**SECTION 01 35 33  
INFECTION CONTROL RISK ASSESSMENT (ICRA) PROJECT REQUIREMENTS**

[This section is required for ALL University of Iowa Hospitals & Clinics projects and shall be edited by the Design Professional.

The Design Professional shall develop the Owner an approved detailed Interim Infection Control Measures plan for the Work areas, including barrier placement, barrier construction, HVAC isolation details, and Negative Air Machine requirements for inclusion in the Construction Documents. This IICM plan must be presented to and approved by the UIHC Infection Control Risk Assessment (ICRA) Committee prior to Bid.

The Design Professional shall coordinate demolition and construction activities in adjacent areas, especially where access to ceiling areas is required.

When there is a need for Work outside of the Primary Containment Area, the Design Professional shall denote the area(s) as Secondary Containment Areas with the proper Class identified for all Containment Areas on the Drawings.

The ICRA Committee and Owner’s Rep should always be made aware of situations where the Negative Air Machine cannot be exhausted to outside of the building envelope.

All the Negative Air Machine requirement calculations shall be done by the Design Professional and inserted into this Specification prior to issuing Construction Documents for Bid. (See Part 3 herein)]

**PART 1 - GENERAL**

* 1. DEFINITIONS
     1. Airborne Contaminants include dust, smoke and fumes and Airborne Contaminant producing activities include, but are not limited to:
        1. Demolition and/or removal of walls, floors, ceilings, and other finish materials.
        2. Demolition of plumbing, mechanical and electrical systems and equipment.
        3. Finish operations such as sanding, painting, and application of special surface coatings.
        4. All other construction activity that may generate dust, smoke, or fumes.
     2. Containment Area: A Primary and/or Secondary Containment Area.
     3. High Efficiency Particulate Air (HEPA): A HEPA filter is an air filter capable of capturing 99.97% of particles passing through the filter that are 0.3 microns in size and larger.
     4. Interim Infection Control Measures (IICM): A detailed plan outlined by the Contract Documents to ensure proper barrier placement, barrier construction, HVAC isolation details, and Negative Air Machine quantity and sizing.
     5. Negative Air Machine: A freestanding, portable device that creates Negative Air Pressure. It does so by removing air via flexible ductwork from the Containment Area. The units can also be placed remotely from the Containment Area and use ductwork to remove air from the controlled environment.
     6. Negative Air Pressure: The relative air pressure difference between two areas in a facility. A space that is at negative pressure has a lower pressure than adjacent areas, ensuring that any directional air movement is from the clean air environment into the contained area and preventing contaminated air from escaping into adjacent rooms or areas through doors, openings, and cracks.
     7. Portable Air Scrubber: HEPA filter equipped air circulation (non-ducted) machine that provide roughing filters (stage 1 pre-filter), primary filters (stage 2 pre-filters) and HEPA final filters, and will clearly indicate airflow capacity, to permit the Responsible Person to easily calculate and record the Air Change Rate for the work area. A minimum 6 air exchanges per hour are required (for recirculating option only). If negative pressure is achieved with less than the required Portable Air Scrubbers, remaining air scrubbers will be used as recirculating machines. Safety features will include thermal overload protection, auto reset and UL compliance rating. Charcoal filter may be desired to decrease odors. Annual inspection of scrubbers is required.
     8. Preparation Area (aka Anteroom): A specific area designated by the Owner for donning and removing protective clothing prior to enter the Primary Containment Area.
     9. Primary Containment Area: The largest area of project work around which infection control (dust) barriers are built.
     10. Protection Areas: Interior occupied areas within the facility, that are adjacent to a Primary Containment Area, either occupied or used for passage, as well as areas connected to construction area by mechanical system air intake, exhaust, and ductwork.
     11. Secondary Containment Area: Areas of Work within the Protection Area outside of the Primary Containment Area that requires a form of dust control.
  2. CONSTRUCTOR’S RESPONSIBILITY
     1. Constructor shall provide all barriers necessary to separate all construction activities from non-construction areas of the hospital.
     2. Constructor shall provide and maintain all necessary barriers required to create Primary and Secondary Containment Areas required to perform the Work.
     3. Constructor shall verify the maintenance of Negative Air Pressure in Primary and Secondary Containment Areas relative to Protection Areas on a continual basis by use of differential pressure monitors.
     4. All new ductwork and duct accessories openings to be incorporated into the project shall be blocked off or sealed to keep them clean before arriving to the project site.
     5. Constructor shall hire a testing and balancing firm to verify air flow of Negative Air Machines required by the Contract Documents and submitted to the Owner.
     6. Constructor is responsible for its personnel’s education and certification and for the Above Ceiling Work Permit preparation required to perform Work:
        1. Above Ceiling Work Education and Certification, information found at <https://sites.google.com/view/uihcacp/home>
        2. General Above Ceiling Work Permit found at <https://sites.google.com/view/acpermit/home>
        3. Failure to comply with Above Ceiling Work Permit requirements will result in immediate stoppage of Work.
     7. Constructor is responsible for preparing, maintaining, and providing to the Owner the following documents at the intervals indicated on the documents and for the entire duration of the project:
        1. Negative Air Machine log (as applicable),
        2. University of Iowa Hospitals & Clinics Life Safety/Interim Life Safety Measures Evaluation and Amendment Record, and

