

Change Proposal

(Not a change order)

PROJECT: Northeastern Vermont Regional Medical Center
New MRI Addition
St. Johnsbury, VT

CONTRACT NO. 2533
CHANGE PROPOSAL NO. 10
DATE: 6-Aug-19

Attached is an itemized quotation for changes to the subject project sum and/or time as described herein.

This document, when fully executed, as accepted, shall constitute authorization to proceed with the work described herein.

DESCRIPTION OF PROPOSED CHANGE:

CFW Electric	\$2,450
VHV	<u>\$7,394</u>

Sub Total	\$9,844
CM Fee @ 3.75%	\$369
Change Proposal Total	\$10,213

ATTACHMENTS: CFW proposal dated 7/2/19, VHV proposal dated 7/24/19

Net Amount Of This Proposed Change	Add/Deduct	\$10,213
Net Change In Working Days Due To This Proposed Change	0 Days	

The Amount Of This Proposal Is Subject To Revision If Not Accepted In 10 Days

H.P. CUMMINGS CONSTRUCTION COMPANY

BY:



Dan Smith, Senior Project Manager

Date: 6-Aug-19

ENGINEER

Recommend Acceptance

Do Not Recommend Acceptance

BY: _____

DATE: _____

OWNER

Accept

Do Not Accept

BY: _____

DATE: _____



Electrical Contracting Company

PO Box 142, 578 Route 2 W
Danville, Vermont 05828

CHANGE ORDER #2

July 2, 2019

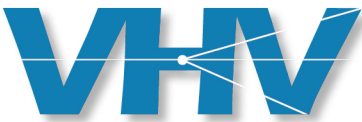
H.P. Cummings Construction Co.
5 High Street
Woodsville, NH 03785

RE: NVRH MRI Addition – Revised Siemens Drawings Dated 06-17-19

Change Order Proposal Total - \$2,450.00

- Revise conduit schedule and quantities per revised drawings dated 06-17-19
- Item 7 – Delete 30' ¾" EMT and ADD 30' of 2" EMT
- Item 8 – Delete 60' of 1" EMT and ADD 120' of 2 ½" EMT
- Item 9 – Delete 60" of 2 ½ EMT and ADD 60' of 1 ½" EMT
- Item 12 – Delete 170' of ¾" EMT and ADD 170' of 1" EMT

Labor -	\$880.00
<u>Materials –</u>	<u>\$1,570.00</u>
Total -	\$2,450.00



Change Request Proposal

Project: (name and address)	2794 / NVRH NEW MRI ADDITION 1315 HOSPITAL DRIVE ST JOHNSBURY, VT 05819	Change request number:	PCO-0020
		Description:	CP #10 / PR #5 MRI REVISED DRAWINGS

Customer: HP CUMMINGS

Notice to Proceed

Submitted date:
Received date:
Rough order of magnitude: 0.00

Status: PROPOSED
Origination date: 07/24/19

Quotation

Submitted date: 07/24/19
Due date:
Submitted amount: 7,394.00
Requested days delay: 0

Revenue Detail

Billing Item	Description	Revenue
PCO-0020	REVISED MRI DRAWINGS	7,394.00
Total Revenue For CR PCO-0020		7,394.00

This quotation is guaranteed for 30 days, provided the conditions of the work site remain the same as of the date stated above. Be advised lack of a timely response could create additional interference that was not included in this quotation. Should that occur, we reserve the right to cancel or modify this proposal accordingly.

If this proposal meets with your approval, please sign below and return one copy for our records. Please feel free to contact us if you have any questions.

Approvals

Customer: HP CUMMINGS
Authorized Representative: _____
By: _____
Date: _____

Contractor: VHV Company
By:
Date: July 24, 2019

Sell Summary	Labor	Material	Subs	Other	Total
HVAC - Sheetmetal	-	-	-	-	-
Mechanical Piping	3,287	3,258	-	409	6,954
Plumbing	-	-	-	-	-
Miscellaneous	-	-	440	-	440
Bond	-	-	-	-	-
Grand Total	3,287	3,258	440	409	7,394

NVRH New MRI Addition

Line	Description	Qty	UOM	Hours	Rate	Labor	Material	Subs	Other	Total
8	Additional Piping on M1.3			-	-	-	-	-	-	-
9	140 - CHWS M&R			-	-	-	-	-	-	-
10	Pipe	1	ea	0.7	68.00	50	112	-	-	161
11	Fittings , Flanges , Nipples , Joints	1	ea	14.7	68.00	998	296	-	-	1,294
12	Valves	1	ea	4.0	68.00	269	230	-	-	498
13	Hanger Components, Labor	1	ea	0.7	68.00	48	9	-	-	56
14	Other	1	ea	1.2	68.00	82	141	-	-	222
15	Feet of Pipe:	10.8	LF	-	-	-	-	-	-	-
16	Number of Joints:	52	JTS	-	-	-	-	-	-	-
17	Joints Per Man Day:	20.736		-	-	-	-	-	-	-
18	Pipe volume:	1.6504	GAL	-	-	-	-	-	-	-
19	Visual Flow Meter	1	pc	-	-	-	325	-	-	325
21				-	-	-	-	-	-	-
23	DI Water for secondary CW Loop	30	gal	4.8	68.00	326	390	-	-	716
24	DI Water for Primary Loop	100	gal	16.0	68.00	1,088	1,300	-	-	2,388
25				-	-	-	-	-	-	-
26	Oxygen Monitoring by others			-	-	-	-	-	-	-
75				-	-	-	-	-	-	-
78	Pipe Labels	2	ea	0.4	68.00	27	16	-	-	43
79	Valve Tags	5	ea	0.5	68.00	34	15	-	-	49
81				-	-	-	-	-	-	-
82	Warranty	% of	Eqmt	-	101.00	-	-	-	-	-
85	Field Management	1	lot	3.2	68.00	219	-	-	-	219
86	Measuring, Detailing, Ordering	1	lot	2.1	68.00	146	-	-	-	146
87	Engineering	1	lot	-	-	-	-	-	-	-
88	Travel Expenses	1	lot	-	-	-	-	-	163	163
89	Vehicles, Tools, Ladders, etc	1	lot	-	-	-	-	-	209	209
90				-	-	-	-	-	-	-
91	Freight (Included with Material)	1	lot	-	-	-	-	-	-	-
Mechanical Piping Subtotal				48.3		3,287	2,833	-	372	6,492
Mark-up %							15%	10%	10%	
Mechanical Piping Total				48.3		3,287	3,258	-	409	6,954

NVRH New MRIAddition

Line	Description	Qty	UOM	Hours	Rate	Labor	Material	Subs	Other	Total
3	ENGINEERING			-	-	-	-	-	-	-
7	Coordination Drawings	1	lot	-	-	-	-	-	-	-
8	Spool Drawings	1	lot	-	-	-	-	-	-	-
10				-	-	-	-	-	-	-
11	SERVICE			-	-	-	-	-	-	-
19	Service Veh, Tools, Ladders, etc			-	-	-	-	-	-	-
20				-	-	-	-	-	-	-
21	OTHER COSTS			-	-	-	-	-	-	-
31	Other Veh, Tools, Ladders, etc			-	-	-	-	-	-	-
39	Standard Subs			-	-	-	-	-	-	-
40	Testing + Balancing	1	LOT	-	-	-	-	-	-	-
41	Crane	1	LOT	-	-	-	-	-	-	-
42	Controls	1	LOT	-	-	-	-	-	-	-
43	Insulation (Thermalock Quote)	1	LOT	-	-	-	-	400	-	400
48				-	-	-	-	-	-	-
49	Other Subs			-	-	-	-	-	-	-
50	Core Drilling	1	LOT	-	-	-	-	-	-	-
51	Welding Sub	1	LOT	-	-	-	-	-	-	-
52	Electrical	1	LOT	-	-	-	-	-	-	-
53	GC Work	1	LOT	-	-	-	-	-	-	-
54	Plumbing	1	LOT	-	-	-	-	-	-	-
55	Piping	1	LOT	-	-	-	-	-	-	-
56	Roofing	1	LOT	-	-	-	-	-	-	-
Miscellaneous Subtotal				-		-	-	400	-	400
Mark-up %							15%	10%	10%	
Miscellaneous Total				-		-	-	440	-	440

RE: Contract #233
Northeastern Vermont Regional Hospital
New MRI Addition
St. Johnsbury, VT

HPC'S CHANGE PROPOSAL REQUEST – CP 10

DATE: June 27, 2019
TO: Bradley Fontaine CFW
FROM: Meagan Pennock H.P. Cummings
ENCLOSURE: Siemens Site Specific Sola XJ Drawings

Please review the updated site-specific drawings for the Siemens Sola Machine. NVRH updated to this unit from the Magnetom Aera XJ included in the project documents.

Please provide your cost changes within five (5) days.

Thank you.

Your written response should refer to HPC's Change Proposal Request - CP #10 listed above.

RE: Contract #233
Northeastern Vermont Regional Hospital
New MRI Addition
St. Johnsbury, VT

HPC'S CHANGE PROPOSAL REQUEST – CP 10

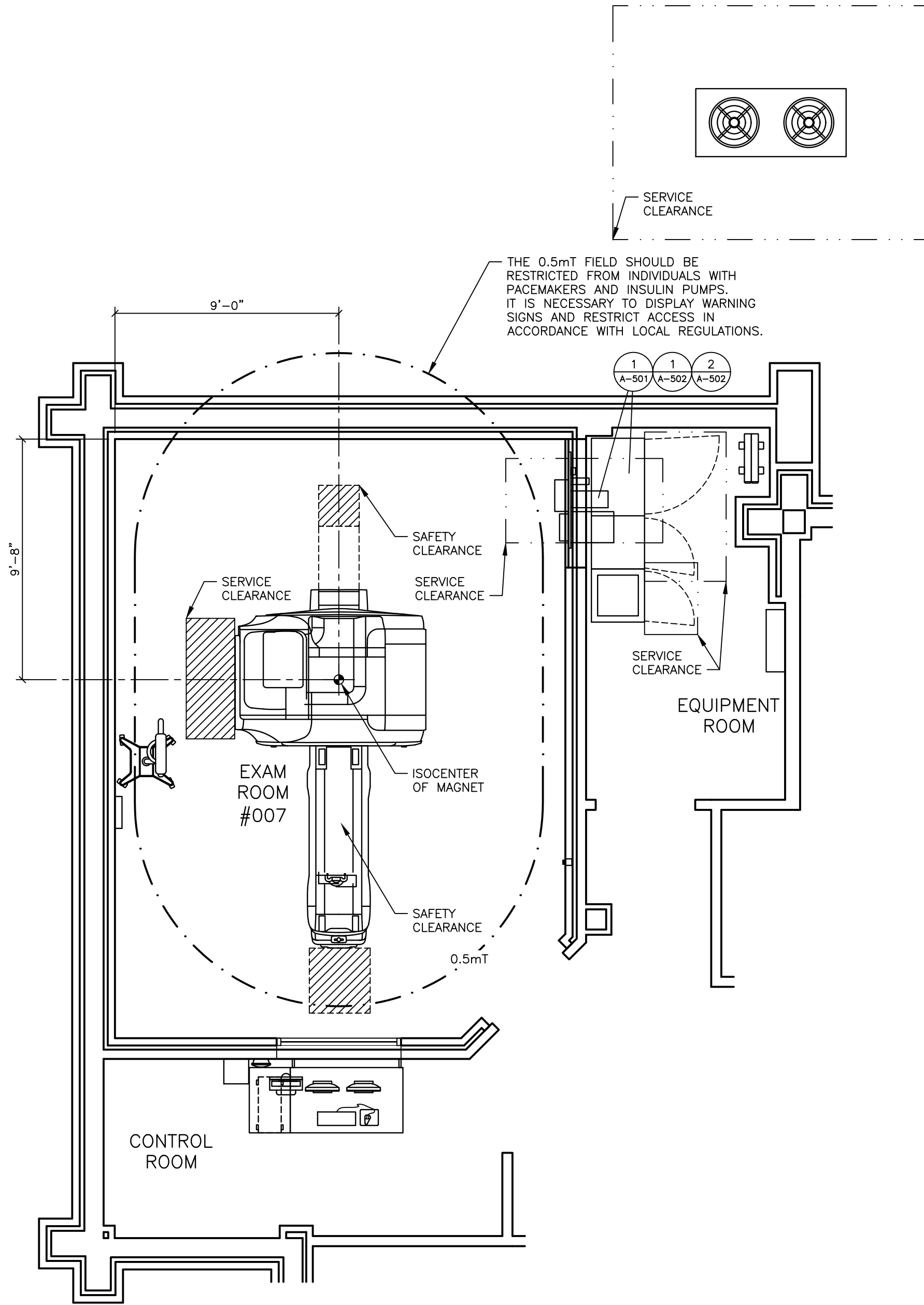
DATE: June 28, 2019
TO: Tim Valyou VHV
FROM: Meagan Pennock H.P. Cummings
ENCLOSURE: Siemens Site Specific Sola XJ Drawings

Please review the updated site-specific drawings for the Siemens Sola Machine. NVRH updated to this unit from the Magnetom Aera XJ included in the project documents.

Please provide your cost changes within five (5) days.

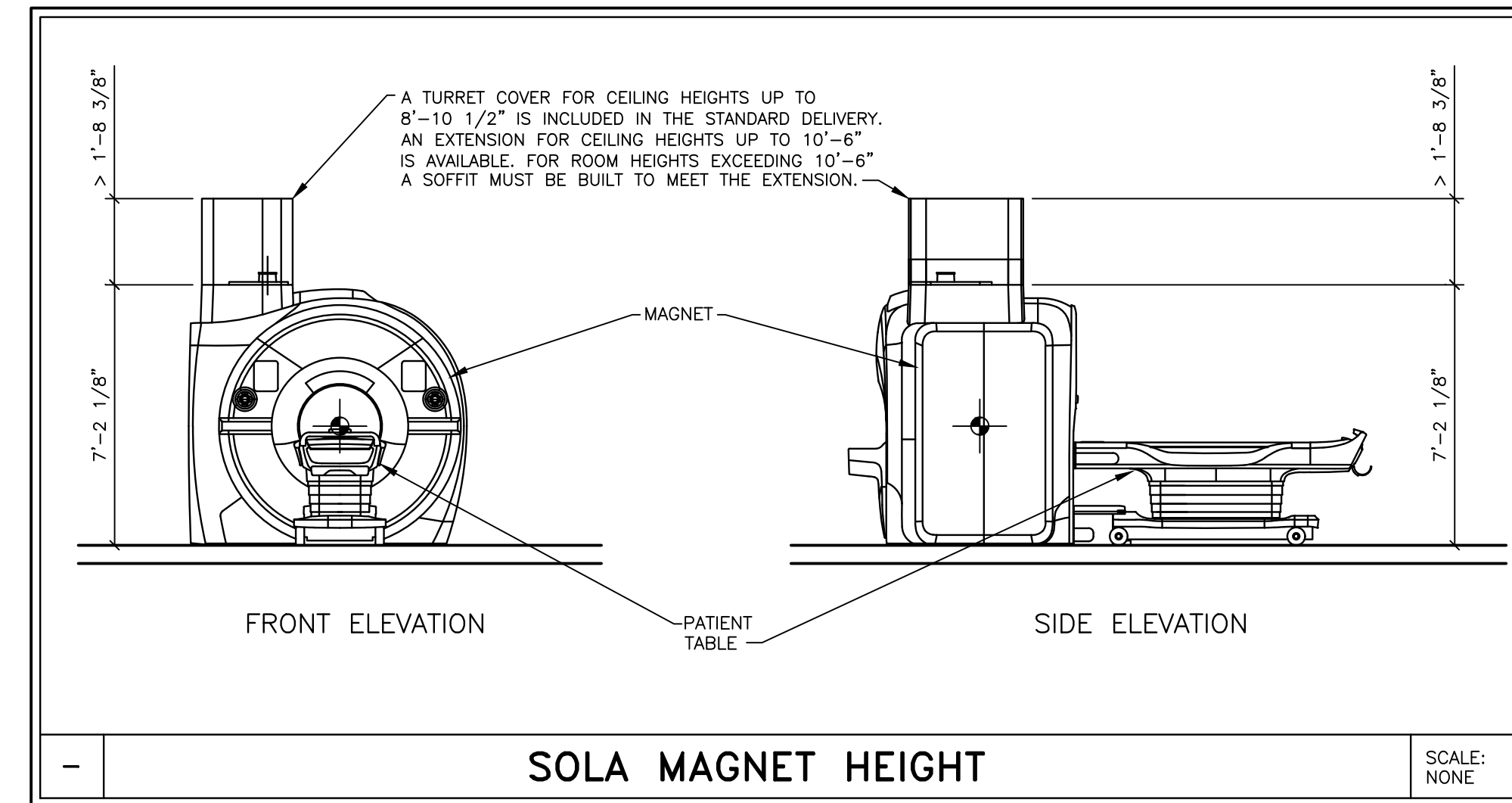
Thank you.

Your written response should refer to HPC's Change Proposal Request - CP #10 listed above.



SAFETY/SERVICE CLEARANCE PLAN

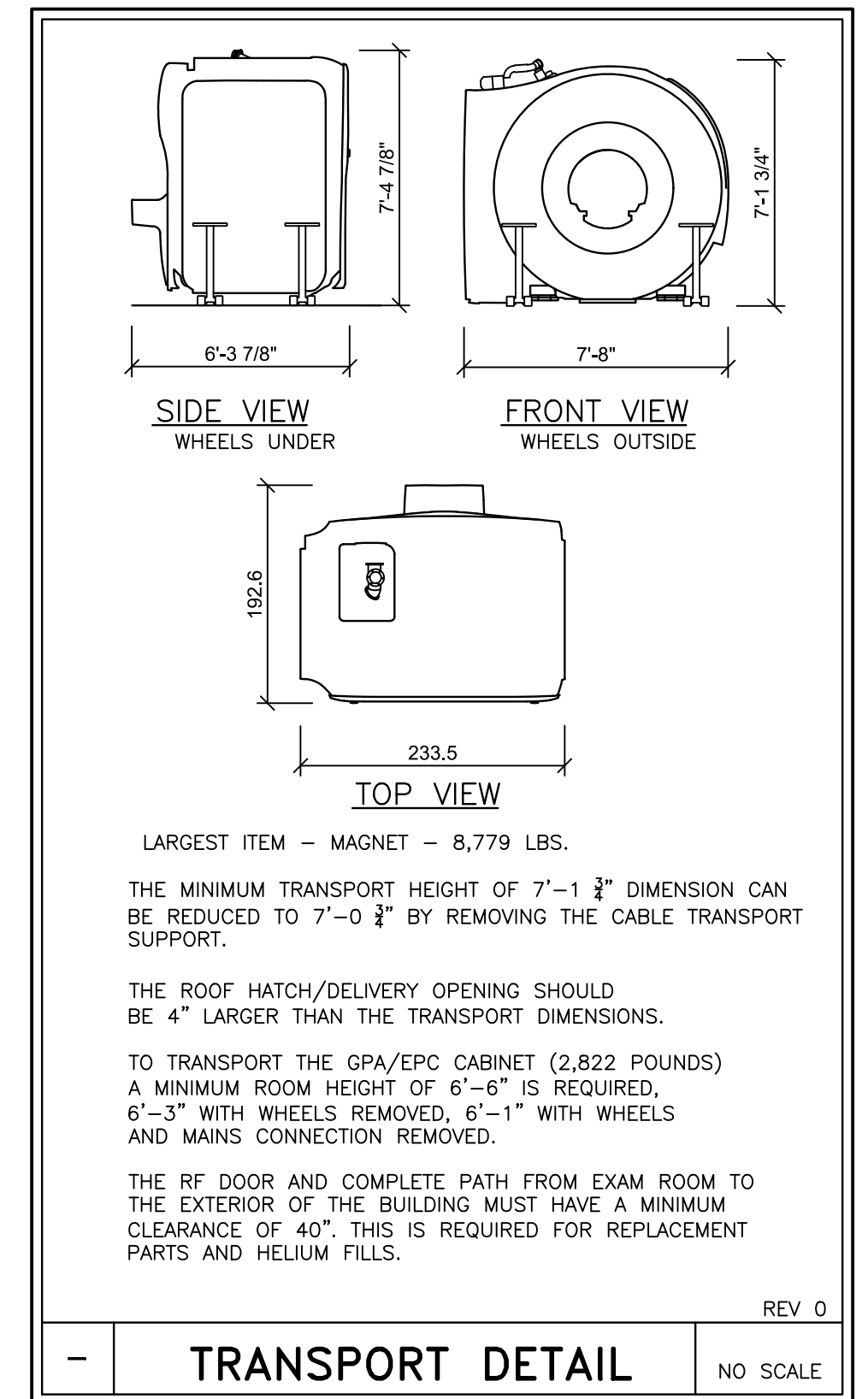
SCALE: 1/4" = 1'-0"



NOISE LEVELS XJ GRADIENTS	
SYSTEM ROOM	NOISE LEVEL / dB(A)
CONTROL ROOM	<55
EXAMINATION ROOM	80.3 dB(A) - 8 HOUR AVERAGE 98.7 dB(A) MAXIMUM, MEASURED INSIDE THE EXAM ROOM.
EQUIPMENT ROOM	<65

NOISE LEVELS ARE BASED ON AN AVERAGE MEASUREMENT OVER 8 HOURS OF CLINICAL SCANNING. PEAK LEVELS MAY BE HIGHER FOR CERTAIN SEQUENCES.

IT IS THE CUSTOMER'S RESPONSIBILITY TO ENSURE THAT ALL LOCAL/STATE/OSHA NOISE REGULATIONS ARE ADHERED TO. ADDITIONAL NOISE DATA MAY BE PROVIDED BY SIEMENS PROJECT MANAGER UPON REQUEST. 05/19/18



SURFACE COIL STORAGE				
SURFACE COILS ARE COMPONENTS OF THE MRI SYSTEM THAT ARE ATTACHED TO THE PATIENT TABLE DURING EXAMS. WHEN NOT IN USE COILS SHOULD BE STORED SO THAT THEY ARE FREE FROM DAMAGE. THE DESIGN OF THE MR EXAM ROOM MUST HAVE AMPLE STORAGE SPACE TO ACCOMMODATE ANY COILS THAT THE OWNER WILL HAVE. COILS MAY BE SELECTED FROM THE LIST BELOW. STORAGE PROVIDED BY CUSTOMER/CONTRACTOR.				
COIL NAME	POUND WEIGHT	INCHES		
		LENGTH	WIDTH	HEIGHT
BIOMATRIX HEAD/NECK 20	13	16 3/4	14 5/8	15 1/8
BIOMATRIX SPINE 32	23	47 1/4	19 1/4	3
BODY 18	4	15 1/8	23 1/4	3
FLEX LARGE 4	1.2	20 3/8	8 7/8	-
FLEX SMALL 4	1	14 3/8	8 7/8	-

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

PROJECT MANAGER: TIMOTHY CARMICHAEL TEL: (603) 387-4211 EXT: VMAIL: FAX: EMAIL: timothy.carmichael@siemens-healthineers.com		SIEMENS	
NORTHEASTERN VERMONT REG HOSP 1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819 MRI SUITE 1 - SOLA XJ GRADIENTS			
PROJECT #: 1902436		SHEET: A-102	
THE USE OR REPRODUCTION OF THIS TITLE BLOCK WITHOUT SIEMENS AUTHORIZATION WILL RESULT IN PROSECUTION UNDER FULL EXTENT OF THE LAW.		DRAWN BY: R. SUTHERS	
ALL RIGHTS ARE RESERVED.		DATE: 06/17/19	
SYMBOL	DATE	DESCRIPTION	SCALE: AS NOTED REF. #: PUFQGY
-ISSUE BLOCK-			

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.

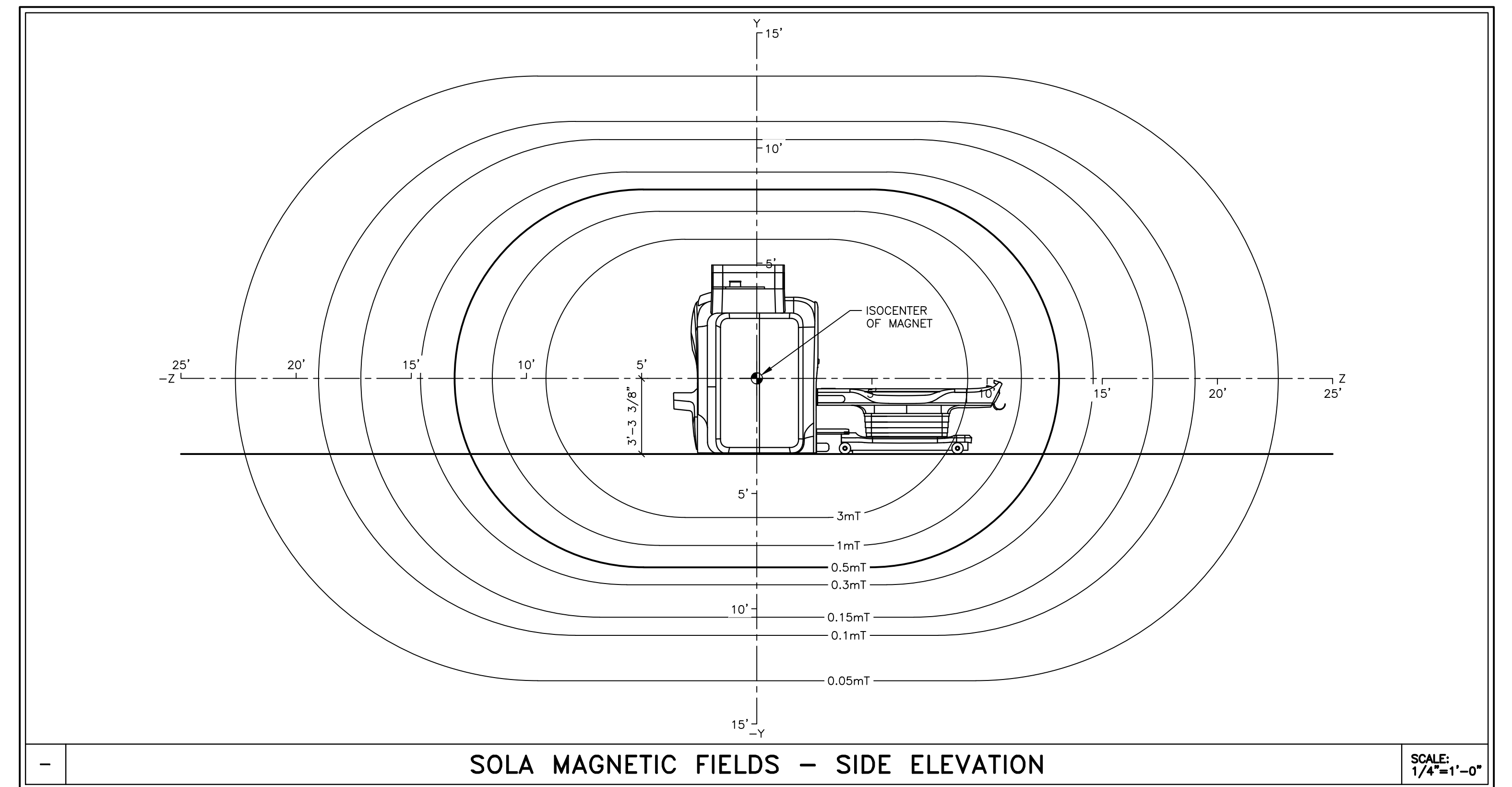
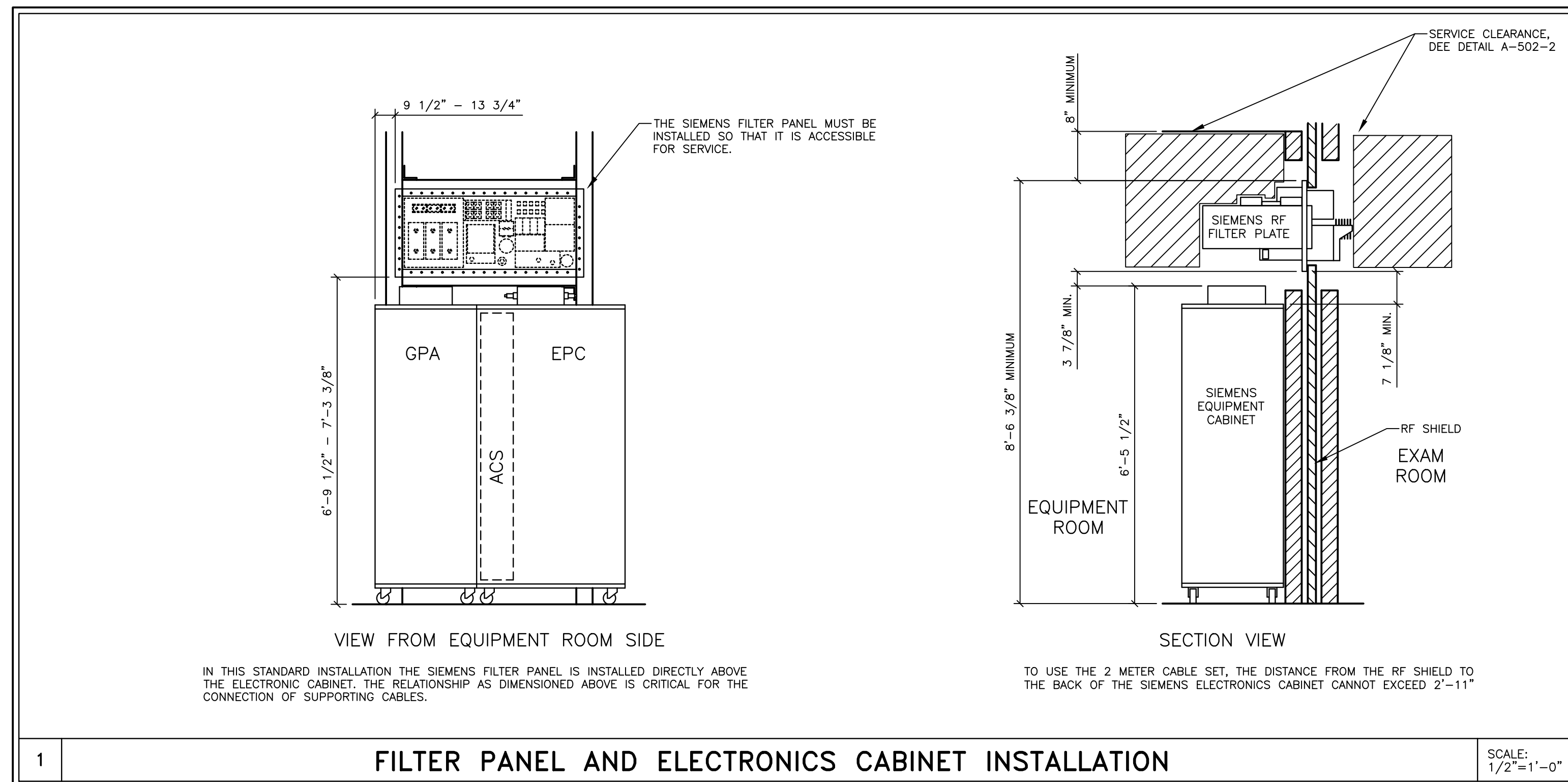
- ALL DIMENSIONS SHOWN ON THIS DRAWING ARE FROM FINISHED SURFACES.

