

SUMMARY OF DESIGN FEATURES

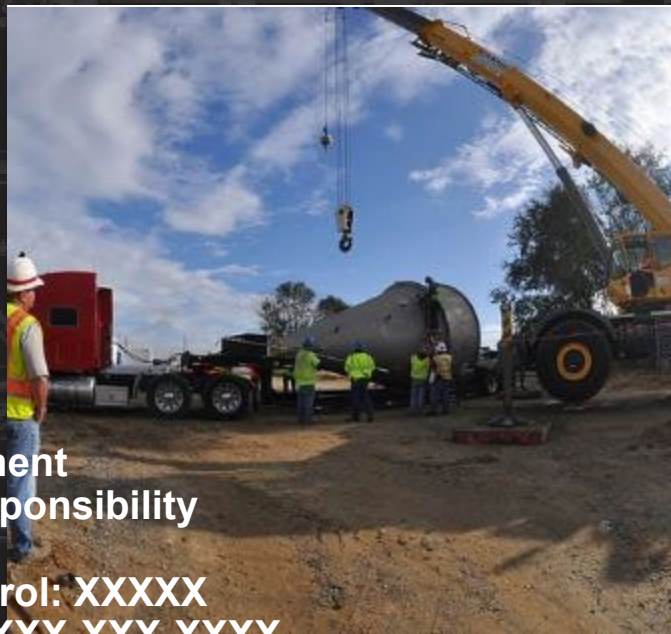
Sentinel GBSD
Integrated Command Center (FY23)
F.E. Warren Air Force Base, WY

Project Number: GHNL231990
Solicitation Number: W9128F23R0022



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Controlled by: DoD Component
Controlled by: Office of Responsibility
CUI Category(ies): XXXXX
Limited Dissemination Control: XXXXX
POC:XXXXXX XXXXXXXX, XXX-XXX-XXXX





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CUI **AGENDA**

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01 Project Objectives

02 Concept

03 Unique Design Features

04 Special Coordination Needs

SAFETY MOMENT



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PROJECT OBJECTIVES



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PROJECT OBJECTIVES

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The GBSD Integrated Command Center (ICC) services the Intercontinental Ballistic Missile mission at F.E. Warren AFB.

The ICC is an integral part of the Weapon System and provides centralized Missile Wing maintenance, security, cyber, and communications operations for the Weapon System.

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CS10



- Dewatering for construction of basement
- Chemical treatment system for reduction of TCE, Permanganate, PFAS – see specification section 02 61 13 Excavation and Handling of Contaminated Material
- Discharge to storm sewer after treatment

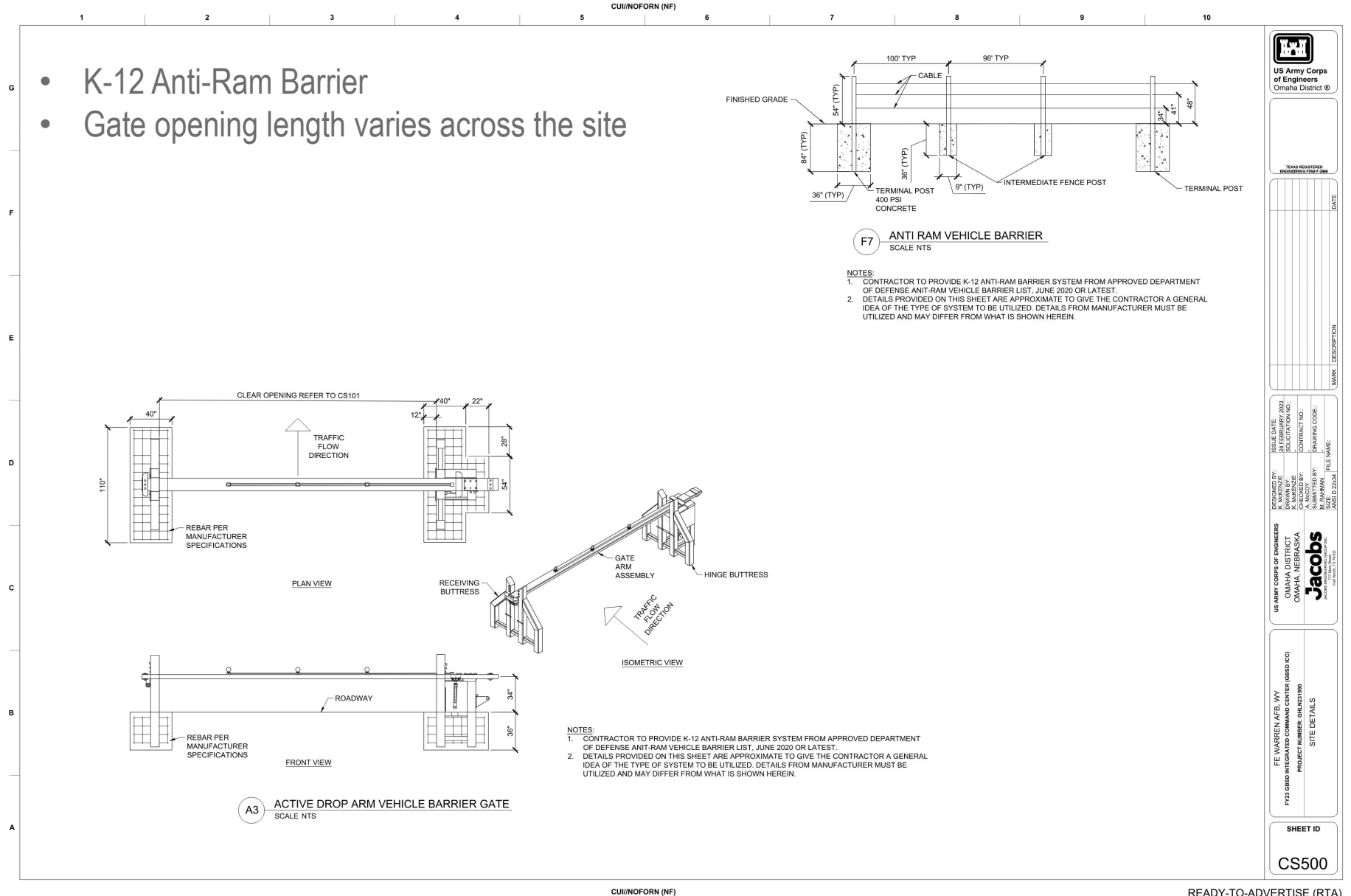




SPECIAL COORDINATION NEEDS

Active Drop Arm Vehicle Barrier

- K-12 Anti-Ram Barrier
- Gate opening length varies across the site



STRUCTURAL



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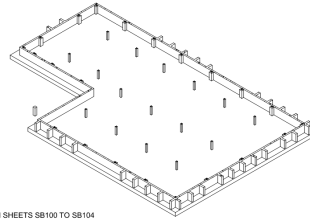


CONCEPT

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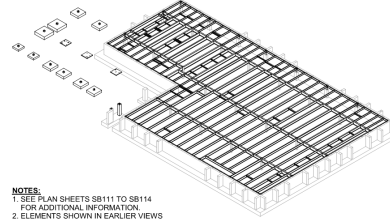
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Complex, Highly Interconnected Structure



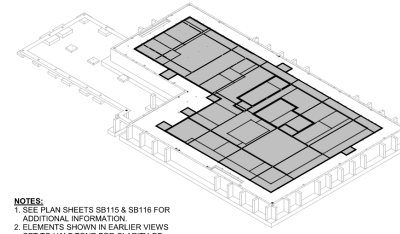
NOTES:
1. SEE PLAN SHEETS SB100 TO SB104 FOR ADDITIONAL INFORMATION.

