INVITATION FOR BIDS

ALL PROSPECTIVE MECHANICAL CONTRACTORS

INVITATION FOR BIDS
Grady MRI Chiller

Grady Health System Department of Facilities Management is soliciting proposals for mechanical services for the ***Marcus Trauma Tower 4th Floor Penthouse.***

The project will be located at the main campus at 80 Jesse hill Dr., Atlanta, GA. 30303 in the Marcus Trauma Tower 4th Floor Penthouse.

The IFB (dated Monday, August 19, 2024) will be posted on the Grady website prior to the ***mandatory pre-proposal*** meeting Monday, September 2, 2024, at 3:00pm EST, in the offices of the Health System's Department of Facilities Management, Basement Floor, Grady Hospital. The driving address is 80 Jesse hill Dr., Atlanta, GA. 30303

Proposals will be due on **Tuesday, *09/17/2024*, at 4:00 PM EST.** Additional RFP documents will be presented at the ***mandatory pre-proposal*** meeting.

Additionally, registration with VendorMate (through the following website: https://registersupplier.ghx.com) must be completed prior to proposal submission.

Please notify ***Ron Henry*** by email at rehenry@gmh.edu of your intention to attend the pre-proposal meeting by email no later than **Friday, August 30 at 4:00 PM EST.**

Please see the attached documents below for Project Background and New Scope Narrative.

Sincerely,

Grady Health System

GRADY HEALTH SYSTEMS

ATLANTA, GEORGIA

MRI CHILLER CONCEPT DESIGN

JULY 12, 2024

TLC Engineering Solutions
4360 Chamblee Dunwoody Rd., Ste 210
Atlanta, Georgia 30341

PES STRUCTURAL ENGINEERS

TLC ENGINEERING SOLUTIONS PES STRUCTURAL ENGINEERS

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APPENDICES:

1.0 Project Background and Existing Conditions

Background:

Grady operates three MRIs on the 3rd floor of the Marcus Trauma Building. The MRIs' cooling is supplied by the chiller plant located in the 4th floor Mechanical penthouse. Grady engaged TLC to produce a concept design to add dedicated chillers, one for each MRI. TLC brought on PES Structural Engineers to determine if additional roof supports would be required.

Mechanical:

The MRIs system is isolated from the main chilled water system with a heat exchanger, and there are three dedicated circulation pumps for the system. When the third MRI was installed in 2022, the heat exchanger was replaced with a larger capacity model and the third pump was added to maintain redundancy. The pump system operates at constant volume of approximately 90 GPM.

Electrical:

The existing chillers pumps will remain as they are. No changes to electrical installation is anticipated.

Structural:

The existing roof construction based on original design documents dated 11-6-2014 consists of a concrete beam and slab construction. The existing 5" thick reinforced slab spans to 21" deep cast in place beams at various spacings which are supported by concrete girders. The concrete strength is 5000 psi.

2.0 New Scope Narrative

Mechanical:

Three air-cooled chillers will be installed on the 4th floor roof, one chiller dedicated to each MRI. Piping shall be routed through the 4th floor mechanical room to each MRI equipment room. All piping shall be insulated, and exterior piping will also be heat traced for freeze protection. The piping shall connect to the existing systems upstream of the components required by Siemens (Appendix C). The existing MRI chilled water loop shall remain in service to function as a backup system. Control valves and a bypass will be installed to ensure that cold water is available without interruption.

The new chillers shall have manufacturer provided, onboard controls. Integrate each chiller with the BMS for monitoring and alarms as indicated in Appendix A. Provide an add/alternate price to use a Filtrine Quick Connect Panel (or similar). Integrate the existing MRI loop pumps into the BMS and provide new controls as required per the sequence on the drawings.

At each location where piping penetrates the roof, provide a piping doghouse or box. Coordinate with Grady's preferred roofing vendor and provide proper installation.

One of the chiller locations is less than 10' from a roof edge and may require fall protection during maintenance activities. The connection work inside of the MRI rooms shall be coordinated with the Owner to minimize downtime.

Electrical:

The three air-cooled chillers will derive their power from existing distribution panel "4CED2". Panel 4CED2 will need to be metered for 30 days to confirm the electrical capacity of the panel. Each chiller will require a NEMA 3R disconnect rated at 200A and non-fused. 150A breaker will be provided at distribution panel "4CED2" for each chiller. Refer to Appendix B for wiring and conduit information. For the new chiller piping mounted on the exterior of the building, a new 277V, 30A breaker shall be utilized to power the heat traced that will be used on the exterior piping. This should be obtained from the existing 277/480V equipment distribution panel.

Structural:

PES has analyzed the existing structure for the weight of the 6,400# chillers. The existing roof slab, girders and columns are all capable of supporting the new units. However, not all the roof beams have the capacity to support the units. PES has worked with TLC to locate the units in the locations on their plan so that they are either on a girder line or supported directly over a beam that can support their weight.

