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DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 21 13

BOARD AND BLOCK INSULATION

02/16, CHG 2: 08/20

-- End of Section Table of Contents --

SECTION 07 21 13

BOARD AND BLOCK INSULATION
02/16, CHG 2: 08/20

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 90.1 - IP	(2019; Errata 1 2019; Errata 2-6 2020; Addenda BY-CP 2020; Addenda AF-DB 2020; Addenda A-G 2020; Addenda F-Y 2021; Errata 7-8 2021; Interpretation 1-4 2020; Interpretation 5-8 2021; Addenda AS-CB 2022) Energy Standard for Buildings Except Low-Rise Residential Buildings

ASTM INTERNATIONAL (ASTM)

ASTM C165	(2007; R 2017) Standard Test Method for Measuring Compressive Properties of Thermal Insulations
ASTM C272/C272M	(2016) Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions
ASTM C578	(2019) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C612	(2014; R 2019) Standard Specification for Mineral Fiber Block and Board Thermal Insulation
ASTM C930	(2019) Standard Classification of Potential Health and Safety Concerns Associated with Thermal Insulation Materials and Accessories
ASTM D1621	(2016) Standard Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM D3833/D3833M	(1996; R 2011) Water Vapor Transmission of Pressure-Sensitive Tapes
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials
ASTM E154/E154M	(2008a; R 2013; E 2013) Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2021) International Building Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 31	(2020) Standard for the Installation of Oil-Burning Equipment
NFPA 54	(2021) National Fuel Gas Code
NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 211	(2019) Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS	SCS Global Services (SCS) Indoor Advantage

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168	(2017) Adhesive and Sealant Applications

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134	Respiratory Protection

UNDERWRITERS LABORATORIES (UL)

UL 2818	(2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's Standard Details; G

Block or Board Insulation; G

Pressure Sensitive Tape; G

Protection Board or Coatings; G

Accessories including sealants; G

Recycled Content for Block or Board Insulation; S

SD-07 Certificates

Block or Board Insulation; G

Vapor Retarder; G

Protection Board or Coating; G

Draft Special Warranties; G

Final Special Warranties; G

Indoor Air Quality For Block Or Board Insulation; S

Indoor Air Quality for Adhesive; S

SD-08 Manufacturer's Instructions

Block or Board Insulation

Adhesive

1.3 MANUFACTURER'S DETAILS

Submit manufacturer's standard details indicating methods of attachment and spacing, transition and termination details, and installation details. Include verification of existing conditions.

1.4 PRODUCT DATA

Include data for material descriptions, recommendations for product shelf life, requirements for protection board or coatings, and precautions for flammability and toxicity. Include data to verify compatibility of sealants with insulation.

1.5 CERTIFICATIONS

1.5.1 Indoor Air Quality Certification

Submit required indoor air quality certifications in one submittal package.

Provide insulation installed within the interior of the building (inside of the weatherproofing system) certified to meet California Department of Public Health (CDPH) Standard Method, UL 2818 GREENGUARD Gold, SCS Global Services Indoor Advantage Gold. Submit product data for indoor air quality for block or board insulation.

Provide adhesive applied within the interior of the building (inside of the weatherproofing system) certified to meet California Department of Public Health (CDPH) Standard Method, UL 2818 GREENGUARD Gold, SCS Global Services Indoor Advantage Gold and VOC content requirements of

SCAQMD Rule 1168. Submit product data for indoor air quality for adhesive.

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Delivery

Deliver materials to the site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.6.2 Storage

Inspect materials delivered to the site for damage and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling. Keep materials wrapped and separated from off-gassing materials (such as drying paints and adhesives). Do not use materials that have visible moisture or biological growth. Comply with manufacturer's recommendations for handling, storage, and protection of materials before and during installation.

1.7 SAFETY PRECAUTIONS

1.7.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by the National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) and in accordance with 29 CFR 1910.134.

1.7.2 Other Safety Considerations

Comply with the safety requirements of ASTM C930.

1.8 SPECIAL WARRANTIES

1.8.1 Guarantee

Guarantee insulation installation against failure due to ultraviolet light exposure for a period of three years from the date of Beneficial Occupancy or Substantial Completion. Submit draft and final guarantees in accordance with Section01 78 23 OPERATION AND MAINTENANCE DATA.

1.8.2 Warranty

Provide manufacturer's material warranty for all system components for a period of three years from the date of Beneficial Occupancy or Substantial Completion. Submit draft and final warranties in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

PART 2 PRODUCTS

2.1 BLOCK OR BOARD INSULATION

Provide thermal insulating materials as recommended by manufacturer for

each type of application indicated. Provide insulation with the following physical properties and in accordance with the following standards:

a. Extruded Preformed Cellular Polystyrene: ASTM C578 REV A

b. Mineral Fiber Block and Board: ASTM C612

2.1.1 Thermal Resistance

Unless otherwise indicated, Roof R-30 c.i. Wall R-11.4 c.i. and R-10 c.i. and R-13, as indicated in accordance with ASHRAE 90.1 - IP for Climate Zone 5.

2.1.2 Fire Protection Requirements

a. Flame spread index of 75 or less when tested in accordance with ASTM E84.

b. Smoke developed index of 165 or less when tested in accordance with ASTM E84.

c. Provide insulated assemblies in accordance ICC IBC Chapter Fire and Smoke Protection Features.

2.1.3 Other Material Properties

Provide thermal insulating materials with the following properties:

a. Rigid cellular plastics: Compressive Resistance at Yield: Not less than 25 pounds per square inch (psi) when measured according to ASTM D1621.

b. Mineral fiber board: Compressive strength: Minimum load required to produce a reduction in thickness of 10 percent pounds per square foot (lbf/sf): 1000 when tested according to ASTM C165.

c. Water Vapor Permeance: Not more than 1.0 Perms or less when measured according to ASTM E96/E96M, desiccant method, in the thickness required to provide the specified thermal resistance, including facings, if any.

d. Water Absorption: Not more than 0.3 percent by total immersion, by volume, when measured according to ASTM C272/C272M.

[*Am-5][**Am-5]2.1.4 Recycled Materials

Provide thermal insulation containing recycled materials to the extent practicable, provided that the material meets all other requirements of this section. The minimum required recycled material contents (by weight, not volume) are:

Polyisocyanurate/Polyurethane:	9 percent
Phenolic Rigid Foam:	5 percent

Perlite Board:	75 percent post consumer paper

Provide data identifying percentage of recycled content for block or board insulation.

2.1.5 Indoor Air Quality

Provide certification of indoor air quality for block or board insulation and adhesive.

2.1.6 Prohibited Materials

Do not provide materials containing asbestos.

2.2 VAPOR RETARDER AND DAMPPROOFING

2.2.1 Dampproofing for Masonry Cavity Walls

Provide combined air barrier and vapor retarder system. Refer to Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEMS and as indicated on the drawings.

2.2.2 Vapor Retarder under Floor Slab

a. Water vapor permeance: 0.1 Perm or less when tested in accordance with ASTM E96/E96M.

b. Puncture resistance: Maximum load no less than 40 pounds when tested according to ASTM E154/E154M REV A.

2.3 PRESSURE SENSITIVE TAPE

As recommended by manufacturer of vapor retarder(s). Match water vapor permeance rating for each vapor retarder specified. Provide tape in accordance with ASTM D3833/D3833M.

2.4 PROTECTION BOARD OR COATING

As recommended by insulation manufacturer.

2.5 ACCESSORIES

2.5.1 Adhesive

As recommended by insulation manufacturer.

2.5.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Prior to installation, ensure all areas that are in contact with the

insulation are dry and free of projections that could cause voids, compressed insulation, or punctured vapor retarders. For foundation perimeter or under slab applications, check that subsurface fill is flat, smooth, dry, and well tamped. Do not proceed with installation if moisture or other conditions are present, and notify the Contracting Officer of such conditions. Do not proceed with the work until conditions have been corrected and verified to be dry.

3.2 PREPARATION

3.2.1 Blocking Around Heat Producing Devices

Provide noncombustible blocking at all spaces between heat producing devices and the floors, ceilings and roofs through which they pass. Provide in accordance with ICC IBC Section 2111.12 Fireplace Blocking and with the following clearances:

a. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless certified for installation surrounded by insulation: 3 inches from outside face of fixtures and devices or as required by NFPA 70 and, if insulation is placed above fixture or device, 24 inches above fixture.

b. Masonry chimneys or masonry enclosing a flue: 2 inches from outside face of masonry. Masonry chimneys for medium and high heat operating appliances: Minimum clearances required by NFPA 211.

c. Vents and vent connectors used for venting products of combustion, flues, and chimneys other than masonry chimneys: Minimum clearances as required by NFPA 211.

d. Gas Fired Appliances: Clearances as required in NFPA 54.

e. Oil Fired Appliances: Clearances as required in NFPA 31.

Blocking is not required if chimneys or flues are certified in writing by the chimney or flue manufacturer for use in contact with specific insulating materials.

3.3 INSTALLATION

3.3.1 Installation and Handling

Provide insulation in accordance with the manufacturer's printed installation instructions. Keep material dry and free of extraneous materials.

3.3.2 Electrical Wiring

Do not install insulation in a manner that would enclose electrical wiring between two layers of insulation.

3.3.3 Cold Climate Requirement

Place insulation on the outside of pipes.

3.3.4 Continuity of Insulation

Butt tightly against adjoining boards, studs, rafters, joists, sill

plates, headers and obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joint, roof, and floor. Avoid creating thermal bridges and voids. Provide and verify continuity of insulative barrier throughout the building enclosure.

3.3.5 Coordination

Verify final installed insulation thicknesses comply with thicknesses indicated, R-values specified herein, and with the approved insulation submittal(s).

3.4 INSTALLATION ON WALLS

3.4.1 Installation using Furring Strips

Install insulation between members as recommended by insulation manufacturer.

3.4.2 Installation on Masonry Walls

Apply board directly to masonry with adhesive or fasteners as recommended by the insulation manufacturer. Fit between obstructions without impaling board on ties or anchors. Apply in parallel courses with joints breaking midway over course below. Place boards in moderate contact with adjoining insulation without forcing and without gaps. Cut and shape as required to fit around wall penetrations, projections or openings to accommodate conduit or other utilities. Seal around cutouts with sealant. Install insulation in wall cavities so that it leaves at least a nominal 1 inch air space outside of the insulation to allow for cavity drainage.

3.4.3 Adhesive Attachment to Concrete and Masonry Walls

Apply adhesive to wall and completely cover wall with insulation.

a. As recommended by the insulation manufacturer.

3.4.4 Mechanical Attachment on Concrete and Masonry Walls

Cut insulation to cover walls. Apply adhesive to wall and set clip or other mechanical fastener in adhesive as recommended by manufacturer. After curing of adhesive, install insulation over fasteners and bend split prongs to provide a flush condition with the insulation. Butt all edges of insulation and seal with tape.

3.4.5 Protection Board or Coating

Install protection board or coating in accordance with manufacturer's printed instructions. Install protection over all exterior exposed insulation and to 1 foot below grade.

3.5 INSTALLATION ON UNDERSIDE OF CONCRETE FLOOR SLAB

3.5.1 Mechanically Fastened Systems

Size insulation to cover underside of slab. Apply adhesive to slab and set fasteners in adhesive as recommended by manufacturer. After curing of adhesive, install insulation over fasteners and bend split prongs to provide a flush condition with the insulation. Butt all edges of insulation and seal with tape.

3.5.2 Adhesively Bonded Systems

Apply adhesive to underside of slab and completely cover wall with insulation.

a. As recommended by insulation manufacturer.

3.6 PERIMETER INSULATION

Install perimeter thermal insulation where heated spaces are adjacent to exterior walls, slab edges in slab-on-grade, or floating slab construction.

3.6.1 Manufacturer's Instructions

Layout insulation, tape edges, provide vapor retarder and other required accessories to protection against vermin, insects, and damage in accordance with manufacturer's printed instructions.

3.6.2 Insulation on Vertical Surfaces

Provide thermal insulation on exterior of foundation walls on grade beams below grade and on edges of slabs-on-grade. Fasten insulation with adhesive or mechanical fasteners.

3.6.3 Protection of Insulation

Protect insulation from damage during construction and back filling by application of protection board or a coating. Do not leave installed vertical insulation unprotected overnight. Protect installed insulation from weather, including rain and ultraviolet light, from mechanical abuse, compression, and dislocation. Install protection over entire exposed exterior insulation board. Extend protection at least 1 foot below grade.

3.7 VAPOR RETARDER

Apply vapor retarder continuous across all surfaces. Overlap all joints at least 6 inches and seal with pressure sensitive tape. Seal at sills, header, windows, doors and utility penetrations. Repair punctures or tears with pressure sensitive tape.

3.8 ACCESS PANELS AND DOORS

Attach insulation to all access panels greater than 1 square foot and all access doors in insulated floors and ceilings. Use insulation with same R-Value as that for the floor or ceiling in which each panel occurs.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 21 16

MINERAL FIBER BLANKET INSULATION

11/11, CHG 4: 08/18

-- End of Section Table of Contents --

SECTION 07 21 16

MINERAL FIBER BLANKET INSULATION
11/11, CHG 4: 08/18

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C665	(2017) Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM C930	(2019) Standard Classification of Potential Health and Safety Concerns Associated with Thermal Insulation Materials and Accessories
ASTM D5359	(2015) Standard Specification for Glass Cullet Recovered from Waste for Use in Manufacture of Glass Fiber
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E136	(2019a) Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350	(2010; Version 1.1) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

GREEN SEAL (GS)

GS-36	(2013) Adhesives for Commercial Use

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 31	(2020) Standard for the Installation of Oil-Burning Equipment
NFPA 54	(2021) National Fuel Gas Code
NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4)

National Electrical Code

NFPA 211 (2019) Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS SCS Global Services (SCS) Indoor Advantage

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134 Respiratory Protection

UNDERWRITERS LABORATORIES (UL)

UL 2818 (2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Blanket Insulation

Recycled Content for Insulation Materials; S

Vapor Retarder

Pressure Sensitive Tape

Accessories

SD-07 Certificates

Indoor Air Quality for Insulation Materials; S

Indoor Air Quality for Adhesives; S

SD-08 Manufacturer's Instructions

Insulation

1.3 CERTIFICATIONS

Submit required indoor air quality certifications and validations in one submittal package.

1.3.1 Insulation Products

Provide product certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification by other third-party programs. Provide current product certification from certification body.

1.3.2 Adhesives and Sealants

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party programs that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver materials to site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.4.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.

1.5 SAFETY PRECAUTIONS

1.5.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) in accordance with 29 CFR 1910.134.

1.5.2 Other Safety Concerns

Consider other safety concerns and measures as outlined in ASTM C930.

PART 2 PRODUCTS

2.1 BLANKET INSULATION

ASTM C665, Type I, blankets without membrane coverings, except a flame spread rating of 25 or less and a smoke developed rating of 150 or less when tested in accordance with ASTM E84.

2.1.1 Thermal Resistance Value (R-VALUE)

The R-Value must be as indicated on drawings.

2.1.2 Recycled Materials

Provide insulation materials containing the following minimum percentage of recycled material content by weight:

Fiberglass: 20 percent glass cullet complying with ASTM D5359

Provide data identifying percentage of recycled content for insulation materials.

2.1.3 Prohibited Materials

Do not provide asbestos-containing materials.

2.1.4 Reduced Volatile Organic Compounds (VOC) for Insulation Materials

Provide certification of indoor air quality for insulation materials.

[*Am-5][**Am-5]2.2 BLOCKING

Wood, metal, unfaced mineral fiber blankets in accordance with ASTM C665, Type I, or other approved materials. Use only non-combustible materials meeting the requirements of ASTM E136 for blocking around chimneys and heat producing devices.

2.3 ACCESSORIES

2.3.1 Adhesive

As recommended by the insulation manufacturer. Provide non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) that meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide aerosol adhesives used on the interior of the building that meet either emissions requirements of CDPH SECTION 01350 (use the office or classroom requirements, regardless of space type) or VOC content requirements of GS-36. Provide certification or validation of indoor air quality for adhesives.

2.3.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

2.3.3 Wire Mesh

Corrosion resistant and as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Before installing insulation, ensure that areas that will be in contact with the insulation are dry and free of projections which could cause

voids, compressed insulation, or punctured vapor retarders. If moisture or other conditions are found that do not allow the workmanlike installation of the insulation, do not proceed but notify Contracting Officer of such conditions.

3.2 PREPARATION

3.2.1 Blocking at Attic Vents and Access Doors

Prior to installation of insulation, install permanent blocking to prevent insulation from slipping over, clogging, or restricting air flow through soffit vents at eaves. Install permanent blocking around attic trap doors. Install permanent blocking to maintain accessibility to equipment or controls that require maintenance or adjustment.

3.2.2 Blocking Around Heat Producing Devices

Install non-combustible blocking around heat producing devices to provide the following clearances:

a. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless these are certified by the manufacturer for installation surrounded by insulation: 3 inches from outside face of fixtures and devices or as required by NFPA 70 and, if insulation is to be placed above fixture or device, 24 inches above fixture.

b. Masonry chimneys or masonry enclosing a flue: 2 inches from outside face of masonry. Masonry chimneys for medium and high heat operating appliances: Minimum clearances required by NFPA 211.

c. Vents and vent connectors used for venting the products of combustion, flues, and chimneys other than masonry chimneys: Minimum clearances as required by NFPA 211.

d. Gas Fired Appliances: Clearances as required in NFPA 54.

e. Oil Fired Appliances: Clearances as required in NFPA 31.

Blocking around flues and chimneys is not required when insulation blanket, including any attached vapor retarder, passed ASTM E136, in addition to meeting all other requirements stipulated in Part 2. Blocking is also not required if the chimneys are certified by the manufacturer for use in contact with insulating materials.

3.3 INSTALLATION

3.3.1 Insulation

Install and handle insulation in accordance with manufacturer's instructions. Keep material dry and free of extraneous materials. Any materials that show visual evidence of biological growth due to presence of moisture must not be installed on the building project. Ensure personal protective clothing and respiratory equipment is used as required. Observe safe work practices.

3.3.1.1 Electrical wiring

Do not install insulation in a manner that would sandwich electrical

wiring between two layers of insulation.

3.3.1.2 Continuity of Insulation

Install blanket insulation to butt tightly against adjoining blankets and to studs, rafters, joists, sill plates, headers and any obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joints, roof, and floor. Avoid creating thermal bridges.

3.3.1.3 Installation at Bridging and Cross Bracing

Insulate at bridging and cross bracing by splitting blanket vertically at center and packing one half into each opening. Butt insulation at bridging and cross bracing; fill in bridged area with loose or scrap insulation.

3.3.1.4 Cold Climate Requirement

Place insulation to the outside of pipes.

3.3.1.5 Sizing of Blankets

Provide only full width blankets when insulating between trusses, joists, or studs. Size width of blankets for a snug fit where trusses, joists or studs are irregularly spaced.

3.3.1.6 Special Requirements for Floors

Hold insulation in place with corrosion resistant wire mesh, wire fasteners, or wire lacing.

3.3.1.7 Access Panels and Doors

Affix blanket insulation to access panels greater than one square foot and access doors in insulated floors and ceilings. Use insulation with same R-Value as that for floor or ceiling.

3.3.2 Installation of Separate Vapor Retarder

Apply continuous vapor retarder as indicated. Overlap joints at least 6 inches and seal with pressure sensitive tape. Seal at sill, header, windows, doors and utility penetrations. Repair punctures or tears with pressure sensitive tape.

-- End of Section --

GENERAL NOTES

APPLICABLE CODES/STANDARDS:
- FC 3-600-01 MPO FIRE PROTECTION ENGINEERING FOR FACILITIES - MPO (2020)
- TSFPEWG 3-600-01.01 AIR FORCE FIRE PROTECTION CRITERIA AND TECHNICAL GUIDANCE FOR MISSION CONTINUITY OF ELECTRONIC, INFORMATION TECHNOLOGY, AND TELECOMMUNICATION EQUIPMENT INSTALLATION (25 FEBRUARY 2021, WITH CHANGE 1 , 21 APRIL 2021) (MISSION ASSURANCE CATEGORY III (MAC III))
- INTERNATIONAL BUILDING CODE (2018 EDITION)
- NFPA 1, FIRE CODE (2021 EDITION)
- NFPA 10, STANDARD FOR PORTABLE FIRE EXTINGUISHERS (2022 EDITION)
- NFPA 13, STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS (2022 EDITION)
- NFPA 24, STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES (2022 EDITION)
- NFPA 70, NATIONAL ELECTRICAL CODE (2020 EDITION)
- NFPA 72, NATIONAL FIRE ALARM AND SIGNALING CODE (2022 EDITION)
- NFPA 75, STANDARD FOR THE FIRE PROTECTION OF INFORMATION TECHNOLOGY EQUIPMENT (2020 EDITION)
- NFPA 101, LIFE SAFETY CODE (2021 EDITION)
- UFC 1-200-01, GENERAL BUILDING REQUIREMENTS (CHANGE 1, OCTOBER 2020)
- UFC 4-021-01, DESIGN AND O&M: MASS NOTIFICATION SYSTEMS (JANUARY 2016)
- UFC 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES (8 AUGUST 2016, WITH CHANGE 5, 24 SEPTEMBER 2020)

CONSTRUCTION TYPE: II-B (602)

OCCUPANCY: NON-SEPARATED MIXED-USE (508.3)
ASSEMBLY (A-3) (303.4)
BUSINESS (B) (304.1)
STORAGE (S-2) (311.3)

SPRINKLERED: YES

FIRE ALARM: YES

ALLOWABLE HEIGHT: 3 STORIES / 75 FT (504.2)

ACTUAL HEIGHT: 2 STORIES/ 36 FT 4 INCHES

ALLOWABLE AREA:
A-3 38,000 SQFT (506.2)
B 92,000 SQFT (506.2)
S-2 104,000 SQFT (506.2)

ACTUAL AREA: 14,961 SQFT (FIRST FLOOR)
16,243 SQFT (FIRST FLOOR BID OPTION 1)
14,770 SQFT (SECOND FLOOR)
16,052 SQFT (SECOND FLOOR BID OPTION 1)

REQUIRED FIRE RESISTANCE RATINGS:

BUILDING ELEMENT	FIRE RESISTANCE RATING
STRUCTURAL FRAME	0 HOUR
BEARING WALLS	
EXTERIOR	0 HOUR
INTERIOR	0 HOUR
NONBEARING WALLS/ PARTITIONS	
EXTERIOR	0 HOUR
INTERIOR	0 HOUR
FLOOR CONSTRUCTION	0 HOUR
ROOF CONSTRUCTION	0 HOUR

EGRESS REQUIREMENTS: BASED ON NFPA 101 PER UFC 3-600-01 2-1.1 MEANS OF EGRESS REQUIREMENTS ARE BASED ON ASSEMBLY OCCUPANCY DUE TO NON-SEPARATED MIXED USE PROVISIONS EXCEPT WHERE A COMMON PATH OF TRAVEL EXISTS COMPLETELY WITHIN A BUSINESS ASSEMBLY.

MINIMUM NUMBER OF EXITS: 2

MAXIMUM TRAVEL DISTANCE: 250 FEET (ASSEMBLY)
300 FEET (BUSINESS)
200 FEET (CLASSROOM)

MAXIMUM DEAD-END: 20 FEET (ASSEMBLY)
50 FEET (BUSINESS)
20 FEET (CLASSROOM)

MAXIMUM COMMON PATH: 75/20 FEET (ASSEMBLY)
100 FEET (BUSINESS)
100 FEET (CLASSROOM)

MINIMUM EGRESS WIDTH
DOORS: 32 INCHES
STAIRS: 44 INCHES

AREA OF REFUGE REQUIREMENTS: PROVIDE SIGNAGE AND TWO WAY COMMUNICATIONS, AND SIZING IN ACCORDANCE WITH NFPA 101.