These documents are found at <https://www.facilities.uiowa.edu/projects/contractors>.

* + 1. Constructor shall not track any type of dust, debris or foreign material from their Work sites.
    2. Constructor shall have proper Interim Infectious Control Measures (IICM) in place prior to commencement of Work. This includes but is not limited to having walk off mats, Portable Air Scrubbers, Negative Air Machines and requirements in place.
    3. If the Constructor fails to maintain Infection Control Risk Assessment Project Requirements:
       1. If non-conformance issues are not corrected immediately, the Owner may stop Work as provided in Contract Documents at no additional cost to the Owner.
       2. The Owner may dismiss Constructor’s job site personnel for non-conformance.
       3. Costs to the Owner associated with non-conformance shall be assigned to the Constructor.
  1. OWNER RESPONSIBILITIES
     1. The Owner may provide baseline particle counts and conduct periodic air sampling of Protection Areas during construction to monitor effectiveness ofInterim Infection Control Measures (IICM).
  2. SUBMITTALS

[Submittal requirements for this specification section shall be identified as a line item on the submittal log at the end of specification section 01 33 23 – Submittals]

* + 1. Constructor shall submit the following information:
       1. Submit information for Constructor’s plan for containment of Airborne Contaminants and IICM for the Owner’s review and approval.
          1. Drawings for each phase of the Work shall indicate, as a minimum, Primary and Secondary Containment Areas, Protection Areas, location of all IICM including but not limited to temporary enclosure and barrier types, Anterooms, location of Negative Air Machines including vent/exhaust location, capped ductwork, and differential pressure monitors.
          2. Negative Air Machine calculations based on Constructor verified Containment Area dimensions (volume).
       2. Product Data: Submit data on specified Products (Materials) and include Manufacturer’s recommended interval for dust filter media changes for the Negative Air Machines and DOP testing results.