APPENDIX A

MECHANICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
D	-CEILING DIFFUSER, ROUND NECK (CEILING DIFFUSERS ARE 4-WAY THROW UNO)
	-ROUND DIFFUSER
	-CEILING RETURN
	-CEILING EXHAUST
	-CEILING DIFFUSER, RECTANGULAR OR SQUARE NECK (CEILING DIFFUSERS ARE 4-WAY THROW UNO)
	-SUPPLY REGISTER OR GRILLE (VERTICAL MOUNT, SIDEWALL)
	-RETURN/EXHAUST REGISTER OR GRILLE (VERTICAL MOUNT, SIDEWALL)
1	-REVISION REFERENCE
1 / M-1	-DETAIL REFERENCE: TOP-DETAIL#, BOTTOM-DRAWING# SHOWN ON
T	-THERMOSTAT/TEMPERATURE SENSOR
H	-HUMIDISTAT/HUMIDITY SENSOR
	-DUCT SMOKE DETECTOR
	-CONNECT TO EXISTING
	-DEMOLISH TO POINT INDICATED
M	-MOTORIZED CONTROL DAMPER
TS	-TEMPERATURE SENSOR
P P	-DIGITAL ROOM PRESSURE MONITOR
P P	-ANALOG ROOM PRESSURE MONITOR
BD	-BACKDRAFT DAMPER
	-NEUTRAL RELATIVE PRESSURE
	-POSITIVE RELATIVE PRESSURE
	-NEGATIVE RELATIVE PRESSURE
T	-SHEET NOTE CALLOUT
T	-SHEET NOTE CALLOUT
T	-SHEET NOTE CALLOUT
	-CEILING MOUNTED ACCESS DOOR

SYMBOL	DESCRIPTION
	-FIRE DAMPER (WITH ACCESS PANEL)
	-FIRE & SMOKE DAMPER (WITH ACCESS PANEL)
	-SMOKE DAMPER (WITH ACCESS PANEL)
SA-1/	-SOUND ATTENUATOR
M	-MOTOR OPERATED CONTROL DAMPER (MOD)
FM	-AIR FLOW MEASURING STATION
	-MANUAL BALANCING DAMPER
	-DOOR GRILLE
	-UNDERCUT DOOR
M	-ACCESS DOORS, VERTICAL OR HORIZONTAL
	-STAINLESS STEEL DUCTWORK
	-FLEXIBLE CONNECTION
12/8	-FLAT OVAL DUCT
24x12	-NEW DUCTWORK, FIRST DIMENSION IS SIDE SHOWN
24x12	-EXISTING DUCTWORK TO REMAIN
24x12	-EXISTING DUCTWORK TO BE REMOVED
24x12	-DUCT ELBOW, POSITIVE PRESSURE (SUPPLY), FIRST DIMENSION INDICATES SIDE TO WHICH ARROW IS POINTING
DOWN / UP W/IN FLOOR	
	-DUCT ELBOW, EXHAUST
	-DUCT ELBOW, NEGATIVE PRESSURE, RETURN
	-DUCT ELBOW UP THROUGH ROOF OR SLAB ABOVE
	-RECTANGULAR DUCT SECTION UP, POSITIVE PRESSURE, SUPPLY OR OUTSIDE AIR
	-RECTANGULAR DUCT SECTION UP, NEGATIVE PRESSURE, RETURN
	-RECTANGULAR DUCT SECTION UP, EXHAUST
	-ROUND DUCT SECTION UP
	-FLAT OVAL DUCT SECTION UP

SYMBOL	DESCRIPTION
	-TERMINAL UNIT, VARIABLE/CONSTANT AIR VOLUME WITH ELECTRIC HEAT
	-TERMINAL UNIT, VARIABLE/CONSTANT AIR VOLUME WITH ELECTRIC HEAT
	-TERMINAL UNIT, VARIABLE/CONSTANT AIR VOLUME, FAN POWERED
	-TERMINAL UNIT, VARIABLE/CONSTANT AIR VOLUME, FAN POWERED, WITH ELECTRIC HEAT
	-ELECTRIC DUCT HEATER (W/ PANEL CLEARANCE)
	-HYDRONIC REHEAT COIL
	-INLINE CENTRIFUGAL FAN
	-PACKAGED TERMINAL AIR CONDITIONER (PTAC)
UP / DN	-CHANGE OF ELEVATION
	-FLEXIBLE DUCT
	-TRANSITION, CONCENTRIC
	-TRANSITION, ECCENTRIC
10x8 / 8"	-TRANSITION, SQUARE TO ROUND
	-SQUARE THROAT TEE WITH DAMPERS
12x8	-RADIUS TEE WITH DAMPERS
	-RECTANGLE-TO-ROUND TAKE-OFF WITH DAMPER
	-STANDARD BRANCH TAKE-OFF WITH DAMPER
	-SPIN-IN TAKE-OFF WITH DAMPER
	-SQUARE THROAT ELBOW W/TURNING VANES
	-RADIUS ELBOW
	-RECTANGULAR/ROUND BRANCH TAKE-OFF OR ROUND/ROUND BRANCH TAKE-OFF
	-EXHAUST DUCT UP THROUGH SLAB W/ FAN ON ROOF ABOVE
	-EXHAUST FAN ON ROOF W/ DUCT DOWN THROUGH ROOF

