE 1.C17
CHASE 1.C18
CHASE 1.C19
CHASE 1.C20
CHASE 1.C21
STAIRS #3 1.S3
BALCONY 1.145
CORR 1.131
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OFF 1.130
IN CHARGE NURSE 1.129
DUTY / CLEAN 1.128
WALKWAY 1.132
PAT. WARD 1.126
CHASE 1.C15
TLT / SHWR 1.127
DUTY / CLEAN 1.125
TLT / SHWR 1.123
DUTY / CLEAN 1.124
CHASE 1.C14
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IT 1.177
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OFF 1.170
OFF 1.164
TLT 1.166
M. LOCKERS 1.165
RT EQUIP 1.167
HALL 1.162
NURSE STATION 1.168
CORR 1.106
CHAI 1.161
DUTY / CLEAN 1.152
MEDS 1.158
W. LOCKERS 1.159
TLT 1.160
SHAFT 1.C24
CORR 1.147
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ELECT. 1.154
DUTY / CLEAN 1.155
SOILED LINEN / SLUICE 1.157
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ON CALL 1.146
CHASE 1.C22
PAT. WARD 1.148
TLT / SHWR 1.149
TLT / SHWR 1.151
CHASE 1.C23
PAT. WARD 1.150
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FAMILY CONSULT 1.105
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W. RESTROOM 1.102
STAIR #5 1.S6
MECH CHASE 1.C13
CHASE 1.C12
CHASE 1.C11
DUTY / CLEAN 1.119
ISO / PRIV. RM 1.117
TLT / SHWR 1.118
TLT / SHWR 1.116
ISO / PRIV. RM 1.115
MECH CHASE 1.C6
CHASE 1.C10
CHASE 1.C9
CHASE 1.C8
CHASE 1.C7
ISO / PRIV. RM 1.113
TLT / SHWR 1.114
TLT / SHWR 1.112
ISO / PRIV. RM 1.111
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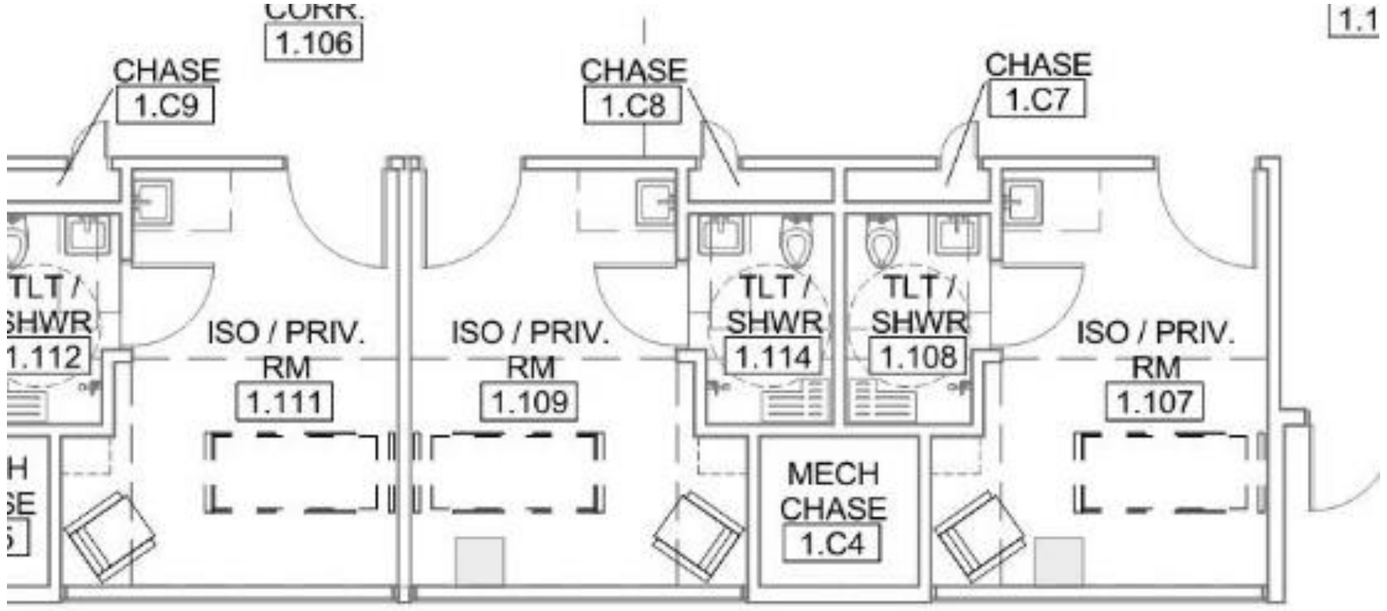
MECH CHASE 1.C5
MECH CHASE 1.C4



