Table of Contents

Section 1  Foreword & Acknowledgements
  Introduction
  Definitions
  Abbreviations
  Legends and Symbols

Section 2  Narrative
  General Considerations
  Functional Considerations
  Technical Considerations

Section 3  Functional Diagram

Section 4  Guide Plates (typical order)
  Floor Plan
  Reflected Ceiling Plan
  Design Standards
  Equipment Guide List
### Section 1: Foreword and Acknowledgements

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>1-2</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>1-3</td>
</tr>
<tr>
<td>Introduction</td>
<td>1-5</td>
</tr>
<tr>
<td>Definitions</td>
<td>1-6</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>1-8</td>
</tr>
<tr>
<td>Logistical Categories</td>
<td>1-9</td>
</tr>
<tr>
<td>Legends of Symbols</td>
<td>1-10</td>
</tr>
</tbody>
</table>
Foreword

The material contained in the Radiology Service Design Guide is the culmination of a partnering effort by the Department of Veterans Affairs Veterans Health Administration and the Facilities Quality Office. The goal of the Design Guide is to ensure the quality of VA facilities while controlling construction and operating costs.

This document is intended to be used as a guide and as a supplement to current technical manuals and other VA criteria in the planning of the Radiology Service. The Design Guide is not to be used as a standard design, and the use of this Design Guide does not limit the project Architect’s and Engineer’s responsibilities to develop a complete and accurate project design that best meets the user’s needs and the applicable code requirements.

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Director, Strategic Management Office
Office of Construction & Facilities Management
Washington, DC
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Introduction

The Radiology Service Design Guide was developed as a tool to assist Contracting Officers, Medical Center Staff, and Architects and Planners with the design and construction of Radiology Service facilities. It is not intended to be project specific; but rather provide an overview with respect to the design and construction of Radiology Service facilities.

Guide plates for various rooms within the Radiology Service are included in this chapter to illustrate typical VA furniture, equipment, and personnel space needs. They are not project specific as it is not possible to foresee future requirements. The project specific space program is the basis of design for an individual project. It is important to note that the guide plates are intended as a generic graphic representation only.

Equipment manufacturers should be consulted for actual dimensions, utilities, shielding, and other requirements as they relate to specified equipment. Use of this design guide does not supersede the project architects’ and engineers’ responsibilities to develop a complete and accurate design that meets the user’s needs and complies with appropriate code requirements.
Definitions

Angiographic Room: A radiographic/fluoroscopic system with rapid filming techniques and with special capabilities for performing angiographic procedures. The system may be single-plane or bi-plane.

Chest Room - Dedicated: A specific or specialized radiographic room used for routine chest X-rays and those radiographic procedures which can or should be performed in an upright position.

Computed Radiology (CR): CR uses special plate technology, scanning and computer processing to produce a digital image of a patient’s organ or body part.

Computed Tomography: The technique employing ionizing radiation to produce axial (cross section) body section images. Data obtained by X-ray transmission through the patient are computer analyzed to produce these images. The series of sectional, planar images may be manipulated to produce different planar or volumetric view of the areas of interest and eliminate overlying structures such as bone. Manipulations of data allows for the selective view of either dense tissues such as bones or diffuse tissues such as the heart, brain, or lung. CT is used for both head and body imaging and is applicable to diagnosis, biopsy, and therapy planning.

Diagnostic Radiology: The medical specialty that utilizes imaging examinations with or without ionizing radiation to affect diagnosis. Techniques include radiography, tomography, fluoroscopy, ultrasonography, mammography, interventional radiography (IR) and computed tomography (CT).

Diagnostic Room: Designated room containing diagnostic equipment performing patient procedures such as Radiographic, Radiographic/Fluoroscopic (R/F), Mammography, Ultrasound, Interventional Radiology (IR), and Computed Tomography (CT).

Digital Radiography: The capture or conversion of radiographic images in a digital format.