MECHANICAL ABBREVIATIONS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
AFD	-ADJUSTABLE FREQUENCY DRIVE	LD	-LINEAR DIFFUSER
AFF	-ABOVE FINISHED FLOOR	MBH	-THOUSAND BTUs PER HOUR
AFR	-ABOVE FINISHED ROOF	MCA	-MINIMUM CIRCUIT AMPS
AHU	-AIR HANDLING UNIT	MOCP	-MAXIMUM OVER CURRENT PROTECTION
AP	-ACCESS PANEL	MOD	-MOTOR OPERATED CONTROL DAMPER (MOD)
BOP	-BOTTOM OF PIPE	NAM	-NEGATIVE AIR MACHINE
BHP	-BRAKE HORSEPOWER	NC	-NORMALLY CLOSED
BTU	-BRITISH THERMAL UNIT	NO	-NORMALLY OPEN
CL	-CENTER LINE	NTS	-NOT TO SCALE
CFM	-CFM (CUBIC FEET PER MINUTE)	OA	-OUTSIDE AIR
CD	-CEILING DIFFUSER	OAL	-OUTSIDE AIR LOUVER
CT	-COOLING TOWER	PRV	-PRESSURE REDUCING VALVE
CV	-CONSTANT AIR VOLUME	PRS	-PRESSURE REDUCING STATION
ΔP	-CHANGE IN PRESSURE	PSI	-POUNDS PER SQUARE INCH
ΔT	-CHANGE IN TEMPERATURE	PSIG	-PSI GAUGE
CFM	-CUBIC FEET PER MINUTE	PTAC	-PACKAGED TERMINAL AIR CONDITIONER
CU	-CONDENSING UNIT	PVC	-POLYVINYL CHLORIDE PIPE
DDC	-DIRECT DIGITAL CONTROLS	RA	-RETURN AIR
DN	-DOWN	RHC	-REHEAT COIL
EA	-EXHAUST AIR	RHP	-ROOFTOP HEAT PUMP
EAT	-ENTERING AIR TEMPERATURE	RPM	-REVOLUTIONS PER MINUTE
ESP	-EXTERNAL STATIC PRESSURE	RS/L	-REFRIGERANT SUCTION & LIQUID LINES
EWT	-ENTERING WATER TEMPERATURE	RTU	-ROOFTOP AIR HANDLING UNIT
FCU	-FAN COIL UNIT	SA	-SUPPLY AIR
FD	-FIRE DAMPER	SP	-STATIC PRESSURE
FF	-FINAL FILTERS	TSP	-TOTAL STATIC PRESSURE
FLA	-FULL LOAD AMPS	UNO	-UNLESS NOTED OTHERWISE
FPM	-FEET PER MINUTE	V/PH	-VOLTS/PHASE
GPM	-GALLONS PER MINUTE	VAV	-VARIABLE AIR VOLUME
ISO	-ISOLATION EXHAUST	VFD	-VARIABLE FREQUENCY DRIVE
KW	-KILOWATT		
LAT	-LEAVING AIR TEMPERATURE		
LWT	-LEAVING WATER TEMPERATURE		