- 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.

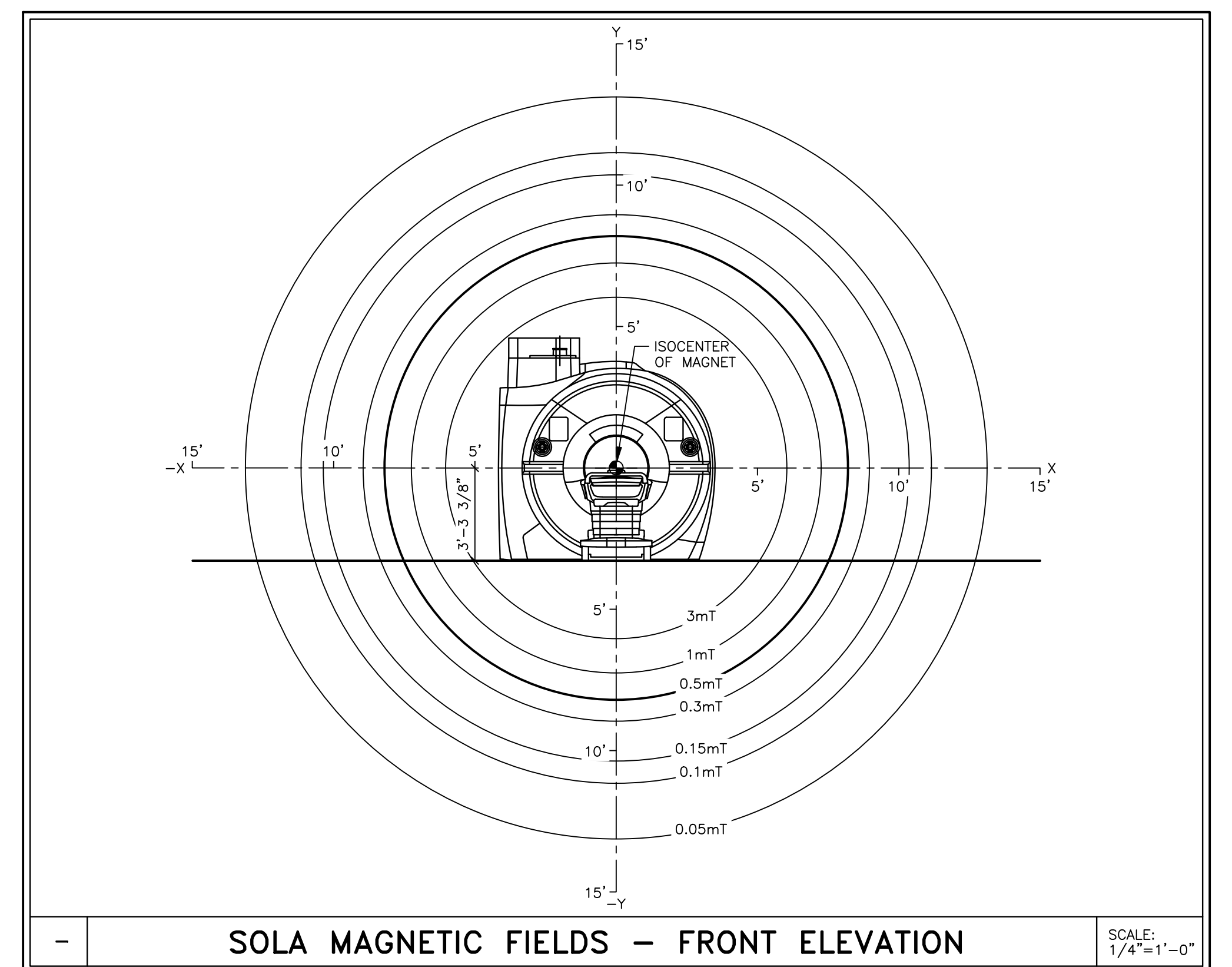
SOLA
REV 2

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



SOLA MAGNETIC FIELDS - SIDE ELEVATION



SOLA MAGNETIC FIELDS - FRONT ELEVATION

1 FILTER PANEL AND ELECTRONICS CABINET INSTALLATION

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

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

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

SOLA REV 2

ATTENTION:

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PROJECT MANAGER: TIMOTHY CARMICHAEL TEL: (603) 387-4211 EXT: VMAIL: FAX: EMAIL: timothy.carmichael@siemens-healthineers.com		SIEMENS	
1902436 RA DATED 06/12/19 APPROVED BY CUSTOMERS FOR FINALS		PROJECT #: 1902436	
THE USE OR REPRODUCTION OF THIS TITLE BLOCK WITHOUT SIEMENS' AUTHORIZATION WILL RESULT IN PROSECUTION UNDER FULL EXTENT OF THE LAW.		SHEET: A-501	
ALL RIGHTS ARE RESERVED.		DRAWN BY: R. SUTHERS	
SYMBOL	DATE	DESCRIPTION	DATE
	06/17/19		06/17/19
-ISSUE BLOCK-		SCALE: AS NOTED	REF. #: PUFQGY
SHEET 3 OF 10		DATE: 06/17/19	

NORTHEASTERN VERMONT REG HOSP
1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819
MRI SUITE 1 - SOLA XJ GRADIENTS

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

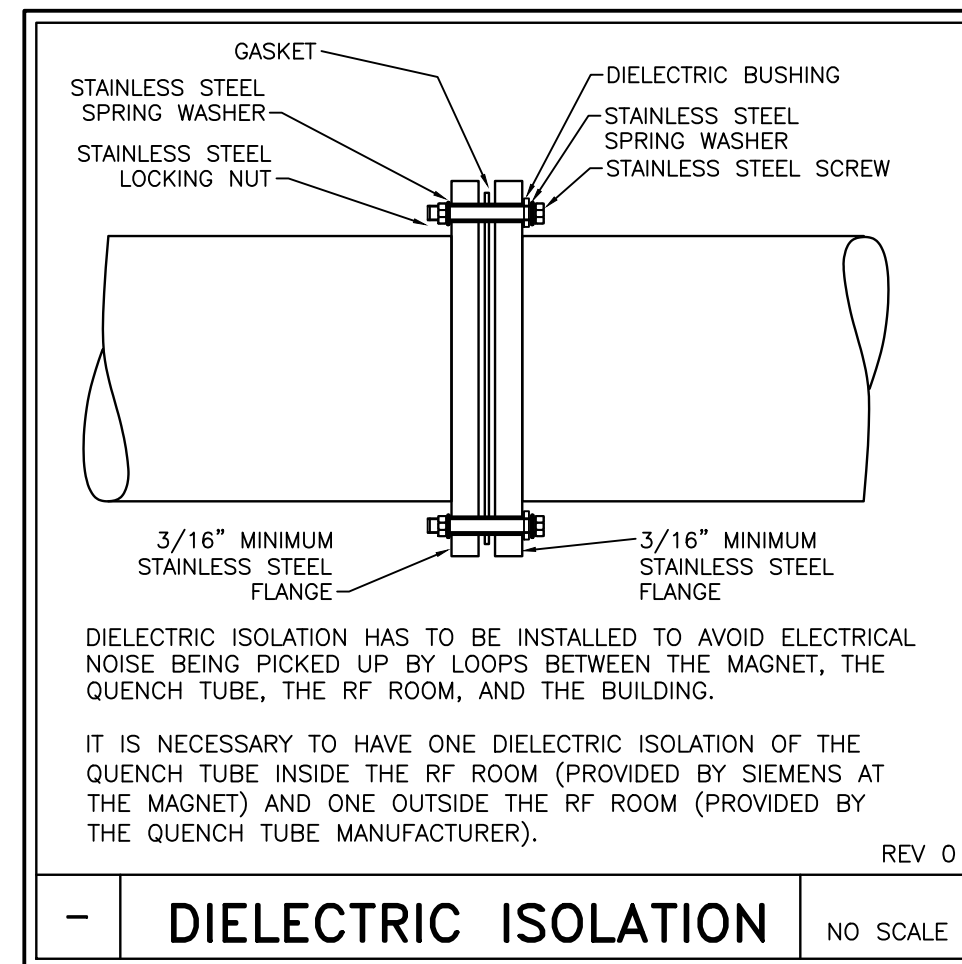
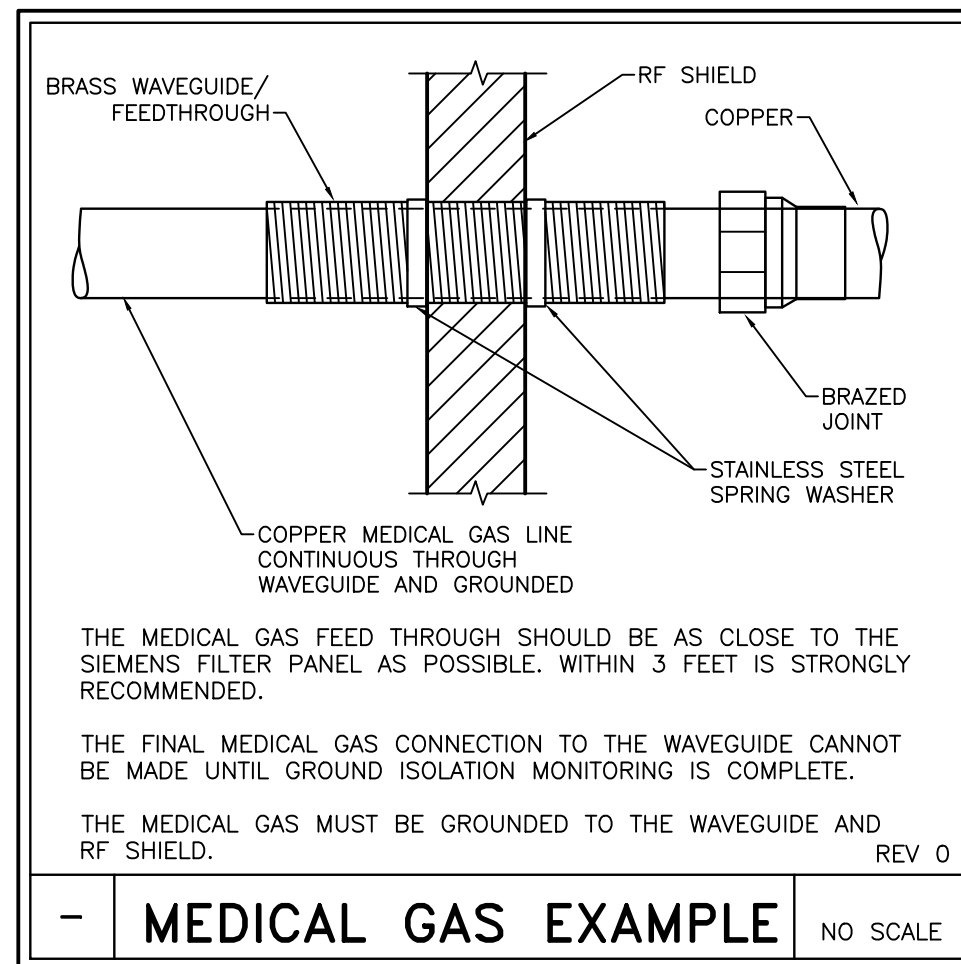
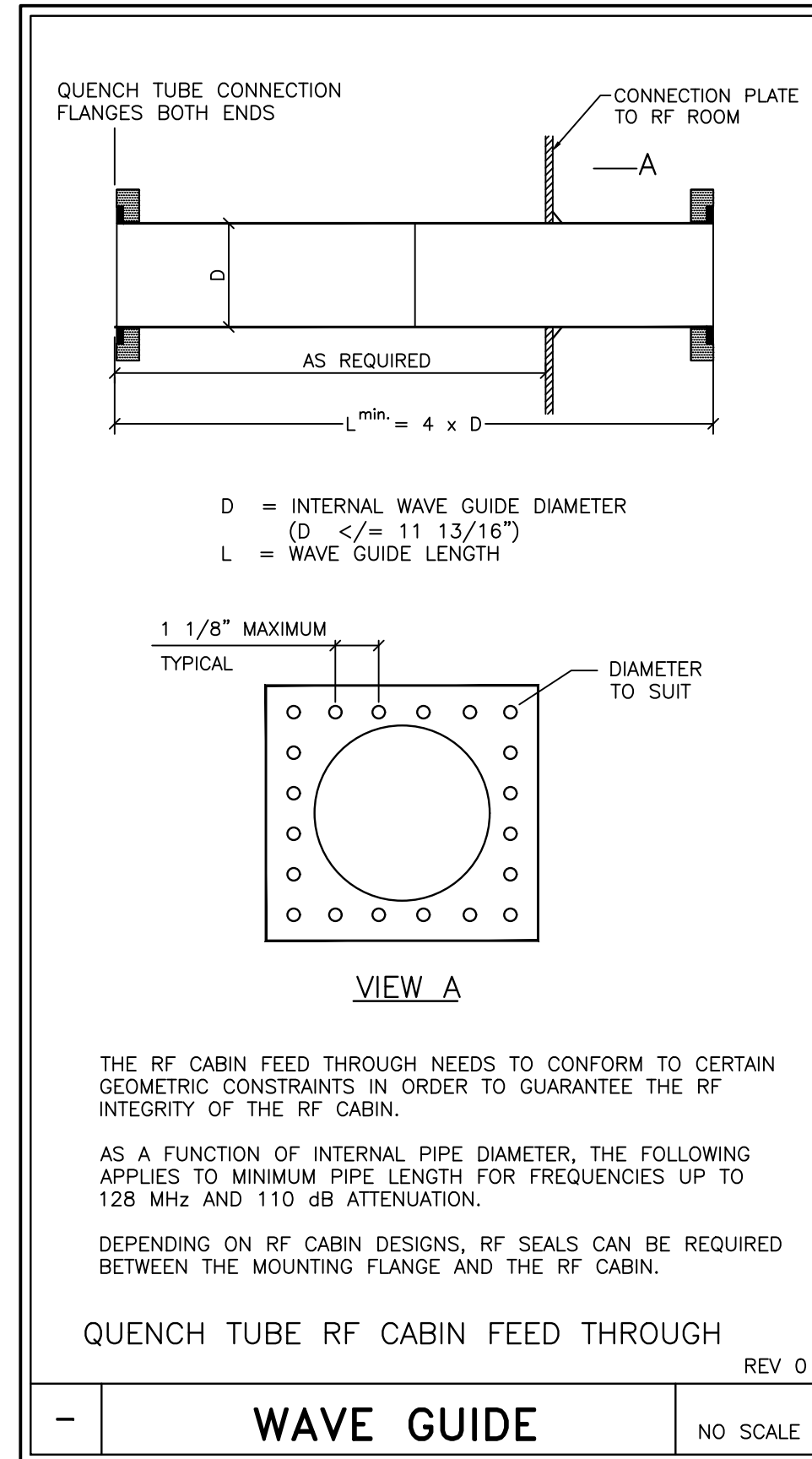


IMAGE QUALITY CONCERNS

BROADBAND RF NOISE IS A SINGLE TRANSIENT OR CONTINUOUS SERIES OF TRANSIENT DISTURBANCES CAUSED BY AN ELECTRICAL DISCHARGE. LOW HUMIDITY ENVIRONMENTAL CONDITIONS WILL HAVE HIGHER PROBABILITY OF ELECTRICAL DISCHARGE. THE ELECTRICAL DISCHARGE CAN OCCUR DUE TO ELECTRICAL ARCING OR MERELY STATIC DISCHARGE. SOME POTENTIAL SOURCES CAPABLE OF PRODUCING ELECTRICAL DISCHARGE INCLUDE:

- LOOSE HARDWARE/FASTENERS-VIBRATION OR MOVEMENT (ELECTRICAL CONTINUITY MUST ALWAYS BE MAINTAINED).
- FLOORING MATERIAL INCLUDING RAISED ACCESS FLOORING (PANELS AND SUPPORT HARDWARE) AND CARPETING.
- ELECTRICAL FIXTURES (LIGHTING FIXTURES, TRACK LIGHTING, EMERGENCY LIGHTING, BATTERY CHARGERS, OUTLETS).
- DUCTING FOR HVAC AND CABLE ROUTING.
- RF SHIELD SEALS (WALLS, DOORS, WINDOWS, ETC.).

REV 0



RF DOOR OPENING

IN THE EVENT OF A CATASTROPHIC FAILURE OF THE QUENCH VENT DURING A QUENCH, PRESSURE BUILT UP MAY PREVENT OPENING A DOOR THAT OPENS INTO THE RF ROOM, PREVENTING EVACUATION FROM LIFE THREATENING CONDITIONS.

FOR THIS REASON THE RF DOOR SHOULD OPEN TO THE OUTSIDE OF THE RF ROOM. IF THE DOOR CANNOT OPEN OUT FROM THE RF ROOM, OTHER APPROPRIATE MEANS HAVE TO BE PROVIDED SO THAT THE RF ROOM DOOR IS NOT PREVENTED FROM OPENING DUE TO PRESSURE.

IF THE DOOR OPENS INTO THE RF ROOM, A 24"x24" OPENING FOR PRESSURE EQUALIZATION INTO THE RF ROOM MUST BE INSTALLED. THIS IS MANDATORY. THIS IS NOT AN ESCAPE HATCH. THE PURPOSE OF THE OPENING IS TO RELIEVE PRESSURE AND ALLOW THE MAIN DOOR TO BE OPENED SO THAT OCCUPANTS CAN BE EVACUATED.

THE OPENINGS WILL HAVE PANELS INSTALLED IN THE RF ROOM OR THE DOOR THAT CAN BE UNLOCKED AND OPENED TO THE OUTSIDE IN CASE OF EMERGENCY. THESE PANELS REQUIRE AN RF SEALED INSTALLATION. AFTER OPENING THE PANEL, THE OUTLET SHOULD MEASURE AT LEAST 24"x24". WHEN USING RECTANGULAR PANELS, THE SHORTER SIDE SHOULD MEASURE OF MINIMUM OF 24".

TO ENSURE UNOBSTRUCTED VENTING, THIS OPENING CANNOT BE SUBDIVIDED. THIS MEANS THAT, FOR EXAMPLE, RF SEALED HONEYCOMB GRIDS ARE NOT PERMITTED.

EASY REMOVAL OF THE PANEL BY A PERSON HAS TO BE ENSURED AND A MINIMUM DISTANCE OF 40" TO A FIXED OBJECT MUST BE MAINTAINED. THE PANEL SHOULD BE INSTALLED IN AN ACCESSIBLE LOCATION AND ALLOW ESCAPE OF THE LOW DENSITY HELIUM.

AS AN ALTERNATIVE TO AN OUTSWING DOOR, THE STATIONARY OBSERVATION WINDOW IS REPLACED BY A WINDOW OPENING INTO THE CONTROL AREA OR THE DOOR IS REPLACED WITH AN RF SEALED SLIDING DOOR. IT SHOULD BE ENSURED THAT THE DOOR CLOSING IN A WAY THAT ALLOWS IT TO MOVE AWAY FROM THE FRAME IN CASE OF OVERPRESSURE.

IF THE DOOR OPENS TO THE OUTSIDE, THE OPENING IN THE RF ROOM IS STILL RECOMMENDED.

THE RF ROOM MANUFACTURER CAN PROVIDE YOU WITH ADDITIONAL RF SEALED ROOM OPENINGS THAT LEAD DIRECTLY TO THE OUTSIDE. HOWEVER, THESE OPENINGS ARE ALSO CONDUITS FOR NOISE GENERATED OUTSIDE THE RF ROOM. UNOBSTRUCTED FLOW THROUGH THIS PIPE MUST BE GUARANTEED.

EXHAUST AND INTAKE FOR AIR CONDITIONING
RF FILTER PANEL OPENING
QUENCH TUBE EXIT
RF WINDOW
RF SHIELDING
OPENING FOR PRESSURE EQUALIZATION
RF ROOM DOOR OPENING DIRECTION TO THE OUTSIDE

SAFETY ASPECTS FOR THE RF ROOM:
IT MUST BE POSSIBLE TO LOCK THE RF ROOM (EXAMINATION ROOM) DOOR FROM THE OUTSIDE. IT MUST ALSO BE POSSIBLE TO OPEN THE DOOR FROM THE INSIDE WITHOUT A KEY OR ADDITIONAL DEVICE.

THE RF DOOR IS AN IMPORTANT COMPONENT FOR GOOD IMAGE QUALITY AS WELL AS SAFETY. THE OWNER/OPERATOR OF THE MR SYSTEM MUST MAINTAIN THE RF ROOM AS INSTRUCTED BY THE RF ROOM MANUFACTURER IN ORDER TO GUARANTEE CORRECT FUNCTION OF THE RF DOOR.

NO FERROMAGNETIC ITEMS CAN BE BROUGHT INTO THE RF ROOM AFTER THE MAGNET HAS BEEN RAMPED UP TO FIELD. MAGNETIC ITEMS WILL BECOME ATTRACTED TO THE MAGNET WITH NO WARNING AND DUE TO THE HIGH MAGNETIC FIELD, WILL BECOME MISSILES.

NOTE: FOR DOORS MOVED BY AN AUXILIARY DRIVES (ELECTRICAL OR PNEUMATIC), MANUAL OPERATION HAS TO BE ENSURED. AN OUTSIDE WINDOW SHOULD BE IN THE VICINITY TO ALLOW VENTING EXHAUSTED GAS TO THE OUTSIDE. THE INTEGRITY OF THE RF SHIELD MUST BE TESTED AFTER REMODELING.

REV 0

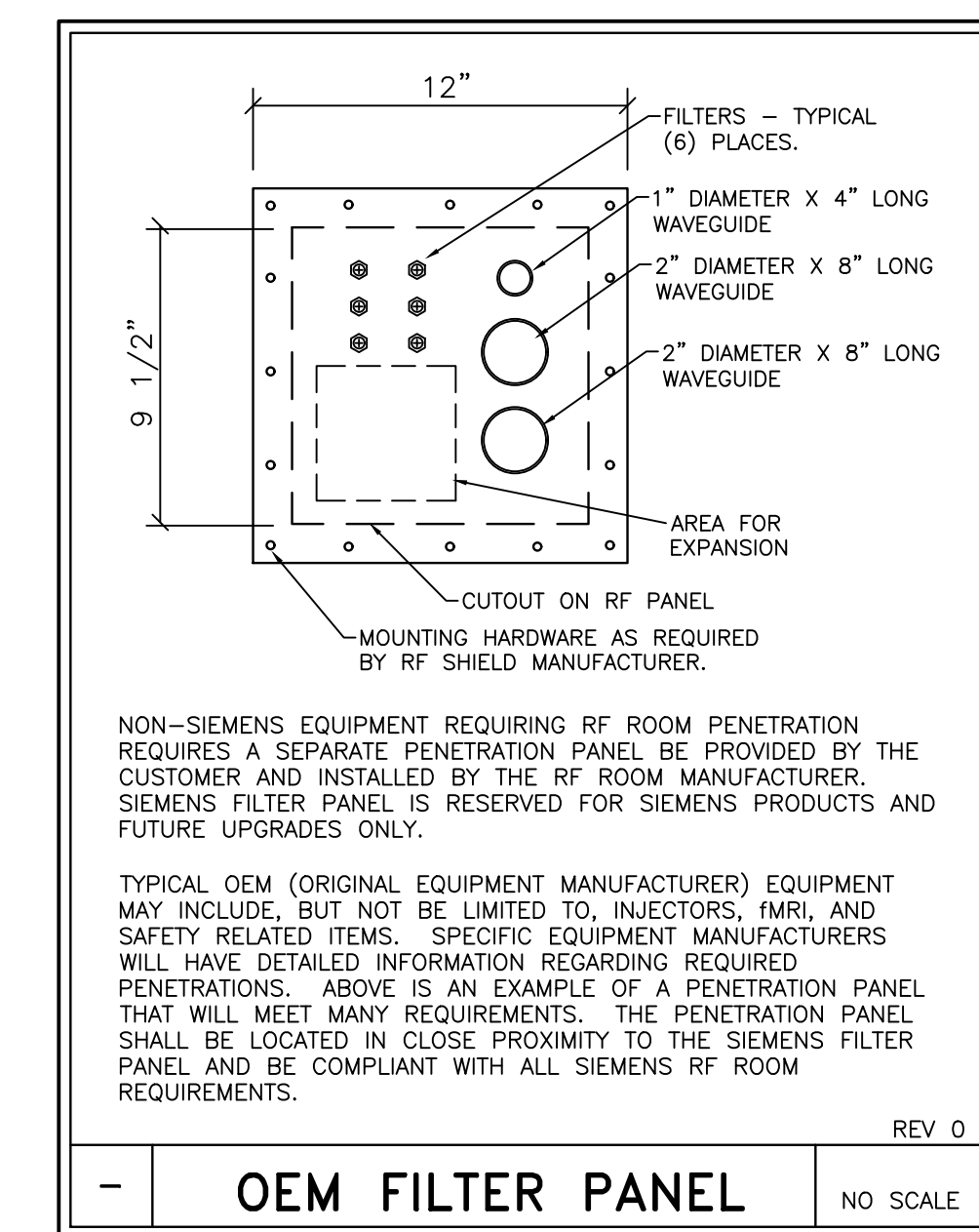
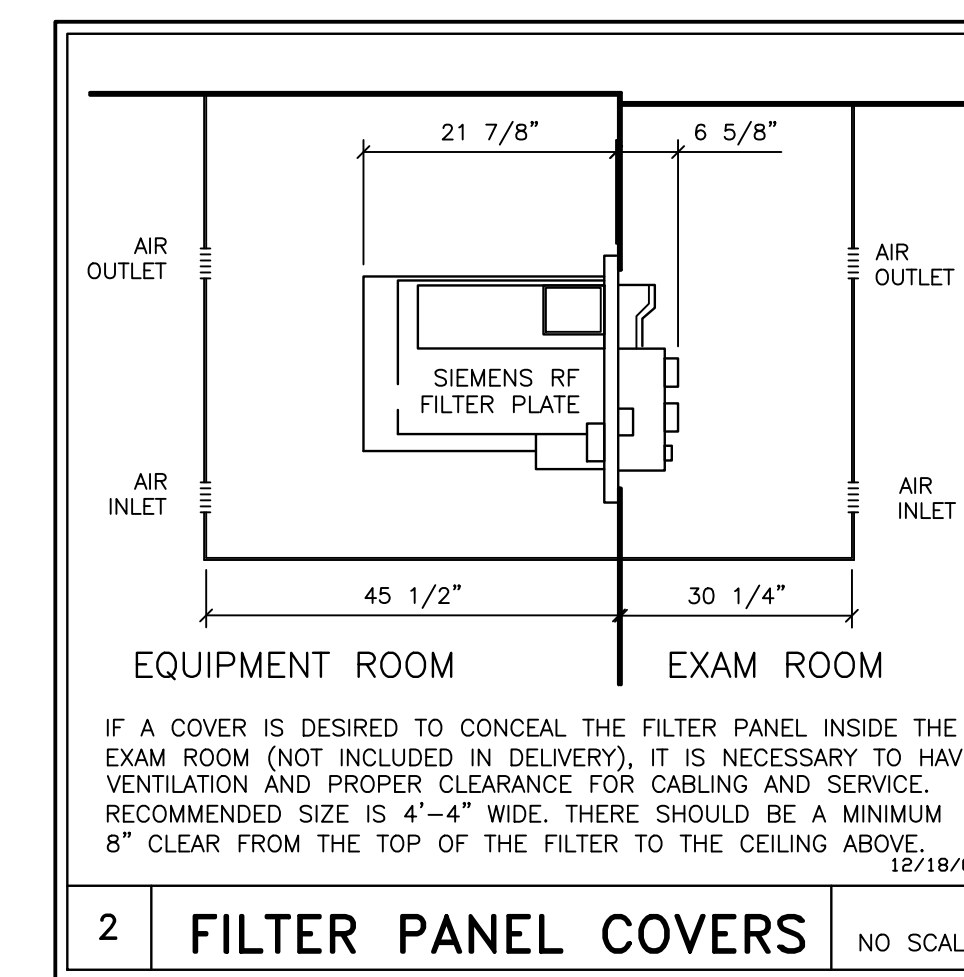
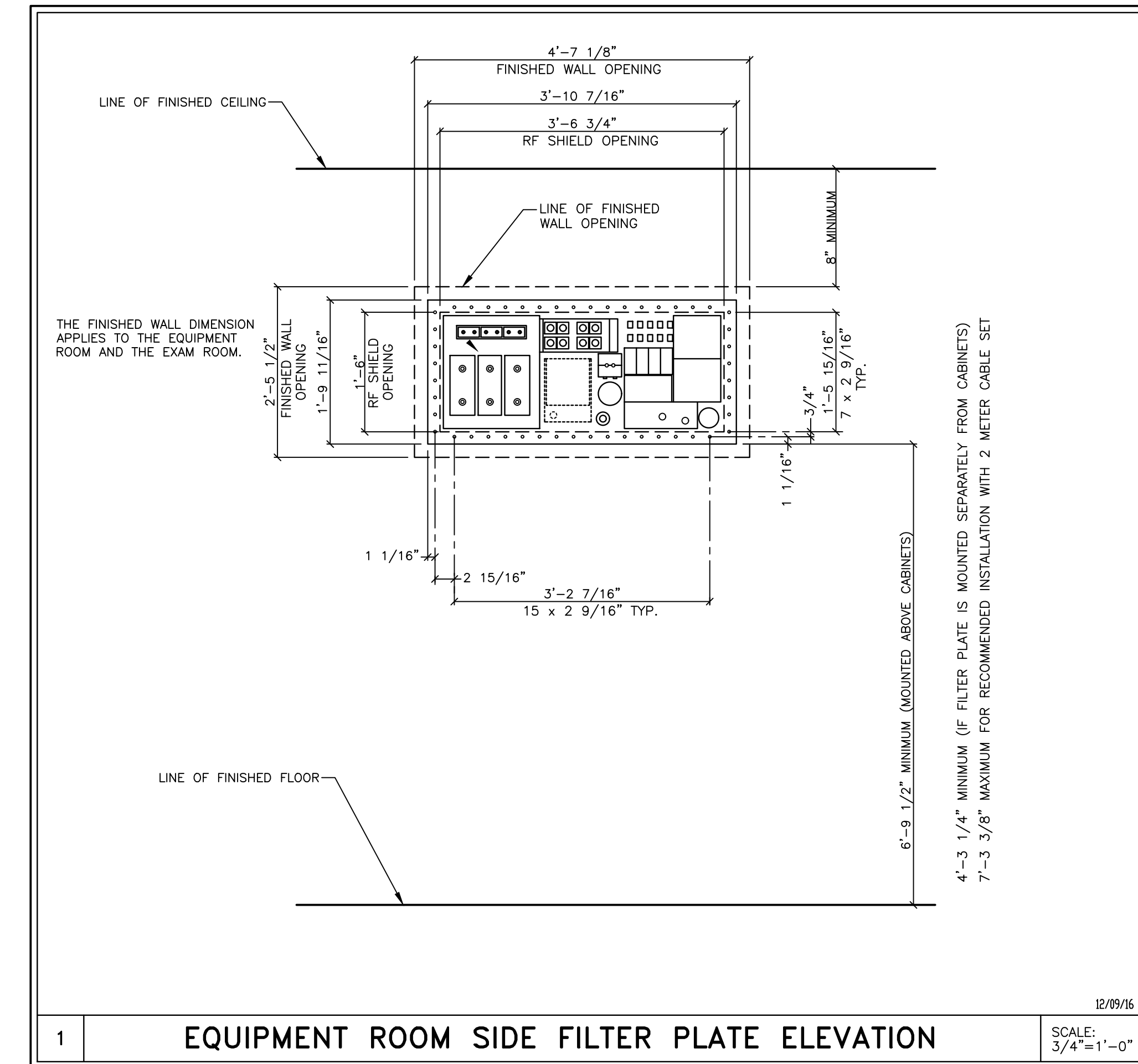
SAFETY INFORMATION - PRESSURE EQUALIZATION SCALE: NONE

