

HARRIMAN

## ADDENDUM

Date May 2, 2014

To Prospective Bidders

Re Addendum No. 1 to the Bidding Documents for:

SMCC  
CEC Building Renovations  
South Portland, ME  
Project No. 13783

This Addendum forms a part of the Contract Documents and modifies the original Bidding documents dated April 14, 2014. Acknowledge receipt of this Addendum in the space provided in the Bid Form.

This Addendum consists of three pages, sections 004113, 012100, 084113, 212200 and Drawing Nos. listed on page three.

Harriman

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Addendum No. 1

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## CHANGES TO BID DOCUMENTS

1. 00 41 13 Contractor Bid Form
  - a. Issued with this Addendum.

## CHANGES TO SPECIFICATIONS

1. SECTION 011000 – SUMMARY
  - a. Article 1.6, B delete and replace with the following:
    - “B. Substantial Completion: Work shall be substantially complete on or before August 15, 2014. Work to the “Data Center” shall be substantially complete prior to August 1, 2014.
      1. Final Completion: All work, including punch list items shall be complete on or before August 25, 2013.”
2. SECTION 012100 - ALLOWANCES
  - a. Issued with this Addendum.
3. SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
  - a. Issued with this Addendum.
4. SECTION 212200 - CLEAN-AGENT FIRE-EXTINGUISHING SYSTEMS
  - a. Issued with this Addendum.

## CHANGES TO DRAWINGS

1. DRAWING A05.1 – FIRST FLOOR DEMOLITION PLAN
  - a. Change note : “Remove exg wall mtd coat rack system patch holes & paint to match exg” to read “Remove existing wall mounted coat rack system (typical of 5) patch holes & paint to match existing”
  - b. Change demo note D01: “Remove existing HM door and HM frame” to read “Remove and salvage to owner existing HM door & frame and hardware.”
  - c. Change demo note D 08: “Remove existing markerboard” to read “Remove & salvage to owner existing markerboard.”
  - d. Change demo note D10: “Remove existing projection screen” to read “Remove & salvage to owner existing projection screen.”
2. DRAWING A10.1 – FIRST FLOOR PLAN
  - a. Add dimension string 9’-0” to front of “bench”.
  - b. General note # 10 to partition legend which reads: “Wall type 112 to have 1 ½” rigid insulation typical.”
  - c. Add marker “BL2” to corner frame at Room 017 – Data Center.
  - d. Add general note #5: “At Offices 010 thru 014 and Data Center solid- lined rectangles shown are owner furniture/equipment.”
  - e. Revise: Room 017 General Note #3 “Room to be sealed tight to requirements of fire suppression system – confirm reg with manufactures” to read: “Room to be sealed tight to requirements of Inergen system – confirm reg with manufacturer.”
  - f. Details: C5 Add door tags 006 and 006A to doors shown in Room 006 - Controls and Machines Lab.
  - g. Partition type 243A – “UL No. UXXX” change to read “UL No. U465”.
  - h. Graphically add room name: “General Lab 008C” to room north of Room 008B.

3. DRAWING A 40.1 – CONSTRUCTION SYSTEM AND DETAILS
  - a. Detail A2 – change title “Bench Section (Alternate #3)” to read: “Bench Section (Alternate #2)”
4. DRAWING A70.1 – FIRST FLOOR CEILING PLANS & PARTIAL ROOF PLAN
  - a. Graphically add section marker C2/A40.1 at Column Line 2 (pointing east) and at column line A (pointing north).
5. DRAWING P20.1 – FIRST FLOOR SUPPLY
  - a. Visually add general note pointing to room 017 – Data Center that reads: “Inergen system – see specifications for more information. Tanks to be located in Room 007 – Storage”
6. DRAWING M10.1 – FIRST FLOOR DUCTWORK
  - a. Add note pointing to room 007 that reads: “The outside air duct and exhaust air duct for the existing ERV are wrapped with foil-faced fiberglass insulation. Remove the insulation and stiffen the ducts externally per SMACNA, HVAC Duct Construction Standards, Third Edition – 2005, Table 2-7 (10” static pressure) and 2-29 and replace the insulation. The contractor will field verify the sizes of these two ducts and strengthen them accordingly.”
  - b. Graphically move OU-1 to match placement per A1/A10.1
7. DRAWING E05.1 – ELECTRICAL EXISTING CONDITIONS PLAN
  - a. Existing Panel LP1 is located on the south wall of Corridor #15, between Janitor’s Closet #12 and Storage Room #13. Existing lighting circuits shall be maintained for reconnection to new lighting fixtures.

**DRAWINGS ISSUED WITH THIS ADDENDUM, DATED MAY 2, 2014:**

1. DRAWING SKA01 – REVISED DOOR SCHEDULE
2. DRAWING SKA02 – PARTIAL DETAIL D2/60.1
3. DRAWING SKA03 – REVISED PARTIAL PLAN A1/A05.1
4. DRAWING SKA04 – REVISED PARTIAL PLAN A1/A10.1
5. DRAWING SKA05 – NEW DETAIL (C2/A40.1)
6. DRAWING SKA06 – REVISED LIGHTING PLAN

**00 41 13  
Contractor Bid Form**

**SMCC CEC Building Renovations**

To: *Scott Beatty*  
Dean of Administration  
Southern Maine Community College  
2 Fort Road  
South Portland, ME 04106-1698

The undersigned, or "Bidder", having carefully examined the form of contract, general conditions, specifications and drawings dated April 14, 2014, prepared by Harriman for SMCC, as well as the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the Base Bid amount of:

\_\_\_\_\_ Dollars  
\$ \_\_\_\_\_

Allowances *are included* on this project.

1. Alternate bids *are included* on this project.

1. Alternate 1: \$ \_\_\_\_\_.

2. Alternate 2: \$ \_\_\_\_\_.

3. Alternate 3: \$ \_\_\_\_\_.

4. The Bidder acknowledges receipt of the following addenda to the specifications and drawings:

Addendum No. \_\_\_\_\_ Dated: \_\_\_\_\_

**00 41 13**  
**Contractor Bid Form**

5. Bid security *is required* on this project.  
The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.
  
6. Filed Sub-bids *are not required* on this project.  
The bid amount includes the following Filed Sub-bids which were submitted to the Bidder and to the Maine Construction Bid Depository.

**00 41 13  
Contractor Bid Form**

**SMCC CEC Building Renovations**

- 7. The Bidder agrees, if this bid is accepted by the Owner, to sign the designated Owner-Contractor contract and deliver it, with any and all bonds and affidavits of insurance specified in the Bid Documents, within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the day following the holiday or other closure day, Saturday or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

- 8. This bid is hereby submitted by:

Signature: \_\_\_\_\_

Printed name and title: \_\_\_\_\_

Company name: \_\_\_\_\_

Mailing address: \_\_\_\_\_

City, state, zip code: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

State of incorporation,  
if a corporation: \_\_\_\_\_

List of all partners,  
if a partnership: \_\_\_\_\_

## SECTION 012100 - ALLOWANCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items or work may be specified in the Contract Documents by allowances. Allowances established in lieu of actual requirements defer specific requirements to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
- C. Related Requirements:
  - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders for allowances.
  - 2. Division 02 through Division 33 for additional allowances that affect individual sections.

#### 1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

#### 1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

#### 1.5 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner under allowance less any applicable trade discounts, and shall include taxes, freight, and delivery to Project site, costs for receiving and handling at Project site, labor and installation.
- B. Unless otherwise indicated, Contractor's costs for overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.

## 1.6 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between actual installed cost amount and the allowance.
  - 1. Include installation costs as part of the allowance.
  - 2. Submit documentation on supplier's and subcontractor's letterhead actual cost for associated allowances.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1 – Communication Cabling: Lump-sum allowance of \$40,000 for communication cabling and provisions.

END OF SECTION 012100

## SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Storefront framing for window walls.
  - 2. Break metal in conjunction with frames.
  - 3. Sealant at interior and exterior perimeter of storefront.
- B. Related Sections:
  - 1. Division 07 Section "Joint Sealants" for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.
  - 2. Division 08 Section "Glazing" for glazing requirements to the extent not specified in this Section.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
  - 1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
  - 2. Dimensional tolerances of building frame and other adjacent construction.
  - 3. Failure includes the following:
    - a. Deflection exceeding specified limits.
    - b. Thermal stresses transferring to building structure.
    - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
    - d. Noise or vibration created by wind and by thermal and structural movements.
    - e. Loosening or weakening of fasteners, attachments, and other components.
    - f. Sealant failure.
    - g. Failure of operating units to function properly.
- B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Structural Loads:
  - 1. Wind Loads:
    - a. Basic Wind Speed: 100 mph.
    - b. Importance Factor: 1.0.
    - c. Exposure Category: C.
  - 2. Code: IBC 2009.