MECHANICAL GENERAL NOTES

1. CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER'S CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VERIFIED AND PROVIDED FOR EQUIPMENT FURNISHED.
2. DIMENSIONS SHALL BE FIELD-VERIFIED AND COORDINATED PRIOR TO PROCUREMENT OR FABRICATION. COORDINATE THE WORK WITH OTHER TRADES INVOLVED. FIELD MODIFICATIONS SUCH AS OFFSETS IN PIPING OR DUCTWORK (INCLUDING DIVIDED DUCTWORK) NEEDED DUE TO OBSTRUCTIONS OR INTERFERENCES SHALL BE PROVIDED AT NO ADDITIONAL COST, FOR PROJECTS INVOLVING RENOVATION, COORDINATE NEW WORK WITH EXISTING ELEMENTS SUCH AS THE BUILDING STRUCTURE AND ARCHITECTURAL FEATURES, SPRINKLER PIPING, LIGHTS, PLUMBING, AND ELECTRICAL CONDUIT.
3. DUCT CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARD.
4. SEE SPECIFICATIONS FOR GAUGES, THICKNESS, BRACING, REQUIREMENTS, ETC., OF DUCTWORK.
5. PROVIDE AIR TURNING VANES IN ALL 90 DEGREE RECTANGULAR DUCT ELBOWS.
6. DUCT SIZES AND ALL OPENINGS THROUGH BUILDING CONSTRUCTION SHALL SUIT EQUIPMENT FURNISHED.
7. COORDINATE DIFFUSER, GRILLE AND REGISTER LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND EQUIPMENT OF ALL TRADES.
8. LOCATE THERMOSTATS, TEMPERATURE SENSORS, HUMIDISTATS, AND HUMIDITY SENSORS AT 48" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. COORDINATE LOCATIONS WITH OTHER EQUIPMENT, FURNITURE, AND DOOR SWINGS.
9. ALL EQUIPMENT, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED AND/OR SPECIFIED. PROVIDE ADDITIONAL SUPPORTS AS REQUIRED TO PROVIDE A VIBRATION-FREE, RIGID INSTALLATION.
10. ALL DUCT SIZES SHOWN ARE INSIDE CLEAR DIMENSIONS.
11. DAMPERS AND INSIDES OF DUCTS VISIBLE THROUGH GRILLES, REGISTERS AND DIFFUSERS SHALL BE PAINTED FLAT BLACK.
12. REFER TO TYPICAL DETAILS FOR PIPING AND INSTALLATION OF EQUIPMENT.
13. TRAPPED CONDENSATE DRAINS FROM ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED FOR PROPER DRAINAGE TO SUIT EQUIPMENT FURNISHED.
14. ACCESS PANELS IN DUCTWORK AND CEILINGS SHALL BE PROVIDED WHERE REQUIRED FOR OPERATION, BALANCING OR MAINTENANCE OF ALL MECHANICAL EQUIPMENT.
15. ALL DUCTWORK AND PIPING IS SHOWN SCHEMATICALLY. PROVIDE ALL TRANSITIONS, TURNING VANES, ELBOWS, FITTINGS, ETC., TO ALLOW SMOOTH FLOWS. ALL SPLIT DUCT FITTINGS SHALL TRANSITION TO FULL SIZE OF THE SUM OF BOTH BRANCHES, UPSTREAM OF SPLIT.
16. PROVIDE CONCRETE HOUSEKEEPING PAD UNDER ALL FLOOR-MOUNTED EQUIPMENT. REFER TO SPECIFICATIONS FOR DETAILED REQUIREMENTS.
17. VERIFY FINISH WITH ARCHITECT PRIOR TO PURCHASING GRILLES, REGISTERS, DIFFUSERS, LOUVERSAND OTHER AIR DISTRIBUTION DEVICES.
18. PROVIDE FLEXIBLE DUCT CONNECTIONS ON ALL DUCTWORK CONNECTING TO EACH FAN, AIR HANDLING UNITS, AND FAN COIL UNITS.
19. PROVIDE TRANSITIONS AT DIFFUSER NECKS AS REQUIRED TO MATCH SIZES OF FLEX DUCTS TO BECONNECTED.
20. INTERRUPTIONS TO EXISTING SERVICES SHALL BE SCHEDULED FOR TIMES OTHER THAN NORMAL OPERATING HOURS (SUCH AS NIGHTS AND WEEKENDS). SUCH INTERRUPTIONS TO SERVICES SHALL NOT BE MADE WITHOUT THE PRIOR WRITTEN CONSENT OF THE OWNER'S REPRESENTATIVE AND PROPER COORDINATION WITH OTHER TRADES. PRE-WORK SHALL BE PERFORMED TO MAKE THE SHUTDOWN PERIOD AS BRIEF AS POSSIBLE.
21. ALL EQUIPMENT, DUCTWORK, ETC., TO BE REMOVED SHALL REMAIN PROPERTY OF THE OWNER OR DISPOSED OF LEGALLY, AS DIRECTED BY OWNER.
22. MAINTAIN CLEARANCE OF A MINIMUM OF 4" BETWEEN DUCTWORK, PIPING, EQUIPMENT, ETC., AND ALL FIRE AND/OR SMOKE RATED WALLS, TO ALLOW FOR INSPECTIONS OF RATED WALLS.
23. LOCATE ALL OUTSIDE AIR INTAKES A MINIMUM OF 10' CLEAR FROM ALL PLUMBING VENTS AND EXHAUST AIR DISCHARGE LOCATIONS, AND A MINIMUM OF 1' ABOVE ROOF SURFACES/GRADE.
24. DUCT RUNOUTS TO DIFFUSERS SHALL MATCH THE SIZE OF THE DIFFUSER NECK.
25. WATER PRESSURE DROPS THROUGH COIL CONTROL VALVES SHALL NOT EXCEED 5 PSI.
26. UNLESS OTHERWISE NOTED, ALL EQUIPMENT AND VALVE DRAINS SHALL BE INDEPENDENTLY PIPED FULL SIZE TO THE NEAREST PLUMBING DRAIN.
27. SLEEVE AND SEAL ALL PIPING PENETRATIONS THROUGH BUILDING PARTITIONS. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS IN CHILLED WATER AND HOT WATER PIPING.
28. PIPING, DUCTWORK, LEAK PROTECTION APPARATUS, OR OTHER EQUIPMENT FOREIGN TO ELECTRICAL SWITCHBOARDS, PANELBOARDS, DISTRIBUTION BOARDS, OR MOTOR CONTROL CENTERS SHALL NOT BE INSTALLED WITHIN THE REQUIRED SPACE FOR WORKING CLEARANCES OR DEDICATED SPACES OF THE ELECTRICAL EQUIPMENT, EXTENDING IN FRONT OF AND FROM FLOOR TO STRUCTURAL CEILING WITH A WIDTH AND DEPTH OF THE ELECTRICAL EQUIPMENT IN ACCORDANCE WITH NEC-110.26.
29. TEST AND BALANCE SHALL BE PERFORMED AT EACH PHASE OF CONSTRUCTION, ON ALL SPACES AND SYSTEMS ASSOCIATED WITH THE PHASE. PROVIDE REPORT TO ENGINEER FOR REVIEW.
30. SUBMITTALS: ELECTRONIC SUBMITTALS SHALL BE IN SEARCHABLE FORMAT. DO NOT SUBMIT SCANNED DOCUMENTS.
31. MECHANICAL SYSTEMS COMMISSIONING WILL BE PERFORMED IN ACCORDANCE WITH CURRENT FLORIDA BUILDING CODE SECTION C408. A COMMISSIONING PLAN WILL BE DEVELOPED IN ACCORDANCE WITH FBC C408.2.1. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

MECHANICAL PIPING SYMBOL LEGEND

SYMBOL	DESCRIPTION
CWS	-CONDENSER WATER SUPPLY
CWR	-CONDENSER WATER RETURN
CHWS	-CHILLED WATER SUPPLY
CHWR	-CHILLED WATER RETURN
CD	-CONDENSATE
CR	-CONDENSATE RETURN
PC	-PUMPED CONDENSATE
HWR	-HEATING HOT WATER RETURN
HWS	-HEATING HOT WATER SUPPLY
HPS	-HIGH PRESSURE STEAM SUPPLY
MPS	-MEDIUM PRESSURE STEAM SUPPLY
LPS	-LOW PRESSURE STEAM SUPPLY
HPR	-HIGH PRESSURE STEAM RETURN
MPR	-MEDIUM PRESSURE STEAM RETURN
LPR	-LOW PRESSURE STEAM RETURN
RL	-REFRIGERANT LIQUID
RS	-REFRIGERANT SUCTION
	-TEE, OUTLET DOWN
	-TEE, OUTLET UP
D D	-45° PIPE RISE (R) / DROP (D)
	-PIPE ANCHORS
	-CONCENTRIC REDUCER
	-ECCENTRIC REDUCER