**PART 2 – PRODUCTS**

* 1. MATERIALS
     1. HEPA Vacuums:
        1. HEPA vacuum shall trap 99.999% of particles 0.12 microns and larger.
        2. HEPA Vacuum shall have a minimum airflow of 90 cfm.
        3. Acceptable products:
           1. ISC Sales “Minuteman Model CRV- 99.999%”
           2. Nilfisk Advance
           3. Pro-Team “Vacer HEPA/ULPA Vacuum”
     2. Polyethylene:
        1. 6 mil or 8 mil thick reinforced laminated polyethylene film and shall meet requirements of NFPA 701 large scale flammability test and ASTM E84 Class A.
        2. Include compatible fire-retardant tape.
        3. Acceptable products:
           1. AmeriCover “Surface Cover” (tel: 800.747.6095).
           2. Reef Industries “Griffolyn Type 55 FR” (tel: 800.231.6074)
     3. Adhesive-Faced Contamination Control Mats (sticky walk-of mats):
        1. Size of mats shall be the width of the opening and 30” (minimum) depth.
        2. Acceptable products:
           1. ASG “Walk-off Mats” (tel: 216.486.6163)
           2. Controlled Environment Equipment “Cleanline Sticky Mat” (tel: 207.854.9126) or [www.ceecusa.com](http://www.ceecusa.com)
           3. Liberty Industries “Tacky Mat” (tel: 800.828.5656)
           4. Curtain Wall Company “CleanStep” tacky mats (tel: 800.424.8251)
           5. AmeriCover “Surface Cover” (tel: 800.747.6095)
     4. Negative Air Machine:
        1. Provide unit sized to meet room requirements.
        2. Carbon filtering, when required.
        3. Units shall include prefilters, primary filters, HEPA - filters and filter static pressure gauges.
        4. HEPA filters shall be 99.997% efficient at 0.3-micron particle size.
        5. Acceptable manufacturers:
           1. Abatement Technologies (<tel:800.634.9091>)
           2. Phoenix (<tel:800.533.7533>)
           3. Dri-Eaz (<tel:800.932.3030>)
           4. Micro-Trap, Inc. (<tel:877.646.8208>)
           5. Control Resource System Inc
           6. NIKRO Industries, Inc. (<tel:800.875.6457>)
     5. Portable Air Scrubber:
        1. Provide unit sized to meet room requirements
        2. Units shall include prefilters, primary filters and HEPA - filters
        3. HEPA filters shall be 99.997% efficient at 0.3-micron particle size.
        4. Acceptable manufacturers:
           1. Abatement Technologies
           2. Dri-Eaz
           3. Force Air
           4. Or approved equal.
     6. Zipper Lock Entrance:
        1. Fire retardant, reinforced vinyl construction with reinforced stitching.
        2. Acceptable products:
           1. Curtain Wall Company “Dust Door” (tel: 800.424.8251)
           2. Pro Venture Inc. “Zip-Up” (tel: 978.744.5000)
     7. Temporary Prefabricated Enclosure Units:
        1. Provide the enclosure with an inspection window and pressure differential porthole.
        2. Acceptable products:
           1. Fiberlock Technologies “Kontrol Kube” with frame #6640, enclosure #6442, wheelbase platform #6443 and Milfish 87 cfm vacuum device and manometer.
           2. Specialty Tool Manufacturing “MCU-Quick Wall Mobile Containment Unit”; provide with HEPA vacuum connection (tel: 888.718.3878).
           3. Mintie Technologies “ECU EnteRoom Envelope”
     8. Airflow Direction Indicator:
        1. Acceptable products:
           1. Airflow Direction Inc. “ADI-69-V-N” (tel: 888.334.4545)
           2. Austin Ventrues “Model LN102” (tel: 909.043.8172)
     9. Dust Catching Device:
        1. Disposable, dry, electrostatic cloths or mitts for dust removal.
        2. Disposable, wet cloths, presoaked with cleaning solution, for dust removal.
        3. Acceptable products:
           1. Proctor & Gamble “Swiffer Dry”, “Swiffer Mitt” or “Swiffer Wet”
           2. Reckitt Brenckiser “Mop & Glo”
           3. S.C. Johnson & Sons “Pledge Grab It”
     10. Magnehelic Differential Pressure Sensor
         1. Dwyer #2000-00
            1. Range 0 - 0.25” w.c.
            2. Minor divisions 0.005
            3. Calibrated for vertical scale position.
     11. Disposable Coveralls, Hair Nets, Beard Nets, Shoe Covers
         1. Uline Products (800-295-5510) “Uline Deluxe” <https://www.uline.com/BL_1219/Uline-Deluxe-Protective-Clothing>
         2. Other acceptable manufacturers are:
            1. 3M
            2. DuPont
            3. Enviroguard
            4. Lakeland Industries, Inc.
            5. Kimberly-Clark

**PART 3 – EXECUTION**

NOTE: The ICRA Committee shall determine which Interim Infection Control Measures Classification(s) to use on the project and the Design Professional shall update this specification based on that direction. Most projects will include Class III or Class IV requirements. Applicable Class requirements shall be included and Class levels that do not apply shall be deleted from the specification section.]

* 1. GENERAL
     1. This project requires the following Interim Infection Control Measures - **Classes [I], [II], [III], [IV], [II and III], [II, III and IV]** of Primary Containment Areas**.** Constructor shall refer to Drawings for additional requirements for temporary enclosures, barriers, IICM, etc. including but not limited to assembly details.