E1 3D STRUCTURAL VIEW - BASEMENT



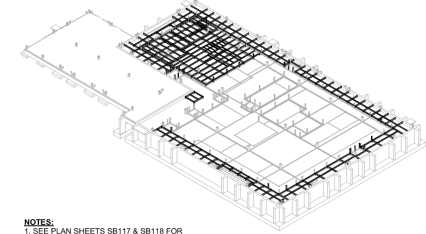
NOTES:
1. SEE PLAN SHEETS SB111 TO SB114 FOR ADDITIONAL INFORMATION.
2. ELEMENTS SHOWN IN EARLIER VIEWS SET TO HALF TONE FOR CLARITY OF SCOPE. TYP.
3. SLAB-ON-GRADE AND COMPOSITE METAL DECK HIDDEN FOR CLARITY.

E6 3D STRUCTURAL VIEW - GROUND FLOOR FRAMING



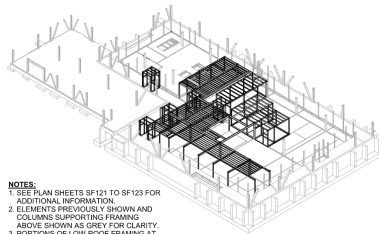
NOTES:
1. SEE PLAN SHEETS SB115 & SB116 FOR ADDITIONAL INFORMATION.
2. ELEMENTS SHOWN IN EARLIER VIEWS SET TO HALF TONE FOR CLARITY OF SCOPE. TYP.
3. DARK GRAY AREA INDICATES EXTENTS OF HEMP SHIELD FLOOR PLATE.
4. STEEL FRAMING ATTACHED TO FLOOR PLATE SUPPORTS WALLS ABOVE. TYP.

A1 3D STRUCTURAL VIEW - HEMP SHIELD FLOOR



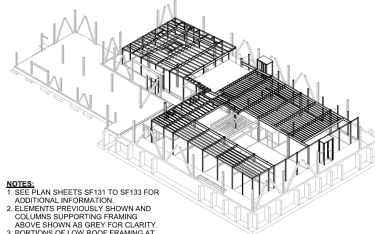
NOTES:
1. SEE PLAN SHEETS SB117 & SB118 FOR ADDITIONAL INFORMATION.
2. ELEMENTS SHOWN IN EARLIER VIEWS SET TO HALF TONE FOR CLARITY OF SCOPE. TYP.
3. GRATING NOT SHOWN FOR CLARITY.

A6 3D STRUCTURAL VIEW - GRATING FRAMING



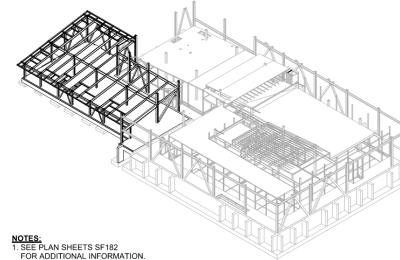
NOTES:
1. SEE PLAN SHEETS SF121 TO SF123 FOR ADDITIONAL INFORMATION.
2. ELEMENTS PREVIOUSLY SHOWN AND COLUMNS SUPPORTING FRAMING ABOVE SHOWN AS GREY FOR CLARITY.
3. PORTIONS OF LOW ROOF FRAMING AT OR BELOW THIS ELEVATION HIDDEN FOR CLARITY. SEE A1/S-902.

E1 3D STRUCTURAL VIEW - LOWER SECURE LID AND HEMP SHIELD



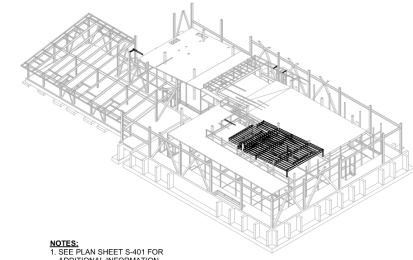
NOTES:
1. SEE PLAN SHEETS SF131 TO SF133 FOR ADDITIONAL INFORMATION.
2. ELEMENTS PREVIOUSLY SHOWN AND COLUMNS SUPPORTING FRAMING ABOVE SHOWN AS GREY FOR CLARITY.
3. PORTIONS OF LOW ROOF FRAMING AT OR BELOW THIS ELEVATION HIDDEN FOR CLARITY. SEE A1/S-902.

E6 3D STRUCTURAL VIEW - UPPER SECURE LID AND MIDDLE HEMP SHIELD



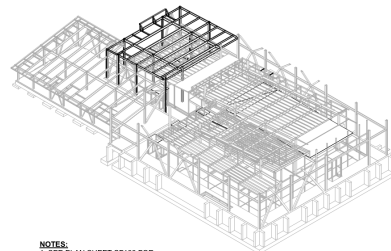
NOTES:
1. SEE PLAN SHEETS SF182 FOR ADDITIONAL INFORMATION.
2. ELEMENTS PREVIOUSLY SHOWN AND COLUMNS SUPPORTING FRAMING ABOVE SHOWN AS GREY FOR CLARITY.

A1 3D STRUCTURAL VIEW - LOW ROOF FRAMING



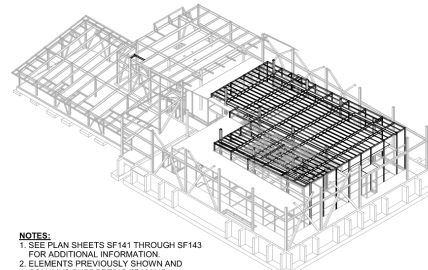
NOTES:
1. SEE PLAN SHEET S-401 FOR ADDITIONAL INFORMATION.
2. ELEMENTS PREVIOUSLY SHOWN AND COLUMNS SUPPORTING FRAMING ABOVE SHOWN AS GREY FOR CLARITY.

A6 3D STRUCTURAL VIEW - UPPER SECURE LID



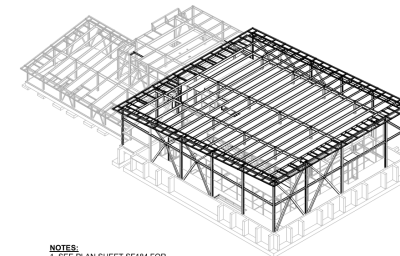
NOTES:
1. SEE PLAN SHEET SF183 FOR ADDITIONAL INFORMATION.
2. ELEMENTS PREVIOUSLY SHOWN AND COLUMNS SUPPORTING FRAMING ABOVE SHOWN AS GREY FOR CLARITY.

E1 3D STRUCTURAL VIEW - MIDDLE ROOF



NOTES:
1. SEE PLAN SHEETS SF141 THROUGH SF143 FOR ADDITIONAL INFORMATION.
2. ELEMENTS PREVIOUSLY SHOWN AND COLUMNS SUPPORTING FRAMING ABOVE SHOWN AS GREY FOR CLARITY.
3. UPPER ROOF FRAMING AT OR BELOW THIS LEVEL HIDDEN FOR CLARITY.

E6 3D STRUCTURAL VIEW - UPPER HEMP SHIELD



NOTES:
1. SEE PLAN SHEET SF184 FOR ADDITIONAL INFORMATION.
2. ELEMENTS PREVIOUSLY SHOWN SET TO GREY FOR CLARITY.

