

MECHANICAL PLAN

ENVIRONMENTAL REQUIREMENTS

1) AIR CONDITIONING IS TO PROVIDE A TEMPERATURE OF 70°F $\pm 5^\circ$ F IN THE EXAM ROOM, 70°F±10°F IN THE EQUIPMENT & CONTROL AREAS, │ RELATIVE HUMIDITY OF 40-60% (NON-CONDENSING) IS REQUIRED EXAMINATION ROOM AND 40-80% (NON-CONDENSING) IN ALL OTHER AREAS WHERE SIEMENS EQUIPMENT IS INSTALLED. THESE CONDITIONS ARE TO BE MET AT ALL TIMES; 24 HOURS A DAY, 7 DAYS A WEEK. 2) A DEDICATED AIR CONDITIONING AND HUMIDIFICATION SYSTEM IS RECOMMENDED FOR THE EXAM ROOM. A MINIMUM AIR EXCHANGE RATE OF 6 TIMES PER HOUR FOR THE EXAM ROOM IS REQUIRED. IT IS RECOMMENDED TO INSTALL A FRESH AIR SYSTEM WITH 30%-50% FRESH AIR INTAKE

AIR SUPPLY AND RETURN ABOVE THE FINISHED CEILING IN THE EXAM ROOM IS RECOMMENDED. EACH ROOM SHOULD HAVE A DEDICATED CONTROL AND SENSOR TO MONITOR AND ADJUST THE AIR.

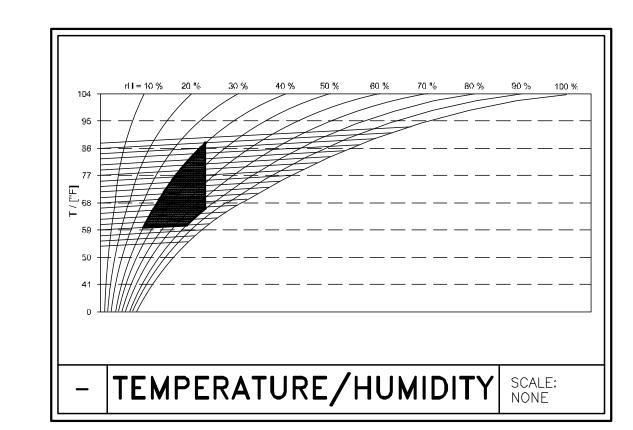
- 3) THE HEAT INTO THE EXAM ROOM IS LESS THAN 10.236 BTU/HR. THE HEAT INTO THE EQUIPMENT ROOM IS LESS THAN 3,412 BTU/HR. THIS HEAT DISSIPATION IS FROM THE SIEMENS EQUIPMENT ONLY, AUXILIARY SUPPORT EQUIPMENT (ie UPS) AND LIGHTING MUST BE CONSIDERED FOR TOTAL HEAT LOADS.
- 4) IT IS IMPORTANT FOR FRESH AIR INTAKE SYSTEMS TO EXHAUST AIR DIRECTLY OUT OF THE BUILDING. THE EXHAUST AIR MUST NOT BE DEFLECTED INTO ANOTHER ROOM, THE MAGNET ROOM EXHAUST AIR SHOULD BE INSTALLED AT LEAST 6'-6" ABOVE FINISHED FLOOR. 5) THE AIR INTAKE OF THE AIR CONDITIONING SYSTEM MUST NOT BÉ LOCATED IN THE VICINITY OF THE QUENCH VENT EXHAUST.

6) IF THE INPUT DRAWS UPON AIR FROM OUTSIDE THE BUILDING, IT

IS RECOMMENDED TO INSTALL AN ON-SITE FILTER TO REMOVE DUST

PARTICLES GREATER THAN 10 MICRONS. 7) DO NOT LOCATE ANY HVAC DIFFUSERS ABOVE THE MAGNET.

THERE SHALL NOT BE AIR BLOWING DIRECTLY ON THE MAGNET.



CHILLED WATER SUPPLY

A CHILLED WATER SUPPLY IS REQUIRED TO THE MRI SYSTEM 24 HOURS A DAY, YEAR ROUND FOR THE COLD HEAD AND GRADIENT SYSTEMS. THIS CAN BE PROVIDED BY A CENTRAL CHILLED WATER SUPPLY OR A SEPARATE STAND ALONE CHILLER THAT MEETS THE STATED REQUIREMENTS. THE CHILLED WATER CAN ALSO BE SUPPLIED BY A DEDICATED KRAUS ECO CHILLER AND INTERFACE PANEL. WITHOUT THE USE OF A DEDICATED KRAUS CHILLER, A SEP (SYSTEM SEPARATOR CABINET), MUST BE INCLUDED WITH THE SIEMENS ORDER. THE PIPE SIZE BETWEEN THE KRAUS CHILLER AND INTERFACE PANEL, OR BETWEEN THE WATER SUPPLY AND SEP MUST BE 2 INCH UP TO 82 FEET, 2-1/2 INCH UP TO 148 FEET, CONSULT FOR LONGER PIPE. PERMISSIBLE MATERIALS THAT CAN BE USED FOR THE PIPING ARE: STAINLESS STEEL (V2A, V4A), NON-FERROUS METAL (COPPER, BRASS) SYNTHETIC MATERIAL, PLASTICS, BRAZING SOLDER, HARD SOLDER, OR FITTING SOLDER TYPE 3 AND 4. THERE ARE MATERIALS THAT MAY CAUSE DAMAGE TO THE COOLING SYSTEM AND CANNOT BE USED, THESE MATERIALS ARE ALUMINUM, IRON, CARBON STEEL, ZINC, ZINC PLATED STEEL, OR STANDARD STEEL PIPES.

THESE REQUIREMENTS ARE REQUIRED FOR NEW INSTALLATIONS, IF EXISTING WATER PIPES COMPLY WITH SIEMENS WATER SPECIFICATIONS, THEY DO NOT NEED TO BE REPLACED.

NORMAL TAP WATER MUST BE AVAILABLE FOR FILLING THE SECONDARY WATER CIRCUIT. THERE SHALL BE A HOSE BIB LOCATED WITHIN 65' OF THE SEP, IFP, ACC OR THE KRAUS CHILLER. THE SUPPLY AND RETURN CHILLED WATER PIPES MUST BE LABELED. THE LOCATION OF THE LABELS MUST BE AT ALL CONNECTION AND

REFILLING POINTS AND MUST CONTAIN FLOW DIRECTION AND CONTENTS.

SCALE: NO SCALE

WATER REQUIREMENTS TO BE MEASURED AT THE SEP CABINET.

CHILLED WATER REQUIREMENTS

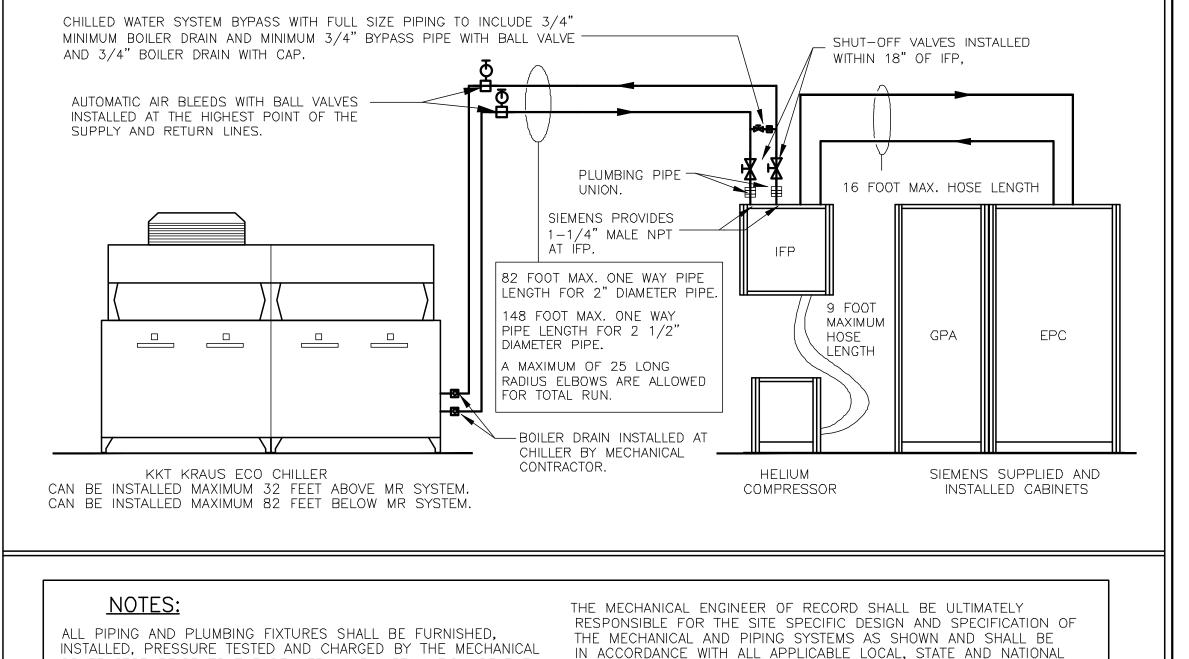
FLOW RATE:	23.78-29.05 GPM
WATER TEMPERATURE:	42.8°F – 53.6°F
BTU DISCHARGE TO THE WATER	204,729 BTU/HR
WATER PRESSURE	MAXIMUM 87 PSI
LOSS OF PRESSURE FOR SEP CABINET	<14.5 PSI 11.6 TYPICAL
CHILLED WATER ACIDITY RANGE	6 pH TO 8 pH
CHILLED WATER HARDNESS	<250 ppm CALCIUM CARBONATE
CHLORINE GAS CONCENTRATION	<200 ppm
FILTRATION	500 um

FOR INSTALLATION OF A KRAUS ECO CHILLER, IT IS THE RESPONSIBILITY OF THE CUSTOMER/MECHANICAL CONTRACTOR TO PROVIDE A MIXTURE OF WATER | WITH 35%-38% ETHYLENE GLYCOL PRIOR TO CHILLER START UP. DO NOT USE PROPYLENE GLYCOL OR AUTOMOTIVE ANTI-FREEZE. THE AMOUNT OF THE MIXTURE MUST FILL THE CHILLER, MR SYSTEM AND

PIPING (SUPPLY AND RETURN), SEE EXAMPLES BELOW. (1) GALLON OF UNDILLUTED GLYCOL, OR (2) GALLONS OF WATER/GLYCOL MIXTURE MUST REMAIN ON SITE FOR USE AFTER START UP.

MIXTURE VOLUME INCLUDING SUPPLY & RETURN+15 GAL. CHILLER & MR			
PIPE DIAMETER	TOTAL LENGTH	MIXTURE VOLUME	GLYCOL NEEDED
2"	100'	31.3 GALLONS	11.9 GALLONS
2"	200'	47.6 GALLONS	18.1 GALLONS
2.5"	100'	40.5 GALLONS	15.4 GALLONS
2.5"	200'	66.0 GALLONS	25.1 GALLONS
MIXTURE VOLUME = 3.14 x (PIPE RADIUS) ² x PIPE LENGTH + 15 GALLONS.			

GLYCOL AMOUNT = 35-38% OF MIXTURE VOLUME.



CHILLED WATER SYSTEM BYPASS WITH FULL SIZE PIPING TO

INCLUDE 3/4" MINIMUM BOILER DRAIN AND MINIMUM 3/4"

BYPASS PIPE WITH BALL VALVE AND 3/4" BOILER DRAIN

THE PIPE OR HOSE FROM THE CHILLED

WATER SUPPLY TO THE SEP CABINET

MAINTAIN THE FUNCTION OF THE WATER

MUST BE 1" NPT FEMALE THREAD FOR

KRAUS CHILLER AN AUTOMATIC DEAERATION DEVICE (AIR VENT) WITH TO THE SEP/IFP MUST BE LABELED TO SHOW FLOW DIRECTION AND

LEAK TEST ALL PIPING WITH A MIXTURE OF R-22 TRACE GAS AND A TAP WATER SUPPLY MUST BE AVAILABE WITHIN 45' OF THE

PIPING SCHEMATIC FOR FACILITY PROVIDED CHILLED WATER

45KW SEP CABINET OR 1-1/4"Ø FOR

MUST BE A MINIMUM 1-1/4"Ø TO

COOLING CIRCUIT. THE CONNECTION

60KW SEP CABINET.

CONTRACTOR PRIOR TO THE DELIVERY AND INSTALLATION OF THE SIEMENS SUPPLIED AND INSTALLED EQUIPMENT UNLESS SPECIFIED OTHERWISE.

AT THE HIGHEST POINT OF THE WATER SUPPLY PIPE FROM THE KRAUS CHILLER AN AUTOMATIC DEAERATION DEVICE (AIR VENT) WITH TO THE SEP/IFP MUST BE LABELED TO SHOW FLOW DIRECTION AND BALL VALVE MUST BE INSTALLED BY THE MECHANICAL CONTRACTOR. CONTENT (WATER/GLYCOL). LEAK TEST ALL PIPING WITH A MIXTURE OF R-22 TRACE GAS AND A TAP WATER SUPPLY MUST BE AVAILABE WITHIN 45' OF THE NITROGEN. DO NOT PERFORM LEAK TEST WITH WATER.

CODES. ALL WORK SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR AND SHALL BE SUBJECT TO COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES. THE SUPPLY AND RETURN PIPES FROM THE CHILLED WATER SUPPLY SEP/IFP AND CHILLER CONNECTION FOR FILLING THE CIRCUIT.

PIPING SCHEMATIC FOR CHILLED WATER - KRAUS CHILLER

MECHANICAL NOTES

1) THE AIR H.V.A.C. SYSTEM MUST OPERATE FOR A MINIMUM OF $48\,$ CONSECUTIVE HOURS PRIOR TO THE DELIVERY OF THE EQUIPMENT. 2) THE FILTERS MUST BE CHANGED IMMEDIATELY PRIOR TO THE DELIVERY OF THE EQUIPMENT.

3) SMS REQUIRES THE USE OF A DEDICATED H.V.A.C. SYSTEM FOR THE EQUIPMENT ROOM TO BE LOCATED, SIZED AND SPECIFIED BY THE MECHANICAL ENGINEER OF RECORD AND TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR.

4) SMS RECOMMENDS THAT THE CUSTOMER PROVIDE AND INSTALL AN OXYGEN MONITORING SYSTEM WITH VISUAL AND AUDIBLE ALARMS TO INDICATE WHEN THE OXYGEN CONTAINED IN AMBIENT AIR FALLS BELOW PRE-PROGRAMMED SAFETY LEVELS WITH THE SENSOR TO BE LOCATED IN THE SCAN ROOM IN THE AREA DESIGNATED FOR CRYOGEN FILLING,

5) THE SIEMENS ACTIVE SHIELDED MAGNET RECIRCULATES LIQUID HELIUM, ELIMINATING THE NEED FOR A DEDICATED CRYOGEN STORAGE AREA. THE RECIRCULATING SYSTEM SIGNIFICANTLY REDUCES THE HELIUM "BOIL OFF". THE MAGNET WILL REQUIRE OCCASIONAL FILLING, A DELIVERY ROUTE FOR CRYOGEN DEWARS MUST BE ESTABLISHED. A MINIMUM 36" CLEARANCE IS REQUIRED.

FIRE CONTROL NOTES

1) SIEMENS HAS NO SPECIFIC REQUIREMENT FOR FIRE PROTECTION. FIRE PROTECTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH LOCAL CODES AND CUSTOMER'S INSURANCE REQUIREMENTS. ALL FIRE PROTECTION SYSTEMS SHALL BE DEFINED BY THE ARCHITECT OF RECORD WITH DESIGN, SPECIFICATION AND DETAILING OF THE FIRE PROTECTION SYSTEM BY THE MECHANICAL ENGINEER OF RECORD IN ACCORDANCE WITH SIEMENS GUIDELINES AS STATED HEREIN.

THE ELECTRONIC EQUIPMENT OF THE MR SYSTEMS WILL BE DAMAGED BY WATER. REDUCTION OR ELIMINATION OF WATER USED FOR FIRE SUPPRESSION WILL REDUCE POTENTIAL WATER DAMAGE. PRE-ACTION INERT GAS, OR HALOCARBONS OR OTHER METHODS CAN REDUCE OR ELIMINATE WATER. REFER TO YOUR FIRE PROTECTION PROFESSIONAL

2) THE USE OF SMOKE DETECTORS INSIDE OF THE MR EXAMINATION ROOM IS NOT RECOMMENDED. SMOKE DETECTORS, BY DESIGN, CAN GENERATE NOISE THAT MAY INTERFERE WITH THE MRI EXAMINATION AND CAUSE IMAGE ARTIFACTS. IF THE USE OF A SMOKE DETECTOR IN THE EXAMINATION ROOM IS MANDATED BY LOCAL REQUIREMENTS SPECIAL NOISE TESTS MUST BE PERFORMED BY SIEMENS SERVICE AFTER THE MRI IS OPERATIONAL. MRI EQUIPMENT PERFORMANCE PROBLEMS DUE TO SMOKE DETECTORS ARE THE RESPONSIBILITY OF THE CUSTOMER AND ARE NOT COVERED UNDER WARRANTY OR SERVICE AGREEMENT.

3) ALL MATERIAL USED INSIDE THE MAGNET ROOM SHALL BE NON-MAGNETIC.