LEGEND

A. USE (OCCUPANT LOAD FACTOR IN SQFT/PERSON)

5

XX BUSINESS (150 GROSS)

XX ASSEMBLY (15 NET)

XX ACCESSORY/STORAGE (500 GROSS)

XX CLASSROOMS (20 GROSS)

XX VOCATIONAL ROOMS (50 GROSS)

B. FIRE RESISTANCE RATING

1 HOUR FIRE RESISTANCE (BARRIER)

2 HOUR FIRE RESISTANCE (BARRIER)

C. TRAVEL DISTANCE (MEASURED IN FEET)

TD = XX

D. COMMON PATH (MEASURED IN FEET)

CP = XX

E. DEAD END CORRIDOR (MEASURED IN FEET)

DE = XX

F EGRESS CAPACITY

W / X / Y / Z

W = EXIT CAPACITY FACTOR (IN/PERSON)
X = OCCUPANTS USING EXIT (PERSONS)
Y = EXIT CAPACITY (PERSONS)
Z = EXIT CLEAR WIDTH (IN)

G. FIRE EXTINGUISHER

FE 4A:80BC: DRY-CHEMICAL FIRE EXTINGUISHER IN SEMI-RECESSED CABINET

FE CO_2 2A:C CO_2 FIRE EXTINGUISHER

H. ROOM NAME WITH ACTUAL LOAD BASED ON SEATS IN BUSINESS AREAS

##P = NUMBER OF PEOPLE BASED ON SEAT COUNT

ROOM NAME ##P
XXX

COMMONWEALTH OF VIRGINIA
JAMES ALBERT BEALS
Lic. No. 0402 26777
12/14/2022
PROFESSIONAL ENGINEER

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

DESIGNED BY: J. BEALS
DRAWN BY: S. FLERI
CHECKED BY: M. CONNOLLY
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

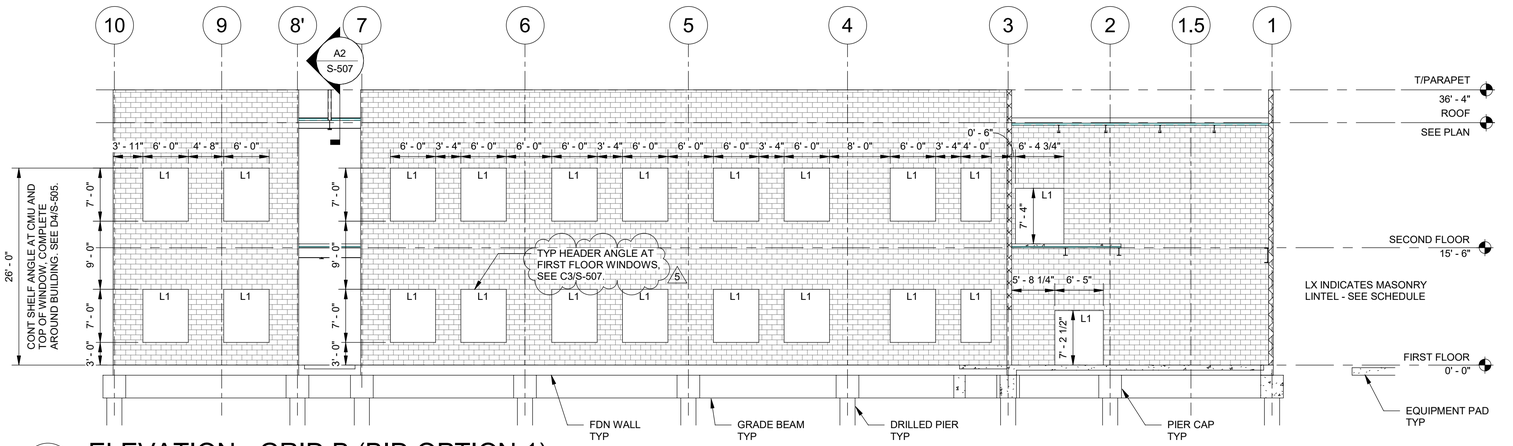
JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

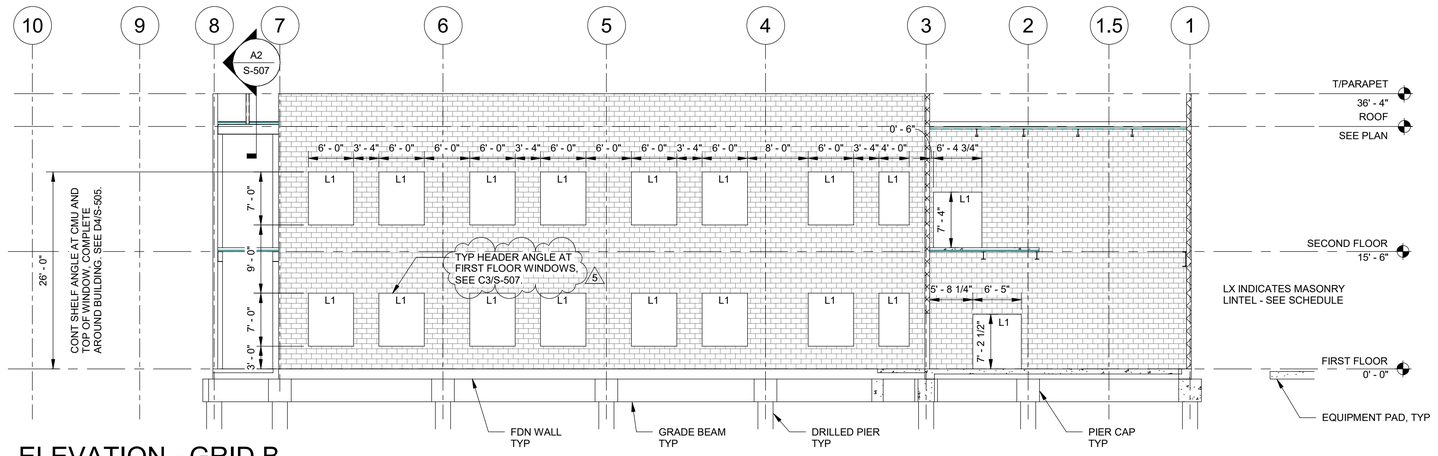
LIFE SAFETY - BUILDING CODE ANALYSIS

SHEET ID

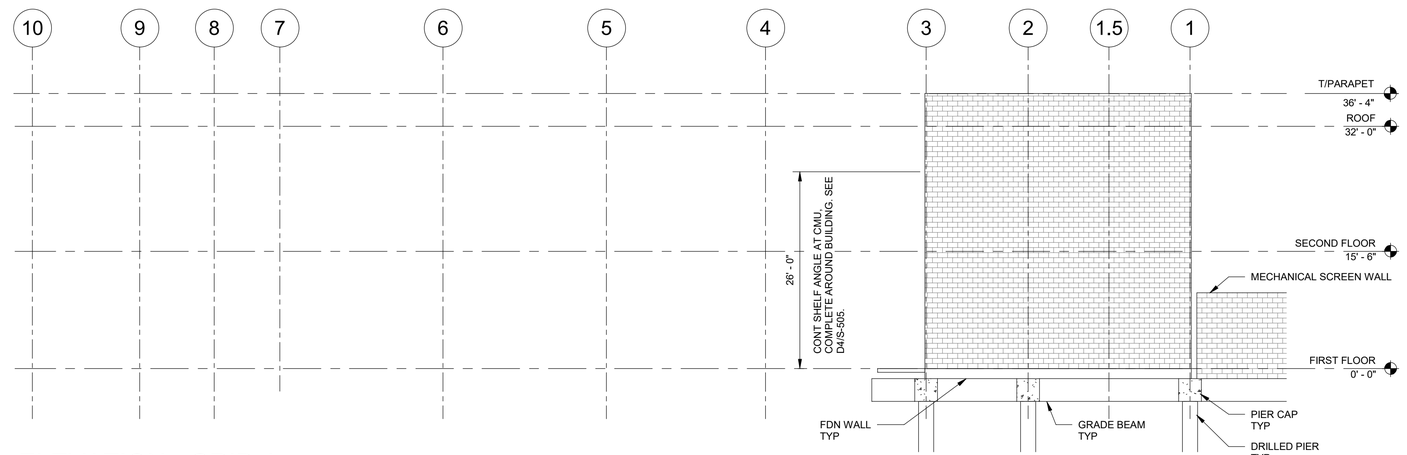
LS001



C1 ELEVATION - GRID B (BID OPTION 1)
1" = 10'-0"



B1 ELEVATION - GRID B
1" = 10'-0"



A1 ELEVATION - GRID A
1" = 10'-0"

US Army Corps of Engineers ®

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

DESIGNED BY:	J. PAQUETTE
DRAWN BY:	J. PAQUETTE
CHECKED BY:	A. POZOLO
SUBMITTED BY:	
SIZE: ANSI 'D'	FILE NAME:
ISSUE DATE:	14 DECEMBER 2022
SOLICITATION NO.:	W9128F23R0006
CONTRACT NO.:	
FILE NUMBER:	

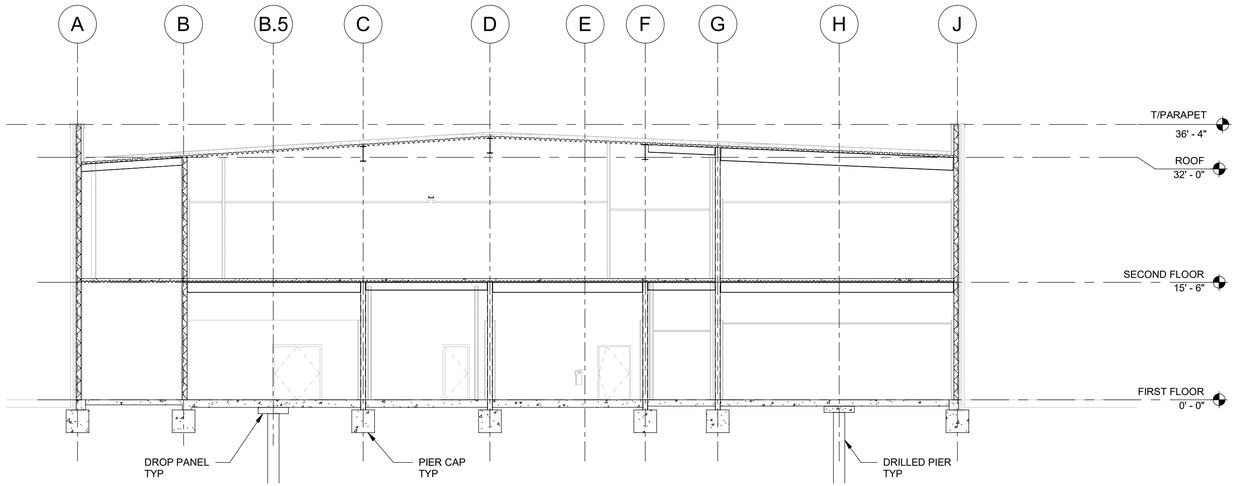
DESIGN OF: JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

STRUCTURAL - ELEVATIONS

SHEET ID

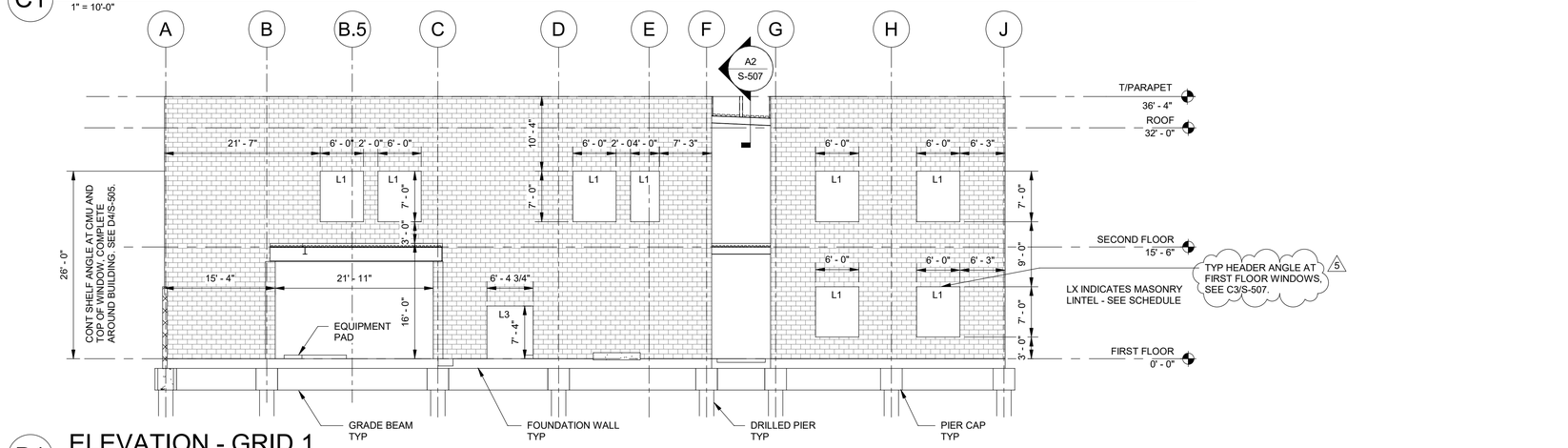
S-201

COMMONWEALTH OF VIRGINIA
MATTHEW T. BRETTHAUER
Lic. No. 60478
PROFESSIONAL ENGINEER
12/14/22



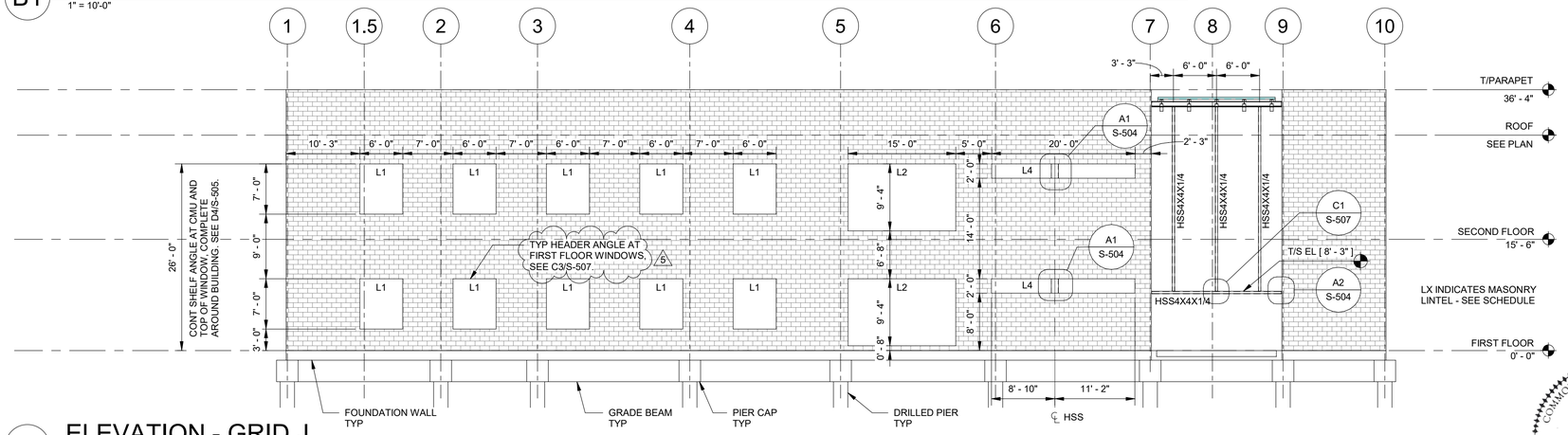
C1 ELEVATION - GRID 2

1" = 10'-0"



B1 ELEVATION - GRID 1

1" = 10'-0"



A1 ELEVATION - GRID J

1" = 10'-0"

COMMONWEALTH OF VIRGINIA
MATTHEW T. BRETTHAUER
Lic. No. 60478
12/14/22
PROFESSIONAL ENGINEER

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
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CONTRACT NO.:
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DESIGNED BY: J. PAQUETTE
DRAWN BY: J. PAQUETTE
CHECKED BY: A. POZOLO
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

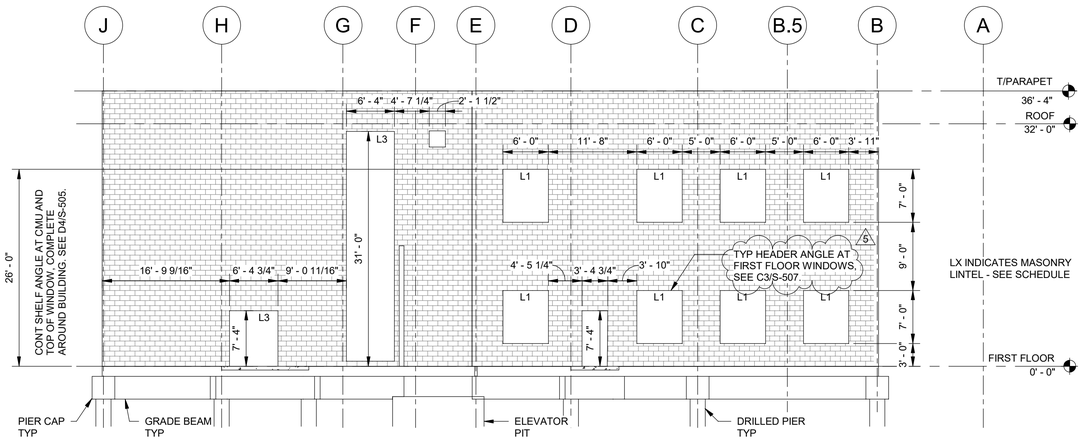
JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

STRUCTURAL - ELEVATIONS

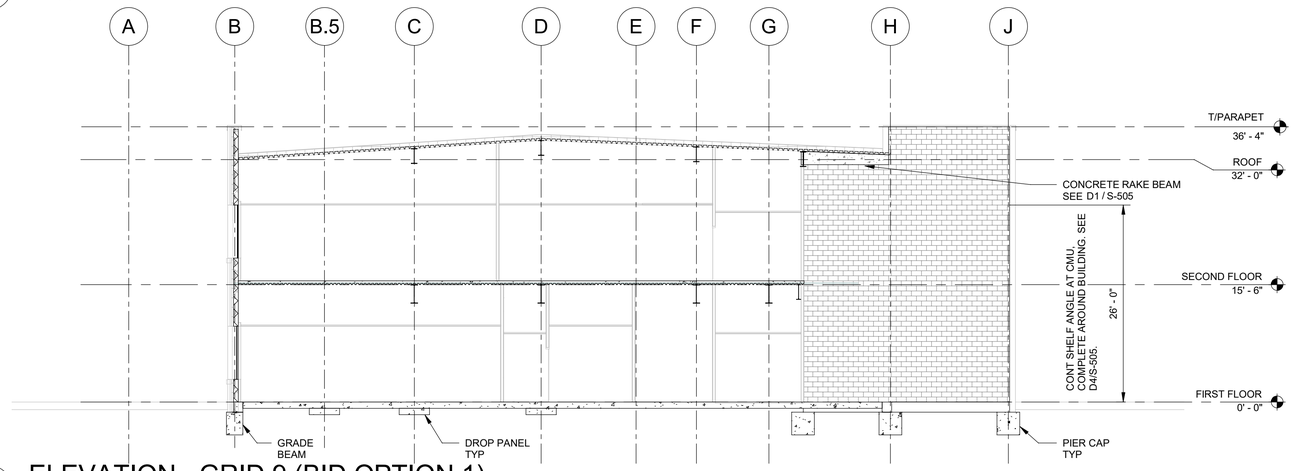
SHEET ID

S-205



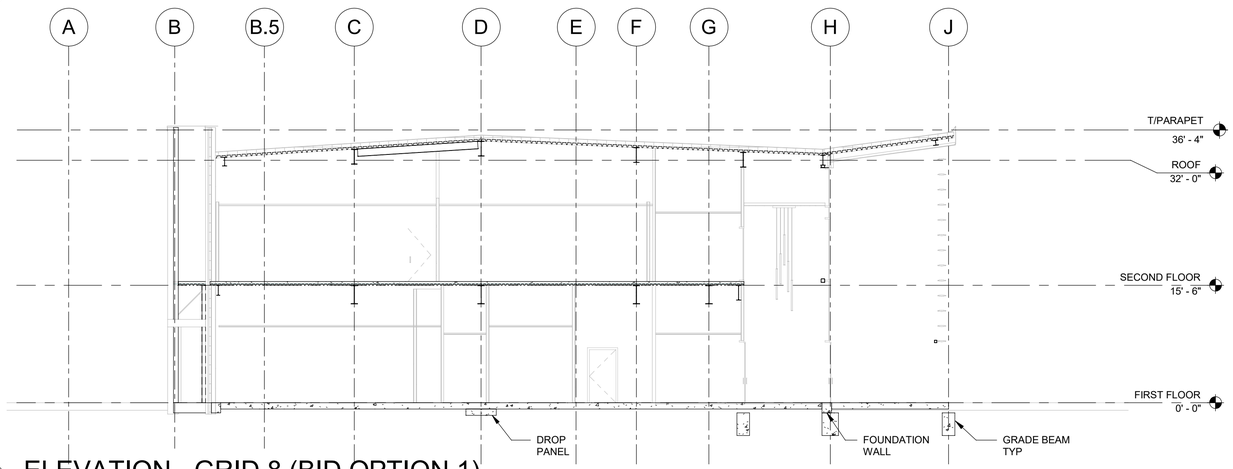
C1 ELEVATION - GRID 10 (BID OPTION 1)

1" = 10'-0"



B1 ELEVATION - GRID 9 (BID OPTION 1)

1" = 10'-0"



A1 ELEVATION - GRID 8 (BID OPTION 1)

1" = 10'-0"

US Army Corps of Engineers ®

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DESIGNED BY: J. PAQUETTE
DRAWN BY: J. PAQUETTE
CHECKED BY: A. POZOLO
SUBMITTED BY:
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128P23R0008
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US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

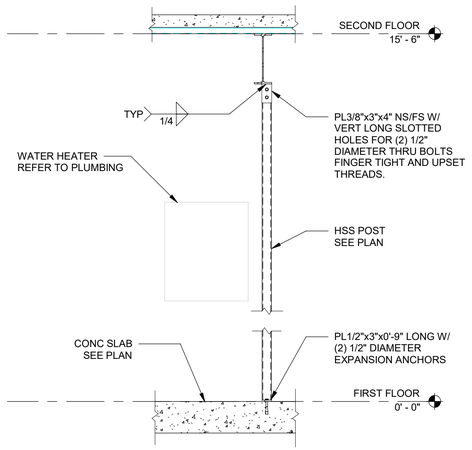
JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

STRUCTURAL - ELEVATIONS

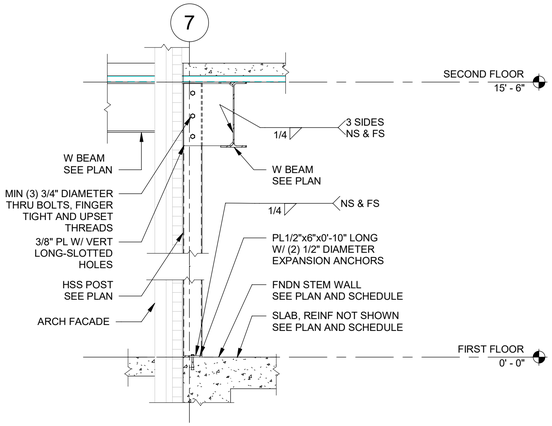
SHEET ID

S-209



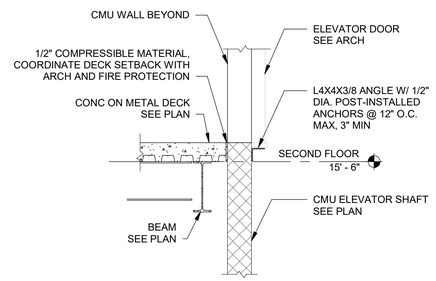
C1 WALL MOUNTED WATER HEATER SUPPORT POST

1/2" = 1'-0"



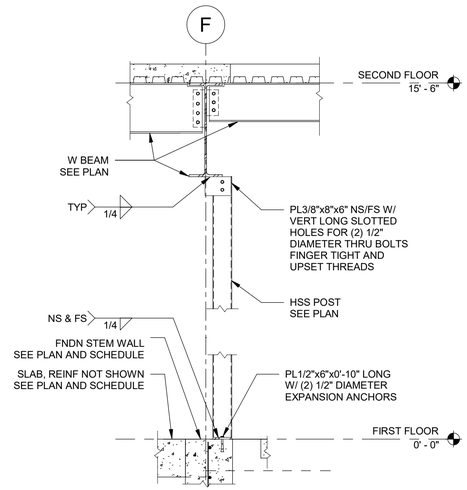
C3 ENTRANCE CANOPY SUPPORT

1/2" = 1'-0"



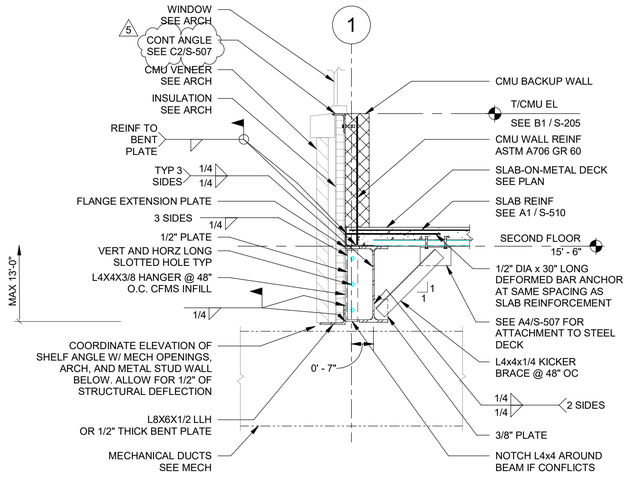
C4 ELEVATOR DOOR SUPPORT

1/2" = 1'-0"



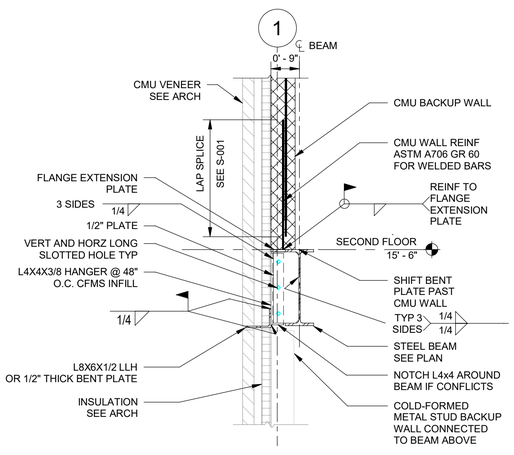
B1 ENTRANCE CANOPY SUPPORT

1/2" = 1'-0"



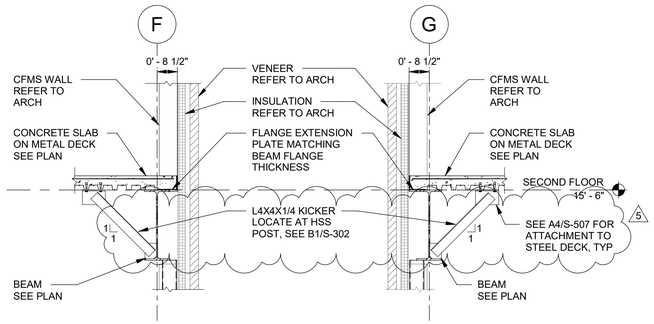
B3 SHELF ANGLE SECTION

1/2" = 1'-0"



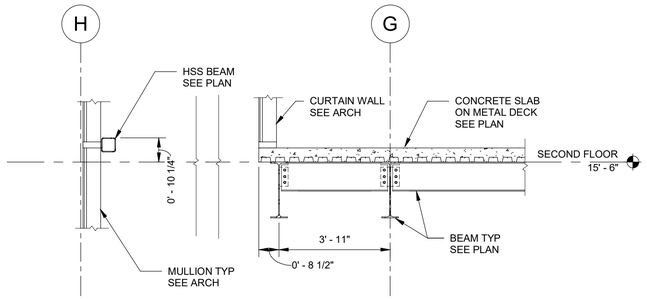
B4 SHELF ANGLE SECTION

1/2" = 1'-0"



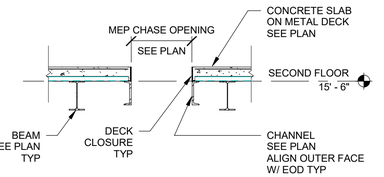
A1 WEST ENTRANCE

3/8" = 1'-0"