- RF SHIELDING**
- 1) THE EXAMINATION AREA MUST BE SHIELDED TO PROVIDE A REDUCTION OF RADIO FREQUENCY WAVES EMANATING FROM EXTERNAL TRANSMITTERS. THE REQUIRED ATTENUATION IS 90dB IN THE FREQUENCY RANGE OF 15-128 MHz. IF CO-SITING TWO SYSTEMS EACH ROOM SHOULD BE 100 dB.
 - 2) THE RF SHIELD MUST BE TESTED BEFORE AND AFTER MAGNET PLACEMENT IN THE RF ROOM AND AFTER THE SIEMENS RF FILTER PANEL IS INSTALLED. THE RF-SHIELDING MUST BE INSULATED FROM ALL GROUNDS SUCH THAT THE ONLY GROUND IS THE SINGLE POINT GROUND ON THE OUTSIDE OF THE RF-ROOM WALL. RESISTANCE ≥ 100 OHMS.
 - 3) ALL ELECTRICAL LINES INTO THE RF ROOM MUST BE ROUTED THROUGH RF FILTERS (PROVIDED BY RF SHIELDING SUPPLIER). ALL ELECTRICALLY NON-CONDUCTIVE SUPPLY LINES (E.G. FIBER OPTIC CABLES, OR HOSES) INTO THE RF ROOM MUST BE ROUTED THROUGH RF SEALED WAVE GUIDES (PROVIDED BY RF SHIELDING SUPPLIER).
 - 4) FOR PRESSURE EQUALIZATION PURPOSES THE RF DOOR SHOULD OPEN TO THE OUTSIDE OF THE RF ROOM. AS AN ALTERNATIVE A 24"x24" OPENING IN THE RF ROOM FOR PRESSURE EQUALIZATION IS REQUIRED.
- REV 1

- EXAM ROOM INTERIOR NOTES**
- 1) ONLY NON-MAGNETIC MATERIALS ARE TO BE USED AND INSTALLED IN THE RF ROOM. SEE CONSTRUCTION REQUIREMENTS.
 - 2) A SUSPENDED CEILING MUST BE STATICALLY SUSPENDED, NOT SUSPENDED WITH MOVABLE CLAMPS, SPRINGS, ETC.
 - 3) RODS IN SUSPENDED CEILINGS MUST BE INSTALLED SECURELY. GALVANIC CONTACT BETWEEN THE RODS MUST BE GUARANTEED. THEY MUST NOT JUST LIE ON TOP OF ONE ANOTHER. A WIRE JUMPER BETWEEN RODS MAY BE USEFUL.
 - 4) ELECTRICAL WIRING, FOR AMBIENT LIGHTS FOR EXAMPLE, MUST NOT SIMPLY REST ON THE SUSPENDED CEILING. THEY MUST BE FASTENED OR INSIDE A CONDUIT TO PREVENT MOTION.
- REV 1

- SHIELDING GENERAL NOTES**
- 1) SIEMENS REQUESTS THAT THE SHIELDING MANUFACTURER(S) SUBMIT FINAL SHOP DRAWINGS TO SIEMENS FOR REVIEW PRIOR TO THEIR INCLUSION IN CONSTRUCTION DOCUMENTS. SIEMENS SHALL BE COPIED ON ALL FIELD ORDER CHANGES CONCERNING CHANGES IN RF AND MAGNETIC SHIELDING CONDITIONS, CONFIGURATION AND SPECIFICATION. THE RF AND MAGNETIC SHIELDING CONTRACTOR(S) SHALL FURNISH "AS BUILT" SCALED AND DIMENSIONED PLANS REFLECTING ANY AND ALL FIELD ORDER CHANGES PRIOR TO THE COMPLETION OF THE CONSTRUCTION DOCUMENTS.
 - 2) ALL CHANGES TO SIEMENS RECOMMENDED OPENINGS AND PENETRATIONS SHALL BE APPROVED BY THE SIEMENS PROJECT MANAGER PRIOR TO THE COMPLETION OF THE CONSTRUCTION DOCUMENTS.
 - 3) THE SIZE, LOCATION, AND DIMENSIONS OF ANY MAGNETIC SHIELDING REQUIRED HAS BEEN DETERMINED BY SIEMENS. THIS INFORMATION HAS BEEN SUPPLIED TO THE MAGNETIC SHIELDING FABRICATOR TO DESIGN THE STRUCTURAL SUPPORT SYSTEM REQUIRED FOR THE MAGNETIC SHIELDING MATERIAL.
- REV 0

- FILTER PLATE GENERAL NOTES**
- 1) STRUCTURAL SUPPORT AND INTEGRATION OF THE SIEMENS SUPPLIED AND INSTALLED FILTER PLATE WITH MAGNETIC AND RF SHIELDING SHALL BE SPECIFIED, DETAILED AND NOTED BY THE RF AND MAGNETIC SHIELDING MANUFACTURER(S) WITH OVERALL COORDINATION WITH SIEMENS SITE SPECIFIC RECOMMENDATIONS TO BE THE RESPONSIBILITY OF THE ARCHITECT OF RECORD.
 - 2) THE FILTER PLATE FRAME, RF FILTER PLATE BLANK, RF GASKET AND MOUNTING HARDWARE FOR THE PURPOSES OF TESTING THE INTEGRITY OF THE RF ENCLOSURE PRIOR TO THE INSTALLATION OF THE SIEMENS SUPPLIED AND INSTALLED RF FILTER PLATE, SHALL BE PROVIDED AND INSTALLED BY THE SHIELDING CONTRACTOR(S) UNLESS SPECIFIED OTHERWISE.
- REV 0



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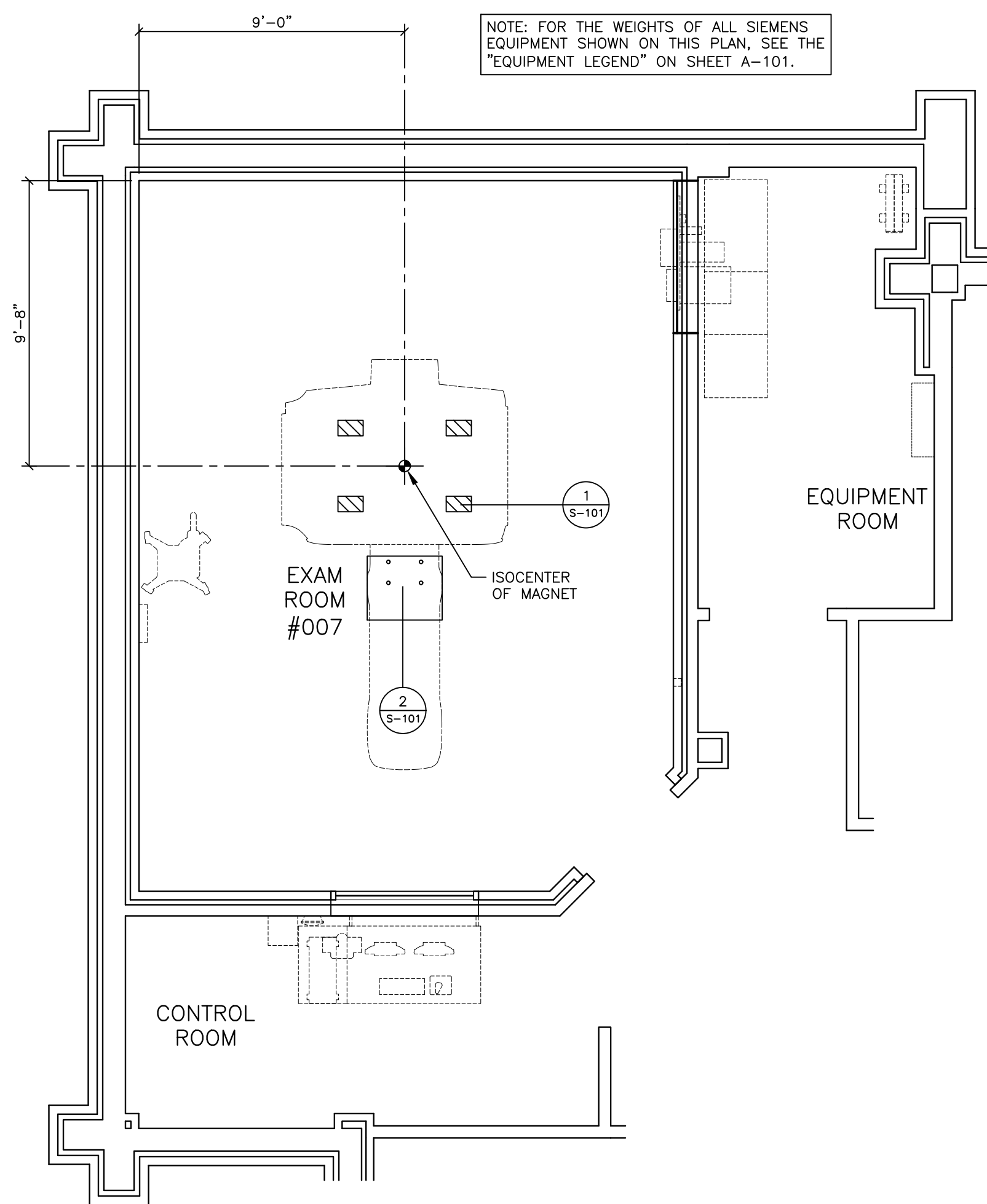
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PROJECT MANAGER: TIMOTHY CARMICHAEL TEL: (603) 387-4211 FAX: EMAIL: timothy.carmichael@siemens-healthineers.com		SIEMENS	
NORTHEASTERN VERMONT REG HOSP 1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819 MRI SUITE 1 - SOLA XJ GRADIENTS			
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ALL RIGHTS ARE RESERVED.		SHEET: A-502	
DATE: 06/17/19	DESCRIPTION: 1902436 RA DATED 06/12/19 APPROVED BY CUSTOMERS FOR FINALS	SHEET OF: 4 OF 10	DRAWN BY: R. SUTHERS
SCALE: AS NOTED		REF. #: PUFQGY	
DATE: 06/17/19			
-ISSUE BLOCK-			

SOLA REV 2

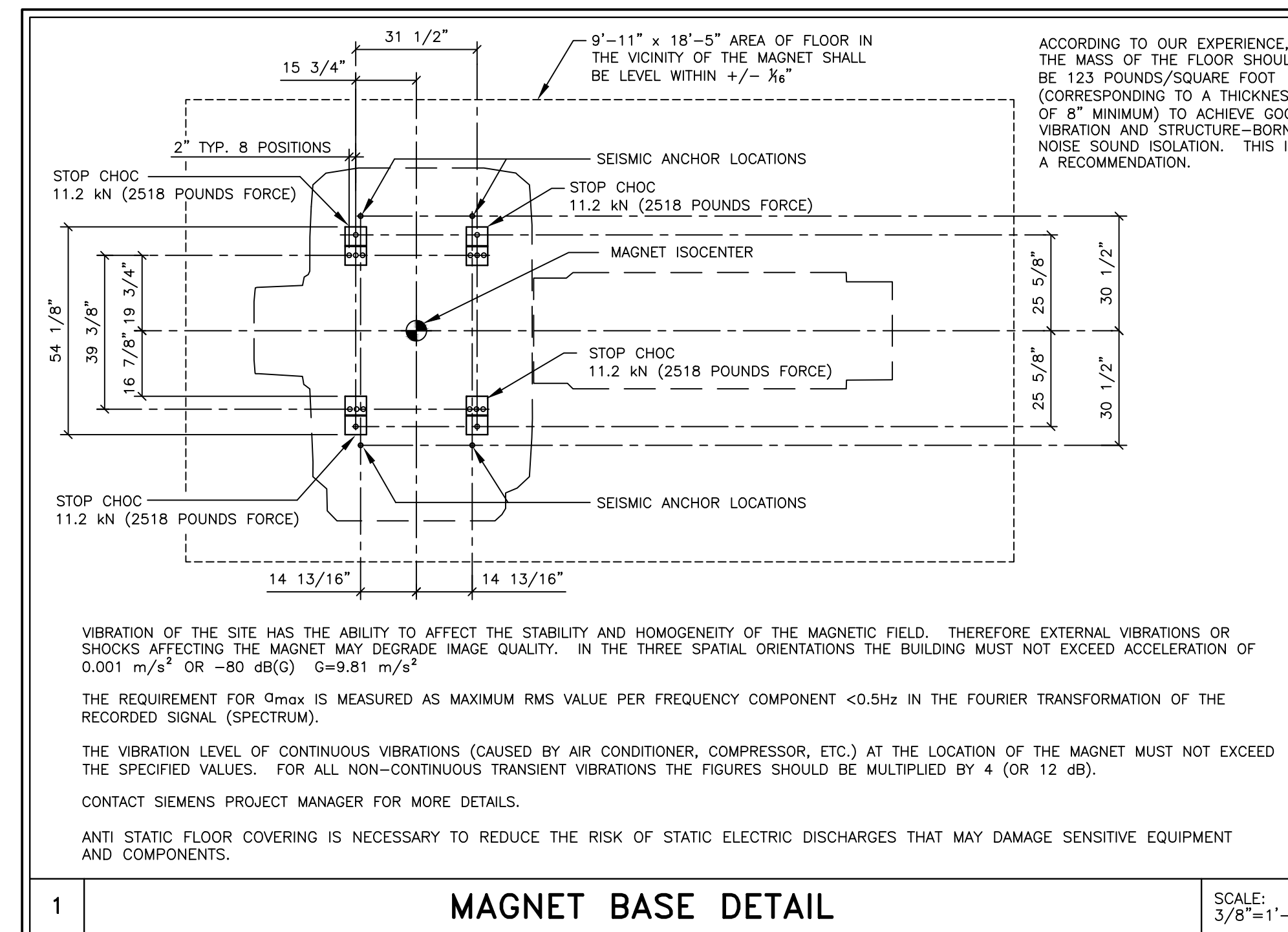
REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



NOTE: FOR THE WEIGHTS OF ALL SIEMENS EQUIPMENT SHOWN ON THIS PLAN, SEE THE "EQUIPMENT LEGEND" ON SHEET A-101.

STRUCTURAL FLOOR PLAN

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



ACCORDING TO OUR EXPERIENCE, THE MASS OF THE FLOOR SHOULD BE 123 POUNDS/SQUARE FOOT (CORRESPONDING TO A THICKNESS OF 8" MINIMUM) TO ACHIEVE GOOD VIBRATION AND STRUCTURE-BORNE NOISE SOUND ISOLATION. THIS IS A RECOMMENDATION.

VIBRATION OF THE SITE HAS THE ABILITY TO AFFECT THE STABILITY AND HOMOGENEITY OF THE MAGNETIC FIELD. THEREFORE EXTERNAL VIBRATIONS OR SHOCKS AFFECTING THE MAGNET MAY DEGRADE IMAGE QUALITY. IN THE THREE SPATIAL ORIENTATIONS THE BUILDING MUST NOT EXCEED ACCELERATION OF 0.001 m/s² OR -80 dB(G) G=9.81 m/s²

THE REQUIREMENT FOR a_{max} IS MEASURED AS MAXIMUM RMS VALUE PER FREQUENCY COMPONENT <0.5Hz IN THE FOURIER TRANSFORMATION OF THE RECORDED SIGNAL (SPECTRUM).

THE VIBRATION LEVEL OF CONTINUOUS VIBRATIONS (CAUSED BY AIR CONDITIONER, COMPRESSOR, ETC.) AT THE LOCATION OF THE MAGNET MUST NOT EXCEED THE SPECIFIED VALUES. FOR ALL NON-CONTINUOUS TRANSIENT VIBRATIONS THE FIGURES SHOULD BE MULTIPLIED BY 4 (OR 12 dB).

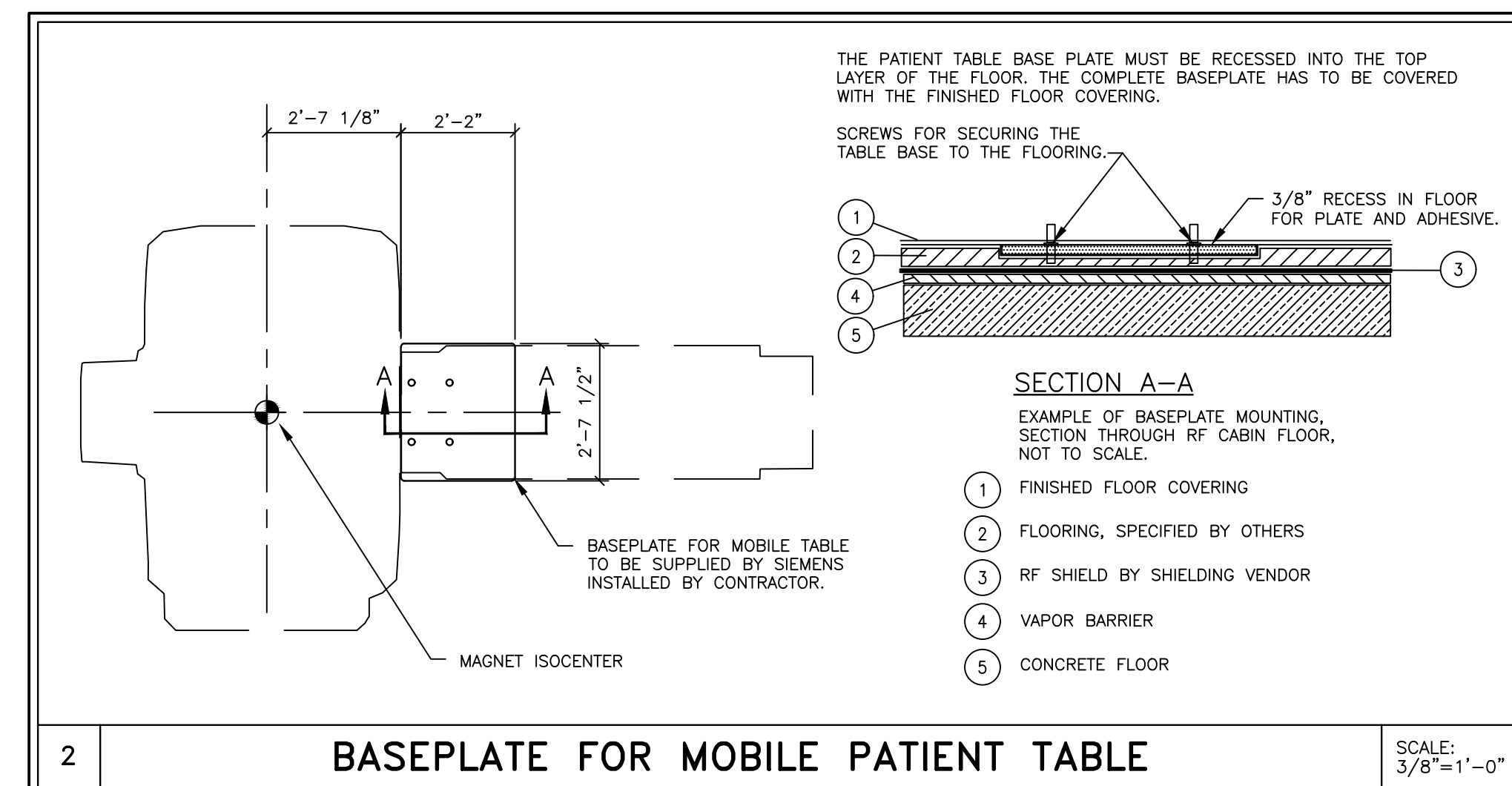
CONTACT SIEMENS PROJECT MANAGER FOR MORE DETAILS.

ANTI STATIC FLOOR COVERING IS NECESSARY TO REDUCE THE RISK OF STATIC ELECTRIC DISCHARGES THAT MAY DAMAGE SENSITIVE EQUIPMENT AND COMPONENTS.

MAGNET BASE DETAIL

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

- STRUCTURAL NOTES**
- 1) THE CUSTOMER/CONTRACTOR SHALL FURNISH AND INSTALL ALL STRUCTURAL SUPPORT MEMBERS AND NEEDED HARDWARE FOR THE INSTALLATION OF THE SIEMENS EQUIPMENT.
 - 2) THE OVERHEAD STRUCTURAL SUPPORT SYSTEM SHALL BE FIXED, RIGID AND BRACED FOR SWAY.
 - 3) ALL STRUCTURAL SUPPORT MEMBERS SHALL BE TRUE, SQUARE, LEVEL, PARALLEL AND COPLANAR WITH RESPECT TO EACH OTHER, WITH A HORIZONTAL STRUCTURAL SUPPORT MEMBER TO BE LOCATED AND SET WITH A TRANSIT.
 - 4) ALL STRUCTURAL SUPPORT DETAILS SHOWN ARE SAMPLE DETAILS BASED UPON TYPICAL AND STANDARD BUILDING PRACTICES AND ARE NOT INTENDED AS ACTUAL CONSTRUCTION DETAILS. ALL CONSTRUCTION DETAILS AND SUPPORT CALCULATIONS SHALL BE PREPARED BY A PROFESSIONAL STRUCTURAL ENGINEER AT THE CUSTOMER'S EXPENSE. IN THE EVENT AN EXISTING SUPPORT SYSTEM IS TO BE USED, IT WILL BE THE CUSTOMER'S RESPONSIBILITY TO VERIFY THE INTEGRITY OF THAT SYSTEM.
 - 5) MOUNTING PLATES, FRAMES, AND HARDWARE SUPPLIED BY SIEMENS AS DETAILED IN THIS DRAWING SET ARE INSTALLED BY SIEMENS UNLESS OTHERWISE REQUIRED. ANY DEVIATION FROM THE PROVIDED MATERIALS OR MOUNTING METHODS MUST BE DESIGNED AND DOCUMENTED BY THE STRUCTURAL ENGINEER OF RECORD. ALTERNATE MOUNTING MATERIALS (I.E. ANCHORS, THREADED ROD, BACKING PLATES, ETC.) MUST BE SUPPLIED BY THE CUSTOMER/CONTRACTOR. SIEMENS MAY REQUIRE ASSISTANCE FROM THE CUSTOMER/CONTRACTOR WITH INSTALLATION WHEN UTILIZING ALTERNATE MOUNTING MATERIALS.
 - 6) ALL CEILING FIXTURES (I.E. AIR SUPPLY GRILLES, AIR RETURN GRILLES, EXHAUST GRILLES, SPRINKLER HEADS, INCANDESCENT AND FLUORESCENT LIGHT FIXTURES, INTERCOM SPEAKERS, MEDICAL GAS COLUMNS, ETC.) SHALL BE INSTALLED FLUSH MOUNTED WITH THE FINISHED CEILING TO PROVIDE FREE AND UNRESTRICTED TRAVEL OF THE SMS CEILING MOUNTED EQUIPMENT.
 - 7) THE STRUCTURAL PLANNING AS SHOWN ON THE 1/4" STRUCTURAL PLAN HAS BEEN COORDINATED WITH THE EQUIPMENT LOCATION AS SHOWN ON THE 1/4" EQUIPMENT LAYOUT PLAN. FOR THIS REASON, ANY DEVIATIONS FROM THE STRUCTURAL PLANNING AS SHOWN MUST BE APPROVED BY SMS PLANNING DEPARTMENT.
 - 8) THE STRUCTURAL ENGINEER OF RECORD SHALL BE RESPONSIBLE FOR THE DESIGN AND DETAIL OF FLOOR, WALL AND CEILING STRUCTURES IN ACCORDANCE WITH THE WEIGHTS, MOMENTS AND FORCES AS SHOWN ON OUR STRUCTURAL CALCULATIONS, OR INFORMATION IN CONSIDERATION OF FORCES AS DETERMINED PER LOCAL GOVERNING BUILDING CODES.