A1 3D STRUCTURAL VIEW - UPPER ROOF

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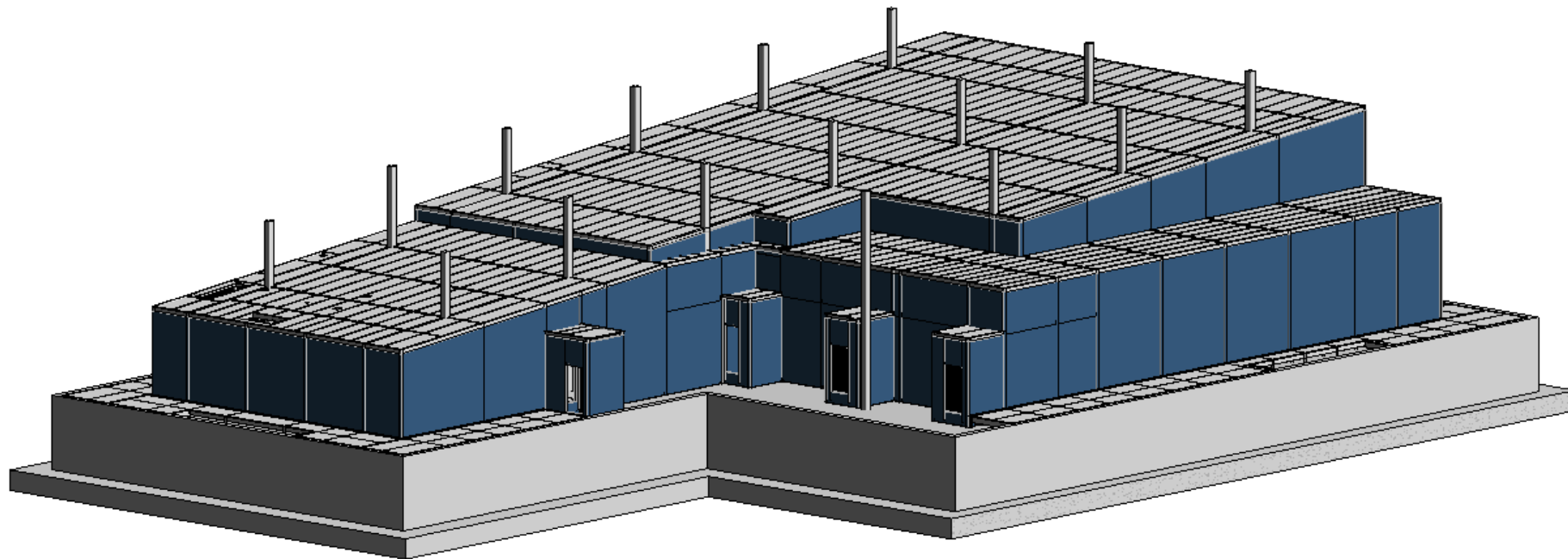
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UNIQUE DESIGN FEATURES

HEMP Shield

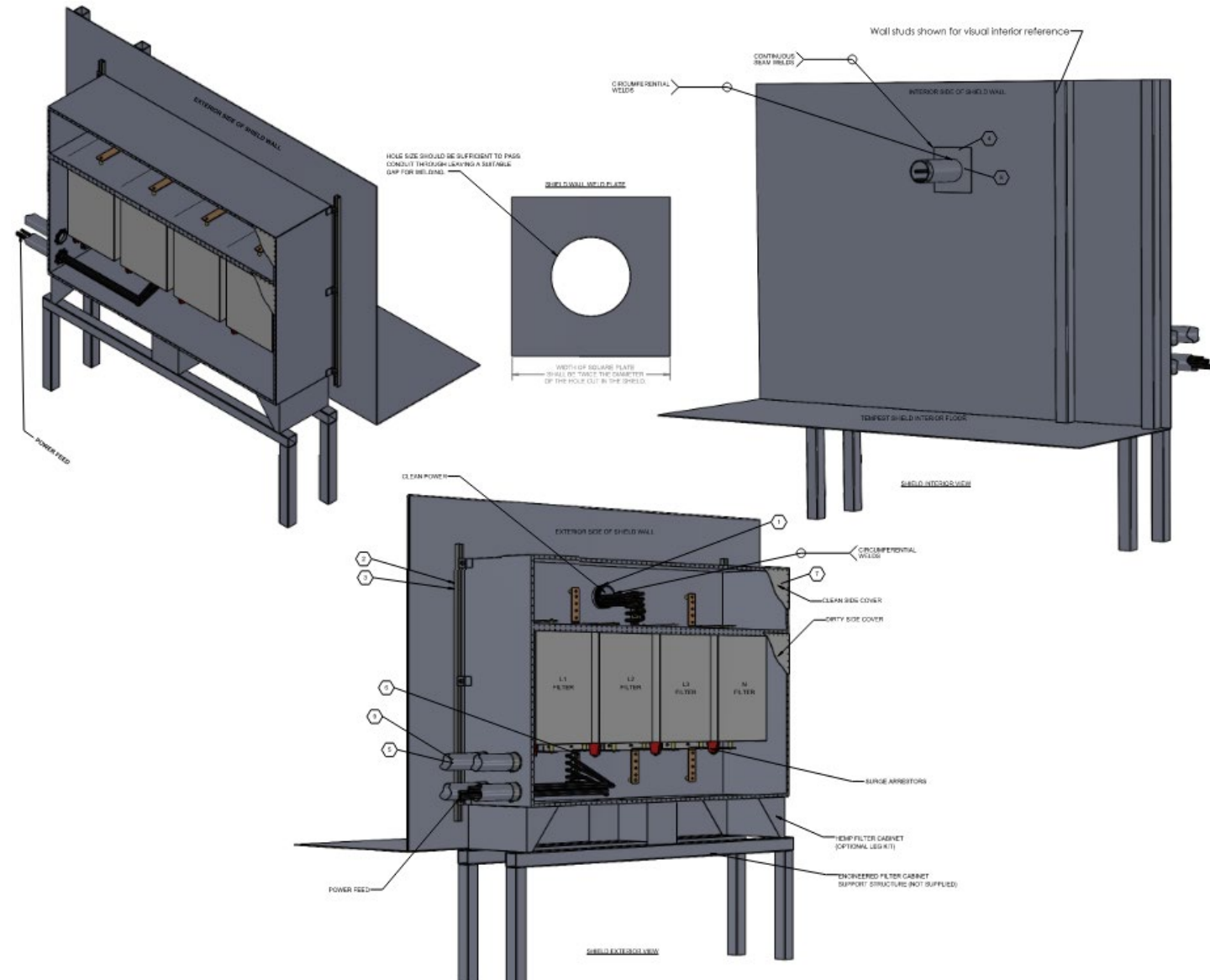
Complex, steel plated system with stringent fabrication, construction, and penetration requirements.