4) ALL PENETRATIONS IN THE RF CABIN/SHIELD SHALL BE THROUGH A WAVEGUIDE TO BE EQUIPPED WITH A SIEMENS APPROVED DIELECTRIC COUPLER ON BOTH ENDS OF THE WAVEGUIDE. ALL WAVEGUIDES SHALL BE DESIGNED, DETAILED AND SPECIFIED BY THE RF CABIN/ SHIELD CONTRACTOR WITH ALL LOCATIONS TO BE DETERMINED BY THE ARCHITECT AND MECHANICAL ENGINEER OF RECORD TO BE ESTABLISHED IN A PRE-PLANNING MEETING PRIOR TO THE DESIGN, SPECIFICATION, AND FABRICATION OF THE RF CABIN/SHIELD. 5) EACH ELECTRICAL PENETRATION OF THE RF CABIN/SHIELD FOR ELECTRICAL SERVICING OF THE FIRE PROTECTION SYSTEM SHALL BE THROUGH AN RFI FILTER TO BE SUPPLIED BY THE RF SHIELD CONTRACTOR WITH FILTER LOCATIONS TO BE DETERMINED BY THE ARCHITECT AND THE ELECTRICAL ENGINEER OF RECORD TO BE ESTABLISHED IN A PRE-PLANNING MEETING PRIOR TO THE DESIGN,

SPECIFICATION AND FABRICATION OF THE RF CABIN/SHIELD. 6) IT IS PERMISSIBLE TO RUN "BLACK PIPE" UP TO THE DIELECTRIC COUPLER ON THE OUTSIDE OF THE RF SHIELD.

- 7) THERE MUST BE NO GROUND CONNECTIONS MADE DURING THE THE INSTALLATION OF EITHER THE PIPING OR ELECTRICAL FOR THE FIRE PROTECTION SYSTEM.
- 8) THE USE OF HALON IS NOT ACCEPTABLE.
- 9) THE LOCATION OF FIRE CONTROL SYSTEM COMPONENTS SHALL BE COORDINATED THROUGH THE ARCHITECT OF RECORD WITH ALL LOCATIONS TO BE COORDINATED WITH SIEMENS EQUIPMENT LOCATIONS AS SHOWN ON THE 1/4" SCALE EQUIPMENT LOCATION PLAN.
- 10) THE FIRE CONTROL CONTRACTOR SHALL VERIFY EQUIPMENT MOUNTING PROCEDURES AND LOCATIONS ON ANY WALLS CONTAINING RF SHIELDING WITH THE SIEMENS PROJECT MANAGER PRIOR TO THE COMMENCEMENT OF WORK.

COMPRESSOR LINE INSULATION

COMPRESSOR LINES RUNNING FROM THE COMPRESSOR (OR SEP CABINET) TO THE MAGNET ARE INSULATED BY SIEMENS. ADDITIONAL INSULATION (ARMAFLEX OR EQUIVALENT) FOR NOISE REDUCTION (CHIRPING) MAY BE REQUIRED. ADDITIONAL INSULATION NOT PROVIDED BY SIEMENS.

CEILING HEIGHTS

DEDICATED, STAND ALONE, CLOSED LOOP WATER CHILLER

OR FACILITY CENTRAL CHILLED WATER SUPPLY TO MEET

REQUIREMENTS LISTED ON THIS SHEET.

BALL VALVE

BOILER DRAIN

-T- VISUAL FLOW METER WITH GAUGE

○ THERMOMETER WITH RANGE FROM 30°F

PRESSURE GAUGE WITH RANGE FROM 40

ALL PIPING AND PLUMBING FIXTURES SHALL BE FURNISHED.

NITROGEN. DO NOT PERFORM LEAK TEST WITH WATER.

INSTALLED. PRESSURE TESTED AND CHARGED BY THE MECHANICAL

SIEMENS SUPPLIED AND INSTALLED EQUIPMENT UNLESS SPECIFIED

AT THE HIGHEST POINT OF THE WATER SUPPLY PIPE FROM THE

BALL VALVE MUST BE INSTALLED BY THE MECHANICAL CONTRACTOR. CONTENT (WATER/GLYCOL).

CONTRACTOR PRIOR TO THE DELIVERY AND INSTALLATION OF THE

TO 80°F (LOCATED NEAR SEP)

TO 110 PSI (LOCATED NEAR SEP)

FILTER - 700 MICRONS MINIMUM

A BYPASS MAY BE BENEFICIAL

FOR MAINTENANCE PURPOSES

EXAM ROOM 7'-11" MINIMUM CONTROL ROOM 6'-11 MINIMUM EQUIPMENT ROOM 7'-3" MINIMUM

MAGNETOM AERA 1.5T THE USE OR REPRODUCTION OF PROJECT #: THIS TITLE BLOCK WITHOUT SIEMENS AUTHORIZATION WILL RESULT IN PROSECUTION UNDER FULL EXTENT OF THE LAW. 10023

ATTENTION:

- THIS DRAWING IS DESIGNED TO CONFORM TO FEATURES AND EQUIPMENT REQUIREMENTS PRESENTED AT THE TIME OF THEIR PREPARATION. SINCE BOTH THESE FACTORS ARE SUBJECT TO DESIGN MODIFICATION, THEY ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES. - THIS SET OF PLANS REPRESENTS A COMPLETE SET OF DETAILS AND SHOULD NOT BE SEPARATED.

- IT IS RECOMMENDED THAT THE SIEMENS DRAWINGS BE INCORPORATED WITH THE CONSTRUCTION DOCUMENTS FOR REFERENCE.

- ALL DIMENSIONS SHOWN ON THIS DRAWING ARE FROM FINISHED SURFACES. -THIS DRAWING DOES NOT PROVIDE RADIATION SHIELDING REQUIREMENTS FOR X-RAY AND ASSOCIATED EQUIPMENT. THE CUSTOMER IS RESPONSIBLE FOR CONSULTING WITH A REGISTERED RADIATION PHYSICIST TO SPECIFY RADIATION PROTECTION.

ALL RIGHTS ARE RESERVED. DESCRIPTION CALE: AS NOTED -ISSUE BLOCK-

SHUT-OFF VALVES FOR

SERVICING SEP CABINET.

16 FOOT MAX. HOSE LENGTH

GPA

SIEMENS SUPPLIED AND

INSTALLED CABINETS

SEP

THE MECHANICAL ENGINEER OF RECORD SHALL BE ULTIMATELY

RESPONSIBLE FOR THE SITE SPECIFIC DESIGN AND SPECIFICATION OF

THE MECHANICAL AND PIPING SYSTEMS AS SHOWN AND SHALL BE

CODES. ALL WORK SHALL BE PERFORMED BY THE MECHANICAL

CONTRACTOR AND SHALL BE SUBJECT TO COMPLIANCE WITH ALL

SEP/IFP AND CHILLER CONNECTION FOR FILLING THE CIRCUIT.

APPLICABLE LOCAL, STATE AND NATIONAL CODES.

IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL

THE SUPPLY AND RETURN PIPES FROM THE CHILLED WATER SUPPLY

— 6 FOOT MAX, HOSE LENGTH

1" MALE THREAD PROVIDED

BY SIEMENS FOR 45 kW SEP.

BY ŚIEMENS FOR 60 kW SEP.

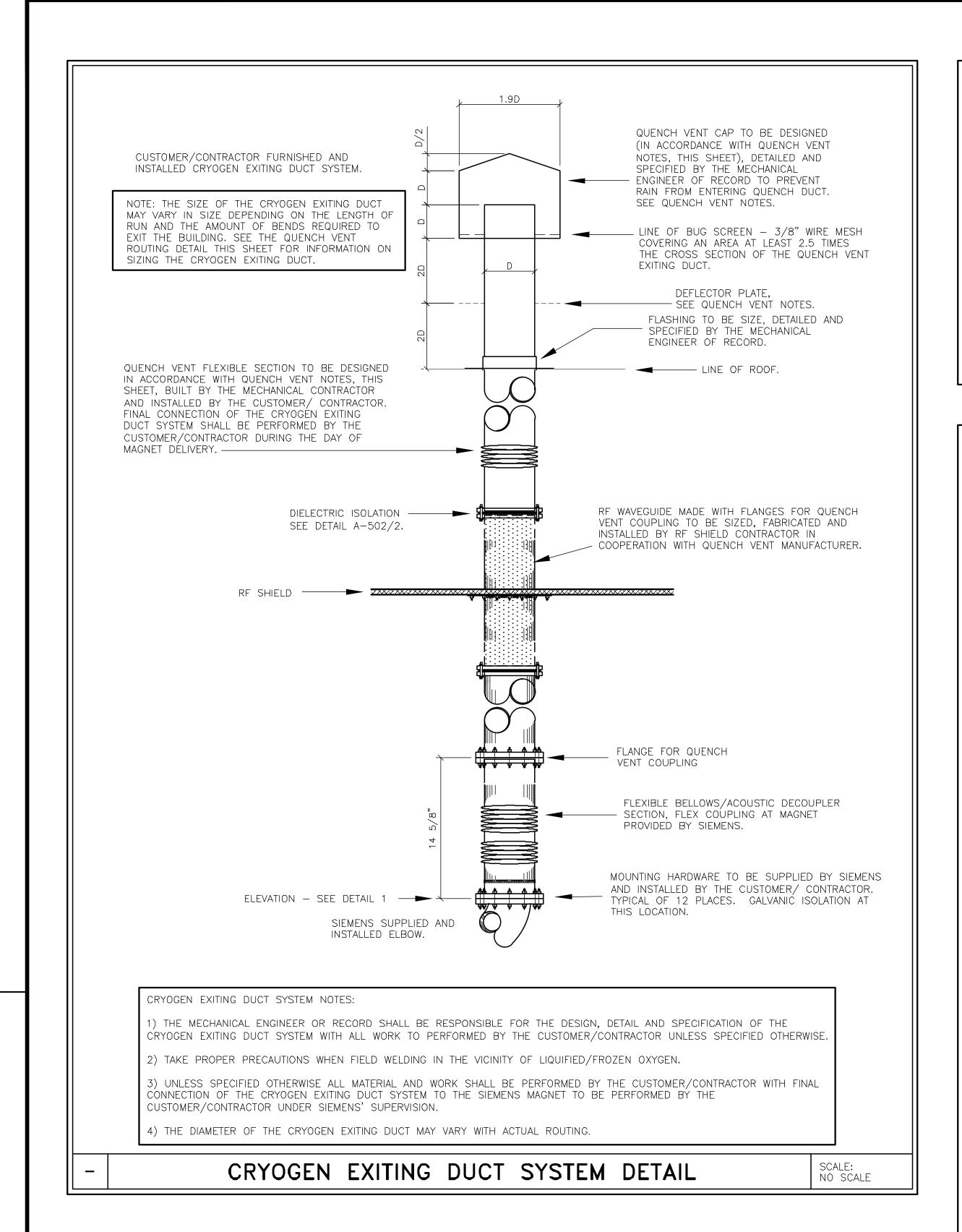
1-1/4" MALE THREAD PROVIDED

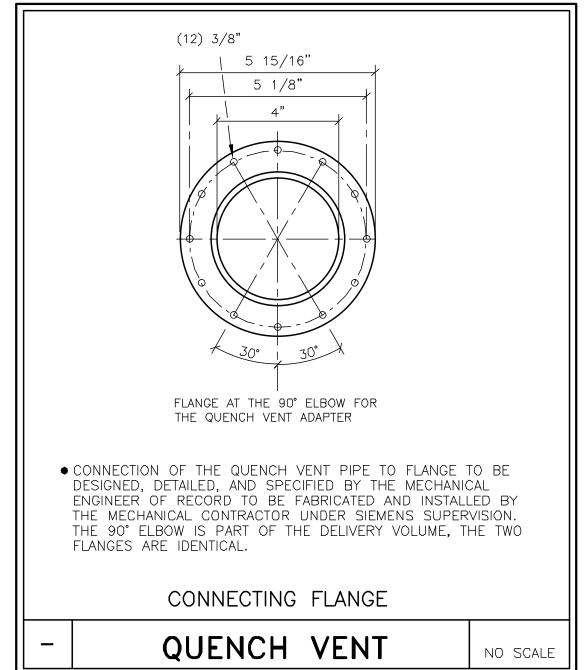
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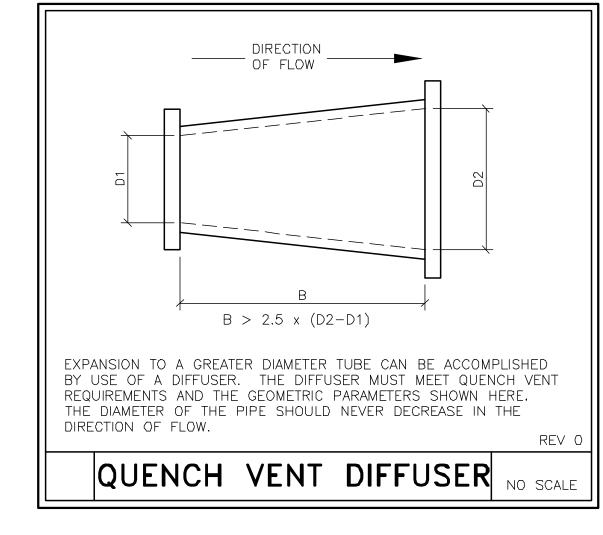
05/16/13

SIEMENS

03/13/13







CRYOGEN NOTES

1) "CRYOGENS" IS A TERM USED TO IDENTIFY THE REFRIGERANT USED TO MAGE THE MAGNET "SUPER-CONDUCTING", IN THIS APPLICATION, LIQUID AND GASEOUS HELIUM. SPECIAL CARE MUST BE TAKEN DURING THE TRANSFILLING OF THE MAGNET WITH CRYOGENS AND NORMAL EXHAUST OF CRYOGENS FROM THE SYSTEM. ASIDE FROM THE OBVIOUS DANGER OF FREEZING, HELIUM GAS WILL ALSO DISPLACE THE OXYGEN IN THE ROOM. THE INSTALLATION OF AN APPROVED TOXGARD MONITORING SYSTEM IS RECOMMENDED.

2) THERE SHALL BE A TRANSPORT ROUTE FOR DELIVERY OF CRYOGENS TO THE EXAM ROOM. SPECIAL VESSELS CALLED DEWARS ARE USED TO TRANSPORT HELIUM. A 250 LITER DEWAR WEIGHS 335 POUNDS AND HAS A 32" DIAMETER, A 500 LITER IS 540 POUNDS, AND IS 42" IN DIAMETER.

3) HELIUM GAS CYLINDERS MAY BE USED DURING THE INITIAL FILLING OF HELIUM INTO THE MAGNET. THE FACILITY IN WHICH THESE MAY BE USED NEEDS TO HAVE THE ABILITY TO TEMPORARILY STORE AND SECURE THESE CYLINDERS THAT WILL PREVENT THEM FROM INADVERTENTLY FALLING OVER.

4) OUTSIDE VENTING OF THE HELIUM IS TO BE PROVIDED BY MEANS OF A VENT PIPE OF NON-MAGNETIC MATERIAL CALLED A QUENCH VENT.

QUENCH VENT NOTES

1) IN THE EVENT OF A QUENCH, THE THERMAL ENERGY DISSIPATED CAUSES AN EXTREMELY RAPID BOIL OFF OF THE LIQUID HELIUM. THE SYSTEM MUST BE CAPABLE OF VENTING THE LARGE VOLUME OF GAS GENERATED AT THE APPROXIMATE EXPANSION RATIO OF 1:700 FROM LIQUID AT 4.2°K TO ROOM TEMPERATURE GAS. THE EXHAUST SYSTEM S CRITICAL FOR THE SAFE OPERATION OF THE MAGNET, THE DATA IN THIS DOCUMENT MUST BE FOLLOWED. SINCE HELIUM VENTED IN A QUENCH IS AN ASPHYXIANT & AN EXTREMELY COLD GAS, THE QUENCH TUBE MUST ALWAYS END AT A POINT WHERE ACCESS BY PEOPLE IS NOT POSSIBLE. QUENCH TUBE PLANNING MUST ONLY BE DONE BY QUALIFIED PERSONNEL. IT IS THE OWNER'S RESPONSIBILITY TO ENSURE THAT THE QUENCH TUBE IS MAINTAINED IN AN OPERABLE STATE. 2) IF THE QUENCH VENT IS NOT CONFIGURED CORRECTLY THERE IS

A RISK OF DANGER THAT MAY LEAD TO DEATH OR SERIOUS INJURY AND CAN RESULT IN STRUCTURAL DAMAGE. THE EXHAUST MUST NOT BE VENTED IN AN ENCLOSED SPACE. THE OPERATOR OF THE SYSTEM MUST PREPARE AN EMERGENCY PLAN IN THE EVENT OF A QUENCH. 3) THE QUENCH TUBE CONSISTS OF STRAIGHT, HYDRAULICALLY SMOOTH SECTIONS, BENDS UP TO 90° AND A DIFFUSER, IF REQUIRED. THE END OF THE TUBE MUST BE PROTECTED FROM RAIN, SNOW, AND FOREIGN OBJECTS. ROUND SECTIONS ONLY, NO SQUARE SECTIONS. 4) THE SIEMENS MAGNET HAS A QUENCH VALVE ASSEMBLY FOR CONNECTION TO THE TUBE LOCATED AT THE TOP LEFT SIDE OF THE MAGNET (SEE MAGNET ELEVATION). THE MECHANICAL CONTRACTOR WILL SUPPLY AND INSTALL A QUENCH VENT TUBE WITH CAP, TO BE NON-MAGNETIC STAINLESS STEEL (≥22 GAUGE RECOMMENDED) GRADES AISI304, 309, 316, OR 321 ONLY. THERMAL CONDITIONS MAY CAUSE THE TUBE TO CONTRACT UP TO 3mm/METER SO A STAINLESS STEEL BELLOWS OR FLEXIBLE SECTION MUST BE INSTALLED A MINIMUM OF EVERY 32'-9" NOT TO EXCEED 2% OF THE OVERALL LENGTH. THE QUENCH TUBE MAY ALSO BE MADE OF ALUMINUM, EXTRUDED TUBE ALUMINUM GRADES 6063 AND 6082 ONLY MUST BE USED. ROLLED AND WELDED TUBE FROM SHEET ALUMINUM GRADE 5083 ONLY MUST BE USED. THE WALL SECTIONS OF ALUMINUM TUBE MUST BE A MINIMUM 14 GAUGE. THERMAL CONTRACTION OF 4.5 MM/METER MUST BE CONSIDERED FOR ALUMUNIUM QUENCH TUBES. THE MOVEMENT OF THE BELLOWS MUST BE RESTRICTED TO PREVENT EXCESSIVE EXPANSION DUE TO PRESSURE. THE WEIGHT OF THE TUBE MUST BE SUPPORTED BY THE BUILDING AND BE FLEXIBLE ENOUGH TO ALLOW MOVEMENT FROM THERMAL CONTRACTION, THE WALL EXIT SHOULD ALSO BE FLEXIBLE.