A3 SOUTH ENTRANCE

3/8" = 1'-0"



A4 MEP CHASE OPENING FRAMING SECTION

3/8" = 1'-0"

COMMONWEALTH OF VIRGINIA
MATTHEW T. BRETTHAUER
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PROFESSIONAL ENGINEER
12/14/22

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JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SPB, CO

STRUCTURAL - SECTIONS - SECOND FLOOR

SHEET ID
S-302

5

CONCRETE FOUNDATION WALL SCHEDULE						
MARK	THICKNESS (IN)	REINF "A"	REINF "B"	REINF "C"	REINF "D"	REMARKS
CW8	8	#4@12"	#4@12"	-	-	-
CW15	15	#4@12"	#4@12"	#4@12"	#4@12"	-
CW18	18	#6@12"	#4@12"	#5@12"	#4@12"	-
CW20	20	#5@12"	#4@12"	#5@12"	#4@12"	-

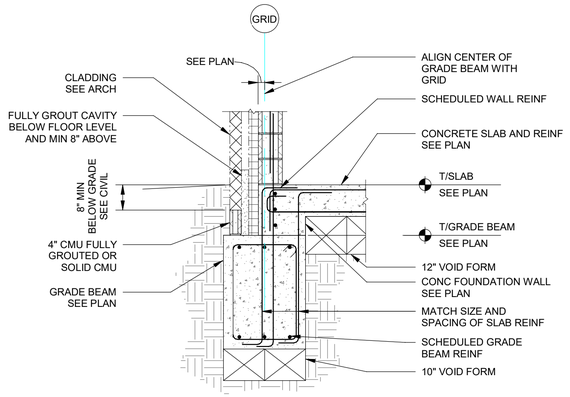
D1 FOUNDATION WALL SCHEDULE
NTS

PIER CAP SCHEDULE				
MARK	LENGTH	WIDTH	THICKNESS	REINFORCEMENT
PC30	2'-6"	2'-6"	3'-0"	(3) #5 T&B
PC36	3'-0"	3'-0"	3'-0"	(4) #5 T&B
PC42	3'-6"	3'-6"	3'-0"	(5) #5 T&B

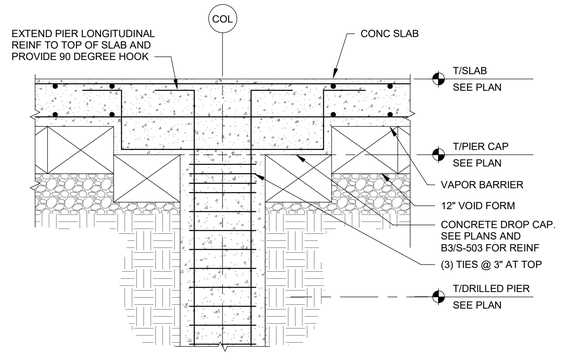
D3 PIER CAP SCHEDULE
NTS

DRILLED PIER SCHEDULE				
MARK	DIAMETER	VERT REINF	TIES	REMARKS
DP18	1'-6"	6#7	#3@6" TOP 15', #3@12 R	VERT REINF FULL LENGTH OF PIER
DP24	2'-0"	8#8	#3@6" TOP 15', #3@12 R	VERT REINF FULL LENGTH OF PIER

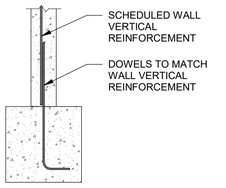
D4 DRILLED PIER SCHEDULE
NTS



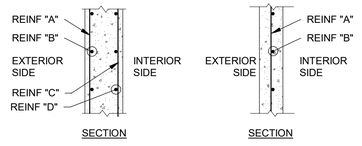
C1 SLAB CONNECTION TO FOUNDATION WALL AND GRADE BEAM
NTS



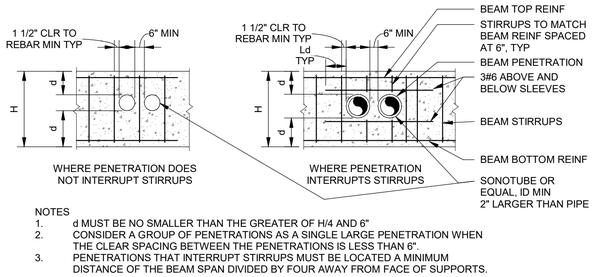
C3 SLAB AT DRILLED PIER
NTS



B1 CONCRETE WALL BEARING ON FOUNDATION
NTS

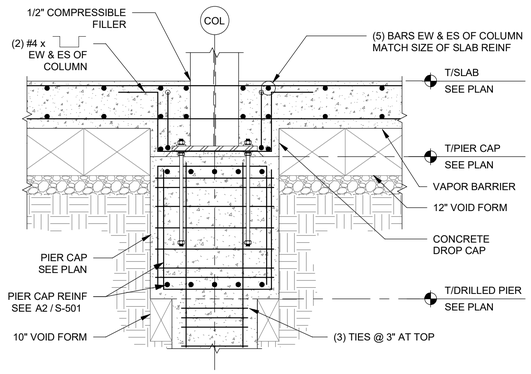


B2 FOUNDATION WALL REINFORCEMENT
NTS

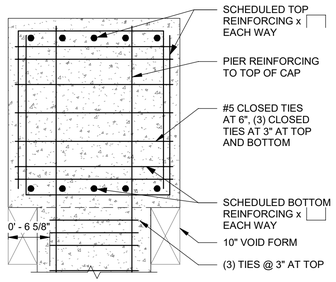


NOTES
1. d MUST BE NO SMALLER THAN THE GREATER OF H/4 AND 6"
2. CONSIDER A GROUP OF PENETRATIONS AS A SINGLE LARGE PENETRATION WHEN THE CLEAR SPACING BETWEEN THE PENETRATIONS IS LESS THAN 6".
3. PENETRATIONS THAT INTERRUPT STIRRUPS MUST BE LOCATED A MINIMUM DISTANCE OF THE BEAM SPAN DIVIDED BY FOUR AWAY FROM FACE OF SUPPORTS.

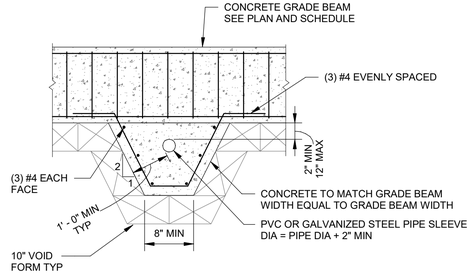
B3 GRADE BEAM PENETRATION
1/2" = 1'-0"



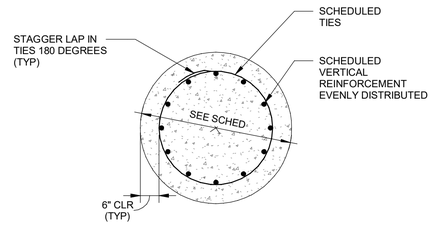
A1 PIER CAP & SLAB CONNECTION
3/4" = 1'-0"



A2 PIER CAP ELEVATION
NTS



A3 PIPE SLEEVE UNDERNEATH BEAM
1/2" = 1'-0"



A4 DRILLED PIER SECTION
NTS

COMMONWEALTH OF VIRGINIA
MATTHEW T. BRETTHAUER
Lic. No. 60478
PROFESSIONAL ENGINEER
12/14/22

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

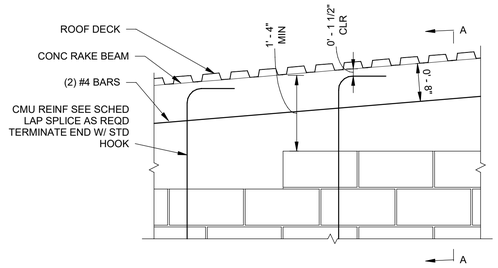
JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

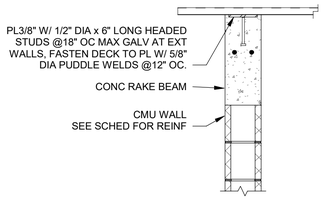
DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

STRUCTURAL - TYPICAL DETAILS - FOUNDATION

SHEET ID
S-501

AMENDMENT 0005





SECTION A-A

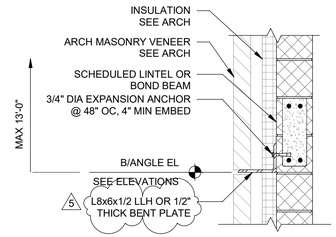
D1 CONCRETE RAKE BEAM

NTS

MASONRY LINTEL SCHEDULE					
MARK	DEPTH (IN)	TOP REINF	BOT REINF	STIRRUPS	REMARKS
L1	24	--	(2) #5	#4@16" OC	--
L2	48	--	(2) #6	#4@16" OC	--
L3	16	--	(1) #5	--	--
L4	48	(2) #5	(2) #5	#4@16" OC	--

D3 MASONRY LINTEL SCHEDULE

NTS



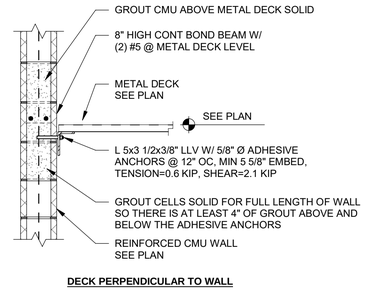
D4 TYPICAL SHELF ANGLE

3/4" = 1'-0"

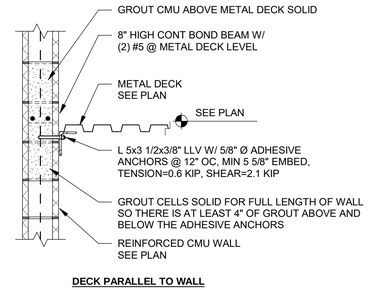
BEAM BEARING PLATE SCHEDULE		
AT BEAM END		
BEAM SIZE	BEARING PLATE SIZE	HEADED STUD SPACING
W8 - W12	3/8 X 6" X 0'-10"	6 INCHES
W16 - W18	1/2 X 6" X 0'-10"	6 INCHES
W21 - W30	5/8 X 6" X 1'-0"	8 INCHES
AT CONTINUOUS BEAM		
BEAM SIZE	BEARING PLATE SIZE	HEADED STUD SPACING
W8 - W12	3/8 X 7" X 0'-10"	6 INCHES
W16 - W18	1/2 X 7" X 0'-10"	6 INCHES
W21 - W30	5/8 X 7" X 1'-0"	8 INCHES

C1 CMU BEARING PLATE SCHEDULE

NTS



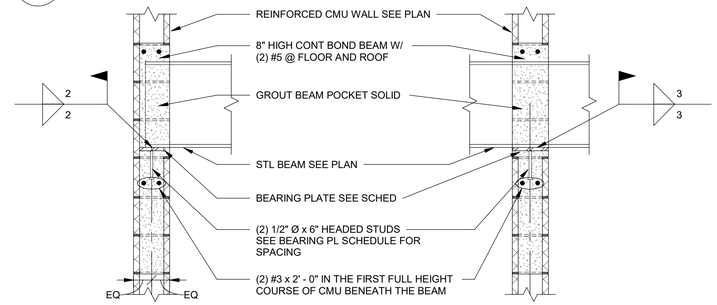
DECK PERPENDICULAR TO WALL



DECK PARALLEL TO WALL

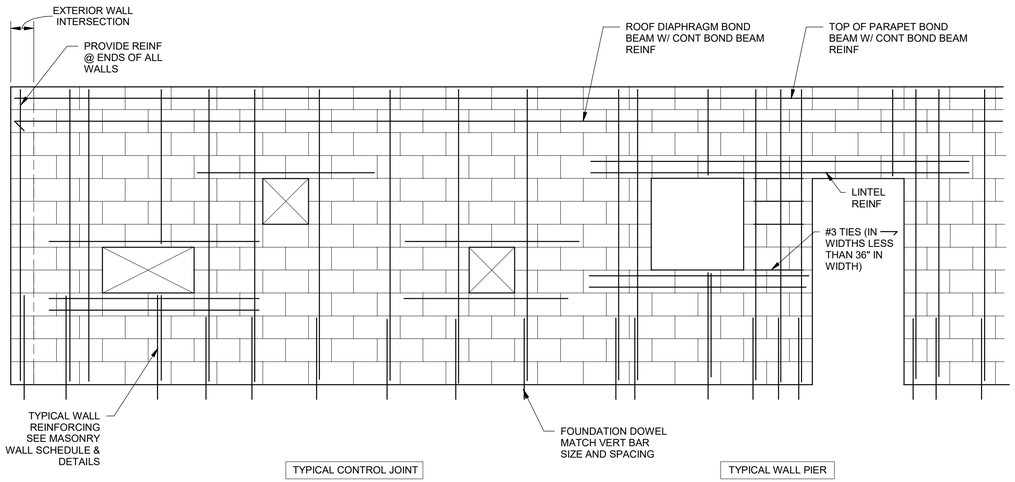
C2 METAL DECK SUPPORT AT CMU WALL

NTS



C4 STEEL BEAM ON CMU WALL

NTS

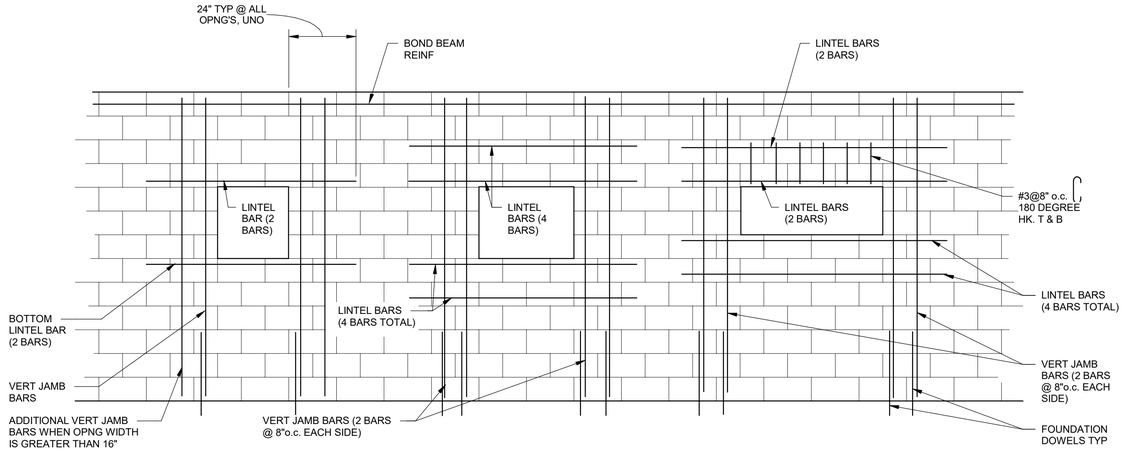


TYPICAL CONTROL JOINT

TYPICAL WALL PIER

NOTES:
1. PROVIDE 135 DEGREE HOOK FOR BOND BEAM REINF AT ENDS OR CORNERS OF WALLS. HOOK HORIZ REINF AROUND VERT REINF.
2. PROVIDE CONTROL JOINT (CJ) SPACING AT NON-LOADBEARING CMU WALLS AT A DISTANCE EQUAL TO THE LESSER OF 25'-0" OR 1.5 TIMES THE WALL HEIGHT TYP UON. PROVIDE CONTROL JOINT SPACING AT LOAD-BEARING CMU WALLS AS INDICATED ON THE WALL ELEVATIONS, SEE S-200 SERIES DRAWINGS.
3. STOP HORZ JOINT REINF ON EITHER SIDE OF CJ.
4. REINFORCE NON-LOAD BEARING CMU WALLS WITH #5@48" O.C.

TYPICAL REINFORCED CMU DETAILS



OPENINGS 24" OR LESS IN EITHER DIRECTION FOR STRUCTURAL PARTITIONS & EXTERIOR WALLS AND FOR ALL OPENINGS IN NON-STRUCTURAL PARTITIONS.

OPENINGS WHICH EXCEEDS 24" BUT NOT MORE THAN 48" IN EITHER DIRECTION FOR STRUCTURAL PARTITIONS & EXTERIOR WALLS.

OPENINGS WHICH EXCEED 48" WIDTHS FOR STRUCTURAL PARTITIONS & EXTERIOR WALLS.

NOTES:
1. TYPICAL WALL REINFORCING NOT SHOWN FOR CLARITY.
2. TYPICAL LINTEL/BOND BEAM BARS EQUAL 2-#5
3. VERTICAL JAMB REINF MUST MATCH TYP WALL REINF.
4. TYPICAL BOND BEAMS NOT SHOWN FOR CLARITY.
5. ONLY SOLID BOTTOM LINTEL BLOCK UNITS WILL BE ALLOWED OVER DOORS/WINDOWS.
6. OPENINGS WITH LESS THAN 24" BETWEEN THEM MUST BE CONSIDERED AS SINGLE OPENING WHEN SELECTING LINTEL SIZE.

MINIMUM REINFORCEMENT AROUND CMU OPENINGS

A1 TYPICAL CMU DETAILS

1" = 1'-0"

US Army Corps of Engineers ®

MARK	DATE	DESCRIPTION
5	FEB 2023	REVISED I.A.W. AMENDMENT 0005
4	FEB 2023	REVISED I.A.W. AMENDMENT 0004

DESIGNED BY: J. PAQUETTE
DRAWN BY: J. PAQUETTE
CHECKED BY: A. POZOLO
SUBMITTED BY:
SIZE: ANSI 'D'
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0008
CONTRACT NO.:
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF- JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

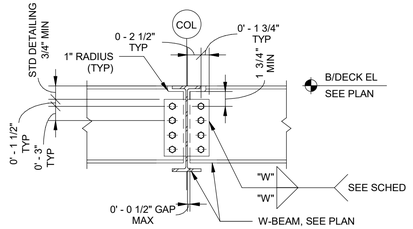
STRUCTURAL - TYPICAL DETAILS - MASONRY

SHEET ID

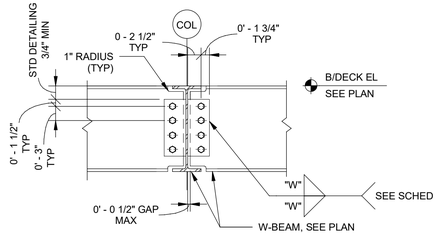
S-505

SINGLE PLATE SHEAR CONNECTION SCHEDULE FOR 3/4" ⌀ BOLTS				
BEAM SIZE	NO. OF BOLT ROWS	A36 PLATE SIZE	FILLET WELD SIZE "W"	ϕRn CAPACITY
W12	3	PL 3/8x4-1/2x0'-9"	1/4"	44k
W16 W18	4	PL 3/8x4-1/2x1'-0"	1/4"	63k
W21	5	PL 3/8x4-1/2x1'-3"	1/4"	82k
W24	6	PL 3/8x4-1/2x1'-6"	1/4"	100k
W30	8	PL 3/8x4-1/2x2'-0"	1/4"	137k

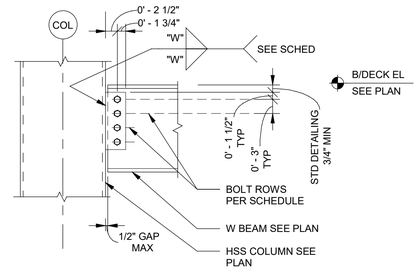
D1 SHEAR CONNECTION SCHEDULE
NTS



AT UNEQUAL BEAM DEPTH



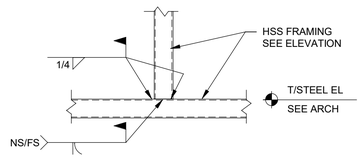
AT EQUAL BEAM DEPTH



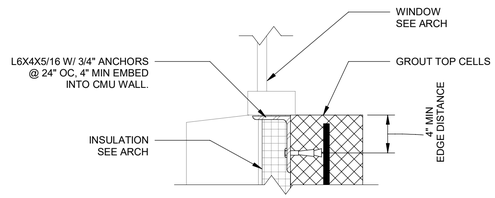
NOTES:

1. PROVIDE SHEAR CONNECTION IN ACCORDANCE WITH AISC STANDARD.
2. ALL BOLTS HOLES ARE SHORT SLOTTED HOLES IN THE PLATE AND STD HOLES IN THE BEAM WEB.
3. ALTERNATIVE CONNECTION MAY BE USED IN LIEU OF CONNECTION SHOWN. IN THIS CASE, SUPPORTING CALCULATIONS MUST BE PROVIDED.
4. PROVIDE SHEAR CONNECTION WITH FACTORED SHEAR CAPACITY (LRFD) TO EXCEED SHEAR DEMAND INDICATED IN THE SCHEDULE. MIN BOLTS INDICATED IN GEN NOTES.

D2 TYP SHEAR CONNECTION
NTS

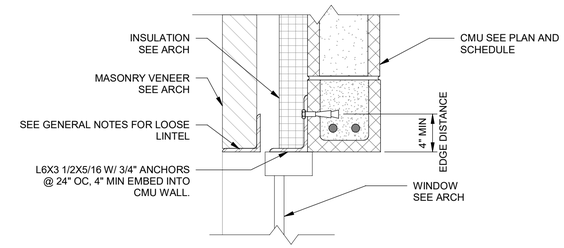


C1 HSS TO HSS CONNECTION
NTS



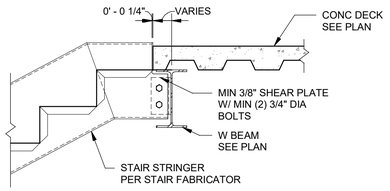
NOTE: COORDINATE LENGTH OF SUPPORT ANGLE WITH WINDOWS SIZE. REFER TO ARCH WINDOW SCHEDULE.

C2 TYP WINDOW LEDGER ANGLE
NTS

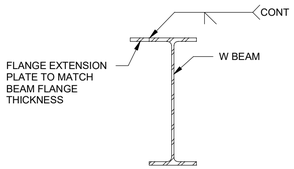


NOTE: COORDINATE LENGTH OF SUPPORT ANGLE WITH WINDOWS SIZE. REFER TO ARCH WINDOW SCHEDULE.

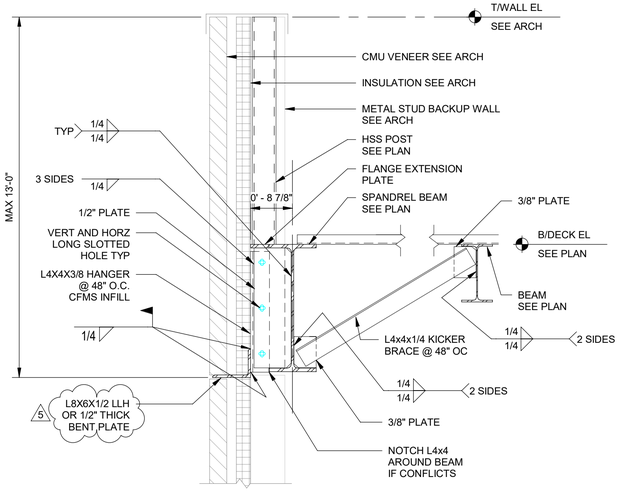
C3 TYP 1ST FLOOR WINDOW HEADER ANGLE
NTS



B1 TYP STAIR STRINGER
NTS

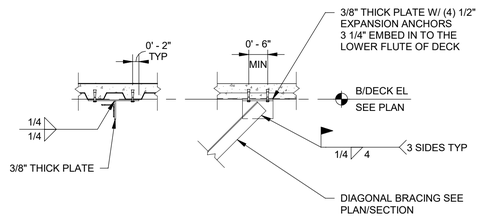


A1 TYP FLANGE EXTENSION PLATE
NTS



NOTE: MAINTAIN CONSISTENT ELEVATION OF SHELF ANGLE AROUND THE STRUCTURE WHERE THIS DETAIL APPLIES.