* + 1. The Owner reserves the right to inspect the work at any time to verify that the Constructor is complying with these Infection Control Risk Assessment Project Requirements.
    2. The Constructor’s personnel shall notify the Owner at least **[fourteen (14)]** calendar days prior to installing a Containment Area or starting Work outside of a Containment Area.
    3. Constructor shall not open windows or doors that would allow Airborne Contaminants into adjacent hospital areas.
    4. Constructor shall direct exhaust, dust, and fumes away from building air intakes, windows, and doors.
    5. When required by Contract Documents, Contractor shall ensure filters on building air intakes are Operational.
    6. Constructor employees, including Subcontractors, shall wear clean clothing and footwear to perform Work.
    7. Disposable protective clothing used by the Constructor such as coveralls, shoe covers, hair and beard nets shall be in good condition. Torn or dirty disposable protective clothing listed above shall be replaced.
    8. Constructor shall seal Polyethylene to walls, floors, and ceilings with tape when Polyethylene is included in IICM.
  1. CLEANING
     1. Constructor shall maintain Containment Areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
     2. Constructor shall remove debris and rubbish from pipes chases, plenums and other closed or remote spaces, prior to enclosing the space.
     3. Constructor shall clean interior areas using HEPA vacuum prior to start of surface finishing and continue cleaning throughout the performance of Work to eliminate dust.
     4. Constructor shall remove waste materials, debris and rubbish from the site daily and legally dispose off-site.
  2. STANDARD OPERATION PROCEDURES FOR CLASS I PRIMARY CONTAINMENT AREAS – **Not Used** [Edit as necessary, remove “Not Used” and keep “A and B in their entirety” below or keep “Not Used” and delete “A and B in their entirety” below]
     1. Preparation and Operation of Class I Areas
        1. Constructor shall execute Work by methods to minimize creating dust from construction operations.
        2. Constructor shall Immediately replace ceiling tile displaced for visual inspection.
     2. Clean-up of Class I areas:
        1. Constructor shall wet mop and/or HEPA vacuum before leaving area.
  3. STANDARD OPERATION PROCEDURES FOR CLASS II PRIMARY CONTAINMENT AREAS – **Not Used** [Edit as necessary, remove “Not Used” and keep “A, B, C in their entirety” below or keep “Not Used” and delete “A, B, C in their entirety” below.  *Should item #2 below include wording on material used to block off or seal material and should it be airtight?]*
     1. Preparation and Operation of Class II Areas
        1. To contain dust and debris, install duct tape to seal doors for demolition and/or install Polyethylene temporary enclosure for construction activities that produce large amounts of dust or utilize Temporary Prefabricated Enclosure Units.
        2. Constructor shall block off and seal HVAC supply, return and exhaust terminal, registers, grilles, and diffusers in the rooms affected by construction.
        3. Holes cut or punctured in temporary enclosures (walls, ceilings, floors, and/or doors) cannot be left exposed longer than four (4) hours. If work cannot be completed within the four (4) hours, the holes shall be covered.
     2. Flooring removal in Class II Secondary Containment Areas
        1. Construction materials and equipment to be used for flooring removal shall be stored within areas designated by the Owner.
        2. Only flooring areas of a size that can be removed and replaced in one work period (typically 8 hours) shall be allowed.
        3. Removal of flooring:
           1. Vacuum carpet before removal with a HEPA vacuum.
           2. Damp mop before removal sheet vinyl and vinyl composition tile flooring.
           3. Use methods that minimize the dispersing of dust and debris while removing flooring.
           4. HEPA vacuum floor after removal of flooring, adhesive and leveling of area prior to installation of new flooring.
     3. Clean-up of Class II areas
        1. At the completion of the Work in Class II areas, the following shall occur:
           1. Clean work surfaces and debris carts with water.
           2. Contain construction debris before transport in clean, tightly covered containers or sealed plastic bags.
           3. Wet mop and/or vacuum with HEPA vacuum before leaving the Containment Area.
           4. Remove any temporary measures installed to isolate HVAC system in Containment Areas.
  4. STANDARD OPERATION PROCEDURES FOR CLASS III PRIMARY CONTAINMENT AREAS – **Not Used** [Edit as necessary, remove “Not Used” and keep “A in its entirety” below or keep “Not Used” and delete “A in its entirety” below. Design Professional shall also review and update sections highlighted in yellow to ensure they are applicable to the Project.]
     1. Preparation and Operation of Class III Areas
        1. Refer to the Drawings for location of Constructor pathways to the Containment Areas. Entry and exit locations to the Containment Areas shall be coordinated with the Owner.
        2. The Constructor shall comply with the following:
           1. The use of damaged doors and frames is not allowed.
           2. Swing door into the construction area. Keep Containment Area enclosure door locked at all times.
           3. Electronic door access associated with Containment Areas, when required by Contract Documents, shall be installed, and connected to the Owner’s system; the Constructor will be granted site access through the Owner’s building card access system through their contractor identification badge.
           4. Install an airflow direction indicator (magnehelic) within a temporary barrier (the enclosure) following the manufacturer’s installation procedures to indicate if improper direction airflow exists. A pressure differential monitor (magnehelic) shall be installed to indicate negative pressure. The pressure differential monitor shall be installed adjacent to Primary Containment Area enclosure door.
           5. The location and details of the Containment Area enclosure construction shall be as indicated on the Drawings.
           6. Materials for constructing the enclosure shall be precut off-site to the greatest extent possible.
           7. Provide fire rated barriers, doors, and doorframes, where required.
           8. Provide two adhesive faced contamination control mats at the construction entry point on the construction side of the enclosure. Constructor employees shall step on both mats when exiting a Containment Area. Carts shall be moved across both mats when exiting a Containment Area. Mats shall be wider than the carts.
           9. To supplement the effectiveness of adhesive faced contamination control mats, the contractor may use a wetted carpet mat in addition to adhesive control mats. If used, the contractor shall ensure that the carpet is kept clean and replaced at a frequency sufficient to prevent fungal or bacterial growth as well as prior to becoming visibly soiled.
        3. Constructor shall provide the necessary quantity of Negative Air Machines to maintain each separate project work area at a negative pressure to control the spread of Airborne Contaminants from Containment Areas to adjacent Protection Areas. Refer to Drawings for additional information.
           1. Negative Air Pressure machines equipped with HEPA filters shall be used in conjunction with a sealed work area to maintain a negative pressure inside the Containment area relative to Protection Area.