5) THE MAXIMUM INTERNAL PRESSURE IS CALCULATED AT 1.45 PSI. THE MAXIMUM PRESSURE SHOULD BE ENGINEERED FOR 6.5 PSI. 6) USE THE QUENCH VENT CALCULATOR PROVIDED BY SIEMENS TO DESIGN A QUENCH VENT THAT MEETS DESIGN REQUIREMENTS FOR DIAMETER, LENGTH, NUMBER OF ELBOWS AND PRESSURE DROP. ALL BENDS MUST BE SMOOTH WALLED AND HAVE A CENTERLINE TO INTERNAL PIPE DIAMETER RATIO OF 1.5 TO 5.0. EXPANSIONS TO PIPE DIAMETER CAN BE DONE WITH A DIFFUSER. ONLY ROUND TUBE SECTIONS MAY BE USED, RECTANGULAR SECTIONS ARE NOT ALLOWED.) THERE MUST BE A 12-19 INCH FLEXIBLE SECTION OF PIPE FOR CONNECTION TO THE QUENCH VALVE AT THE MAGNET WITH AN INSIDE DIAMETER GREATER THAN 4" (1.5T) OR 6" (3.0T) AND ABLE TO WITHSTAND 6.5 PSI.

8) SECTIONS OF THE PIPE CAN ONLY BE JOINED BY WELDING OR BOLTED FLANGES WITH FIBER GASKETS. ROTARY FLANGES ARE PERMITTED, VEE CLAMPED FLANGES MAY NOT BE USED. 9) THE PROTECTION AT THE END OF THE TUBE SHALL BE 3/8" WIRE MESH COVERING AN AREA AT LEAST 2.5 TIMES THE CROSS SECTION AREA OF THE QUENCH PIPE.

10) WHERE THE QUENCH TUBE EXITS THROUGH A FLAT ROOF, THE THE OUTLET MUST BE ABOVE A LEVEL WHERE WATER COULD ENTER IN THE EVENT THAT THE ROOF DRAINS BECOME BLOCKED. IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET SHOULD BE ANGLED DOWNWARD NOT LESS THAN 1 PIPE DIAMETER TO PREVENT RAIN INGRESS, THE EXIT SHOULD BE LOCATED ABOVE THE LEVEL OF DRIFTING SNOW.

11) WHERE THE QUENCH TUBE EXITS VERTICALLY, A RAIN COVER MUST ALSO BE FITTED WITH THE DIAMETER TO BE TWO TIMES THE DIAMETER OF THE QUENCH TUBE. THE CLEARANCE BETWEEN THE RAIN GUARD AND THE MESH SHOULD 2 TIMES THE DIAMETER OF THE TUBE. A DEFLECTOR PLATE SHOULD BE WELDED TO THE TUBE WHERE IT EXITS THE ROOF TO PREVENT HELIUM FROM RE-ENTERING THE BUILDING, THE DEFLECTOR SHOULD BE AT LEAST THE DIAMETER OF THE RAIN GUARD AND LOCATED TWO PIPE DIAMETERS ABOVE THE ROOF AND TWO PIPE DIAMETERS BELOW THE RAIN GUARD. 12) TO AVOID INJURY FROM COLD BURNS AND ASPHYXIATION ACCESS TO THE QUENCH VENT MUST BE RESTRICTED BY 9'-11"

ON EACH SIDE AND BELOW, AND 19'-9" ABOVE WITH WARNING

SIGNS. THE EXIT MUST NOT LOCATED WHERE HELIUM GAS COULD BE DRAWN INTO AN AIR INLET OR OPEN WINDOW. 13) THE QUENCH TUBE MUST HAVE MINIMUM 1" INSULATION FOR THE FULL LENGTH. WITHIN THE RF ROOM THERE SHOULD BE A 1" LAYER OF MINERAL FIBER INSULATION WITH A VAPOR BARRIER AND 1" CLASS O OR CLASS AP ARMAFLEX. OUTDOOR PIPES MUST BE WEATHERPROOF. THE TUBE MUST HAVE A WARNING POSTED ALONG IT'S ENTIRE LENGTH

FOR EXTREMELY COLD HELIUM GAS - AUTHORIZED PERSONNEL ONLY. THE INSULATION MUST NOT TOUCH THE MAGNET COVERS. 14) GALVANIC SEPARATION MUST BE PROVIDED BETWEEN THE MR SYSTEM, THE RF ROOM, AND THE BUILDING, TWO SEPARATIONS ARE REQUIRED USING STAINLESS STEEL BOLTS, INSULATING BUSHES AND LOCKING NUTS. NO OTHER DESIGNS ARE PERMITTED FOR

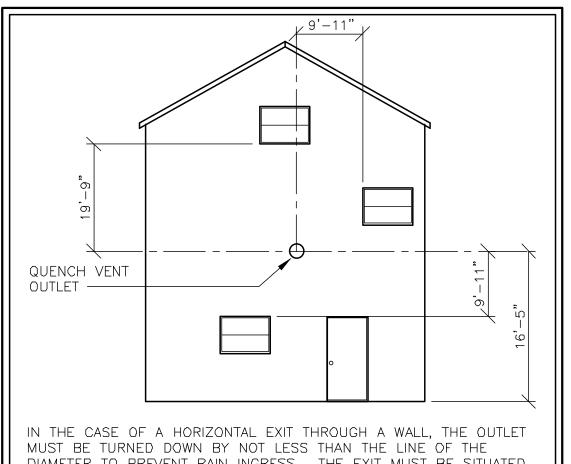
15) THE DESIGN AND CONSTRUCTION OF THE QUENCH PIPE MUST BE DCUMENTED WITH DRAWINGS AND CALCULATIONS THAT ARE KEPT WITH INSTALLATION DOCUMENTS. IT MUST COMPLY WITH THE REQUIREMENTS IN THIS DOCUMENT BEFORE BEING CONNECTED TO THE

HELIUM CONTENT LITERS AT 100% 0.0 L/HR FOR TYPICAL CLINICAL USE, TYPICAL BOIL OFF RATE DEPENDING ON SEQUENCES TYPICAL REFILL INTERVAL AND OPERATING TIME. 10 YEARS

WITHOUT THE COLDHEAD RUNNING THE LIQUID HELIUM WILL BOIL OFF FROM

THE LOSS DURING SHIPPING IS APPROX. 3.3% PER DAY.

97% TO 0% IN APPROX 30 DAYS.

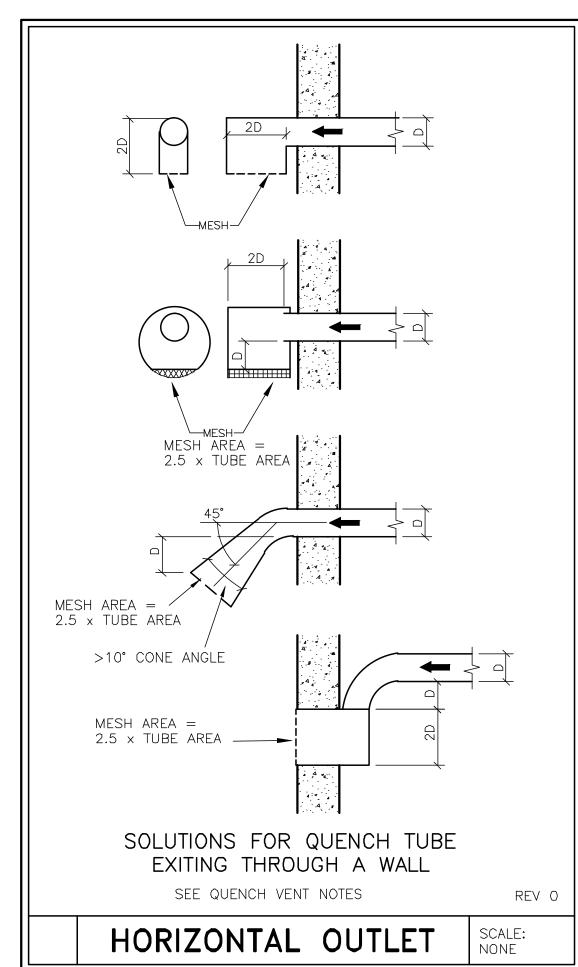


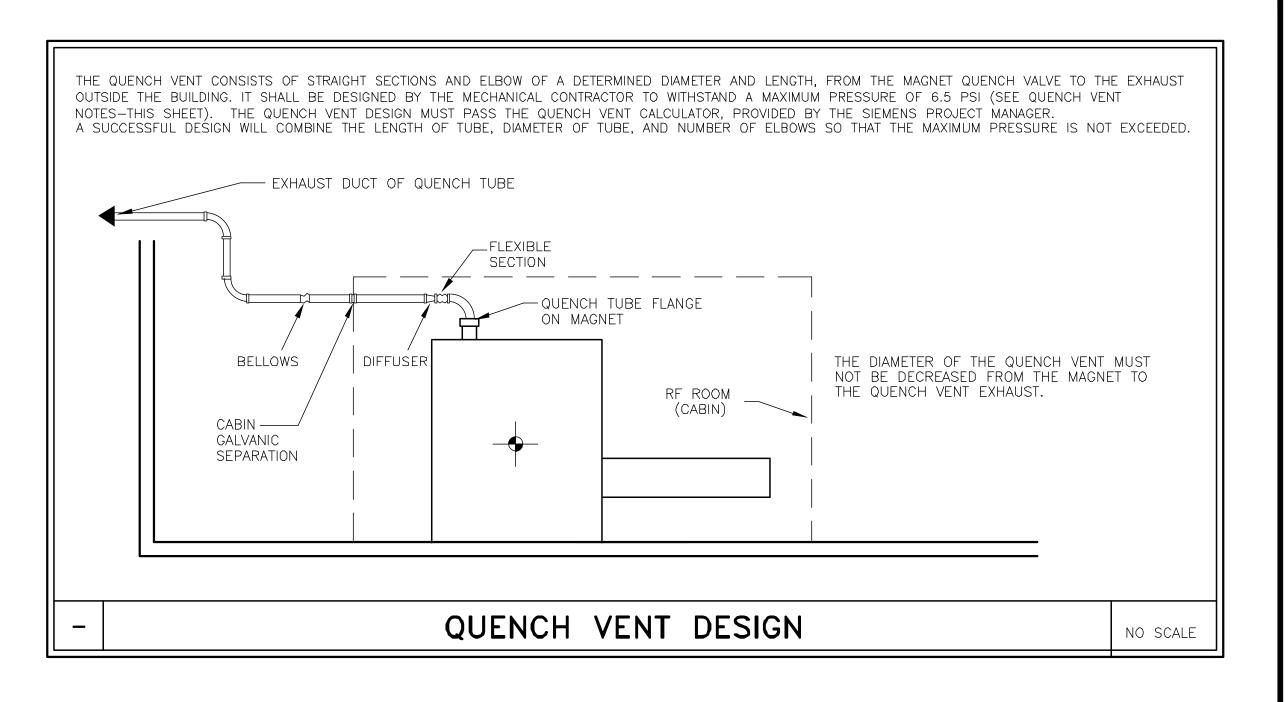
DIAMETER TO PREVENT RAIN INGRESS. THE EXIT MUST BE SITUATED WHERE IT CANNOT BE BLOCKED BY DRIFTING SNOW. TO AVOID RISK OF INJURY FROM COLD BURNS AND ASPHYXIATION, ACCESS TO THE QUENCH VENT OUTLET MUST BE RESTRICTED AS SHOWN. THE OUTLET MUST NOT BE SITUATED WHERE, IN THE EVENT OF A QUENCH, HELIUM GAS COULD BE DRAWN INTO AN AIR INLET OR OPEN WINDOW. WHERE WINDOWS ARE WITHIN THE RESTRICTED AREA, THEY MUST BE PERMANENTLY CLOSED.

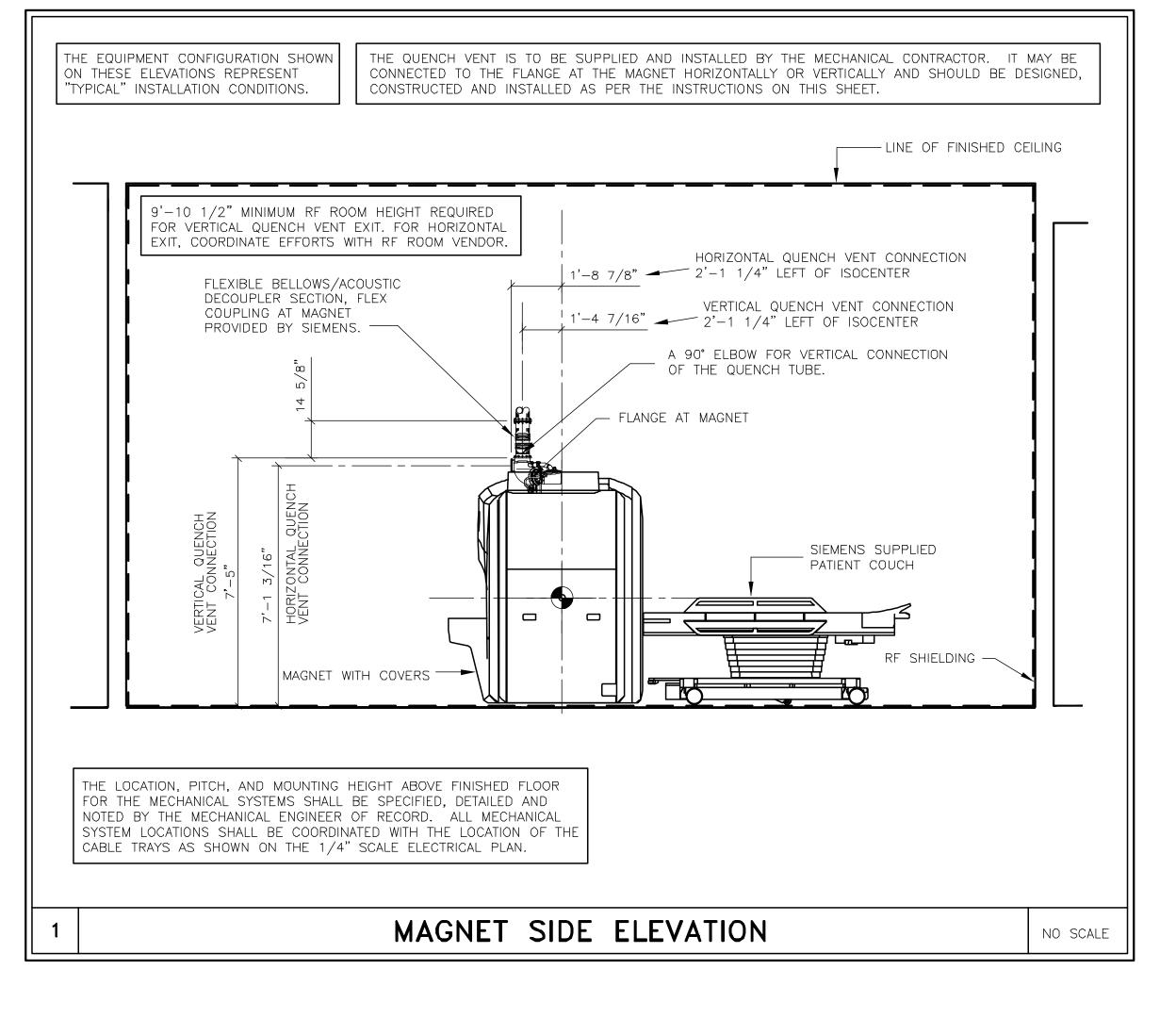
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OUTLET SAFETY CLEARANCES







03/13/13

			_				
			-				SIEMENS
			MA	GNE		DRAWING SET	RA 1.5T
			THIS TITLE B SIEMENS AUTH RESULT IN PROS	EPRODUCTION OF BLOCK WITHOUT ORIZATION WILL SECUTION UNDER OF THE LAW.	PROJECT #:)23	SHEET:
SYM	DATE	DESCRIPTION	ALL RIGHTS A	RE RESERVED.	SHEET OF 10 10	DRAWN BY: B. HERRMANN	
	-ISSUI	E BLOCK—	SCALE: AS NOTED	REF. #:	DATE: 05/16/13	CHECKED:	

- THIS DRAWING IS DESIGNED TO CONFORM TO FEATURES AND EQUIPMENT REQUIREMENTS PRESENTED AT THE TIME OF THEIR PREPARATION. SINCE BOTH THESE FACTORS ARE SUBJECT TO DESIGN MODIFICATION, THEY ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES. - THIS SET OF PLANS REPRESENTS A COMPLETE SET OF DETAILS AND SHOULD NOT BE SEPARATED.