UNIQUE DESIGN FEATURES

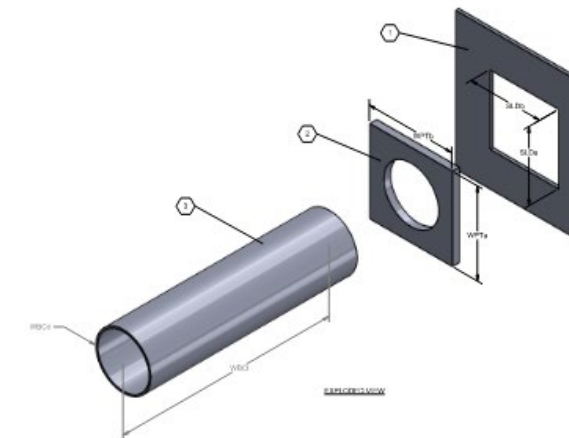
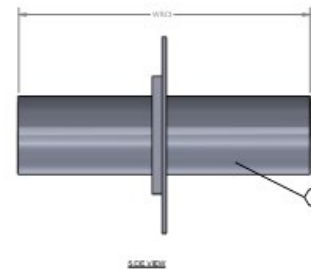
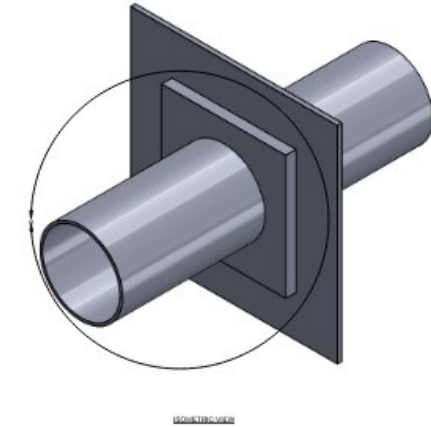
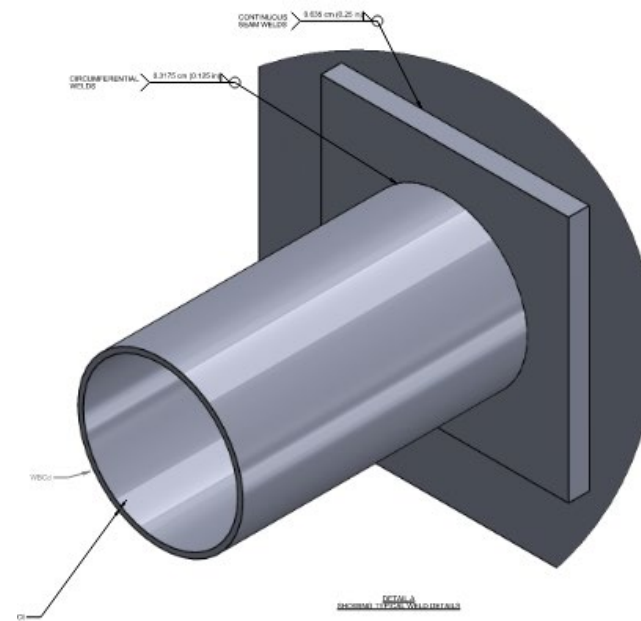
HEMP Shield





UNIQUE DESIGN FEATURES

HEMP Shield





SPECIAL COORDINATION NEEDS

Sequence of Construction

The structural design is sensitive to sequence of construction. As a result, an acceptable sequence of construction is listed in the structural drawings, which must be followed unless the contractor and their licensed engineer analyze the structure for an alternate sequence of construction.

Custom Cut Steel Plates

The HEMP shielded structure is supported by a composite steel floor. As a result, some of the HEMP shield steel plates may need to be custom fabricated to align with the deflected shape of the steel floor plate that is supported by the composite framing below. This will require building much of the structure, taking many field measurements, and then custom fabricating the pieces.

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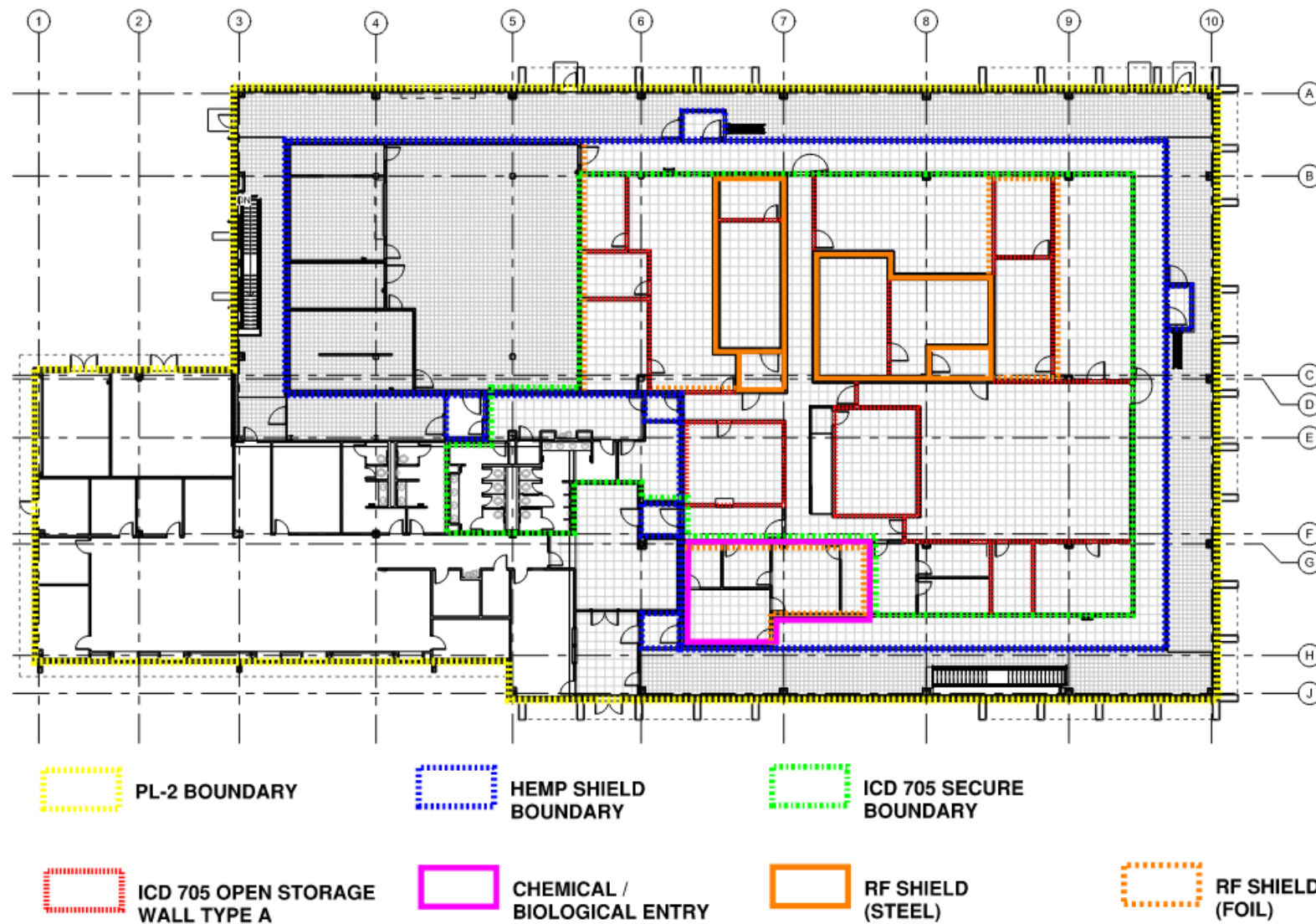
CONCEPT