- D. Deflection of Framing Members:
1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
  2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.
- E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.
- F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft..
- G. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- H. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- I. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 62 when tested according to AAMA 1503.
- J. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.44 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

#### 1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01 Section "Submittal Procedures."
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- C. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
  2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
  3. Indicate fastener layout and size for transferring loads back to supporting structure.
- D. Samples for Initial Selection of Sealant Color: For units with factory-applied color finishes. Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- E. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Detail fabrication and assembly of aluminum-framed systems.
  2. Include design calculations.
- F. Qualification Data: For qualified Installer and professional engineer.
- G. Welding certificates.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
- I. Manufacturer's Field Reports: Manufacturer's field service representative shall submit field inspection report of product installation to Architect.
- J. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
1. Include maintenance manuals for hardware provided in this Section.
  2. Include replacement parts lists, adjustment instructions, and maintenance requirements for all components and hardware.
- K. Warranties: Sample of special warranties.
- 1.5 QUALITY ASSURANCE
- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of glazed storefront systems that are similar to those indicated for this Project in material, design, and extent.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by

dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
1. Operable window units in aluminum-framed storefront system shall be from storefront system manufacturer.
- F. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."
- G. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to glazed aluminum storefront and entrance systems including, but not limited to, the following:
1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
  2. Review structural loading limitations.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review required inspecting, testing, and certifying procedures.
  5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.
  6. Review temporary protection requirements for existing construction during and after installation.
  7. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
  8. Provide 5 business days minimum advance notice to participants prior to convening preinstallation conference.
- H. Field Quality Control: Provide manufacturer's field services consisting of product use recommendations, site visit at commencement of work, and periodic site visit for inspection of product installation in accordance with manufacturer's instruction. Manufacturer's field representative shall prepare written report on installation of systems.

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Coordinate rough opening, masonry opening, and wood blocking requirements.

## 1.7 WARRANTY

- A. General: Special warranty specified in this Article shall not deprive Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to

and run concurrent with other warranties made by Contractor under requirements of the Contract Documents.

- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Failure of system to meet performance requirements.
    - c. Noise or vibration caused by thermal movements.
    - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - e. Adhesive or cohesive sealant failures.
    - f. Water leakage through fixed glazing and framing areas.
    - g. Failure of operating components to function properly.
    - h. Glazing breakage.
  2. Warranty Period: Five years from date of Substantial Completion.
- C. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
1. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the following:
1. Kawneer North America:
    - a. Exterior Storefront and Entrances: Trifab 451T frames with 350 Medium Stile Entrances and Frames.
  2. Oldcastle Building Envelope (Formerly Vistawall):
    - a. Exterior Storefront and Entrances: Series 3000 poured and debridged Thermal Storefront System with 350 Medium Stile Entrances and Frames.
  3. Tubelite:
    - a. Exterior Storefront and Entrances: Exterior Storefront and Entrances: T14000 frames with Medium Stile Entrances and Frames.
  4. EFCO Corporation:
    - a. Exterior Storefront and Entrances: System 403 Framing with Series D302 Medium Stile Entrances and Frames.

### 2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
  2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  3. Extruded Structural Pipe and Tubes: ASTM B 429.
  4. Structural Profiles: ASTM B 308/B 308M.

5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
  2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
  3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

### 2.3 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
  2. Glazing System: Retained mechanically with gaskets on four sides.
  3. Glazing Plane: **Center**.
  4. Provide components having face width indicated on Drawings.
  5. Provide thermally broken extruded aluminum subframes for storefront sills.
  6. Provide thermally broken extruded aluminum sill flashing with end dams for storefronts.
  7. Provide operable units (windows and doors) manufactured by storefront system manufacturer.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  2. Reinforce members as required to receive fastener threads.
  3. Do not use exposed fasteners, except for hardware application. For hardware application, use exposed fasteners with countersunk Phillips screw heads, finished to match framing system or hardware being fastened, unless otherwise noted. Exposed fasteners shall be stainless steel.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Aluminum Break Metal: Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness, not less than 0.063-inch thick, to maintain a flat appearance without visible deflection.
- G. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

## 2.4 GLAZING SYSTEMS

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard pressure-glazing system of black, extruded EPDM rubber gaskets, fabricated to comply with system performance requirements. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.
- C. Spacers and Setting Blocks: Manufacturer's standard permanent, nonmigrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.
- D. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- E. Sealants and Joint Fillers (Backer Rods): Provide for joints at perimeter storefront systems as specified in Division 07 Section "Joint Sealants."

## 2.5 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Confirm that wood blocking, where used, has been sufficiently fastened to transfer storefront loads back to structure.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General:
  - 1. Comply with manufacturer's written instructions.
  - 2. Do not install damaged components.
  - 3. Fit joints to produce hairline joints free of burrs and distortion.
  - 4. Rigidly secure nonmovement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
  6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
  2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation. Install sills in one piece, full width of opening except where opening exceeds available manufactured lengths. Provide sealed metal end dams at ends of sills. Sills shall turn up on backside to form pan, directing water to the exterior.
- E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- F. Install glazing as specified in Division 08 Section "Glazing."
- G. Windows: Install windows to produce smooth operation and tight fit at contact points.
1. Windows: Install to produce weathertight enclosure and tight fit at weather stripping.
- H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation. Color of sealant to match aluminum finish.

### 3.3 ERECTION TOLERANCES

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
  2. Alignment:
    - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
    - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
- B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

### 3.4 ADJUSTING AND CLEANING

- A. Adjust operating windows hardware to function smoothly as recommended by manufacturer.
1. Provide tight fit at contact points and weather stripping. Provide smooth operation and weathertight closure. Frame shall be free from distortion.
- B. Remove excess sealant and glazing compounds and dirt from surfaces. Remove nonpermanent labels and clean surfaces.

- C. Comply with manufacturer's written recommendations for final cleaning and maintenance.

3.5 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures entrances and storefront systems are without damage or deterioration at time of Substantial Completion.

END OF SECTION 084113

## SECTION 212200 - CLEAN-AGENT FIRE-EXTINGUISHING SYSTEMS

### PART 1 – GENERAL

#### 1.1 DESCRIPTION OF WORK:

- A. Design and installation of an engineered fire detection and INERGEN total flooding, gaseous agent, fire suppression system as manufactured by Tyco Fire Protection Products (hereinafter referred to as “Tyco”), Marinette, Wisconsin.
- B. System design is based on the use of a Selector valve to direct the flow of INERGEN agent into the protected zone where indicated on drawings. Quantity of INERGEN cylinders is to be based on the largest zone of protection. Cylinders shall be provided to offer adequate protection of the largest zone of protection. Selector valves shall be provided to supply discharge of proper design concentration of INERGEN agent into the protected zone.
- C. Drawings: The contract drawings indicate the general arrangements of the areas to receive detection and INERGEN system protection. Contractor is to review all drawings so that all items affecting the operation of the fire detection/INERGEN fire suppression system (such as equipment location, air diffusers, damper closures, and door openings) are considered in the design of the engineered system.
- D. Section Includes:
  - 1. Piping and piping specialties.
  - 2. Extinguishing-agent containers.
  - 3. Extinguishing agent.
  - 4. Detection and alarm devices.
  - 5. Control and alarm panels.
  - 6. Accessories.
  - 7. Connection devices for and wiring between system components.
  - 8. Connection devices for power and integration into building's fire-alarm system.