*2.1-2.4.2 Airborne Infection Isolation (AII) Room

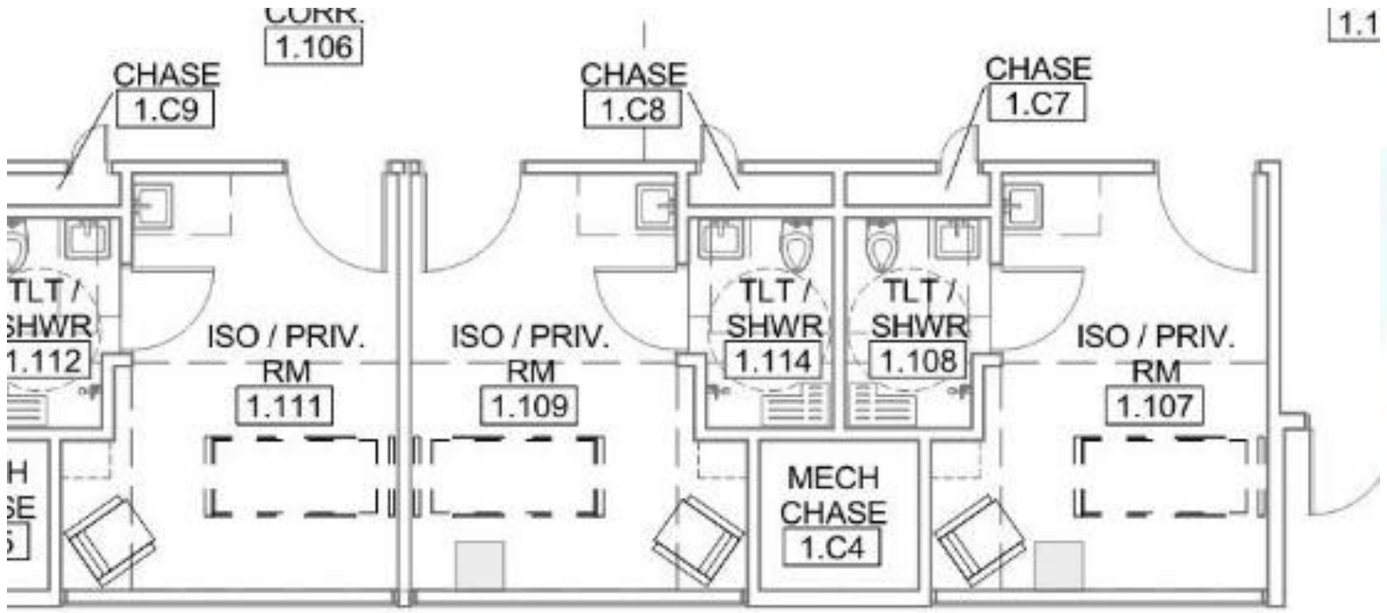
2.1-2.4.2.1 General

(1) The AII room requirements contained in the *Guidelines* for particular areas throughout a facility shall be:

(a) Predicated on an infection control risk assessment (ICRA).
(b) Based on the needs of specific community and patient populations served by an individual health care organization. See Section 1.2–3.2.3 (Infection Control Risk Mitigation).
(c) Used for patients who require an AII room but do not need a protective environment (PE) room.

(2) Number. For specific requirements, see facility chapters.