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Secure Area Diagram

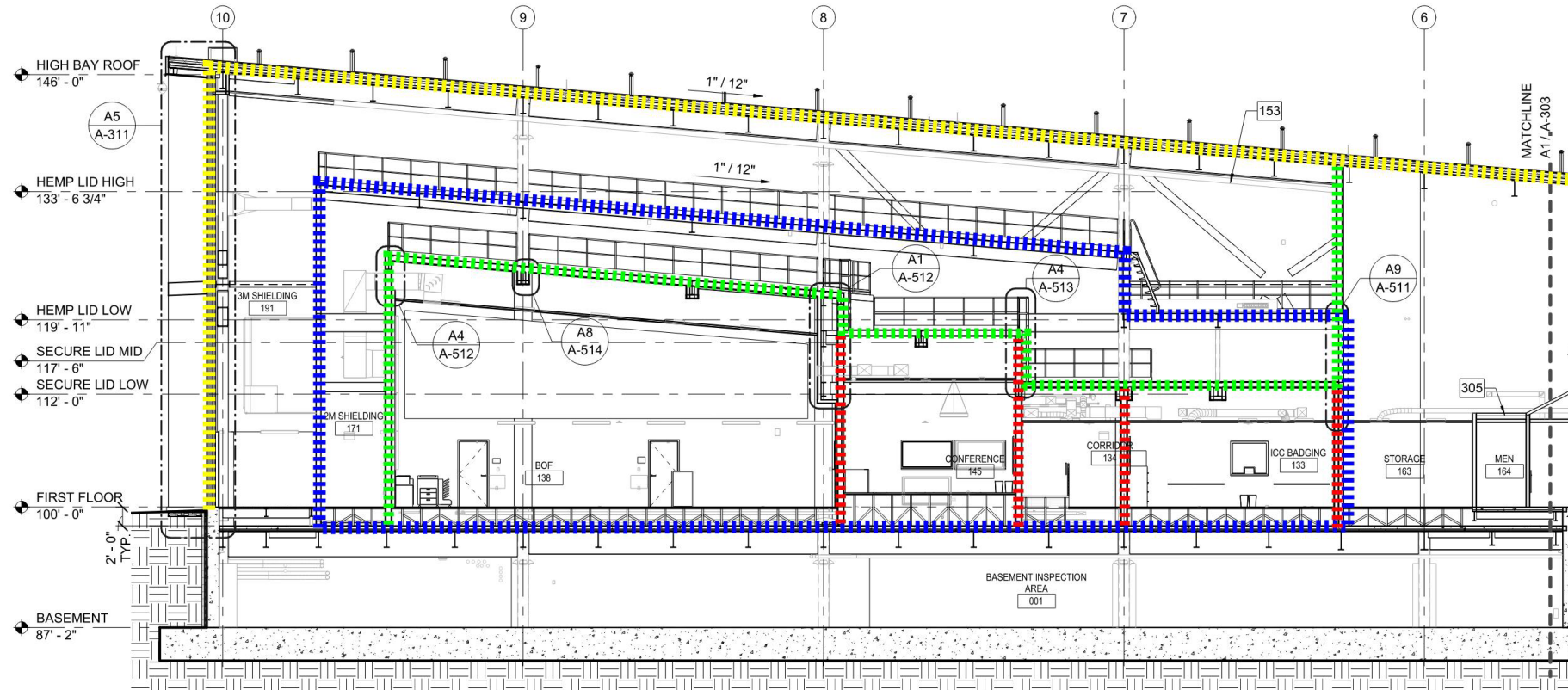


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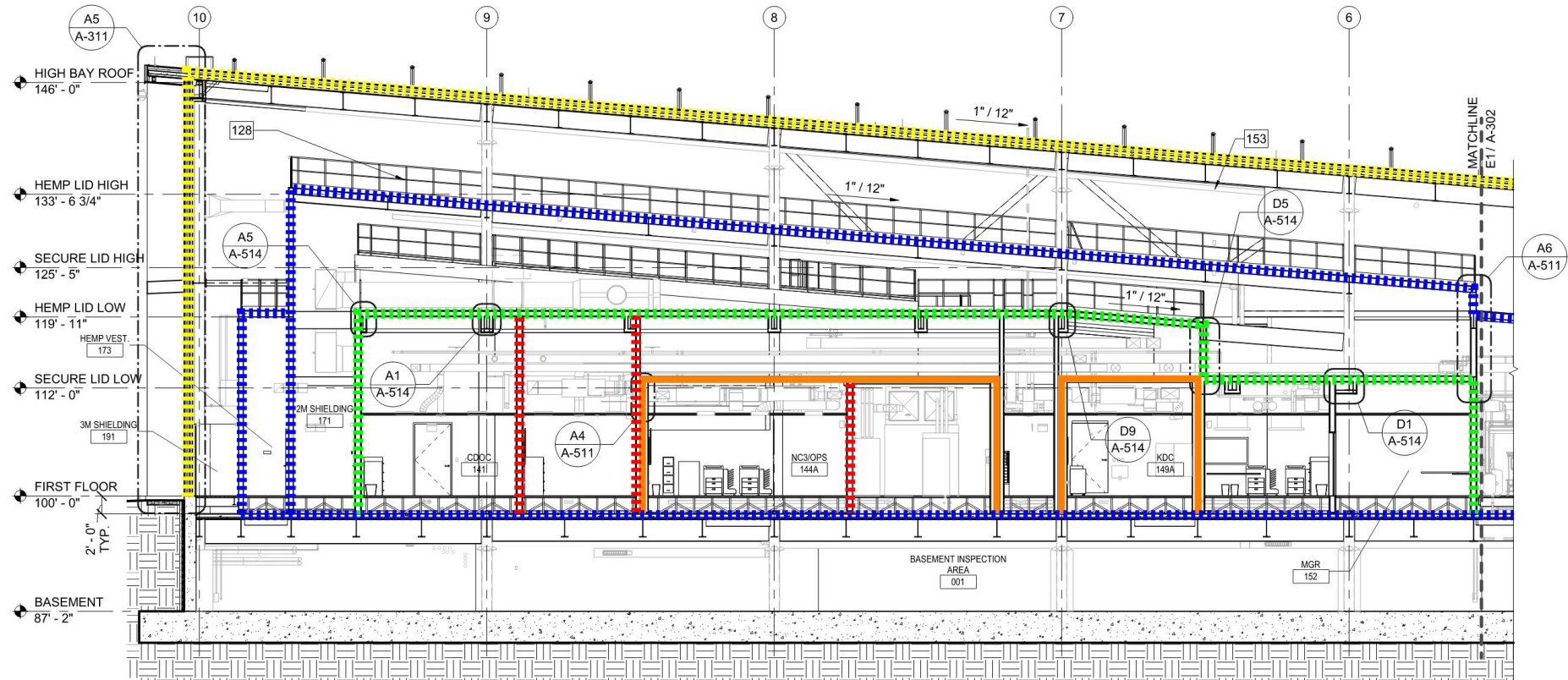
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Secure Area Cross Section



Secure Area Cross Section





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UNIQUE DESIGN FEATURES

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Interior Scope

Secure Areas and Shielding

- HEMP and RF shielding

Inspection Zones for HEMP Shield

- 2M and 3M zones
- Walkable “lid” above secure areas

RF Shielding

- Steel plate (refer to Structural)
- Protective Technical Barrier (PTB)
(Section 13 27 54.00 10)

Shielded Doors

- HEMP doors (see details on A-614)
- RF doors (see details on A-615)

Raised Access Floor

- Intended to facilitate inspection of HEMP
Shield floor
- No underfloor air distribution

Removable Wall Panels at Main Lobby

- Intended to facilitate inspection of HEMP
Shield walls
- Refer to sheets A-403 and A-520

High STC Ratings Throughout

- STC-50 is “typical” partition
- Resilient isolation clips at STC-55 partitions
- STC-52 double IGU glazing at Conference
Room

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Exterior

Below Grade Waterproofing

- Underslab (blind-side application)
- Basement wall (positive-side application)
- Retention system by Contractor

Architectural Precast

- 8” thick panels (cladding; not structural)
- Formliner, thin brick, pilaster
- Color matching (PCI color and existing Building 1235)

Insulation and Air Barrier Continuity

- Refer to sheets GI013 – GI015 for continuity drawings
- Closed-cell spray-foam insulation
 - Ignition barriers: metal panel, GWB, intumescent film

Exterior Storefront and Glazing

- Refer Section 08 41 13, 2.1.1.f for Blast Loads at Storefront
- Refer Section 04 81 00 1.3 for Blast Loads at Glazing
- Refer sheet A-631 for blast resistant laminated glazing details

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ANTITERRORISM/FORCE PROTECTION



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All required AT/FP requirements are included in the drawings and specifications. Hardened outer shell and vehicle barrier meet needed UFC requirements.