SYMBOL	DESCRIPTION
	-FLOW DIRECTION
	-ISOLATION VALVE
	-BALL VALVE
	-CALIBRATING BALANCING VALVE
	-BUTTERFLY VALVE
	-GAS COCK
	-UNION
	-STRAINER
	-CONTROL VALVE
	-SOLENOID VALVE
	-PSI REG.
	-CHECK VALVE
	-FLOW SWITCH
	-SLOPE DIRECTION (DOWN)
	-FLEX CONNECTION
	-O.S.&Y. GATE VALVE
	-STEAM TRAP
	-THREE-WAY CONTROL VALVE
	-THERMOMETER

SYMBOL	DESCRIPTION
EQUIP	- P-TRAP
	-TWO-WAY CHECK VALVE
MV	-MANUAL VENT
	-PRESSURE GAUGE
	-RELIEF VALVE
FM	-FLOW METER
M	-WATER METER
	-INLINE PUMP
	-INLINE PUMP
	-VALVE ON RISER
	-CAP
	-CONNECTION, BOTTOM
	-CONNECTION, TOP
	-COUPLING
	-ELBOW, 90°
	-ELBOW, 45°
	-ELBOW, TURNED DOWN
	-ELBOW, TURNED UP

NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT

APPLICABLE CODES

A. STATE, COUNTY, AND CITY HEALTH AND BUILDING CODES
B. INTERNATIONAL FIRE PREVENTION CODE, 2018 EDITION, WITH GEORGIA AMENDMENTS
C. INTERNATIONAL BUILDING CODE, 2018 EDITION, WITH GEORGIA AMENDMENTS
D. INTERNATIONAL PLUMBING CODE, 2018 EDITION, WITH GEORGIA AMENDMENTS
E. INTERNATIONAL MECHANICAL CODE, 2018 EDITION, WITH GEORGIA AMENDMENTS
F. INTERNATIONAL ENERGY CODE, 2015 EDITION, WITH GEORGIA AMENDMENTS
G. NFPA 51B, 2019 EDITION, STANDARD FOR FIRE PREVENTION DURING WELDING, CUTTING, AND OTHER HOT WORK
H. NFPA 70, 2020 EDITION, NATIONAL ELECTRICAL CODE
I. NFPA 72, 2019 EDITION, NATIONAL FIRE ALARM AND SIGNALING CODE
J. NFPA 90A, 2021 EDITION, STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS
K. NFPA 99, 2021 EDITION, HEALTH CARE FACILITIES CODE
L. OTHER NFPA CODES AS REFERENCED BY STANDARD CODES.
M. *ASHRAE STANDARD 15, 2019 EDITION*
N. *ASHRAE STANDARD 34, 2019 EDITION*
O. ASHRAE STANDARD 62.1, 2019 EDITION
P. FGI GUIDELINES FOR DESIGN AND CONSTRUCTION OF HOSPITALS, 2022

MECHANICAL EQUIPMENT TAGS

TAG: A / CFM: 200 — -AIR DISTRIBUTION DEVICE TAG

EQUIPMENT NAME: AHU- / EQUIPMENT NUMBER: 1 — -EQUIPMENT TAG

DUCT SIZE: 24x12 SA / 24/12 SA / 12Ø SA — DUCT SYSTEM: SA

-RECTANGULAR DUCT TAG
-OVAL DUCT TAG TAG
-ROUND DUCT TAG

PIPE SIZE: 12" / PIPE SYSTEM: CHWS — -PIPE TAG

MECHANICAL SHEET INDEX

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COA K938087

TLC Project No.: 824101
THINK. LISTEN. CREATE.

Grady MRI Chiller Concept Design

80 Jesse Hill Jr Dr SE
Atlanta, GA 30303

Consultants:

Revisions:

No.	Date	Description
A	10 JUL 24	DRAFT FOR REVIEW

Seal:

NOT FOR CONSTRUCTION

Project No.: 824101
Issue Date: 10 JULY 2024
Drawn By: Christian D.
Approved By: MDM
Scale: NTS

Drawing Title:
MECHANICAL LEGENDS SHEET

Drawing No.:
M001

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BASIC MECHANICAL REQUIREMENTS:

CONFLICTS: NOTHING CONTAINED HEREIN SHALL BE CONSTRUED TO CONFLICT IN ANY WAY WITH OTHER PROVISIONS OR REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE INTENT IS THAT THIS SECTION WILL TAKE PRECEDENCE. WHERE DIFFERENCES ARISE, THE ARCHITECT SHALL DECIDE WHICH DIRECTIONS OR INSTRUCTIONS TAKE PRECEDENCE.

UNLESS AN ITEM IS SPECIFICALLY MENTIONED AS BEING PROVIDED BY OTHERS, THE REQUIREMENTS OF DIVISION 23 CONTRACT DOCUMENTS SHALL BE COMPLETED. THE SYSTEMS, EQUIPMENT, DEVICES AND ACCESSORIES SHALL BE INSTALLED, FINISHED, TESTED AND ADJUSTED FOR CONTINUOUS AND PROPER OPERATION. ANY APPARATUS, MATERIAL OR DEVICE NOT SHOWN ON THE DRAWINGS BUT MENTIONED IN THESE SPECIFICATIONS, OR VICE VERSA, OR ANY INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE PROJECT COMPLETE AND OPERATIONAL IN ALL RESPECTS, SHALL BE FURNISHED, DELIVERED AND INSTALLED WITHOUT ADDITIONAL EXPENSE TO THE OWNER. INCLUDE ALL MATERIALS, EQUIPMENT, SUPERVISION, OPERATION, METHODS AND LABOR FOR THE FABRICATION, INSTALLATION, START-UP AND TESTS NECESSARY FOR COMPLETE AND PROPERLY FUNCTIONING SYSTEMS.