A2 SHELF ANGLE AT METAL STUD WALLS
NTS



A4 TYP BRACING CONNECTION TO METAL DECK
NTS

COMMONWEALTH OF VIRGINIA
MATTHEW T. BRETTHAUER
Lic. No. 60478
PROFESSIONAL ENGINEER
12/14/22

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

DESIGNED BY: J. PAQUETTE
DRAWN BY: J. PAQUETTE
CHECKED BY: A. POZOLO
SUBMITTED BY:
SIZE: ANSI 'D'
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0008
CONTRACT NO.:
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

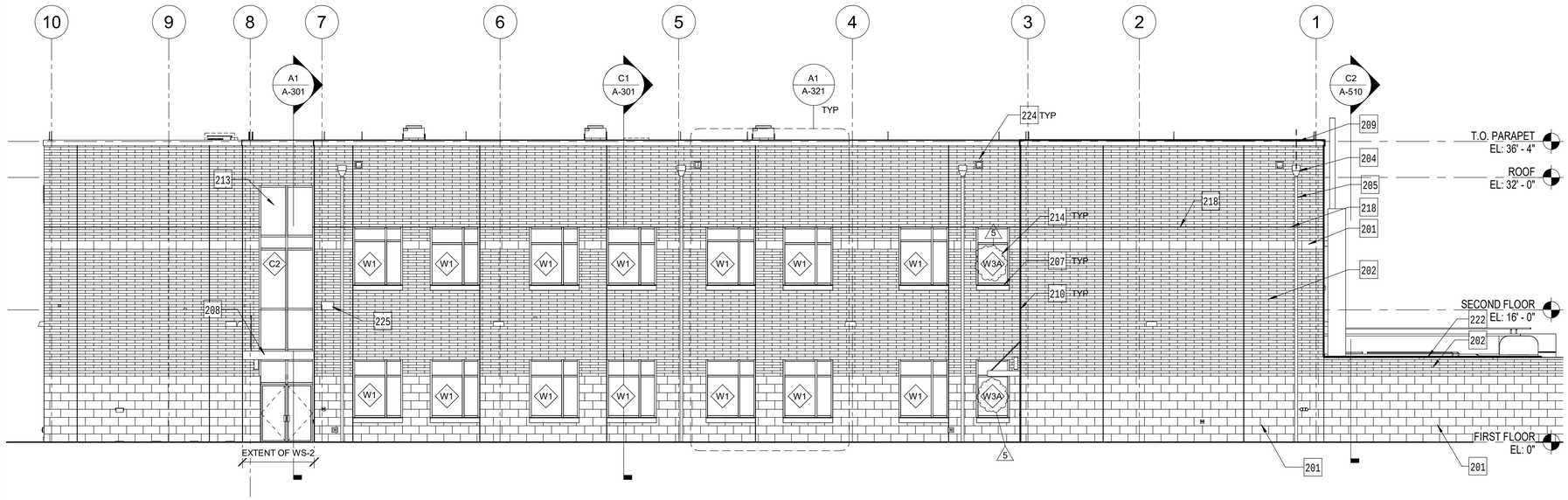
JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

STRUCTURAL - TYPICAL DETAILS - STEEL FRAMING

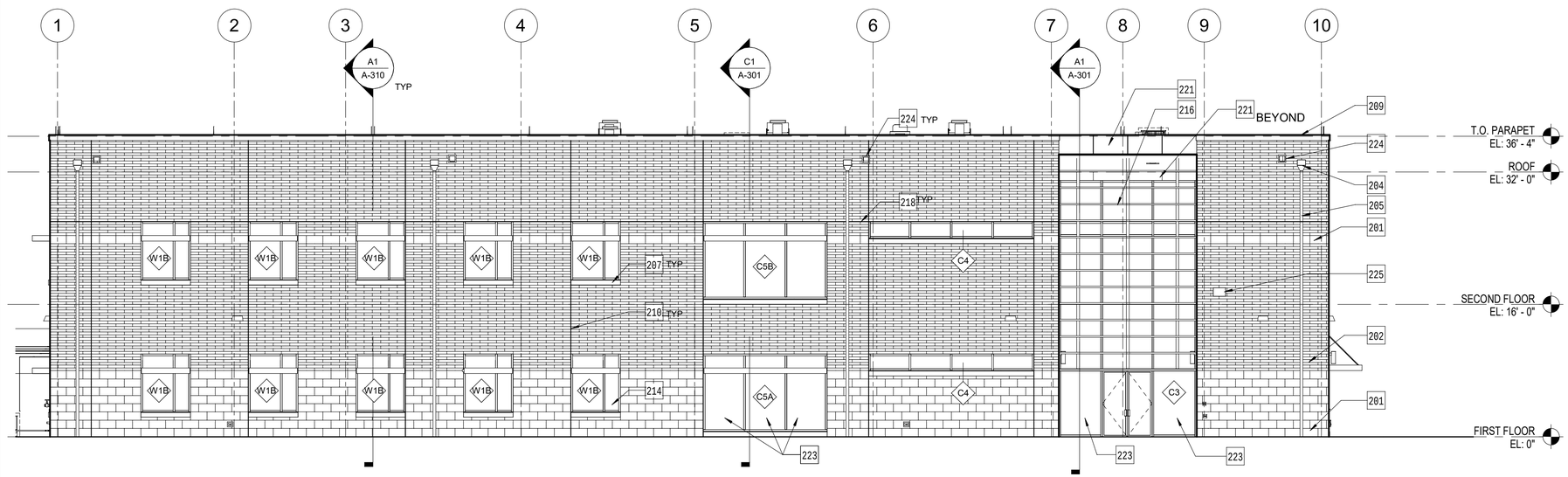
SHEET ID
S-507

AMENDMENT 0005



C1 NORTH ELEVATION

1/8" = 1'-0"



A1 SOUTH ELEVATION

1/8" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET A-320 FOR WALL SYSTEM (WS-) TYPES
2. REFER TO A-321 FOR TYPICAL EXTERIOR WALL PATTERN
3. REFER TO A-601 FOR EXTERIOR MATERIAL SCHEDULE
4. REFER TO CIVIL FOR GRADE ELEVATIONS
5. REFER TO A-560 FOR WINDOW & LOUVER SCHEDULE

KEYNOTES

#	
201	AB-1 ARCHITECTURAL FACE CMU
202	AB-2 ARCHITECTURAL FACE CMU
204	METAL CONDUCTOR BOX, MTL-3
205	METAL DOWNSPOUT, MTL-3
207	ST-1 CMU SILL
208	PRE-FABRICATED ALUMINUM HANGER ROD FLAT SOFFIT CANOPY, MTL-5
209	MTL-1 METAL COPING
210	CONTROL JOINT, 20' OC MAX
213	ALUMINUM FRAMED CURTAIN WALL
214	ALUMINUM-FRAMED CURTAIN WALL WINDOW
216	SUN CONTROL SYSTEM, CUSTOM
218	SHELF ANGLE SUPPORT, SEE STRUCTURAL DRAWINGS
221	METAL COMPOSITE PANELS, MTL-4
222	PRECAST STONE WALL COPING
223	SAFETY GLAZING
224	OVERFLOW SCUPPER
225	BUILDING NUMBER SIGN, REFER TO SIGNAGE DRAWINGS, COORDINATE THE FINAL LOCATION WITH THE COTR, PROVIDE MASONRY WITH SMOOTH SURFACE FOR SIGNAGE SUBSTRATE

REGISTERED ARCHITECT
THEO LORENZEN-SCHMIDT
037114
STATE OF NEW YORK

GRAPHIC SCALE(S)

8 4 0 8 16

SCALE: 1/8" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMANDMENT 0005	FEB 23

DESIGNED BY: G. GAN
DRAWN BY: T. LORENZEN-SCHMIDT
CHECKED BY: W. STEVENS
SUBMITTED BY:
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

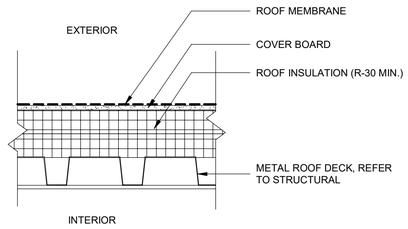
JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SPB, CO

ARCHITECTURAL - EXTERIOR
ELEVATIONS - NORTH AND SOUTH

SHEET ID

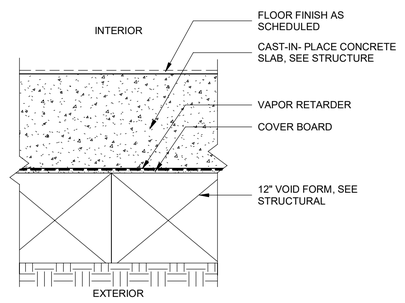
A-201



NOTES:
1. MIN. THERMAL VALUE: R-30 c.i.
2. PROVIDE TAPERED POLYISOCYANURATE INSULATION ROOF CRICKETS AS INDICATED ON THE ROOF PLAN

B1 RS-1 SINGLE PLY ROOFING

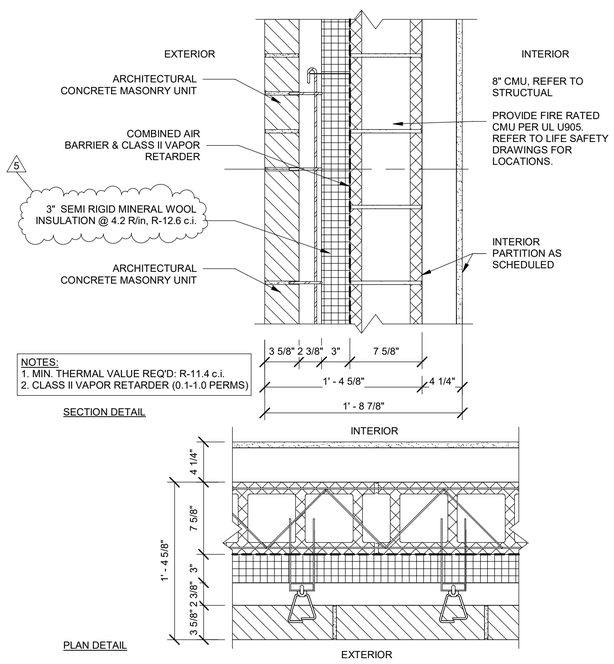
1 1/2" = 1'-0"



NOTES:
1. CLASS I VAPOR RETARDER (<0.1 PERMS)

A1 FS-1 SLAB ON GRADE

1 1/2" = 1'-0"



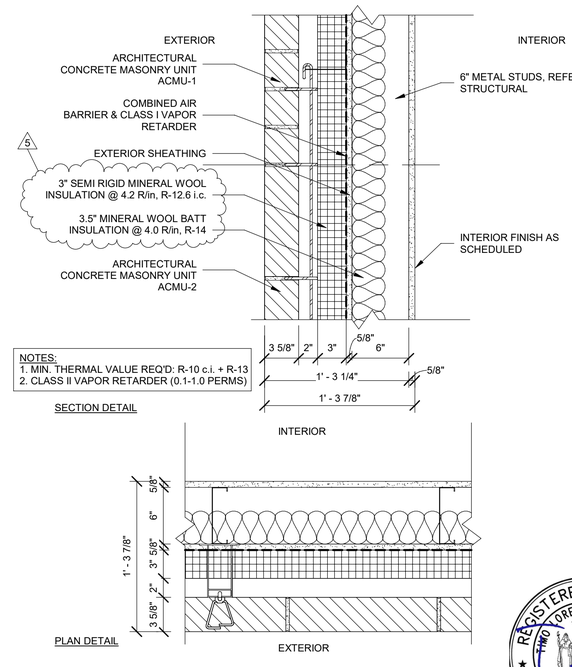
NOTES:
1. MIN. THERMAL VALUE REQ'D: R-11.4 c.i.
2. CLASS II VAPOR RETARDER (0.1-1.0 PERMS)

SECTION DETAIL

PLAN DETAIL

A2 WS-1 FACE CMU ON CMU

1 1/2" = 1'-0"



NOTES:
1. MIN. THERMAL VALUE REQ'D: R-10 c.i. + R-13
2. CLASS II VAPOR RETARDER (0.1-1.0 PERMS)

SECTION DETAIL

PLAN DETAIL

A3 WS-2 FACE CMU ON CFSF

1 1/2" = 1'-0"

GENERAL SHEET NOTES

LEGEND

WS-X	WALL SYSTEM
RS-X	ROOF STSTEM
FL-X	FLOOR SYSTEM

REGISTERED ARCHITECT
LORENZEN-SCHMIDT
037114
STATE OF NEW YORK

GRAPHIC SCALE(S)

1 0 1

SCALE: 1 1/2" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMANDMENT 0005	FEB 23

ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
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DESIGNED BY: G. GAN
DRAWN BY: T. LORENZEN-SCHMIDT
CHECKED BY: W. STEVENS
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

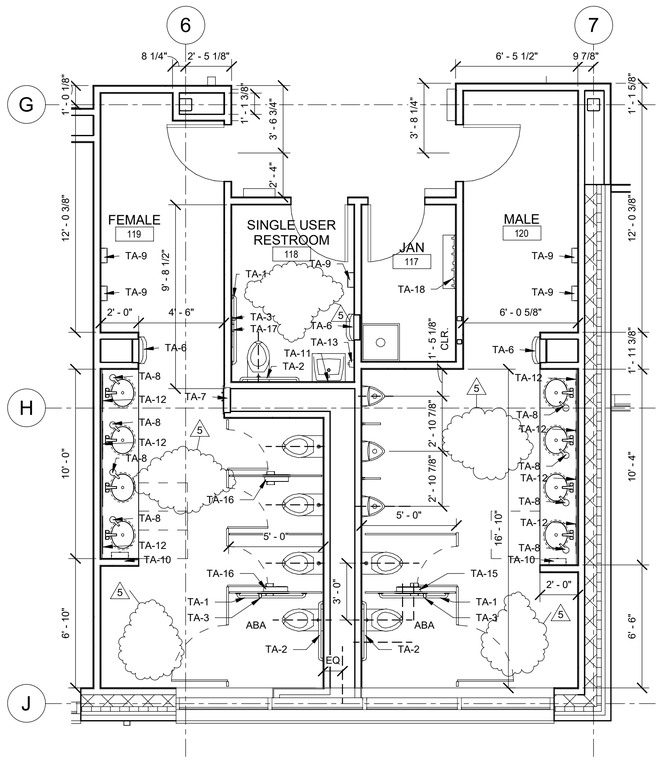
DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

ARCHITECTURAL - EXTERIOR ASSEMBLY TYPES

SHEET ID

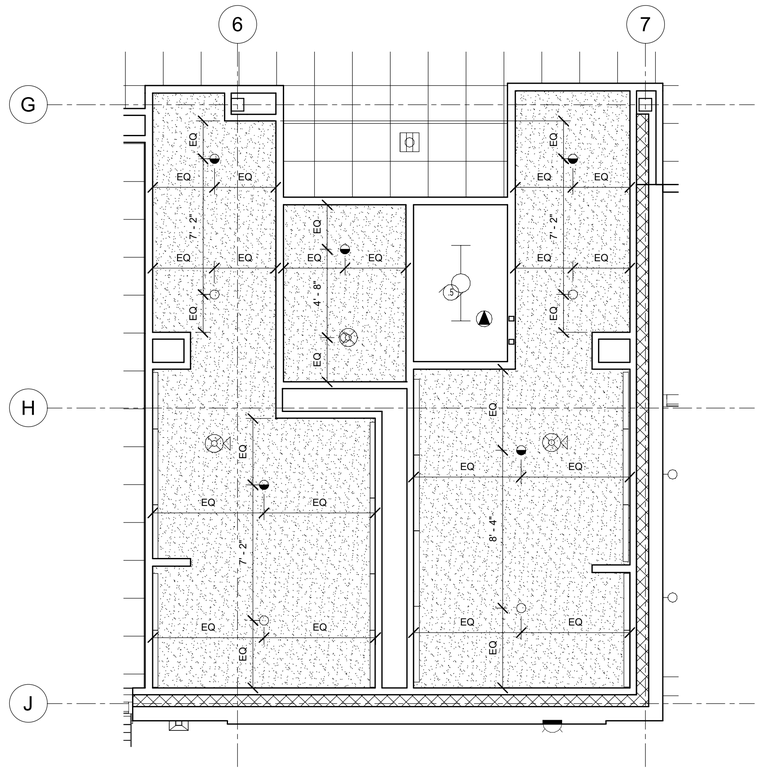
A-320

AMENDMENT 0005



B1 FIRST FLOOR PLAN - TOILET ROOMS

1/4" = 1'-0"



B3 FIRST FLOOR REFLECTED CEILING PLAN - TOILET ROOMS

1/4" = 1'-0"

TOILET ACCESSORY SCHEDULE			
CODE	DESCRIPTION	MANUFACTURER (BASIS OF DESIGN)	MODEL
TA-1	36" GRAB BAR, STRAIGHT	BOBRICK	6806
TA-2	42" GRAB BAR, STRAIGHT	BOBRICK	6806
TA-3	18" GRAB BAR, VERTICAL	BOBRICK	6806
TA-6	TOWEL DISPENSER WASTE, SEMI-RECESSED	BRADLEY CORP	2A15-1036
TA-7	NAPKIN/TAMPON DISPENSER	BRADLEY CORP	407
TA-8	COUNTER SOAP DISPENSER, SENSOR OPERATED	BRADLEY CORP	6315
TA-9	HAND DRYER/AIRBLADE	DYSON	307174-01
TA-10	WALL MOUNTED PAPER TOWEL DISPENSER	BOBRICK	B-262
TA-11	MIRROR, ANGLE FRAME	BRADLEY CORP	780
TA-12	MIRROR, FRAMELESS	BRADLEY CORP	747
TA-13	SOAP DISPENSER, WALL MOUNTED	BRADLEY CORP	6563
TA-15	COMBINATION UNIT: PARTITION-MOUNTED, TOILET SEAT-COVER AND TOILET TISSUE DISPENSER	BOBRICK	B-3471
TA-16	COMBINATION UNIT: PARTITION-MOUNTED, TOILET SEAT-COVER DISPENSER, SANITARY NAPKIN DISPOSAL AND TOILET TISSUE DISPENSER	BOBRICK	B-3571
TA-17	COMBINATION UNIT: SEAT-COVER DISPENSER, SANITARY NAPKIN DISPOSAL AND TOILET TISSUE...	BOBRICK	B-35745
TA-18	MOP-BROOM HOLDER WITH HOLDERS	BRADLEY CORP	9983
TA-19	DOUBLE GARMENT HOOK	BRADLEY CORP	9125

GENERAL SHEET NOTES

1. REFER TO SHEET A-001 FOR TYPICAL MOUNTING HEIGHTS AND ACCESSIBILITY STANDARDS
2. FOR INTERIORS ELEVATIONS AND INTERIORS FINISH SCHEDULE, REFER TO INTERIORS DRAWINGS
3. FOR TOILET PARTITION SUPPORT REFER TO STRUCTURAL DRAWINGS

KEYNOTES

#

GRAPHIC SCALE(S)

4 3 2 1 0 4 8

SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMANDMENT 0005	FEB 23

DESIGNED BY: G. GAN
DRAWN BY: T. LORENZEN-SCHMIDT
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SUBMITTED BY:
SIZE: ANSI 'D'
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US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

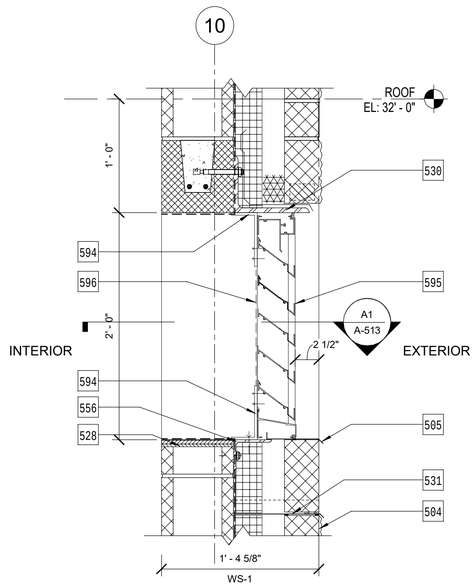
JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

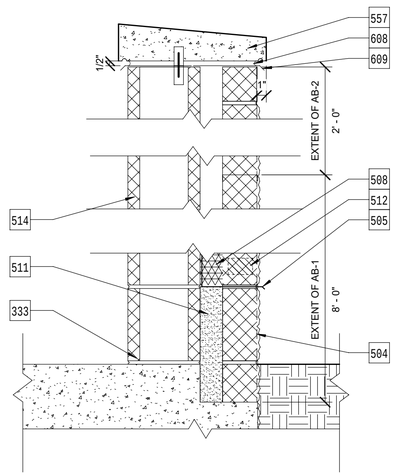
DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

ARCHITECTURAL - ENLARGED PLANS - TOILET ROOMS

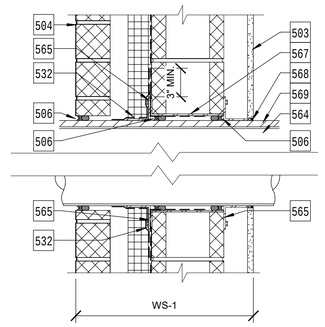
SHEET ID

A-410



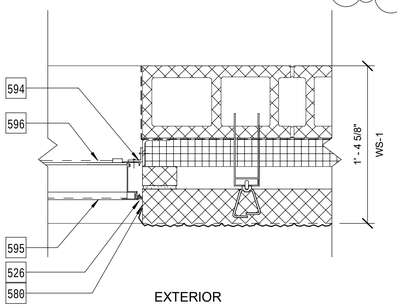


TYPICAL SECTION AT DUMPSTER ENCLOSURE



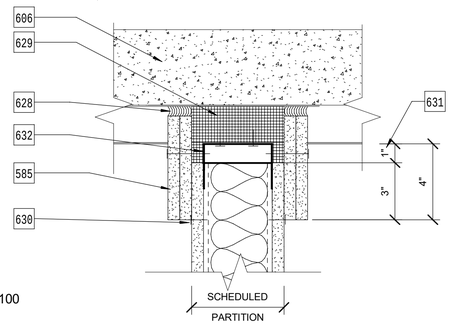
TYPICAL SECTION AT PIPE/ DUCT PENETRATION

C1 SECTION DETAIL
1 1/2" = 1'-0"



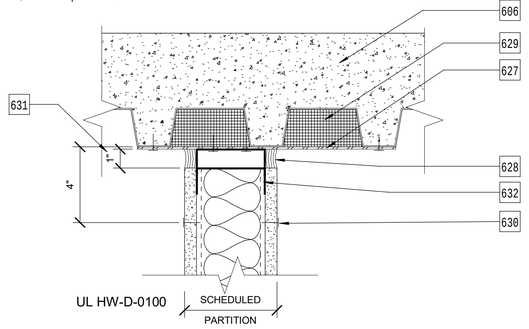
A1 PLAN DETAIL
1 1/2" = 1'-0"

C2 SECTION DETAIL
1 1/2" = 1'-0"



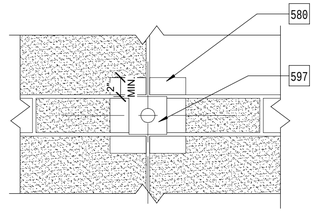
TYP. TOP WALL TRACK PERPENDICULAR TO MTL DECKING

C3 SECTION DETAIL
1 1/2" = 1'-0"

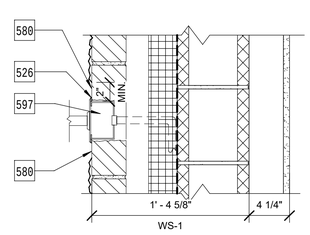


TYP. TOP WALL TRACK PARALLEL TO MTL DECKING

A2 SECTION DETAIL
3" = 1'-0"



ELEVATION VIEW



SECTION DETAIL

TYPICAL BACK BOX MOUNTING DETAIL

A3 SECTION DETAIL
1 1/2" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO CIVIL FOR GRADE ELEVATION
2. FOR LOAD BEARING CMU, REFER TO STRUCTURAL
3. REFER TO SHEET A-320 FOR EXTERIOR ASSEMBLY TYPES
4. REFER TO SHEET A-560 FOR WINDOW SCHEDULE

KEYNOTES

#	
333	FLOOR SLAB, REFER TO STRUCTURAL DRAWINGS
503	SCHEDULED PARTITION
504	EXTERIOR WALL ASSEMBLY, TYPE WS-1
505	METAL FLASHING, STAINLESS STEEL
506	BACKER ROD AND SEALANT
508	MORTAR NET
511	GROUT CAVITY
512	CAVITY DRAINAGE MATERIAL AND WEEPS AT 24" OC
514	8" REINFORCED CMU WALL, REFER TO STRUCTURAL DRAWINGS
526	SEALANT
528	BLOCKING
530	GALV MTL SHELF ANGLE, REFER TO STRUCTURAL DRAWINGS, PT-12
531	THROUGH WALL FLASHING, STAINLESS STEEL
532	TRANSITION SHEET/AIR BARRIER
556	STEEL ANGLE, REFER TO STRUCTURAL DRAWINGS
557	ST-1 STONE WALL COPING WITH SEALANT JOINTS
564	PIPE OR DUCT WITH INSULATION
565	WATERPROOFING CLAMPING FLANGE
567	PRE-FABRICATED MTL PIPE SLEEVE
568	CAULK BED
569	MTL JACKET
580	SMOOTH SURFACE AT ROUGH OPENING TO ACCOMMODATE, WINDOW MULLION, BACK BOX ETC.
585	(2) LAYERS OF 5/8" GYPSUM WALL BOARD
594	ALUMINUM CLIP ANGLE BY LOUVER MANUFACTURER
595	LV-1 EXTERIOR DRAINABLE LOUVER
596	BIRD, INSECT SCREEN BY LOUVER MANUFACTURER
597	TYPICAL BACK BOX, CENTER ON FACE CMU, TYP
606	CONCRETE ON METAL DECK, REFER TO STRUCTURE
608	MORTAR JOINT
609	KEYED FLASHING
627	CONTINUOUS 18 GA. STEEL PLATE, ALONG LENGTH OF PARTITION, MECHANICALLY ATTACHED
628	FIRE RATED, ACOUSTICAL SEALANT, BOTH SIDES
629	FIRE SAFING INSULATION AT RATED AND STC WALLS
630	TYPE "S" SCREW AT 12" O.C. #8 WAFERHEAD
631	DEFLECTION GAP
632	DEFLECTION TRACK

GRAPHIC SCALE(S)

0 1/4 1/2 1

SCALE: 3" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMANDMENT 0005	FEB 23

DESIGNED BY: G. GAN
DRAWN BY: T. LORENZEN-SCHMIDT
CHECKED BY: W. STEVENS
SUBMITTED BY:
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

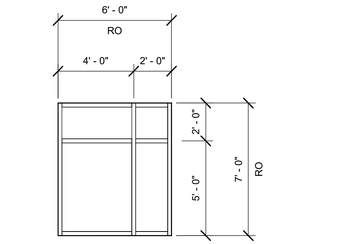
DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

ARCHITECTURAL - ENLARGED DETAILS

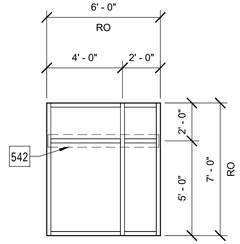
SHEET ID

A-513

REGISTERED ARCHITECT
THEO LORENZEN-SCHMIDT
037114
STATE OF NEW YORK



W1A WINDOW TYPE W1 (5)
1/4" = 1'-0"



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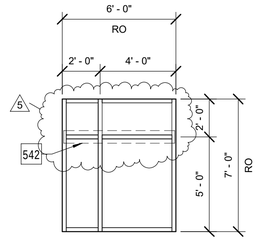

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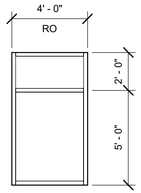

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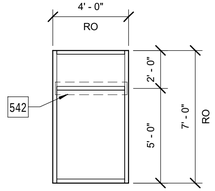
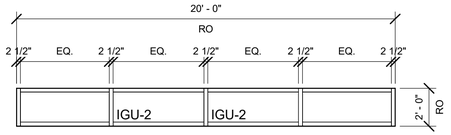
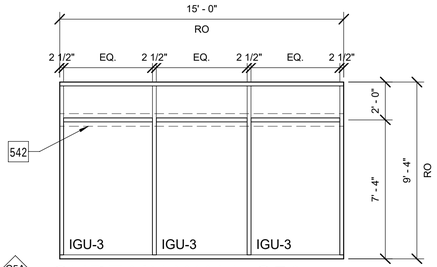


