Infection Control Risk Assessment for Construction

APIC – San Diego & Imperial Valley

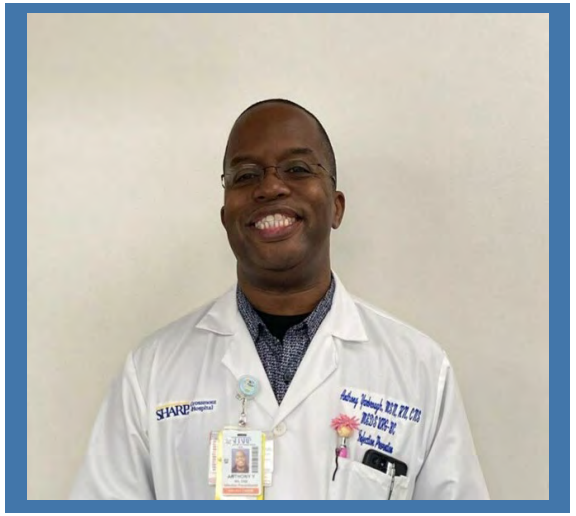
We keep moving forward, opening new doors, and doing things, because we're curious and curiosity keeps leading to new paths.

-Walt Disney

Meet the Presenters

Robert Turner, Assoc. DBIA

Robert Turner holds a professional Bachelor's of Architecture degree from Woodbury University. He has worked in project management in the design & construction industry for 21 years. He has worked in healthcare for 10 years. He is currently a Senior Project Manager of Facilities Design & Construction, is 8-hour ICRA trained and is an Associate Design Build Institute of America member.



Anthony Yarbrough, MSN, RN, CNS, MEDSURG-BC

Anthony Yarbrough holds professional degrees in Nursing from Florida State University and the University of San Diego. He is a decorated veteran with 30 years of Naval Service. He has over 20 years of Med-Surg nursing experience with five years total experience in Infection Prevention. He is currently an Infection Preventionist at Sharp Grossmont Hospital and a national and local APIC chapter member.

Learning Objectives

- Understand basic construction terminology
- Significance of PCRA/ICRA
- Understand the roles of the committee members
- Understand the Infection Control Risk Assessment documentation
- Understand the basic barrier setup

Construction Acronyms and Terms

- PCRA – Pre-Construction Risk Assessment
- ICRA – Infection Control Risk Assessment
- ILSM – Interim Life Safety Measures
- MOP – Method of Procedure
- HVAC – Heating, Ventilation & Air Conditioning
- Med Gas – Medical gases including Oxygen, Medical Air, Vacuum, Nitrous Oxide
- Demo – Demolition
- Air Scrubber – Negative Air Machine with HEPA filtration

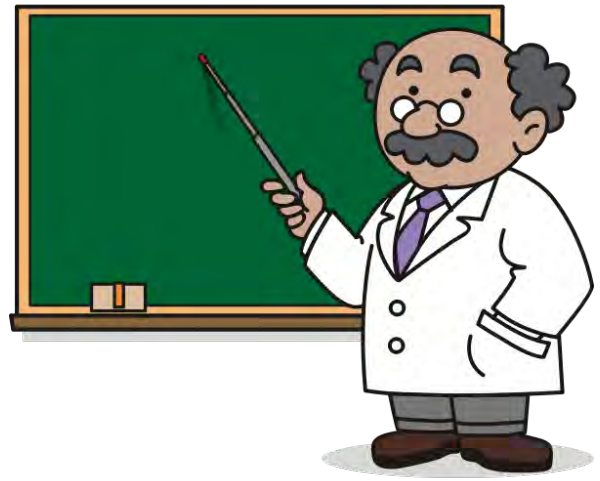
Construction Acronyms and Terms (continued)

- Tacky Mat – Sticky mat that is used to collect dust/dirt from boots
- Coroplast – Corrugated plastic panels/sheets used for barrier walls
- Visqueen – Rolled plastic sheeting used for barrier walls
- Stark Wall – Reusable wall panel system sometimes used for barrier walls
- HEPA Machine – High-Efficiency Particulate Air Machine (aka Air Scrubber)
- MACU – Mobile Air Containment Unit
- Manometer – Device used to monitor the air pressure difference between to rooms/spaces

Significance of PCRA/ICRA

What is a PCRA/ICRA

PCRA/ICRA is used for any healthcare facility demolition, construction, or renovation. It is a formal protocol used to identify potential healthcare construction risks and create mitigation strategies to reduce or eliminate them. It sets guidelines on the appropriate infection prevention and control procedures for the type of activity depending on where the activity will occur.