Spaces are provided for CB threats. The Government will provide equipment needed to meet the requirements.

HEMP and RF designs cover building systems. Weapons systems penetration and filter requirements are GF/GI.



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UNIQUE DESIGN FEATURES

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AT/FP – ensure vehicle barrier is K12 or equivalent.

Work with Government stakeholders to understand CB equipment needs and locations.

WBC Designs for the weapon system need to be developed. Space is allocated but the filter and waveguide requirements are not known.

RF spaces may prove difficult to implement waveguides and filter systems.

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MECHANICAL



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Chilled Water System

- 2N redundancy
- Separate systems for Comfort Cooling and IT Loads
- Modular water-cooled chillers (Trane)
- Closed Loop Outdoor Unit rejects heat with hydraulically powered fans.

Heating Water System

- Two Condensing Boilers each @ 65% Load
- Terminal Units with reheat.
- Heating system is not 2N redundant.

Air-Side Systems

- VAV air handling units with single zone terminal units.
- In-row coolers for spaces with IT racks.
- Outer HEMP test zone heated and ventilated only.



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UNIQUE DESIGN FEATURES

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All equipment serving HEMP shielded spaces that have electronic devices to be within HEMP boundary.

RF shielded spaces with HEMP boundary.

Penetrations through HEMP and RF require waveguides.

Fan filter units protect against CB threat.

2N redundancy on chilled water, ventilation, and CB systems.

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SPECIAL COORDINATION NEEDS

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HEMP boundary penetrations require coordination with structural framing.

Delegated design of hydraulic powered fluid coolers on condenser water system.

Government furnished equipment coordination. Some work stations require duct connections from MILCON equipment.

Diesel fuel tank for generator. Located exterior of building with pumps inside of HEMP shield.

No restrooms within HEMP shielding.

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ELECTRICAL



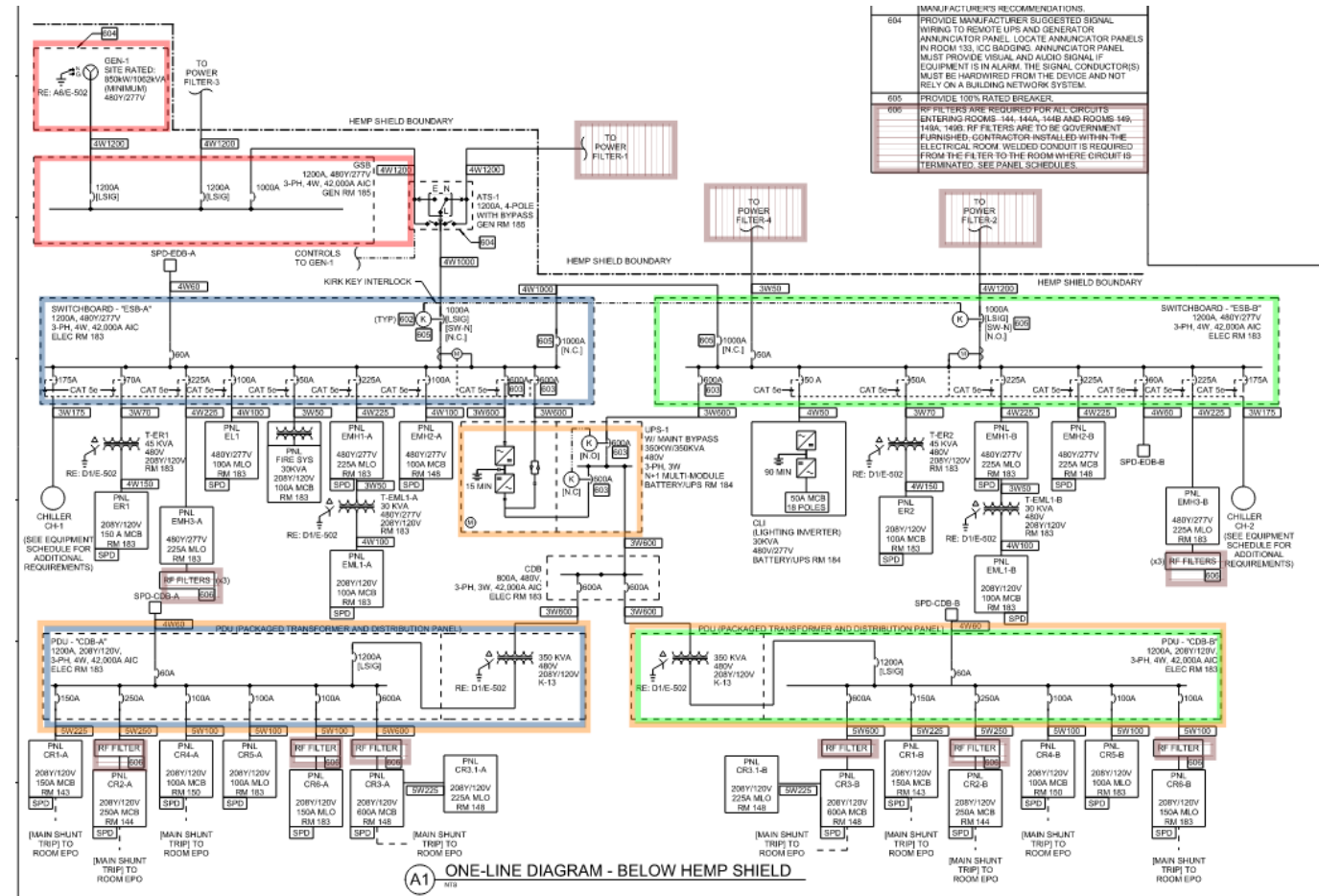
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Electrical Distribution System

- Single Utility Transformer Radial Feed
- Redundant Feeds / Redundant Distribution within the HEMP Shield
- 100% Generator Back-up within HEMP
- UPS Distribution to Data Racks / Critical Electronics Equipment





Other systems

- Grounding and Lightning Protection
- HEMP Shielding
- Filtering
- Lighting within inspection areas (three volumes)
- Central lighting inverter within HEMP volume
- Site Parking lot lighting, Radio, and Gate Arm Systems



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Interior Generator System

- All electrical systems within HEMP must operate without support from electrically driven devices outside of HEMP
 - Generator cooling, signal wiring, fuel pumps, etc. must be interior to HEMP Shield and not reliant

Clear Boundary / RF Boundary

- Consolidate conduit penetrations to a single area
- Conduits entering space must terminate within space (no pass through)
- RF Boundaries require additional filtering and welded conduits