(3) Location. AII rooms shall be located in individual nursing units or grouped as a separate isolation nursing unit. When not required for patients with airborne infectious diseases, use of these rooms for acute care patients without airborne infectious diseases shall be permitted.



infection isolation room shall comply with the requirements in Section 2.2-2.2.2 (Medical/Surgical Nursing Unit: Patient Room) as well as the following requirements:

(1) Capacity. Each patient room shall contain only one bed.

(2) Provision shall be made for personal protective equipment (PPE) storage at the entrance to the room.

(3) Hand-washing stations

(a) A hand-washing station shall be located in each patient room.

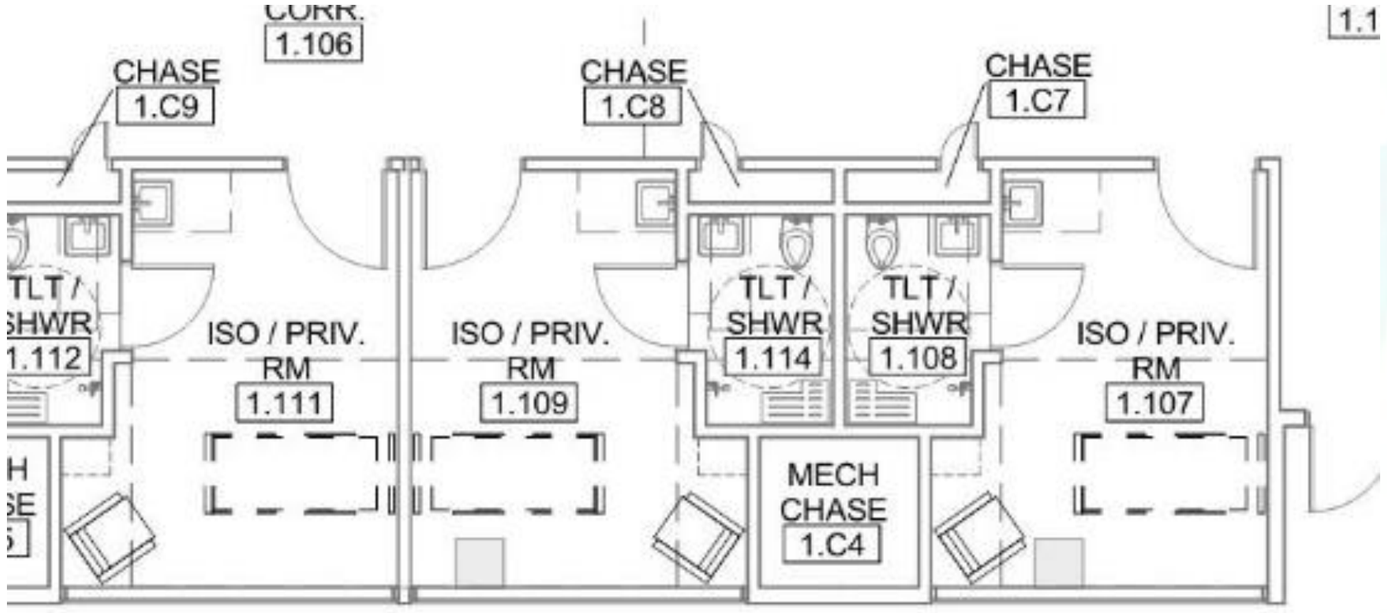
(b) Placement of an additional hand-washing station outside the room entrance shall be permitted.

(c) Section 2.1-2.2.5.3 (3) (Hand-washing station in the patient room—Renovation) shall not apply to AII rooms.

(4) A separate room with a toilet, hand-washing station, and bathtub or shower shall be provided for each AII room.