PCRA/ICRA Significance

Construction or renovation projects in hospitals pose special challenges. Infection control personnel should be involved in all phases of these projects to ensure that patients, visitors, and staff are protected from unnecessary exposure to infectious agents. Infection control personnel must identify the infection risks posed by each project and must plan ways to minimize the risk. Infection control personnel also must ensure that municipal, county, state, and federal infection control guidelines and regulations are met.

PCRA/ICRA Significance

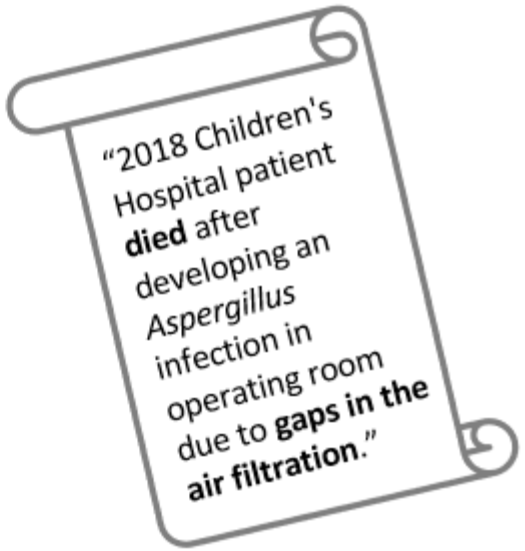
Risks associated with construction include dust and debris compromising the environment, airborne microbes journeying via air currents to infect other susceptible hosts, an unbalanced ventilation system affecting air quality, water stagnation and contamination, accumulated and multiple waste reservoirs and ineffective dustproof barriers, and managing the transportation of waste and contaminated workers, among others.

PCRA/ICRA Significance

Aspergillus *Legionella* Asbestos E. coli Silica Mold

...and more!

PCRA/ICRA Significance



PCRA/ICRA Significance

An ICRA is necessary in both design and construction, but the approaches to identifying risks and solutions are different. A risk assessment in a health facility design can be conducted as a proactive approach to include the following:

- Identify the hazards
- Who might be harmed and how
- Evaluate the risks and decide on the precautions and risk mitigation strategies
- Record findings, propose action and identify who will lead on what action or strategy
- Review the assessment and update periodically, if necessary
- Determine if Interim Life Safety Measures are required

The CDC requires healthcare facilities to perform an Infection Control Risk Assessment (ICRA) before any renovation, construction or repair project.

ICRA Committee

Video

Why have an ICRA Committee?

Safety from infection risks requires a systems approach that takes into account the interactions of the complex system of health care that includes the organization, the people and the environment in which care takes place.

ICRA Committee

An interdisciplinary team should address minimum standards identified in several guidance sources. These include the number, location and type of airborne infection isolation rooms, HVAC needs, water and plumbing systems and selection of materials for surfaces and furnishings.

Who is on the ICRA Committee and their Roles?

The overall goal is staff and patient care, safety.

- Infection Prevention
- Facilities Engineering
- Safety
- Security
- Environmental Services (Housekeeping)
- Others as necessary

ICRA Documentation

Pre-Construction Risk Assessment

- Asks questions to the committee to determine if an ICRA is required
- Setup a pre-construction walk with the construction manager

Yes	No	Question
		Will construction directly affect patient care areas?
		List systems that will be affected by the construction (i.e., outside air intakes, exhaust systems, air handlers)? If yes, note which systems and provide an action plan.
		Will deliveries or debris removal be made outside of normal working hours?
		Will debris removal require precautions above and beyond those required for the assigned ICRA precaution level? (i.e., covered carts, wiped down for levels III-IV)
		Are Utility Shut Downs Required? If so list names of systems
		Will construction activities generate noise or vibration that will disrupt occupants adjacent to, above, or below the construction area?
		Does the construction area contain any environmental hazards?
		• Additional Permitted Work: Above Ceiling work, Confined Space work, Hot work, Utility Shutdown
		• ILSM Review: Emergency Exit obstructed, Fire Alarm System impaired, Fire Sprinklers impaired, Increase to the building's flammable or combustible load, Fire Alarm access blocked