HEMP Boundary

- Exterior bonded to counterpoise system at 20' intervals
- Penetrations
 - HEMP furnished filters at each penetration
 - Consolidated to four power penetrations (Two Utility Power, One Load Bank, One Security (outside of HEMP))
 - Welded conduit from filter through boundary

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SPECIAL COORDINATION NEEDS

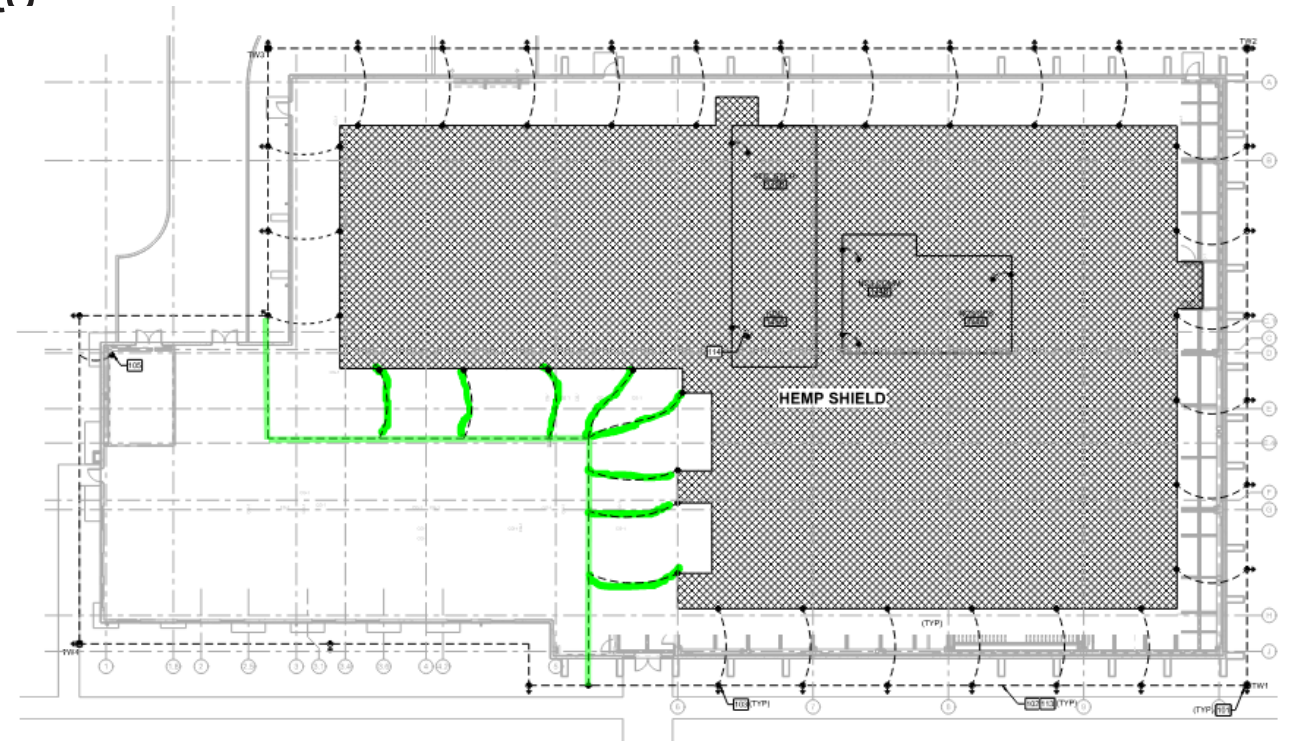
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Grounding

- Ground system beneath building for bonding to HEMP Shield
 - From underground through basement to HEMP Shield
- RF Shield (in wall) and raised floor bonded to HEMP Shield
- Coordinate bonds to HEMP Shield with manufacturer (exothermic weld)



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SPECIAL COORDINATION NEEDS

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Coordinate filter mounting, sizes, and location

- Power Filters on HEMP wall
- RF Filters overhead in electrical room or just outside of protected space

Conduit routing and Supports

- Above or Below HEMP, Clear, and RF areas.
- HEMP shield not to be used for conduit support (basement conduits could be underfloor)
- No concealed conduit or recessed devices in HEMP boundary, clear boundary, and RF walls; Utilize Surface mounted devices for clear and RF Boundaries

Chiller VFD must limit in-rush to 110%

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TELECOMMUNICATIONS



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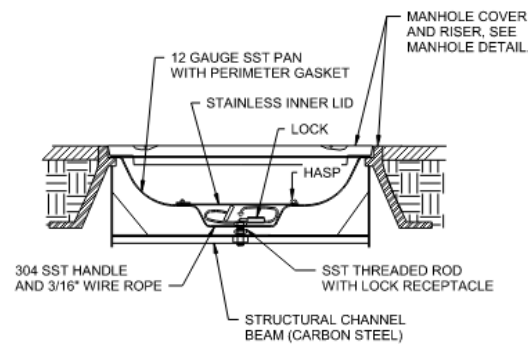
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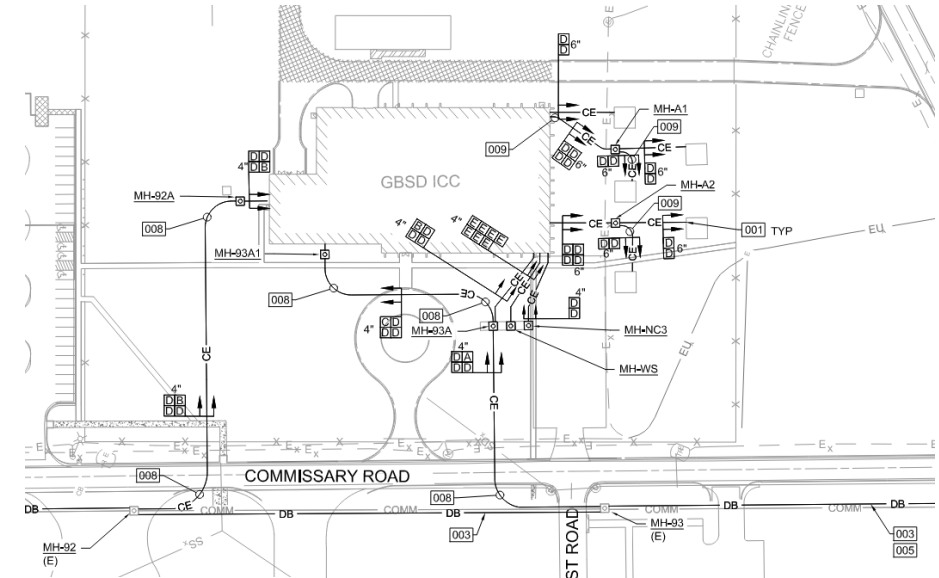
Site Comm

- Duct bank augmentation
 - Mostly direct buried
 - Some Directional boring
 - Includes entry to ITNs
- Lockable Comm Manholes
 - Must match existing products A3/T-501
 - Coordinate for access to manholes.