HFG
HEALTH FACILITIES GROUP
FLYMODE
PRESS SPACE TO WALK ON THE GROUND

1.1


CORR.
1.106
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TLT /
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MECH
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architecture
FLYMODE
PRESS SPACE TO WALK ON THE GROUND
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Hide Instructions
H
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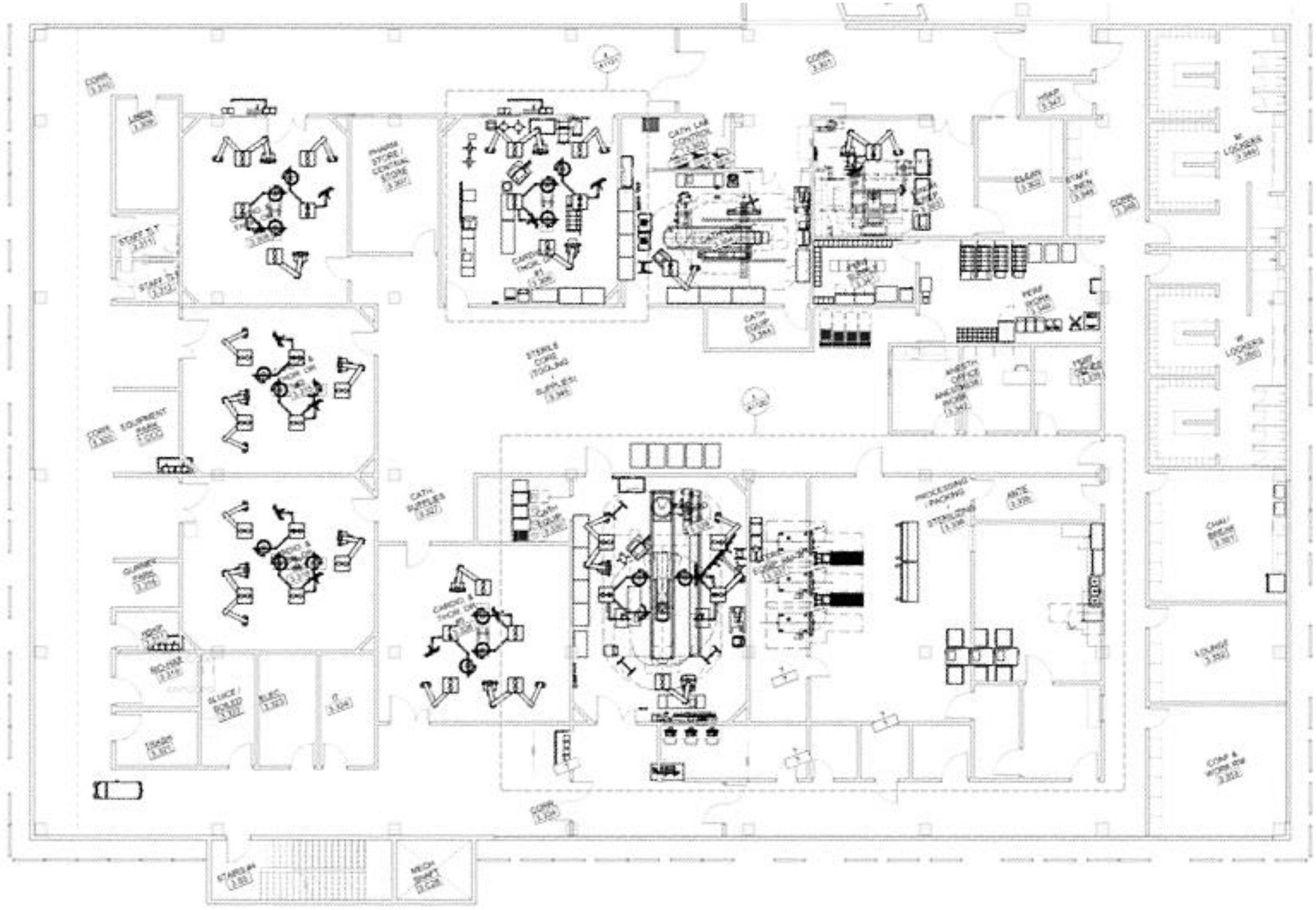