-IT IS RECOMMENDED THAT THE SIEMENS DRAWINGS BE INCORPORATED WITH THE CONSTRUCTION DOCUMENTS FOR REFERENCE.

EQUIPMENT. THE CUSTOMER IS RESPONSIBLE FOR CONSULTING WITH A REGISTERED RADIATION

- ALL DIMENSIONS SHOWN ON THIS DRAWING ARE FROM FINISHED SURFACES. - THIS DRAWING DOES NOT PROVIDE RADIATION SHIELDING REQUIREMENTS FOR X-RAY AND ASSOCIATED PHYSICIST TO SPECIFY RADIATION PROTECTION.

ATTENTION:

An ESCO Technologies Company

Wood Dale Office: Allen Oliver

1360 North Wood Dale Road, Wood Dale, IL 60191-1075

630.912.1050 630.912.1150 - Fax Allen.Oliver@ETS-Lindgren.com

Customer: MOSER PILON NELSON / ARCHITECTS

30 JORDAN LANE

WETHERSFIELD, CT 06109 Contact: JIM BELL

Phone: 860.563.6164 Email: jbell@mpn-arch.com

Vendor: SIEMENS

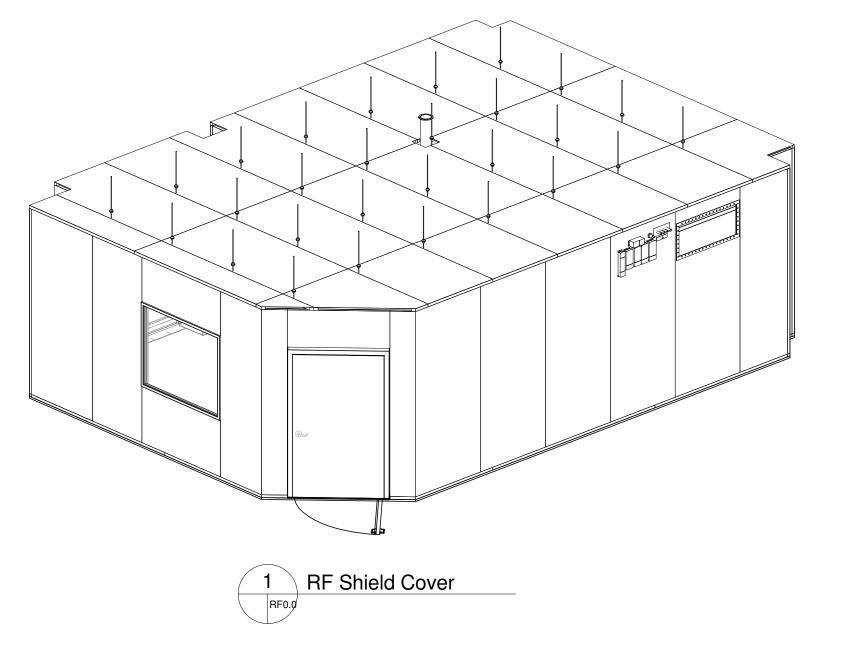
Magnet: AERA 1.5T PIM: N/A

Project #: N/A
Revision: N/A
PM: N/A
Phone: N/A

RADIO FREQUENCY SHIELD FOR:

BROCKTON VA HOSPITAL

BROCKTON, MA



SITE PREPARATION CHECKLIST PRIOR TO RF SHIELD INSTALLATION

MODULAR RF WOOD FLOOR
THE FOLLOWING ITEMS ARE <u>REQUIRED / TO BE VERIFIED</u> BY THE GENERAL CONTACTOR (GC)
PRIOR TO THE RF SHIELDING INSTALLATION.

CONTACT YOUR SHIELDING VENDOR PROJECT MANAGER TO ADVISE OF ANY DISCREPENCIES.

1. THE FLOOR TRENCH, IF REQUIRED, SHALL COMPLY WITH THE ABOVE CONCRETE SLAB SPECIFICATIONS. THE TRENCH WALLS SHALL BE PLUMB, STRAIGHT, AND TRUE. THE TOP AND BOTTOM WALL CORNERS/EDGES SHALL BE CLEAN, SMOOTH, AND SQUARE.

2. THE PARENT ROOM STRUCTURE SHALL BE SQUARE, PLUMB, AND TRUE TO THE DIMENSIONS DETAILED ON THIS DRAWING, AS NOTED.

3. THE LOCATION OF THE MAGNET ISOCENTER AND RELATED MAGNET INTERFACE CONNECTIONS SHALL BE FURNISHED BY THE IMAGING SYSTEM SUPPLIER WITH THE APPROVAL OF THESE DRAWINGS. THESE LOCATIONS SHALL ALSO BE FIELD IDENTIFIED DURING THE RF ENCLOSURE INSTALLATION BY THE IMAGING SYSTEM SUPPLIER.

4. BEFORE THE RF COMPONENTS MAY BE INSTALLED, THE SHIELDED AREA SHALL BE **WEATHERPROOFED**. THIS SHALL INCLUDE, BUT NOT LIMITED TO, THE MAGNET ACCESS OPENING AREA, CRYOGEN EXHAUST VENTING, AND ALL OTHER ENCLOSURE PENETRATIONS.

5. THE MRI ROOM MUST BE HEATED TO A MINIMUM OF 68°F AT FLOOR LEVEL DURING THE RF SHIELD INSTALLATION AND 48 HOURS AFTER APPLICATION OF THE RF FLOORING FILLER TILES. THE TEMPERATURE REQUIREMENT IS TO ALLOW FOR PROPER CURE FOR THE TILE ADHESIVE THAT THE SHIELD VENDOR INSTALLS. NOTE: TEMPORARY HEAT IS ALLOWED, BUT CANNOT CAUSE EXCESSIVE HEAT & HUMIDITY. HUMIDITY EFFECTS CURING/CURE TIMES AND INCREASES CORROSION. HUMIDITY IN THE MRI ROOM IS NOT ACCEPTABLE.

6. INTERIOR DRY STORAGE AREA SHALL BE PROVIDED FOR THE RF COMPONENTS, MATERIALS, AND RELATED EQUIPMENT DURING INSTALLATION. THE APPROXIMATE STORAGE AREA REQUIRED IS 20ft. x 20ft. AND SHOULD BE REASONABLY CLOSE TO THE MRI ROOM AREA. THE CONTROL ROOM AND/OR EQUIPMENT ROOM AREAS WORK FOR STORAGE. THE GC IS RESPONSIBLE TO PROVIDE "OTHER" STORAGE IF NEARBY/INTERIOR STORAGE IS NOT AVAILABLE. CONTACT THE SHIELDING VENDOR PROJECT MANAGER TO DISCUSS.

7. THE ROOM MUST BE DRY, EMPTY, AND BROOM SWEPT. TRASH CONTAINER, SHALL BE PROVIDED BY THE G.C., FOR THE REMOVAL OF WASTE AND CRATING MATERIALS.

8. TEMPORARY ELECTRIC POWER; 115V, SINGLE PHASE FOR HAND TOOLS IS REQUIRED FOR INSTALLATION OF THE RF ENCLOSURE.

9. TEMPORARY ELECTRIC POWER; 115v SINGLE PHASE NON-GFI FOR RF TESTING. CAUTION: DO NOT CONNECT UNTIL RF SHIELD HAS BEEN GROUNDED.

10. TEMPORARY LIGHTING: 4 LIGHTS 100 WATT MINIMUM.

11. ANY OVERHEAD MEP'S MUST CLEAR THE HEIGHT OF THE RF SHIELD. ANY OBSTRUCTIONS MUST BE RELOCATED OR ACCOUNTED FOR IN THE SHIELDING HEIGHT. PIPING THAT MAY SWEAT OR LEAK MUST HAVE DRIP PANS INSTALLED.

12. THE RF SHIELDED CEILING FRAMES SHALL BE SUPPORTED FROM THE PARENT ROOM STRUCTURE IMMEDIATELY ABOVE THE SCAN ROOM. REFER TO THE CEILING SUPPORT ANCHOR DETAIL ON THIS DRAWING SET FOR PARTICULAR APPLICATION.

A STANDARD, ONE POUND PER SQUARE FOOT, INTERIOR SUSPENDED CEILING MAY BE SUPPORTED FROM THE RF CEILING PANEL SYSTEM, REFER TO THE CEILING DETAIL ON THIS DRAWING SET.

AN INTERIOR FINISHED CEILING EXCEEDING ONE POUND PER SQUARE FOOT SHALL REQUIRE ADDITIONAL RF CEILING SYSTEM SUPPORT, REFER TO DETAILS ON THIS DRAWING SET OR CONTACT THE SHIELD VENDOR / APPLICATIONS ENGINEERING.

CAUTION: THE RF CEILING SYSTEM IS NOT A LOAD BEARING SURFACE.

13. IF THERE IS/ARE EXTERIOR WINDOW(S) TO BE MATCHED BY AN RF WINDOW(S) THE GC WILL NEED TO MAKE PREPARATIONS TO FRAME OUT THE AREA BETWEEN THE RF SHIELD AND THE PARENT WALL AROUND THE WINDOW PERIMETER(S). TYPICALLY THIS IS DONE WITH BLACK PAINTED DRYWALL OR PLYWOOD, OR SOME TYPE OF CUSTOM WINDOW FRAME. THIS WILL NEED TO BE READY TO BE INSTALLED DURING THE RF SHIELD INSTALLATION.

NOTE: ALL DIMENSIONS ARE FINAL ON THIS LAYOUT, UNLESS NOTED OTHERWISE ON THE RETURNED SET OF APPROVED RF DRAWINGS.

GENERAL MRI ROOM CONSTRUCTION NOTES

1. PLUMBING, SPRINKLER, MEDGAS AND ELECTRICAL ENTRIES INTO THE RF SHIELD SHOULD BE MADE AT THE PENETRATION PANEL LOCATION, THROUGH THE SHIELD VENDOR INSTALLED WAVEGUIDES/RF FILTERS, THEN ROUTED THROUGH THE ROOM AS REQUIRED. ALL PIPE PENETRATIONS SHALL BE INSTALLED AS DETAILED ON THESE DRAWINGS. ACCESS TO THESE PIPE CONNECTIONS SHALL COMPLY WITH LOCAL CODES.

2. FINAL BUILDING GROUND CONNECTION TO THE RF ENCLOSURE GROUND STUD (BY THE G.C.) SHALL COMPLY WITH LOCAL CODES.

3. IF ANY RF COMPONENTS ARE DAMAGED AFTER THE INSTALLATION CREW HAS COMPLETED THE RF VERIFICATION TEST, CONTACT SHIELDING VENDOR FOR INSTRUCTIONS AND/OR REPAIR SCHEDULE.

4. NO PENETRATIONS THROUGH THE RF SHIELD ARE ALLOWED WITHOUT A RF WAVEGUIDE OR RF FILTER.

5. FINAL ELECTRICAL CONNECTIONS AND ACCESS REQUIREMENTS TO THE RF POWER FILTERS SHALL COMPLY WITH LOCAL CODES AND DETAILS ON THESE DRAWINGS.

6. THE INTERIOR SCAN ROOM WALL FINISH MAY BE APPLIED TO THE VERTICAL 16" O.C. FURRING STRIPS, FURNISHED & INSTALLED PER CONTRACT.

NEW CONCRETE SLAB SPECIFICATIONS

REFER TO RF1.0 "FOUNDATION" PAGE.

EXISTING CONCRETE SLAB SPECIFICATIONS

REFER TO RF1.0 "FOUNDATION" PAGE

RF SHIELD FLOOR PANELS

1. THE MODULAR FLOOR SYSTEM MUST
NOT BE EXPOSED TO LIQUIDS OF ANY SORT,
ie:(WATER, COFFEE, LIQUID CLEANER, ETC.)
LIQUID WILL DEGRADE THE SHIELDING
PROPERTIES IF EXPOSED TO THE MODULAR

2. THERE MAY BE ADDITIONAL FLOOR PREP REQUIRED BY THE G.C. ON THE MODULAR TYPE RF FLOOR SYSTEMS BEFORE FINISH FLOORING IS APPLIED.

 THIS FLOOR SYSTEM CONSISTS OF METAL LAMINATED WOOD PANELS WHICH ARE CLAMPED TOGETHER. FILLER TILE IS PLACED BETWEEN THE CLAMPS TO LEVEL OUT THE FLOOR SURFACE.

• TYPICAL INSTALLATIONS REQUIRE THE GC/FLOORING CONTRACTOR TO PUT A "FLASH-PATCH" MATERIAL ON TOP OF THE RF FLOOR TO PROVIDE A BETTER SURFACE TO INSTALL THE FINISH FLOORING PRODUCT.

THE FLASH-PATCH MATERIAL MUST NOT CAUSE MOISTURE PROBLEMS WITH THE RF FLOOR. USE A PRODUCT SIMILAR TO **ARDEX SD-F FEATHER FINISH.**

RF SHIELD FRAME CONSTRUCTION

THE RF SHIELD IS CONSTRUCTED WITH; DIM. LVL LUMBER WITH 3oz. PAPER-BACKED COPPER WRAPPED TO THE OUTSIDE OF THE FRAME. THE LUMBER IS FIRE RETARDANT

TREATED WOOD LVL LUMBER, FLAMESPREAD 10, SMOKE DEVELOPED 50, AWPA C20-99, INTERIOR TYPE A

Sheet Number	Sheet Name
RF0.0	COVER
RF1.0	FOUNDATION PLAN
RF1.1	CEILING SUPPORT LAYOU
RF1.2	FLOOR PLAN
RF2.0	ELEVATIONS
RF2.1	ELEVATIONS
RF3.0	DETAILS
RF3.1	DETAILS
RF4.0	AUTOSEAL 2 DOOR

SPECIFICATIONS

TESTING PROCEDURE

RF TESTING PERFORMED IN GENERAL ACCORDANCE WITH MIL.STD . 285. SHOULD A VERIFICATION TEST BE REQUIRED, IT IS THE RESPONSIBILITY OF THE MAGNET MANUFACTURER TO CORRECT ANY DEFICIENCIES IN RF ATTENUATION OF THE MRI SUPPLIED PENETRATION PANEL.

THE SHIELDING VENDOR SHALL HAVE AN ONGOING PRODUCT IMPROVEMENT PROGRAM.

UNDER NO CIRCUMSTANCE CAN ANY CONDUCTIVE
MATERIAL COME IN CONTACT WITH THE EXTERIOR OF THE
ENCLOSURE OR THE STRUCTURAL SYSTEM OF THE
SHIELDED ROOM.

GROUND ISOLATION GUIDELINES

ANY DUCT OR PIPE WORK (INCLUDING ELECTRICAL CONDUIT) MUST BE BROKEN WITH A DIELECTRIC OUTSIDE THE SHIELD, AND PASS THROUGH A WAVEGUIDE OR FILTER AT THE PENETRATION POINT.

THE CONCRETE SLAB SHALL BE FREE OF STANDING WATER AND/OR MOISTURE PRIOR TO INSTALLATION OF R.F. SHIELDING TO INSURE GROUND ISOLATION. FAILURE TO CONTROL THE MOISTURE MAY ADVERSELY AFFECT ADHESION AND DETERIORATE THE GROUND ISOLATION CHARACTERISTICS. UPON ESTABLISHING SPECIFIED GROUND ISOLATION, IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO INSURE GROUND ISOLATION IS MAINTAINED.

PRIOR TO INSTALLATION OF THE COPPER RF FLOOR, THE UNDERLYING CONCRETE SLAB SHALL HAVE HAD A MINIMUM OF SEVEN DAYS CURE TIME WITH ABSOLUTELY NO CONCRETE SEALANT OR CURING COMPOUND APPLIED TO IT. THE SLAB MUST BE KEPT DRY AND CLEAN AT ALL TIMES.

UPON COMPLETION OF THE RF SHIELDING INSTALLATION A GROUND ISOLATION TEST WILL BE PERFORMED BY LINDGREN AND SHALL BE WITNESSED AND SIGNED OFF BY A REPRESENTATIVE OF OUR CUSTOMER. ESTABLISHING THE ACHIEVEMENT OF AT LEAST 1000 OHMS GROUND ISOLATION.