Infection Control Risk Assessment Form

- General Information (contact/project information)
- Construction Activity Type: (determining class level)
  - Patient Risk Group
- Interim Infection Control Measures: (class level details)
- Other Potential Risks:
  - Noise, Vibration, Air Quality, Utility Failures, Emergency Procedures, Operational Impacts, Equipment Danger/Risks, Security Risks, Psychiatric/Suicide Risks
- ICRA Training
- Additional Requirements & Project Description

General Project Information

Project Infection Control Risk Assessment (ICRA) and Environmental Health & Safety Risk Assessment

1 – General Information			Date:
Project Manager:			Project No.:
Project Location:			Permit No.:
Contractor Performing Work:			
Contact Person/Supervisor:		Phone#:	Permit Expiration Date:
Project Start Date:	Estimated Duration:		
Permit Requested by: Date:		Permit Authorized by: Date:	

Activity Type & Patient Risk Group

CONSTRUCTION ACTIVITY TYPE (page 2&3)				
PATIENT RISK GROUP	❍ **Type A:** Inspection and Non-Invasive Activity	❍ **Type B:** Small scale, short duration activities creating minimal dust	❍ **Type C:** Activity generates moderate to high levels of dust or requires demolition or removal of building components or requires greater than one day for completion	❍ **Type D:** Major demolition or construction activities requiring consecutive work shifts
❍ **LOW**	**I**	**II**	**II**	**III**
❍ **MEDIUM**	**I**	**II**	**III**	**III**
❍ **HIGH**	IP to decide level of precaution	**III**	**III**	**III**

Note: Provide additional ICRAs for "Secondary Containment Areas" (if applicable) and attach to the end of this document.

Determining Construction Activity Type

TYPE A	**Inspection and Non-Invasive Activities**. • Includes, but is not limited to: • removal of ceiling tiles for visual inspection limited to 1 tile per 50 square feet and without a patient in the room • painting (but not sanding) • wall covering, electrical trim work, minor plumbing, and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection.
TYPE B	**Small scale, short duration activities which create minimal dust** • Includes, but is not limited to: • installation/repairs minor electrical work, ventilation components, telephone wires and computer cabling • access to chase spaces (spaces allocated for various utilities) • cutting of walls or ceiling where dust migration can be controlled. • sanding of walls for painting or wall covering to only repair small patches
TYPE C	**Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies** • Includes, but is not limited to: • sanding of walls for painting or wall covering • removal of floor coverings, ceiling tiles and casework • new wall construction • minor duct work or electrical work above ceilings • major cabling activities • any activity which cannot be completed within a single work shift.
TYPE D	**Major demolition and construction projects** • Includes, but is not limited to: • activities which require consecutive work shifts • requires heavy demolition or removal of a complete cabling system • new construction.

Determining Patient Risk Categories

Low Risk	Medium Risk	High Risk	
▪ Office areas ▪ Lobby ▪ Cafeteria ▪ Kitchen	▪ Cardiology ▪ Echocardiography ▪ Nuclear Medicine ▪ Physical Therapy ▪ Respiratory Therapy ▪ Waiting Rooms	▪ Emergency Room ▪ Labor & Delivery ▪ Laboratories (specimen) ▪ Newborn Nursery ▪ Outpatient Surgery ▪ Pediatrics ▪ Pharmacy ▪ Post Anesthesia Care Unit ▪ Surgical Units ▪ Any area caring for immunocompromised patients ▪ Transplant Unit and out patient clinics for transplant recipients ▪ Burn Unit ▪ Cardiac Cath Lab	▪ Central Sterile Supply ▪ Intensive Care Units ▪ Medical Unit ▪ Negative pressure isolation rooms ▪ Oncology & outpatient clinics for patients with cancer ▪ Operating rooms including C-section rooms ▪ Endoscopy ▪ MRI ▪ Long Term Care ▪ Tertiary Care Nurseries ▪ Dialysis Unit ▪ Supply areas ▪ Bronchoscopy ▪ Interventional Radiology ▪ Radiology ▪ Hallway adjacent to the areas listed as High Risk