COMPLY WITH ALL RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENTS AND THE AMENDMENTS AND INTERPRETATION OF SUCH RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENTS BY THE AUTHORITIES HAVING LAWFUL JURISDICTION.

DRAWINGS AND SPECIFICATIONS:
INTENT: THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO ESTABLISH MINIMUM ACCEPTABLE QUALITY STANDARDS FOR MATERIALS, EQUIPMENT AND WORKMANSHIP, AND TO PROVIDE OPERABLE MECHANICAL SYSTEMS COMPLETE IN EVERY RESPECT.

EQUIPMENT PLACEMENT: THE DRAWINGS ARE DIAGRAMMATIC, INTENDED TO SHOW GENERAL ARRANGEMENT, CAPACITY AND LOCATION OF VARIOUS COMPONENTS, EQUIPMENT AND DEVICES. EACH LOCATION SHALL BE DETERMINED BY REFERENCE TO THE GENERAL BUILDING PLANS AND BY ACTUAL MEASUREMENTS IN THE BUILDING AS BUILT. REASONABLE CHANGES IN LOCATIONS ORDERED BY THE ARCHITECT PRIOR TO THE PERFORMANCE OF THE AFFECTED WORK SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

DRAWING SCALE: DUE TO THE SMALL SCALE OF THE DRAWINGS, AND TO UNFORESEEN JOB CONDITIONS, ALL REQUIRED OFFSETS, TRANSITIONS AND FITTINGS MAY NOT BE SHOWN BUT SHALL BE PROVIDED AT NO ADDITIONAL COST.

CONFLICT: IN THE EVENT OF A CONFLICT, THE ARCHITECT WILL RENDER AN INTERPRETATION IN ACCORDANCE WITH THE GENERAL CONDITIONS.

ABBREVIATIONS: ABBREVIATIONS, WHERE NOT DEFINED IN THE CONTRACT DOCUMENTS, SHALL BE INTERPRETED TO MEAN THE NORMAL CONSTRUCTION INDUSTRY TERMINOLOGY, AS DETERMINED BY THE ARCHITECT. PLURAL WORDS SHALL BE INTERPRETED AS SINGULAR AND SINGULAR WORDS SHALL BE INTERPRETED AS PLURAL WHERE APPLICABLE FOR CONTEXT OF THE CONTRACT DOCUMENTS.

WORKMANSHIP:
GENERAL: THE INSTALLATION OF MATERIALS AND EQUIPMENT SHALL BE DONE IN A NEAT, WORKMANLIKE AND TIMELY MANNER BY AN ADEQUATE NUMBER OF CRAFTSMEN KNOWLEDGEABLE OF THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. THEY SHALL BE SKILLED IN THE METHODS AND CRAFTSMANSHIP NEEDED TO PRODUCE A FIRST-QUALITY INSTALLATION. PERSONNEL WHO INSTALL MATERIALS AND EQUIPMENT SHALL BE QUALIFIED BY TRAINING AND EXPERIENCE TO PERFORM THEIR ASSIGNED TASKS.

HOUSEKEEPING: KEEP INTERIORS OF DUCT AND PIPE SYSTEMS CLEAN AND FREE FROM DIRT, RUBBISH AND FOREIGN MATTER. CLOSE OPEN ENDS OF PIPING AND DUCTWORK AT ALL TIMES THROUGHOUT THE INSTALLATION.

EQUIPMENT PROTECTION: PROTECT FAN MOTORS, SWITCHES, EQUIPMENT, FIXTURES, AND OTHER ITEMS FROM DIRT, RUBBISH AND FOREIGN MATTER. DO NOT OPERATE AIR HANDLING EQUIPMENT IF THE BUILDING IS NOT CLEAN OR IF DUST CAN ENTER THE COILS OR THE FAN HOUSINGS.

EQUIPMENT CLEANING: THOROUGHLY CLEAN EQUIPMENT AND ENTIRE PIPING SYSTEMS INTERNALLY UPON COMPLETION OF INSTALLATION AND IMMEDIATELY PRIOR TO FINAL ACCEPTANCE.

BUILDING CLEANUP: REMOVE DEBRIS, RUBBISH, LEFTOVER MATERIALS, TOOLS AND EQUIPMENT FROM WORK AREAS AND SITE. CLEAN TUNNELS AND CLOSED OFF SPACES OF PACKING BOXES, WOOD FRAME MEMBERS AND OTHER WASTE MATERIALS USED IN THE INSTALLATION.

FILTER REPLACEMENT: PROVIDE FILTERS, WITH THE SAME EFFICIENCY RATING AS REQUIRED FOR THE FINAL INSTALLATION, FOR THE PROTECTION OF THE AIR MOVING EQUIPMENT AND DUCTWORK CONTINUOUSLY THROUGHOUT THE CONSTRUCTION PHASE. PROVIDE A NEW SET OF CLEAN FILTERS FOR THE TEST AND BALANCE OF THE AIR SIDE EQUIPMENT.