SEISMIC

THE SHIELDS ARE NOT ENGINEERED FOR SEISMIC PERFORMANCE UNLESS SPECIFIED ON THESE DRAWINGS. THE G.C. IS RESPONSIBLE FOR ANY SEISMIC ENGINEERING REQUIREMENTS PER APPLICABLE SITE BUILDING CODES.

SHIELD INSTALLATION IS 4-6 WEEKS AFTER DRAWING

COMPLY WITH THE FOLLOWING SPECIFICATIONS:

APPROVAL.

RF ENCLOSURE PERFORMANCE

THE RF ENCLOSURE PERFORMANCE SHALL BE VERIFIED

AFTER THE SHIELD INSTALLATION IS COMPLETE, AND SHALL

INSTALLATION SCHEDULE

RF ATTENUATION:

PLANE WAVE: 90 dB at 128 Mhz (+/- .5Mhz) 100 dB for co-siting

ISOLATION RESISTANCE: >100 ohms MINIMUM

THE RF PERFORMANCE SHALL BE WITNESSED BY THE G.C. OR THE G.C'S REPRESENTATIVE

RF DOOR

 THE DOOR FINISH MUST BE DETERMINED BY OUR CUSTOMER AT LEAST FOUR WEEKS PRIOR TO THE INSTALLATION DATE.

THE RF DOOR PROVIDED IS NOT FIRE RATED

THE FINISH FOR THE RF DOOR(S) MAY BE:

PLASTIC LAMINATES:

FORMICA #7152 NORTHERN OAK WILSONART #1573-60 FROSTY WHITE.

• CUSTOM PLASTIC LAMINATES CAN BE SELECTED FOR AN ADDITIONAL CHARGE.

<u>VENEERS:</u>

BIRCH, RED OAK, CHERRY, OR MAPLE

NOTE: ETS-LINDGREN MANUFACTURING DOES NOT PROVIDE FINISHES FOR VENEERS.

VENEERS FINISHED ON SITE BY G.C.

DOOR HARDWARE SPECIFICATIONS / SEE DOOR DETAIL THIS DRAWING SET.

THE RF DOOR CONTACTS ARE NOT A WARRANTED ITEM.
PRECAUTION SHOULD BE TAKEN TO PREVENT DAMAGE TO
THE CONTACTS DURING THE CONSTRUCTION PHASE AND
END USER USE.

COVER

An ESCO Technologies Company

An ESCO Technologies Company

Minocqua Office:

7352 Giles Drive Minocqua, WI 54548

715,356–2022 Tiles Drive Minocqua, WI 54548

715,356–7022 Tiles Drive Minocqua,

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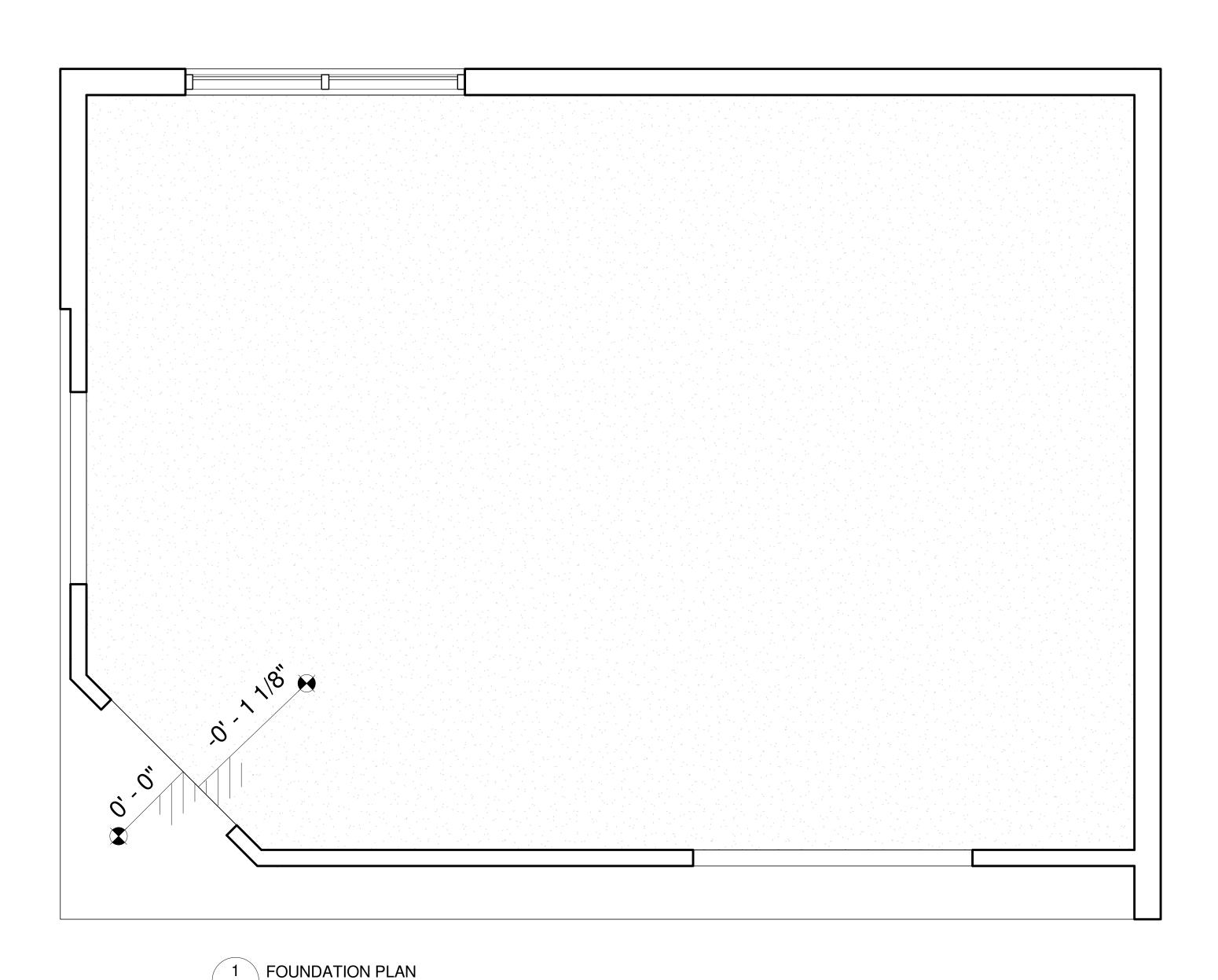
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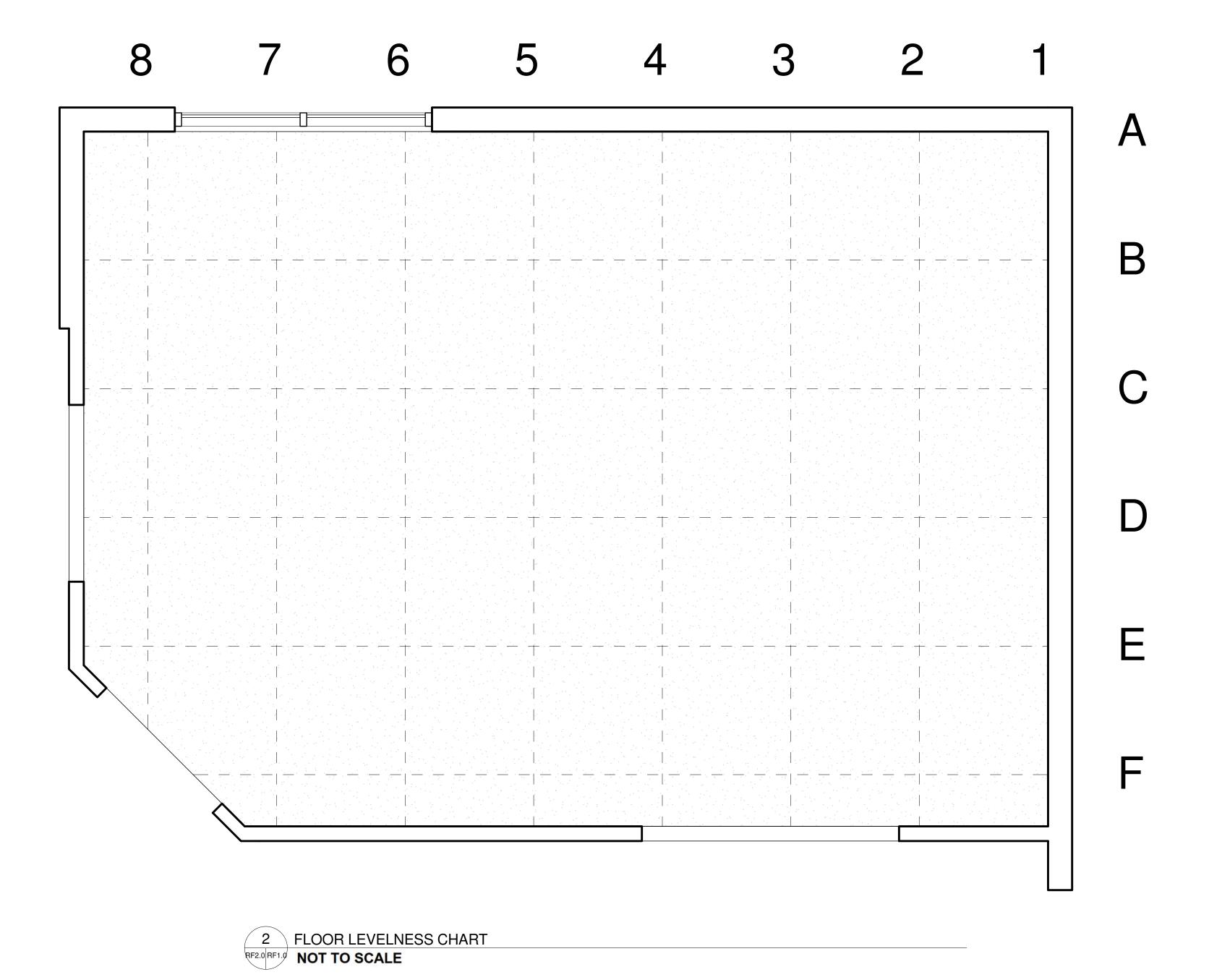
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DRAWING NO:





THE BELOW SPECIFICATIONS AND/OR PARENT FLOOR CONDITIONS MUST BE MET PRIOR TO THE RF SHIELD INSTALLATION.

IT IS THE GC/CUSTOMER/OWNERS RESPONSIBILITY FOR GETTING THE SITE TO MEET SPECIFICATION.

ETS-LINDGREN INSTALLERS WILL INSPECT THAT THE SPECIFICATIONS HAVE BEEN MET AND WILL ACCEPT OR REJECT THE CONDITIONS TO BEGIN THE JOB BASED ON THOSE FINIDINGS.

SITE REQUIREMENTS

CONCRETE SLAB SPECIFICATIONS CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF:

- A. SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDING ACI301
- B. GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION ACI 302.1
- C. SURFACE SHALL BE SOUND CONCRETE WHICH EXHIBITS A MINIMUM 100PSI PULLOUT STRENGTH.
- 1. ACI 302 CLASS 4 CONCRETE FLOOR.
- 2. TYPE PORTLAND CEMENT PER C150.
- 3. PARENT CONCRETE FLOOR MUST BE LEVEL WITHIN +/- 1/8". NOT TO EXCEED 1/4" ACROSS ENTIRE SCAN ROOM AREA AND/OR BE IN COMPLIANCE WITH MORE STRINGENT MAGNET VENDOR SPECIFICATIONS FOR SPECIALIZED ZONES UNDER MAGNET AND PATIENT TABLE (SEE MAGNET VENDOR SPECIFIC NOTES, SHEET RF3.1, IF APPLICABLE)
- 4. CONCRETE JOINTS/SEAMS MAY NEED SPECIAL TREATMENT AND NEED TO BE IDENTIFIED IN LOCATION AND PURPOSE. (IE: EXPANSION, CONTROL VIBRATION)
- 5. THE CONCRETE SLAB MUST BE FREE OF STANDING WATER AND/OR MOISTURE PRIOR TO INSTALLATION OF R.F. SHIELDING TO INSURE GROUND ISOLATION. FAILURE TO CONTROL THE MOISTURE MAY DETERIORATE THE GROUND ISOLATION CHARACTERISTICS. UPON ESTABLISHING SPECIFIED GROUND ISOLATION, IT IS THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENDTATIVE TO INSURE GROUND ISOLATION IS MAINTAINED.
- 6. TEMPURATURE: MAINTAIN ROOM TEMPERATURE AT 68 DEGREES F FOR 48 HOURS BEFORE, DURING AND 48 HOURS AFTER INSTALLATION.
- THE ABOVE CONCRETE SLAB SPECIFICATIONS IS THE MINIMUM REQUIREMENT FOR INSTALLATION OF A PANELIZED R.F. FLOOR SHIELD AND IS IN ADDITION TO ARCHITECTURAL CONCRETE SPECIFICATIONS.

SURFACE PREPARATION

SURFACE SHALL BE FREE OF ANY DELETERIOUS MATERIALS SUCH AS LAITANCE, DUST, DIRT, OIL AND MATERIALS RESULTING FROM SURFACE PREPARATION

THE CONCRETE SLAB SHALL BE FREE OF STANDING WATER AND/OR MOISTURE PRIOR TO INSTALLATION OF R.F. SHIELDING TO INSURE GROUND ISOLATION. FAILURE TO CONTROL THE MOISTURE MAY ADVERSELY AFFECT AND/OR DETERIORATE THE GROUND ISOLATION CHARACTERISTICS. UPON ESTABLISHING SPECIFIED GROUND ISOLATION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO INSURE GROUND ISOLATION IS MAINTAINED.

REMOVE ALL PROJECTIONS AND OTHER CONDITIONS, WHICH AFFECT THE INSTALLATION OF THE FLOORING.

RF SHIELD FLOOR PANELS

 THE MODULAR FLOOR SYSTEM MUST NOT BE EXPOSED TO LIQUIDS OF ANY SORT, ie:(WATER, COFFEE, LIQUID CLEANER, ETC.) LIQUID WILL DEGRADE THE SHIELDING PROPERTIES IF EXPOSED TO THE MODULAR PANELS.

2. THERE MAY BE ADDITIONAL FLOOR PREP REQUIRED BY THE CUSTOMER ON THE MODULAR TYPE RF FLOOR SYSTEMS BEFORE FINISH FLOORING IS APPLIED.

THIS FLOOR SYSTEM CONSISTS OF METAL LAMINATED WOOD PANELS WHICH ARE CLAMPED TOGETHER. FILLER TILE IS PLACED BETWEEN THE CLAMPS TO LEVEL OUT THE FLOOR SURFACE.

TYPICAL INSTALLATIONS REQUIRE THE GC/FLOORING CONTRACTOR TO PUT A "FLASH-PATCH" MATERIAL TO FILL S MALL CRACKS OR VOIDS TO PROVIDE A BETTER SURFACE TO INSTALL THE FINISH FLOORING PRODUCT.

THE FLASH-PATCH MATERIAL MUST NOT CAUSE MOISTURE PROBLEMS WITH THE RF FLOOR. USE A PRODUCT SIMILAR TO ARDEX SD-F FEATHER FINISH.

NO POURING OF ANY SUBSTRATE FOR LEVELING PURPOSES, CRACK TROWEL FILL ONLY.

FLOOR LEVELNESS CHART: (48"x48" GRID)

GC TO VERIFY FLOOR LEVELNESS. READING SHOULD BE RECORDED USING LASER LEVEL AND RESULTS TO BE RECORDED ON THIS SHEET AND RETURNED TO ETS-LINDGREN.