A sufficient quantity of negative pressure ventilation machines equipped with filtration shall be utilized to provide one Work site (Containment Area) air change every 15 minutes. This requirement shall apply to the removal of Airborne Contaminants from the air.

The total quantity of Negative Air Machines required is dependent upon the total quantity of simultaneous Containment Areas being occupied by the Constructor.

To calculate total airflow requirement:

Total cubic feet/minute = volume of work area (in cubic feet)/15 minutes

To calculate the quantity of units needed for the dust control in a specific work area:

Quantity of units needed = total cubic feet/minute capacity of unit in cubic feet/minute

Constructor shall change pre-filter and filter media as recommended by the manufacturer for the Negative Air Machines for the duration of the Work within the Containment Area to maintain a negative pressure of 0.1 – 0.2 IN of water gauge.

* + - * 1. Make-up air for the air exhausted from the spaces shall be taken from the existing HVAC system unless indicated otherwise.
        2. Negative Air Machines shall run continuously.
        3. Constructor shall vent Negative Air Machines to the outside by removing existing windows and replacing them with vented panels having fittings for exhaust holes, or as detailed by the Drawings and Specifications.
        4. Negative Air Machines shall be DOP tested and certified prior to being placed into service, and when dropped, damaged, or moved extensively as determined by the Owner.
        5. Constructor shall thoroughly clean Negative Air Machine and replace both pre-filters and the primary filter before a Negative Air Machine is placed into service.
        6. Constructor shall encapsulate and remove each Negative Air Machine at the end of use and prior to removing it from the worksite.
        7. Constructor shall place used filters in a plastic bag prior to disposal.
      1. Each phase of construction shall be considered a separate Containment Area.
      2. Duct Caps: Block off and seal all existing return, exhaust and supply air ductwork within the Containment Area by capping ducts to withstand airflow, and so they are airtight.
      3. Constructor shall monitor and replace containment control mats before they become loaded with dirt.
      4. Constructor shall wipe down dust barriers daily with a moist cloth or dust-catching device.
      5. Constructor employee traffic between containment areas and Protection Areas shall be kept to a minimum.
      6. Constructor shall keep doors to containment areas closed at all times.
      7. All vacuuming of area outside of the work area not within the barriers shall be done by the Constructor with HEPA vacuums.
      8. Constructor shall seal all holes, pipes, conduit, punctures, and exposures.
      9. Removal of debris from the project work areas shall be as follows:
         1. Constructor shall remove debris as per the Contract Documents. Removal is generally required to be removed before 7am and after 5pm. Debris shall be removed on an “as needed” daily basis.
         2. Constructor shall transport debris in clean, tightly sealed, rubber-tired containers and/or carts (with tightly fitted covers) provided by the Constructor. The Owner shall review the type of container/cart and condition of the containers/carts proposed for use.
         3. Before leaving a Containment Area, all containers/carts shall be wiped or HEPA vacuumed clean to prevent tracking of dust. The container/cart shall be rolled over the adhesive faced contamination control mats inside the enclosure entrances.
      10. Constructor supplies and tools brought into the Containment Area shall be done in accordance with the following procedure:
          1. Tools and supplies shall be wiped clean or wrapped in plastic sheeting and moved by Constructor provided rubber-tired containers/carts, from a staging area to the Containment Area.
          2. The containers/carts shall be cleaned with a HEPA vacuum by the Constructor prior to moving through the occupied space to the Containment Area. The Constructor shall notify the Owner of the need to move these containers/carts through Protection Areas prior to entering the Containment Area.
          3. Removal of tools and supplies from the Containment Area shall follow the same procedure specified for debris removal from the Containment Area.
      11. The following procedure shall be implemented when Constructor’s personnel are required to pass through a Protection Area to enter a Containment Area:
          1. Constructor shall don protective clothing required by the Owner within the Preparation Area before passing through Protection Areas.
          2. Protective clothing shall be removed in the Anteroom prior to entering the Containment Area.
      12. The following procedure shall be implemented when Constructor’s personnel are required to exit a Containment Area through a Protection Area:
          1. Prior to leaving the Containment Area, the Constructor shall vacuum themselves with a HEPA vacuum. After being vacuumed, the Constructor may exit the Containment Area into the Anteroom.