Interim Infection Control Measures

	INTERIM INFECTION CONTROL MEASURES (Check all that apply during initial assessment)	Upon Completion of Project Review all items checked are complete
CLASS I	❑ Execute work by methods to minimize raising dust from construction operations. ❑ Immediately replace ceiling tile displaced for visual inspection.	❑ Wet mop and/or vacuum before leaving area.
CLASS II	❑ Provide active means to prevent airborne dust from dispersing into atmosphere. ❑ Seal windows & unused doors with duct tape. ❑ Block off and seal air vents. ❑ Place dust mat at entrance and exit of work areas. ❑ Isolate HVAC system in areas where work is being performed. ❑ Water mist work surfaces to control dust. ❑ Remove or isolate HVAC system in areas where work is being performed ❑ Verify that patient care equipment & supplies are protected from dust exposure	❑ Wipe surfaces with disinfectant. ❑ Contain construction waste in tightly covered containers before transporting. ❑ Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area. ❑ Upon completion, restore HVAC system where work was performed..
CLASS III	❑ Isolate HVAC system in area where work is being done to prevent contamination of duct system. Seal unused doors with tape. ❑ Complete all critical barriers (sheetrock, plywood, plastic 6 mil) to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins. ❑ Seal holes, pipes, conduits, and punctures appropriately. Place dust mat at entrance and exit of work area. Clean up gross debris. ❑ Maintain negative air pressure at all times within work site utilizing HEPA equipped air filtration units. If non filtered exhausted to the outside, keep away from intake vents. ❑ Contain construction waste and transport in tightly covered and sealed containers before transporting. Cart wheels will be cleaned before exit from construction area. ❑ Construct anteroom and require all personnel to pass through so they can be vacuumed using a HEPA vacuum cleaner before leaving work area, or they can wear cloth or paper coveralls that are removed each time they leave the work area. ❑ All personnel entering work area are required to wear shoe covers. Shoe covers must be changed each time worker exits work area. ❑ In collaboration with facility project manager designate a traffic pattern for construction workers that avoids patient care areas & a traffic pattern for clean or sterile supplies and equipment that avoids the construction area. ❑ Verify ventilation systems are working properly in adjacent areas. ❑ Inspect barriers _____(write frequency). Confirm negative pressure by smoke, visual or gauge.	❑ Do not remove barriers until area is inspected by Project Manager & others as determined during initial risk assessment & thoroughly cleaned by Environmental Services Department. See *Note on Page 4 Additional Requirements/Comments section* ❑ Remove barrier materials carefully to minimize spreading of dirt and debris. Transport in tightly covered and sealed containers. ❑ Vacuum work area with HEPA filtered vacuums. ❑ Wet mop area with disinfectant. ❑ Remove isolation of HVAC system. ❑ Registers are unobstructed & air flow is restored to original conditions or per design drawings ❑ Minimum of 2 room Air Changes at design conditions after final cleaning

Additional Requirements & Project Description

Contractor will present proposed cleaning agents or other chemicals to the Safety Officer for approval before use. MSDS sheets will be kept on site.			
Note: Infection Control/Safety Education – Construction workers have viewed the infection control video	All contractors and construction workers are required to view Infection Control video	Yes ❒ No ❒	Comments
Note: Complaint Resolution/Contact All complaints are being forwarded to contact personnel	All complaints by hospital staff regarding construction activities will be directed to the Facility Manager or the duty engineer after hours	Yes ❒ No ❒	Comments

Additional Requirements/Comments: Frequency of Surveillance: ❒ One time ❒ At each set up ❒ Daily ❒ Weekly ❒ Monthly.

Documentation will be placed at the main entrance to the Work area. If there are separate entrances each entrance will have a sign directing staff to the main entrance. Scope of work (The scope of work should describe the type of work to be done and the department(s) and areas in which the work is to be conducted).

❒ Barrier(s) will be erected and all work will be completed within barrier(s).

❒ All work will be completed using a containment unit with negative pressure. Units will be checked before each use to ensure they are functioning properly.

❒ Full containment will be setup with an anteroom. All work will be completed inside the containment unit with negative pressure operating at all times.