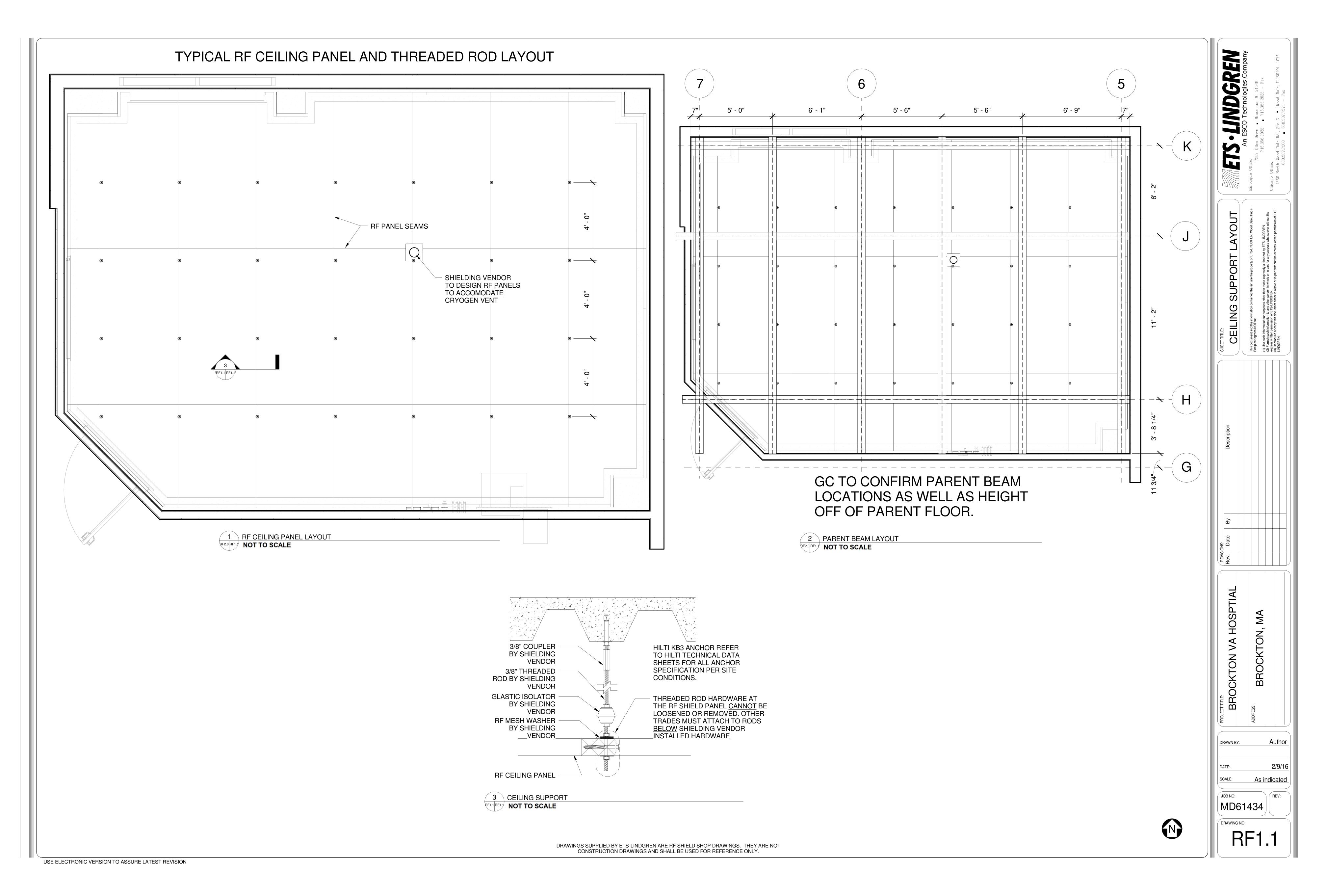


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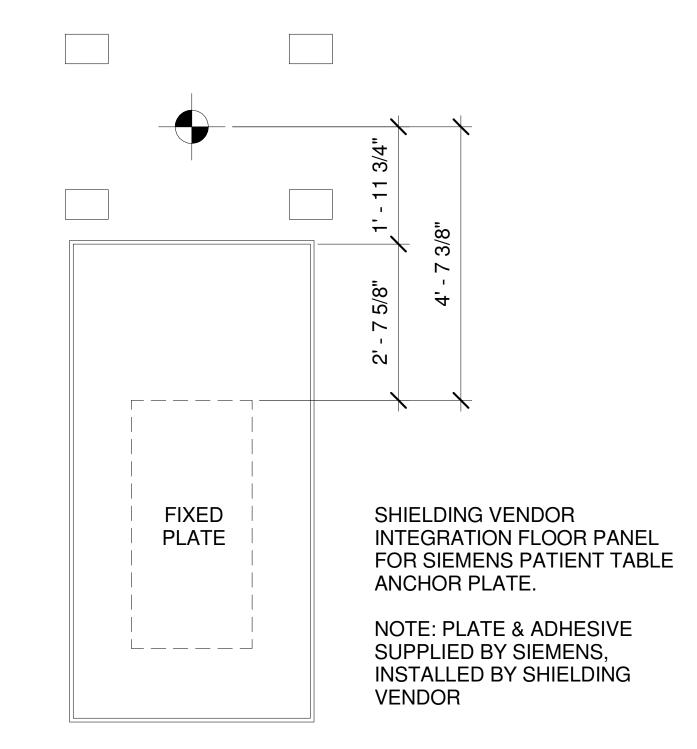
NOTES:
1. GC TO FIELD VERIFY ALL PARENT ROOM DIMENSIONS.

2. FINAL R.O. FOR PENETRATION PANEL TO BE COORDINATED WITH MAGNET VENDOR DRAWINGS.

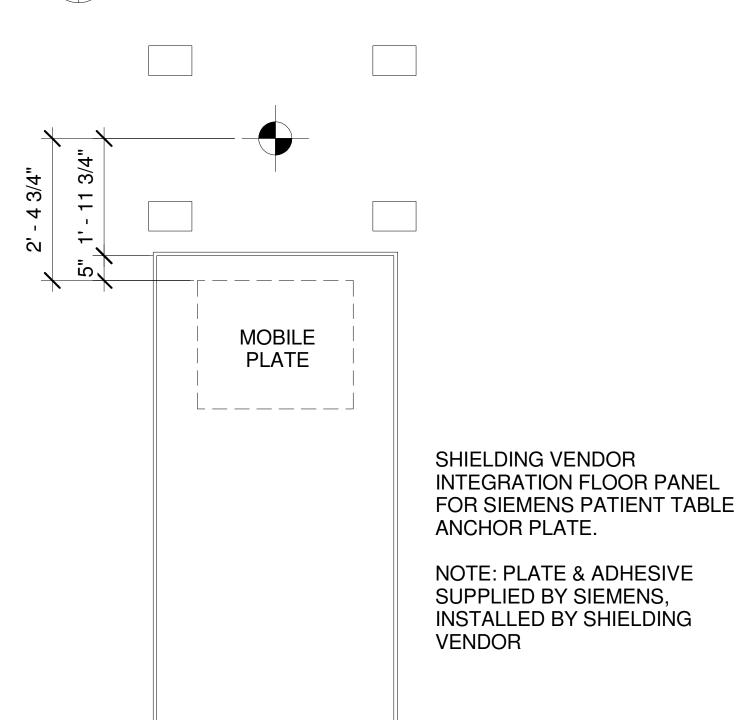
3. 20" x 29" CEILING HATCH IS FOR PRESSURE RELIEF AND ACCESS ABOVE SHIELD. NO DUCTWORK IS ATTACHED TO THIS ITEM.

4. INSTALLERS NOTE: MAGNET ANCHORS, PADS, BRACKETS, CRYOGEN VENT LOCATIONS TO BE LOCATED ON SITE WITH VENDOR DRAWINGS BY THE G.C.

5. SEE MAGNET VENDOR SPECIFIC NOTES, SHEET RF3.1, (IF APPLICABLE).



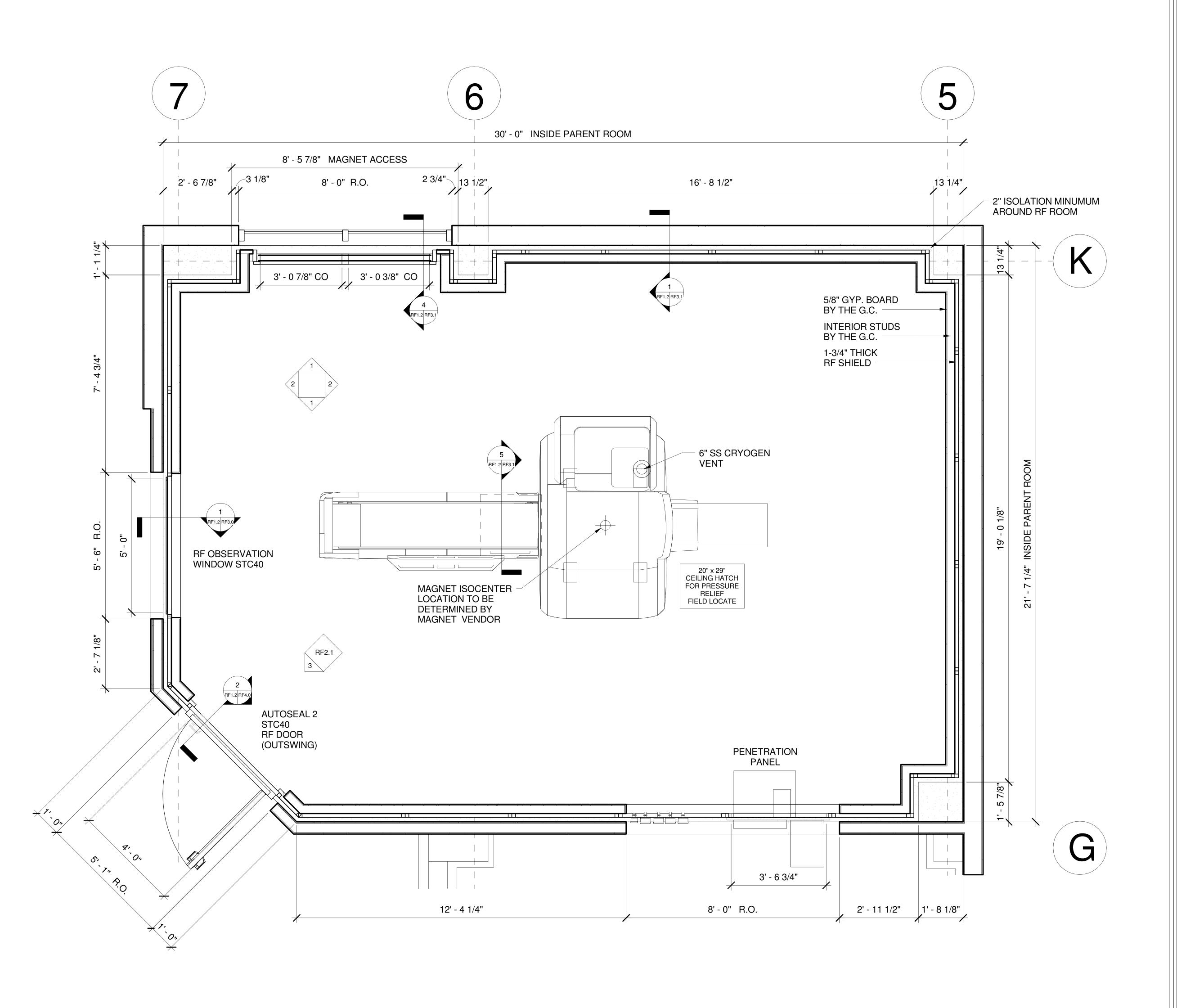
2 SIEMENS 1.5T AERA FIXED PATIENT TABLE PAD LOCATION NOT TO SCALE



3 SIEMENS 1.5T AERA MOBILE PATIENT TABLE PAD LOCATION NOT TO SCALE

SHIELDING VENDOR RF SHIELD ACOUSTIC RATING		
	STC RATING	
COPPER WALL (ONLY)	14	
COPPER WALL + MINERAL WOOL	19	
COPPER WALL + INTERIOR STUD WALL & GYP BOARD FINISH	40	
COPPER WALL + MINERAL WOOL + INTERIOR STUD WALL & GYP BOARD FINISH	46	

CONTACT YOUR SHIELDING VENDOR SALES OR PROJECT MANAGER FOR THE MINERAL WOOL ACOUSTIC DAMPENING OPTION.



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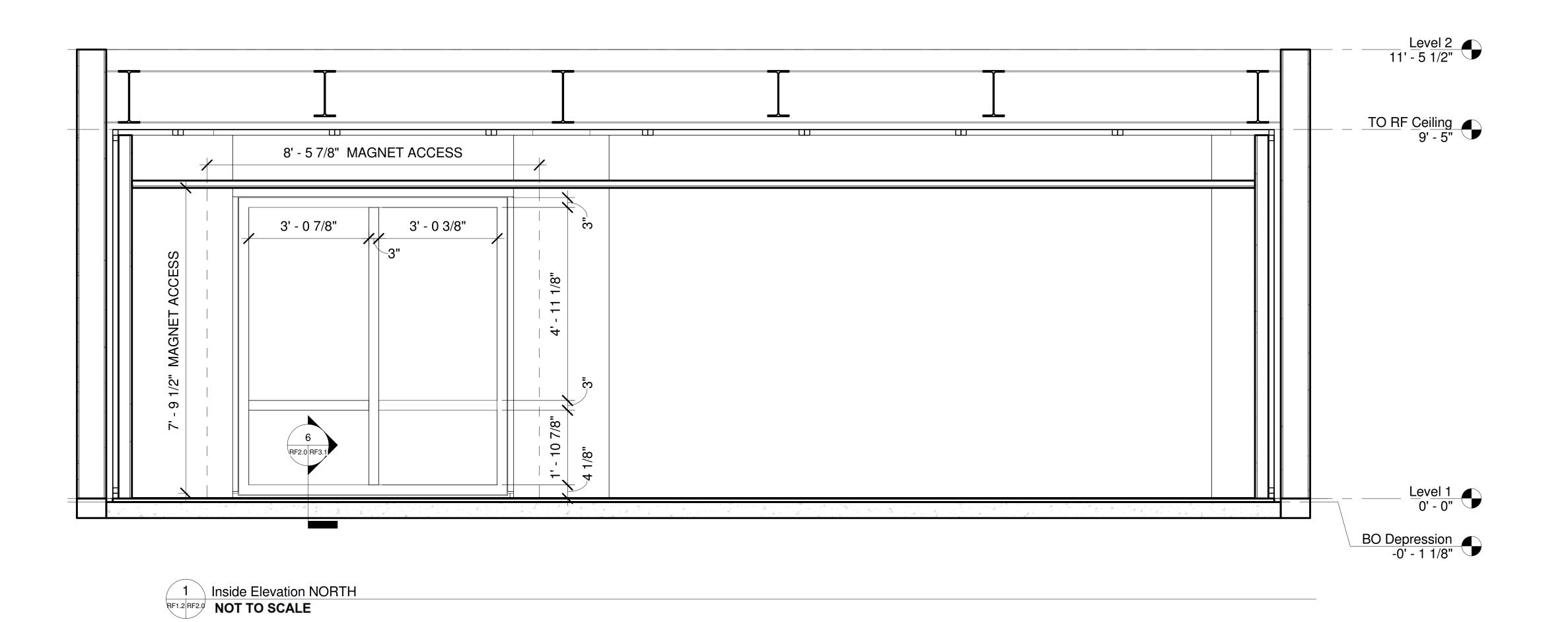
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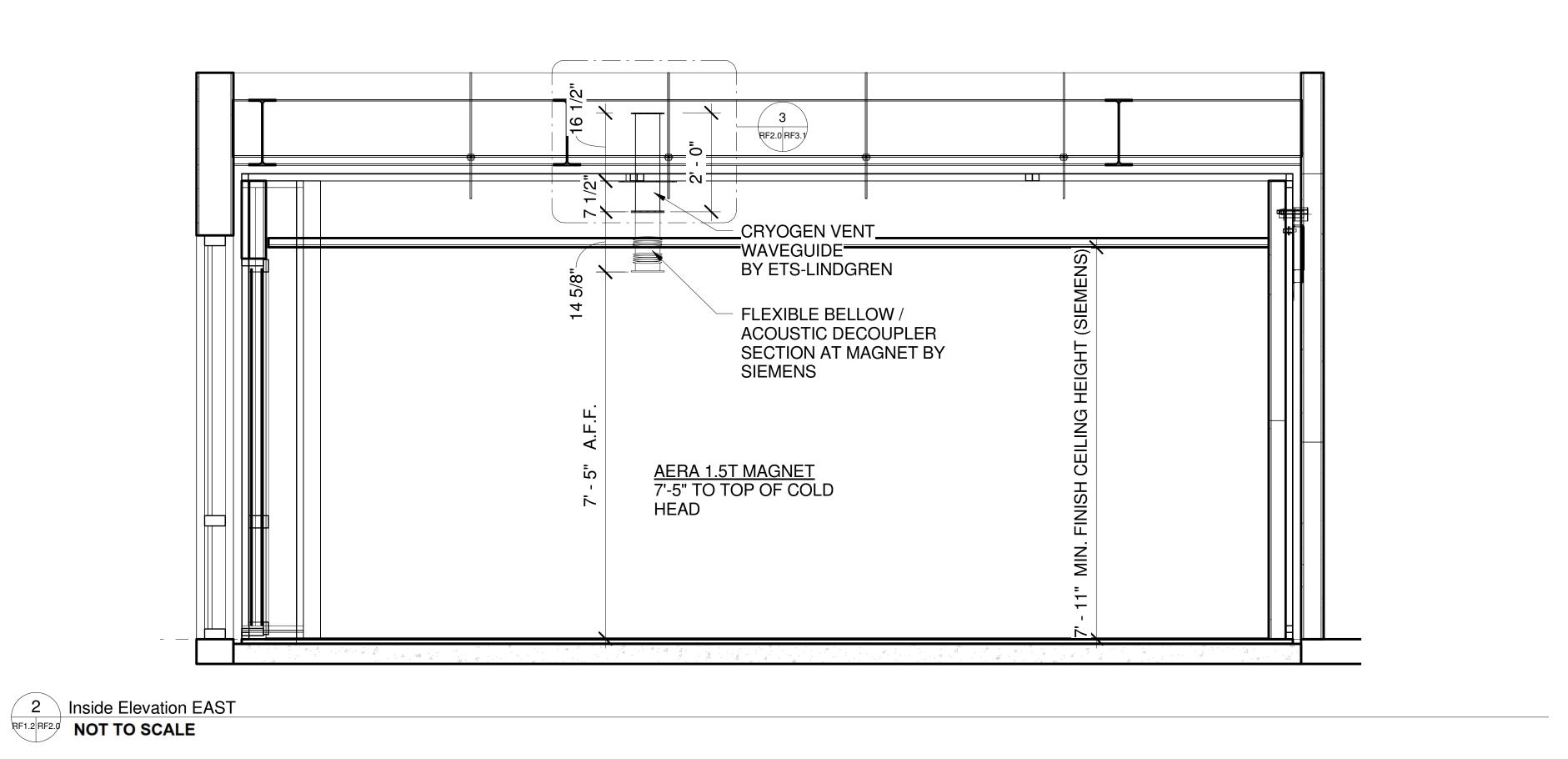
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Author