W3B WINDOW TYPE W3B
1/4" = 1'-0"

WINDOW TYPES



C4 CURTAIN WALL C4
1/4" = 1'-0"



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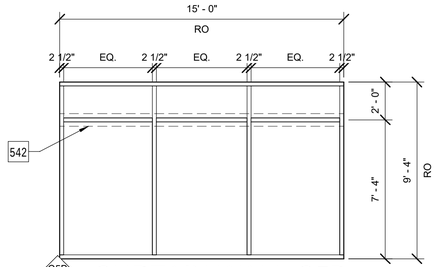
1/4" = 1'-0"



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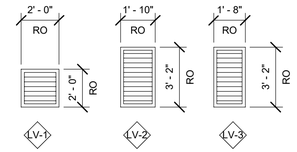
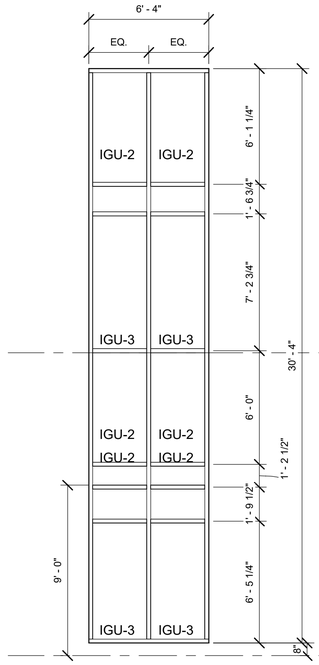
1/4" = 1'-0"



LOUVER LV-1
1/4" = 1'-0"



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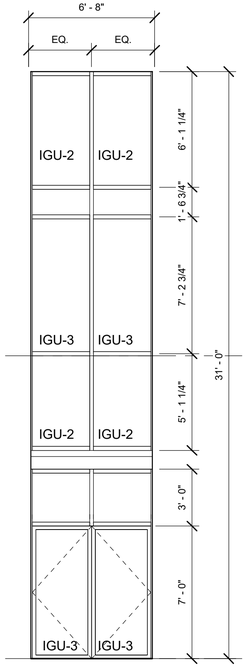
1/4" = 1'-0"



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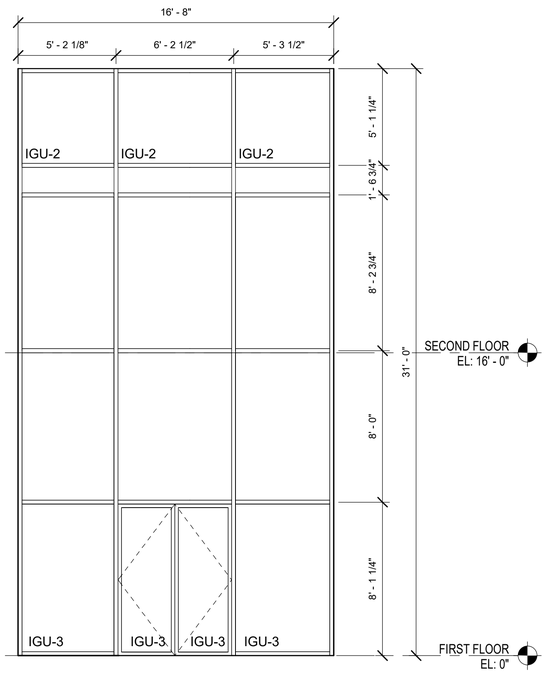
1/4" = 1'-0"



C3 CURTAIN WALL C3
1/4" = 1'-0"

CURTAIN WALL TYPES

GENERAL SHEET NOTES

1. GLASS TYPES ARE IGU-1 UNO
2. REFER TO EXTERIOR MATERIAL SCHEDULE ON SHEET A-601
3. REFER TO DOOR SCHEDULE ON SHEET A-605

KEYNOTES

#	
542	SUN CONTROLS BY ALUMINUM CURTAIN WALL MANUFACTURER

REGISTERED ARCHITECT
TIMOTHY LORENZEN-SCHMIDT
037114
STATE OF NEW YORK

GRAPHIC SCALE(S)

4 3 2 1 0 4 8

SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMANDMENT 0005	FEB 23

ISSUE DATE: 14 DECEMBER 2022
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DRAWN BY: T. LORENZEN-SCHMIDT
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SIZE: ANSI 'D'
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US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

ARCHITECTURAL - WINDOWS & LOUVER SCHEDULE

SHEET ID
A-560

AMENDMENT 0005

GENERAL NOTES AND SYMBOLS

(ALL SYMBOLS SHOWN ARE NOT NECESSARILY USED ON THE DRAWINGS)

FIRE SPRINKLER SYMBOLS

PIPING SYMBOLS

- SYSTEM RISER
- ELBOW UP
- ELBOW DOWN
- VALVE IN DROP
- VALVE IN CENTER DROP
- VALVE IN RISE
- DIRECTION OF FLOW
- DIRECTION OF SLOPE DOWN
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- TEE OUTLET UP
- TEE OUTLET DOWN
- UNION
- STRAINER WITH BLOWDOWN VALVE
- GATE VALVE
- CHECK VALVE
- PRESSURE CONTROL VALVE
- RELIEF VALVE
- PRESSURE GAUGE WITH GAUGE COCK
- TEST PORT
- FLOW SWITCH
- OH — ORDINARY HAZARD
- LH — LIGHT HAZARD

SPRINKLER SYMBOLS

- PENDENT SPRINKLER, STANDARD TEMPERATURE
- UPRIGHT SPRINKLER, STANDARD TEMPERATURE
- SIDEWALL SPRINKLER, STANDARD TEMPERATURE

MISCELLANEOUS

- POINT OF NEW CONNECTION TO EXISTING PIPING
- CALCULATION NODE POINT (2 NODES)
- CALCULATION NODE POINT (1 NODE)

FIRE SPRINKLER NOTES

1. PROVIDE COMPLETE WET PIPE FIRE SPRINKLER SYSTEMS FOR THE ENTIRE BUILDING DESIGNED AND INSTALLED IN ACCORDANCE WITH

   5 ~~UFC 3-600-01 FIRE PROTECTION ENGINEERING FOR FACILITIES (8 AUGUST 2016, WITH CHANGE 5, 24 SEPTEMBER 2020)~~
   ~~-2018 INTERNATIONAL BUILDING CODE (IBC) (2018 EDITION)~~
   ~~-NFPA 13: STANDARD FOR INSTALLATION OF SPRINKLER SYSTEMS (2022 EDITION)~~
   ~~- FC 3-600-01 MPO FIRE PROTECTION ENGINEERING FOR FACILITIES - MPO (2020)~~
   ~~-TSFPEWG 3-600-01.01 AIR FORCE FIRE PROTECTION CRITERIA AND TECHNICAL GUIDANCE FOR MISSION CONTINUITY OF ELECTRONIC, INFORMATION TECHNOLOGY, AND TELECOMMUNICATION EQUIPMENT INSTALLATION (25 FEBRUARY 2021, WITH 21 APRIL 2021)~~
2. VERIFY ALL LOCATIONS AND MEASUREMENTS AS CONDITIONS MAY VARY THROUGHOUT CONSTRUCTION. ALL CHANGES FROM THE ORIGINAL DESIGN MUST BE APPROVED BY THE FPDOR.
3. SPRINKLER CONTRACTOR MUST INSTALL TAMPER AND FLOW SWITCHES. CONNECTIONS TO THE FIRE ALARM SYSTEM'S SIGNALING LINE CIRCUIT MUST BE MADE UNDER SPECIFICATION DIVISION 28.
4. SPRINKLER CONTRACTOR MUST UTILIZE FLOW DATA PROVIDED TO BASE HYDRAULIC CALCULATIONS AND SIZE PIPING. IF THE TEST RESULTS ARE OVER ONE YEAR OLD, SPRINKLER CONTRACTOR TO PERFORM A NEW HYDRANT FLOW TEST.
5. CONTRACTOR MUST OBTAIN ALL REQUIRED PERMITS AND APPROVALS FROM THE AHJ PRIOR TO COMMENCING WORK.
6. HYDRAULICALLY CALCULATE THE WET PIPE SPRINKLER SYSTEMS PER NFPA 13 DENSITY AND SPACING LISTED IN THE SPRINKLER DESIGN CRITERIA TABLE BELOW. FIELD VERIFY SYSTEM DESIGN AND LAYOUT PRIOR TO FABRICATION OR INSTALLATION.
7. PROVIDE PIPE HANGERS ON ALL FIRE SPRINKLER SYSTEM PIPING AND EQUIPMENT PER NFPA 13.
8. SEE ARCHITECTURAL DRAWINGS FOR ROOM FINISH SCHEDULE AND ROOM USE. SEE ARCHITECTURAL, ELECTRICAL, MECHANICAL, AND TELECOMMUNICATIONS PLANS FOR THE LOCATION OF ALL CEILING-MOUNTED DEVICES. FIELD VERIFY AND COORDINATE THE LOCATIONS OF ALL SYSTEM COMPONENTS INCLUDING PIPING, ALARMS, DRAINS, TEST POINTS, ETC. WITH ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND ELECTRICAL EQUIPMENT WITHIN THE BUILDING.
9. PROVIDE AUXILIARY DRAINAGE WITH A DRAIN VALVE AND PLUG FOR ALL TRAPPED SECTION OF PIPE, AS REQUIRED BY NFPA 13.
10. THESE DOCUMENTS DEPICT PERFORMANCE LEVEL ENGINEERING DESIGN CRITERIA TO BE UTILIZED AS GUIDANCE FOR THE PLANNING OF THE FIRE SPRINKLER SYSTEM BY THE CONTRACTOR. PROVIDE COMPLETE DOCUMENTS FOR REVIEW AND APPROVAL FROM THE ENGINEER OF RECORD AND AHJ PRIOR TO INSTALLATION. INCLUDE IN THE SHOP DRAWINGS AND CALCULATIONS ANY ADDITIONAL EQUIPMENT NECESSARY TO PROVIDE A COMPLETE INSTALLATION.
11. PIPE ALL SPRINKLER DRAINS TO SANITARY SEWER.

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AVG	AVERAGE
BFP	DOUBLE CHECK BACKFLOW PREVENTER
CFM	CUBIC FEET PER MINUTE
CO	CONTRACTING OFFICER
COTR	CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE
ELEV	ELEVATION
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FHV	FIRE HOSE VALVE
FP	FIRE PUMP
FPC	FIRE PUMP CONTROLLER
FPDOR	FIRE PROTECTION DESIGNER OF RECORD
FVC	FIRE VALVE CABINET
GALS	GALLONS
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GV	GATE VALVE
JP	JOCKEY PUMP
MIN	MINIMUM
NC	NONCOMBUSTIBLE
NIC	NOT IN CONTRACT
NP	NOT PERMITTED
OS&Y	OUTSIDE SCREW & YOKE
PSIG	POUNDS PER SQUARE INCH GAUGE
SOV	SOLENOID VALVE
SQFT	SQUARE FEET
UH	UNIT HEATER
VLV	VALVE

WATERFLOW TEST DATA

TEST DATE:	DECEMBER 2, 2020
STATIC PRESSURE:	84 PSIG
RESIDUAL PRESSURE:	65 PSIG
DISCHARGE FLOW:	2226 GPM
GAUGE HYDRANT #:	WAFH 1-19
FLOW HYDRANT #:	WAFH 1-18

SPRINKLER DESIGN CRITERIA

GENERAL ROOM/AREA CLASSIFICATION	HAZARD CLASSIFICATION	DENSITY REQUIREMENTS	DURATION OF SUPPLY	MAXIMUM SPRINKLER PROTECTION AREA	K-FACTOR	SPRINKLER TEMPERATURE	HOSE ALLOWANCE
OFFICES, CONFERENCE ROOMS, CLASSROOMS, CORRIDORS, ETC	LIGHT (HC-1)	0.10 GPM/SQFT OVER MOST REMOTE 1500 SQFT	60 MIN.	225 SQFT	5.6	ORDINARY	250 GPM
MECHANICAL, STORAGE, MAINTENANCE AREAS	ORDINARY (HC-2)	0.20 GPM/SQFT OVER MOST REMOTE 2500 SQFT	60 MIN.	130 SQFT	8.0	ORDINARY	250 GPM

COMMONWEALTH OF VIRGINIA
JAMES ALBERT BEALS
Lic. No. 0402 26777
12/14/2022
PROFESSIONAL ENGINEER

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED IAW AMENDMENT 0005	FEB 2023

DESIGNED BY: J. BEALS
DRAWN BY: S. FLERI
CHECKED BY: M. CONNOLLY
SUBMITTED BY:
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

FIRE SUPPRESSION - SYMBOLS, LEGENDS, ABBREVIATIONS AND NOTES

SHEET ID

FX001

AMENDMENT 0005

FIRE ALARM / MASS NOTIFICATION

GENERAL NOTES

GENERAL NOTES

1. THE FIRE ALARM/MASS NOTIFICATION SYSTEM MUST BE DESIGNED, INSTALLED, AND COMMISSIONED IN ACCORDANCE WITH THE FOLLOWING:
   - INTERNATIONAL BUILDING CODE (IBC), (2018 EDITION)
   - NFPA 72: NATIONAL FIRE ALARM AND SIGNALING CODE (2022 EDITION)
   - UFC 3-600-01:UFC 3-600-01 FIRE PROTECTION ENGINEERING FOR FACILITIES (8 AUGUST 2016, WITH CHANGE 5, 24 SEPTMEBER 2020)
   - UFC 4-021-01:DESIGN AND O&M: MASS NOTIFICATION SYSTEMS (CHANGE 1, JANUARY 2010)
   - FC 3-600-01 MPO FIRE PROTECTION ENGINEERING FOR FACILITIES - MPO (2020)
   - TSFPEWG 3-600-01.01 AIR FORCE FIRE PROTECTION CRITERIA AND TECHNICAL GUIDANCE FOR MISSION CONTINUITY OF ELECTRONIC, INFORMATION TECHNOLOGY, AND TELECOMMUNICATION EQUIPMENT INSTALLATION (25 FEBRUARY 2021, WITH CHANGE 1, 21 APRIL 2021)

   (5)

2. THESE DOCUMENTS DEPICT A PERFORMANCE LEVEL ENGINEERING DESIGN LAYOUT TO BE UTILIZED AS GUIDANCE FOR THE PLANNING OF THE SYSTEM BY THE CONTRACTOR. PROVIDE COMPLETE DOCUMENTS FOR REVIEW AND APPROVAL FROM THE ENGINEER OF RECORD AND THE AUTHORITY HAVING JURISDICTION PRIOR TO INSTALLATION. INCLUDE IN THE SHOP DRAWINGS AND CALCULATIONS ANY ADDITIONAL EQUIPMENT NECESSARY, INCLUDING INITIATING DEVICES AND NOTIFICATION APPLIANCES, TO PROVIDE A COMPLETE INSTALLATION AND COMPLY WITH LOCAL CODES, AMENDMENTS AND BASE STANDARDS.

3. FOR COMPLETE SYSTEM CONTROL, REFER TO THE MATRIX OF OPERATIONS WITHIN THIS PACKAGE.

4. PROVIDE AN ADDRESSABLE FIRE ALARM/MASS NOTIFICATION SYSTEM CONTROL PANEL. SYSTEM MUST BE NETWORKED INTO THE EXISTING BASEWIDE FIRE ALARM SYSTEM NETWORK.

5. FINAL FIRE ALARM/MASS NOTIFICATION SYSTEM TEST MUST BE WITNESSED BY THE QFPE AND MPO AHJ. FILE A "RECORD OF COMPLETION" PREPARED IN ACCORDANCE WITH NFPA 72, AND THE FIRE ALARM TEST REPORT WITH THE FPDOR AND AHJ.

6. THE FLASH RATE OF VISIBLE NOTIFICATION APPLIANCES MUST NOT EXCEED 2 FLASHES PER SECOND, NOR BE LESS THAN 1 FLASH EVERY SECOND, IN ACCORDANCE WITH NFPA 72. A MAXIMUM PULSE DURATION MUST BE 0.2 SECONDS WITH A MAXIMUM DUTY CYCLE OF 40%, IN ACCORDANCE WITH NFPA 72. VISIBLE NOTIFICATION APPLIANCES MUST BE SPACED IN ACCORDANCE WITH NFPA 72. ALL STROBES MUST BE SYNCHRONIZED.

7. AUDIBLE FIRE ALARM SOUND LEVELS MUST BE AT LEAST 15 dBA ABOVE THE AVERAGE AMBIENT SOUND LEVEL OR 5 dBA ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, MEASURED 5 FEET ABOVE THE FLOOR IN THE OCCUPIABLE AREA, BUT NOT GREATER THAN 120 dBA AT THE MINIMUM HEARING DISTANCE FROM THE AUDILE APPLIANCE. PROVIDE ADEQUATE NOTIFICATION APPLIANCES THROUGHOUT THE FACILITY TO MEET THE NFPA 72 REQUIREMENTS.

8. SPRINKLER SYSTEM TAMPER AND FLOW SWITCHES MUST BE INSTALLED UNDER SPECIFICATION SECTION 21 13 13. CONNECT DEVICES TO THE FIRE ALARM SIGNALING LINE CIRCUITS.

9. OBTAIN APPROVALS FROM THE FPDOR AND AHJ PRIOR TO COMMENCING WORK.

10. DO NOT LOCATE DETECTORS IN DIRECT AIR OR CLOSER THAN 3 FEET FROM AN AIR SUPPLY OR RETURN DIFFUSER.

11. MOUNT ALL WALL-MOUNTED VISUAL AND VISUAL/AUDIBLE NOTIFICATION APPLIANCES WITH THE ENTIRE STROBE LENS BETWEEN 80" TO 96" ABOVE THE FINISHED FLOOR.

12. FIRE ALARM SIGNALING LINE CIRCUITS (SLC) AND NOTIFICATION APPLIANCE STROBE CIRCUITS (NAC) ARE TO BE CLASS A. NOTIFICATION APPLIANCE SPEAKER CIRCUITS ARE TO BE CLASS A. T-TAPS AND WIRE NUTS ARE NOT PERMITTED.

SYMBOLS - PANEL

SYMBOL	DESCRIPTION
FMCP	FIRE ALARM / MASS NOTIFICATION CONTROL PANEL
ASSD	AIR SAMPLING SMOKE DETECTOR PANEL
RECP	RELEASING CONTROL PANEL
ANN	ANNUNCIATOR PANEL
GAP	GRAPHIC ANNUNCIATOR PANEL
LOC	LOCAL OPERATING CONSOLE
NAC	NOTIFICATION APPLIANCE CONTROL PANEL
ERS	EMERGENCY RESPONSE RADIO REPEATER CONTROL PANEL
SS	SURGE SUPPRESSOR
DACT	DIGITAL ALARM COMMUNICATOR TRANSMITTER
BATT	BATTERY CABINET
AMP	SIGNAL BOOSTER PANEL

SYMBOLS - INITIATING

SYMBOL	DESCRIPTION
P	MANUAL PULL STATION
? P	SMOKE DETECTOR UF = UNDERFLOOR
? ID S,R	DUCT DETECTOR ID = FAN UNIT DESIGNATION S = SUPPLY R = RETURN
? CO	CARBON MONOXIDE DETECTOR
S	LOCAL ALARM SILENCE BUTTON
E	LOCATION OF EMERGENCY POWER OFF (EPO) BUTTON (SEE ELECTRICAL DRAWINGS)

SYMBOLS - NOTIFICATION

SYMBOL	DESCRIPTION
XX	WALL-MOUNTED FIRE ALARM STROBE (XX DENOTES MINIMUM CANDELA RATING)
XX	WALL-MOUNTED FIRE ALARM SPEAKER/STROBE (XX DENOTES MINIMUM CANDELA RATING)
	SPEAKER (WALL-MOUNTED, UNLESS OTHERWISE NOTED) WP = WEATHER PROOF
XX	CEILING MOUNTED-MOUNTED FIRE ALARM SPEAKER/STROBE (XX DENOTES MINIMUM CANDELA RATING)
XX	CEILING MOUNTED-MOUNTED FIRE ALARM STROBE (XX DENOTES MINIMUM CANDELA RATING)
S	CEILING MOUNTED SPEAKER
XX L	WALL MOUNTED-MOUNTED LOCAL FIRE ALARM HORN/STROBE (XX DENOTES MINIMUM CANDELA RATING)

SYMBOLS - MISCELLANEOUS

SYMBOL	DESCRIPTION
MM	MONITOR MODULE
CM MAU,EF	CONTROL MODULE MAU= MAKEUP AIR UNIT, EF=EXHAUST FAN
C TS	TAMPER SWITCH
C WF	WATER FLOW SWITCH
C TS	POST INDICATOR VALVE TAMPER SWITCH
KB	KNOX BOX (WITH TAMPER SWITCH)
VTD	VISUAL TEXTUAL DISPLAY
	SECURE PENETRATION
	ANTENNA

ABBREVIATIONS

(ALL SYMBOLS AND ABBREVIATIONS SHOWN ARE NOT NECESSARILY USED ON THE DRAWINGS)

ACU	AUTONOMOUS CONTROL UNIT
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AVG	AVERAGE
CA	CLEAN AGENT
CO	CONTRACTING OFFICER
COR	CONTRACTING OFFICER REPRESENTATIVE
COTR	CONTRACTING OFFICERS TECHNICAL REPRESENTATIVE
ELEV	ELEVATION
EOL	END OF LINE RESISTOR
FPC	FIRE PUMP CONTROLLER
FPDOR	FIRE PROTECTION DESIGNER OF RECORD
IDC	INITIATING DEVICE CIRCUIT
MIN	MINIMUM
MPO	MARYLAND PROCUREMENT OFFICE
NAC	NOTIFICATION APPLIANCE CIRCUIT
NC	NONCOMBUSTIBLE
NIC	NOT IN CONTRACT
NP	NOT PERMITTED
QFPE	QUALIFIED FIRE PROTECTION ENGINEER
SLC	SIGNALING LINE CIRCUIT
SQFT	SQUARE FEET
WP	WEATHER PROOF

COMMONWEALTH OF VIRGINIA
JAMES ALBERT BEALS
Lic. No. 0402 26777
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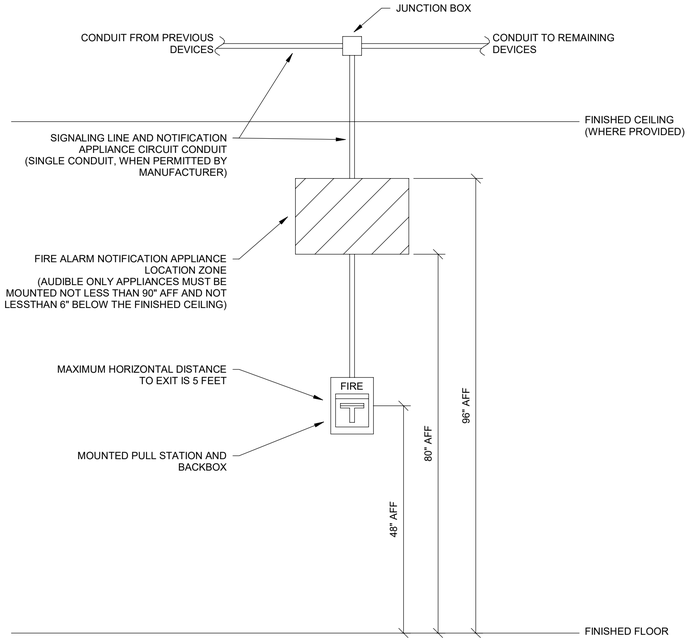
DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

FIRE ALARM - SYMBOLS, LEGENDS, ABBREVIATIONS AND NOTES

SHEET ID

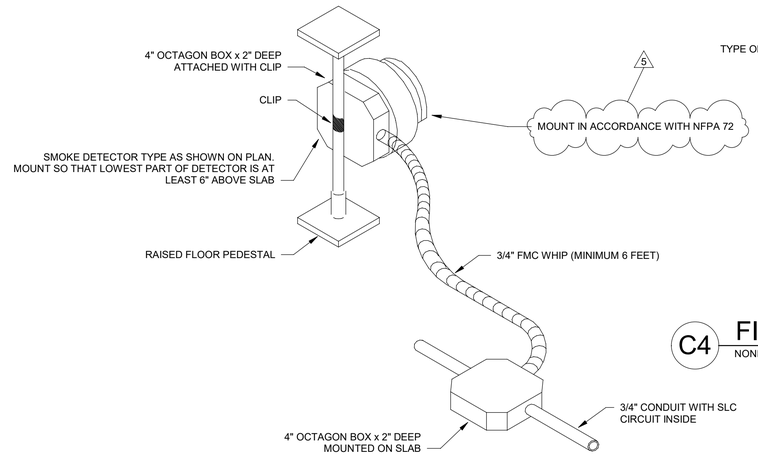
FA001

AMENDMENT 0005



C1 FIRE ALARM MOUNTING DETAIL

NTS



C2 MOUNTING OF UNDERFLOOR DETECTOR

NONE

TYPE OF DEVICE

DEVICE:	NN-LLL-DDD
SPEAKER:	MMM-CCC-DDD
STROBE:	FPADXCOL AN C-DDD

1/2"
3/16"

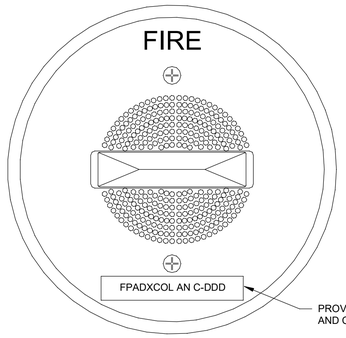
DETAIL NOTES:
PROVIDE WHITE LABEL WITH BLACK LETTERING.

NN	-	NODE NUMBER
LLL	-	LOOP NUMBER
DDD	-	DEVICE NUMBER
MMM	-	MODULE NUMBER
CCC	-	CIRCUIT NUMBER
F	-	FLOOR
X	-	PAD PANEL NUMBER
AN	-	COLUMN GRID LOCATION
C	-	PAD PANEL CIRCUIT NUMBER

NOTE: PROVIDE DEVICE LABELS AS REQUIRED. A LABEL MUST ALSO BE AFFIXED TO ANY FIELD DEVICE WHICH IS MONITORED BY THE FIRE ALARM SYSTEM.