PROTECTION OF FINISHED INSTALLATION: WHERE INSTALLATION IS REQUIRED IN AREAS PREVIOUSLY FINISHED BY OTHER TRADES, PROTECT THE AREA FROM MARRING, SOILING OR OTHER DAMAGE.

CLEAN-UP: DEBRIS AND RUBBISH SHALL NOT BE DISPOSED INTO THE OWNER 'S CONTAINERS.

CORRECTION OF WORK:
GENERAL: AT NO ADDITIONAL COST TO THE OWNER, RECTIFY DISCREPANCIES BETWEEN THE ACTUAL INSTALLATION AND CONTRACT DOCUMENTS WHEN IN THE OPINION OF THE T&B AGENCY OR THE ARCHITECT THE DISCREPANCIES WILL AFFECT SYSTEM BALANCE AND PERFORMANCE.

DRIVE CHANGES: INCLUDE THE COST OF ALL PULLEY, BELT, AND DRIVE CHANGES, AS WELL AS BALANCING DAMPERS, VALVES AND FITTINGS, AND ACCESS PANELS TO ACHIEVE PROPER SYSTEM BALANCE RECOMMENDED BY THE T&B AGENCY.

COORDINATION AND ASSISTANCE:
GENERAL: PROVIDE ALL LABOR, EQUIPMENT, TOOLS AND MATERIAL REQUIRED TO OPERATE THE EQUIPMENT AND SYSTEMS NECESSARY FOR THE TESTING AND BALANCING OF THE SYSTEMS.

COORDINATE THE OPERATION OF THESE SYSTEMS WITH THE T&B AGENCY. CORRECT DEFICIENCIES NOTED BY THE T&B AGENCY. THE CONTRACTOR WILL BE HELD LIABLE FOR RETEST/REBALANCE REQUIRED FROM CONTRACTOR RELATED SYSTEM DEFIECIENCES.

DRAWINGS AND SPECIFICATIONS: PROVIDE TO THE T&B AGENCY A COMPLETE SET OF PROJECT RECORD DRAWINGS AND SPECIFICATIONS AND AN APPROVED COPY OF ALL HVAC SHOP DRAWINGS AND EQUIPMENT SUBMITTALS. THE T&B AGENCY SHALL BE INFORMED OF ALL CHANGES MADE TO THE SYSTEM DURING CONSTRUCTION, INCLUDING APPLICABLE CHANGE ORDERS.

COORDINATION: COORDINATE THE WORK OF ALL TRADES AND EQUIPMENT SUPPLIERS TO COMPLETE THE MODIFICATIONS RECOMMENDED BY THE T&B AGENCY AND ACCEPTED BY THE ARCHITECT. CUT OR DRILL HOLES FOR THE INSERTION OF AIR MEASURING DEVICES AS DIRECTED FOR TEST PURPOSES; REPAIR TO AS-NEW CONDITION, INSERTING PLASTIC CAPS OR COVERS TO PREVENT AIR LEAKAGE. REPAIR OR REPLACE INSULATION AND RE-ESTABLISH THE INTEGRITY OF THE VAPOR RETARDANT.

COORDINATION DRAWINGS: CONTRACTOR WILL PROVIDE M, E, P, & FP COORDINATION DRAWINGS TO BE RECEIVED AND APPROVED BY THE ENGINEER AND ARCHITECT BEFORE FABRICATION OR INSTALLATION OF ANY SYSTEM. PROVIDE 6 COPIES OF COORDINATED 1/4" SCALE DRAWINGS FOR REVIEW. ALL CONFLICTS SHALL RESOLVED BEFORE FINAL ACCEPTANCE.

PROTECTION OF MATERIALS AND EQUIPMENT:
REPLACEMENT OF DAMAGED STORED MATERIAL AND EQUIPMENT: ANY MATERIAL AND EQUIPMENT THAT HAS BEEN WET OR OTHERWISE DAMAGED PRIOR TO INSTALLATION, IN THE OPINION OF THE ARCHITECT, SHALL BE REPLACED WITH NEW MATERIAL REGARDLESS OF THE CONDITION OF THE MATERIAL AND EQUIPMENT AT THE TIME OF INSTALLATION.

REPAIR OF DAMAGED EXISTING MATERIAL AND EQUIPMENT AFTER INSTALLATION: CORRECT OR REPAIR DENTS, SCRATCHES AND OTHER VISIBLE BLEMISHES. AT THE DIRECTION OF ARCHITECT REPLACE OR REPAIR TO "AS NEW" CONDITION EQUIPMENT THAT HAS BEEN DAMAGED DURING CONSTRUCTION.

ASBESTOS AND HAZARDOUS MATERIALS:
GENERAL: SHOULD ASBESTOS OR OTHER HAZARDOUS MATERIAL BE ENCOUNTERED DURING EXECUTION OF THE WORK, OR SHOULD THE PRESENCE OF ASBESTOS OR OTHER HAZARDOUS MATERIAL BE SUSPECTED, IMMEDIATELY NOTIFY THE ARCHITECT AND SUSPEND WORK IN THE AFFECTED AREA. THE OWNER WILL INITIATE A STUDY TO DETERMINE IF ASBESTOS OR OTHER HAZARDOUS MATERIALS ARE PRESENT AND WILL DETERMINE WHAT ACTION WILL BE TAKEN. REMOVAL OF ASBESTOS OR OTHER HAZARDOUS MATERIALS WILL BE DONE UNDER A SEPARATE CONTRACT.