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Author

DATE: 2/9/16

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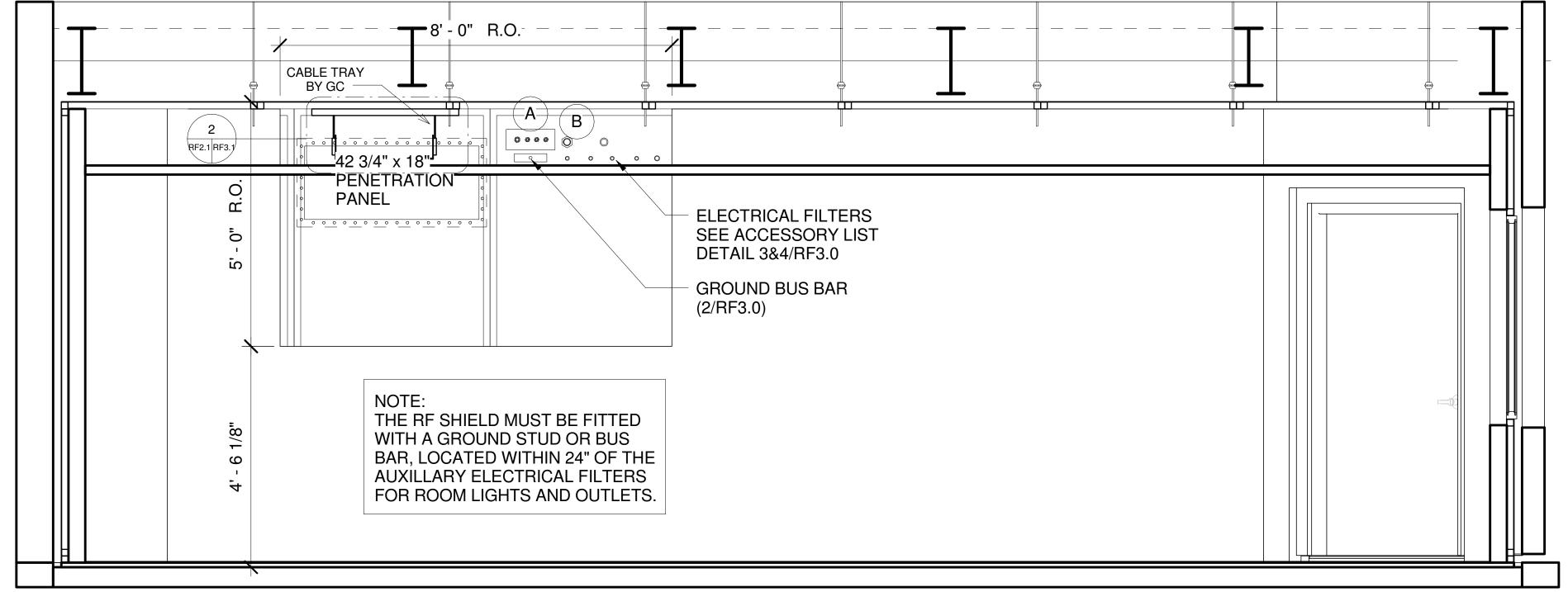
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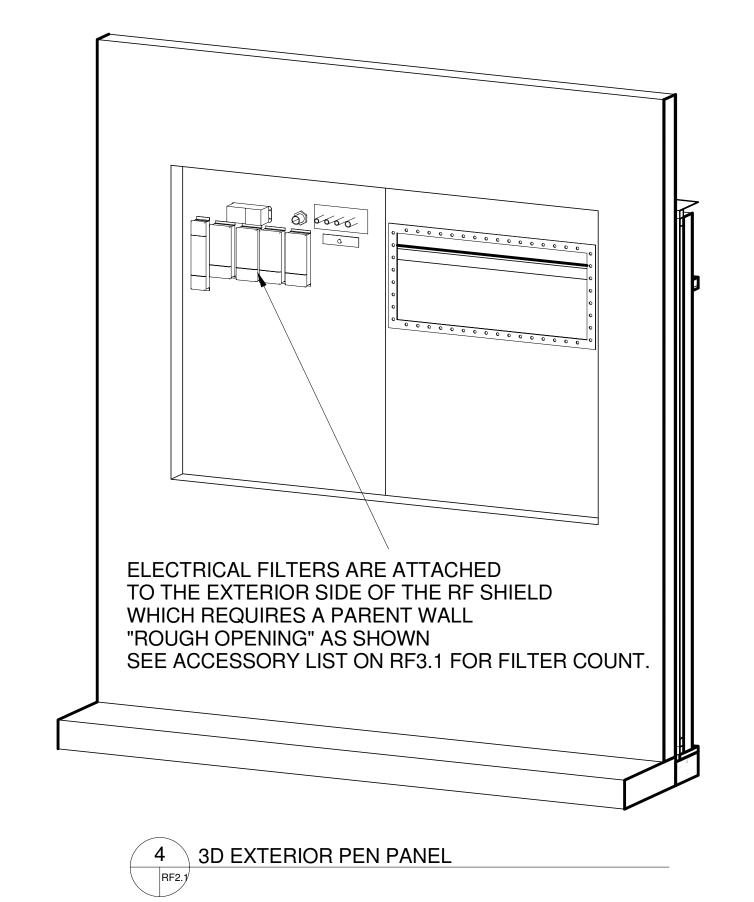
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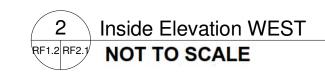
<u>A</u> = MEDICAL GAS PENETRATION MUST BE LOCATED WITHIN THIS AREA. SEE "MEDICAL GAS SERVICE" ENGINEERING NOTE AND 9/RF3.0 FOR DETAIL.

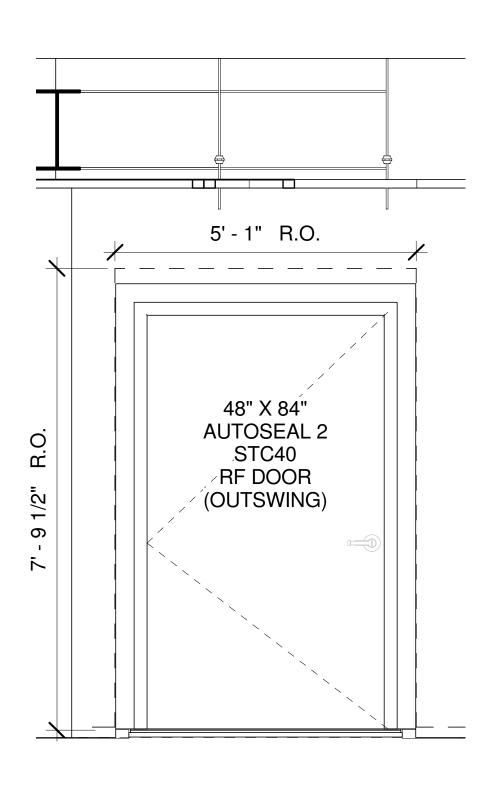
B = 1 1/2" SPRINKLER LINE MUST BE LOCATED IN THIS AREA. SEE ENGINEER SHEET "SPRINKLER LINE SERVICE" AND DETAIL 10/RF3.0



1 Inside Elevation SOUTH NOT TO SCALE

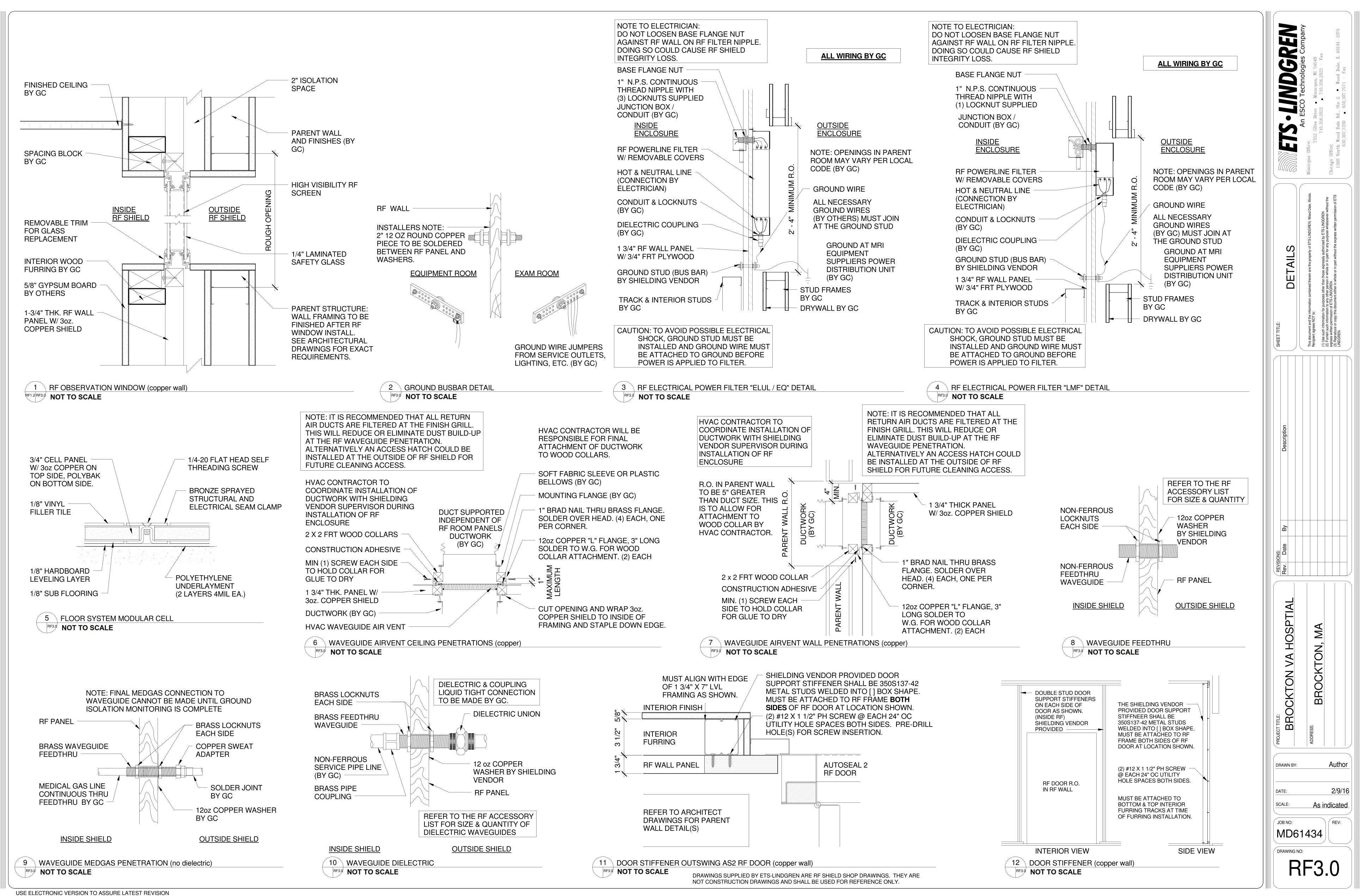


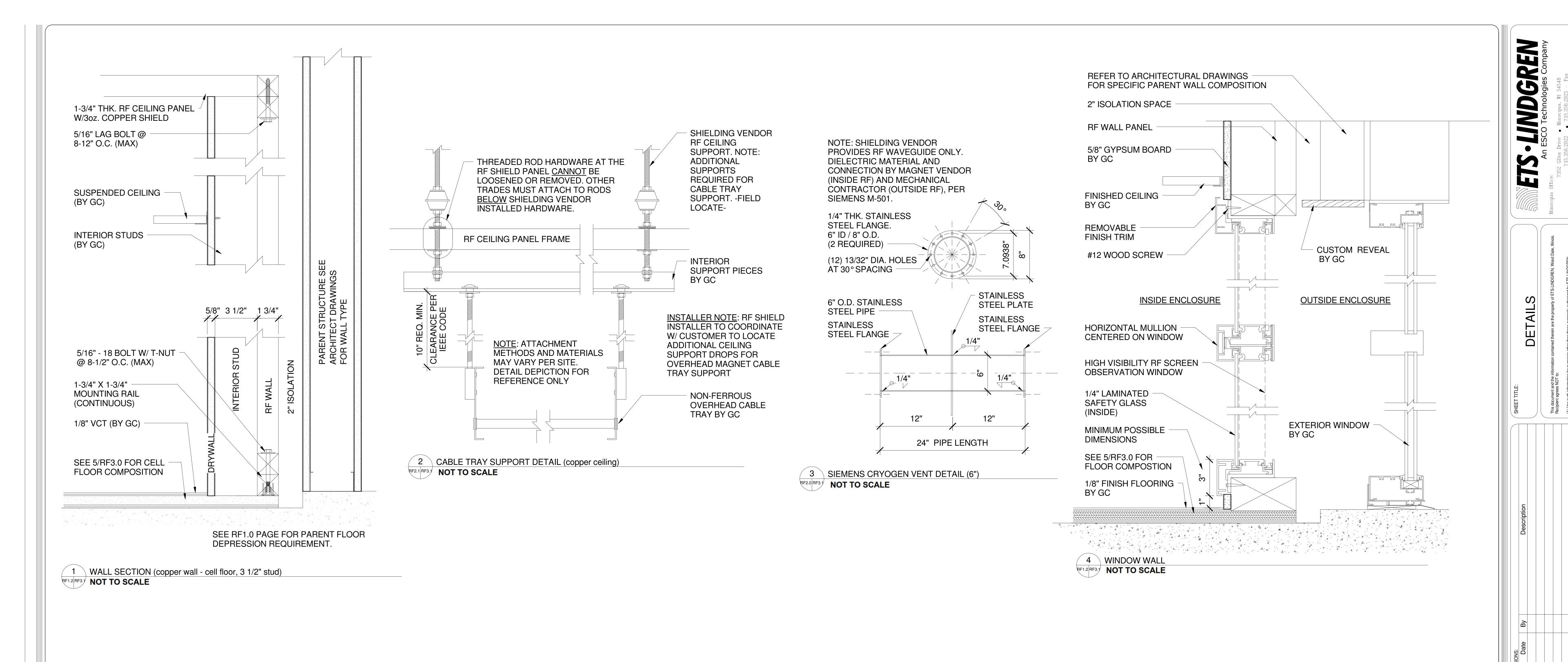


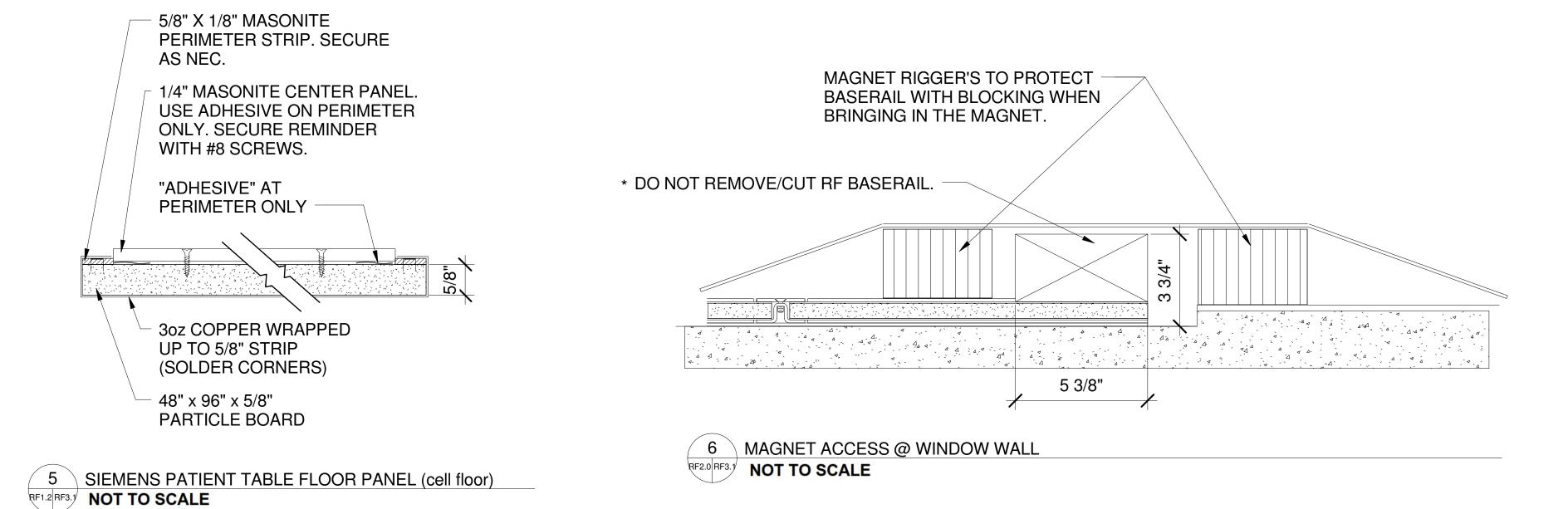


3 Inside Elevation DOOR
RF1.2 RF2.1 NOT TO SCALE

• LINDGREN n ESCO Technologies Company **ETS** ELEVATIONS **BROCKTON VA HOSPTIAL** Author DRAWN BY: SCALE: NOT TO SCALE