BASEPLATE FOR MOBILE PATIENT TABLE

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

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

SYM	DATE	DESCRIPTION
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 TEL: (603) 387-4211 EXT: _____
 EMAIL: timothy.carmichael@siemens-healthineers.com

SIEMENS

NORTHEASTERN VERMONT REG HOSP
 1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819
 MRI SUITE 1 - SOLA XJ GRADIENTS

PROJECT #: **1902436** SHEET: **S-101**

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SHEET 5 OF 10 DRAWN BY: R. SUTHERS
 DATE: 06/17/19

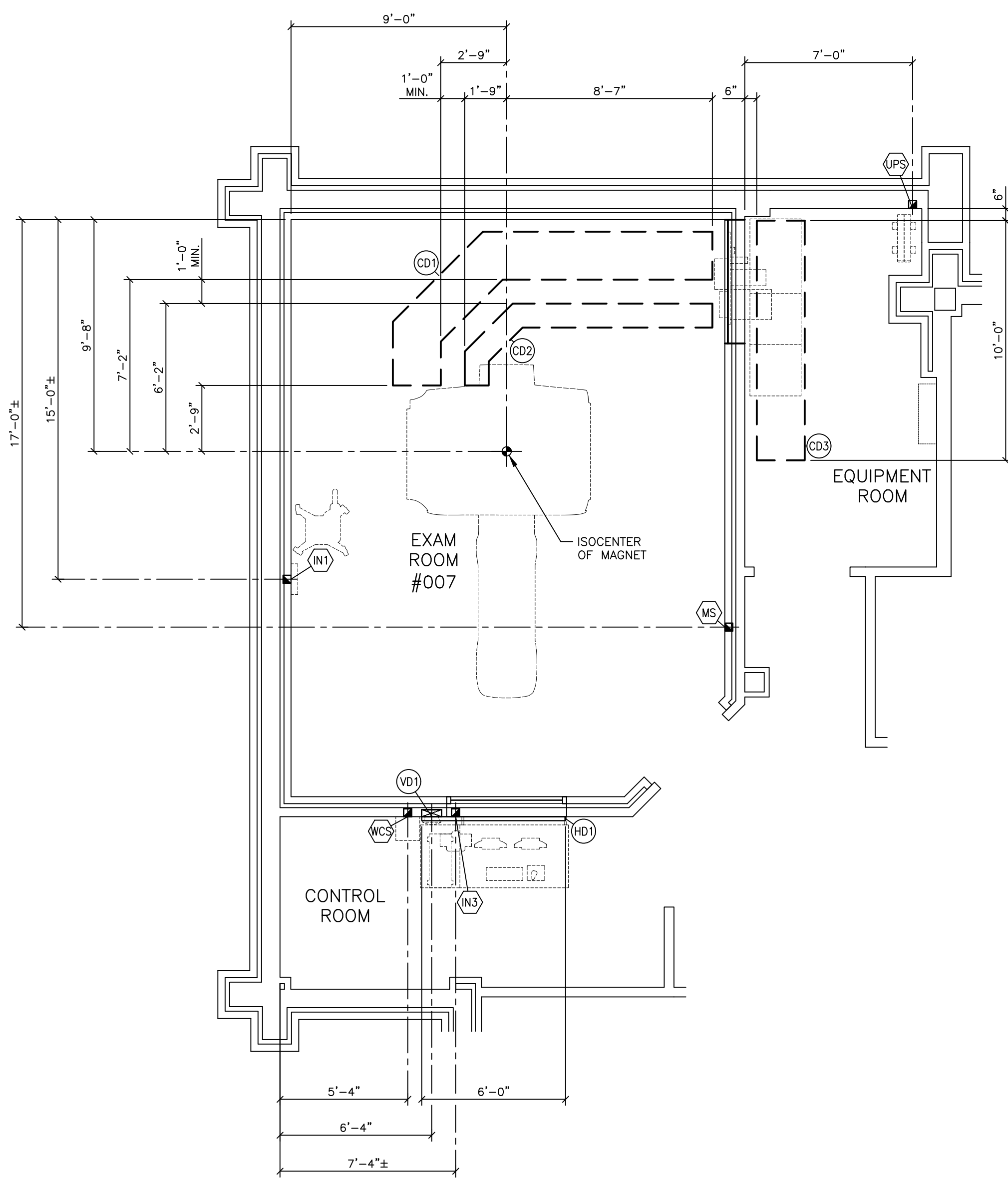
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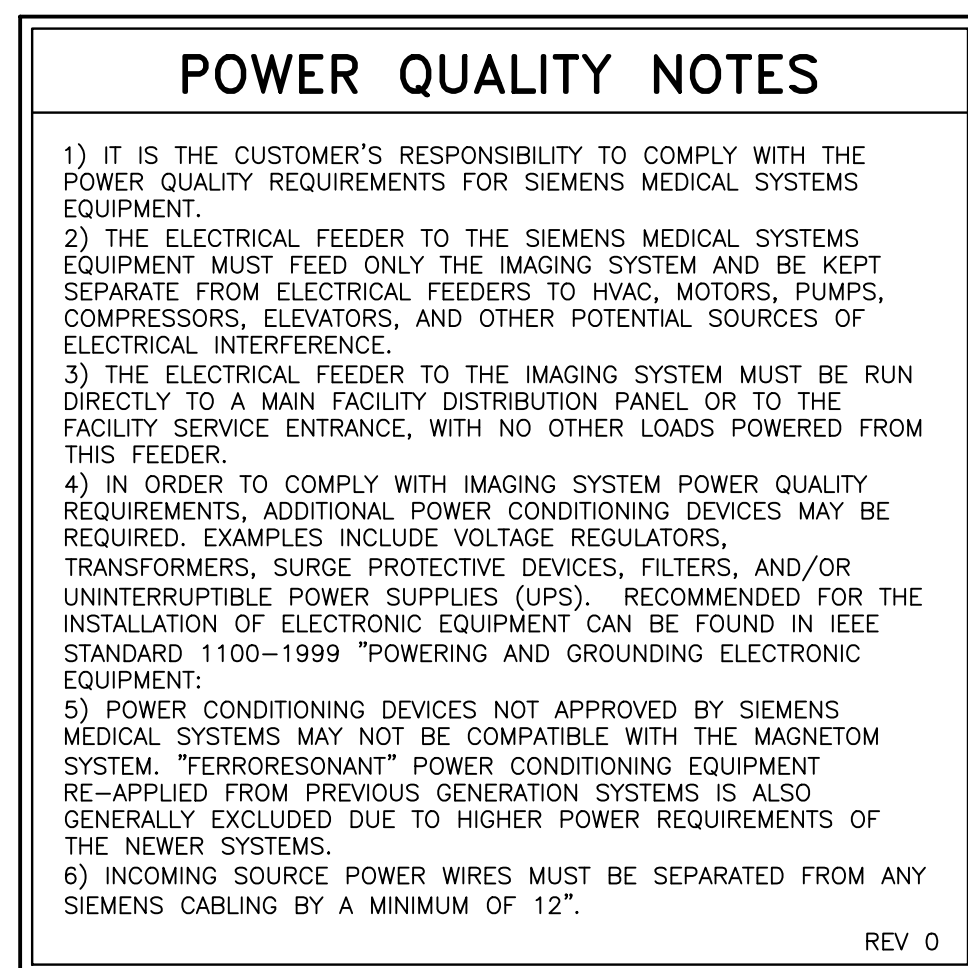
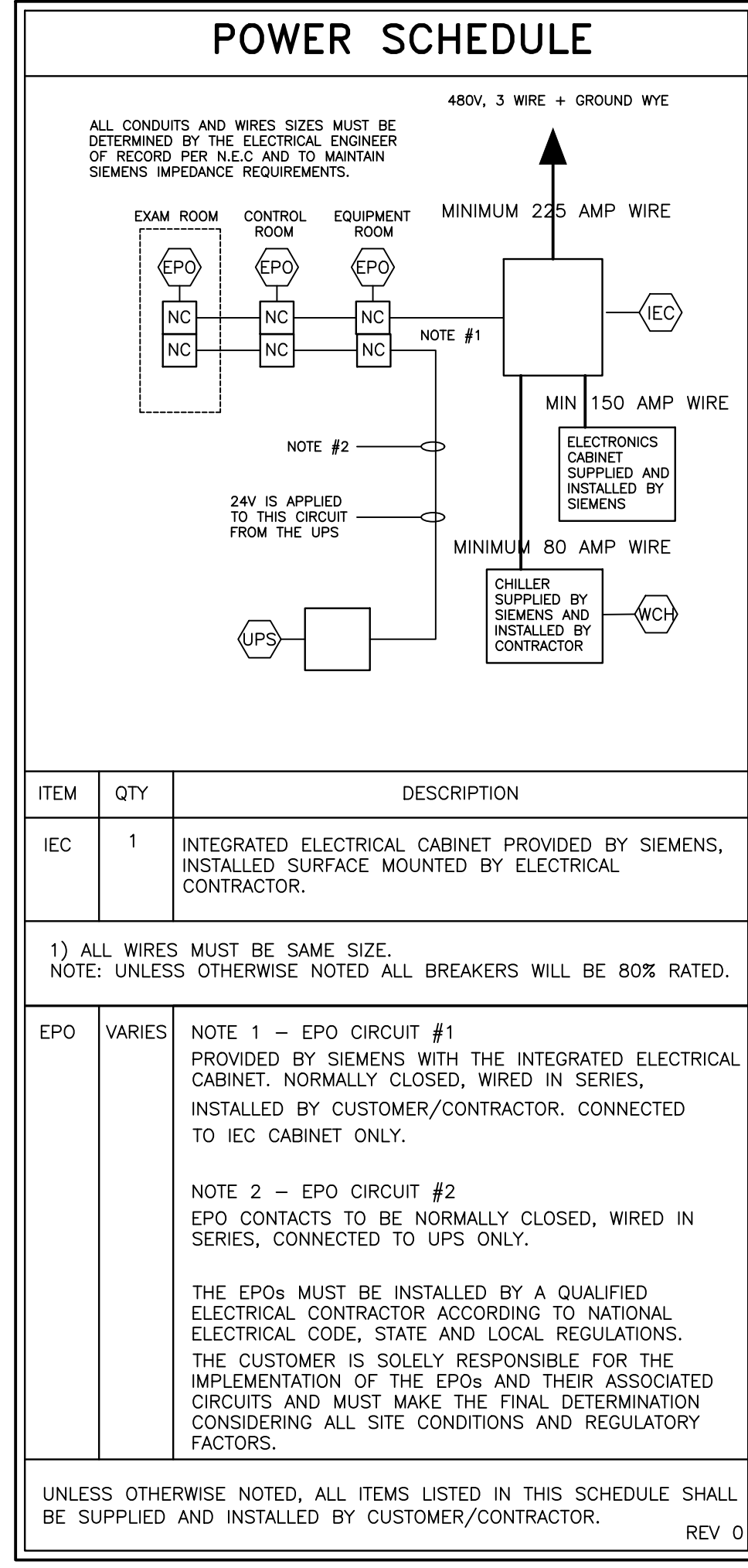
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SOLA REV 2



ELECTRICAL DIMENSION PLAN

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



CEILING HEIGHTS

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

POWER REQUIREMENTS

VOLTAGE VARIATION: 480 VAC ±10% FOR ALL LINE AND LOAD CONDITIONS	480V - 3 PHASE
VOLTAGE UNBALANCE: 2% MAXIMUM DIFFERENCE BETWEEN PHASES	
FREQUENCY:	60 Hz ± 1.0 Hz
LINE IMPEDANCE:	<180 mΩMS
CONNECTION VALUE	69 kVA
SHORT TIME POWER (LESS THAN 3 SECONDS)	75 kVA
MAIN BREAKER SIZE (M)	225 A
MR SYSTEM BREAKER	100 A
CHILLER BREAKER	80 A
ALL BREAKERS ARE RATED AT 80%	

POWER QUALITY

POOR POWER WILL ALTER EQUIPMENT PERFORMANCE

IT IS IN THE CUSTOMER'S INTEREST THAT THE ELECTRICAL CONTRACTOR BE RESPONSIBLE FOR TESTING AND VERIFYING THAT THE EQUIPMENT POWER SUPPLY COMPLIES WITH THE SIEMENS SPECIFICATIONS.

DEMAND AND CAPACITY

- IF EQUIPMENT UPGRADE IS ANTICIPATED, INSTALLING ELECTRICAL POWER TO MEET THE REQUIREMENTS OF THE HIGHER POWER GRADIENT PACKAGE AT THE TIME OF INITIAL INSTALLATION WILL REDUCE THE COST TO UPGRADE THE ELECTRICAL SYSTEM LATER.
- RECOMMENDED TRANSFORMER SIZE (SYSTEM WITHOUT UPS) IS BASED ON INDUSTRY STANDARD ISOLATION TRANSFORMER KVA RATINGS. SOURCE IMPEDANCE FEEDING THE MAGNETOM SYSTEM, INCLUDING ANY ISOLATION TRANSFORMERS, MUST MEET EQUIPMENT REQUIREMENTS AS LISTED HERE. SIEMENS RECOMMENDS A TRANSFORMER WITH COPPER WINDINGS, AN ELECTRO-STATIC SHIELD, AND A LOW IMPEDANCE (<3%) TO ENSURE THAT SOURCE IMPEDANCE REQUIREMENTS ARE MET.
- OVER CURRENT PROTECTION IS SPECIFIED FOR SYSTEMS WITHOUT AN UNINTERRUPTIBLE POWER SUPPLY (UPS). ADDITION OF A UPS REQUIRES A HIGHER CAPACITY MAINS CONNECTION (DEPENDENT UPON UPS MODEL AND SIZE). MAXIMUM FAULT CURRENT IS DEPENDENT UPON THE IMPEDANCE OF THE FACILITY ELECTRICAL SYSTEM. THE CUSTOMER'S ARCHITECT OR ELECTRICAL CONTRACTOR TO SPECIFY AIC RATING OF OVER CURRENT PROTECTION BASED ON FACILITY IMPEDANCE CHARACTERISTICS.
- MOMENTARY POWER IS BASED ON A MAXIMUM RMS VALUE FOR A PERIOD NOT TO EXCEED FIVE (5) SECONDS, AS DEFINED IN NEC 517.2. STAND-BY AND AVERAGE CURRENT ARE SUBSTANTIALLY LOWER.
- THE CONDUCTOR SIZE SHOULD BE SELECTED TO MEET THE VOLTAGE DROP REQUIREMENTS, TAKING INTO CONSIDERATION THE MAINS CAPACITY, RUN LENGTH, AND ANY ADDITIONAL TRANSFORMERS USED TO OBTAIN THE PROPER EQUIPMENT VOLTAGE LEVEL. NEMA STANDARD XR-9-1989 (R1994,R2000) PROVIDES GENERAL GUIDELINES FOR SIZING CONDUCTORS, TRANSFORMERS, AND ELECTRICAL SYSTEMS FOR MEDICAL IMAGING SYSTEMS.
- LONG-TIME POWER IS BASED ON THE HIGHEST AVERAGE RMS VALUES FOR A PERIOD EXCEEDING 5 MINUTES DURING CLINICAL SYSTEM OPERATION, AS DEFINED IN NEC 517.2.
- A CIRCUIT BREAKER WITH A HIGH INRUSH RATING (>8x RATED CURRENT) IS REQUIRED TO PERMIT SWITCH-ON OF THE UPS SYSTEM WITHOUT SPURIOUS TRIPPING. CIRCUIT BREAKERS WITH AN ADJUSTABLE MAGNETIC TRIP (SIEMENS FD6 SERIES OR SIMILAR) ARE HIGHLY RECOMMENDED.

REV 1

ELECTRICAL INSTALLATION NOTES

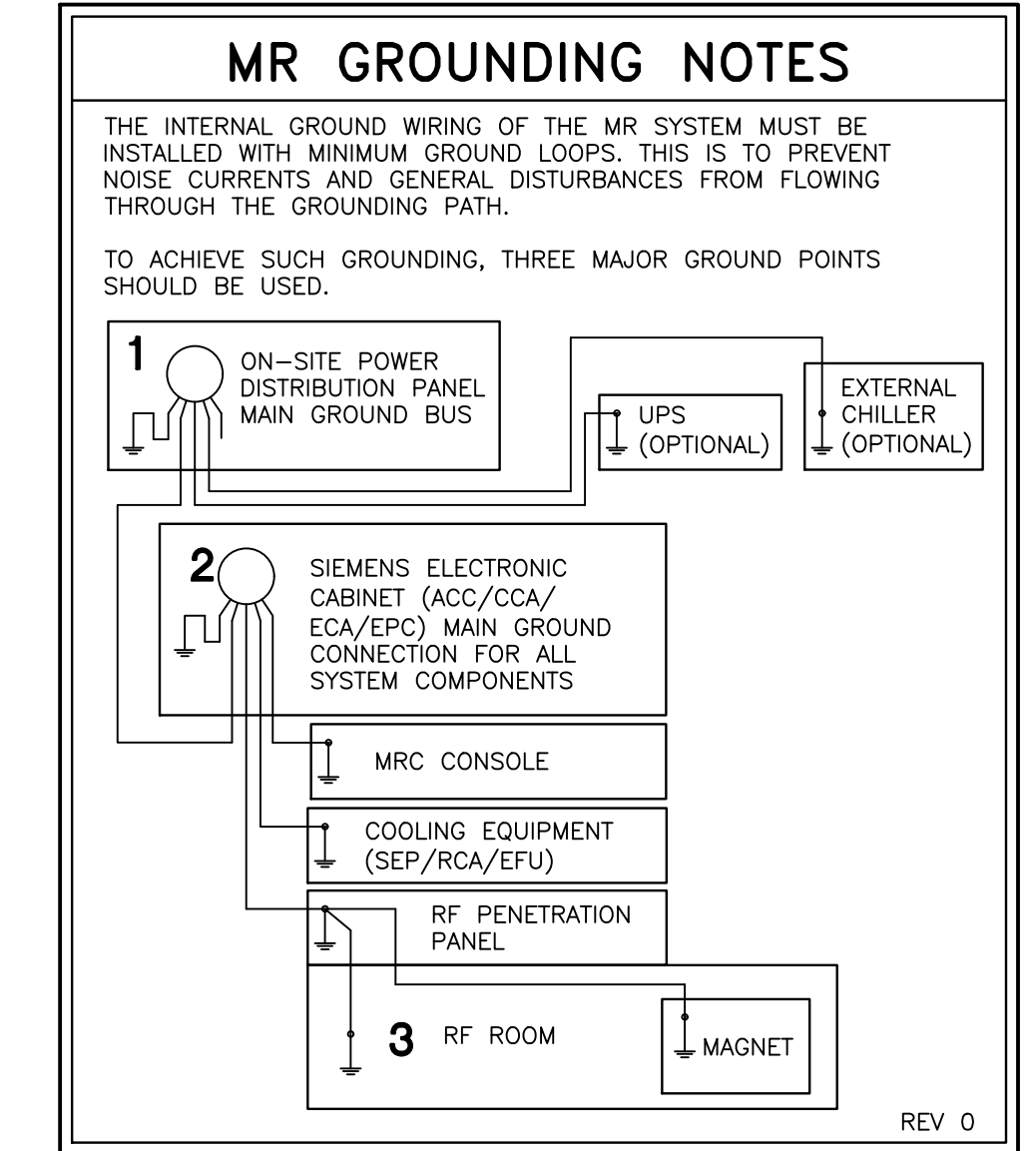
- INSTALL THE MR SYSTEM CIRCUIT BREAKER IN OR NEAR THE EQUIPMENT ROOM. THE PERMITTED FRINGE FIELD FOR THE PANEL IS UP TO 3mT. IF THE FRINGE FIELDS HAVE HIGHER VALUES, MAGNETIC SHIELDING MUST BE PROVIDED OR THE DISTANCE FROM THE MAGNET MUST BE INCREASED.
- AN ACCEPTABLE MEANS FOR SWITCHING MAIN POWER ON AND OFF SHOULD BE INSTALLED IN THE MAIN BREAKER PANEL. INSTALL EMERGENCY SHUTDOWN BUTTONS IN EACH ROOM WHERE THERE IS SIEMENS EQUIPMENT.
- THE ELECTRICAL FEEDER TO THE SIEMENS EQUIPMENT MUST FEED ONLY THE IMAGING SYSTEM AND BE KEPT SEPARATE FROM ELECTRICAL FEEDERS TO HVAC, MOTORS, PUMPS, COMPRESSORS, ELEVATORS AND OTHER POTENTIAL SOURCES OF ELECTRICAL INTERFERENCE.
- THE EMERGENCY POWER OFF (EPO) BUTTONS ARE TO BE MUSHROOM TYPE WITH PUSH LOCK AND PULL TO RELEASE.
- WALL RECEPTACLES MADE OF FERROMAGNETIC MATERIALS ARE NOT PERMITTED IN THE EXAM ROOM. PERIPHERAL UNITS (SUCH AS VENTILATORS) NOT APPROVED FOR USE IN A HIGH MAGNETIC FIELD ENVIRONMENT CAN INFLUENCE THE MAGNETIC FIELD, COMPROMISING IMAGE QUALITY. THE CUSTOMER IS RESPONSIBLE FOR INSTALLATION AND USE OF RECEPTACLES IN THE EXAM ROOM. INSTALLATION OF RECEPTACLES AND THE FILTERS REQUIRED ARE TO BE COORDINATED WITH THE RF SHIELDING SUPPLIER.
- THE RF SHIELD MUST BE FITTED WITH A GROUND STUD OR BUS BAR, LOCATED WITHIN 24" OF THE AUXILIARY FILTERS FOR ROOM LIGHTS AND OUTLETS, SUPPLIED AND INSTALLED BY THE RF SHIELD SUPPLIER.
- IN ORDER TO PREVENT GROUND LOOPS, ALL CUSTOMER OR CUSTOMER/CONTRACTOR SUPPLIED AC POWER ENTERING THE EXAMINATION ROOM (I.E. OUTLETS, EPO, ETC.) SHOULD BE SUPPLIED VIA AN ISOLATION TRANSFORMER. THE ISOLATION TRANSFORMER SECONDARY WINDING GROUND CONDUCTOR SHOULD BE CONNECTED TO THE RF SHIELD GROUND STUD OR BUS BAR. SEE NOTE 6 ABOVE AND THE AUXILIARY AC POWER FOR EXAMINATION ROOM DETAIL.

REV 0

GROUNDING NOTES

EQUIPMENT GROUND CONDUCTOR TO COMPLY WITH THE FOLLOWING:

- SIZED EQUIVALENT TO THE PHASE CONDUCTORS (FULL SIZED GROUND).
- DERIVED FROM THE ELECTRICAL SERVICE, TRANSFORMER OR MAIN DISTRIBUTION PANEL FEEDING THE SIEMENS EQUIPMENT.
- RUN IN THE SAME CONDUIT, TROUGH OR RACEWAY AS THE PHASE CONDUCTORS.
- CONTINUOUS, WITH NO BREAKS OR USE OF CONDUIT, CHASSIS OR EARTH AS THE SOLE GROUNDING PATH.
- BONDED TO CHASSIS AND/OR CONDUIT IN ACCORDANCE WITH THE NEC REQUIREMENTS.
- MINIMIZE CONNECTIONS OR TERMINALS TO ENSURE CONTINUITY OVER THE LIFE OF THE INSTALLATION.
- AS A NORM, THERE SHOULD NOT BE ANY CURRENT PRESENCE ON THE GROUND CONDUCTOR, BUT IT IS ACCEPTABLE TO HAVE <500mA DURING OPERATION OF THE IMAGING EQUIPMENT.



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PROJECT MANAGER: TIMOTHY CARMICHAEL
 TEL: (603) 387-4211 EXT:
 FAX:
 EMAIL: timothy.carmichael@siemens-healthineers.com

SIEMENS

NORTHEASTERN VERMONT REG HOSP
 1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819
 MRI SUITE 1 - SOLA XJ GRADIENTS

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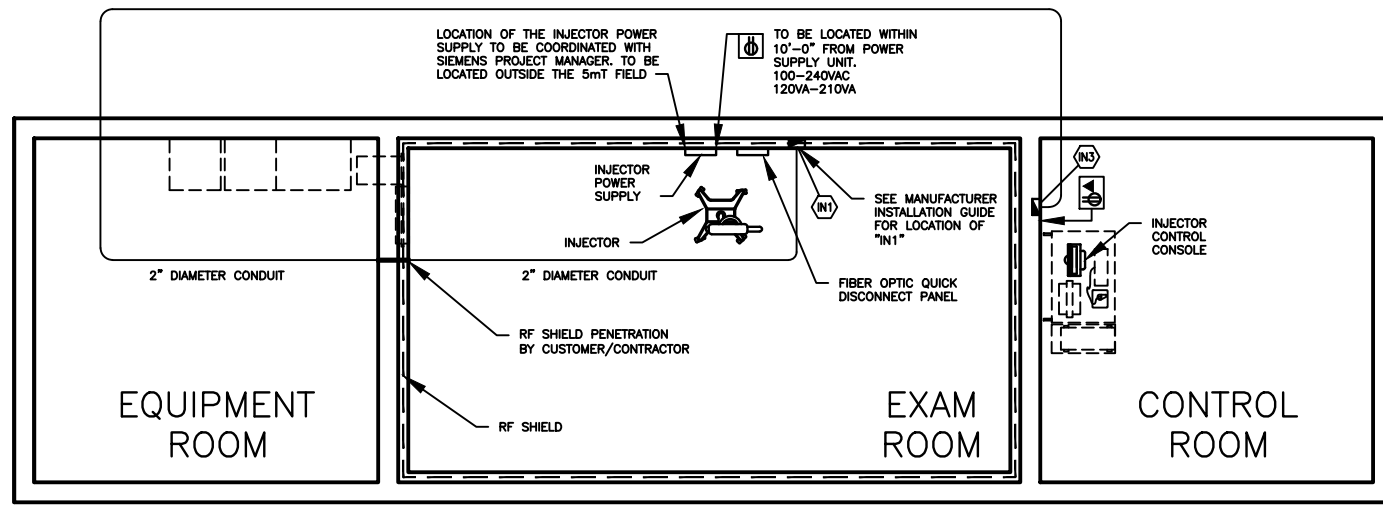
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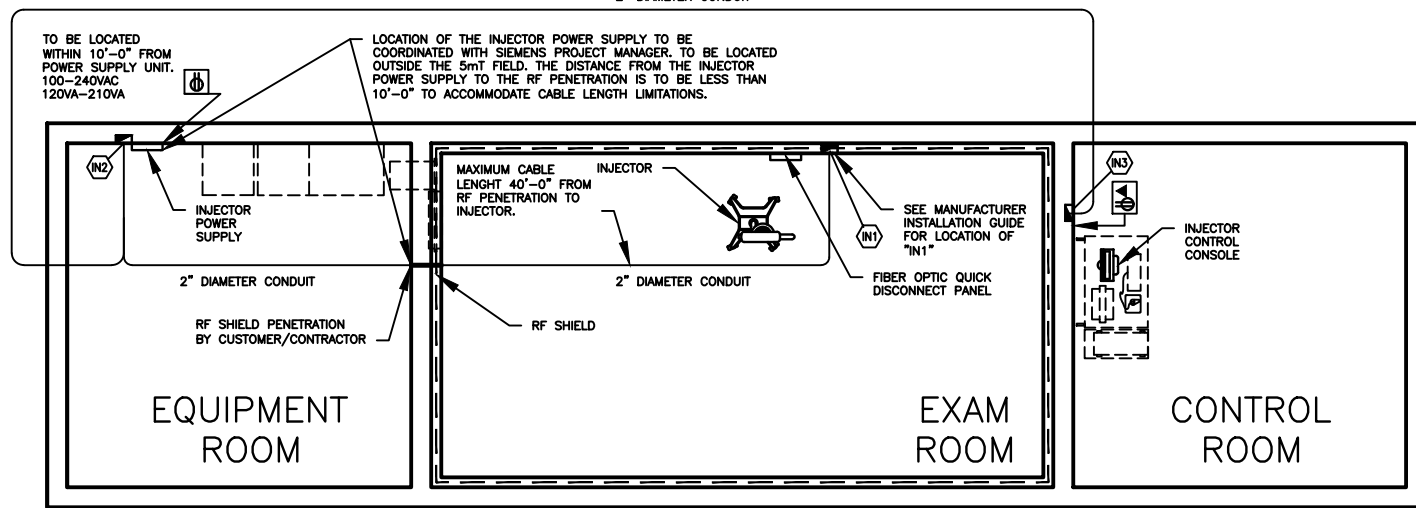
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 DATE: 06/17/19

INJECTOR INSTALLATION OPTIONS

INJECTORS THAT ARE USED IN MRI APPLICATIONS WILL HAVE THREE COMPONENTS: THE INJECTOR, THE POWER SUPPLY AND THE CONTROL UNIT. THE INJECTOR WILL BE LOCATED IN THE EXAM ROOM AND THE CONTROL UNIT WILL BE LOCATED IN THE CONTROL ROOM. THE POWER SUPPLY MAY BE LOCATED IN THE EXAM ROOM, OR OPTIONALLY WITHIN THE EQUIPMENT ROOM. IN EITHER SITUATION A PENETRATION OR PENETRATIONS OF THE RF SHIELD, SEPARATE FROM THE SIEMENS FILTER PANEL, IS REQUIRED.



METHOD 1 INJECTOR POWER SUPPLY IN EXAM ROOM, PENETRATION TO INCLUDE FILTER AND WAVEGUIDE.