#### 1.2 APPLICABLE PUBLICATIONS:

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto (latest edition):
  - 1. National Fire Protection Association (NFPA) Standards:
    - No. 2001 Clean Agent Fire Extinguishing Systems
    - No. 70 National Electric Code
    - No. 72 National Fire Alarm Code
    - No. 75 Protection of Information Technology Equipment
    - No. 76 Fire Protection for Telecommunication Systems
  - 2. Factory Mutual Systems (FM) Publication  
Factory Mutual Approval Guide
  - 3. Underwriters Laboratories, Inc. (UL) Publication

UL 217:	Smoke Detectors, Single and Multiple Stations
UL 228:	Door Closers—Holders for Fire Protective Signaling Systems
UL 268:	Standard for Smoke Detectors for Open Areas
UL 268A:	Standard for Smoke Detectors for Duct Application
UL 521:	Heat Detectors for Fire Protective Signaling Systems
UL 864 9 <sup>th</sup> ed:	Control Units and Accessories for Fire Alarm Systems
UL 1638:	Visual Signaling Appliances
UL 1971:	Signaling Devices for Hearing Impaired
	Fire Protection Equipment Directory with quarterly supplements

4. National Electrical Manufacturers Association (NEMA) Publication Enclosures for Industrial Controls and Systems
5. Industrial Risk Insurers Interpretive Guide (Detection & Controls)
6. U.S. Environmental Protection Agency, Protection of Stratospheric Ozone 59 FR 13044, March 18, 1994 (Final SNAP Ruling)
7. Requirements of the Authority Having Jurisdiction (AHJ)
8. Manufacturer's Design, Installation, Operation and Maintenance Manual
9. The system complete shall have the following applicable listings and approvals
  - a) Underwriters Laboratories Inc.
  - b) Factory Mutual Global

### 1.3 REQUIREMENTS:

- A. This installation shall be made in strict accordance with the drawings, specifications and applicable NFPA Standards. All equipment and devices used shall be listed by the standardizing agencies (UL and/or FM).
- B. Design and installation of the fire detection/INERGEN fire suppression system will be in strict accordance with the following guidelines and regulatory agencies:
  1. NFPA 2001 Clean Agent Fire Extinguishing Systems
  2. NFPA 72 National Fire Alarm Code, Latest Edition
  3. NFPA 70 National Electric Codes, Latest Edition
  4. Americans with Disabilities Act, Title 24, Latest Edition

### 1.4 GENERAL:

- A. Furnish all engineering design and materials for a complete fire detection/INERGEN fire suppression system including charged INERGEN storage cylinders, nozzles, control unit, detectors, wiring, annunciators, alarm and all other equipment necessary for a complete operational system.
- B. Major system components shall be produced by Tyco (no alternatives) and shall be installed by an authorized ANSUL Distributor certified for the design, installation, and service of INERGEN

fire suppression systems.

- C. New and unused materials and equipment must be used for system.
- D. Contractor shall, as a minimum, provide 24-hour emergency service, 7 days a week and shall be able to respond to an emergency situation within 2 hours of receiving an emergency trouble call. In addition, contractor shall maintain no less than \$2 million liability insurance.

#### 1.5 SUBMITTAL:

- A. The following shall be submitted for approval within 21 days of award and prior to delivery of materials:
  - 1. Material and equipment information shall include manufacturer's catalog cut sheet and technical data for each component or device used in the system. This shall include, but not be limited to, the following:
    - a. Detectors
    - b. Manual discharge switches
    - c. Control unit
    - d. Release devices
    - e. Alarm devices
    - f. Agent storage cylinders
    - g. Mounting brackets
    - h. Discharge nozzles
    - i. Abort stations
    - j. Piping isometrics
    - k. Flow calculations
- B. Provide information outlining the warranty of each component or device used in the system.
- C. Provide information outlining the operation and maintenance procedures that will be required of the owner. This information shall explain any special knowledge or tools the owner will be required to employ and all spare parts that should be readily available.
- D. Drawings shall indicate locations, installation details and operation details of all equipment associated with the INERGEN system. Floor plans shall be provided showing equipment locations, piping, point-to-point wiring and other details as required. Floor plans shall be drawn to a scale of not less than 1/8 in. (3.2 mm) = 1 ft 0 in. (0.3 m). Elevations, cross sections and other details shall be drawn to a larger scale as required. Isometric piping layouts shall be provided with the shop drawings. In addition, point-to-point electrical layout drawings shall be provided.
- E. Sequence of operation, electrical schematics and connection diagrams shall be provided to completely describe the operation of the INERGEN system controls.

## PART 2 – PRODUCTS

### 2.1 SYSTEM DESCRIPTION AND OPERATION:

- A. The system shall be an INERGEN total flooding, gaseous, clean agent, fire suppression system designed to provide a uniform concentration of INERGEN agent for the protected area. Agent shall be composed of natural-occurring inert gases.
  - 1. The amount of INERGEN agent to be provided shall be the amount required to obtain a uniform (minimum) concentration as required by the ANSUL INERGEN Design, Installation, Operation, and Maintenance Manual for a minimum period of 10 minutes or for a time period to allow for response by trained personnel. Take into consideration such factors as non-closable openings (if any), "rundown" time of fans, time required for dampers to close (and requirements for any additional dampers), and any other feature of the facility that could affect concentration. The design concentration shall meet the requirements of the ANSUL INERGEN Design, Installation, Operation, and Maintenance Manual.
- B. Cross-zoned Smoke Detection: The INERGEN system shall be automatically actuated by either counting zone detection circuits. Smoke detectors shall be photoelectric with compatibility listings for use with the control unit. Smoke detectors shall be installed at no more than 250 ft<sup>2</sup> (23.2 m<sup>2</sup>) of coverage per detector. The system shall require 2 detectors in alarm prior to automatic agent release.

### 2.2 SEQUENCE OF OPERATION:

- A. Activation of any single detector in any detection zone shall:
    - 1. Cause a first-stage alarm.
    - 2. Energize a lamp on the activated detector, and control unit.
  - B. Activation of a detector on the second zone shall:
    - 1. Transmit an alarm signal to remote monitoring or building alarm panel.
    - 2. Cause a second-stage (pre-discharge) alarm to operate.
    - 3. Operate auxiliary contacts for air conditioning shutdowns and automatic dampers.
    - 4. Initiate a programmable time delay (INERGEN agent release).
  - C. Upon completion of the time delay the INERGEN system
- B. Shall:
- 1. Cause a discharge alarm to be activated.
  - 2. Operate auxiliary contacts for emergency power off of all electrical equipment (excluding lighting and emergency circuits for life safety).
  - 3. Activate visual alarms (strobe) at protected area entrance.

4. Energize control solenoid for INERGEN cylinders releasing gaseous agent into the protected area.

### 2.3 AUXILIARY COMPONENTS:

- A. Double action manual releasing stations shall be provided at each exit of the protected area and shall, when activated, immediately release the INERGEN agent and cause all audible/visual alarms to activate. In addition, activation of the manual releasing stations shall cause immediate shutdown of air and power circuits.
- B. Abort stations shall be provided at each exit of the protected area and shall, when operated, interrupt the discharge of INERGEN agent and emergency power-off functions. The abort stations shall be momentary devices (dead-man) requiring constant pressure to maintain contact closure.  
Note: Manual Releasing Station activation shall override any abort station. Abort station operation shall be per IRI and FM guidelines.

## PART 3 – MATERIAL AND EQUIPMENT

### 3.1 GENERAL REQUIREMENTS:

- A. Materials and equipment shall be of a single manufacturer (Tyco). Alternates will not be accepted. The name of the manufacturer and the serial numbers shall appear on all major components.
- B. Install warning signs on the inside and outside the of each exit door from Inergen protected area. The signs shall be printed as follows on an aluminum background with the word "WARNING" in 2" high letters:
  - a. Exterior Door Sign: WARNING THIS SPACE IS PROTECTED BY AN INERGEN FIRE SUPPRESSION SYSTEM. WHEN SYSTEM IS DISCHARGED AS A RESULT OF FIRE, CAUTION MUST BE TAKEN TO AVOID EXPOSURE TO PRODUCTS OF COMBUSTION. DO NOT ENTER WITHOUT APPROVED SELF-CONTAINED BREATHING APPARATUS OR UNTIL VENTILATION HAS BEEN OPERATE FOR AT LEAST 15 MINUTES
  - b. Interior Door Sign: WHEN ALARM SOUNDS VACATE AT ONCE. INERGEN AGENT BEING RELEASED
  - c. Exterior sign near strobe: Sign shall be red background with white engraved letters. DO NOT ENTER WHEN LIGHT OPERATES, THE INERGEN SYSTEM HAS DISCHARGED

### 3.2 GENERAL MATERIALS – ELECTRICAL:

- A. All electrical enclosures, raceways and conduits shall be employed in accordance with applicable codes and intended use and contain only those electrical circuits associated with the fire detection and control system and shall not contain any circuit that is unrelated to the system.
- B. Unless specifically provided otherwise in each case, all conductors shall be enclosed in steel conduit, rigid or thin wall as conditions dictate.
- C. Any conduit or raceway exposed to weather or other similar conditions shall be properly sealed and installed to prevent damage. Provisions for draining and/or drying shall be employed.