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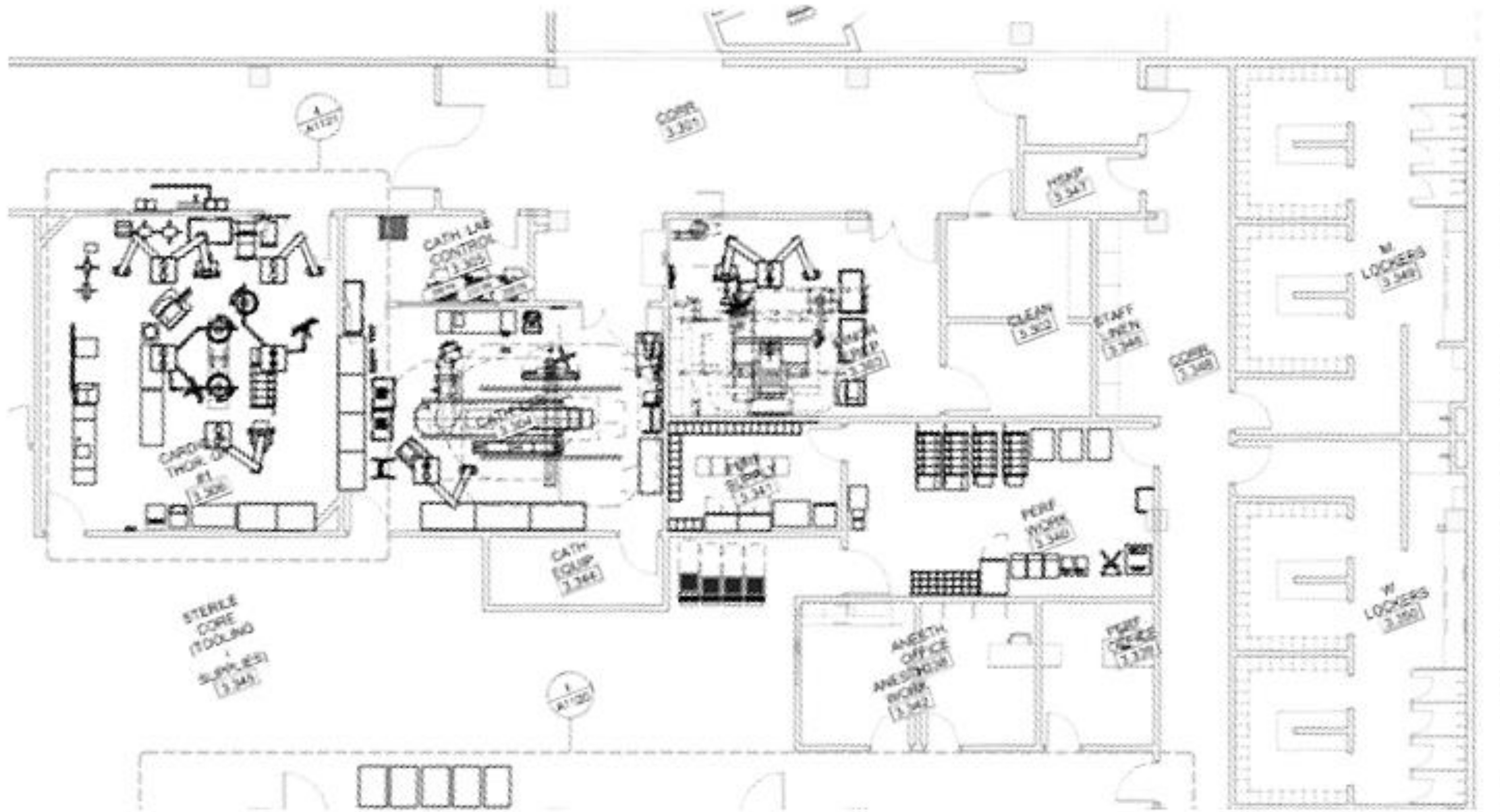
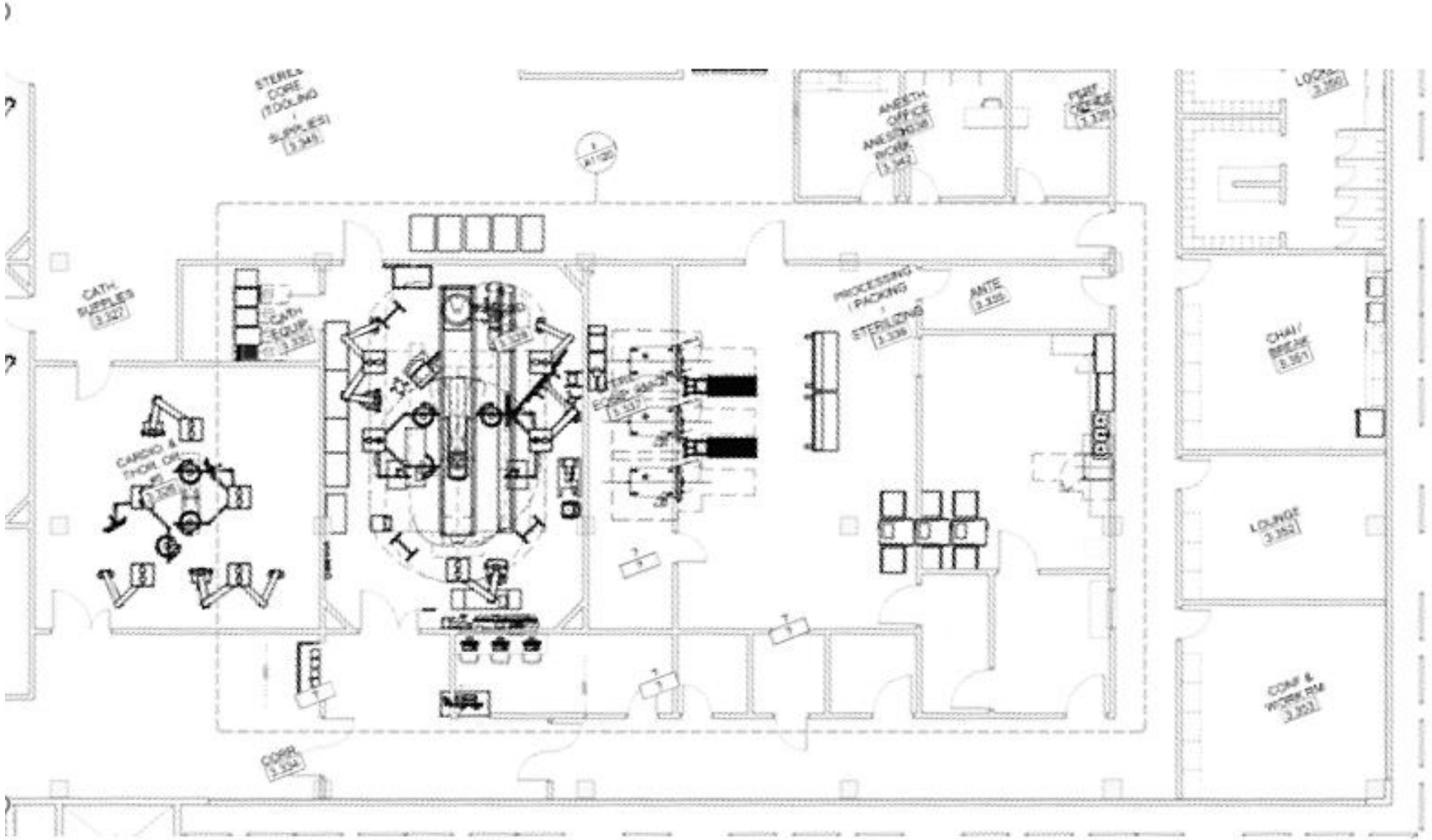