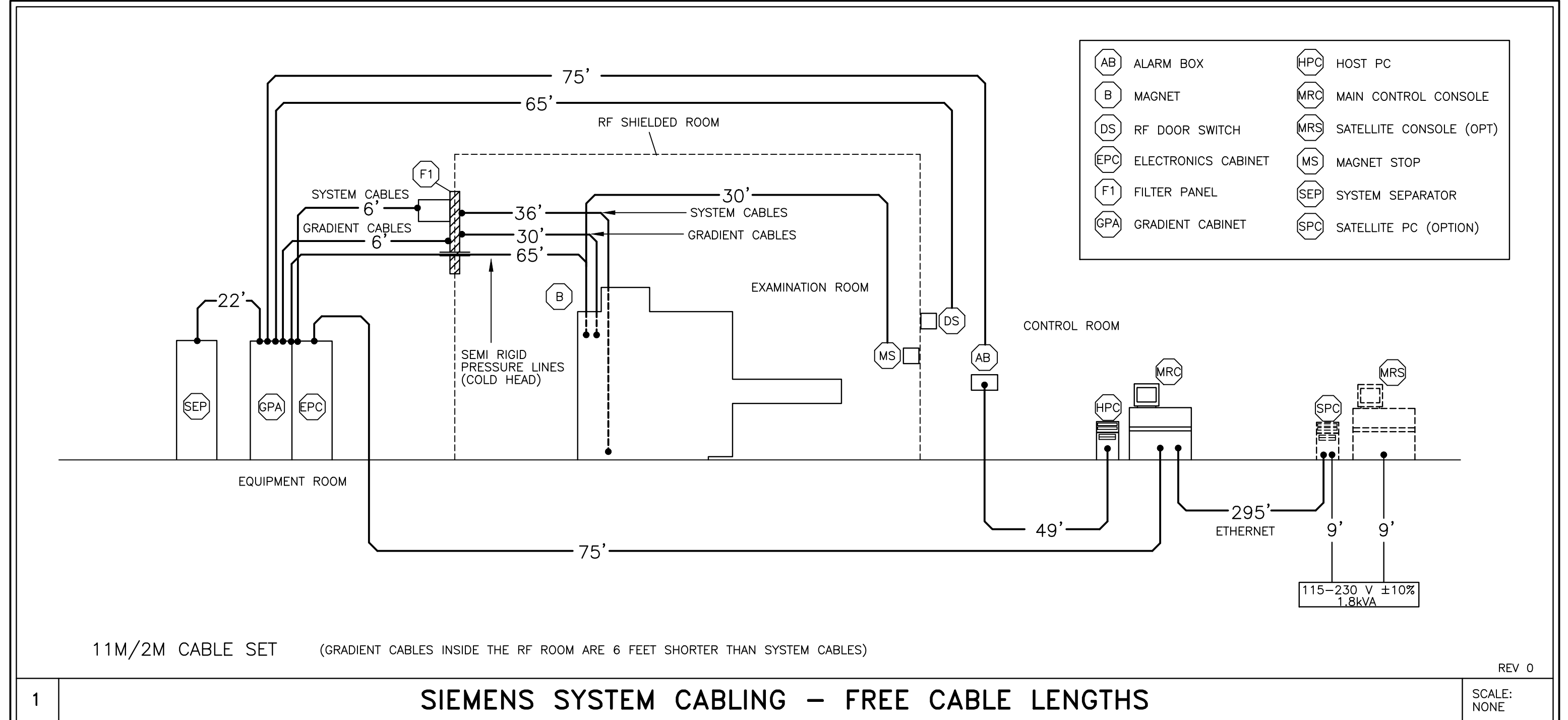


METHOD 2 INJECTOR POWER SUPPLY IN EQUIPMENT ROOM, ELECTRICAL SUPPLY IN EQUIPMENT ROOM, PENETRATIONS TO INCLUDE WAVEGUIDES.

MRXPERION CABLE LENGTHS: THERE IS A 40 FOOT FIBER OPTIC CABLE FROM THE INJECTOR TO THE QUICK DISCONNECT PANEL. THERE IS A 40 FOOT DC POWER CABLE FROM THE INJECTOR TO THE POWER SUPPLY. THERE IS A 150 FOOT FIBER OPTIC CABLE FROM THE PENETRATION TO THE CONTROL CONSOLE.

WITH EITHER METHOD IT IS CRITICAL THAT THE SINGLE POINT GROUND IS MAINTAINED AND THAT NO ELECTRICAL NOISE IS INTRODUCED TO THE MR SYSTEM DUE TO THE INJECTOR INSTALLATION. ALWAYS REFER TO THE MANUFACTURER'S INSTRUCTIONS.

2 **MRXPERION MRI CONTRAST INJECTOR** SCALE: NONE REV 0



1 **SIEMENS SYSTEM CABLING - FREE CABLE LENGTHS** SCALE: NONE REV 0

2 **CABLE SEPARATION** SCALE: NONE REV 0

THE PROPER ROUTING OF CABLES IS ESSENTIAL TO ACHIEVE GOOD IMAGE QUALITY. RF CABLES MUST BE SEPARATED FROM FIBER OPTIC BY AT LEAST 12" AND FROM THE GRADIENT CABLES BY AT LEAST 12". FIBER OPTIC CABLES MUST ALSO BE SEPARATED FROM THE GRADIENT CABLES BY AT LEAST 12". THIS SHOWS RACEWAY/CABLE ROUTING.

THIS CABLE TRAY MAY BE 6" OR 12" WIDE, SEE ELECTRICAL LEGEND.

CABLE DESIGNATIONS ARE SHOWN AS AN EXAMPLE. ANY CATEGORY CABLE CAN BE LOCATED IN ANY OF THE COMPARTMENTS OF THE RACEWAY AS LONG AS CORRECT SEPARATIONS ARE MAINTAINED.

WHEN ROUTING RACEWAYS, DO NOT EXCEED THE MAXIMUM LENGTHS LISTED IN DETAIL E-501/2. EXCESS CABLE SHOULD BE ROUTED IN THE RACEWAY IN A MEANDERING METHOD, NEVER ROLLED IN LOOPS.

THE BENDING RADIUS FOR THE CABLES MUST BE MAINTAINED.
 TRANSMITTER CABLE - 5" WHEN BENT ONCE.
 TRANSMITTER CABLE - 14.25" WHEN BENT SEVERAL TIMES.
 FIBER OPTIC CABLE - 6"
 GRADIENT CABLE - 5.5" (ONLY WITH EXTENDED CABLE SET)
 FIBER OPTIC CABLE FOR PATIENT OBSERVATION - 2"

SIEMENS REMOTE SERVICE

TO ENSURE THE UPTIME OF YOUR SYSTEM DURING THE WARRANTY PERIOD (AND BEYOND WITH A SERVICE AGREEMENT), SIEMENS REMOTE SERVICES (SRS) REQUIRES REMOTE LOCAL AREA NETWORK ACCESS TO SIEMENS SYSTEMS.

THE PREFERRED CONNECTION METHOD IS (VPN) VIRTUAL PRIVATE NETWORK (WHERE THE CUSTOMER HAS AVAILABLE A VPN CAPABLE FIREWALL OR OTHER VPN APPLIANCE). THIS METHOD PROVIDES THE POSSIBILITY FOR REMOTE SYSTEM DIAGNOSTICS WITHOUT ADDITIONAL HARDWARE. PLEASE CONTACT SIEMENS REMOTE SERVICES (800-888-SIEM) TO DETERMINE IF THIS METHOD IS SUITABLE FOR YOUR SITE.

CONDUITS AND RACEWAYS

- 1) ALL POWER CONDUCTORS SUPPLIED BY THE CUSTOMER/ CONTRACTOR SHALL BE INSTALLED IN METAL RACEWAY, 600 VOLT CLASS, STRANDED TYPE THIN-THIN, RATED FOR 75°C (165°F) OPERATION. RECOMMEND MINIMUM 5 FEET WIRE TAILS AT ALL OUTLET POINTS WITH WIRE IDENTIFICATION TAGGED AT BOTH ENDS FOR FINAL CONNECTION BY SIEMENS MEDICAL SYSTEMS.
- 2) THE CABLE GROUPS INCLUDED WITH THE MAGNETOM SYSTEM MAY BE ROUTED IN THE SAME CABLE TRAY IF PROVIDED WITH AN 8" SEPARATION BETWEEN SMALL SIGNAL LINES, GRADIENT CABLES, AND THE RF TRANSMIT CABLE. A 24" WIDE LADDER TYPE CABLE TRAY IS RECOMMENDED. CABLES SHOULD NOT BE BUNDLED TOGETHER.
- 3) NOTE THE CABLE CONNECTOR SIZES (LARGEST CONNECTOR SIZE IS 2 1/2" x 2 1/2") FOR CABLE FEED-THROUGHS AND CABLE DUCTS.
- 4) THE CABLE LENGTHS SPECIFIED ARE THE STANDARD LENGTHS.
- 5) THE SIEMENS SYSTEM CABLES ARE NOT PLENUM RATED AND SHOULD NOT BE RUN UNPROTECTED IN AN AIR PLENUM UNLESS ENCLOSED IN A SEALED CABLE TRAY OR CONDUIT.

REV 0

CABLE LENGTH RESTRICTIONS

- 1) THE CABLE SET LENGTH IDENTIFIES THE "FREE CABLE LENGTH". THIS IS THE LENGTH FROM CONNECTION POINT TO CONNECTION POINT. THE CABLE LENGTH IS NOT THE DISTANCE BETWEEN COMPONENTS.
- 2) THE GRADIENT CABLES INSIDE THE RF SHIELDED ROOM ARE 6'-0" SHORTER THAN THE OTHER SYSTEM CABLES. THIS MEANS THAT IF THE 22' CABLE SET IS SELECTED, THE GRADIENT CABLES WILL BE 16' IN LENGTH. THE GRADIENT CABLES NEED TO GO UP INTO THE CABLE TRAY IN THE CEILING AT THE FILTER PLATE AND DOWN AT THE MAGNET. THESE VERTICAL RUNS MUST BE DEDUCTED FROM THE TOTAL CABLE LENGTH OF 16'.

REV 0

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 1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819
 MRI SUITE 1 - SOLA XJ GRADIENTS

PROJECT #: **1902436** SHEET: **E-501**

THE USE OR REPRODUCTION OF THIS TITLE BLOCK WITHOUT SIEMENS AUTHORIZATION WILL RESULT IN PROSECUTION UNDER FULL EXTENT OF THE LAW.

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SCALE: AS NOTED REF. #: PUFQGY

DATE: 06/17/19 DRAWN BY: R. SUTHERS

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

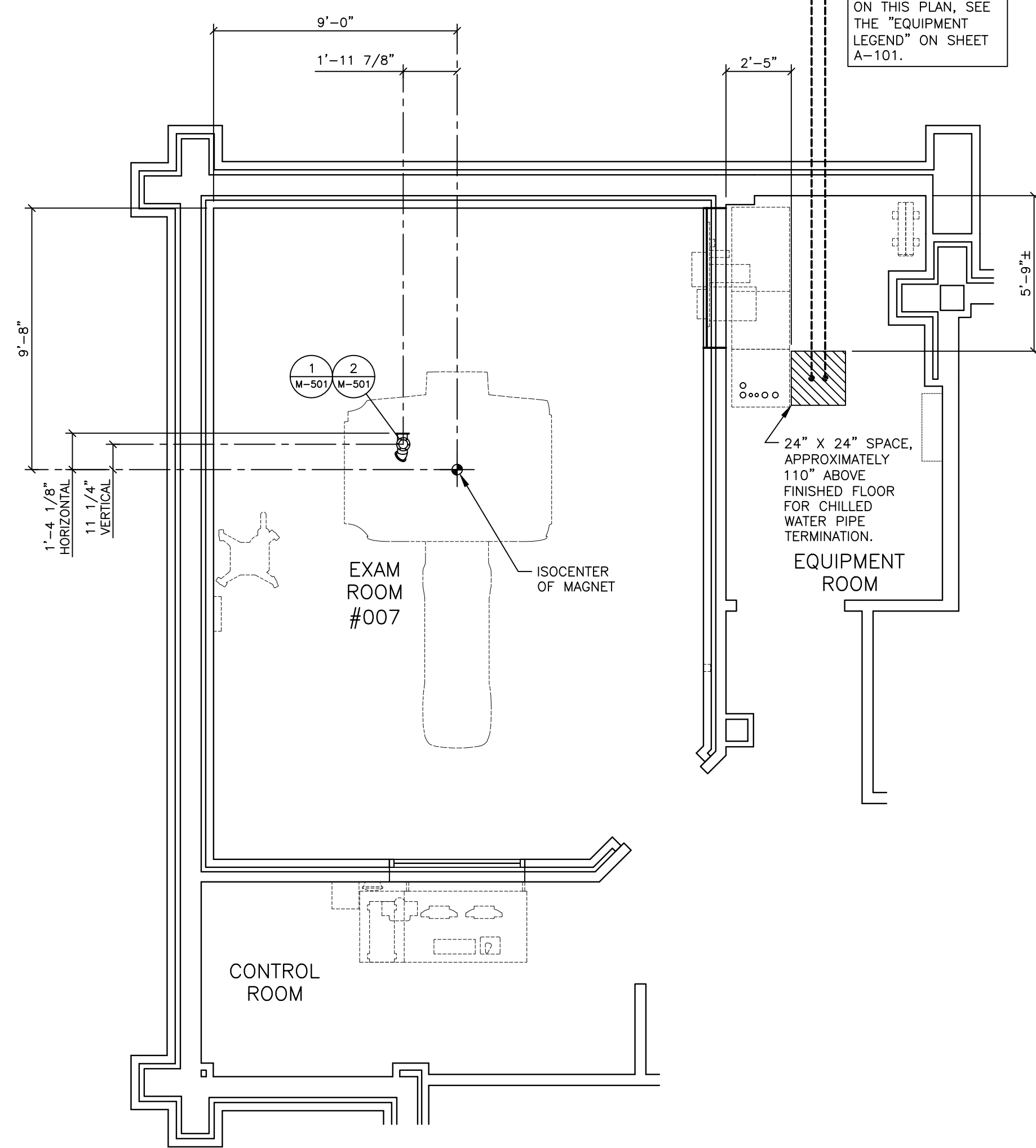
SOLA REV 2

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

NOTE: THE CHILLER IS SUPPLIED AND DELIVERED TO A LOADING DOCK BY SIEMENS. CUSTOMER'S MECHANICAL CONTRACTOR IS RESPONSIBLE FOR MOVING FROM LOADING DOCK TO FINAL LOCATION AND COMPLETING ALL CONNECTIONS. SIEMENS PROJECT MANAGER WILL SCHEDULE CHILLER STARTUP TO COINCIDE WITH MRI STARTUP.

1 CHILLED WATER SUPPLY AND RETURN LINES TO BE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR. SEE DETAILS AND NOTES ON THIS SHEET.

NOTE: FOR THE HEAT OUTPUT (BTU/HR) OF ALL SIEMENS EQUIPMENT SHOWN ON THIS PLAN, SEE THE "EQUIPMENT LEGEND" ON SHEET A-101.

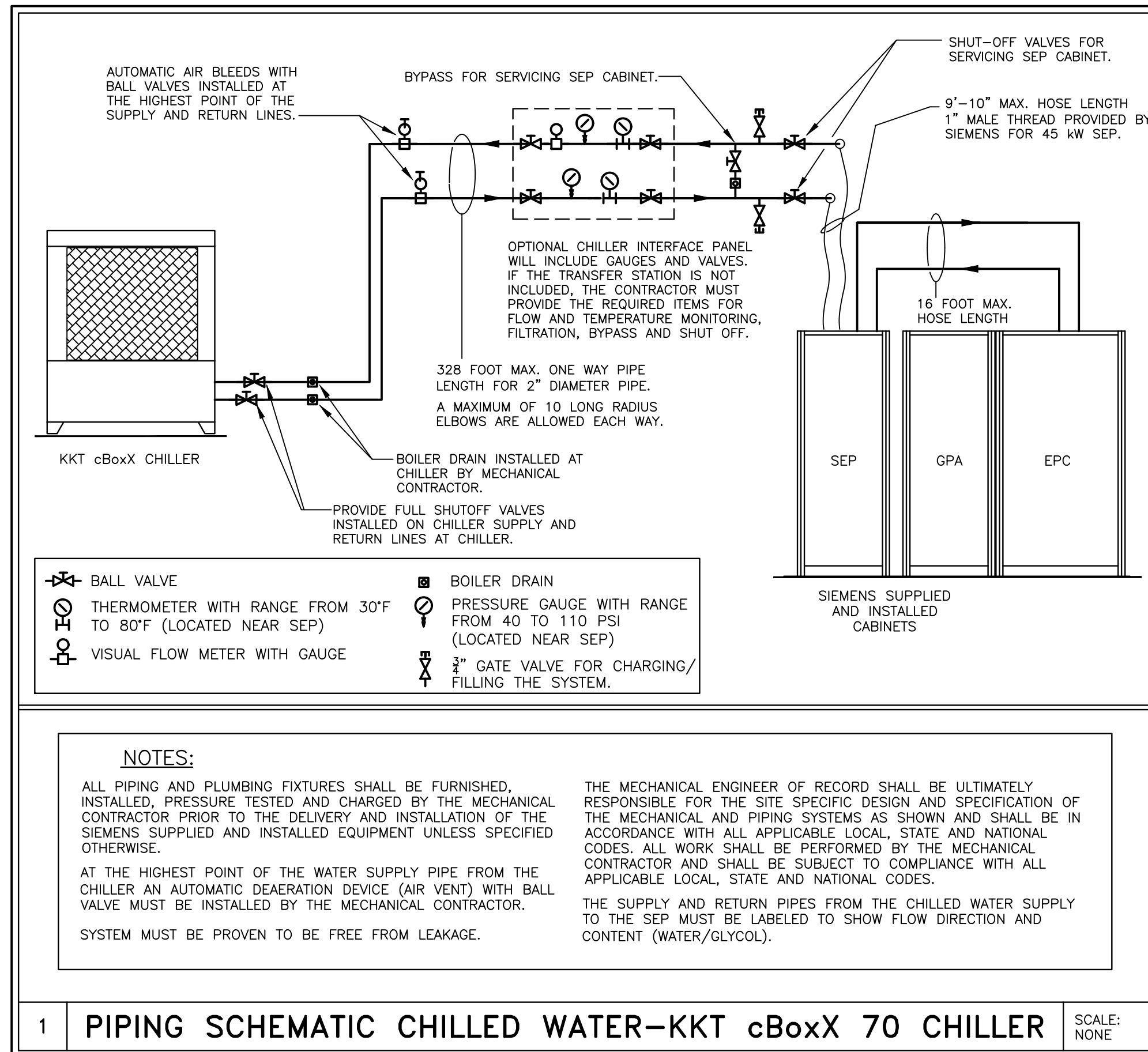


MECHANICAL PLAN

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

ENVIRONMENTAL REQUIREMENTS

- 1) AIR CONDITIONING IS TO PROVIDE A TEMPERATURE OF 70°F ±5°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 (i.e. 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 BE 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. 12/11/12



CHILLED WATER SUPPLY

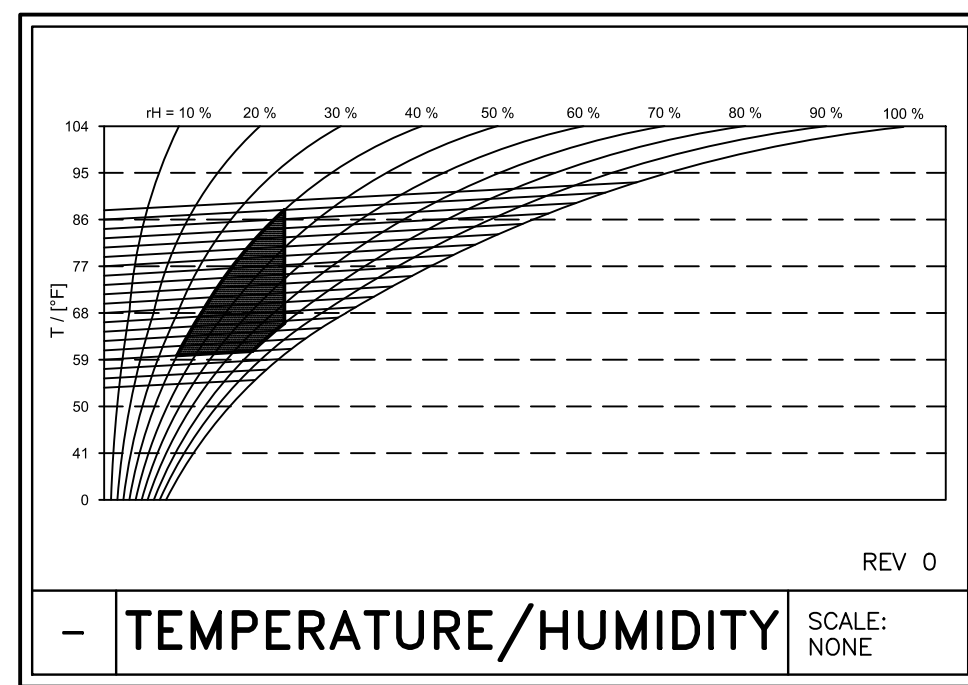
A CHILLED WATER SUPPLY IS REQUIRED TO THE MRI SYSTEM 24 HOURS A DAY, YEAR ROUND FOR THE COLD HEAD AND GRADIENT SYSTEMS. THIS CAN BE PROVIDED BY A cBoxX CHILLER IN COMBINATION WITH A SEP (SEPARATOR) CABINET.

THE PIPE SIZE BETWEEN THE cBoxX CHILLER AND SEP MUST BE 2 INCH UP TO 200 FEET, CONSULT cBoxX FOR LONGER PIPE.

27 GALLONS OF DISTILLED/DE-IONIZED WATER MUST BE PROVIDED FOR FILLING THE SECONDARY WATER CIRCUIT.

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.

10/22/18



CHILLED WATER REQUIREMENTS

XJ GRADIENTS
 WATER REQUIREMENTS TO BE MEASURED AT THE SEP CABINET.

FLOW RATE:	23.78-29.05 GPM
WATER TEMPERATURE:	42.8°F - 53.6°F
BTU DISCHARGE TO THE WATER	170,759 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

08/10/18

CEILING HEIGHTS

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

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) SIEMENS 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) SIEMENS 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.

REV 0

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. SEE CONSTRUCTION REQUIREMENTS.
- 4) ALL PENETRATIONS IN THE RF CABIN/SHIELD SHALL BE THROUGH A WAVE GUIDE TO BE EQUIPPED WITH A DIELECTRIC COUPLER ON BOTH ENDS OF THE WAVE GUIDE. ALL WAVE GUIDES 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 RF 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 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.

REV 1

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.

REV 0

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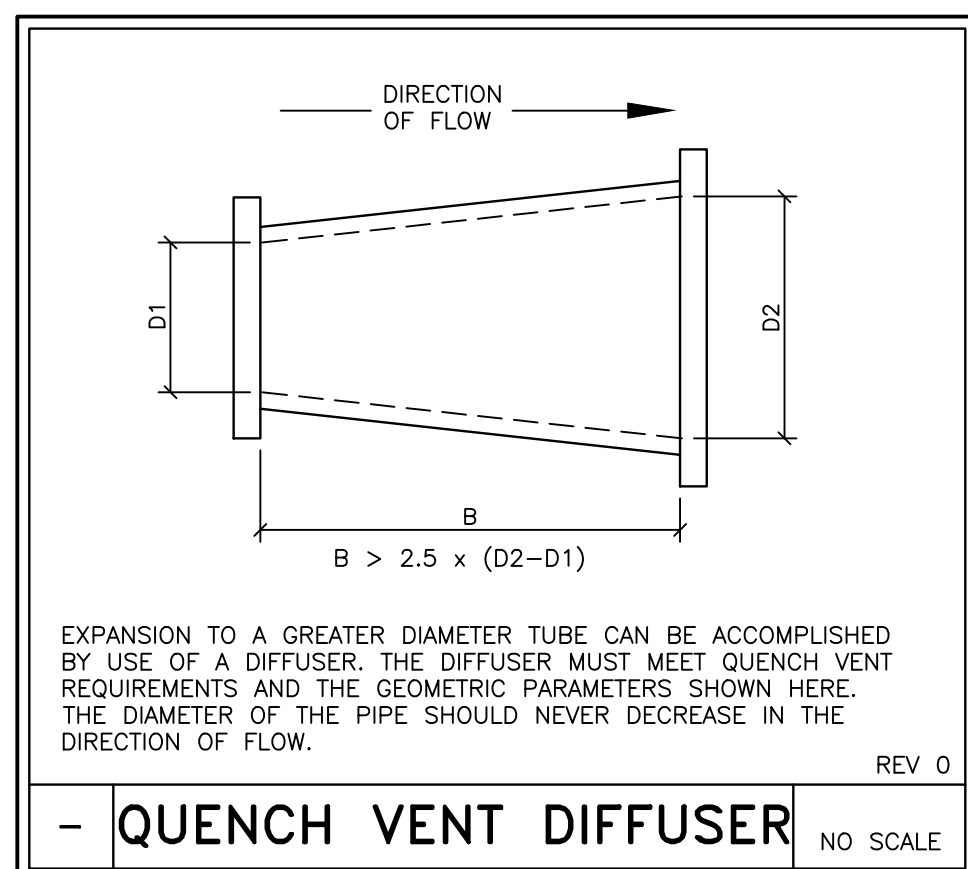
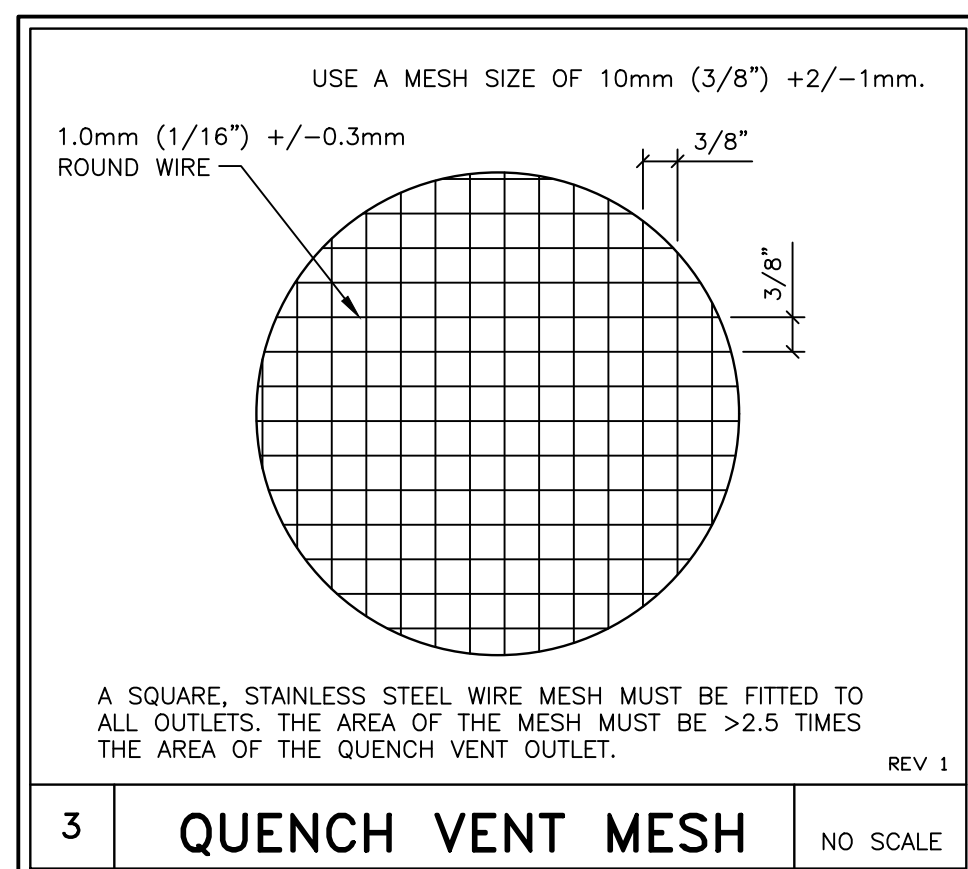
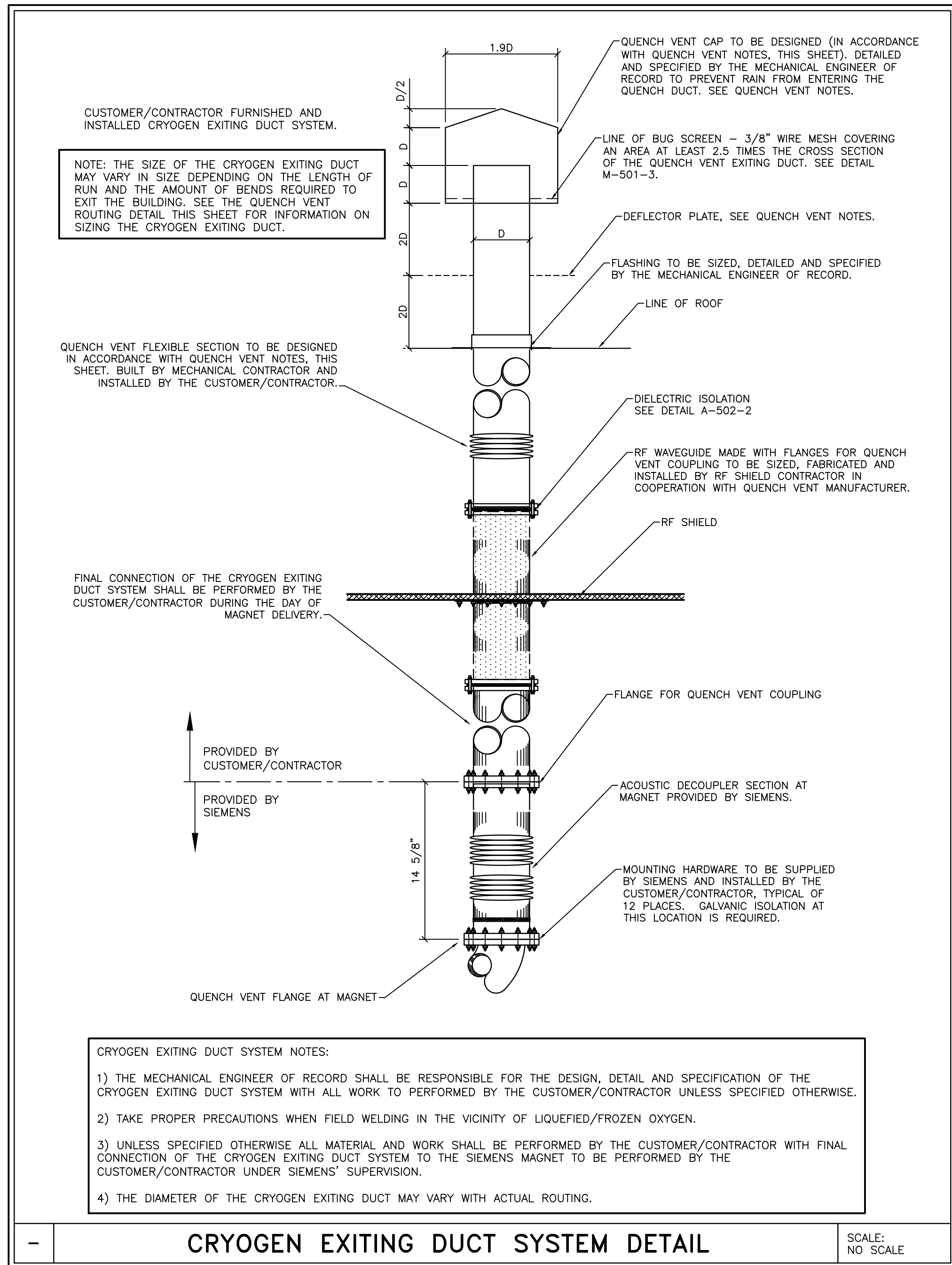
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 - THIS DRAWING DOES NOT PROVIDE RADIATION SHIELDING REQUIREMENTS FOR X-RAY AND ASSOCIATED EQUIPMENT. THE CUSTOMER IS RESPONSIBLE FOR CONSULTING WITH A REGISTERED RADIATION PHYSICIST TO SPECIFY RADIATION PROTECTION.