- D. NEMA rating and/or electrically hazardous classifications shall be observed and any equipment or materials installed must meet or exceed the requirements of service.
- E. Any wiring shall be of the proper size to conduct the circuit current but shall not be smaller than #18 AWG unless otherwise specified for a given purpose. Wire that has scrapes, nicks, gouges or crushed insulation shall not be used. The use of aluminum wire is strictly prohibited.
- F. Splicing of circuits shall be kept to a minimum and are only to be found in an electrical device suited for the purpose.
- G. Wire spliced together shall have the same color insulation.
- H. Wire splices shall be made with appropriate devices suited for the purpose.
- I. All wire terminations shall be made with crimp terminals unless the device at the termination is designed for bare wire terminations.
- J. All electrical circuits shall be numerically tagged with suitable devices at the terminating point and/or splice. All circuit numbers shall correspond with the installation drawings.
- K. The use of colored wires is encouraged but not required unless dictated by state or local authorities.
- L. White-colored wire shall be used exclusively for the identification of the neutral conductor of an alternating current circuit.
- M. Green-colored wire shall be used exclusively for the identification of the earth ground conductor of an AC or DC circuit.

### 3.3 CONTROL SYSTEMS – GENERAL:

- A. All control systems shall be UL Listed or FM approved and shall be utilized with listed or approved compatible operating devices and shall be capable of the following features:
  - 1. Ground fault indication
  - 2. Supervised detection circuit(s)
  - 3. Supervised alarm circuit(s)
  - 4. Supervised release circuit(s)
  - 5. Supervised manual pull circuit (if applicable)
  - 6. Supervised primary power circuit
  - 7. Alarm overrides trouble logic
  - 8. Battery standby
  - 9. Front panel indicating lamps (LEDs)
  - 10. Key lock steel enclosure
  - 11. Programmable time delay
  - 12. Programmable detection logic

13. Prioritized trouble logic
14. Microprocessor based logic
15. History buffer

#### 3.4 CONTROL UNIT – AUTOPULSE Z-10 CONTROL SYSTEM:

- A. The control unit shall be an ANSUL AUTOPULSE Z-10 and shall communicate with and control the following types of equipment used to make up the system: smoke detectors, manual release/abort stations, alarm notification appliances, releasing components and other system controlled devices.
- B. System Capacity - The control unit shall include 2 Style Y/Z (Class A/B) notification circuits, 2 releasing circuits, Form- C alarm and trouble contacts, 4 Style B/D (Class A/B) initiating circuits, 1 Style B/D (Class A/B) manual release circuit, and 1 Style B (Class B) abort circuit.
- C. System Display: The system display shall indicate the status of the following system parameters:

AC POWER: Green LED

SYSTEM ALARM: Red LED

RELEASE: Red LED

SUPERVISORY: Yellow LED

SYSTEM TROUBLE: Yellow LED

CIRCUIT TROUBLE: Yellow LED

ALARM SILENCED: Yellow LED

POWER TROUBLE: Yellow LED

- D. System Control Switch Operation:
  1. Acknowledge Switch: Activation of the control unit acknowledge switch in response to alarms, troubles, and supervisory conditions shall silence the local panel piezo electric signal and change the system alarm or trouble LED from flashing mode to steady ON mode. Occurrence of any new alarm or trouble conditions in the system shall cause the control unit to re-sound the local piezo sounder and repeat the alarm or trouble sequences.
  2. Alarm Silence Switch: Activation of the alarm signal silence switch shall cause all alarm notification appliances to return to the normal condition after an alarm condition.
  3. System Reset Switch: Activation of the system reset switch shall cause all electronically-latched initiating devices, appliances as well as all associated output devices and circuits, to return to their normal condition. Holding system reset down shall perform a LAMP TEST function and will activate the piezo sounder.

## E. System Operation:

1. Zone Status LEDs: The alarm, supervisory or trouble LED(s) shall flash until event(s) has been acknowledged. Any subsequent new alarm, supervisory or trouble condition will re-sound all indications and flash new events.
2. Supervisory: A short circuit on this zone shall cause the supervisory LED to flash. The tone silence switch shall silence the piezo causing the supervisory LED to illuminate steady. An open circuit shall report as a zone trouble.
3. System History Recording and Reporting: The control unit shall contain a history buffer that will be capable of storing up to 50 system alarms/troubles/operator actions. Each of these activations will be stored and time-and-date stamped with the actual time of the activation.
  - a. The non-erasable history buffer shall be maintained which will provide the last 50 system events.
  - b. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable.

## F. Optional modules shall include:

1. Optional module for 4 zone/function relays
2. Optional Class A adapter module

## G. The control unit shall also include the following functions:

1. Output circuits shall be protected against false activations by using a 2-step electronic activation circuit.
2. Battery/earth fault supervision shall be provided.
3. Adjustable delay timer shall be available, 0 to 60 seconds.
4. Cross zone option shall be selectable (2 zones in alarm before release).
5. Three abort functions options shall be selectable: (1) Standard UL method; (2) IRI method; and (3) local AHJ method.
6. A second release circuit may be selected in place of a third notification circuit.
7. A supervised manual release circuit shall be provided which, when activated, shall override the Abort.
8. 7 AH to 12 AH battery options shall be available providing up to 90 hours standby.
9. A watchdog timer to supervise microprocessor shall be provided.
10. Slide-in zone identification labels shall be provided.
11. Capable of protecting up to 2 hazards for suppression release.

#### H. Power Supply:

1. The power supply shall be integral to the control unit and provide all control unit and peripheral devices power needs.
2. Input power shall be 120 VAC, 60 Hz. The power supply shall provide an integral battery charger for use with batteries up to 12 AH.
3. The power supply shall also provide 3 amperes of output at 24 VDC for all circuits. Three terminals shall be provided for positive 24 VDC, negative 0 VDC steady, and resettable 0 VDC with pulse on reset for 4-wire smoke detectors. The combined rating shall be 750 mA for any combination of steady/pulsed.
4. The power supply shall be designed to meet UL and NFPA requirements for power-limited operation on all notification and initiating circuits.
5. Positive-temperature-coefficient thermistors, circuit breakers, fuses, or other over-current protection shall be provided on all power outputs.

#### I. Mechanical Design:

1. The control unit shall be housed in a cabinet designed for mounting directly to a wall or vertical surface. The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top. The door shall provide a key lock and include a glass or other transparent opening for viewing of all indicators. The cabinet shall be approximately 5 in. (127 mm) deep, and 14.5 in. (368 mm) wide, and 16 in. (406 mm) high. An optional trim ring shall be used for flush mounting of the cabinet. Space shall be provided in the cabinet for 7 AH or 12 AH batteries.

#### J. Batteries:

1. Batteries shall be 12 volt, Sealed-Lead Acid type providing 24 VDC (2 required).
2. Batteries shall have sufficient capacity to power the fire alarm system for not less than 24 hours in standby plus 5 minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks, refilling, spills and leakage shall not be accepted.

### 3.5 SMOKE DETECTORS:

- A. Smoke detectors shall be 24 VDC and shall be UL listed and FM approved.
- B. Each detector shall include a visual status indicator, provide remote LED output, and include a built-in test capability.
- C. The sensitivity shall be factory set per UL 268.
- D. The detector cover and screen shall be easily removable for field cleaning.
- E. A special vandal-resistant locking screw shall be provided to lock the head to the base.

- F. The head-to-base connection shall be made by use of bifurcated contacts. Terminal connections to the base shall be the screw type that are accessible with the base installed on the mounting box.
- G. Where specifically identified on the contract drawings, detector bases shall incorporate a relay with Form C contacts rated at 1 amp, 120 VAC or 28 VDC for remote LED alarm annunciation of the detector.
- H. Photoelectric-type smoke detector shall be the light reflective type and compatible with the ANSUL AUTOPULSE control system. The detector shall have an LED in its base which is illuminated in a steady-on mode when in alarm and pulse mode when in standby. Reset of the detector shall be performed by the control unit reset switch.
- I. The design of the photoelectric detector compensating circuits shall provide stable operation with regard to minor changes in temperature, humidity and atmospheric conditions.
- J. Photoelectric-type smoke detector with heat detector shall be the light reflective type and compatible with the ANSUL AUTOPULSE control system. The detector shall have an LED in its base which is illuminated in a steady-on mode when in alarm and pulse mode when in standby. Reset of the detector shall be performed by the control unit reset switch.