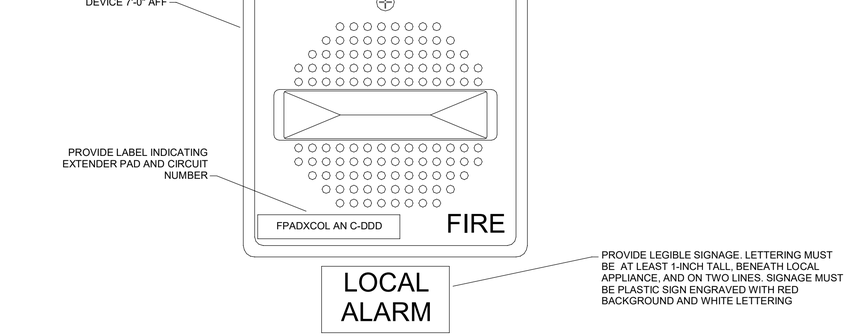
C4 FIRE ALARM DEVICE LABELING

NONE



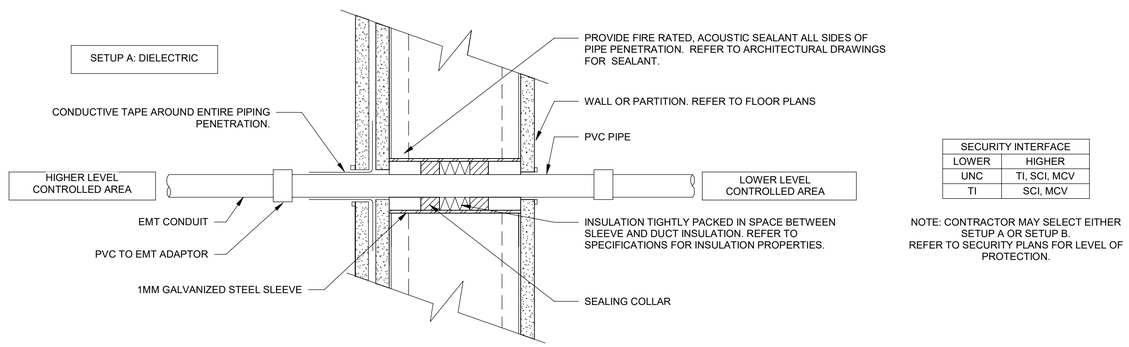
B1 CEILING-MOUNTED SPEAKER STROBE DETAIL

NONE



B2 WALL-MOUNTED LOCAL HORN/STROBE DETAIL

NONE

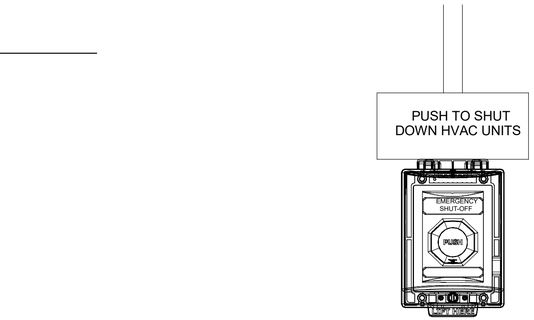


SECURITY INTERFACE	
LOWER	HIGHER
UNC	TI, SCI, MCV
TI	SCI, MCV

NOTE: CONTRACTOR MAY SELECT EITHER SETUP A OR SETUP B. REFER TO SECURITY PLANS FOR LEVEL OF PROTECTION.

A1 SECURE TO UNSECURE BOUNDARY CONDUIT PIPE PENETRATION

NTS



JAMES ALBERT BEALS
Lic. No. 0402 26777
12/14/2022
COMMONWEALTH OF VIRGINIA
PROFESSIONAL ENGINEER

A5 HVAC EPO SHUT-OFF SWITCH

12" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

DESIGNED BY: J. BEALS
DRAWN BY: S. FLERI
CHECKED BY: M. CONNOLLY
SUBMITTED BY:
SIZE: ANSI D
FILE NAME:

ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.:
W9128F23R0006
CONTRACT NO.:
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
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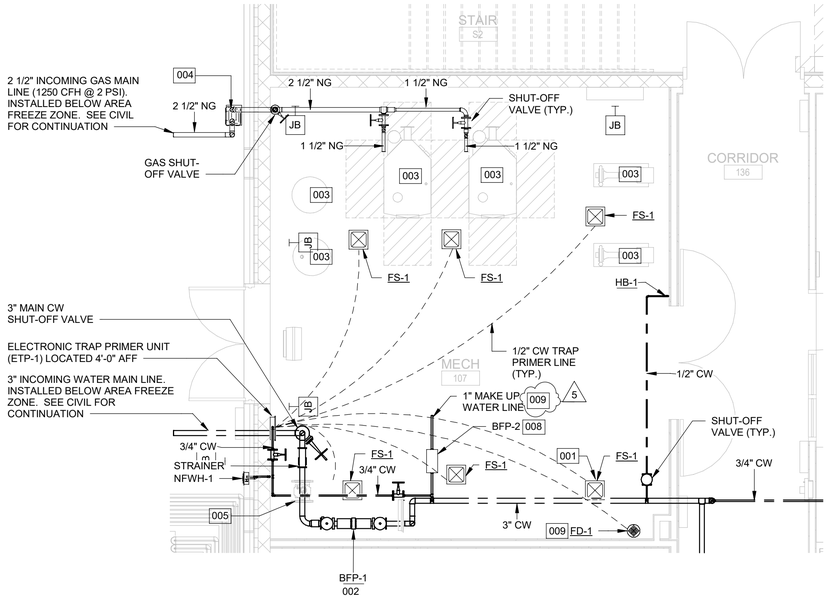
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

FIRE ALARM - DETAILS

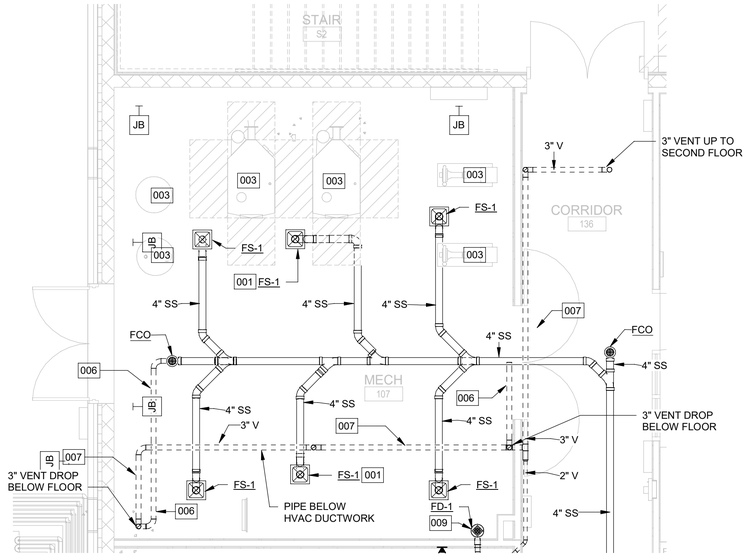
SHEET ID
FA501

AMENDMENT 0005



FIRST FLOOR PLAN - DOMESTIC WATER & NATURAL GAS ENLARGED MECHANICAL ROOM

B1 1/4" = 1'-0"



FIRST FLOOR PLAN - SANITARY & VENT ENLARGED MECHANICAL ROOM

B3 1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET P-001 FOR PLUMBING ABBREVIATIONS, SYMBOLS AND GENERAL NOTES.
2. EACH PLUMBING FIXTURE WITH HOT WATER SUPPLY MUST BE PROVIDED WITH INDIVIDUAL MIXING VALVES.
3. METER MUST BE MS/TP.IAW WITH THE AF DATA MANAGEMENT PLAN AND THE WATER AND GAS METERS WILL PROVIDE DATA TO THE ELECTRIC METER WHO WILL THEN TRANSFER DATA TO THE AMRS/EMCS VIA BAC NET. SEE SPECIFICATION SECTION 23.11.20 FOR MORE INFORMATION FROM AF METER DATA MANAGEMENT PLAN 2020.

KEYNOTES

#	
001	FLOOR SINK (FS-1) SHALL BE WITH TRAP PRIMER SUPPLY LINE (TYPICAL)
002	REDUCED PRESSURE BACKFLOW PREVENTER (BFP-1). SEE DETAIL 1 ON SHEET P-501.
003	MECHANICAL EQUIPMENT LOCATION. SEE MECHANICAL DRAWINGS FOR MORE INFORMATION (TYPICAL).
004	PULSE TYPE ADVANCED GAS METER FOR INTERGRATION TO BUCKLEY EMCS/ AMRS. SEE NOTE 3 ABOVE FOR MORE INFORMATION.
005	PULSE TYPE ADVANCED WATER METER FOR INTERGRATION TO BUCKLEY EMCS/ AMRS. SEE NOTE 3 ABOVE FOR MORE INFORMATION.
006	3" VENT PIPE BELOW FLOOR SLAB CONNECT TO THE TOP OF THE UNDERGROUND SANITARY PIPE.
007	COORDINATE VENT PIPE IN CEILING SPACE WITH HVAC DUCTWORK BEFORE COMMENCEMENT OF WORK.
008	1" BACKFLOW PREVENTER (BFP-2) FOR HVAC MAKE-UP WATER. DRAIN TO NEAREST FLOOR DRAIN.
009	3" FD-1 WITH FUNNEL ATTACHMENT TO RECEIVE CONDENSATE FROM MECHANICAL COOLING UNITS.
010	ROUTE 1" MAKE UP WATER LINE TO SUPPLY OUTDOOR HVAC H-1 AND H-2. SEE MECHANICAL DRAWING FOR HEAT TRACE ON OUTDOOR SECTION OF WATER PIPE.

5

COMMONWEALTH OF VIRGINIA
NASRI SLEEM
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PROFESSIONAL ENGINEER

GRAPHIC SCALE(S)

4 3 2 1 0 4 8
SCALE: 1/4" = 1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISE I.A.W. AMENDMENT 0005	FEB 2023

ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0008
CONTRACT NO.:
FILE NUMBER:
DESIGNED BY: B. HAMLIN
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SIZE: ANSI 'D'
FILE NAME:

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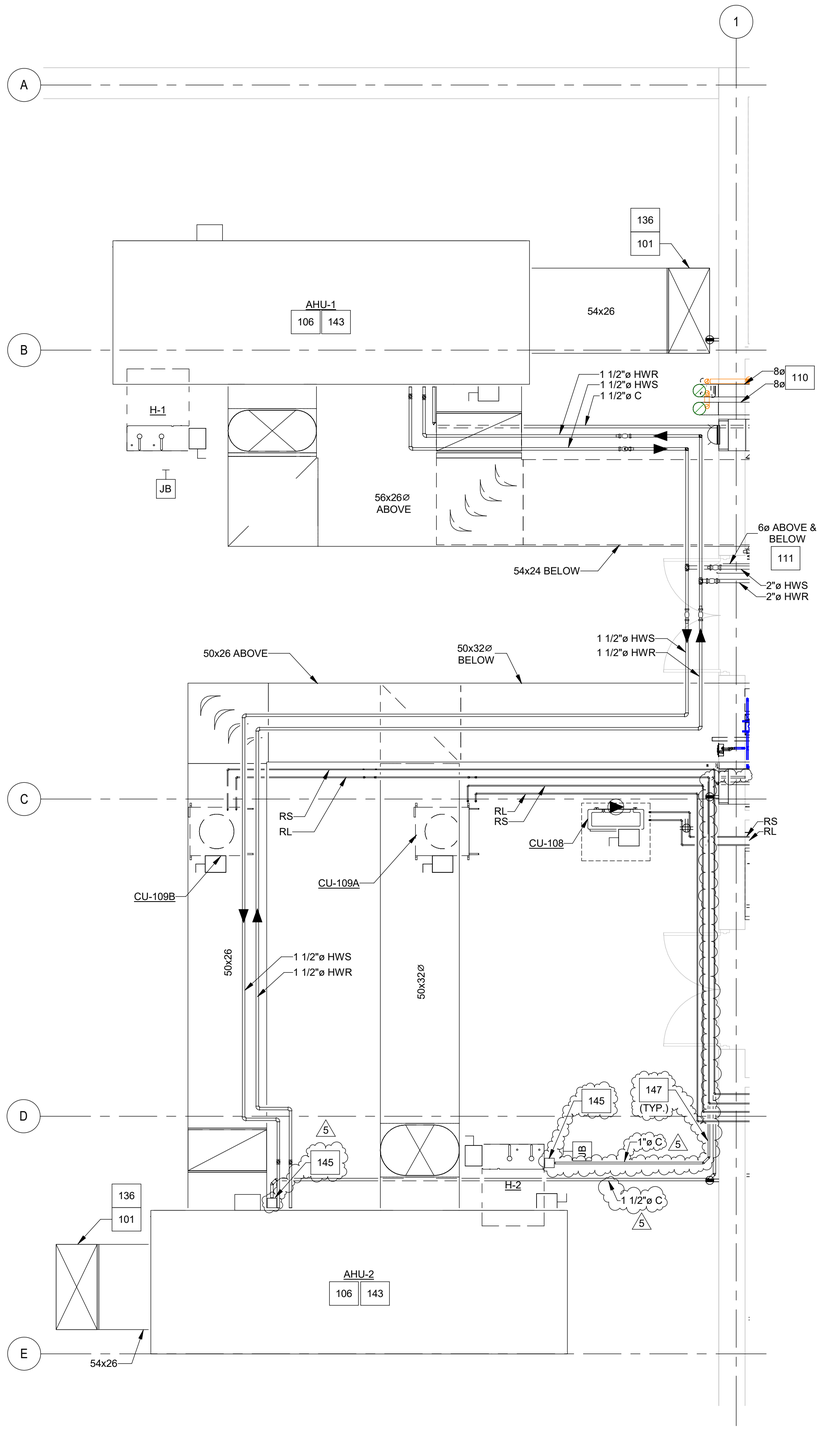
DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

PLUMBING - MECHANICAL ROOM ENLARGED PLAN

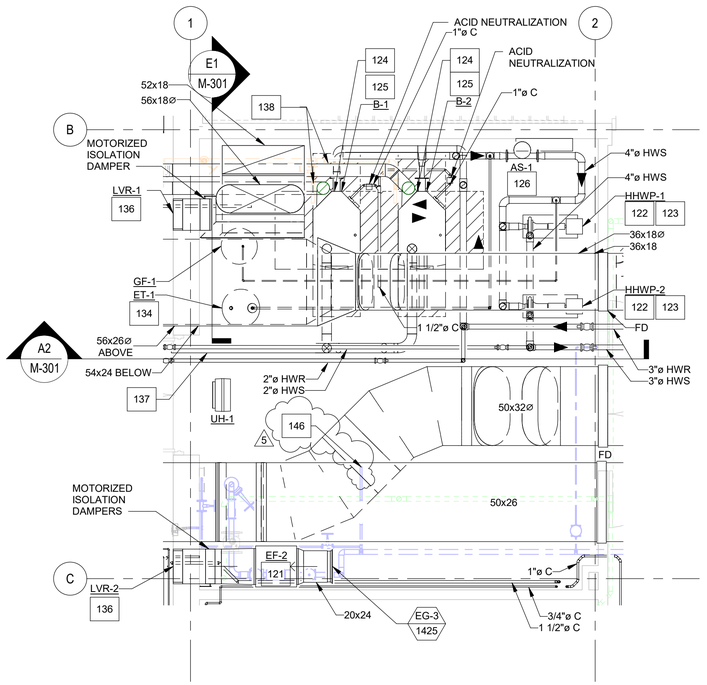
SHEET ID

P-303



A1 MECHANICAL - MECHANICAL YARD - ENGLARGED PLAN

1/4" = 1'-0"



A3 MECHANICAL - 107 MECHANICAL ROOM - ENLARGED PLAN

1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO SHEET G-003 FOR DRAWING INDEX.
2. REFER TO M-001 FOR ABBREVIATIONS, LEGEND, AND GENERAL NOTES.
3. CONNECTED PIPING SYSTEMS MUST NOT IMPART ANY WEIGHT TO EQUIPMENT ITSELF, AND VICE VERSA.
4. MAINTAIN EQUIPMENT ACCESS CLEARANCES FOR ELECTRICAL, MAINTENANCE, REPAIRS, MOTOR REPLACEMENT, ETC. ON SIDES.

KEYNOTES

#	
101	OUTDOOR AIR OPENING MUST BE MINIMUM 10' ABOVE GRADE.
106	PROVIDE PAD THAT EXTENDS 6" BEYOND EQUIPMENT CASING FOOTPRINT ON ALL SIDES.
110	TERMINATE CONDENSING BOILER EXHAUST FLUES ABOVE ROOF LINE, B-VENT TYPE RAIN CAPS.
111	PROVIDE COMBUSTION AIR INTAKES FOR B-1 AND B-2 A MINIMUM OF 10' ABOVE GRADE.
121	INLINE CENTRIFUGAL FAN MUST BE SUSPENDED FROM SUPPLEMENTAL SUPPORT FRAMING OR STRUCTURAL STEEL FRAMING WITH MANUFACTURER'S HOUSED SPRING ISOLATORS, OSHA MOTOR GUARD, AND ANY NECESSARY ACCESSORIES AND APPURTENANCES. PROVIDE FLEX INLET AND OUTLET CONNECTIONS TO DUCTWORK.
122	BASE MOUNTED END SUCTION PUMP MUST BE MOUNTED ON AN MANUFACTURER'S INERTIA BASE; PUMP MUST BE CRITICALLY DAMPENED FOR VIBRATION. SUBMIT DESIGNED AND CERTIFIED INERTIA BASE WITH HOUSED SPRING VIBRATION ISOLATORS BY QUALIFIED PROFESSIONAL.
123	VFDS MUST BE WALL MOUNTED, LOCATED SO THAT THERE IS NOT MORE THAN 50'-0" TOTAL POWER FEEDER LENGTH BETWEEN PUMP AND VFD, INCLUDING VERTICAL RUNS.
124	BOILER CONDENSATE NEUTRALIZING KIT MUST BE LOCATED SO THAT DRAIN PIPE FROM BOILER IS ABLE TO GRAVITY DRAIN TO UNIT. ROUTE DRAIN PIPE FROM NEUTRALIZING KIT TO NEAREST FLOOR DRAIN SLOPED AT 1/8" PER FOOT (1%) IN A MANNER THAT DOES NOT CREATE A TRIPPING HAZARD.
125	HIGH EFFICIENCY NATURAL GAS BOILER MUST BE PROVIDED WITH FLEX CONNECTIONS, LINE SIZED LEAK TIGHT ISOLATION BUTTERFLY VALVES AT CONNECTIONS AND ISOLATION CONTROL VALVE. PROVIDE TRANSITIONS AS NECESSARY TO BOILER CONNECTIONS.
126	INLINE TANGENTIAL AIR SEPARATOR MUST BE SUSPENDED FROM SUPPLEMENTAL SUPPORT FRAMING OR STRUCTURAL STEEL FRAMING, WITH FLEX AND LINE SIZED LEAK TIGHT ISOLATION BUTTERFLY VALVES AT CONNECTIONS. PROVIDE AUTOMATIC AIR VENT WITH LINE SIZE ISOLATION BALL VALVE ON TOP CONNECTION AND HOSE-END DRAIN BALL VALVE WITH THREADED CAP ATTACHED BY CHAIN AT BOTTOM CONNECTION. REFER TO PLUMBING DRAWINGS FOR 1" MAKEUP WATER SUPPLY.
134	VERTICAL BASE MOUNTED DIAPHRAGM EXPANSION TANK MUST BE BASE MOUNTED ON INTEGRAL FACTORY SUPPORTS, WITH FLEX AND LINE SIZED LEAK TIGHT ISOLATION BALL VALVES AT CONNECTIONS. PROVIDE AUTOMATIC AIR VENT WITH LINE SIZE ISOLATION BALL VALVE ON TOP CONNECTION, ISOLATION BALL VALVE AT SYSTEM MAKEUP CONNECTIONS AND HOSE-END DRAIN BALL VALVE WITH THREADED CAP ATTACHED BY CHAIN AT BOTTOM CONNECTION. INSULATE TANK ASSEMBLY AS SCHEDULED.
136	OUTSIDE AIR INTAKE AND EXHAUST AIR LOUVERS MUST BE PROVIDED WITH INTEGRAL ISOLATION DAMPER WITH MOTORIZED ACTUATOR. BOTTOM OF LOUVER MUST BE A MINIMUM OF 10'-0" ABOVE GRADE.
137	SCHEDULE 40 PVC COMBUSTION AIR MAKEUP DUCT TO EACH INDIVIDUAL BOILER AND DOMESTIC WATER HEATER MUST BE SLOPED 1/4" PER FOOT BACK TO OUTSIDE. EACH DUCT MUST BE INSTALLED A MINIMUM OF 10' ABOVE GRADE AND EXTEND 2" BEYOND BUILDING WALL SURFACE, WITH ½"STAINLESS STEEL MESH. STOP EACH DUCT INLET 4" BEHIND ARCHITECTURAL SCREEN PANEL; PANEL MUST BE PERFORATED SIZED SO THAT PRESSURE DROP IS NEGLIGIBLE; COORDINATE WITH ARCHITECTURE.
138	HORIZONTAL SECTION OF BOILER EXHAUST FLUE DUCT MUST BE SLOPED 1/4" PER FOOT BACK TO BOILER CONNECTION.
143	PROVIDE AIR HANDLING UNIT WITH SEPARATE INTEGRAL MINIMUM AND MAXIMUM OUTSIDE AIR DAMPERS.
145	PROVIDE CONDENSATE PUMP, MINIMUM 2.3 GPM AT 12 FT WC WITH REMOVABLE INSULATION JACKET AND CONSTRUCTION SUITABLE FOR CONDENSATE STREAM FLUID TEMPERATURE (I.E. COOLING COIL CONDENSATE AT AHU, STEAM CONDENSATE RETURN AT HUMIDIFIER). PROVIDE TRAP AT DISCHARGE PIPE CONNECTION. PROVIDE UNIT WITH FACTORY MOUNTED, WIRED AND CONFIGURED CONDENSATE PAN OVERFLOW SWITCH.
146	ROUTE 1" MAKE UP WATER LINE TO SUPPLY OUTDOOR HVAC H-1 AND H-2. PROVIDE HEAT TRACE ON OUTDOOR SECTION OF PIPE.
147	PROVIDE HEAT TRACE ON OUTDOOR SECTION OF HEATING HOT WATER, CONDENSATE, AND MAKEUP WATER PIPES.