          2. Constructor shall re-don protective clothing in the Anteroom before entering the Protection Area.
          3. Constructor shall remove the protective clothing in the Preparation Area.
          4. All dust and debris tracked outside the Containment Area shall be HEPA vacuumed immediately by the Constructor.
    1. Flooring Removal in Class III Secondary Containment areas:
       1. Construction materials and equipment to be used for flooring removal shall be stored within areas designated by the Owner.
       2. Only flooring areas of a size that can be removed and replaced in one work period (typically 8 hours) shall be allowed.
       3. Removal of flooring:
          1. Vacuum carpet before removal with a HEPA vacuum.
          2. Damp mop before removal sheet vinyl and vinyl composition tile flooring.
          3. Use methods that minimize the dispersing of dust and debris while removing flooring.
    2. Work within existing ceiling spaces, outside of Primary Containment area, shall be performed as follows:
       1. Scheduled in advance and notify the Owner at least seven (7) calendar days prior to commencing work in ceiling or interstitial spaces above Protection Areas to allow the Owner to relocate or protect occupants.
       2. Constructor shall abide by any active Above Ceiling Work Permit process the Owner may have in effect.
       3. Inform the Owner
    3. Clean-up of Class III areas:
       1. Barriers may not be removed from Containment Areas until the Work is inspected by the Owner and thoroughly cleaned by the Constructor.
       2. Remove all debris, extra materials not used, and equipment from the Containment Area before beginning final cleaning.
       3. Containment Areas shall be vacuumed with HEPA vacuums and/or wet mopped by the Constructor.
       4. When Work is complete, the temporary barriers shall be wiped down using a moist cloth or dust catching device before removal. The barriers shall be removed without creating additional dust in the area.
       5. Clean temporary barriers installed on air vents, diffusers and registers, before removal.
  1. PRIMARY CONTAINMENT AREAS **– Not Used** [Edit as necessary, remove “Not Used” and keep “A, B, C, etc. in their entirety” below or keep “Not Used” and delete “A, B, C in their entirety” below. Design Professional shall also review and update sections highlighted in yellow to ensure they are applicable to the Project.]
     1. Preparation and Operation of Class IV Areas:
        1. Refer to the Drawings for location of Constructor pathways to the Containment Areas. Entry and exit locations to the Containment Areas shall be coordinated with the Owner.
        2. The Constructor shall construct an Anteroom and require all construction personnel, supplies and tools to pass through this room and to be vacuumed using a HEPA Vacuum before entering the Containment Area.
        3. The Constructor shall completely install all temporary enclosure barriers required for creating the Containment Area before construction begins.
        4. The Constructor shall comply with the following:
           1. The use of damaged doors and frames is not allowed.
           2. Keep Containment Area enclosure door locked at all times.
           3. Electronic door access, when required, shall be installed, and connected to the Owner’s system; the Constructor will be assigned key fobs to unlock the door electronically.
           4. Install an airflow direction indicator (magnehelic) within a temporary barrier (the enclosure) following the manufacturer’s installation procedures to indicate if improper direction airflow exists. A pressure differential monitor (magnehelic) shall be installed to indicate negative pressure. The pressure differential monitor shall be installed adjacent to Primary Containment Area enclosure door.
           5. The location and details of the Containment Area enclosure construction shall be as indicated on the Drawings.
           6. Materials for constructing the enclosure shall be precut off-site to the greatest extent possible.
           7. Provide fire rated barriers, doors, and doorframes, where required.
           8. Provide two adhesive faced contamination control mats at the construction entry point on the construction side of the enclosure. Constructor employees shall step on both mats when exiting a Containment Area. Carts shall be moved across both mats when exiting a Containment Area.
        5. Constructor shall provide the necessary quantity of Negative Air Machines to maintain each separate project work area at a negative pressure to control the spread of Airborne Contaminants from Containment Areas to adjacent Protection Areas. Include the number of air machines required on the infection control signage posted at the Work site entrance. Refer to Drawings for additional detail.
           1. Negative Air Pressure machines equipped with HEPA filters shall be used in conjunction with a sealed work area to maintain a negative pressure inside the Containment area relative to Protection Area.