### 3.6 INDICATING APPLIANCES:

#### A. Sounder/Strobe Combination:

- 1. The sounder/strobe combination shall operate on 24 VDC and shall be approved for use with the listed control system.
- 2. The sounder/strobe combination shall be polarized and powered from the control unit.
- 3. The device shall be UL listed or FM approved.
- 4. The strobe shall be listed to UL Standard 1971 for the Hearing Impaired, approved for Fire Protective Service, and rated at either 15 cd or 75 cd.
- 5. The sounder shall have 8 tone options selected by means of programming clips.

#### B. Strobe:

- 1. The strobe shall operate at 24 VDC and shall be approved for use with the listed control system.
- 2. The strobe shall be polarized and powered from the control unit.
- 3. The strobe shall be UL listed or FM approved.
- 4. The strobe shall be listed to UL Standard 1971 for the Hearing Impaired, approved for Fire Protective Service, and rated at either 15 cd or 75 cd.

#### C. Sounder:

- 1. The sounder shall operate at 24 VDC and shall be approved for use with the listed control system.

2. The sounder shall be polarized and powered from the control unit.
3. The device shall be UL listed or FM approved.
4. The sounder shall have 8 tone options selected by means of programming clips.

### 3.7 MANUAL PULL STATIONS:

- A. The manual pull stations shall be provided for the release (electrical) of the fire suppression system in case of an emergency.
- B. The device shall be UL listed.
- C. Manual stations shall be metal with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front and both sides of the stations.
- D. Operation shall require 2 actions.

### 3.8 ABORT SWITCH:

- A. The abort switch shall be used where an investigative delay is desired between detection and actuation of the fire suppression system.
- B. This switch shall be a momentary contact "dead-man" type switch requiring constant pressure to transfer one set of contacts. Clear operating instructions shall be provided at the abort switch.
- C. This switch shall be rated at 28 VDC @ 1.1 amp make/break or 6 amp continuous carry.
- D. The terminal connections shall be of the screw type.

### 3.9 MAINTENANCE LOCK-OUT SWITCH:

- A. The maintenance lock-out switch shall be used where it is desired to disable the fire suppression system during routine maintenance.
- B. This switch shall be key operated allowing removal of the key in either the "Normal" or "Lock-Out" position. A red indicator lamp shall be included on the switch assembly to be illuminated when in the "Lock-Out" position. The control unit is to indicate a trouble condition when in the "Lock-Out" position.
- C. The switch shall include 1 set of normally open and 1 set of normally closed contacts rated at 28 VDC @ 1.1 amp make/break or 6 amp continuous carry.
- D. The terminal connections shall be of the screw type.

### 3.10 SELECTOR SWITCH:

- A. The selector switch shall be used where a connected reserve is required.
- B. This switch shall be key operated allowing removal of the key in either the "Main" or "Reserve" position.

- C. This switch shall be rated at 28 VDC @ 1.1 amp make/break or 6 amp continuous carry.
- D. The terminal connections shall be of the screw type.

## PART 4 – SYSTEM ARRANGEMENT

### 4.1 INERGEN FIRE SUPPRESSION SYSTEM:

- A. The INERGEN fire suppression system shall be of the engineered, permanently piped, fixed nozzle type with all pertinent ANSUL components provided by Tyco.
- B. All agent storage cylinders shall be centrally located as vertical, free-standing cylinders with wall and/or floor mounted retaining brackets. Where multiple cylinders are required for the same hazard, a common manifold shall be employed. (Cylinders mounted horizontally shall be installed in accordance to the manufacturer's design manual.)
- C. On multiple cylinder arrangements (discharging into a common hazard), one cylinder shall be designated as the pilot cylinder and employ both the restorable electric and mechanical manual actuators. All remaining cylinders shall be pneumatically/back-pressure operated from the INERGEN agent discharge of the pilot cylinder into the manifold.
- D. Manifolder cylinders shall employ a flexible discharge hose to facilitate installation and system maintenance. Each cylinder on a manifold shall also include an agent check valve installed to the manifold inlet.
- E. Maximum height distance between cylinder(s) and nozzle(s) can be up to 100 ft (30.48 m) vertical. Horizontal distance is limited to hydraulic calculation.

### 4.2 FLOW CALCULATIONS:

- A. Computerized verification of flow calculations shall be submitted for each INERGEN fire suppression system and include the following data as a minimum:
  - 1. Quantity of agent per nozzle
  - 2. Type of nozzle
  - 3. Pressure at nozzle (psi)
  - 4. Nozzle body nominal pipe size (inch)
  - 5. Number and size of cylinders
  - 6. Total agent
  - 7. Pipe size per pipe section
  - 8. Pipe schedule per pipe section
  - 9. Number, size and type of fitting per pipe section
  - 10. Actual length per pipe section (feet)
  - 11. Equivalent length per pipe section (feet)
  - 12. Discharge time (seconds)

## PART 5 – EQUIPMENT AND MATERIAL (MECHANICAL)

### 5.1 PIPE MATERIAL – INERGEN SYSTEM:

- A. System piping shall be of non-combustible materials having physical and chemical characteristics such that its integrity under stress can be predicted with reliability.
- B. As a minimum, piping materials shall be black steel pipe conforming to ASTM A-53A ERW or ASTM A-106A seamless.
- C. Under no conditions shall ordinary cast iron pipe, steel pipe conforming to ASTM A-120 or ASTM A-53/A-120 be used.
- D. Piping joints shall be suitable for the design conditions and shall be selected with consideration of joint tightness and mechanical strength.
- E. As a minimum, fittings beyond the orifice union/nipple shall be black, 300 lb class fittings conforming to ANSI B-16.3. Ordinary cast iron fittings shall not be used.
- F. The system manifold up to the orifice union nipple must be constructed of Schedule 80 piping and 2000 lb or 3000 lb forged steel fittings. Distribution piping downstream of the orifice union must be a minimum of Schedule 40 with 300 lb fittings.
- G. All piping shall comply with NFPA 2001.
- H. Piping shall be installed in accordance with good commercial practice to the appropriate codes, securely supported with UL Listed hangers and arranged with close attention to the design layout since deviations may alter the design flow performance as calculated.
- I. Piping shall be bracketed within 12 in. (0.3 m) of all discharge nozzles.
- J. All piping shall be reamed, blown clear and swabbed with appropriate solvent to remove mill varnish and cutting oils before assembly.
- K. Multi-outlet fittings other than tees shall not be permitted.
- L. Assembly of all joints shall conform to the appropriate standards. Threaded pipe joints shall utilize Teflon tape applied to the male threads only.

### 5.2 EXTINGUISHING AGENT:

- A. The agent shall be INERGEN agent, a trademark name registered to Tyco.
- B. The agent shall be a mixture of three inerting (oxygen diluting) gases: 52% nitrogen, 40% argon, and 8% carbon dioxide.

### 5.3 INERGEN STORAGE CYLINDERS:

- A. Cylinder assemblies shall be of steel construction with a standard RED enamel paint finish. Each cylinder shall be equipped with a pressure seat-type valve and gauge. The system shall

utilize ANSUL CV-98 valve assemblies. When the system's capacity exceeds 40 cylinders, a second pilot valve shall be provided and used for cylinder activation. Each valve shall be constructed of forged brass and shall attach to the cylinder providing a leak-tight seal.

1. For 150 bar cylinders, each valve shall also include a safety pressure relief device, which provides relief at 3000 to 3360 psi (206.8 to 231.7 bar) per CGA test methods. Cylinder charging pressure is 2175 psi at 70 °F (150 bar at 21 °C).
  2. For 200 bar cylinders, each valve shall also include a safety pressure relief device, which provides relief at 4000 to 4480 psi (276 to 309 bar) per CGA test methods. Cylinder charging pressure is 2900 psi at 70 °F (200 bar at 21 °C).
- B. First filling of the cylinder assembly shall be by a Tyco manufacturing facility.