COMMONWEALTH OF VIRGINIA
NASRI SLEEM
Lic. No. 033845
12/14/2022
PROFESSIONAL ENGINEER

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:

DESIGNED BY: A. HONDA
DRAWN BY: A. HONDA
CHECKED BY: N. SLEEM
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

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Omaha, NE

AECOM
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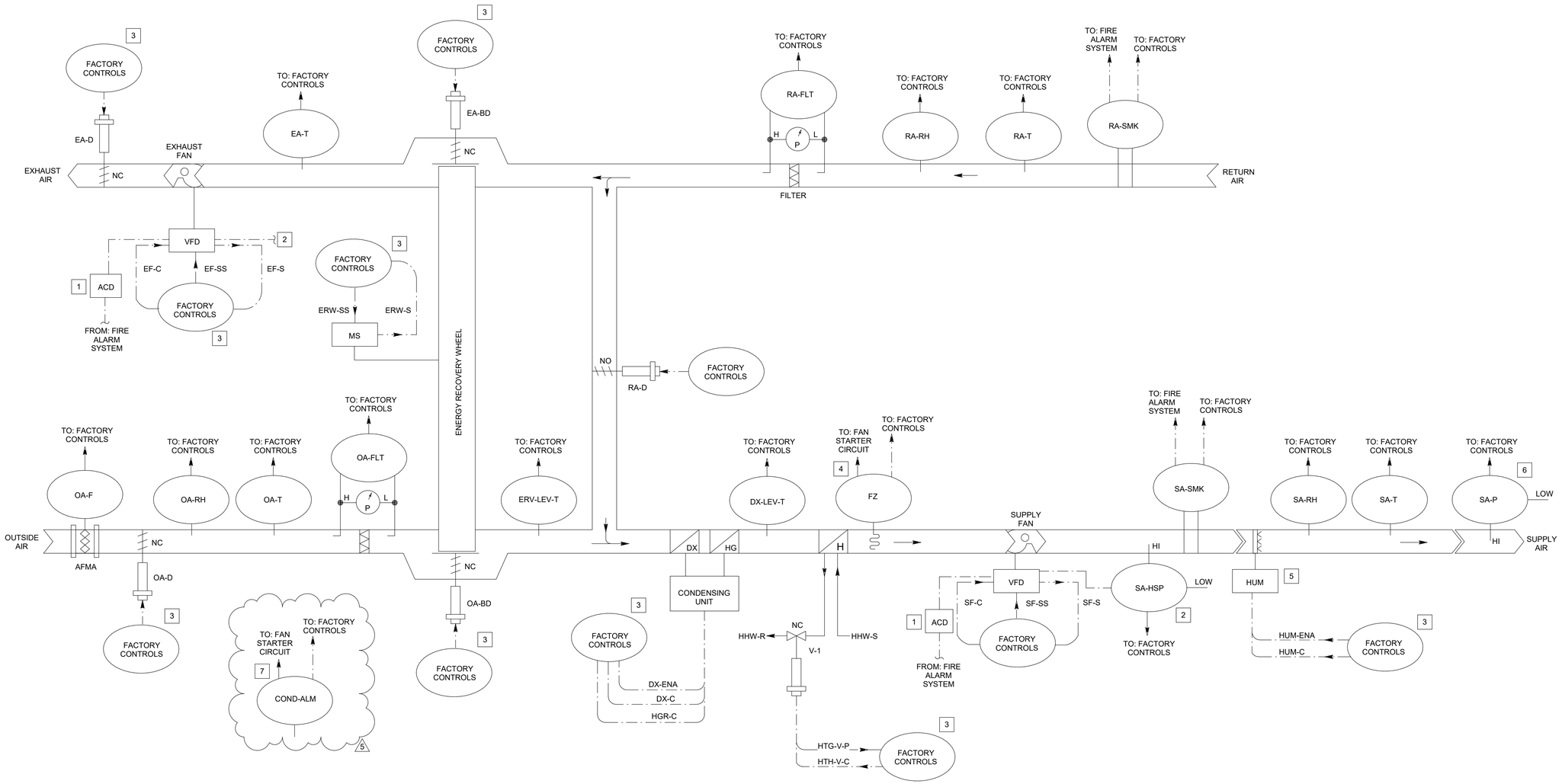
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

MECHANICAL - ENLARGED PLANS

SHEET ID
M-401

AMENDMENT 0005



B1 AIR HANDLING UNIT (AHU-1 AND 2, TYPICAL) - CONTROL DIAGRAM

NTS

GENERAL SHEET NOTES

1. REFER TO SHEET M-001 AND M-800 FOR SYMBOLS AND ABBREVIATIONS.

KEYNOTES

1. HARDWIRE INTERLOCK FAN WITH FIRE ALARM SYSTEM THROUGH CONTROL MODULE (ACD) TO STOP UNIT WHEN ANY DUCT DETECTOR ASSOCIATED WITH FAN SENSES PARTICLES OF COMBUSTION. THIS INTERLOCK MUST BE HARD WIRED AND NOT PERFORMED THROUGH BAS. ACD AND DUCT SMOKE DETECTOR FURNISHED AND INSTALLED UNDER DIVISION 28.
2. HARDWIRE INTERLOCK FAN WITH HIGH DUCT PRESSURE SWITCH TO STOP FAN WHEN SWITCH IS ACTIVATED.
3. AHU MUST BE PROVIDED WITH UNIT MANUFACTURER'S PACKAGED CONTROLS INCLUDING BACNET COMPATIBLE CONTROLLER/FACTORY CONTROLLER WITH BACNET NETWORK INTERFACE, SENSORS AND OTHER CONTROL DEVICES FOR REMOTE CONTROL AND MONITORING. CONNECT TO BAS NETWORK AND INCORPORATE CONTROL AND MONITORING POINTS LISTED IN POINTS SCHEDULE INTO BAS.
4. PROVIDE COVERAGE OF 12 INCHES OF ACTIVE ELEMENT PER SQUARE FOOT OF COIL. HARD WIRE INTERLOCK FREEZESTAT WITH FAN TO STOP FAN WHEN FREEZESTAT IS ACTIVATED.
5. HUMIDIFIER MUST BE PROVIDED WITH AIR FLOW SWITCH IN DOWNSTREAM, WHICH WILL DISABLE HUMIDIFIER VIA HARDWIRE INTERLOCK IF THERE IS NO AIR FLOW.
6. SEE M-110 FOR LOCATIONS OF PRESSURE SENSORS.
7. HARD WIRE INTERLOCK CONDENSATE OVERFLOW SWITCH WITH FAN TO STOP FAN WHEN SWITCH IS ACTIVATED.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

DESIGNED BY: R. JEON
DRAWN BY: R. JEON
CHECKED BY: N. SLEEM
SUBMITTED BY:
SIZE: ANSI 'D'
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:
FILE NAME:

US ARMY CORPS OF ENGINEERS
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ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

MECHANICAL - CONTROL DIAGRAMS

SHEET ID

M-801

AIR HANDLING UNIT (AHU-1 AND AHU-2, TYPICAL) - POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTING (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION (SEE NOTES)	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER (AND PROPERTY ID)	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECT TYPE & INSTANCE NUMBER OR COMMANDABLE	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	TREND OBJECT LOCATION (L OR R), TYPE AND INSTANCE NUMBER (PROVIDE DDC ID FOR REMOTE IN NOTES)	ALARM INFORMATION: ALARM TYPE (PROVIDE DDC ID FOR REMOTE IN NOTES)	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER	CONFIGURATION INFORMATION
PROOF & SAFETIES	SF-S	SUPPLY FAN STATUS	< >	~	ON/OFF	NET-IN	N/A	~	V	~	FAN PROOF ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EF-S	EXHAUST FAN STATUS	< >	~	ON/OFF	NET-IN	N/A	~	V	~	FAN PROOF ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	ERW-S	ENERGY RECOVERY WHEEL STATUS	< >	~	ON/OFF	NET-IN	N/A	~	V	~	FAN PROOF ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EA-D-P	EXHAUST AIR DAMPER POSITION	< >	~	0-100%	NET-IN	N/A	~	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	RA-D-P	RETURN AIR DAMPER POSITION	< >	~	0-100%	NET-IN	N/A	~	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	OA-D-P	OUTSIDE AIR DAMPER POSITION	< >	~	0-100%	NET-IN	N/A	~	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	OA-BD-P	OUTSIDE AIR BYPASS DAMPER POSITION	< >	~	0-100%	NET-IN	N/A	~	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EA-BD-P	EXHAUST AIR BYPASS DAMPER POSITION	< >	~	0-100%	NET-IN	N/A	~	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	HTG-V-P	HEATING VALVE POSITION	< >	~	0-100%	NET-IN	N/A	~	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SA-HSR	SUPPLY AIR HIGH STATIC PRESSURE SWITCH	< >	2.5 IN-WC	< IN-WC>	NET-IN	N/A	~	V	~	HIGH PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	FZ	FREEZESTAT	< >	37 DEG F	< DEG F>	NET-IN	N/A	~	V	~	FREEZESTAT ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	COND-ALM	CONDENSATE OVERFLOW ALARM	< >	~	ALARM/NORMAL	NET-IN	N/A	~	V	~	CONDENSATE ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SA-SMK	SUPPLY AIR SMOKE	< >	~	ALARM/NORMAL	NET-IN	N/A	~	V	~	SA MOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	RA-SMK	RETURN AIR SMOKE	< >	~	ALARM/NORMAL	NET-IN	N/A	~	V	~	RA SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
SCHEDULING	SYS-OCC-SCHED	SYSTEM OCCUPANCY SCHEDULE	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SYS-OCC-C	SYSTEM OCCUPANCY COMMAND	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SYS-OCC	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCCUPIED/UNOCCUPIED	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
START/STOP	SF-SS	SUPPLY FAN START/STOP	< >	~	ON/OFF	NET-OUT	Y	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EF-SS	EXHAUST FAN START/STOP	< >	~	ON/OFF	NET-OUT	Y	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	ERW-SS	ENERGY RECOVERY WHEEL START/STOP	< >	~	ON/OFF	NET-OUT	Y	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
SUPPLY FAN SPEED CONTROL	SA-P	SUPPLY AIR STATIC PRESSURE	< >	< PSI>	~	NET-IN	N/A	C	VO	Y	SA PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SA-P-SP	SUPPLY AIR STATIC PRESSURE SETPOINT	~	< PSI>	0.25 ~ 1.5 IN.WG.	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SF-C	SUPPLY FAN COMMAND	< >	~	0-100%	NET-OUT	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SUPPLY FAN SPEED CONTROL SETTING	PROPORTIONAL CONSTATN	< >	~	< >	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	< >	~	< >	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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		MAXIMUM OUPUT	< >	~	< >	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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		INTEGRAL CONSTANT	< >	~	< >	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
		BIAS	< >	~	< >	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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OUTDOOR/RETURN/EXHAUST & ECONOMIZER MODE CONTROL	SYS-OCC	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	~	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	OA-F	OUTSIDE AIR FLOW	< >	~	< CFM>	NET-IN	N/A	~	V	Y	LO/HI OA FLOW ALARM	INFO	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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	ECON-ENA-SP	ECONOMIZER MODE ENABLE SETPOINT (OAT)	~	< DEG F>	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EA-D-C	EXHASUT AIR DAMPER COMMAND	< >	~	0-100%	NET-OUT	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	RA-D-C	RETURN AIR DAMPER COMMAND	< >	~	0-100%	NET-OUT	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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		BIAS	< >	~	< >	NET-IN	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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	DX-C	DX COOLING COMMAND	< >	~	0-100%	NET-OUT	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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SUPPLY AIR HUMIDITY CONTROL	RA-RH	RETURN AIR HUMIDITY	< >	~	< %>	NET-IN	N/A	C	V	~	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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OTHER POINTS	RA-T	RETURN AIR TEMPERATURE	< >	~	< DEG F>	NET-IN	N/A	~	V	Y	ALARM	INFO	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EA-T	EXHAUST AIR TEMPERATURE	< >	~	< DEG F>	NET-IN	N/A	~	V	Y	ALARM	INFO	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	ERW-LEV-T	ERW LEAVING AIR TEMPERATURE	< >	~	< DEG F>	NET-IN	N/A	~	V	Y	ALARM	INFO	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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	OA-T	OUTDOOR AIR TEMPERATURE	< >	~	< DEG F>	NET-IN	N/A	~	V	Y	ALARM	INFO	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	OA-RH	OUTDOOR AIR RELATIVE HUMIDITY	< >	~	< %>	NET-IN	N/A	~	V	Y	ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	OA-FLT	OUTDOOR AIR FILTER PRESSURE	< >	~	ALARM/NORMAL	NET-IN	N/A	~	V	Y	ALARM	INFO	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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LEGEND

"< >" INDICATE ENTRY MADE BY BUILDING CONTRACTOR
" -- " INDICATE NO ENTRY REQUIRED.
"N/A" INDICATES NO VALID ENTRY AVAILABLE.

NOTES

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COMMONWEALTH OF VIRGINIA
NASIR SLEEM
Lic. No. 033845
12/14/2022
PROFESSIONAL ENGINEER

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

DESIGNED BY: R. JEON
DRAWN BY: R. JEON
CHECKED BY: N. SLEEM
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD., SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

MECHANICAL - POINT SCHEDULES

SHEET ID
M-804

AMENDMENT 0005

MISCELLANEOUS POINTS - POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTING (WITH UNITS)	RANGE (WITH UNITS)	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVRD	TREND REQ'D	ALARMING: ALARM CONDITION (SEE NOTES)	ALARMING: ALARM PRIORITY	ALARMING: M&C ROUTING	PRIMARY POINT INFORMATION: OBJECT TYPE AND INSTANCE NUMBER (AND PROPERTY ID)	PRIMARY POINT INFORMATION: SNVT NAME	PRIMARY POINT INFORMATION: SNVT TYPE	PRIMARY POINT INFORMATION: NIAGARA ID	NETWORK DATA EXCHANGE: DATA FROM	NETWORK DATA EXCHANGE: DATA TO	OVERRIDES: OBJECT TYPE & INSTANCE NUMBER OR COMMANDABLE	OVERRIDES: SNVT NAME	OVERRIDES: SNVT TYPE	TREND OBJECT LOCATION (L OR R), TYPE AND INSTANCE NUMBER (PROVIDE DDC ID FOR REMOTE IN NOTES)	ALARM INFORMATION: ALARM TYPE (PROVIDE DDC ID FOR REMOTE IN NOTES)	ALARM INFORMATION: NOTIFICATION CLASS OBJECT INSTANCE NUMBER	ALARM INFORMATION: EVENT ENROLLMENT OBJECT INSTANCE NUMBER	CONFIGURATION INFORMATION
OTHER POINTS	EM	ELECTRIC METER - TOTAL KW	< >	~	< KW>	NET-IN	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EM	ELECTRIC METER - PEAK DEMAND KW	< >	~	< KW>	NET-IN	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EM	ELECTRIC METER - VLN A/B/C PHASE (TYP.)	< >	~	< V>	NET-IN	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EM	ELECTRIC METER - AMPS A/B/C PHASE (TYP.)	< >	~	< A>	NET-IN	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EM	ELECTRIC METER - KW A/B/C PHASE (TYP.)	< >	~	< KW>	NET-IN	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	WM	WATER METER	< >	~	< GPM>	PULSE	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
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	GM	GAS METER	< >	~	< CFM>	PULSE	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	GM	GAS METER - TOTAL CONSUMPTION	< >	~	< CCF>	PULSE	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	EMER-SW	EMERGENCY AIR DISTRIBUTION SHUTDOWN SWITCH	< >	~	ALARM/NORMAL	BI	N/A	~	VO	Y	EMER. AIR. DIST. ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	GLY-ALM	GLYCOL ALARM	< >	~	ALARM/NORMAL	BI	N/A	~	VO	Y	GLYCOL ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SPD-MAL	SURGE PROTECTION DEVICE MALFUNCTION	< >	~	ALARM/NORMAL	BI	N/A	~	VO	Y	SPD MALF. ALARM	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >
	SPD-ALM	SURGE PROTECTION DEVICE ALARM/REPLACEMENT	< >	~	ALARM/NORMAL	BI	N/A	~	VO	Y	SPD ALARM/REPLACE	CRIT	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >	< >

LEGEND

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AIR HANDLING UNIT (AHU-1 AND AHU-2, TYPICAL):

THE AIR HANDLING UNIT MUST BE CONTROLLED BY A PACKAGED CONTROLS WITH BACNET INTERFACE/GATEWAY OR A BACNET-COMPATIBLE UNIT CONTROLLER PROVIDED BY THE UNIT MANUFACTURER. THE UNIT MUST BE DIRECTLY CONNECTED TO THE BAS NETWORK USING BACNET MS/TP AND COMMUNICATE WITH THE BAS. THE CONTROLS CONTRACTOR MUST COORDINATE WITH UNIT PROVIDER AND PROVIDE NECESSARY CONTROL POINT MAPPING AND SOFTWARE MODIFICATION TO THE BAS FOR REMOTE CONTROL AND MONITORING OF THE UNIT. REFER TO POINT SCHEDULE FOR A LIST OF CONTROL AND MONITORING POINTS THAT MUST BE INCORPORATED INTO THE BAS. PROVIDE NECESSARY GRAPHICAL DISPLAYS SHOWING THE OPERATING STATUS, PARAMETERS AND SET POINTS.

SUPPLY/EXHAUST FAN OFF-AUTO OPERATION: OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE OFF MODE, THE FAN MUST BE STOPPED. IN THE AUTO MODE, THE BAS WILL START/STOP THE UNIT THROUGH THE UNIT CONTROLLER AS DESCRIBED BELOW. UPON ACTIVATION, SAFETIES MUST BE HARD WIRED TO THE VFD TO STOP THE UNIT SUPPLY AND EXHAUST FANS IN THE AUTO MODE.

SUPPLY/EXHAUST FAN LOCAL-REMOTE SPEED CONTROL: LOCAL-REMOTE SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE (VFD) THROUGH THE DRIVE'S KEYPAD. IN THE LOCAL MODE, THE FAN SPEED MUST BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE RESPECTIVE DRIVE CONTROL PANEL. IN THE REMOTE MODE, THE FAN SPEED MUST BE CONTROLLED BY THE BAS THROUGH THE UNIT CONTROLLER.

AUTOMATIC MODE START/STOP CONTROL: THE BAS MUST START AND STOP THE AIR HANDLING UNIT. TO START THE UNIT, THE BAS MUST SEND A START SIGNAL TO THE UNIT CONTROLLER, WHICH WILL START THE SUPPLY FAN. IF THE FAN DOES NOT START AFTER A 60 SECOND (ADJUSTABLE) TIME DELAY, A UNIT FAILURE ALARM MUST BE ISSUED AND THE START COMMAND MUST BE CANCELED. TO STOP THE UNIT, THE BAS MUST SEND A STOP COMMAND TO THE UNIT CONTROLLER, WHICH WILL DE-ENERGIZE THE SUPPLY FAN. THE UNIT MUST BE PLACED ON A TIME SCHEDULE:

OPTIMAL START: THE BAS MUST START THE UNIT ACCORDING TO AN OPTIMAL START ROUTINE. COOL DOWN MODE MUST BE USED IF THE SPACE TEMPERATURE, AS SENSED BY ANY ONE OF THE ASSOCIATED VAV BOX ROOM TEMPERATURE SENSORS, IS ABOVE THE OCCUPIED SET POINT. WARM UP MODE MUST BE USED IF THE SPACE TEMPERATURE, AS SENSED BY ANY ONE OF THE ASSOCIATED VAV BOX ROOM TEMPERATURE SENSORS, IS BELOW THE OCCUPIED SET POINT. AT THE SCHEDULED OCCUPANCY TIME, THE UNIT MUST START IF NOT ALREADY STARTED BY THE OPTIMAL START ROUTINE, AND THE UNIT MUST BE SWITCHED TO THE OCCUPIED MODE.

SCHEDULED STOP: THE BAS MUST STOP THE UNIT WHEN THE OCCUPANCY SCHEDULE INDICATES THAT THE OCCUPIED PERIOD HAS ENDED.

UNOCCUPIED START/STOP: IN THE UNOCCUPIED MODE, THE BAS MUST START THE UNIT AND THE UNIT CONTROLLER WILL OPERATE THE SYSTEM IN THE UNOCCUPIED COOLING MODE IF THE AVERAGE SPACE TEMPERATURE, AS SENSED BY THE ASSOCIATED VAV BOX SPACE TEMPERATURE SENSORS, RISES ABOVE 80°F (ADJUSTABLE). THE UNIT MUST OPERATE UNTIL THE AVERAGE SPACE TEMPERATURES HAVE DROPPED BELOW 77°F (ADJUSTABLE). THE BAS MUST START THE UNIT AND THE UNIT CONTROLLER MUST OPERATE THE UNIT IN THE UNOCCUPIED HEATING MODE IF THE AVERAGE SPACE TEMPERATURE DROPS BELOW 55°F (ADJUSTABLE). THE UNIT MUST OPERATE UNTIL THE SPACE TEMPERATURE IS AT LEAST 58°F (ADJUSTABLE).

SUPPLY FAN AUTOMATIC SPEED CONTROL: WHEN THE SUPPLY FAN VFD IS STARTED, THE UNIT CONTROLLER MUST CONTROL THE SPEED OF THE VFD TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE AS SENSED BY STATIC PRESSURE SENSOR AT THE SUPPLY DUCT STATIC PRESSURE SET POINT. WHEN THE SUPPLY DUCT STATIC PRESSURE IS BELOW THE SET POINT, THE SPEED MUST INCREASE AND WHEN THE SUPPLY DUCT STATIC PRESSURE IS ABOVE THE SET POINT, THE SPEED MUST DECREASE. WHEN THE VFD IS STOPPED, THE UNIT CONTROLLER MUST RETURN THE VFD TO A SPEED OF ZERO.

SUPPLY DUCT STATIC PRESSURE SET POINT: THE SET POINT MUST BE RESET BASED ON THE VAV BOX REQUIRING THE MOST STATIC PRESSURE. THE UNIT CONTROLLER MUST MONITOR THE POSITIONS OF THE DAMPERS IN THE VAV BOXES AND SEND A RESET SIGNAL TO THE UNIT CONTROLLER. THE SUPPLY AIR STATIC PRESSURE SET POINT MUST BE LOWERED UNTIL ONE OF THE VAV BOX DAMPERS HAS MODULATED COMPLETELY OPEN. THIS SET POINT MUST BE INCREASED SHOULD MORE THAN ONE VAV BOX DAMPER COMPLETELY OPEN. THE STATIC PRESSURE SET POINT MUST NOT BE ALLOWED TO RISE ABOVE 1.5 INCHES W.C. OR FALL BELOW 0.25 INCHES W.C.

COOLING CONTROL: WHEN THE SUPPLY AIR TEMPERATURE RISES ABOVE THE SET POINT, INITIALLY SET AT 54°F (ADJUSTABLE), THE UNIT CONTROLLER MUST OPERATE THE DX COOLING COIL TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE SUPPLY AIR TEMPERATURE COOLING SET POINT. WHEN THE SUPPLY FAN IS OFF, THE DX COOLING COIL MUST BE DISABLED. COOLING CONTROL MUST BE ACTIVATED IN COORDINATION WITH HEATING CONTROL SO BOTH COOLING AND HEATING CONTROL DO NOT OPERATE SIMULTANEOUSLY.

HEATING CONTROL: WHEN THE SUPPLY AIR TEMPERATURE DROPS BELOW THE SET POINT, INITIALLY SET AT 52°F (ADJUSTABLE), THE UNIT CONTROLLER MUST MODULATE THE HEATING CONTROL VALVE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE SUPPLY AIR TEMPERATURE HEATING SET POINT. WHEN THE SUPPLY FAN IS OFF, THE HEATING CONTROL VALVE MUST BE CLOSED. HEATING CONTROL MUST BE ACTIVATED IN COORDINATION WITH COOLING CONTROL SO BOTH COOLING AND HEATING CONTROL DO NOT OPERATE SIMULTANEOUSLY.

AIR HANDLING UNIT (AHU-1 AND AHU-2, TYPICAL): CONTINUED

ECONOMIZER/OUTDOOR AIR CONTROL: WHEN THE SUPPLY FAN IS STARTED IN THE OCCUPIED MODE, THE UNIT CONTROLLER MUST MODULATE OUTDOOR AIR DAMPER, RETURN AIR DAMPER AND EXHAUST AIR DAMPER TO MAINTAIN THE MINIMUM OUTDOOR AIR FLOW, AS SENSED BY AIR FLOW MEASURING STATION. WHEN THE UNIT IS OFF, OUTDOOR AIR DAMPER AND EXHAUST AIR DAMPER MUST BE CLOSED AND RETURN AIR DAMPER MUST OPEN.

MECHANICAL COOLING: THE UNIT CONTROLLER MUST MONITOR OUTDOOR AIR TEMPERATURE. WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE THE ECONOMIZER ENABLE SET POINT, INITIALLY SET AT 70°F (ADJUSTABLE), IN THE OCCUPIED MODE, THE UNIT CONTROLLER MUST MODULATE OUTDOOR AIR DAMPER, RETURN AIR DAMPER AND EXHAUST AIR DAMPER TO MAINTAIN THE MINIMUM OUTDOOR AIR FLOW AT SET POINT. THE OUTDOOR AIR DAMPER WILL NOT OPEN BEYOND THE MINIMUM SETTING DURING THE MECHANICAL COOLING MODE.

ECONOMIZER COOLING: WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW THE ECONOMIZER ENABLE SET POINT, INITIALLY SET AT 70°F (ADJUSTABLE), IN THE OCCUPIED MODE, THE UNIT CONTROLLER MUST MODULATE OUTDOOR AIR DAMPER, RETURN AIR DAMPER AND EXHAUST AIR DAMPER BEYOND THE SCHEDULED MINIMUM OUTDOOR AIR FLOW TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SET POINT. AS THE SUPPLY AIR TEMPERATURE RISES ABOVE THE SET POINT, THE OUTDOOR AIR DAMPER MUST MODULATE FROM MINIMUM OUTDOOR AIR FLOW TO FULLY OPEN POSITION. AS THE SUPPLY AIR TEMPERATURE DROPS BELOW THE SET POINT, THE OUTDOOR AIR DAMPER MUST MODULATE FROM FULLY OPEN POSITION TO MINIMUM OUTDOOR AIR FLOW.

ENERGY RECOVERY WHEEL BYPASS DAMPERS: DURING THE MECHANICAL COOLING MODE, THE ENERGY RECOVERY WHEEL BYPASS DAMPERS FOR BOTH OUTDOOR AND EXHAUST AIRSTREAMS MUST REMAIN CLOSED. DURING THE ECONOMIZER MODE, THE DAMPERS MUST BE FULLY OPEN.

DURING UNOCCUPIED AND WARM UP/COOL DOWN MODES OF UNIT OPERATION, THE OUTDOOR AIR DAMPER AND EXHAUST AIR DAMPER MUST BE CLOSED, AND RETURN AIR DAMPER MUST BE OPEN.

EXHAUST FAN SPEED CONTROL: WHEN THE EXHAUST FAN VFD IS STARTED IN THE OCCUPIED MODE, THE UNIT CONTROLLER MUST CONTROL THE SPEED OF THE VFD TO MAINTAIN THE EXHAUST FAN SPEED EQUAL TO THE SUPPLY FAN SPEED PLUS/MINUS AN ADJUSTABLE OFFSET TO MAINTAIN THE POSITIVE BUILDING PRESSURE. THIS FAN SPEED OFFSET BETWEEN SUPPLY AND EXHAUST FAN MUST BE DETERMINED IN CONSULTING WITH AIR BALANCING CONTRACTOR DURING THE COMMISSIONING. DURING THE UNOCCUPIED AND WARM UP/COOL DOWN MODES OF UNIT OPERATION, THE EXHAUST FAN MUST REMAIN OFF.

DEHUMIDIFICATION CONTROL: WHEN THE RETURN AIR HUMIDITY RISES ABOVE THE RETURN AIR DEHUMIDIFICATION SET POINT, THE UNIT CONTROLLER MUST OVERRIDE THE TEMPERATURE CONTROL. THE UNIT CONTROLLER MUST RESET THE DISCHARGE AIR TEMPERATURE SETPOINT AND OPERATE THE DX COOLING COIL AS REQUIRED TO MAINTAIN THE RETURN DUCT RELATIVE HUMIDITY AT OR BELOW THE RETURN AIR DEHUMIDIFICATION SET POINT, INITIALLY SET AT 60% RH (ADJUSTABLE). DURING THE DEHUMIDIFICATION MODE, THE UNIT CONTROLLER MUST MODULATE THE HOT GAS REHEAT TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SET POINT, TO AVOID OVER COOLING. WHEN THE RETURN AIR HUMIDITY FALLS BELOW THE DEHUMIDIFICATION SET POINT, CONTROL OF COOLING MUST RETURN TO NORMAL OPERATION.

HUMIDIFIER CONTROL: THE HUMIDIFIER OUTPUT MUST BE ADJUSTABLE FROM 0 TO 100 PERCENT. THE UNIT CONTROLLER MUST ENABLE AND MODULATE THE HUMIDIFIER OUTPUT AS REQUIRED TO MAINTAIN THE SPACE HUMIDITY, AS SENSED BY THE RETURN AIR HUMIDITY SENSOR AT OR ABOVE THE SET POINT, INITIALLY SET AT 40 % RH (ADJUSTABLE). WHEN THE FAN IS OFF, THE HUMIDIFIER MUST BE DISABLED.