1. A sufficient quantity of negative pressure ventilation machines equipped with filtration shall be utilized to provide one Work site (Containment Area) air change every 15 minutes. This requirement shall apply to the removal of Airborne Contaminants from the air.
2. The total quantity of Negative Air Machines required is dependent upon the total quantity of simultaneous Containment Areas being occupied by the Constructor.

To calculate total airflow requirement:

Total cubic feet/minute = volume of work area (in cubic feet)/15 minutes

Quantity of units needed = total cubic feet/minute capacity of unit in cubic feet/minute

1. Change dust filter media as recommended by the manufacturer for the Negative Air Machines for the duration of the Work within the Containment Area to maintain a negative pressure of 0.1 – 0.2 IN of water gauge.
   * + - 1. Make-up air for the air exhausted from the spaces shall be taken from the existing HVAC system unless indicated otherwise.
         2. Constructor shall vent Negative Air Machines to the outside by removing existing windows and replacing them with vented panels having fittings for exhaust holes, or as detailed by the Drawings and Specifications. If unit does not exhaust air to the outside of the building, provide additional carbon filtering.
         3. Negative Air Machines shall be DOP tested and certified prior to being placed into service, and when dropped, damaged, or moved extensively as determined by the Owner.
         4. Constructor shall thoroughly clean Negative Air Machine and replace both pre-filters and the primary filter before a Negative Air Machine is placed into service.
         5. Constructor shall encapsulate and remove each Negative Air Machine at the end of use and prior to removing it from the worksite.
         6. Constructor shall place used filters in a plastic bag prior to disposal.
       1. Each phase of construction shall be considered a separate Containment Area.
       2. Duct Caps: Block off and seal all existing return, exhaust and supply air ductwork within the Containment Area by capping ducts to withstand airflow, and so they are airtight.
       3. Constructor shall monitor and replace containment control mats before they become loaded with dirt.
       4. Constructor shall wipe down dust barriers daily with a moist cloth or dust-catching device.
       5. Constructor traffic between containment areas and Protection Areas shall be kept to a minimum.
       6. Constructor shall keep doors to
       7. Constructor shall seal all holes, pipes, conduit, punctures, and exposures.
       8. Removal of debris from the project work areas shall be as follows:
          1. Constructor shall remove debris. The Constructor shall notify the Owner when there is debris to be removed.
          2. Constructor shall transport debris in clean, tightly sealed, rubber-tired containers and/or carts (with tightly fitted covers) provided by the Constructor. The Owner shall review the type of container/cart and condition of the containers/carts proposed for use.
          3. Before leaving a Containment Area, all containers/carts shall be wiped or HEPA vacuumed clean to prevent tracking of dust. The container/cart shall be rolled over the adhesive faced contamination control mats inside the enclosure entrances.
       9. Constructor supplies and tools brought into the Containment Area shall be done in accordance with the following procedure:
          1. Tools and supplies shall be wiped clean or wrapped in plastic sheeting and moved by Constructor provided rubber-tired containers/carts, from a staging area to the Containment Area.
          2. The containers/carts shall be cleaned with a HEPA vacuum by the Constructor prior to moving through the occupied space to the Containment Area. The Constructor shall notify the Owner of the need to move these containers/carts through Protection Areas prior to entering the Containment Area.
          3. Removal of tools and supplies from the Containment Area shall follow the same procedure specified for debris removal from the Containment Area.
       10. The following procedure shall be implemented when Constructor’s personnel are required to pass through a Protection Area to enter a Containment Area:
           1. Constructor shall don protective clothing required by the Owner within the Preparation Area before passing through Protection Areas.
           2. Constructor shall provide an Anteroom within the dustproof enclosure.
           3. Protective clothing shall be removed in the Anteroom prior to entering the Containment Area.
       11. The following procedure shall be implemented when Constructor’s personnel are required to exit a Containment Area through a Protection Area:
           1. Containment Area, the Constructor shall vacuum themselves with a HEPA vacuum. After being vacuumed, the Constructor may exit the Containment Area into the Anteroom.
           2. Constructor shall re-don protective clothing in the Anteroom before entering the Protection Area.
           3. Constructor shall remove the protective clothing in the Preparation Area.
           4. All dust and debris tracked outside the Containment Area shall be HEPA vacuumed immediately by the Constructor.
       12. Construction materials and equipment to be used for flooring removal shall be stored within areas designated by the Owner.
       13. Only flooring areas of a size that can be removed and replaced in one work period (typically 8 hours) shall be allowed.
       14. Removal of flooring:
           1. Vacuum carpet before removal with a HEPA vacuum.
           2. Damp mop before removal sheet vinyl and vinyl composition tile flooring.
           3. Use methods that minimize the dispersing of dust and debris while removing flooring.
     1. Work Within Existing Ceiling Spaces Outside Primary Containment Area shall be performed as follows:
        1. Scheduled in advance and notify the Owner
        2. Inform the Owner so that doors to Protection spaces near ceiling work can be kept closed while Work is in progress.
        3. Cover all horizontal surfaces, except flooring, to protect from dust and debris.
        4. HEPA vacuum the top of the ceiling system to be removed, and surrounding affected area, to remove dust prior to removal.
        5. Acoustical ceiling panels or ceiling access panels opened for investigation outside of the containment areas shall be closed when unattended.
        6. Whenever acoustical ceiling panels or access panels are opened in Protection Areas, provide a portable enclosure that encloses the ladder and seals off opening. Fit enclosure tight to ceiling.
        7. Exercise caution when handling fluids within ceiling or interstitial spaces.
        8. When working with fluids provide a watertight barrier beneath the work area to catch and retain all spillage before it reaches the ceiling below.
        9. Vacuum and clean surfaces free of dust before their removal.
     2. Clean-up of Class IV areas:
        1. Barriers may not be removed from work areas until the completed project is inspected by the Owner and thoroughly cleaned by the Constructor.
        2. Remove all debris, extra materials and equipment from the Containment Area before beginning final cleaning.
        3. Work areas shall be vacuumed with HEPA filtered vacuums and/or wet mopped by the Constructor.