Description of scope of work (The scope of work should describe the type of work to be done and the department(s) and areas in which the work is to be conducted):

❒ As determined during initial risk assessment, barriers may not be removed and/or staff may not use the area unless inspected by: (Circle all that apply) Infection Prevention, Safety, Engineering, Project Manager (Project Manager Initial Here) _____ Date _____

Signatures from the Committee

SIGNATURES / DISTRIBUTION LIST / DATES	
Project Manager:	Infection Preventionist:
Safety:	Facilities Engineering Services:
Security:	Department Manager:
EVS Manager:	Contractor:
Any Exceptions/Additions to this risk assessment are to be noted in “Additional Requirements/Comments”.	
Project Completion	
Project Manager:	Infection Preventionist:
Safety:	Facilities Engineering Services:
Security:	Department Manager:
EVS Manager:	Contractor:

ICRA Surveillance Forms

INFECTION CONTROL - General Precautions/Enhanced Precautions							
Element	Standard	Date(s)					Comments
Demolition/Dust Controls are in place and intact?	During demolition activities, the construction site will be physically segregated from occupied hospital areas including an ante room, to prevent the infiltration of dust and other particles. Tacky mats are placed appropriately at site entrances.						
Protective Clothing is available and being used?	During demolition, workers within the demolition area are to wear 'bunny suits', booties, and caps. Each worker must remove overgarments and HEPA vacuum any dust from their clothes before leaving the demolition area.						
Trash Removal Methods are being utilized?	All trash will be bagged and placed in an appropriate covered and sealed transport cart. Cart wheels will be cleaned before exit from the construction area.						
Air Quality/HVAC Controls are working properly?	HVAC systems will be adjusted/modified to prevent the transmission of dust or other particles to occupied areas of the hospital.						
Negative Pressure/HEPA Filtration is working properly and negative pressure is appropriate?	During active demolition or open wall construction activities, the construction site will be exhausted with HEPA-filtration and maintained at 〉.02" WC negative pressure at all times.						
Cleaning Agents – Only approved chemical are being used?	Contractor will present proposed cleaning agents or other chemicals to the Infection Control practitioner for approval before use. MSDS sheets will be kept on site.						

ICRA Surveillance Forms

SAFETY/SECURITY							
Element	Standard	Date(s)					Comments
Training – Construction staff are trained to recognize impairments in structure?	Personnel are trained to compensate for impaired structural or compartmentalization features of fire safety.						
Site Security – Job site is secure after-hours?	Construction area is secured. Doors and windows are locked and unauthorized access prohibited.						
Job Site Access - Area is secure from non-authorized individuals?	Access into job site is designated. Doors locked before and after construction hours. Typical construction hours are 7am – 3:30pm. Site security and engineering have continuous access.						
Identification of Workers – Construction workers have identification badges?	All construction workers will be issued and wear temporary Sharp ID badges.						
Noise/Vibration are not excessive and being monitored?	Due to possible sensitive hospital activities, excessive noise or vibration from construction activities must be pre-planned and authorized by the project manager.						
Personal Protective Equipment is available and used?	Construction workers will follow all recommended OSHA/CAL-OSHA guidelines for personal protective equipment.						
Directional and Safety Signs are visible and appropriate?	Directional and re-directional signage posted whenever paths of travel may be compromised. Required safety signage must be posted at the job site.						
Emergency Procedures are available at the job site?	Construction workers will follow Sharp's 'Safety Procedures for Construction Personnel Working on Hospital Grounds' provided at contractor check in.						
Mold – There is no mold visible?	If evidence of water damage or mold is discovered during any construction phase, work will immediately stop. Report to project manager for resolution/remediation.						
Asbestos – There is no asbestos being disrupted?	If any asbestos bearing materials are discovered during construction, work will immediately stop. Report to project manager for resolution/remediation.						
Dress Code – Construction workers are wearing appropriate clothing?	All construction workers must dress appropriately for work in a hospital setting.						
Other:							
Other:							

ICRA Surveillance Forms – Lessons Learned

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INFECTION CONTROL and SAFETY SURVEILLANCE FORM

Project Title:	Project Number:
Project Location:	Project Start Date:
Frequency of Surveillance: ☐ One-time ☒ Daily ☐ Weekly ☐ Monthly	This form is to be completed in accordance with the Project Risk Assessment form for this project.

Stop Work Intervention: For the protection of our patients, visitors and staff, the Safety Officer or Infection Control Practitioner may stop all construction activities if any of the practices are not considered effective.