5 DUCT HIGH STATIC PRESSURE ALARM: WHEN A HIGH DUCT PRESSURE IS SENSED BY THE DUCT STATIC PRESSURE SWITCH, THE UNIT SUPPLY AND EXHAUST FANS MUST BE STOPPED AND AN ALARM SIGNAL MUST BE SENT TO THE UNIT CONTROLLER AND THE BAS. THE DUCT PRESSURE SWITCH MUST BE SET AT 1.5" (MANUALLY ADJUSTABLE) AND MUST BE MANUALLY RESET AT THE SWITCH.

CONDENSATE OVERFLOW ALARM: WHEN THE CONDENSATE OVERFLOW SWITCH IN DRIP PAN IS ACTIVATED, THE UNIT MUST BE DISABLED, UNIT SUPPLY AND EXHAUST FANS MUST BE STOPPED, AND AN ALRM SIGNAL MUST BE SENT TO THE UNIT CONTROLLER AND THE BAS. THE ALARM CONDITION MUST BE VERIFY AND MANUALLY RESET BEFORE THE UNIT IS PLACED IN NORMAL OPERATION.

FIRE ALARM SHUTDOWN: WHEN PARTICLES OF COMBUSTION ARE SENSED BY THE SUPPLY AIR DUCT SMOKE DETECTOR OR THE RETURN AIR DUCT SMOKE DETECTOR, A DUCT SMOKE ALARM SIGNAL MUST BE SENT TO THE FIRE ALARM SYSTEM. UPON RECEIVING AN ALARM SIGNAL FROM DUCT SMOKE DETECTOR, THE FIRE ALARM SYSTEM MUST ACTIVATE A CONTROL MODULE (CM) TO STOP THE FAN. WHEN THE FIRE ALARM CONDITION HAS BEEN CLEARED, AND THE FIRE ALARM SYSTEM HAS BEEN RESET, THE UNIT MUST BE RETURNED TO NORMAL OPERATION.

DIRTY FILTER ALARM: DIFFERENTIAL PRESSURE SWITCH MUST MONITOR THE PRESSURE DROP AT THE FILTERS. WHEN THE PRESSURE EXCEEDS AN ADJUSTABLE LIMIT, AN ALARM SIGNAL WILL BE SENT TO THE UNIT CONTROLLER AND THE BAS.

FAN STATUS: THE FAN VFD STATUS CONTACT MUST BE USED TO MONITOR THE STATUS OF THE UNIT SUPPLY AND RELIEF FANS. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT FOR THE FAN AN ALARM MUST BE GENERATED AT THE UNIT CONTROLLER AND THE BAS.

ADDITIONAL MONITORING: IN ADDITION TO THE POINTS MENTIONED IN THESE SEQUENCES, PROVIDE THE ADDITIONAL MONITORING POINTS LISTED IN THE POINT SCHEDULES.

COMMONWEALTH OF VIRGINIA
NASRI SLEEM
Lic. No. 033845
12/14/2022
PROFESSIONAL ENGINEER

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 2023

DESIGNED BY: R. JEON
DRAWN BY: R. JEON
CHECKED BY: N. SLEEM
SUBMITTED BY:
ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

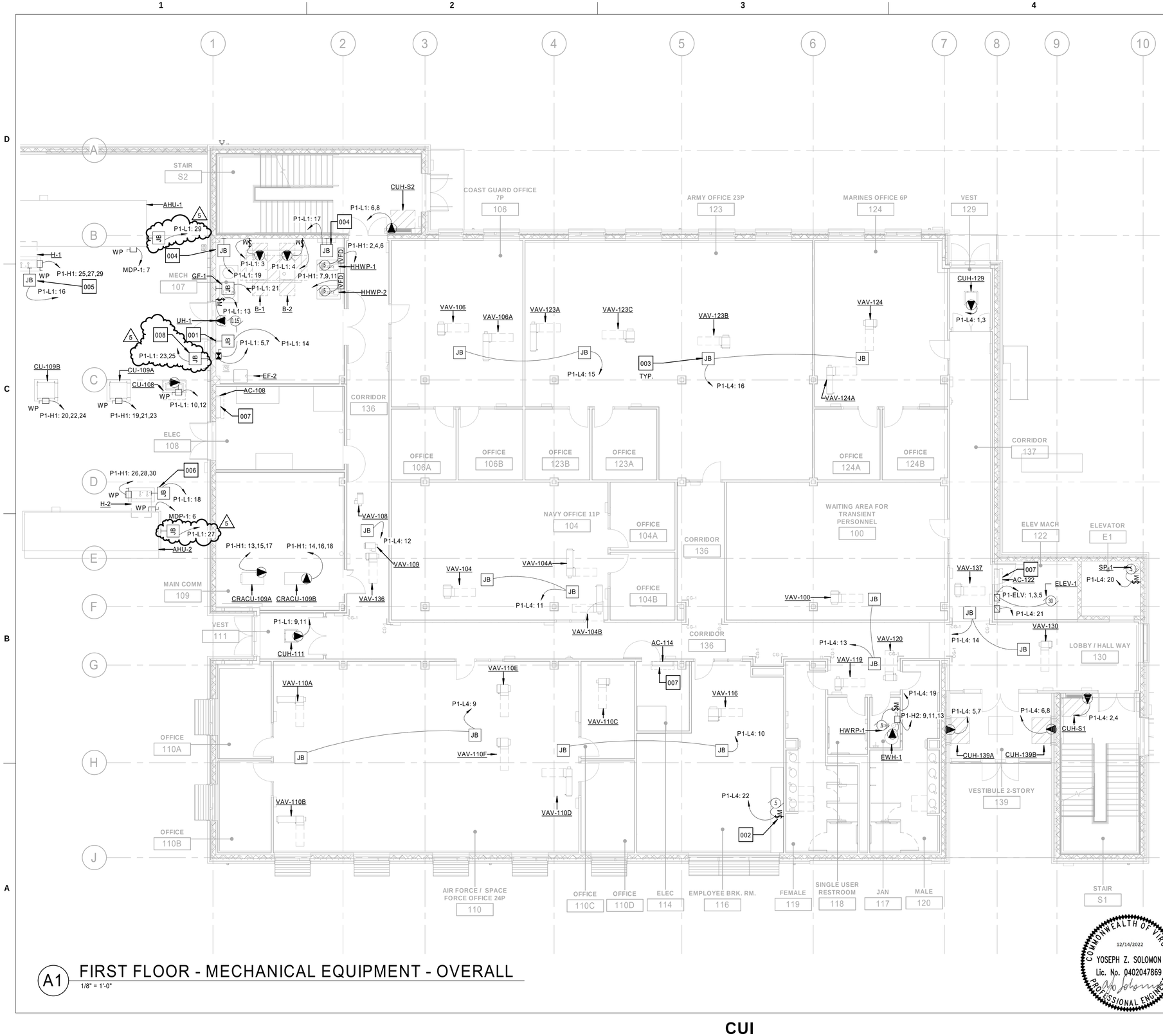
US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD., SUITE 500
ARLINGTON, VA 22201

DESIGN OF- JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

MECHANICAL - SEQUENCE OF OPERATION

SHEET ID
M-807



A1 FIRST FLOOR - MECHANICAL EQUIPMENT - OVERALL

1/8" = 1'-0"

GENERAL SHEET NOTES

1. REFER TO EM701 FOR MECHANICAL CONNECTION SCHEDULE, FOR POWER REQUIRMENTS OF MECHANCIAL EQUIPMENT.
2. REFER TO E-001 AND E-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGENDS.
3. REFER TO E-700 SERIES DRAWINGS FOR PANEL SCHEDULES.

KEYNOTES

#	
001.	JUNCTION BOX FOR TRAP PRIMER PANEL.
002.	POWER CONNECTION FOR GARBAGE DISPOSAL.
003.	POWER FOR VAV CONTROLLERS. MAXIMUM OF FOUR VAV BOXES TO BE FED FROM A SINGLE 120V CIRCUIT.
004.	JUNCTION BOX FOR BAS CONTROL PANEL
005.	JUNCTION BOX FOR H-1 HEATER AND CONDENSATE PUMP.
006.	JUNCTION BOX FOR H-2 HEATER AND CONDENSATE PUMP.
007.	POWER TO INTERIOR AC UNIT ARE PROVIDED FROM CORRESPONDING EXTERIOR UNIT.
008.	POWER FOR HEAT TRACE. COORDINATE POWER REQUIRMENTS WITH HEAT TRACE MANUFACTURER.

COMMONWEALTH OF VIRGINIA
12/14/2022
YOSEPH Z. SOLOMON
Lic. No. 0402047869
PROFESSIONAL ENGINEER

GRAPHIC SCALE(S)

8 6 4 2 0 8 16

SCALE: 1/8" = 1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
4	REVISED I.A.W. AMENDMENT 0004	FEB 23
5	REVISED I.A.W. AMENDMENT 0005	FEB 23

ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W9128F23R0006
CONTRACT NO.:
FILE NUMBER:

DESIGNED BY: Y. SOLOMON
DRAWN BY: D. PAXTON
CHECKED BY: Y. SOLOMON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

ELECTRICAL - FIRST FLOOR - MECH EQUIPMENT

SHEET ID

EM110

PANELBOARD: P1-L1

LOCATION: ELEC 108
SUPPY FROM: P1-H1
MOUNTING: Surface
ENCLOSURE: Type 1

VOLTAGE: 208/120V,3P,4W,60Hz
BUS AMPS: 250 A
MCB SIZE: 225 A (NOTE 1)

NOTES	DESCRIPTIONS	TRIP AMPS	POLES	CKT NO.	A	B	C	A	B	C	CKT NO.	POLES	TRIP AMPS	DESCRIPTIONS	NOTES
	REC EXTERIOR GFI WP	20 A	1	1	0.9			0.72			2	1	20 A	REC EXTERIOR GFI WP	
	HVAC MECH 107 B-1	20 A	1	3		1.2			1.2		4	1	20 A	HVAC MECH 107 B-2	
	HVAC MECH 107	20 A	2	5			0.1			0.208	6	2	15 A	EQN STAIR S2 CUH-S2	
				7	0.1			0.208			8				
	EQN VEST 111 CUH-111	15 A	2	9		0.104			1.976		10	2	30 A	HVAC EXTERIOR CU-108	
				11			0.104			1.976	12				
	HVAC MECH 107 UH-1	20 A	1	13	1.501			0.03			14	1	20 A	EQN MECH 107 TRAP PRIMER PANEL	
	ELEC 108 FIRE ALARM NAC PANEL (NOTE 1)	20 A	1	15		0.3			0.1		16	1	20 A	EQN H-1 HEATER EXTERIOR	
	EQN BAS CONTROL PANEL MECH 107	20 A	1	17			0.5			0.1	18	1	20 A	EQN H-2 HEATER EXTERIOR	
	EQN BAS CONTROL PANEL MECH 107	20 A	1	19	0.5			1			20	1	20 A	ELEC 108 FIRE ALARM CONTROL PANEL (NOTE1)	
	MECH 107 CF-1	20 A	1	21		0.5			1		22	1	20 A	LOBBY 130 FIRE ALARM ANNUNCIATOR (NOTE 1)	
	HEAT TRACE	20 A	2	23			0.75			1	24	1	20 A	ELEC 204 FIRE ALARM NAC PANEL (NOTE 1)	
				25	0.75			--			26	1	--	SPACE	
5	CONDENSATE PUMP FOR AHU-2	20 A	1	27		0.1			--		28	1	--	SPACE	
5	CONDENSATE PUMP FOR AHU-1	20 A	1	29			0.1			--	30	1	--	SPACE	
	SPACE	--	1	31	--			--			32	1	--	SPACE	
	SPACE	--	1	33		--			--		34	1	--	SPACE	
	SPACE	--	1	35			--			--	36	1	--	SPACE	
	SPD	30 A	3	37	0			8.54			38				
				39		0			9.44		40	3	100 A	P1-C MAIN COMM 109	
				41			0			9.44	42				
	TOTAL CONNECTED LOAD / PHASE:				14.249 kVA		15.92 kVA		14.278 kVA						

TOTAL LOAD SUMMARY			
LOAD (kVA)		CURRENT (AMPS)	
CONNECTED LOAD:	44.447 kVA	CONNECTED CURRENT:	123.4 A
ESTIMATED DEMAND LOAD:	34.927 kVA	ESTIMATED DEMAND CURRENT:	96.9 A
ESTIMATED DEMAND FACTOR:	78.58%		
SPARE CAPACITY:			
ESTIMATED LOAD WITH SPARE:	34.927 kVA	ESTIMATED CURRENT WITH SPARE:	97 A

PANELBOARD NOTES: 1. PROVIDE RED LOCK-ON BREAKER.

PANELBOARD: P1-L2

LOCATION: ELEC 114
SUPPY FROM: P1-D1
MOUNTING: Surface
ENCLOSURE: Type 1

VOLTAGE: 208/120V,3P,4W,60Hz
BUS AMPS: 100 A
MCB SIZE: 100 A

NOTES	DESCRIPTIONS	TRIP AMPS	POLES	CKT NO.	A	B	C	A	B	C	CKT NO.	POLES	TRIP AMPS	DESCRIPTIONS	NOTES
	REC CORRIDOR 136	20 A	1	1	1.62			1.26			2	1	20 A	REC MECH 107	
	REC CORRIDOR 136	20 A	1	3		1.8			1.26		4	1	20 A	REC LOBBY / HALL WAY 130	
	REC FEMALE 119	20 A	1	5			1.44			1.44	6	1	20 A	REC EMPLOYEE BRK. RM. 116	
	REC AIR FORCE/SPACE FORCE OFFICE 110...	20 A	1	7	0.5			1.08			8	1	20 A	REC OFFICE 110A	
	REC OFFICE 110C	20 A	1	9		0.9			1.08		10	1	20 A	REC AIR FORCE / SPACE FORCE OFFICE 24P 110	
	REC EMPLOYEE BRK. RM. 116 REF.	20 A	1	11			0.725			1.44	12	1	20 A	REC OFFICE 110A	
	REC EMPLOYEE BRK. RM. 116 MICROWAVE	20 A	1	13	1.2			0.36			14	1	20 A	REC EMPLOYEE BRK. RM. 116	
	REC AIR FORCE/SPACE FORCE OFFICE 110...	20 A	1	15		0.5			1.2		16	1	20 A	REC EMPLOYEE BRK. RM. 116 MICROWAVE	
	REC OFFICE 104B	20 A	1	17			1.08			0.933	18				
	EQN AIR FORCE / SPACE FORCE OFFICE 24P 110 FURNITURE SYSTEMS	20 A	3	19	0.933			0.933			20	3	20 A	EQN AIR FORCE / SPACE FORCE OFFICE 24P 110 FURNITURE SYSTEMS	
				21		0.933			0.933		22				
				23			0.933			0.933	24				
	EQN MARINES OFFICE 104 FURNITURE SYSTEMS	20 A	2	25	1.05			0.933			26	3	20 A	EQN AIR FORCE / SPACE FORCE OFFICE 24P 110 FURNITURE SYSTEMS	
				27		1.05			0.933		28				
	REC ELEV MACH 122	20 A	1	29			0.36			1.08	30	1	20 A	REC OFFICE 106A	
	REC COAST GUARD OFFICE 7P 106	20 A	1	31	0.72			0.18			32	1	20 A	REC ELEVATOR E1	
	SPARE	20 A	1	33		0			0.5		34	1	20 A	REC COAST GUARD OFFICE 7P 106 COPIER	
	SPARE	20 A	1	35			0			0	36	1	20 A	SPARE	
	EQN MARINES OFFICE 11P 104 FURNITURE SYSTEMS	20 A	2	37	0.35			0.525			38	2	20 A	EQN MARINES OFFICE 11P 104 FURNITUTRE SYSTEMS	
				39		0.35			0.525		40				
	REC EMPLOYEE BRK. RM. 116	20 A	1	41			0.725			0	42	1	20 A	SPARE	
	SPARE	20 A	1	43	0			0			44	1	20 A	SPARE	
	SPARE	20 A	1	45		0			0		46	1	20 A	SPARE	
	SPARE	20 A	1	47			0			0	48	1	20 A	SPARE	
	SPACE	--	1	49	--			0			50	1	20 A	SPARE	
	SPACE	--	1	51		--			0		52	1	20 A	SPARE	
	SPACE	--	1	53			--			0	54	1	20 A	SPARE	
	TOTAL CONNECTED LOAD / PHASE:				11.645 kVA		11.965 kVA		11.09 kVA						

TOTAL LOAD SUMMARY			
LOAD (kVA)		CURRENT (AMPS)	
CONNECTED LOAD:	34.700 kVA	CONNECTED CURRENT:	96.3 A
ESTIMATED DEMAND LOAD:	28.475 kVA	ESTIMATED DEMAND CURRENT:	79.0 A
ESTIMATED DEMAND FACTOR:	82.06%		
SPARE CAPACITY:	15%		
ESTIMATED LOAD WITH SPARE:	32.746 kVA	ESTIMATED CURRENT WITH SPARE:	91 A

PANELBOARD NOTES:

PANELBOARD: P1-L3

LOCATION: ELEC 114
SUPPY FROM: P1-D1
MOUNTING: Surface
ENCLOSURE: Type 1

VOLTAGE: 208/120V,3P,4W,60Hz
BUS AMPS: 250 A
MCB SIZE: 225 A

NOTES	DESCRIPTIONS	TRIP AMPS	POLES	CKT NO.	A	B	C	A	B	C	CKT NO.	POLES	TRIP AMPS	DESCRIPTIONS	NOTES
	EQN ARMY OFFICE 23P 123 FURNITURE SYSTEMS	20 A	2	1	0.875			0.525			2	2	20 A	EQN ARMY OFFICE 23P 123 FURNITURE SYSTEMS	
				3		0.875			0.525		4				
	EQN ARMY OFFICE 23P 123 FURNITURE SYSTEMS	20 A	2	5			1.05			1.05	6	2	20 A	EQN ARMY OFFICE 23P 123 FURNITUTE SYSTEMS	
				7	1.05			1.05			8				
	REC MARINES OFFICE 11P 104	20 A	1	9		0.9			0.5		10	1	20 A	REC MARINES OFFICE 11P 104 COPIER	
	EQN NAVY OFFICE 6P 124	20 A	2	11			1.05			0.7	12	2	20 A	EQN COAST GUARD OFFICE 106 FURNITURE SYSTEMS	
				13	1.05			0.7			14				
	REC OFFICE 106A	20 A	1	15		1.62			1.62		16	1	20 A	REC OFFICE 104B	
	REC ARMY OFFICE 23P 123	20 A	1	17			1.26			0.5	18	1	20 A	REC ARMY OFFICE 23P 123 COPIER	
	REC NAVY OFFICE 6P 124 COPIER	20 A	1	19	0.5			1.08			20	1	20 A	REC NAVY OFFICE 6P 124	
	REC OFFICE 124A	20 A	1	21		1.08			0.72		22	1	20 A	REC OFFICE 124A	
	REC WAITING AREA FOR TRANSIENT PERSONNE...	20 A	1	23			1.08			1.08	24	1	20 A	REC WAITING AREA FOR TRANSIENT PERSONNE...	
	EQN WAITING AREA FOR TRANSIENT PERSONNE...	20 A	1	25	1.08			1.08			26	1	20 A	REC WAITING AREA FOR TRANSIENT PERSONNE...	
	EQN WAITING AREA FOR TRANSIENT PERSONNE...	20 A	1	27		1.44			1.08		28	1	20 A	EQN WAITING AREA FOR TRANSIENT PERSONNE...	
	REC WAITING ARE AFOR TRANSIENT PERSONNE...	20 A	1	29			0.36			0.9	30	1	20 A	REC WAITING AREA FOR TRANSIENT PERSONNE...	
	REC COVE 4P 126	20 A	1	31	1.08			1.44			32	1	20 A	REC COVE 4P 126	
	EQN CLASSROOM 125	20 A	1	33		1.08			1.08		34	1	20 A	EQN CLASSROOM 20P 125	
	EQN CLASSROOM 125	20 A	1	35			1.08			1.08	36	1	20 A	EQN CLASSROOM 20P 125	
	EQN ARMY OFFICE 23P 123 FURNITURE SYSTEMS	20 A	2	37	0.525			0.525			38	2	20 A	EQN COAST GUARD OFFICE 7P 106 FURNITURE SYSTEMS	
				39		0.525			0.525		40				
	REC CLASSROOM 20P 125	20 A	1	41			1.62			0	42	1	20 A	SPARE	
	REC CLASSROOM 20P 125	20 A	1	43	0.36			0			44	1	20 A	SPARE	
	SPARE	20 A	1	45		0			0		46	1	20 A	SPARE	
	SPARE	20 A	1	47			0			0	48	1	20 A	SPARE	
	SPACE	--	1	49	--			--			50	1	--	SPACE	
	SPACE	--	1	51		--			--		52	1	--	SPACE	
	SPACE	--	1	53			--			--	54	1	--	SPACE	
	TOTAL CONNECTED LOAD / PHASE:				12.92 kVA		13.57 kVA		12.81 kVA						

TOTAL LOAD SUMMARY			
LOAD (kVA)		CURRENT (AMPS)	
CONNECTED LOAD:	39.300 kVA	CONNECTED CURRENT:	109.1 A
ESTIMATED DEMAND LOAD:	35.090 kVA	ESTIMATED DEMAND CURRENT:	97.4 A
ESTIMATED DEMAND FACTOR:	89.29%		
SPARE CAPACITY:	15%		
ESTIMATED LOAD WITH SPARE:	40.354 kVA	ESTIMATED CURRENT WITH SPARE:	112 A

PANELBOARD NOTES:

PANELBOARD: P1-L4

LOCATION: ELEC 114
SUPPY FROM: P1-D1
MOUNTING: Surface
ENCLOSURE: Type 1

VOLTAGE: 208/120V,3P,4W,60Hz
BUS AMPS: 100 A
MCB SIZE: 100 A

NOTES	DESCRIPTIONS	TRIP AMPS	POLES	CKT NO.	A	B	C	A	B	C	CKT NO.	POLES	TRIP AMPS	DESCRIPTIONS	NOTES
	EQN VEST 129 CUH-129	15 A	2	1	0.104			0.208			2	2	15 A	EQN STAIR S1 CUH-S1	
				3		0.104			0.208		4				
	EQN VESTIBULE 2-STORY 139 CUH-139A	15 A	2	5			0.208			0.208	6	2	15 A	EQN VESTIBULE 2-STORY 139 CUH-139B	
				7	0.208			0.208			8				
	EQN OFFICE 110 VAV-(110A,110B,110E,110-F)	20 A	1	9		0.06			0.06		10	1	20 A	EQN BRK. RM. 116 VAV-(110C,110D,116)	
	EQN OFFICE 104 VAV -(104A,104B,104,136)	20 A	1	11			0.06			0.03	12	1	20 A	EQN CORRIDOR 136 VAV-108, VAV-109	
	EQN CORR. 136 VAV-100,VAV-119,VAV-120	20 A	1	13	0.06			0.06			14	1	20 A	EQN CORRIDOR 137 VAV-130, VAV-137	
	EQN OFFICE 106 VAV - (106,106A,123A,123C)	20 A	1	15		0.06			0.06		16	1	20 A	EQN ARMY OFFICE 123 VAV-123B, VAV-124	
	EQN VAV-125A, VAV-125B, VAV-245	20 A	1	17			0.06			0.06	18	1	20 A	EQN VAV-240, VAV-246, VAV-247	
	HVAC JAN 117 HWRP-1	20 A	1	19	1.177			1.177			20	1	20 A	HVAC ELEVATOR E1 SP-1	
	HVAC ELEV MACH 122 ELEVATOR LIGHTING	20 A	1	21		1.5			0.757		22	1	20 A	HVAC EMPLOYEE BRK. RM. 116 GARBAGE...	
	SPARE	20 A	1	23			0			0	24	1	20 A	SPARE	
	SPARE	20 A	1	25	0			0			26	1	20 A	SPARE	
	SPARE	20 A	1	27		0			0		28	1	20 A	SPARE	
	SPARE	20 A	1	29			0			0	30	1	20 A	SPARE	
	SPACE	--	1	31	--			--			32	1	--	SPACE	
	SPACE	--	1	33		--			--		34	1	--	SPACE	
	SPACE	--	1	35			--			--	36	1	--	SPACE	
	SPACE	--	1	37	--			--			38	1	--	SPACE	
	SPACE	--	1	39		--			--		40	1	--	SPACE	
	SPACE	--	1	41			--			--	42	1	--	SPACE	
	TOTAL CONNECTED LOAD / PHASE:				3.202 kVA		2.809 kVA		0.626 kVA						

TOTAL LOAD SUMMARY			
LOAD (kVA)		CURRENT (AMPS)	
CONNECTED LOAD:	6.637 kVA	CONNECTED CURRENT:	18.4 A
ESTIMATED DEMAND LOAD:	6.637 kVA	ESTIMATED DEMAND CURRENT:	18.4 A
ESTIMATED DEMAND FACTOR:	100.00%		
SPARE CAPACITY:	15%		
ESTIMATED LOAD WITH SPARE:	7.633 kVA	ESTIMATED CURRENT WITH SPARE:	21 A

PANELBOARD NOTES:

12/14/2022
COMMONWEALTH OF VIRGINIA
YOSEPH Z. SOLOMON
Lic. No. 0402047869
PROFESSIONAL ENGINEER

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE
5	REVISED I.A.W. AMENDMENT 0005	FEB 23
4	REVISED I.A.W. AMENDMENT 0004	FEB 23
3	REVISED I.A.W. AMENDMENT 0003	JAN 23
2	REVISED I.A.W. AMENDMENT 0002	JAN 23

ISSUE DATE: 14 DECEMBER 2022
SOLICITATION NO.: W912PF23R0006
CONTRACT NO.:
FILE NUMBER:
DESIGNED BY: Y. SOLOMON
DRAWN BY: D. PAXTON
CHECKED BY: Y. SOLOMON
SUBMITTED BY:
SIZE: ANSI 'D'
FILE NAME:

US ARMY CORPS OF ENGINEERS
Omaha District
Omaha, NE

JACOBS
1100 N. GLEBE ROAD, SUITE 500
ARLINGTON, VA 22201

DESIGN OF JOINT CRYPTOLOGIC CENTER (JCC) BUILDING
BUCKLEY SFB, CO

ELECTRICAL - PANEL SCHEDULES

SHEET ID
E-703