PROJECT MANAGER: TIMOTHY CARMICHAEL TEL: (603) 387-4211 FAX: EXT: EMAIL: timothy.carmichael@siemens-healthineers.com		SIEMENS NORTH EASTERN VERMONT REG HOSP 1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819 MRI SUITE 1 - SOLA XJ GRADIENTS
PROJECT #: 1902436 SHEET: M-101		
DATE: 06/17/19	DESCRIPTION: 1902436 RA DATED 06/12/19 APPROVED BY CUSTOMERS FOR FINALS	THE USE OR REPRODUCTION OF THIS TITLE BLOCK WITHOUT SIEMENS AUTHORIZATION WILL RESULT IN PROSECUTION UNDER FULL EXTENT OF THE LAW.
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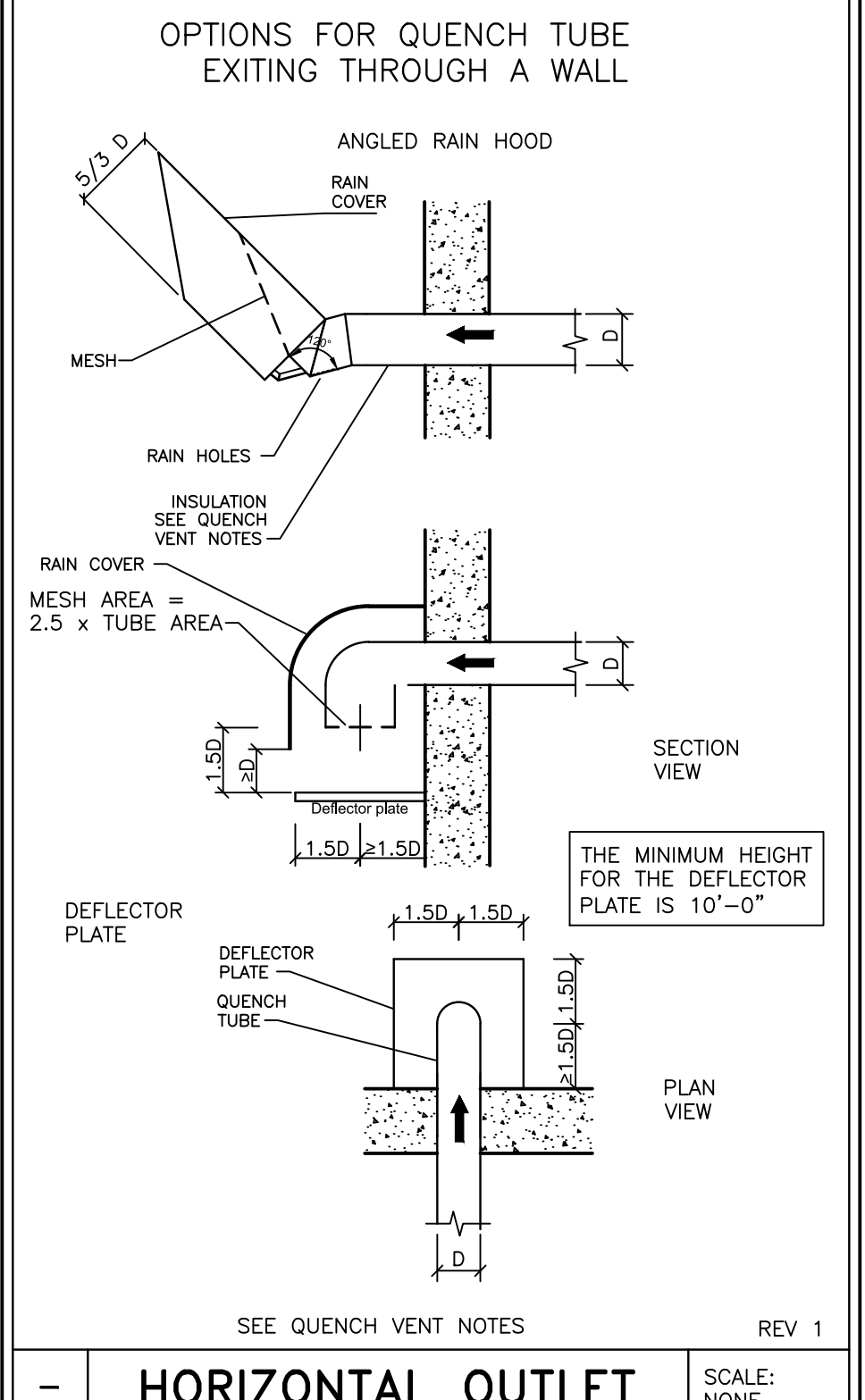
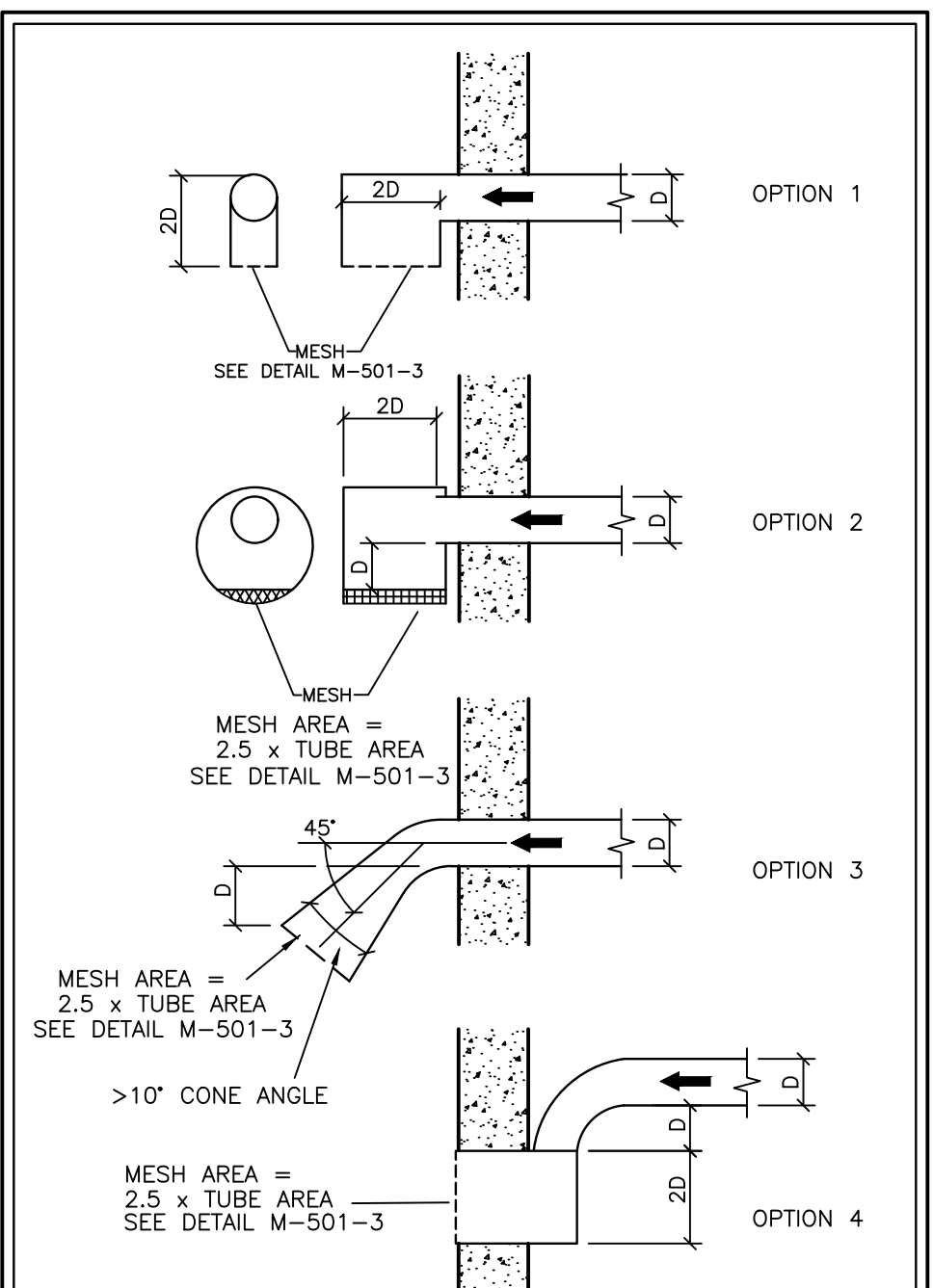
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CRYOGEN NOTES

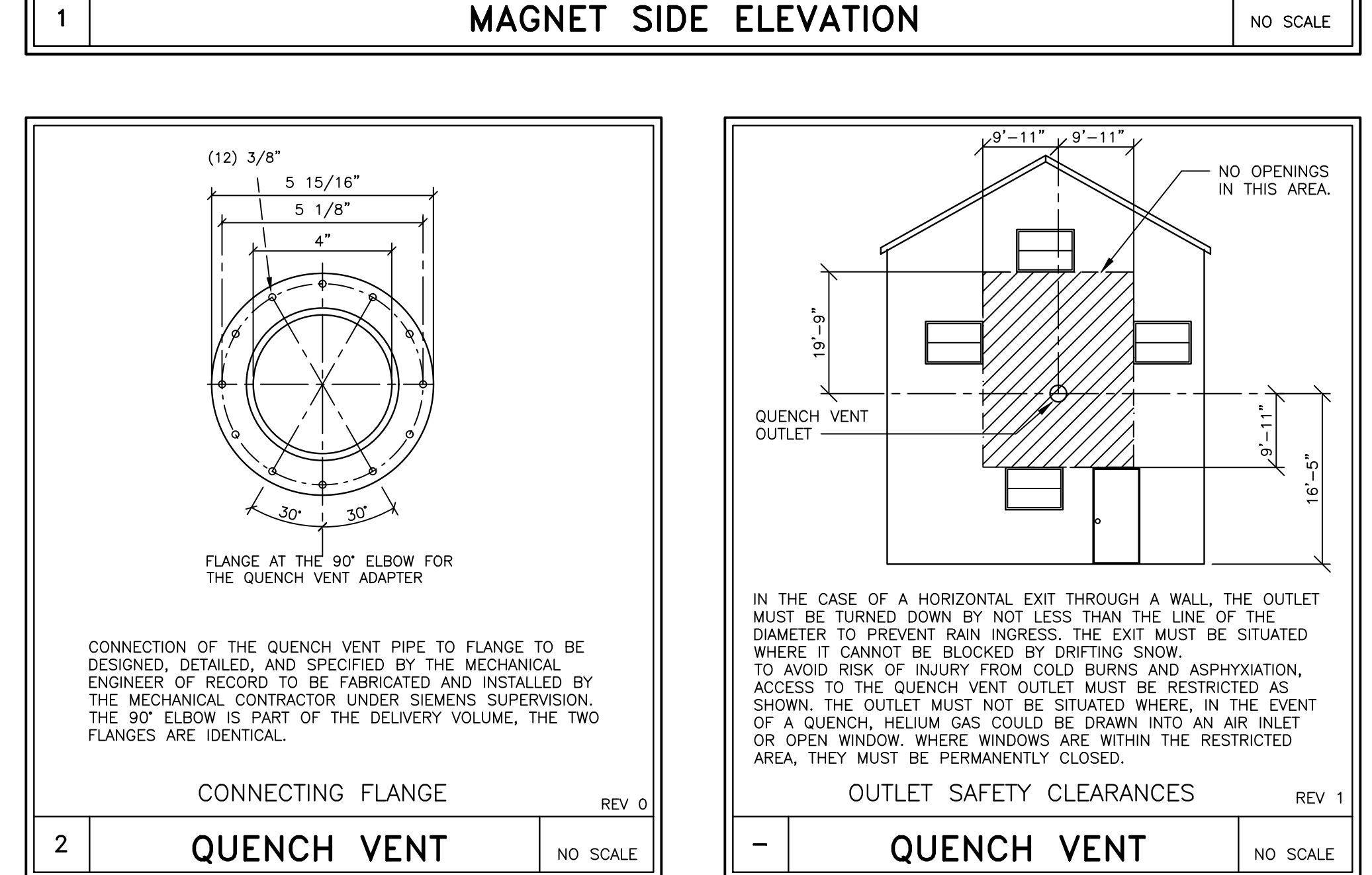
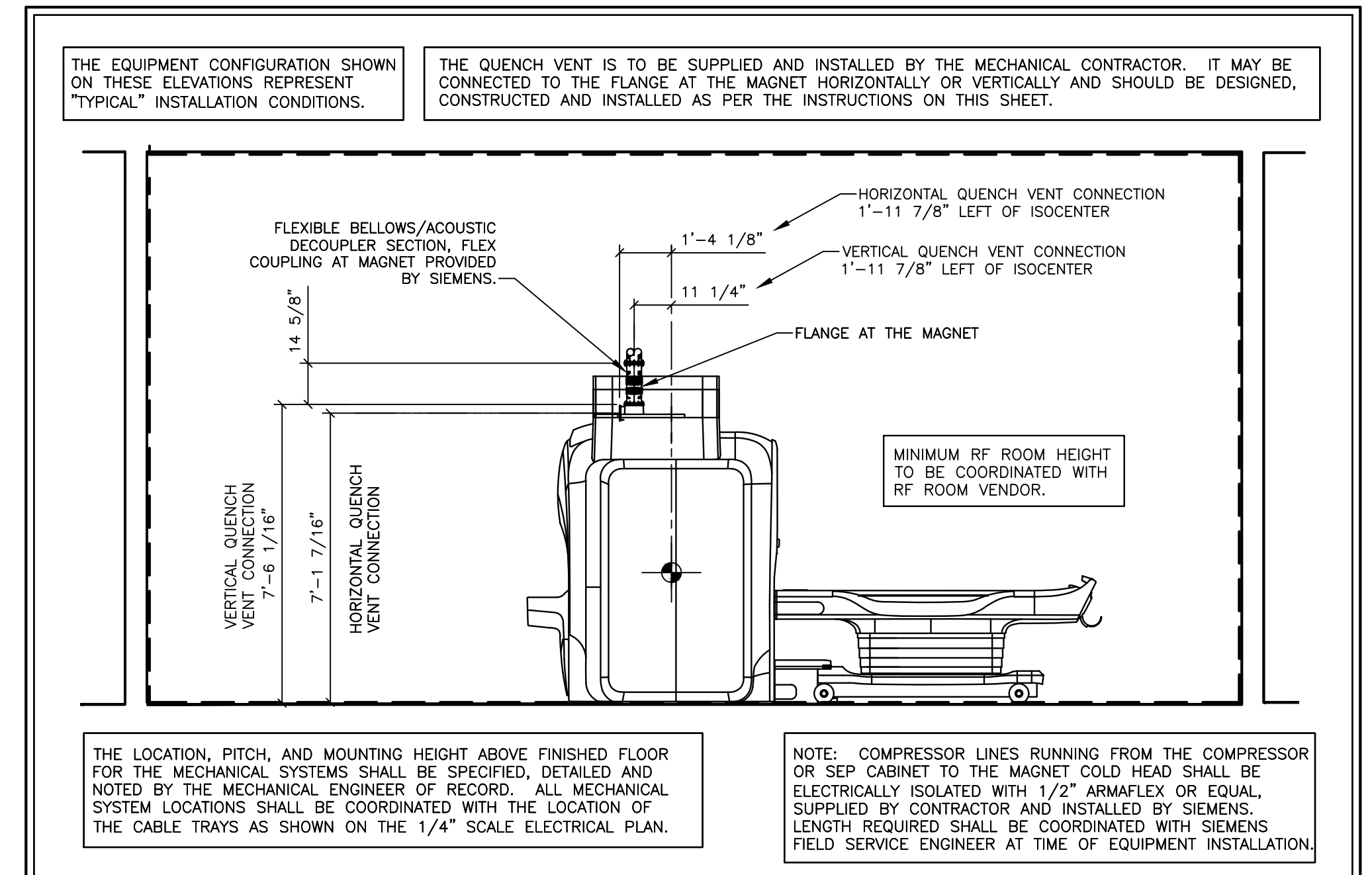
- "CRYOGENS" IS A TERM USED TO IDENTIFY THE REFRIGERANT USED TO MAKE THE MAGNET "SUPER-CONDUCTING". IN THIS APPLICATION, LIQUID AND GASEOUS HELIUM. SPECIAL CARE MUST BE TAKEN DURING THE TRANSFERRING OF THE MAGNET WITH CRYOGENS AND NORMAL EXHAUST OF CRYOGENS FROM THE SYSTEM. ASIDE FROM THE OBVIOUS DANGER OF FREEZING, HELIUM GAS WILL ALSO DISPLACE THE OXYGEN IN THE ROOM. THE INSTALLATION OF AN APPROVED TOXGARD MONITORING SYSTEM IS RECOMMENDED.
- 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.
- 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.
- OUTSIDE VENTING OF THE HELIUM IS TO BE PROVIDED BY MEANS OF A VENT PIPE OF NON-MAGNETIC MATERIAL CALLED A QUENCH VENT. REV 0



QUENCH VENT NOTES

QUENCH VENT DESIGN INSTRUCTIONS

- 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 4.2K TO ROOM TEMPERATURE GAS. THE EXHAUST SYSTEM IS 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.
- 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.
- 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.
- 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 6062 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 ALUMINUM 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.
- PRESSURE CALCULATION**
5) THE MAXIMUM INTERNAL PRESSURE IS CALCULATED AT 1.45 PSI. THE MAXIMUM PRESSURE SHOULD BE ENGINEERED FOR 6.5 PSI.
- 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 WELDED 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.
- CONNECTING SECTIONS**
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.
- QUENCH VENT EXIT**
9) THE PROTECTION AT THE END OF THE TUBE SHALL BE 3/8" WIRE MESH WITH 1/16 INCH WIRES, 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 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 SHALL BE ANGLED DOWNWARD NOT LESS THAN 1 PIPE DIAMETER TO PREVENT RAIN INGRESS. THE EXIT SHALL 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 SHALL BE 2 TIMES THE DIAMETER OF THE TUBE. A DEFLECTOR PLATE SHALL BE WELDED TO THE TUBE WHERE IT EXITS THE ROOF TO PREVENT HELIUM FROM RE-ENTERING THE BUILDING. THE DEFLECTOR SHALL BE AT LEAST 3 TIMES THE DIAMETER OF THE QUENCH TUBE AND LOCATED TWO PIPE DIAMETERS ABOVE THE ROOF AND TWO PIPE DIAMETERS BELOW THE RAIN GUARD.
DURING A QUENCH THE HELIUM GAS EXITING THE QUENCH PIPE MAY BE AT TEMPERATURES OF LESS THAN -400°F. DUE TO THIS TEMPERATURE ROOFING MATERIALS OR ITEMS AROUND THE VENT EXIT MAY BE ADVERSELY AFFECTED. CONSIDERATION OF MATERIALS AND ITEMS PLACED NEAR THE VENT EXIT SHOULD BE TAKEN INTO ACCOUNT SO DAMAGE DOES NOT OCCUR.
- WHERE THE QUENCH TUBE EXITS HORIZONTALLY, THE OUTLET MUST CONFORM TO OPTIONS 1-4 OR THE ANGLED RAIN HOOD. THE OUTLET SHOULD NOT BE LOCATED WHERE HELIUM GAS CAN BE DRAWN INTO AN AIR INLET, ENTER AN OPEN WINDOW, OR BLOW DIRECTLY ONTO STRUCTURE OR EQUIPMENT. RESTRICT ACCESS TO WINDOWS AND DOORS TO AVOID INJURY FROM COLD BURNS AND ASPHYXIATION BY 9'-11" ON EACH SIDE, BELOW AND 19'-9" ABOVE, IF THE OUTLET IS POSITIONED TOO LOW A DEFLECTOR PLATE CAN BE USED WITH OPTION 1 AND 3.
- WARNING SIGNS AND OUTLET RESTRICTIONS**
A WARNING SIGN MUST BE FIXED AND VISIBLE NEAR THE QUENCH VENT OUTLET. THE TUBE MUST HAVE A WARNING POSTED ALONG ITS ENTIRE LENGTH FOR EXTREMELY COLD HELIUM GAS - AUTHORIZED PERSONNEL ONLY.
- AREAS WITH ACCESS IN THE AREA OF THE OUTLET MUST BE CLEARLY IDENTIFIED AND FENCED, FOR EXAMPLE, A ROOF OUTLET WITH MAINTENANCE ACCESS.
- INSULATION AND GALVANIC SEPARATION**
14) 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 0 OR CLASS AP ARMAFLEX. OUTDOOR PIPES MUST BE WEATHERPROOF. THE INSULATION MUST NOT TOUCH THE MAGNET COVERS. TO AVOID RF DISTURBANCES THE INSULATION MUST NOT MAKE ELECTRICAL CONTACT WITH THE WAVEGUIDE.
- GALVANIC SEPARATION MUST BE PROVIDED BETWEEN THE MAGNET, THE QUENCH VENT, 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 SAFETY.
- DOCUMENTATION**
16) THE DESIGN AND CONSTRUCTION OF THE QUENCH PIPE MUST BE DOCUMENTED WITH DRAWINGS AND CALCULATIONS THAT ARE KEPT WITH INSTALLATION DOCUMENTS. IT MUST COMPLY WITH THE REQUIREMENTS IN THIS DOCUMENT BEFORE BEING CONNECTED TO THE MAGNET. REV 6



HELIUM CONTENT

MAXIMUM LIQUID FILL	1,356 LITERS
TYPICAL BOIL OFF RATE	0.0 L/HR
TYPICAL REFILL INTERVAL	NA

FOR TYPICAL CLINICAL USE, DEPENDING ON SEQUENCES AND OPERATING TIME.

WITHOUT THE COLD HEAD RUNNING THE LIQUID HELIUM WILL BOIL OFF FROM 97% TO 0% IN APPROXIMATELY 30 DAYS. THE LOSS DURING SHIPPING IS APPROXIMATELY 65 LITERS PER DAY.

PROJECT MANAGER: TIMOTHY CARMICHAEL
 TEL: (603) 387-4211
 FAX: EXT:
 EMAIL: timothy.carmichael@siemens-healthineers.com

SIEMENS

NORTHEASTERN VERMONT REG HOSP
 1315 HOSPITAL DR, SAINT JOHNSBURY, VT 05819
 MRI SUITE 1 - SOLA XJ GRADIENTS

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SCALE: AS NOTED REF. #: PUFQGY

DATE: 06/17/19

SYMBOL: 06/17/19 DESCRIPTION: 1902436 RA DATED 06/12/19 APPROVED BY CUSTOMERS FOR FINALS

ISSUE BLOCK

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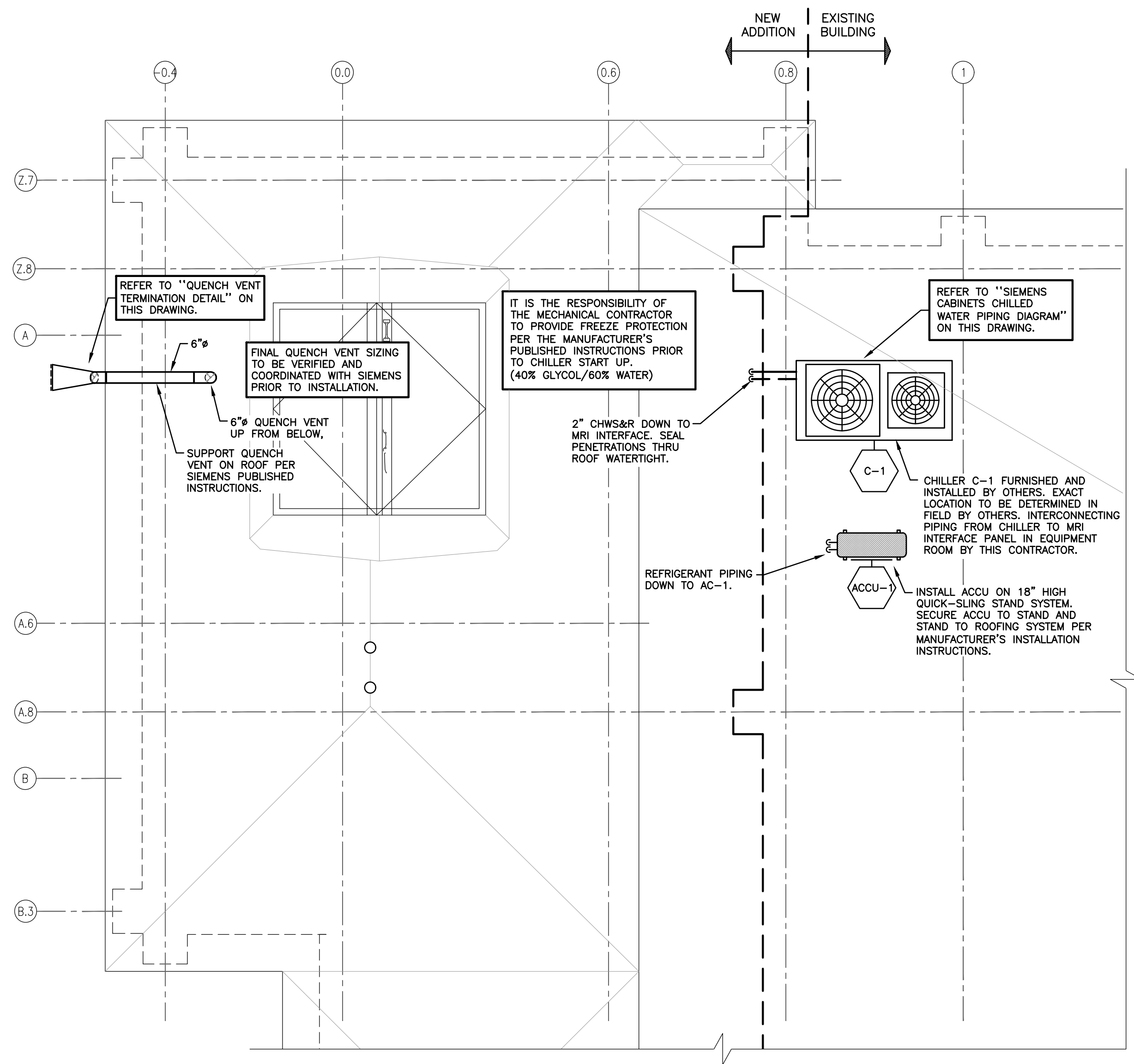
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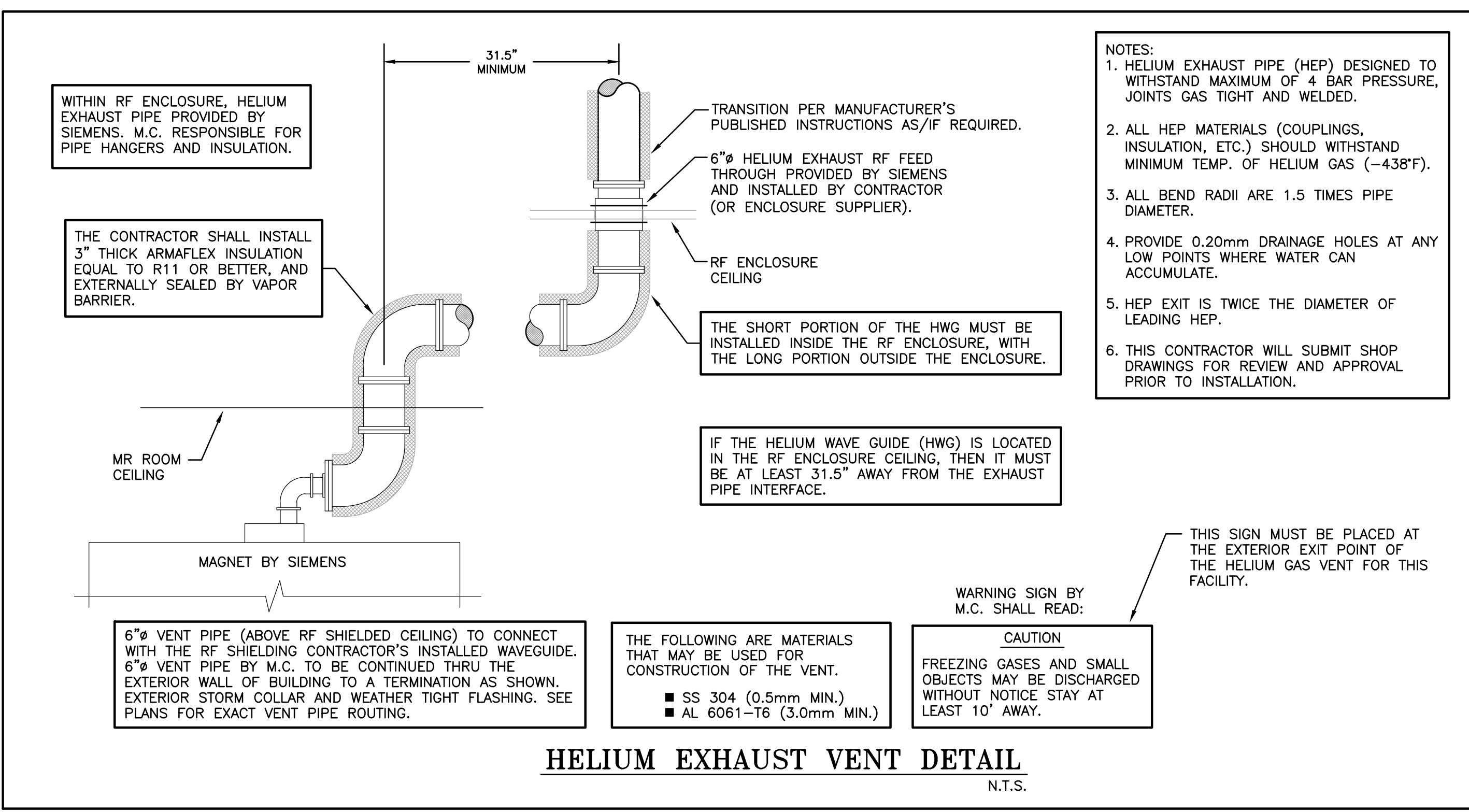
Rev.	Description	By	Date
1	Revised Chilled Water Piping Diagram	BLN	7-9-19