HFG architecture


STERILE CORE (TOOLING / SUPPLIES)
3.341
ANESTH. OFFICE
ANESTHESIOLOGIST WORK
3.342
PERF. OFFICE
3.370
LOCKER
3.350
CATH. SUPPLIES
3.327
CATH. EQUIP.
3.330
PROCESSING / PACKING / STERILIZING
3.339
ANTE
3.335
CHAIR / RECLINE
3.351
CARDIO & ENDOVASC. DIAG.
3.328
LOUNGE
3.352
CONF. & WORK RM
3.353
CONF.
3.354

2.2-3.3 Surgical Services

2.2-3.3.1 General

2.2-3.3.1.1 Location and Layout

(1) The surgical suite shall be located and arranged to prevent unrelated traffic through the suite.

(2) The clinical practice setting shall be designed to facilitate movement of patients and personnel into, through, and out of defined areas in the surgical suite.

(3) Signs that clearly indicate where surgical attire is required shall be provided at all entrances to semi-restricted areas.

*(4) The surgical suite shall be divided into two designated areas—semi-restricted and restricted—defined by the physical activities performed in each area.

*2.2-3.3.2 Operating Rooms

2.2-3.3.2.1 Space requirements

(1) Operating room

(a) Each operating room shall have a minimum clear floor area of 400 square feet (37.20 square meters) with a minimum clear dimension of 20 feet (6.10 meters).

*(b) Where renovation work is undertaken and it is not possible to meet the above minimum standards, each room shall have a minimum clear floor area of 360 square feet (33.48 square meters) with a minimum clear dimension of 18 feet (5.49 meters).

(c) Operating rooms used for cesarean and other delivery procedures shall meet the requirements in Section 2.2-2.11.9.2 (1) (Cesarean Delivery Rooms—Space requirements).

*2.2-3.3.3 Hybrid Operating Room

2.2-3.3.3.1 Application. Hybrid operating rooms shall be designed to comply with the requirements in Section 2.2-3.3.2 (Operating Rooms) and the requirements in this section.

***2.2-3.3.3.2 Space requirements**

(1) Each hybrid operating room shall meet the clear floor area, clearance, and storage requirements for the imaging equipment contained in the room.
(2) Minimum clear dimension
  (a) In new construction, the hybrid operating room shall have a minimum clear dimension of 24 feet (7.32 meters).
  (b) When renovation work is undertaken and it is not possible to meet the minimum clear dimension of 24 feet, a minimum clear dimension of 22 feet (6.70 meters) shall be permitted.
  (c) If mobile storage units are used in lieu of fixed cabinets, the minimum clear dimension shall be available between such units when they are parked against a permanent partition.

2.2-3.3.3.3 Control room. If required, a control room shall be provided that accommodates the imaging system control equipment.

(1) The control room shall have a minimum area of 120 square feet (11.15 square meters), which shall be permitted to include fixed work surfaces.
(2) The room shall be physically separated from the hybrid operating room with walls and a door.
(3) The room shall have viewing windows that allow for a full view of the patient and the surgical team.
(4) If the control room is adjacent to a restricted area, it must be physically separated from the restricted area with walls and a door.

2.2-3.3.3.4 Access route(s). Access route(s) for equipment installation and replacement shall comply spatially and structurally with the manufacturer's technical specifications.

***2.2-3.3.3.5 Structural support.** The floor and (if applicable) ceiling structures shall be designed to support the weight of the imaging equipment as well as other fixed ancillary equipment (e.g., lights, service columns) and movable ancillary equipment.

***2.2-3.3.3.6 Protection from vibration and other**

2.2-3.3.4 Pre- and Postoperative Patient Care Areas

2.2-3.3.4.1 General

(1) Patient care station design

(a) Bays, cubicles, or single-bed rooms shall be permitted to serve as patient care stations.
(b) When determining the area for a patient care station, space shall be provided for equipment described in the functional program.

(2) Provisions shall be made for the isolation of infectious patients.

(a) An airborne infection isolation room is not required in pre- and postoperative patient care areas.
(b) Provisions for the recovery of a potentially infectious patient with an airborne infection shall be determined by an infection control risk assessment (ICRA).

2.2-3.3.4.3 Phase I post-anesthetic care unit (PACU)

(1) General

(a) Location

(i) The PACU is an unrestricted area.
(ii) In new construction, at least one door to the recovery room shall provide access directly from the surgical suite without crossing unrestricted corridors.

*(b) PACU size. A minimum of 1.5 post-anesthesia patient care stations per operating room shall be provided.
(c) If pediatric surgery is part of the functional program, the following requirements shall be met:

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2019 Fall Regional Event

HFG architecture

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