Fluoroscopy: The technique used to produce real time motion in either an instantaneous or stored fashion. A non-ionic contrast material is injected or consumed by the patient to enhance visualization of various organs. A constant stream of radiation passes through the patient and strikes a fluorescent screen creating shadows of the opaque internal organs. Induced motion provides a continuous or nearly continuous evaluation of the visual effects of that motion. Images produced by this modality include upper and lower gastrointestinal series, cystography, pyelography and esophageal mobility studies.

General Purpose Radiology Room: A room in which direct radiography is performed.

General Radiology: Images of the skull, chest, abdomen, spine, and extremities produced by the basic radiographic process.

Interventional Radiology (IR): The clinical subspecialty that uses fluoroscopy, CT and ultrasound to guide percutaneous (through the skin) procedures such as performing biopsies, draining fluids, inserting catheters, or dilating or stenting narrowed ducts or vessels. IR Procedures are complex, requiring a team of doctors and technicians. As such, they are often performed in the Surgical Suite, and scheduled in advance as they require special preparation. An IR / Special Procedure Room can be categorized as: Angiographic Room - an R/F system with rapid filming techniques including capabilities for performing angiographic procedures; Vascular / Neuro-radiology Room - a diographic/fluoroscopic system with rapid film
changer and capabilities for performing a range of neuro, visceral, and peripheral procedures, single-plane or bi-plane.

**Mammography**: A modality utilizing ionic X-ray imaging for breast examinations.

**Picture Archiving and Communication System (PACS)**: The digital capture, transfer and storage of diagnostic images. A PACS system consists of workstations for interpretation, image / data producing modalities, a web server for distribution, printers for file records, image servers for information transfer and holding, and an archive of off-line information. A computer network is needed to support each of these devices.

**Radiography**: A still patient image record utilizing ionizing radiation. The image is recorded in digital format.

**Radiographic / Fluoroscopic Room**: A room containing a radiographic / fluoroscopic system that produces either still photographic records or real-time images of internal body structures. Most fluoroscopy procedures are performed early in the day because of fasting requirements. After most fluoroscopy procedures have been completed, this room can be used as a general purpose room.

**Stereotactic Mammography**: Imaging of the breast from two slightly angled directions in order to identify a path to help guide a needle for breast biopsy. The procedure may be performed upright or with the patient lying face down. Several stereotactic pairs of X-ray images are made. Small samples of tissue are then removed from the breast using a hollow core needle or vacuum-assisted biopsy device that is precisely guided to the correct location using X-ray imaging and computer coordinates.