#### 5.4 CYLINDER BRACKET:

- A. Each cylinder assembly shall be furnished with a bracket made from welded steel. The bracket shall hold the cylinders in a saddle with a front bracket piece that secures the cylinders. The brackets shall be modular in design to allow added bracketing or stacking of cylinders depending on installation requirements.
- B. Cylinder brackets shall be UL listed and/or FM approved for use with the INERGEN system.

#### 5.5 VALVE ACTUATORS:

- A. Electric valve actuators shall be of brass construction and stackable design with swivel connections to allow removal of actuators for maintenance or testing.
- B. Operation of actuators shall not require replacement of components. NO ELECTRO-EXPLOSIVE DEVICES may be used to actuate the valve assembly.
- C. Electric actuators shall be the magnetic latch, continuous duty type for 24 VDC operation.
- D. Actuation devices shall be UL listed and/or FM approved for use with the INERGEN fire suppression system.

#### 5.6 DISCHARGE HOSE/CHECK VALVE:

- A. When manifolding, all cylinder assemblies shall include a flexible discharge hose and check valve for connection to the manifold inlet.
- B. All hose/check valves shall be UL listed and/or FM approved for use with the CV-98 INERGEN valve as manufactured by Tyco. (Flexible Discharge Bend)

#### 5.7 DISCHARGE NOZZLES:

- A. Discharge nozzles shall be of two-piece construction and sized to provide flow rates in accordance with system design flow calculations.
- B. A nozzle inlet orifice plate shall be included. The orifice size shall be determined by a computerized UL listed flow calculation program.

- C. Orifice(s) shall be machined in the nozzle body to provide a horizontal discharge pattern based upon the approved coverage arrangements.
- D. Nozzles shall be permanently marked with the manufacturer's part number. The nozzles shall be threaded directly to the discharge piping without the use of special adapters.
- E. Nozzles shall be UL listed as manufactured by Tyco.

#### 5.8 ORIFICE UNION/NIPPLE ASSEMBLIES:

- A. An orifice union/nipple shall be included in the manifold to reduce pressure in the downstream pipe network.
- B. Orifice union/nipple assemblies shall be rated at 2000 lb Class minimum.
- C. Orifice union/nipple assemblies shall be permanently marked with the manufacturer's orifice code. The union orifice/nipple shall be threaded directly to the manifold piping without the use of special adapters.
- D. Union orifice/nipple assemblies shall be UL Listed and/or FM Approved for use with the INERGEN fire suppression system.

#### 5.9 SYSTEM CHECKOUT AND TESTING:

- A. The completed installation shall be inspected by factory authorized and trained personnel. The inspection shall include a full operational test of all components per the equipment manufacturer's recommendations (including agent discharge).
- B. Inspection shall be performed in the presence of the owner's representative, architect's or engineer's representative, insuring authority and/or the local AHJ.
- C. All mechanical and electrical components shall be tested according to the manufacturer's recommended procedure to verify system integrity.
- D. Inspection shall include a complete checkout of the detection/control system and certification of cylinder pressure. A written report shall be filed with the owner.
- E. As-built drawings shall be provided by the contractor (2 copies) indicating the installation details. All routing of piping, electrical conduit and accessories shall be noted.
- F. Equipment installation and maintenance manuals shall be provided in addition to the as-built drawings.
- G. Prior to final acceptance, the contractor shall provide operational training in all concepts of the system to the owner's key personnel. Training shall consist of:
  - 1. Control system operation
  - 2. Trouble procedures
  - 3. Abort procedures
  - 4. Emergency procedures
  - 5. Safety requirements

6. Demonstration of the system (excluding INERGEN agent release)
  - H. The quantity of agent shall reflect the actual design quantity of INERGEN agent.
  - I. A functional test shall be completed prior to the concentration test consisting of detection, alarm, release, accessories related to the system, AUTOPULSE control unit, and a review of the cylinders, piping, fittings, hangers, and cylinder pressure.
  - J. Concentration testing shall be performed under the supervision of the contractor's authorized personnel in the presence of the owner's representative, local authorities and any other insuring authority.
  - K. INERGEN system test procedures shall be recommended by the equipment manufacturer and/or the INERGEN equipment supplier.
  - L. The contractor shall provide a gas analyzer capable of automatically recording sampling points. Concentration recording shall continue until authorities are satisfied with hazard integrity or until 10 minutes have elapsed.
  - M. The sampling point(s) shall be located at a strategic area(s) but no higher than the highest combustible contents.
  - N. If the test results indicate that the design concentration was not achieved and/or held, the contractor shall determine the cause of the failure. After determination of the cause, the system shall be recharged and again placed in operation. The contractor shall only be responsible for retest based on equipment design failure.
  - O. ROOM INTEGRITY TESTING: A door fan test shall be completed to assure the concentration of agent will remain in the protected space for the duration required by the agent manufacturer. If the room integrity test fails, the room leaks shall be identified and repaired. The door fan test shall be repeated as necessary until the room is deemed acceptable. Provide a report of the door fan testing procedures and results.

## PART 6 – WARRANTY

### 6.1 WARRANTY:

- A. Environmental: The manufacturer (Tyco) shall offer a 20-year warranty covering regulations banning or restricting use of the INERGEN agent due to environmental issues.
- B. Evergreen Discharge: Replacement cost for the INERGEN agent shall be covered in a 20-year discharge warranty except for the system commissioning discharge test, regardless of the cause of the fire suppression system discharge.
- C. Components/System: Limited one year warranty shall be offered for defects in workmanship and material.

END OF SECTION 212200

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**DOOR AND FRAME SCHEDULE**

No.	DOOR PANELS					FRAME					FIRE RATING	REMARKS	
	PANEL SIZE				TYPE	MAT	TYPE	MAT / FIN	DETAILS				
	PANELS	WIDTH	HEIGHT	THICK					HEAD	JAMB			SILL
1ST FLOOR													
006	(1)	3' - 4"	6' - 8"	1 3/4"	EXG	EXG	EXG	EXG	EXG	EXG			EXISTING TO REMAIN-PAINT INTERIOR SIDE
006A	(1)	3' - 0"	7' - 0"	1 3/4"	EXG	EXG	EXG	EXG	EXG	EXG			EXISTING TO REMAIN-PAINT INTERIOR SIDE
008	(2)	3' - 0"	7' - 0"	1 3/4"	FG	WD	1	HM	C6	B6			
008A	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	1	HM	C6	B6		1 HR	
008B	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	1	HM	C6	B6		1 HR	
008C	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	1	HM	C6	B6		1 HR	
008D	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	1	HM	C6	B6		1 HR	
008E	(1)	3' - 0"	7' - 0"	1 3/4"	EXG	EXG	EXG	EXG	EXG	EXG			EXISTING TO REMAIN-PAINT & NEW HARDWARE
009	(2)	2' - 6"	6' - 8"	1 3/4"	F	WD	EXG	EXG	EXG	EXG			EXISTING FRAME TO REMAIN-PAINT
010	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	3	HM	C6	B6		1 HR	
011	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	3	HM	C6	B6			
012	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	3	HM	C6	B6			
013	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	3	HM	C6	B6			
014	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	3	HM	C6	B6			
015	(2)	4' - 0"	7' - 0"	1 3/4"	FG	WD	1	HM	C6	B6		1 HR	
016	(1)	3' - 0"	7' - 0"	1 3/4"	G1	WD	3	HM	C6	B6			
017	(1)	3' - 0"	7' - 0"	1 3/4"	F	WD	7	HM	C6	B6		3/4 HR	
018	(1)	3' - 0"	7' - 0"	1 3/4"	F	WD	8	HM	C6	B6		1 HR	
019	(1)	3' - 0"	7' - 0"	1 3/4"	F	WD	9	HM	C6	B6		1 HR	