NORTHEASTERN VERMONT REGIONAL HOSPITAL
 NEW MRI ADDITION PROJECT
 VERMONT
 ST. JOHNSBURY

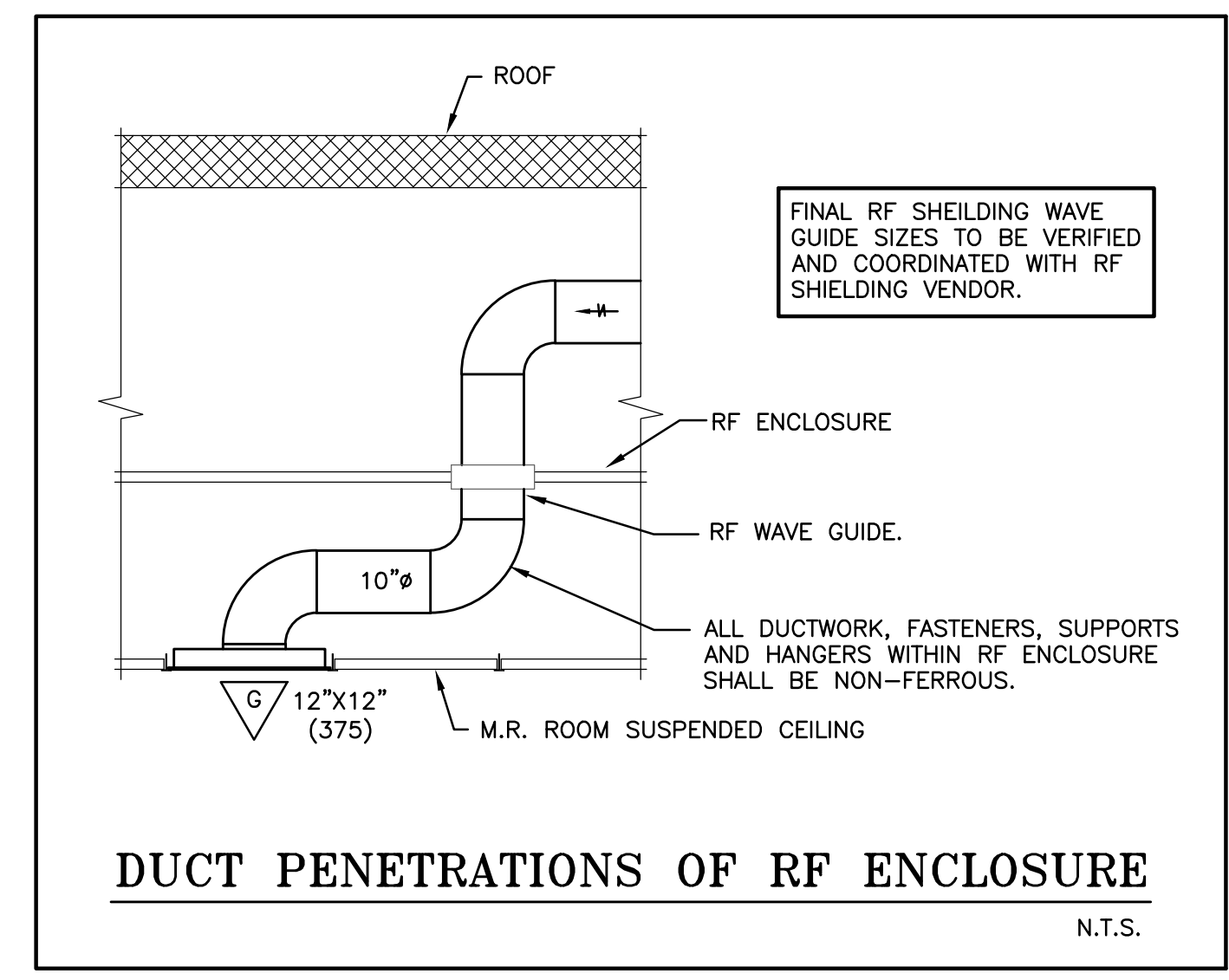
Project No.	1586.00
Proj. Manager	JDV
Proj. Designer	BLN
Drawn By	BLN
Checked By	JDV
Scale	As Noted
Approved	
Date	November 2018



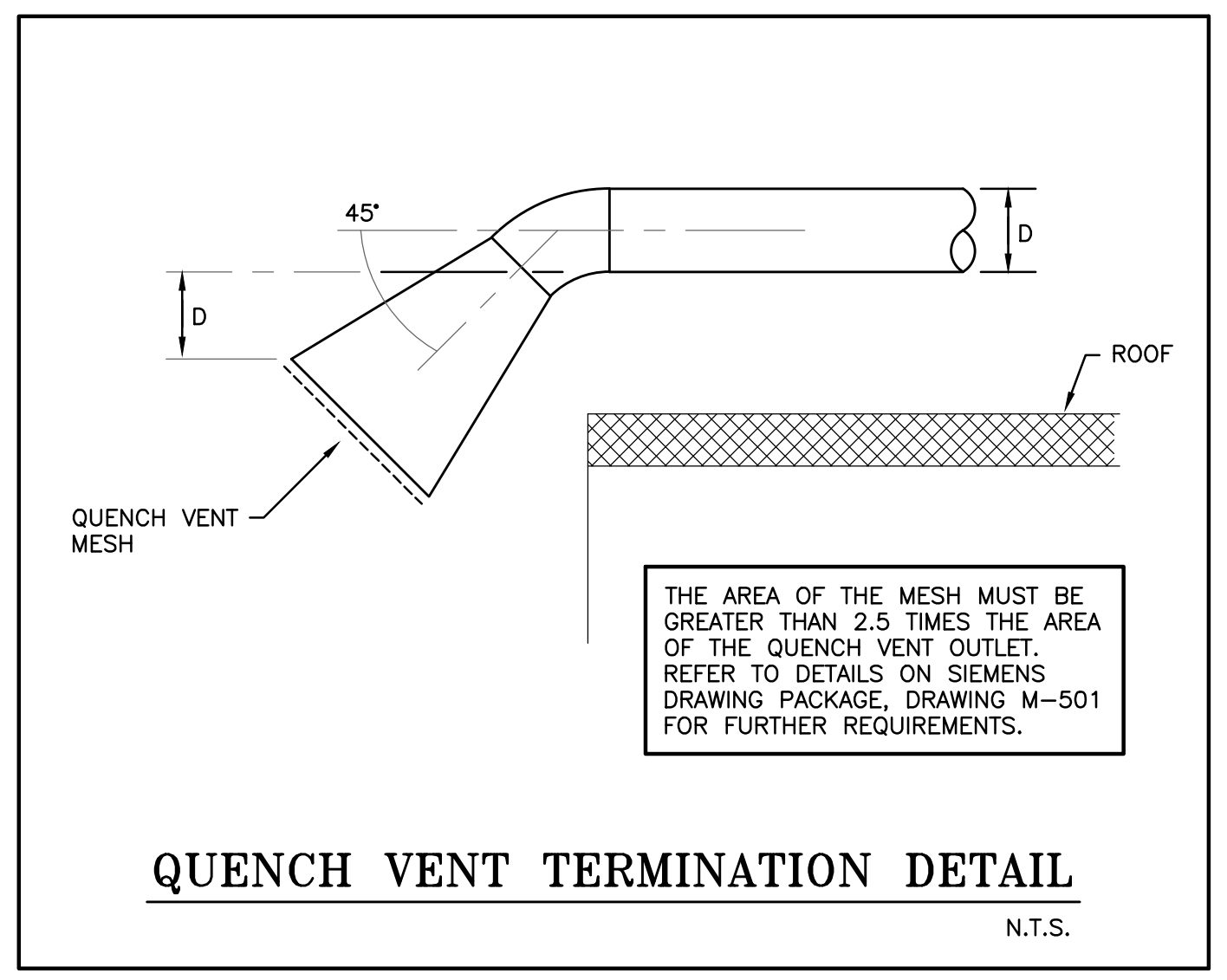
ROOF PART PLAN - MECHANICAL
 SCALE: 1/4" = 1'-0"



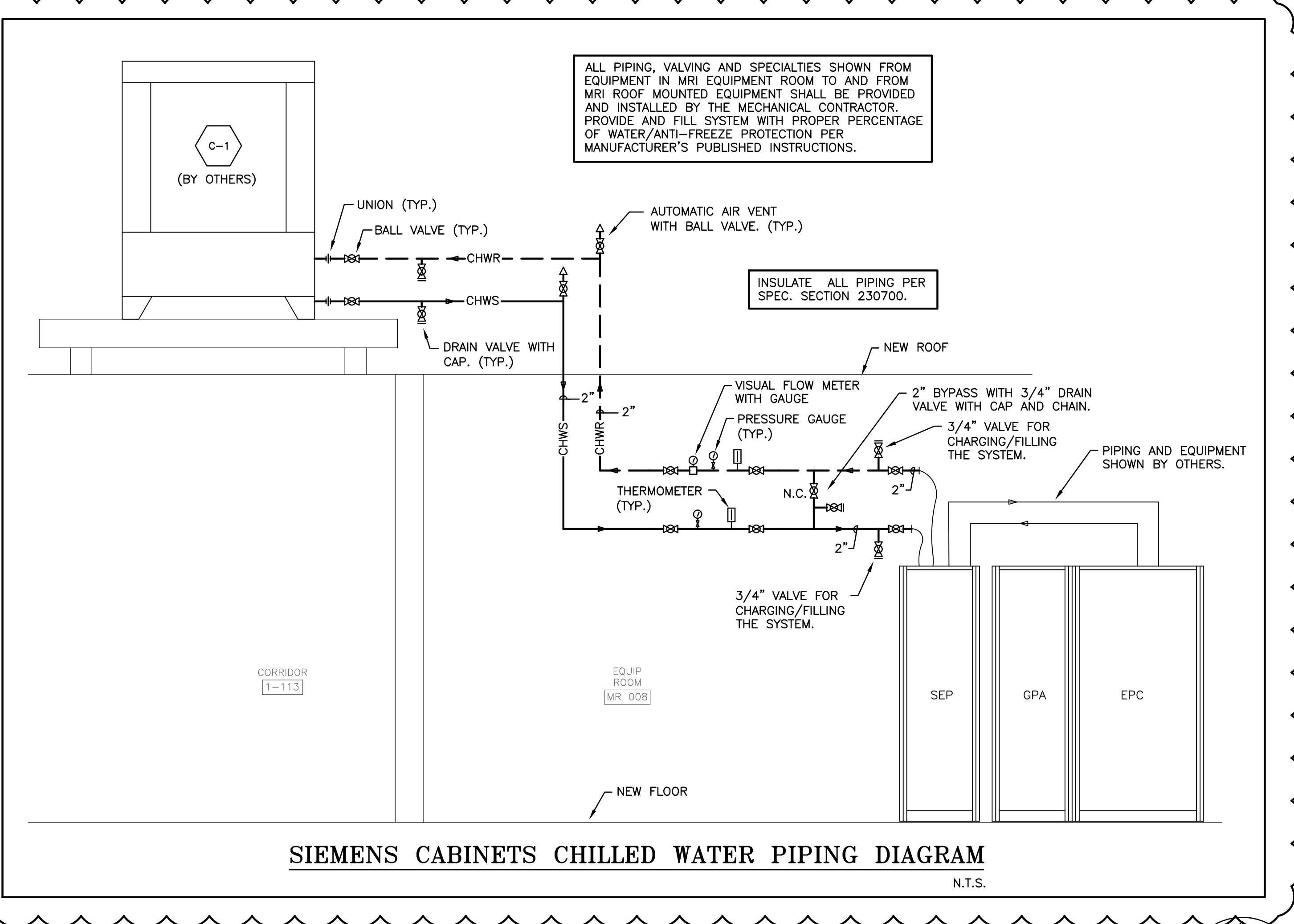
HELIUM EXHAUST VENT DETAIL
 N.T.S.



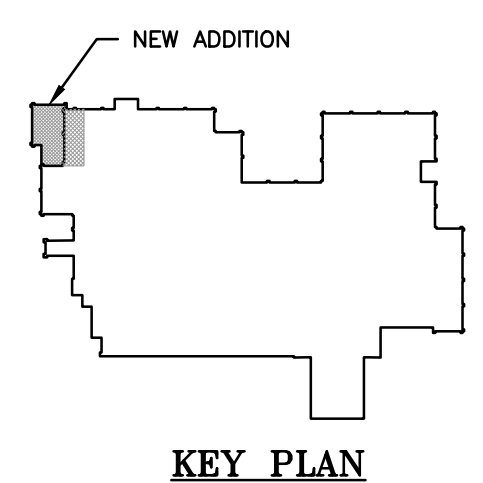
DUCT PENETRATIONS OF RF ENCLOSURE
 N.T.S.



QUENCH VENT TERMINATION DETAIL
 N.T.S.



SIEMENS CABINETS CHILLED WATER PIPING DIAGRAM
 N.T.S.



YEATON ASSOCIATES, INC.
 Bedford, NH | Littleton, NH
 MEP/FP Engineers
 603.444.6578
 www.yeatonassociates.com
 YA Project # 18V02ME

POWER KEYNOTES 'O'

1. REFER TO SIEMENS MRI SITE SPECIFIC EQUIPMENT DRAWINGS FOR ADDITIONAL INSTALLATION REQUIREMENTS.
2. ROUTE 2#12,#12G.,3/4"C. TO AVAILABLE 20A/1P CIRCUIT BREAKER IN NEAREST NORMAL 120V PANEL AND MAKE FINAL TERMINATIONS. BRANCH CIRCUIT SHALL BE ROUTED VIA THE MRI SHEILD FILTER.
3. ROUTE 2#12,#12G.,3/4"C. TO AVAILABLE 20A/1P CIRCUIT BREAKER IN NEAREST NORMAL 120V PANEL AND MAKE FINAL TERMINATIONS.
4. ROUTE 2#12,#12G.,3/4"C. ADJACENT NORMAL RECEPTACLE BRANCH CIRCUIT SERVING EXISTING RECEPTACLES AND MAKE FINAL TERMINATIONS.
5. EXTEND EXISTING 2"C. SERVING EXISTING MRI TRAILER. ROUTE 4#4/0 IN EXISTING CONDUIT AND MAKE FINAL TERMINATIONS TO EXISTING 250A CIRCUIT BREAKER. MODIFY TRIP SETTING OF EXISTING CIRCUIT BREAKER TO 225A.
6. ROUTE 3#2,#8G.,1 1/2"C. TO MRI CHILLER ON ROOF AND MAKE FINAL TERMINATIONS.
7. RELOCATE EXISTING MRI TRAILER DISCONNECT TO NEW LOCATION ADJACENT TO NEW TRAILER LOCATION. ROUTE 4#1/0,2"C. TO EXISTING UTILITY TRANSFORMER SECONDARY AND MAKE FINAL TERMINATIONS. COORDINATE WITH UTILITY COMPANY. PROVIDE REQUIRED TRENCHING AND BACKFILL AS REQUIRED – COORDINATE WITH SITE CONTRACTOR.
8. PROVIDE 25A/2P CIRCUIT BREAKER IN NEAREST 120/208V NORMAL PANEL WITH AVAILABLE SPACE AND CAPACITY. ROUTE 2#10,#10G.,1"C. AND MAKE FINAL TERMINATIONS.

2



YEATON ASSOCIATES, INC.
Bedford, NH | Littleton, NH
MEP/FP Engineers
603.444.6578
18V02ME

Fleck & Lewis Architects P.C.

*Great Hollow Road
Box 886
Hanover, New Hampshire
(603) 643-4226*

LEVEL 1 PLAN - POWER KEYNOTES REVISIONS

PROJECT: NORTHEASTERN VERMONT REGIONAL HOSPITAL
NEW MRI ADDITION PROJECT

PR NO: 1598.00

DATE: 8 July, 2019

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

Revises Sheet E1.2

SKE-2



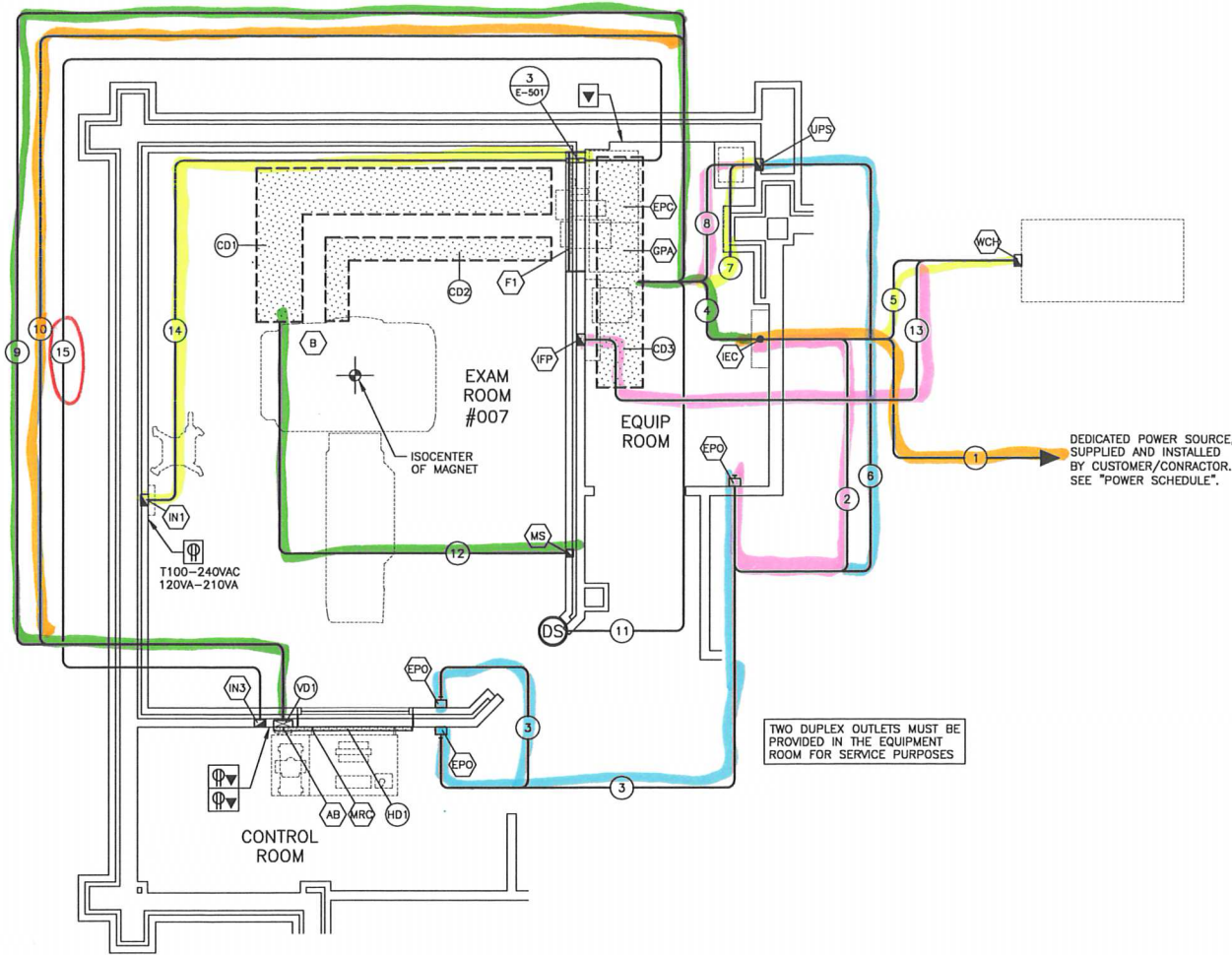
ELECTRICAL LEGEND

SYM	SIZE	DESCRIPTION	REMARKS
		SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR	
AB	3"ø	OPENING IN FACE OF VERTICAL DUCT 5'-0" ABOVE FINISHED FLOOR IN LOCATION TO BE COORDINATED WITH THE ARCHITECT.	ALARM BOX
EP, EP1, EP2	18" x 18"	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	ELECTRONICS CABINETS
B	AS REQUIRED	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	MAGNET CABLE ACCESS
EP	----	EMERGENCY POWER OFF BUTTONS, SUPPLIED BY SIEMENS, INSTALLED BY ELECTRICAL CONTRACTOR. MOUNTED WITH CENTERLINE AT 5'-0" ABOVE FINISHED FLOOR. ALL PARTS ARE TO BE NON-FERROUS INSIDE THE RF ROOM. EXACT LOCATIONS ARE TO BE VERIFIED WITH THE ARCHITECT OF RECORD.	SEE POWER SCHEDULE, SHEET E-102
F1	----	SIEMENS RF FILTER PANEL TO BE MOUNTED ON RF SHIELDED WALL	FILTER PANEL
EP	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN EQUIPMENT ROOM, MOUNTED AT HEIGHT NEAR THE TOP RIGHT OF THE INTERFACE PANEL. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INTERFACE PANEL
EC	----	INTEGRATED ELECTRICAL CABINET SUPPLIED BY SIEMENS, INSTALLED BY CUSTOMER/CONTRACTOR.	SEE POWER SCHEDULE
NI	AS REQUIRED	NON-FERROUS PULL BOX MOUNTED FLUSH WITH FINISHED WALL MOUNTED 2'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INJECTOR POWER SUPPLY-- MUST BE LOCATED OUTSIDE OF 5mT FIELD
NI	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN CONTROL AREA, MOUNTED 2'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INJECTOR CONTROL CONSOLE
MC	4" x 4"	OPENING IN FACE OF RACEWAY IN SHOWN LOCATION.	HOST COMPUTER
MS	AS REQUIRED	NON-FERROUS SINGLE GANG BOX MOUNTED FLUSH WITH FINISHED WALL MOUNTED 6'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	MAGNET STOP
UPS	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL AT FLOOR LINE IN SHOWN LOCATION PROVIDED WITH 2"ø OPENING IN FINISHED COVER.	EATON 9130 UPS
WC	AS REQUIRED	PULL BOX MOUNTED ADJACENT TO WATER CHILLER PROVIDED WITH FLEX-TITE CONDUIT FROM PULL BOX TO KNOCK OUT PANEL ON CHILLER. COORDINATE WITH SIEMENS PROJECT MANAGER.	WATER CHILLER
CD1	24"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER, IN THE EXAM ROOM, MAINTAINING 12" CLEARANCE ABOVE THE TRAY FOR ACCESS. CABLE LADDER IS REQUIRED TO SUPPORT INTERCONNECTING CABLES BETWEEN THE FILTER PANEL AND THE MAGNET. A 15" MINIMUM CLEARANCE IS REQUIRED BETWEEN THE LADDER TRAY AND THE RF FILTER PANEL (F1). WHEN ROUTING ALL RACEWAYS REFER TO DETAIL E-501/2 TAKING CARE SO THAT MAXIMUM CABLE LENGTHS ARE NOT EXCEEDED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/1
CD2	12"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER IN EXAM ROOM. A 12" SEPARATION BETWEEN CD1 AND CD2 MUST BE MAINTAINED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/1
CD3	24"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER IN EQUIPMENT ROOM MAINTAINING 12" CLEARANCE ABOVE THE TRAY FOR ACCESS. CABLE LADDER IS REQUIRED TO SUPPORT INTERCONNECTING CABLES BETWEEN THE EQUIPMENT ROOM AND THE RF FILTER PANEL (F1). AN 18" MINIMUM CLEARANCE IS REQUIRED BETWEEN THE LADDER TRAY AND THE FILTER PANEL.	CABLE TRAY SEE DETAIL E-501/1
VD1	6'-0" x 2"	6'-0" LONG HORIZONTAL DUCT SURFACE MOUNTED ON WALL IN CONTROL AREA AT FLOOR LINE AS SHOWN, FINISHED TO MATCH WALLS. BEGIN AT AND CONNECT TO VERTICAL DUCT "VD1".	
VD	10" x 3-1/2"	VERTICAL DUCT MOUNTED FLUSH WITH FINISHED WALL IN CONTROL AREA FROM ABOVE FINISHED CEILING TO FLOOR LINE PROVIDED WITH REMOVABLE FINISHED COVERS.	
1	AS PER NEC	CONDUIT FROM FACILITY POWER TO INTEGRATED ELECTRICAL CABINET "IEC"	SEE POWER SCHEDULE, SHEET E-102
2	AS PER NEC	CONDUIT FROM "IEC" TO "EPO"	SEE DETAIL E-501/1
3	AS PER NEC	CONDUIT FROM "EPO" TO "EPO" TO BE NON-FERROUS WHEN INSIDE THE RF ROOM. CUSTOMER/CONTRACTOR IS TO PROVIDE RF FILTERS FOR ALL NON-SIEMENS WIRING.	SEE POWER SCHEDULE, SHEET E-102
4	(1) 2"ø	CONDUIT FROM "IEC" TO END AT "CD3" (EPC) VIA FLEX CONDUIT. THERE MUST BE A DIELECTRIC SEPARATION BETWEEN THE CONDUIT AND THE CONNECTION AT THE SIEMENS EPC CABINET.	
5	AS REQUIRED	CONDUIT FROM "IEC" TO "WCH".	
6	(1) 3/4"ø	CONDUIT FROM "EPO" TO "UPS".	
7	(1) 3/4"ø	SURFACE MOUNTED FLEX CONDUIT FROM "UPS" TO SIEMENS PROVIDED UPS/EPO CONTROL BOX.	MAXIMUM LENGTH 4 FEET
8	(1) 1"ø	CONDUIT FROM "UPS" TO "CD3" (EPC)	MAXIMUM LENGTH 29 FEET
9	(2) 2 1/2"ø	CONDUIT FROM "VD1" (MRC) TO "CD3" (EPC).	NOT TO EXCEED 54 FT.
10	(1) 1 1/2"ø	CONDUIT FROM "VD1" (AB) TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
11	(1) 1/2"ø	CONDUIT FROM "DS" TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
12	(1) 3/4"ø	CONDUIT FROM "MS" TO "CD1" (WIRES TO MAGNET) TO BE NON-FERROUS WHEN INSIDE THE RF ROOM.	NOT TO EXCEED 25 FT.
13	(1) 2"ø	CONDUIT FROM "WCH" TO "IFP".	NOT TO EXCEED 164 FEET
14	(1) 2"ø	NON-FERROUS CONDUITS FROM NEAR "F1" TO "IN1" FOR INJECTOR CABLES.	NOT TO EXCEED 40 FEET
15	(1) 2"ø	CONDUIT FROM "IN1" TO "IN3" FOR INJECTOR CABLES.	NOT TO EXCEED 150 FEET