When construction is complete, the temporary barriers shall be wiped down using a moist cloth or dust catching device before removal. The

* + - * 1. barriers
      1. shall be removed without creating additional dust in the area.
      2. Clean blockage of air vents, diffusers and registers, before removal. Then remove.
  1. WORK ENCLOSURE OUTSIDE OF THE PRIMARY CONTAINMENT AREA (SECONDARY CONTAINMENT AERA)
     1. Whenever Work is necessary outside of the Primary Containment Area but inside a Secondary Containment Area, Constructor shall comply with the following:
        1. Work shall be scheduled in advance with the Owner 7 calendar days.
        2. Constructor shall construct a full height temporary enclosure to perform Work. Constructors may use Temporary Prefabricated Enclosure Units or construct a temporary enclosure comprised of Polyethylene and Zipper Lock Entrance parts.
        3. Constructor shall seal opening upon entering or exiting Containment Area.
        4. Constructor shall not track dust and dirt outside of Containment Area. In the event of such an occurrence, the dust and dirt shall be cleaned up immediately.
        5. Constructor shall have necessary manpower and equipment (HEPA vacuum, dust and wet mops, brooms, buckets, and clean wiping rags) to keep Protection Areas clean at all times.
  2. WORK CONFINED TO INDIVIDUAL ROOMS WITHIN A PROTECTION AREA
     1. Work activities which are required within a Protection Area which can be confined to individual rooms may be permitted as follows:
        1. Constructor shall schedule in advance and notify the Owner at least seven (7) calendar days prior to commencing Work in the room to allow the Owner to relocate or protect occupants.
        2. The room shall be treated as a Primary Containment Area.
        3. Constructor shall keep the door to such areas closed and sealed while Work is being performed.
        4. Constructor shall cap HVAC ductwork and/or seal air supply diffusers and return grills.
        5. Constructor shall provide negative pressure in the room by use of Negative Air Machine.
        6. Traffic between the room and adjacent areas shall be kept to a minimum.
        7. Transport materials and debris to and from the room through adjacent areas by transporting in tightly covered and sealed containers/carts.
        8. Constructor shall at no time store equipment or materials outside the room.
        9. All dust tracked outside of the room shall be cleaned up immediately.
        10. HEPA Vacuum and clean surfaces free of dust after completion of the Work.
        11. Have necessary manpower and equipment (HEPA filtered vacuum, walk off mats, dust and wet mops, buckets, and clean wiping rags) to keep adjacent areas clean at all times.

**END OF SECTION 01 35 33**