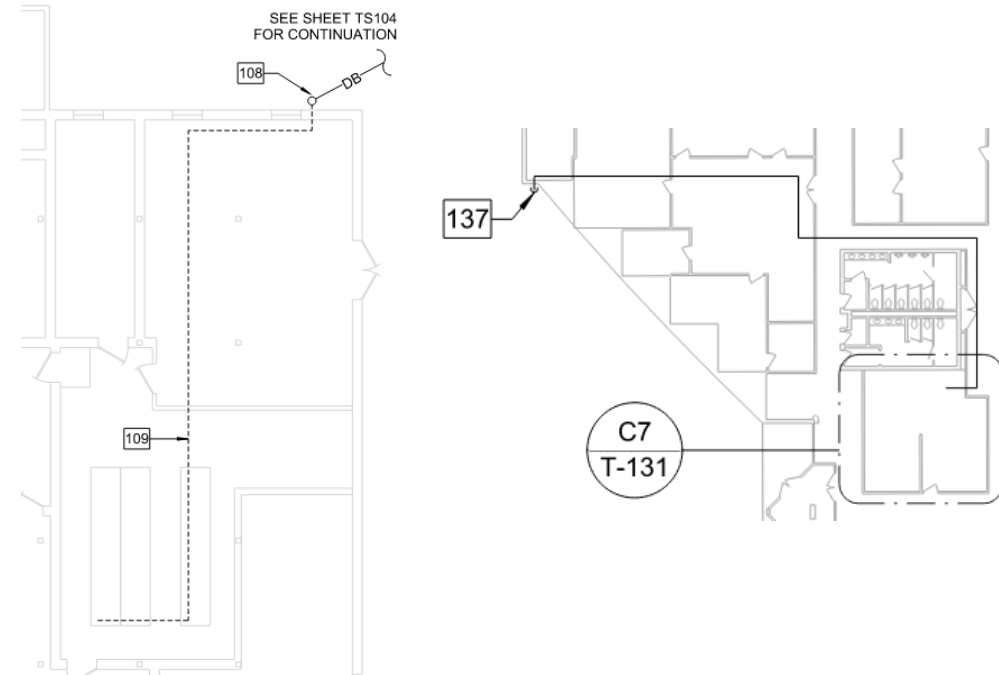


NOTE:

A. PROVIDE MANHOLE LOCKING SYSTEM BY LOCKDOWN INCORPORATED. PROVIDE AN ABLOY PL330/25 PADLOCK. COORDINATE REQUIREMENTS WITH BASE COMMUNICATIONS SHOP.



SEE SHEET TS104 FOR CONTINUATION





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UNIQUE DESIGN FEATURES

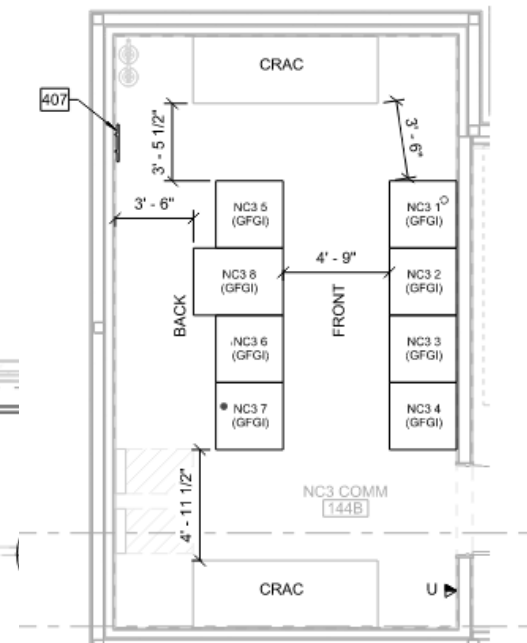
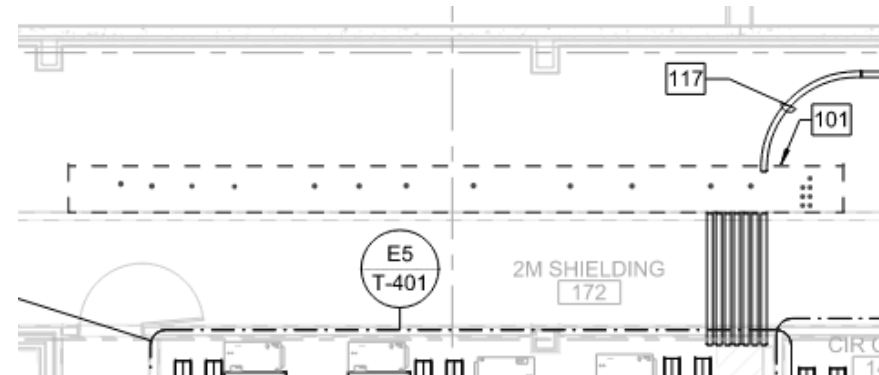
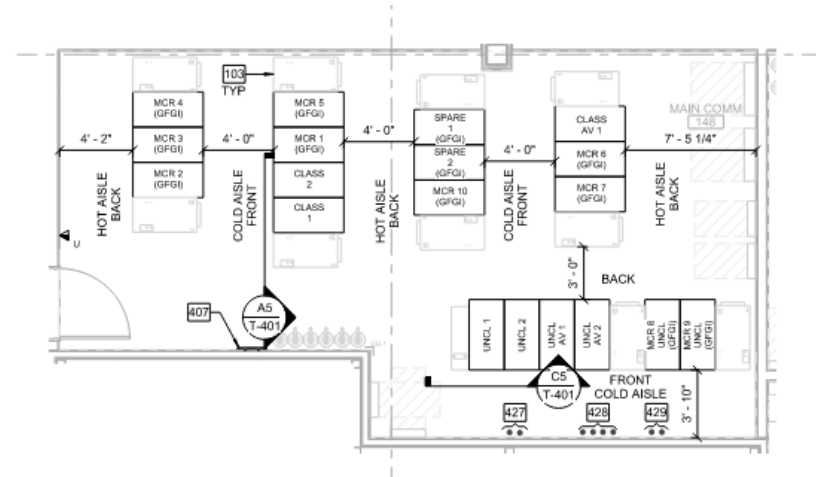
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Interior Comm

- 6' Bend Radius for Antenna conduits
- HEMP Shield Penetrations
 - 3.5" Conduit
 - All dielectric Fiber
 - Filter Copper cables
- Critical Coordination
 - GFGI Antenna RF Filters
 - Other Filters are CFCI
 - Coordination with NG Equipment



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UNIQUE DESIGN FEATURES

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IDS, ACS & CCTV

- GFGI
 - Equipment
 - Software
 - Devices
- CFCI
 - All LV Wiring
 - Power wiring
 - Conduit and Back box infrastructure

Coordination with NG.

NG is the Designer of the ESS and is to be included in the submittal review process.

ACCESS CONTROL & INTRUSION DETECTION

NOTE: ACS AND IDS DEVICES NOTED BELOW AS GFGI ARE NOT IN CONTRACT. PROVIDE RACEWAYS, BOXES, AND CABLING AS INDICATED ON TY SHEETS AND DETAILS. PROVIDE SUPPORTS, PENETRATIONS, AND ASSOCIATED HARDWARE FOR A COMPLETE RACEWAY AND CABLING SYSTEM TO SUPPORT GFGI DEVICES.



| 9 | | 10 | |
|----------|---|----|--|
| KEYNOTES | | | |
| 615 | ACS/IDS DEVICE. NIC. | | |
| 616 | PROVIDE 10' CABLE PIGTAIL. | | |
| 618 | PROVIDE 4' CABLE PIGTAIL. | | |
| 620 | JB FOR GFGI DOOR CONTROLLER. PROVIDE 10' PIGTAIL FOR CABLES ENTERING BOX. | | |

CONDUIT/CONDUCTOR SCHEDULE (THIS DWG ONLY)

[a] = [3/4"C, 1-CAT6]

[b] = [3/4"C, 1-6C #18 AWG, SHIELDED]

[c] = [3/4"C, EMPTY WITH PULLSTRING]

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THANK YOU



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