ELECTRICAL LEGEND

SYM	SIZE	DESCRIPTION	REMARKS
		SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR	
AB	3"ø	OPENING IN FACE OF VERTICAL DUCT 5'-0" ABOVE FINISHED FLOOR IN LOCATION TO BE COORDINATED WITH THE ARCHITECT.	ALARM BOX
EP, EP1, EP2	18" x 18"	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	ELECTRONICS CABINETS
B	AS REQUIRED	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	MAGNET CABLE ACCESS
EP	----	EMERGENCY POWER OFF BUTTONS, SUPPLIED BY SIEMENS, INSTALLED BY ELECTRICAL CONTRACTOR. MOUNTED WITH CENTERLINE AT 5'-0" ABOVE FINISHED FLOOR. ALL PARTS ARE TO BE NON-FERROUS INSIDE THE RF ROOM. EXACT LOCATIONS ARE TO BE VERIFIED WITH THE ARCHITECT OF RECORD.	SEE POWER SCHEDULE, SHEET E-102
F1	----	SIEMENS RF FILTER PANEL TO BE MOUNTED ON RF SHIELDED WALL	FILTER PANEL
EC	----	INTEGRATED ELECTRICAL CABINET SUPPLIED BY SIEMENS, INSTALLED BY CUSTOMER/CONTRACTOR.	SEE POWER SCHEDULE
NI	AS REQUIRED	NON-FERROUS PULL BOX MOUNTED FLUSH WITH FINISHED WALL MOUNTED 2'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INJECTOR POWER SUPPLY-- MUST BE LOCATED OUTSIDE OF 5mT FIELD
NI	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN CONTROL AREA, MOUNTED 2'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INJECTOR CONTROL CONSOLE
MC	4" x 4"	OPENING IN FACE OF RACEWAY IN SHOWN LOCATION.	HOST COMPUTER
MS	AS REQUIRED	NON-FERROUS SINGLE GANG BOX MOUNTED FLUSH WITH FINISHED WALL MOUNTED 6'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	MAGNET STOP
UPS	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL AT FLOOR LINE IN SHOWN LOCATION PROVIDED WITH 2"ø OPENING IN FINISHED COVER.	LIEBERT 9XT4 UPS
WC	AS REQUIRED	PULL BOX MOUNTED ADJACENT TO WATER CHILLER PROVIDED WITH FLEX-TITE CONDUIT FROM PULL BOX TO KNOCK OUT PANEL ON CHILLER. COORDINATE WITH SIEMENS PROJECT MANAGER.	WATER CHILLER
CS	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN LOCATION COORDINATED WITH SIEMENS PROJECT MANAGER, WIRES ENTER CONTROL PANEL FROM THE BOTTOM.	CHILLER REMOTE CONTROL/ STATUS PANEL
CD1	24"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER, IN THE EXAM ROOM, MAINTAINING 12" CLEARANCE ABOVE THE TRAY FOR ACCESS. CABLE LADDER IS REQUIRED TO SUPPORT INTERCONNECTING CABLES BETWEEN THE FILTER PANEL AND THE MAGNET. A 15" MINIMUM CLEARANCE IS REQUIRED BETWEEN THE LADDER TRAY AND THE RF FILTER PANEL (F1). WHEN ROUTING ALL RACEWAYS REFER TO DETAIL E-501/2 TAKING CARE SO THAT MAXIMUM CABLE LENGTHS ARE NOT EXCEEDED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/1
CD2	12"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER IN EXAM ROOM. A 12" SEPARATION BETWEEN CD1 AND CD2 MUST BE MAINTAINED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/1
CD3	24"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER IN EQUIPMENT ROOM MAINTAINING 12" CLEARANCE ABOVE THE TRAY FOR ACCESS. CABLE LADDER IS REQUIRED TO SUPPORT INTERCONNECTING CABLES BETWEEN THE EQUIPMENT ROOM AND THE RF FILTER PANEL (F1). AN 18" MINIMUM CLEARANCE IS REQUIRED BETWEEN THE LADDER TRAY AND THE FILTER PANEL.	CABLE TRAY SEE DETAIL E-501/1
VD1	6'-0" x 2"	HORIZONTAL DUCT SURFACE MOUNTED ON WALL IN CONTROL AREA AT FLOOR LINE AS SHOWN, FINISHED TO MATCH WALLS.	
VD	10" x 3-1/2"	VERTICAL DUCT MOUNTED FLUSH WITH FINISHED WALL IN CONTROL AREA FROM ABOVE FINISHED CEILING TO FLOOR LINE PROVIDED WITH REMOVABLE FINISHED COVERS.	
1	AS PER NEC	CONDUIT FROM FACILITY POWER TO INTEGRATED ELECTRICAL CABINET "IEC"	SEE POWER SCHEDULE, SHEET E-102
2	AS PER NEC	CONDUIT FROM "IEC" TO "EPO"	SEE DETAIL E-501/1
3	AS PER NEC	CONDUIT FROM "EPO" TO "EPO" TO BE NON-FERROUS WHEN INSIDE THE RF ROOM. CUSTOMER/CONTRACTOR IS TO PROVIDE RF FILTERS FOR ALL NON-SIEMENS WIRING.	SEE POWER SCHEDULE, SHEET E-102
4	(1) 2"ø	CONDUIT FROM "IEC" TO END AT "CD3" (EPC) VIA FLEX CONDUIT. THERE MUST BE A DIELECTRIC SEPARATION BETWEEN THE CONDUIT AND THE CONNECTION AT THE SIEMENS EPC CABINET.	
5	AS REQUIRED	CONDUIT FROM "IEC" TO "WCH".	
6	(1) 3/4"ø	CONDUIT FROM "EPO" TO "UPS".	
7	(1) 2"ø	CONDUIT FROM "UPS" TO "CD3" (EPC)	MAXIMUM LENGTH 25 FEET
8	(2) 2 1/2"ø	CONDUIT FROM "VD1" (MRC) TO "CD3" (EPC).	NOT TO EXCEED 54 FT.
9	(1) 1 1/2"ø	CONDUIT FROM "VD1" (AB) TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
10	(1) 1/2"ø	CONDUIT FROM "DS" TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
11	(1) 3/4"ø	CONDUIT FROM "MS" TO "CD1" (WIRES TO MAGNET) TO BE NON-FERROUS WHEN INSIDE THE RF ROOM.	NOT TO EXCEED 25 FT.
12	(1) 1"ø	CONDUIT FROM "WCH" TO "WCS".	NOT TO EXCEED 164 FEET
13	(1) 2"ø	NON-FERROUS CONDUITS FROM NEAR "F1" TO "IN1" FOR INJECTOR CABLES.	NOT TO EXCEED 40 FEET
14	(1) 2"ø	CONDUIT FROM NEAR "F1" TO "IN3" FOR INJECTOR CABLES.	NOT TO EXCEED 150 FEET



DEDICATED POWER SOURCE, SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR. SEE "POWER SCHEDULE".

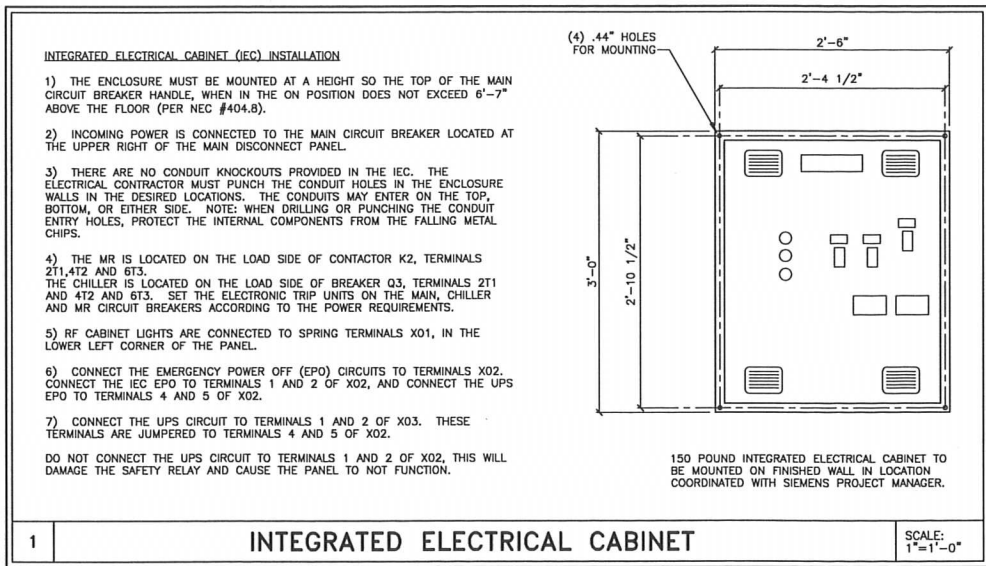
TWO DUPLEX OUTLETS MUST BE PROVIDED IN THE EQUIPMENT ROOM FOR SERVICE PURPOSES

ELECTRICAL RACEWAY PLAN

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

SYMBOLS	
ALL MAY NOT APPLY	
	CAUTION OR WARNING
	CRITICAL NOTE(S)
	PANEL OR ENCLOSURE BY CUSTOMER/CONTRACTOR
	OPENING IN RACEWAY OR TRENCH/DUCT
	PULLBOX IN (FLOOR/WALL/CEILING)
	OPENING IN ACCESS FLOORING
	RF DOOR SWITCH - MCMASTER-CARR SUPPLY ROLLER LIMIT SWITCH 7076k14 PROVIDED BY CONTRACTOR, AND MOUNTED AT TOP OF DOOR. COORDINATE WITH SIEMENS PROJECT MANAGER.
	(EPO) EMERGENCY POWER OFF BUTTON
	CEILING DUCT
	SURFACE MOUNTED DUCT
	VERTICAL DUCT
	ETHERNET CONNECTION TO CUSTOMER'S INFORMATION SYSTEMS NETWORK IN AN ACCESSIBLE LOCATION (VERIFY WITH SIEMENS PROJECT MANAGER).
	110 VOLT, 20 AMP, HOSPITAL GRADE DUPLEX OUTLET LOCATED NEAR THE ETHERNET CONNECTION.

REV 2



SYM	SIZE	DESCRIPTION	REMARKS
✓	3"	SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR	
1	3"	OPENING IN FACE OF VERTICAL DUCT 5'-0" ABOVE FINISHED FLOOR IN LOCATION TO BE COORDINATED WITH THE ARCHITECT.	ALARM BOX
2	18" x 18"	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	ELECTRONICS CABINETS
3	AS REQUIRED	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	MAGNET CABLE ACCESS
4	----	EMERGENCY POWER OFF BUTTONS, SUPPLIED BY SIEMENS, INSTALLED BY ELECTRICAL CONTRACTOR. MOUNTED WITH CENTERLINE AT 5'-0" ABOVE FINISHED FLOOR. ALL PARTS ARE TO BE NON-FERROUS INSIDE THE RF ROOM. EXACT LOCATIONS ARE TO BE VERIFIED WITH THE ARCHITECT OF RECORD.	SEE POWER SCHEDULE, SHEET E-102
5	----	SIEMENS RF FILTER PANEL TO BE MOUNTED ON RF SHIELDED WALL	FILTER PANEL
6	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN EQUIPMENT ROOM, MOUNTED AT HEIGHT NEAR THE TOP RIGHT OF THE INTERFACE PANEL. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INTERFACE PANEL
7	----	INTEGRATED ELECTRICAL CABINET SUPPLIED BY SIEMENS, INSTALLED BY CUSTOMER/CONTRACTOR.	SEE POWER SCHEDULE
8	AS REQUIRED	NON-FERROUS PULL BOX MOUNTED FLUSH WITH FINISHED WALL MOUNTED 2'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INJECTOR POWER SUPPLY - MUST BE LOCATED OUTSIDE OF 5m FIELD
9	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN CONTROL AREA, MOUNTED 2'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	INJECTOR CONTROL CONSOLE
10	4" x 4"	OPENING IN FACE OF RACEWAY IN SHOWN LOCATION.	HOST COMPUTER
11	AS REQUIRED	NON-FERROUS SINGLE GANG BOX MOUNTED FLUSH WITH FINISHED WALL MOUNTED 6'-0" ABOVE FINISHED FLOOR. PROVIDE NEATLY FINISHED AND REMOVABLE COVER WITH CABLE EXIT. EXACT LOCATION TO BE COORDINATED WITH THE ARCHITECT.	MAGNET STOP
12	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL AT FLOOR LINE IN SHOWN LOCATION PROVIDED WITH 2" OPENING IN FINISHED COVER.	EATON 9130 UPS
13	AS REQUIRED	PULL BOX MOUNTED ADJACENT TO WATER CHILLER PROVIDED WITH FLEX-TITE CONDUIT FROM PULL BOX TO KNOCK OUT PANEL ON CHILLER. COORDINATE WITH SIEMENS PROJECT MANAGER.	WATER CHILLER
14	24"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER, IN THE EXAM ROOM, MAINTAINING 12" CLEARANCE ABOVE THE TRAY FOR ACCESS. CABLE LADDER IS REQUIRED TO SUPPORT INTERCONNECTING CABLES BETWEEN THE FILTER PANEL AND THE MAGNET. A 15" MINIMUM CLEARANCE IS REQUIRED BETWEEN THE LADDER TRAY AND THE RF FILTER PANEL (F1). WHEN ROUTING ALL RACEWAYS REFER TO DETAIL E-501/2 TAKING CARE SO THAT MAXIMUM CABLE LENGTHS ARE NOT EXCEEDED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/1
15	12"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER IN EXAM ROOM. A 12" SEPARATION BETWEEN CD1 AND CD2 MUST BE MAINTAINED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/1
16	24"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER IN EQUIPMENT ROOM MAINTAINING 12" CLEARANCE ABOVE THE TRAY FOR ACCESS. CABLE LADDER IS REQUIRED TO SUPPORT INTERCONNECTING CABLES BETWEEN THE FILTER PANEL AND THE RF FILTER PANEL.	CABLE TRAY SEE DETAIL E-501/1
17	4" x 2"	6'-0" LONG HORIZONTAL DUCT SURFACE MOUNTED ON WALL IN CONTROL AREA AT FLOOR LINE AS SHOWN, FINISHED TO MATCH WALLS. BEGIN AT AND CONNECT TO VERTICAL DUCT "VD1".	
18	10" x 3-1/2"	VERTICAL DUCT MOUNTED FLUSH WITH FINISHED WALL IN CONTROL AREA FROM ABOVE FINISHED CEILING TO FLOOR LINE PROVIDED WITH REMOVABLE FINISHED COVERS.	
19	AS PER NEC	CONDUIT FROM FACILITY POWER TO INTEGRATED ELECTRICAL CABINET "IEC"	SEE POWER SCHEDULE, SHEET E-102
20	AS PER NEC	CONDUIT FROM "IEC" TO "EPO"	SEE DETAIL E-501/1
21	AS PER NEC	CONDUIT FROM "EPO" TO "EPO" TO BE NON-FERROUS WHEN INSIDE THE RF ROOM. CUSTOMER/CONTRACTOR IS TO PROVIDE RF FILTERS FOR ALL NON-SIEMENS WIRING.	SEE POWER SCHEDULE, SHEET E-102
22	(1) 2"	CONDUIT FROM "IEC" TO END AT "CD3" (EPC) VIA FLEX CONDUIT. THERE MUST BE A DIELECTRIC SEPARATION BETWEEN THE CONDUIT AND THE CONNECTION AT THE SIEMENS EPC CABINET.	
23	AS REQUIRED	CONDUIT FROM "IEC" TO "WCH".	
24	(1) 3/4"	CONDUIT FROM "EPO" TO "UPS".	
25	(1) 3/4"	SURFACE MOUNTED FLEX CONDUIT FROM "UPS" TO SIEMENS PROVIDED UPS/EPO CONTROL BOX.	MAXIMUM LENGTH 4 FEET
26	(1) 1"	CONDUIT FROM "UPS" TO "CD3" (EPC)	MAXIMUM LENGTH 29 FEET
27	(2) 2 1/2"	CONDUIT FROM "VD1" (MRC) TO "CD3" (EPC).	NOT TO EXCEED 54 FT.
28	(1) 1 1/2"	CONDUIT FROM "VD1" (AB) TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
29	(1) 1/2"	CONDUIT FROM "DS" TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
30	(1) 3/4"	CONDUIT FROM "MS" TO "CD1" (WIRES TO MAGNET) TO BE NON-FERROUS WHEN INSIDE THE RF ROOM.	NOT TO EXCEED 25 FT.
31	(1) 2"	CONDUIT FROM "WCH" TO "IFP".	NOT TO EXCEED 164 FEET
32	(1) 2"	NON-FERROUS CONDUITS FROM NEAR "F1" TO "IN1" FOR INJECTOR CABLES.	NOT TO EXCEED 40 FEET
33	(1) 2"	CONDUIT FROM "IN1" TO "IN3" FOR INJECTOR CABLES.	NOT TO EXCEED 150 FEET

FROM SOURCE	VIA	TO	DESCRIPTION	REMARKS
IEC	2	EPO	(3) PHASE CONDUCTORS, (1) FULL SIZE EQUIPMENT GROUND WIRE TO BE SIZED BY ELECTRICAL CONTRACTOR/ENGINEER.	
EPO	3	EPO	DETERMINED BY ELECTRICAL CONTRACTOR.	
IEC	4, CD3	EPC	(3) 2/0 AND (1) 2/0 EQUIPMENT GROUND. TO REDUCE EMI (INTERFERENCE) THE POWER CABLES MUST BE SHIELDED. THIS CAN BE ACHIEVED BY USING EMT, WHICH IS CONSIDERED A SHIELDING DEVICE. IF CABLES ARE RUN IN FREE AIR SHIELDED CONDUCTORS MUST BE USED.	LANDED BY ELECTRICAL CONTRACTOR
IEC	5	WCH	(3) PHASE CONDUCTORS, (1) FULL SIZE EQUIPMENT GROUND WIRE TO BE SIZED BY ELECTRICAL CONTRACTOR/ENGINEER.	
EPO	6	UPS	DETERMINED BY ELECTRICAL CONTRACTOR.	6 FOOT TAILS

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

PROJECT MANAGER: TIMOTHY CARMICHAEL TEL: (603) 387-4211 EXT: VMAIL: FAX: EMAIL: timothy.carmichael@siemens-healthineers.com	SIEMENS
NORTHEASTERN VERMONT REGIONAL HOSPITAL 1315 HOSPITAL DRIVE, SAINT JOHNSBURY, VT 05819 MRI ROOM #007 - MAGNETOM AERA XJ GRADIENTS	
THE USE OR REPRODUCTION OF THIS TITLE BLOCK WITHOUT SIEMENS AUTHORIZATION WILL RESULT IN PROSECUTION UNDER FULL EXTENT OF THE LAW.	PROJECT #: 1802727
ALL RIGHTS ARE RESERVED.	SHEET 6 OF 10 DRAWN BY: J. RAPER
SCALE: AS NOTED REF: #30198701	DATE: 08/20/18

1) COMPLIANCE: ELECTRICAL WORK SHALL BE IN COMPLIANCE WITH LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA-70), O.S. REGULATIONS, AS WELL AS APPLICABLE REGULATIONS OF CITY, COUNTY, STATE AND FEDERAL AGENCIES. PROVIDE MATERIALS AND EQUIPMENT COMPLY TO ANSI, IEEE AND NEMA STANDARDS. WHERE APPLICABLE, PROVIDE ONLY MATERIALS AND PRODUCTS THAT ARE UL LISTED AND LABELED. THE CUSTOMER'S/CONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF NATIONAL ELECTRICAL CODE.

2) QUALITY ASSURANCE: THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN THE FIELD TO INSURE THAT THE NEW WORK WILL FIT THE EXISTING STRUCTURE AS SHOWN ON THE DRAWINGS. SHOULD ANY CONDITIONS EXIST OR BE DISCOVERED THAT PREVENT THE INSTALLATION OF WORK AS SHOWN, THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE PRIOR TO FABRICATION OF EQUIPMENT, OR THE PERFORMANCE OF ANY WORK THAT MAY BE AFFECTED. DO NOT ALTER DRAWINGS, DIMENSIONS, OR SPECIFICATIONS IN ANY WAY WITHOUT CONTACTING AND RECEIVING WRITTEN CONFIRMATION FROM SIEMENS PROJECT MANAGER. ALL DIMENSIONS ARE FROM FINISHED SURFACES. CONDUIT AND PULL BOXES TO BE INSTALLED BY THE CUSTOMER/CONTRACTOR WITH LOCATIONS BEING FIELD VERIFIED BY SIEMENS PROJECT MANAGER.

3) POWER SUPPLY SOURCE: POWER SUPPLIES FOR SIEMENS HEALTHCARE EQUIPMENT SHALL BE DEDICATED CIRCUIT.

4) WORK FURNISHED BY CUSTOMER/CONTRACTOR: WORK NOT PROVIDED BY SIEMENS HEALTHCARE BUT SHOWN ON DRAWINGS TO BE FURNISHED AND INSTALLED BY CUSTOMER/CONTRACTOR INCLUDES THE FOLLOWING BUT IS NOT LIMITED TO UNLESS NOTED OTHERWISE: ELECTRICAL RACEWAYS AND DUCTS, WIRING TROUGHS, PULL BOXES, CONDUITS, CIRCUIT BREAKERS, EMERGENCY OFF BUTTONS, DOOR SWITCHES, WALL LIGHTS, WIRING DEVICES, CONNECTORS, LIGHTING EQUIPMENT GROUNDING.

5) RACEWAY AND CONDUIT NOTES: ALL ITEMS IN THE MAGNET ROOM SHALL BE NON-FERROUS. ALL CONDUITS SHALL BE INSTALLED PER LATEST NATIONAL ELECTRICAL CODE. CONDUIT BODIES SHALL NOT BE USED, WHERE A CONDUIT ENT A BOX, FITTING, OR OTHER ENCLOSURE, AN INSULATED THROAT CONNECTOR SHALL BE PROVIDED TO PROTECT THE WIRE FROM ABRASION. RACEWAYS AT LEAST 6 INCHES AWAY FROM PARALLEL RUN OF FLUES OR STEAM AND HOT WATER PIPES. INSTALL RACEWAY RUN ABOVE WATER AND STEAM PIPES PROVIDED THAT CABLE RUN DISTANCE ARE MAINTAINED. USE TEMPORARY CLOSURES TO PREVENT FOREIGN WATER FROM ENTERING RACEWAY. CONDUIT RUNS ARE SHOWN SCHEMATICALLY. INSTALL CONDUIT A MINIMUM OF BENDS IN THE SHORTEST PRACTICAL DISTANCE. CONSIDERING THE BUILDING CONSTRUCTION AND OBSTRUCTIONS, EXCEPT AS OTHERWISE INDICATED, THE CONTRACTOR SHALL MAKE CERTAIN THAT ANY CONDUIT/RACEWAY RUNS CONTAINING SIEMENS HEALTHCARE CABLES DO NOT EXCEED THE SPECIFIED MAXIMUM DISTANCES AS SHOWN ON ELECTRICAL DETAILS.

PROVIDE ENCLOSED METAL SYSTEM (WIRE DUCT) WIRE DUCT RACEWAY SYSTEM WHERE SHOWN ON DRAWINGS WITH DIVIDERS TO SEPARATE THE DUCT (FOR POWER AND SIEMENS HEALTHCARE CABLE) DIVIDERS AND CROSSOVER PIECES TO BE PROVIDED AS NECESSARY. UL SYSTEMS, THE CABLE TO CABLE AS WELL AS THE CIRCUIT TO CIRCUIT SEPARATION REQUIREMENT WAS EVALUATED DURING THE UL SYSTEM INVESTIGATION OF THIS EQUIPMENT. ADDITIONAL SEPARATION OF THE SYSTEM CABLE ASSEMBLIES INTO SEPARATE OR PARTITIONED RACEWAYS UNLESS OTHERWISE NOTED, IS NOT NECESSARY TO INSURE SEPARATION OF CIRCUITS AS THEY CAN BE IN THE SAME RACEWAY.

PROVIDE WIRE DUCT/RACEWAY WITH ACCESSIBLE REMOVABLE COVERS. LOCATIONS OF OPENINGS (I.E. ACCESS PANELS) TO BE CUT FIELD ARE TO BE COORDINATED WITH SIEMENS PROJECT MANAGER. ELECTRICAL PULL BOXES AND RACEWAY COVERS SHALL BE INSTALLED IN A MANNER TO ALLOW ACCESSIBILITY FOR INSTALLATION AND MAINTENANCE. IN-FLOOR TRENCH DUCT AND FLUSH FLOOR BOXES SHALL BE PROVIDED WITH FULLY GASKETED REMOVABLE COVERS.

WHEN JUNCTION BOXES AND WIRE DUCT/RACEWAY ARE MOUNTED HIGHER THAN 14 FEET ABOVE FINISHED FLOOR, THE ELECTRICAL CONTRACTOR SHALL PROVIDE TWO ELECTRICIANS TO HELP THE SIEMENS INSTALL TEAM PULL SIEMENS SUPPLIED CABLES AT CUSTOMER EXPENSE.

WHEN JUNCTION BOXES AND WIRE DUCT/RACEWAY ARE MOUNTED ABOVE A HARD CEILING (I.E. SHEET ROCK), A 24" x 24" ACCESS PANEL IS REQUIRED AT EACH JUNCTION BOX AND WITHIN 2 FEET OF EACH RACEWAY TRANSITION IN WIRE DUCT/RACEWAY. THERE MUST BE FREE AND CLEAR ACCESS TO JUNCTION BOXES AND WIRE DUCT/RACEWAY. WHEN ACCESS PANELS ARE LOCATED MORE THAN 3 FEET FROM JUNCTION BOXES AND WIRE DUCT/RACEWAY THE ELECTRICAL CONTRACTOR SHALL PROVIDE TWO ELECTRICIANS TO HELP SIEMENS INSTALL TEAM PULL SIEMENS SUPPLIED CABLES AT CUSTOMER EXPENSE.

6) WIRING: WIRING SHALL BE 600 VOLT CLASS, STRANDED TYPE THHN-THWN, SINGLE CONDUCTOR ANNEALED COPPER FOR A MAXIMUM OPERATING TEMPERATURE OF 75° C (165° F), SIZED AS INDICATED. CUSTOMER/CONTRACTOR SHALL LEAVE MINIMUM 10 FT. WIRE TAILS AT ALL OUTLET POINTS WITH WIRE IDENTIFICATION TAGGED AT BOTH ENDS FOR FINAL CONNECTION BY THE CUSTOMER/ELECTRICAL CONTRACTOR.

7) ALL CIRCUIT BREAKERS SHALL BE RATED FOR 25 KV RMS SHORT CIRCUIT RATING.

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.

08/20/18 R101RA DATED 07/20/18 APPROVED BY CUSTOMERS FOR FINLS

E-1

SYMBOL	MAGNETOM SIZE	SOLA SIZE	DESCRIPTION	CHANGE
AB	3"	3"		
EPC; GPA; SEP	18X18	18X18		
B	AS REQ.	AS REQ.		
EPO				
F1				
IFP		N / A		
IEC				
IN1				
IN3				
MRC				
MS				
PS				
WCH				
WCS	N / A	ADDED	PULL BOX MOUNTED FLUSH W/FINISHED WALL	
CD1				
CD2				
CD3				
HD1				
VD1				
1				
2				
3				
4	(1) 2"	(1) 2"		
5	AS REQ.	AS REQ.		
6	(1) 3/4"	(1) 3/4"		
7	(1) 3/4"	(1) 2"		conduit size increase, run change
8	(1) 1"	(2) 2 1/2"		conduit size & quantity increase, run change
9	(2) 2 1/2"	(1) 1 1/2"		conduit size & quantity decrease,
10	(1) 1 1/2"	(1) 1/2"		conduit size decrease, ,run change
11	(1) 1/2"	(1) 3/4"		conduit size increase, run change
12	(1) 3/4"	(1) 1"		conduit size increase, run change
13	(1) 2"	(1) 2"		run change
14	(1) 2"	(1) 2"		run change
15	(1) 2"			deleted