INFECTION CONTROL - General Precautions/Enhanced Precautions

Element	Standard	Date(s) 19	20	21	22	23	Comments
Demolition/Dust Controls are in place and intact?	During demolition activities, the construction site will be physically segregated from occupied hospital areas including an ante room, to prevent the infiltration of dust and other particles Tacky mats are placed appropriately at site entrances	✓	✓	✓	✓	✓	
Protective Clothing is available and being used?	During demolition, workers within the demolition area are to wear 'bunny suits', booties, and caps Each worker must remove overgarments and HEPA vacuum any dust from their clothes before leaving the demolition area	✓	✓	✓	✓	✓	
Trash Removal Methods are being utilized?	All trash will be bagged and placed in an appropriate covered and sealed transport cart Cart wheels will be cleaned before exit from the construction area	✓	✓	✓	✓	✓	

INFECTION CONTROL and SAFETY SURVEILLANCE FORM

Project Title: on	Project Number:
Project Location:	Project Start Date:
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INFECTION CONTROL - General Precautions/Enhanced Precautions

Element	Standard	Date(s) 9/3	9/4	9/5	9/6	9/7	Comments
Demolition/Dust Controls are in place and intact?	During demolition activities, the construction site will be physically segregated from occupied hospital areas including an ante room, to prevent the infiltration of dust and other particles Tacky mats are placed appropriately at site entrances	✓	✓	✓	✓	✓	
Protective Clothing is available and being used?	During demolition, workers within the demolition area are to wear 'bunny suits', booties, and caps Each worker must remove overgarments and HEPA vacuum any dust from their clothes before leaving the demolition area	✓	✓	✓	✓	✓	

ICRA Surveillance Forms

Any NO responses require corrective actions

Additional Requirements/Modifications to Standard/Other Comments

Date	Name of Person Completing Surveillance	Comments

Other Documents as Attachments

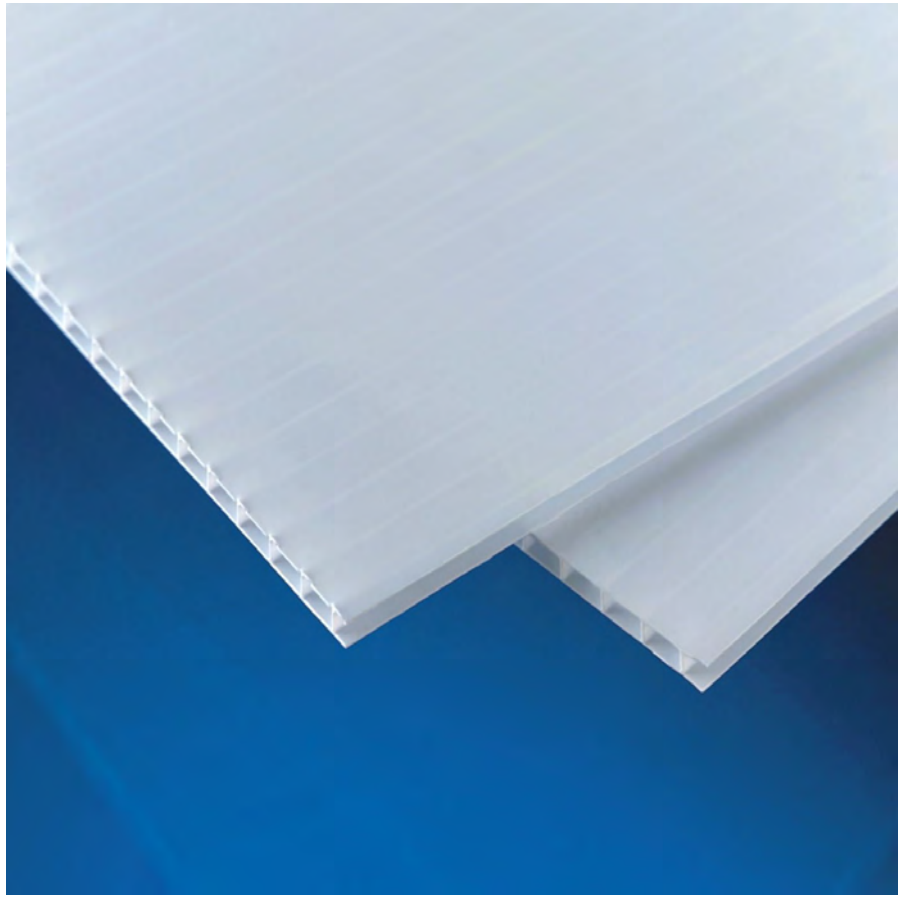
- ILSM Documentation
- ILSM Surveillance Forms
- Hot Work Permit
- Utility Shutdown Requests (MOP)

Containment Overview

- Soft wall Barriers
- Hard wall Barriers
- Mobile Containments
- Anteroom
- Air Pressure Monitoring
- Placards & Signage
- Waste, storage and construction material path of travel
- Contractor/worker routing