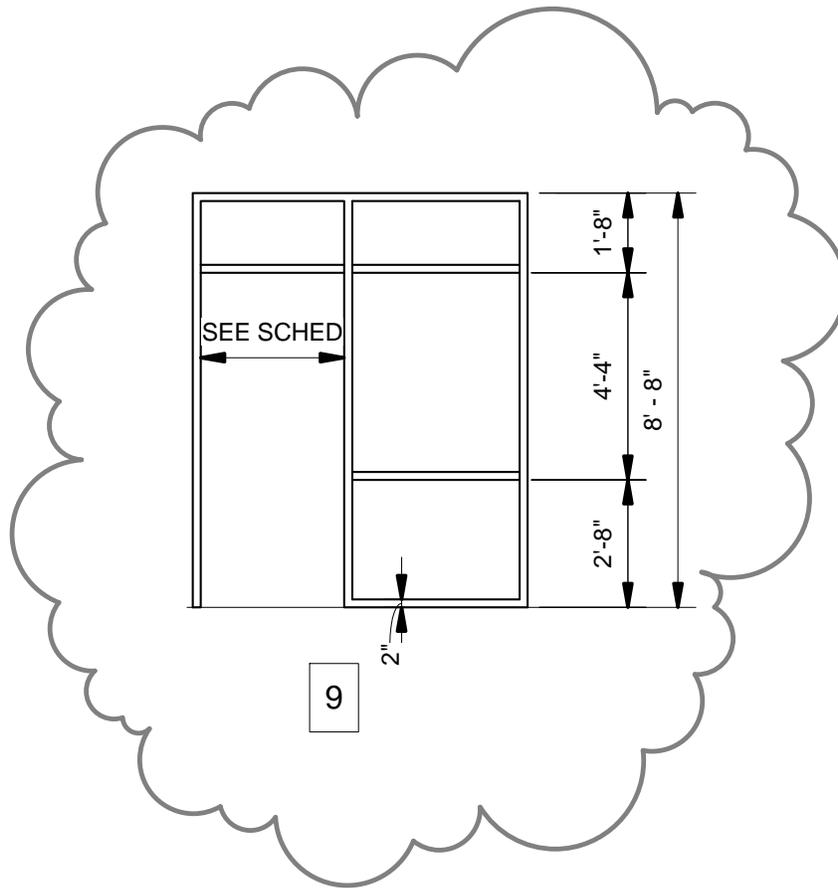
Date 05/02/2014

Scale NO SCALE

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REVISED DOOR  
SCHEDULE

SKA01

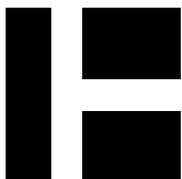


9

PARTIAL DETAIL D2/A60.1

Scale

1/4" = 1'-0"



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**SKA02**

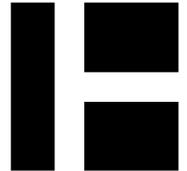
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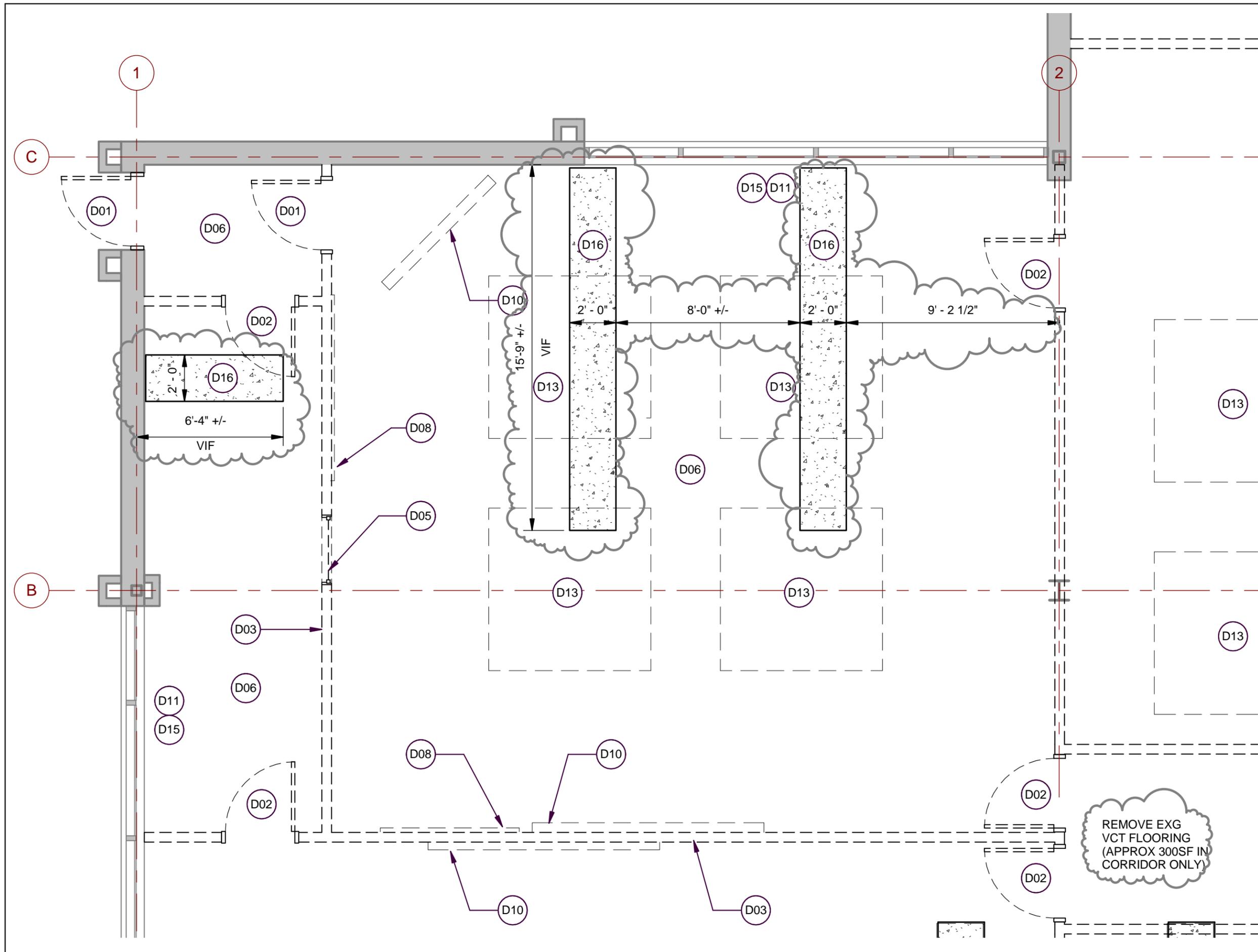
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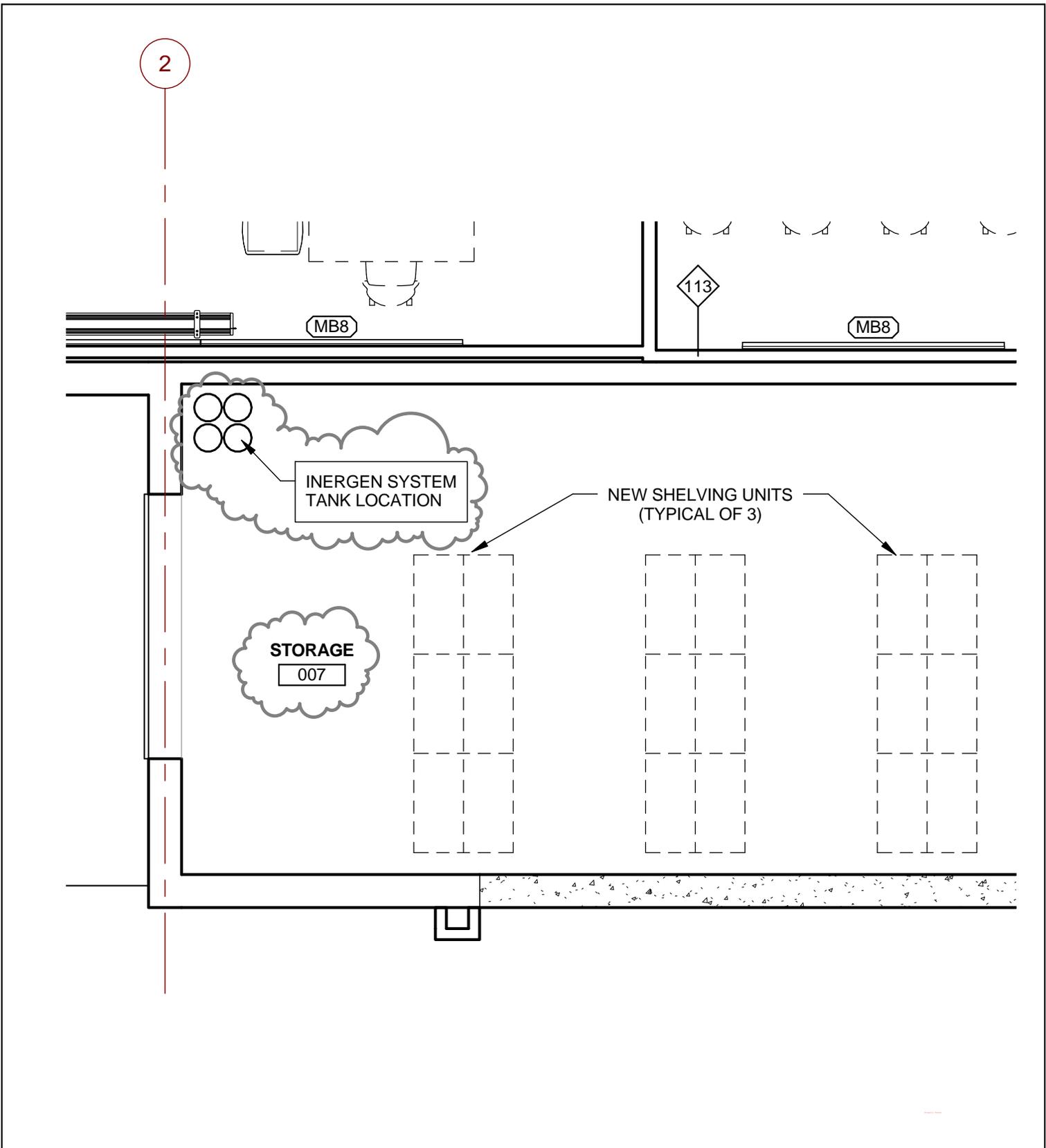