**Ultrasound**: High frequency sound waves are utilized to determine the size and shape of internal organs based on the differential rates of reflection. In addition, images can be observed in real time to reveal motion, and can include coloration of arterial and venous blood flow. Cyst aspiration and fluid removal are also procedures done with the ultrasound modality.
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Amps</td>
</tr>
<tr>
<td>AC</td>
<td>Air Conditioning</td>
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<tr>
<td>ABA</td>
<td>Architectural Barriers Act</td>
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<tr>
<td>AC/HR</td>
<td>Air Changes per Hour</td>
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<tr>
<td>ADA</td>
<td>Americans with Disability Act</td>
</tr>
<tr>
<td>ADAAG</td>
<td>ADA Accessibility Guidelines</td>
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<tr>
<td>A/E</td>
<td>Architectural / Engineering Firm</td>
</tr>
<tr>
<td>AHJ</td>
<td>Authority Having Jurisdiction</td>
</tr>
<tr>
<td>AIA</td>
<td>American Institute of Architects</td>
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<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>AR</td>
<td>As Required</td>
</tr>
<tr>
<td>ASRAE</td>
<td>American Society of Heating Refrigerating &amp; Air-Conditioning Engineers</td>
</tr>
<tr>
<td>BGSF</td>
<td>Building Gross Square Feet</td>
</tr>
<tr>
<td>BTU</td>
<td>British Thermal Unit</td>
</tr>
<tr>
<td>CARES</td>
<td>Capital Asset Realignment for Enhanced Services</td>
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<tr>
<td>CFM</td>
<td>Cubic Feet per Minute</td>
</tr>
<tr>
<td>DOE</td>
<td>Department of Energy</td>
</tr>
<tr>
<td>DGSF</td>
<td>Departmental Gross Square Feet</td>
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<tr>
<td>DVA</td>
<td>Department of Veterans Affairs</td>
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<tr>
<td>FAR</td>
<td>Floor Area Ratio</td>
</tr>
<tr>
<td>FC</td>
<td>Foot Candle</td>
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<tr>
<td>OCFM</td>
<td>Office of Construction &amp; Facilities Management</td>
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<tr>
<td>GSF</td>
<td>Gross Square Feet</td>
</tr>
<tr>
<td>GSM</td>
<td>Gross Square Meters</td>
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<tr>
<td>HIPAA</td>
<td>Healthcare Insurance Portability and Accountability Act</td>
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<tr>
<td>HP</td>
<td>Horsepower</td>
</tr>
<tr>
<td>HVAC</td>
<td>Heating, Ventilating and Air Conditioning</td>
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<tr>
<td>IAQ</td>
<td>Indoor Air Quality</td>
</tr>
<tr>
<td>IBC</td>
<td>International Building Code</td>
</tr>
<tr>
<td>JCAHO</td>
<td>Joint Commission (on Accreditation of Healthcare Organizations)</td>
</tr>
<tr>
<td>LB</td>
<td>Pound, Pounds</td>
</tr>
<tr>
<td>LUX</td>
<td>Lumen Per Square Meter</td>
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<tr>
<td>NEC</td>
<td>National Electrical Code</td>
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<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
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<tr>
<td>NHCU</td>
<td>Nursing Home Care Unit</td>
</tr>
<tr>
<td>NSF</td>
<td>Net Square Feet</td>
</tr>
<tr>
<td>NSM</td>
<td>Net Square Meters</td>
</tr>
<tr>
<td>NTS</td>
<td>Not to Scale</td>
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</tbody>
</table>
NUSIG  National Uniform Seismic Installation Guidelines
OSHA  Occupational Safety and Health Administration
RCP  Reflected Ceiling Plan
RH  Relative Humidity
SF  Square Feet, Square Foot
SMACNA  Sheet Metal and Air Conditioning Contractor’s National Association
SqM  Square Meters
TIL  Technical Information Library
TV  Television
UBC  Uniform Building Code
UFAS  Uniform Federal Accessibility Standards
V  Volts
VA  Department of Veterans Affairs
VACO  Veterans Affairs Central Office
VAFM  Veterans Affairs Facilities Management
VAMC  Veterans Affairs Medical Center
VHA  Veterans Health Administration
VISN  Veterans Integrated Service Network

LOGISITICAL CATEGORIES (LOG CATS)

VV: Department of Veterans Affairs furnished and installed - Medical Care Appropriations

VC: Department of Veterans Affairs furnished and Contractor installed - Medical Care Appropriations for Equipment and Construction Appropriations for Installation

CC: Contractor Furnished and Installed - Construction Appropriations

CF: Construction Appropriations - Department of Veterans Affairs furnished - Installed by the Department of Veterans Affairs or Contractor
SINGLE POLE SWITCH

SINGLE POLE SWITCH - SUFFIX OF a, b OR c INDICATES SEPARATE CONTROL OR FIXTURES WITH SAME DESIGNATION

DIMMER SWITCH

THREE WAY SWITCH

DOOR SWITCH

FUSED OR UNFUSED DISCONNECT SWITCH

EMERGENCY POWER OFF (EPO) PUSH BUTTON

2’ x 2’ FLUORESCENT FIXTURE

1’ x 4’ FLUORESCENT FIXTURE

2’ x 4’ FLUORESCENT FIXTURE

WALL-MOUNTED FLUORESCENT FIXTURE

2’ x 2’ FLUORESCENT FIXTURE - EMERGENCY POWER

2’ x 4’ FLUORESCENT FIXTURE - EMERGENCY POWER

WALL MOUNTED FLUORESCENT FIXTURE - EMERGENCY POWER

WALL MOUNTED LIGHT FIXTURE - TYPE AS NOTED

LIGHT FIXTURE - TYPE AS NOTED

LIGHT FIXTURE - TYPE AS NOTED EMERGENCY POWER

CIRCUIT BREAKER

BATTERY POWERED CLOCK