ACCESSORIES LIST				
QTY	DESCRIPTION	REMARKS	REF.	
1	42 3/4" X 18" R.O.	SIEMENS SET UP PANEL		
1	KIT, GROUND STUD		2/RF3.0	
1	6" DIA. W.G. STAINLESS STEEL	CRYOGEN VENT	3/RF3.1	
TBD	0-30AMP 2LINE POWER FILTERS	LIGHTING / OUTLETS	4/RF3.0	
TBD	0-30AMP 2LINE POWER FILTERS	EPO SHUNT (UPS - L1)	4/RF3.0	
TBD	10AMP PWR FILTER (EQ2010)	EPO - (SYSTEM)	3/RF3.0	
TBD	1 AMP 2LINE POWER FILTER	SMOKE DETECTION	3/RF3.0	
TBD	1/2" DIA. WAVEGUIDE FEEDTHRUS	MEDGAS	9/RF3.0	
TBD	3/4" DIA. MEDGAS FEEDTHRUS	VACUUM	9/RF3.0	
TBD	2"DIA DIELECTRIC FEEDTHRUS	FIRE PROTECTION	10/RF3.0	
	"x " WAVEGUIDE AIRVENTS	FOR HVAC	7/RF3.0	
	"x " WAVEGUIDE AIRVENTS	FOR HVAC	7/RF3.0 7/RF3.0	
	"x " WAVEGUIDE AIRVENTS	FOR HVAC	7/RF3.0	
 _	"x " WAVEGUIDE AIRVENTS	FOR HVAC	7/RF3.0	

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DATE:

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RF3.⁻

DRAWING NO:

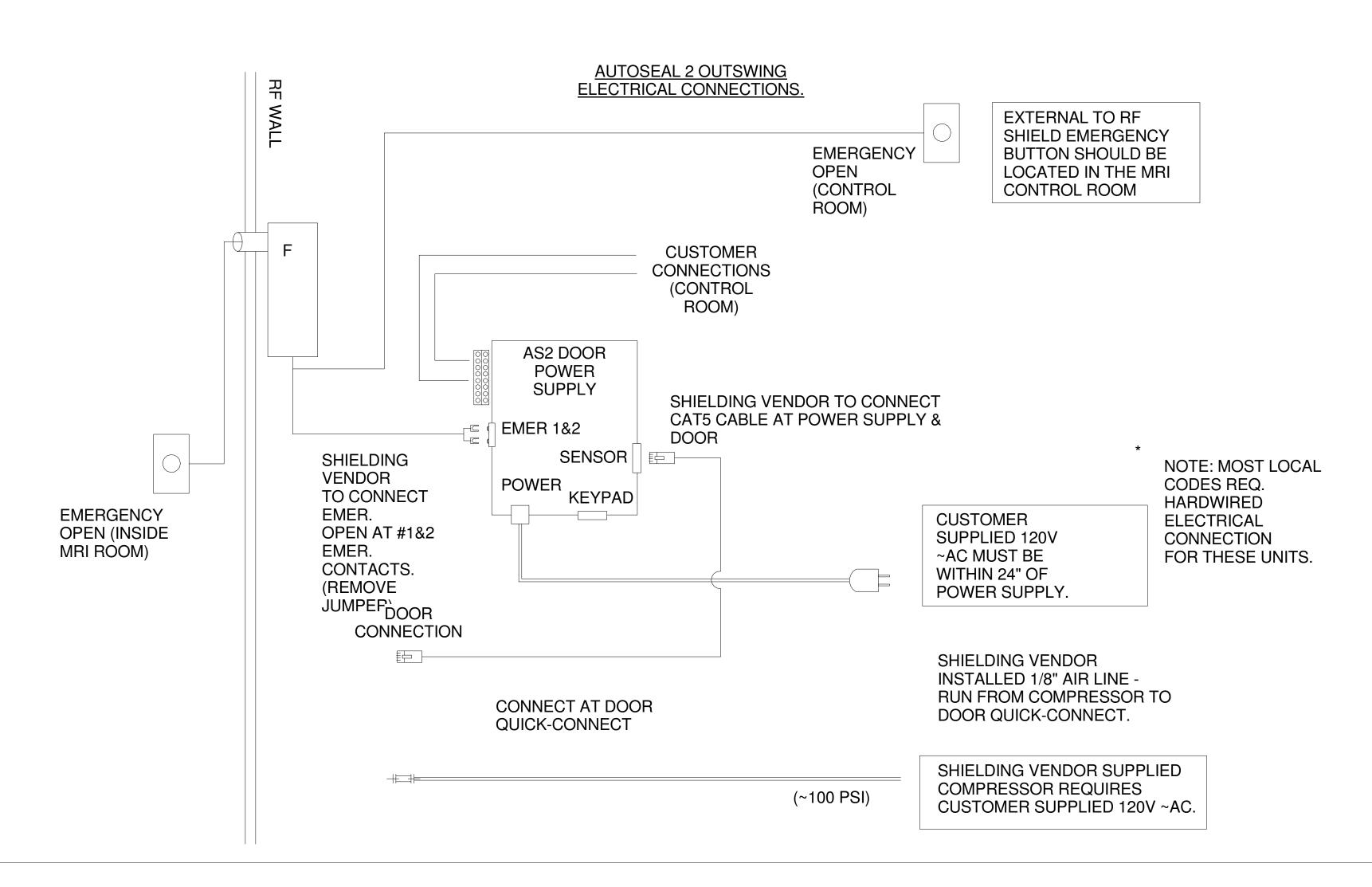
BROCKTON,

Author

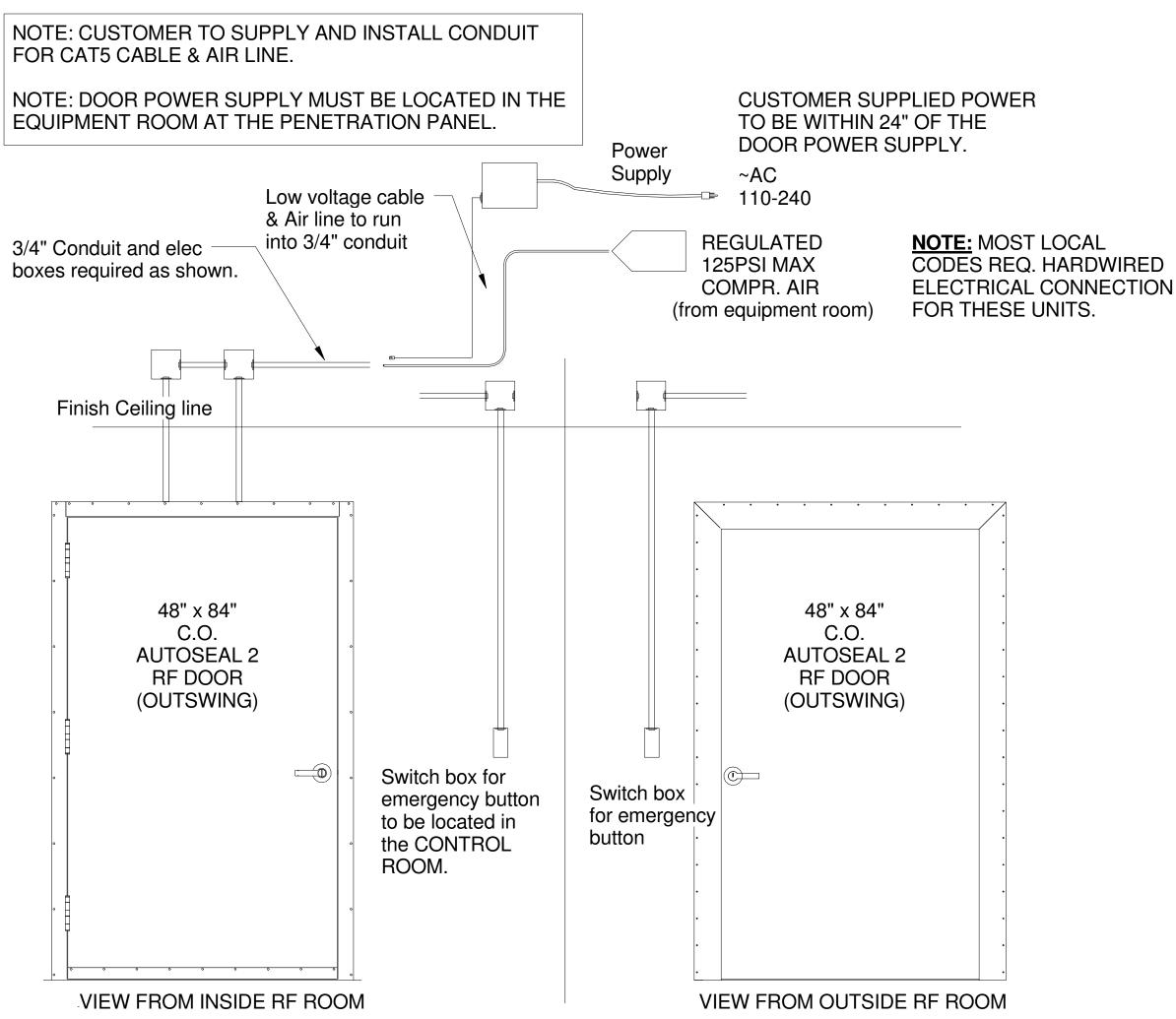
As indicated

7 SIEMENS ACCESSORIES LIST NOT TO SCALE

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AUTOSEAL 2 OUTSWING ELECTRICAL CONNECTIONS



OUTSWING DOOR INSTALLION GUIDE (Reverse for left hand swing)

CUSTOMER SUPPLIED UTILITY ITEMS

Power:	Supply to:	Location:	Method:
120v - 15A	Compressor	Equipment Rm	Outlet or per code Outlet or per code
120/240v - 15A	Door pwr supply	Equipment Rm	

ETS-LINDGREN SUPPLIED AIR COMPRESSOR

PUMA LA-5706 (Size: 24"L x 13"W x 17"H)(28 lbs) Warranty: 1 yr. Limited

NOTE 1: Compressor needs to be located in the Equipment room, in an area that is easily accessible for servicing. Please refer to Users Guide for further information.

NOTE 2: Customer is responsible for locating and mounting compressor at time of RF installation.

NOTE 3: Customer is responsible for 110 volt outlet at compressor location.

DOOR SYSTEM

KEEP STAINLESS STEEL JAMB AND THRESHOLD CLEAN AND FREE OF WAX OR FLOOR POLISH.

USE THE FINE SIDE OF AN ALUMINUM OXIDE ABRASIVE SPONGE TO CLEAN THE JAMB AND THRESHOLD IN THE AREAS WHERE THE DOOR SEAL MAKES CONTACT.

SAND ONLY THE THREE JAMB SURFACES AND THE THRESHOLD. **DO NOT SAND THE DOOR SEALS!**

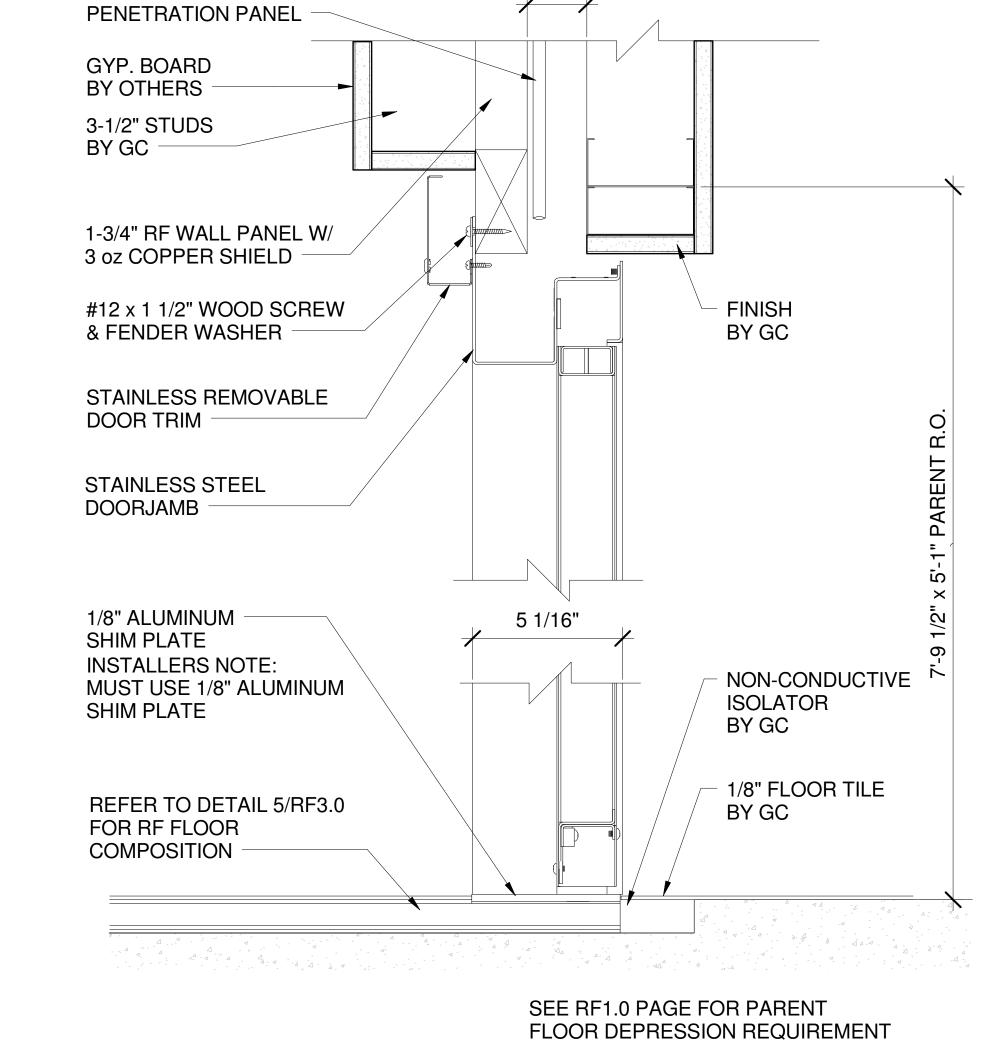
IT IS ONLY NECESSARY TO CLEAN AND BRIGHTEN THE SURFACE. GENERALLY SAND IN THE LENGTH DIRECTION.

USE A CLEAN CLOTH TO WIPE OFF THE PARTICLES AND DIRT FROM THE

JAMB AND THRESHOLD.

FOR OPTIMUM PERFORMANCE, REPEAT THIS PROCEDURE MONTHLY.

THE DOOR MECHANISM AND PERIMETER SEALS ARE MAINTENANCE FREE. CAUTION SHOULD BE TAKEN TO NOT CLOSE THE DOOR WITH OBSTRUCTIONS ACROSS THE THRESHOLD OR IN THE DOOR OPENING. (POWER CORDS, ETC...)



ISOLATION

3/4" CONDUIT FROM

RF FILTER AT

AIR COMPRESSOR

RF1.2 RF4.0 NOT TO SCALE

CUSTOMER SHOULD COMPLETE WARRANTY REGISTRATION AND SEND TO MANUFACTURER. NOTE: NUMBER ON WARRANTY REGISTRATION MUST MATCH NUMBER ON COMPRESSOR

2 DOOR AUTOSEAL 2 OUTSWING (copper wall - cell floor, depress)

DRAIN MOISTURE FROM DISPENSER REGULARLY. RECOMMEND TO LOCATE COMPRESSOR NEAR A DRAIN AND RUN A HOSE FROM THE DISPENSER TO THE DRAIN TO AVOID WEEKLY DRAIN MAINTENANCE OF DISPENSER.

BLOW DOWN RECEIVER (AIR TANK) AT LEAST ONCE A WEEK, CLOSE DRAIN COCK TIGHTLY AFTERWARDS.

EMERGENCY AIR SUPPLY

A COMPRESSOR FAILURE CAN BE TEMPORARILY REPLACED BY A PORTABLE AIR TANK UNTIL A WARRANTED REPLACEMENT CAN BE SENT. CONTACT LINDGREN FOR THIS PROCEDURE.

ALTERNATE COMPRESSOR

IF YOU HAVE SUPPLIED YOUR OWN COMPRESSOR, FOLLOW THE MANUFACTURERS RECOMMENDED MAINTENANCE PROCEDURES.

HANDLE HARDWARE

SCHLAGE LEVER HANDLE WITH US-26D FINISH.

DOOR AUTOSEAL 2 OUTSWING ELECTRICAL CONNECTIONS NOT TO SCALE USE ELECTRONIC VERSION TO ASSURE LATEST REVISION

LINDGREN ETS DOOR AUTOSE HOSPTIAL CKTON BRO Author DRAWN BY: SCALE: NOT TO SCALE MD61434

DRAWING NO:

RF4.0

DRAWINGS SUPPLIED BY ETS-LINDGREN ARE RF SHIELD SHOP DRAWINGS. THEY ARE NOT CONSTRUCTION DRAWINGS AND SHALL BE USED FOR REFERENCE ONLY.