Date	05/02/14
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REVISED PARTIAL PLAN  
A1/A05.1

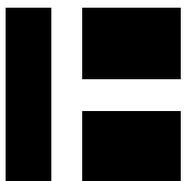
SKA03



REVISED PARTIAL PLAN A1/A10.1

Scale

1/4" = 1'-0"



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**SKA04**

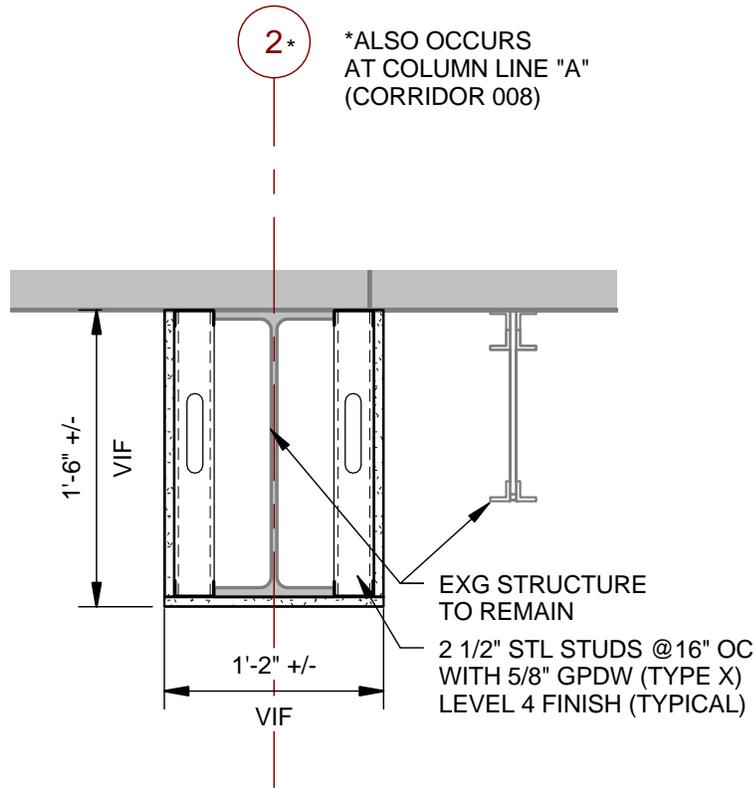
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**C2** **DETAIL AT CORRIDOR 008**

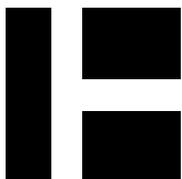
SCALE: 1" = 1'-0"

NOTE: GPDW ENCLOSURE TO SPAN WIDTH OF COORIDOR 008

NEW DETAIL (C2/A40.1)

Scale

1" = 1'-0"



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**SKA05**

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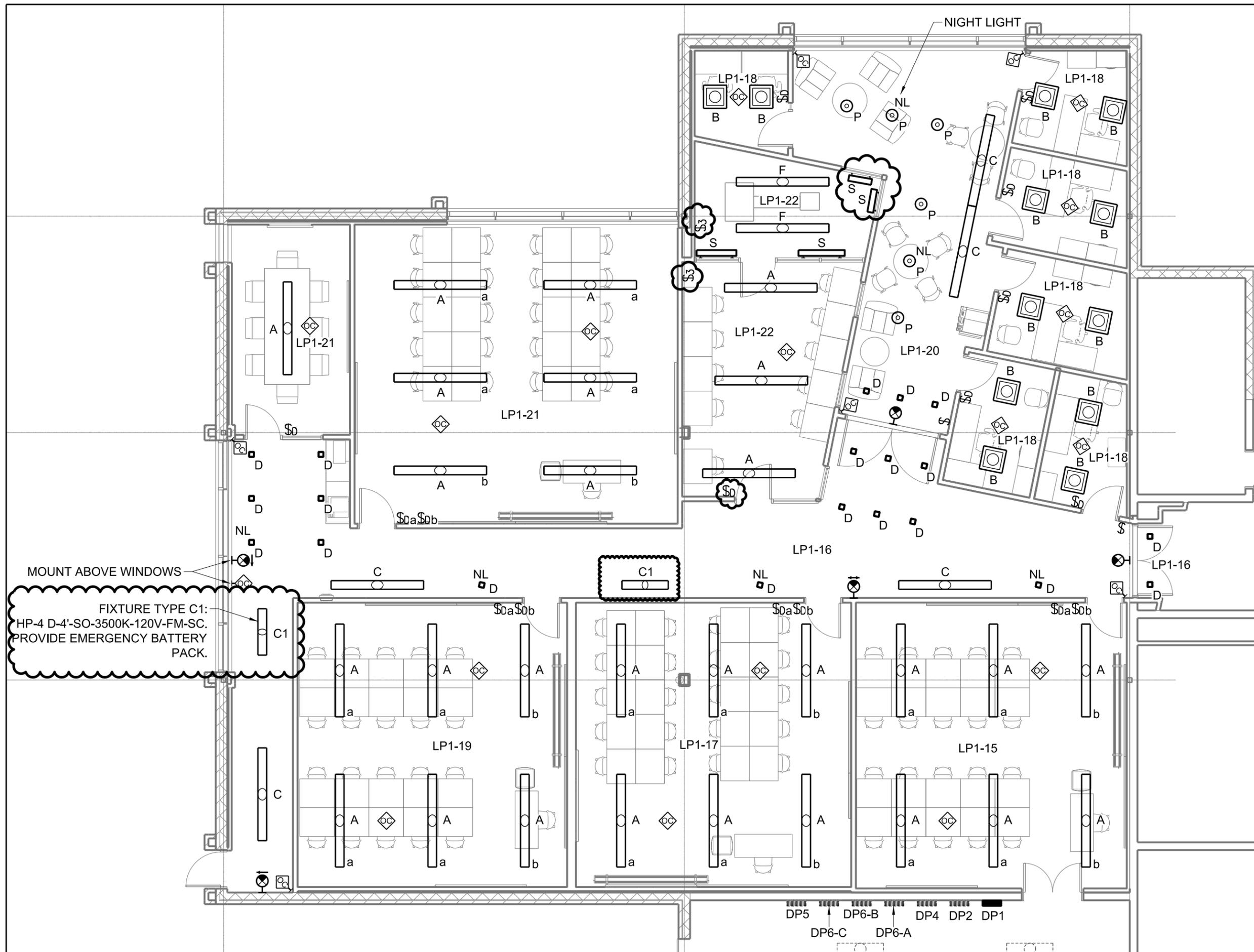
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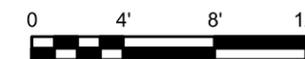
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Scale	1/8" = 1'-0"



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LIGHTING  
PLAN

SKA06