Examples

Visqueen Roll



Coroplast

MACU

Examples

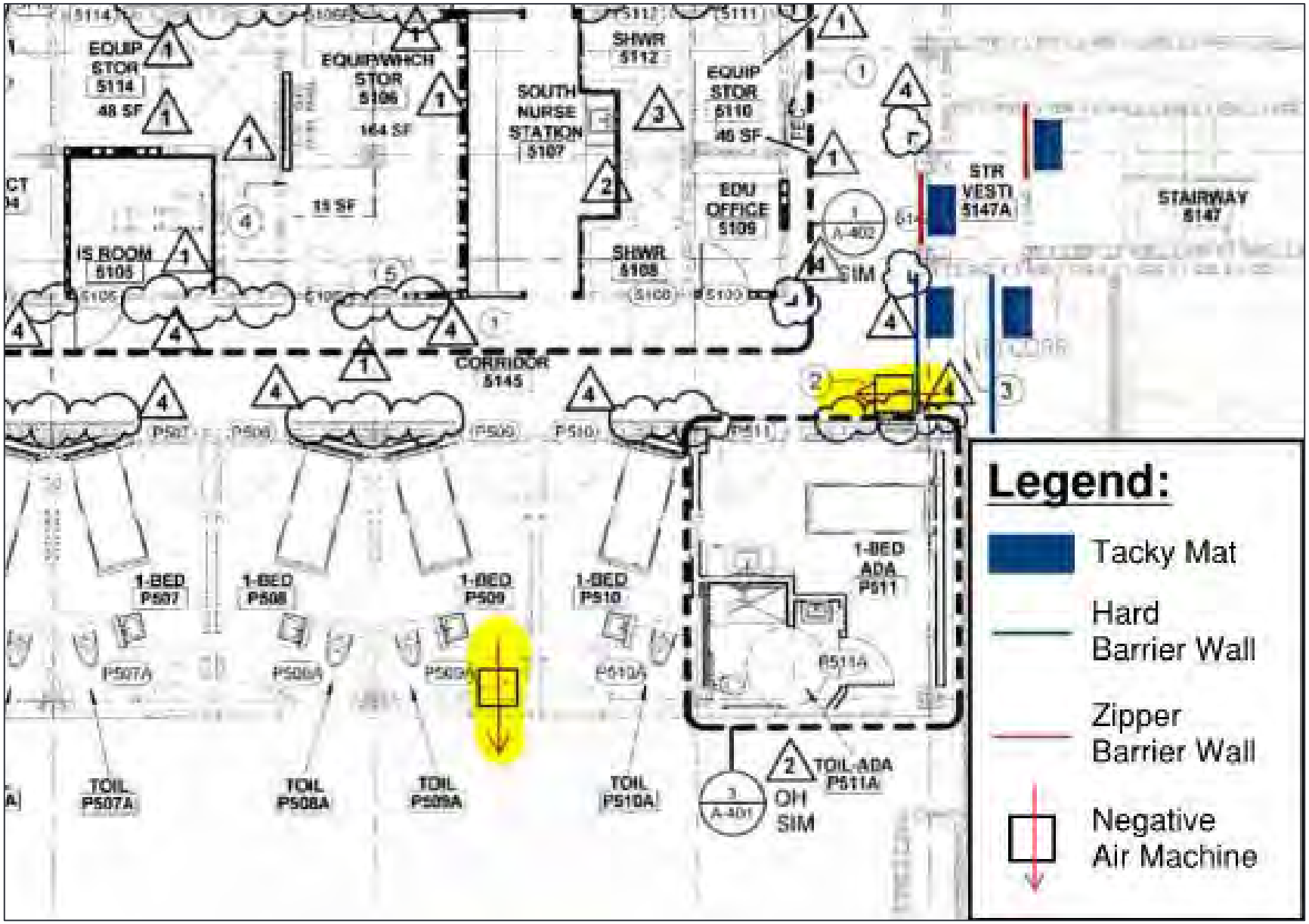
Tacky Mat

Small HEPA Machine

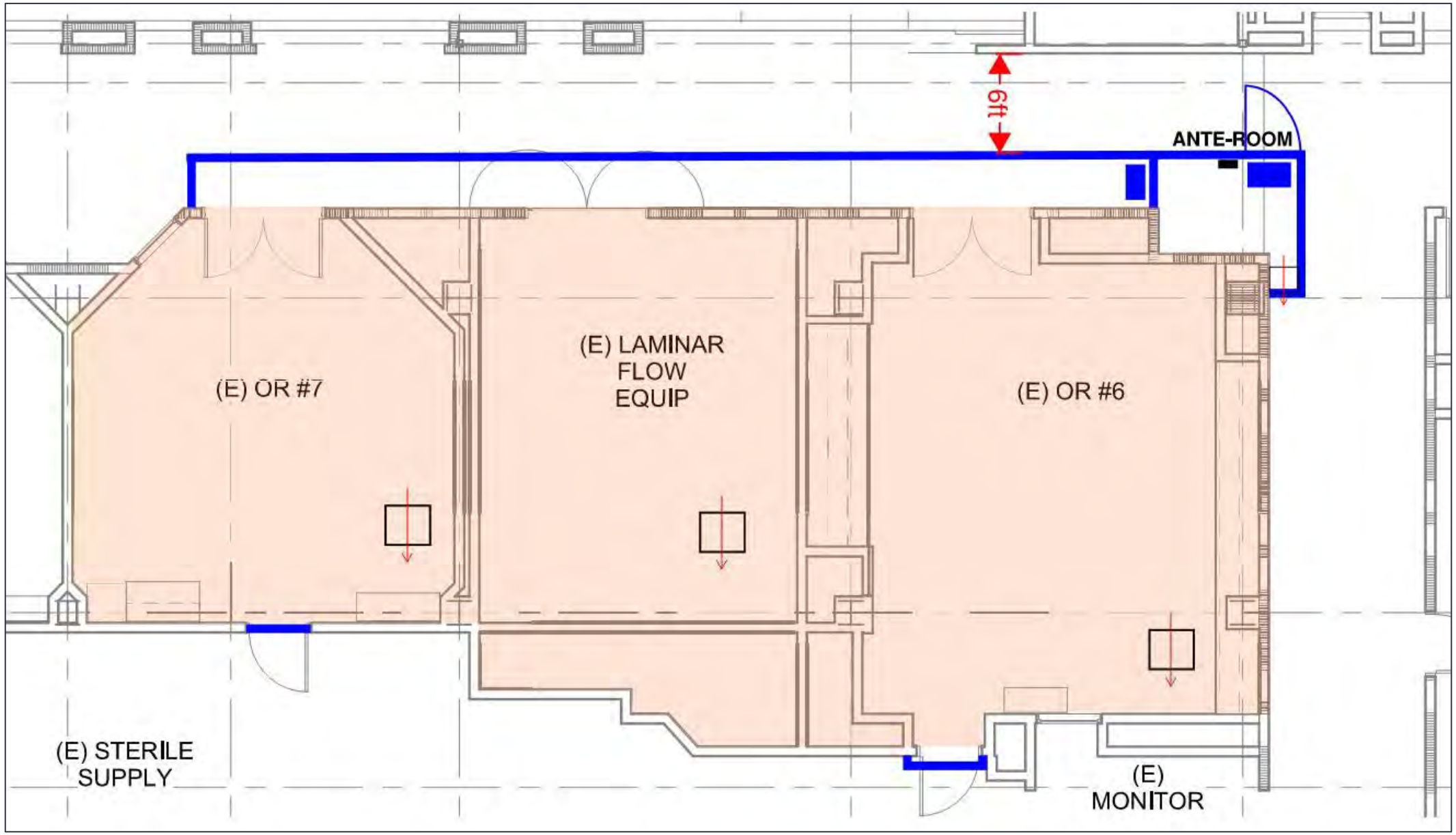
Large HEPA Machine

Examples - Manometers

Containment Plans (example 1)



Containment Plans (example 2)



Examples

Examples

Examples

Examples

Resources

- American Society for Healthcare Engineering – “Infection Control Risk Assessment” www.ASHE.org
- Carpenters International Training Fund. *Infection Control Risk Assessment (ICRA): Construction Trades Best Practices Awareness Training.* 2012.
- APIC Infection Prevention Manual for Construction and Renovation
- The Joint Commission Environment of Care Chapter, updated November 15, 2021
- https://www.carpenters.org/icra-health-care-construction/
- Facility and Occupant Protection During Construction/Renovation and Maintenance Infection Control and Environmental Health and safety, SHC Policy 18615.99

Questions