COORDINATION OF SERVICES:
GENERAL: COORDINATE INTERRUPTION OF EXISTING SERVICES TO OWNER-OCCUPIED AREAS, IN WRITING, AT LEAST 1-WEEK IN ADVANCE WITH THE ARCHITECT. THE OWNER SHALL DECIDE SHUTDOWN TIME AND DURATION OF SERVICES INTERRUPTION. PROVIDE SHUTOFF VALVES AT POINTS OF INTERCONNECTION TO MINIMIZE DOWNTIME. PROCEDURES INCIDENTAL TO THE OUTAGE SHALL BE PREPARED IN ADVANCE TO MINIMIZE DOWNTIME.

FIRE SAFETY IN EXISTING FACILITIES:
DO NOT DECREASE THE FIRE RATING OF WALLS, PARTITIONS, CEILINGS, FLOORS, DOORS OR COMBINATIONS THEREOF IN ADJACENT AREAS OR MEANS OF EGRESS. DO NOT INTERRUPT FIRE SPRINKLING OR LIFE SAFETY SYSTEMS WITHOUT PRIOR COORDINATION WITH THE ARCHITECT. INFORM ALL NECESSARY PARTIES (FIRE DEPARTMENT, OWNER 'S INSURANCE CARRIER, ETC.) IN ADVANCE, PRIOR TO AND IMMEDIATELY AFTER SHUTDOWN, DISCONNECTION OR ISOLATION OF ANY PORTION OF LIFE SAFETY OR FIRE SPRINKLER SYSTEM.

LAYOUT OF EXISTING EQUIPMENT:
GENERAL: EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., AS INDICATED ON THE DRAWINGS HAVE, FOR THE MOST PART, BEEN PROVIDED TO THE ARCHITECT THROUGH EXISTING DRAWINGS. THE LAYOUTS SHOWN MAY NOT BE FROM AS-BUILT DRAWINGS AND MAY BE FROM PARTIAL COPIES OF ORIGINAL DESIGN DOCUMENTS NOT PRODUCED BY THE ARCHITECT. THE ARCHITECT IS NOT RESPONSIBLE FOR THE ACCURACY NOR COMPLETENESS OF THE EXISTING INSTALLATION AND ALL LAYOUTS ARE SHOWN FOR REFERENCE ONLY. IT IS TO BE UNDERSTOOD THAT UNFORESEEN CONDITIONS PROBABLY EXIST AND THAT EXISTING AND NEW WORK MAY NOT BE FIELD LOCATED EXACTLY AS SHOWN ON THE DRAWINGS. VERIFY EXISTING CONDITIONS IN THE FIELD AND NOTIFY THE ARCHITECT OF ANY DEVIATIONS REQUIRED TO INSTALL THE WORK AS SHOWN. COORDINATE NEW WORK WITH EXISTING EQUIPMENT, INCLUDING REMOVING, RELOCATING, REROUTING, EXTENDING WITH NEW MATERIALS, AND REINSTALL EXISTING PIPING, DUCTWORK, CONDUITS, WIRING, TUBING, SUPPORTS AND OTHER EQUIPMENT. THE ARCHITECT SHALL MAKE THE FINAL DECISION ON ALL DEVIATIONS OR MODIFICATIONS REQUIRED BY THE EXISTING CONDITIONS.

AIR FILTER

SUBMITTALS SHALL INCLUDE THE FOLLOWING DATA: MANUFACTURERS LITERATURE, SIZE, MAKE, MODEL NUMBER, THICKNESS, MERV RATING, AND EFFICIENCY OF FILTER SELECTED.

PERFORMANCE DATA: INITIAL AND RECOMMENDED FINAL PRESSURE DROP ACROSS EACH FILTER ASSEMBLY AT THE AIR FLOWS INDICATED.

PLEATED FILTER MEDIA
GENERAL: UNLESS OTHERWISE INDICATED ALL PLEATED MEDIA FILTERS SHALL HAVE A FACE SIZE OF 24 INCHES BY 24 INCHES OR 24 INCHES BY 12 INCHES.

30 PERCENT EFFICIENT/MERV 8 FILTERS: FILTER MEDIA SHALL BE REINFORCED NON- WOVEN COTTON WITH POLYESTER TRACE FIBERS, TREATED WITH ADHESIVE AND CONTINUOUSLY LAMINATED TO A SUPPORTED STEEL WELDED WIRE GRID. THE DISPOSABLE FILTER MEDIA ENCLOSING FRAME SHALL BE RIGID WET-STRENGTH BEVERAGE BOARD WITH DIAGONAL SUPPORT MEMBERS. THE INSIDE PERIPHERY OF THE FRAME SHALL BE BONDED TO THE FILTER MEDIA TO ELIMINATE AIR BYPASS. EACH FILTER SHALL CONTAIN A MINIMUM 3 SQUARE FEET OF MEDIA PER SQUARE FOOT OF FACE AREA, AND A MINIMUM 11 PLEATS PER LINEAR FOOT. UNLESS OTHERWISE INDICATED, MEDIA THICKNESS SHALL BE 2 INCHES; CLEAN RESISTANCE SHALL NOT EXCEED 0.30 INCHES OF WATER AT 500 FPM FACE VELOCITY.

MANUFACTURER AND MODEL: AMERICAN AIR FILTER, PERFECT PLEAT ULTRA, CAMFIL FARR, 30/30

90 PERCENT EFFICIENT/MERV 14 CARTRIDGE FILTERS: AIR FILTERS SHALL BE HIGH PERFORMANCE, EXTENDED AREA, DEEP PLEATED, CARTRIDGE TYPE CONSISTING OF A FILTER ELEMENT, MEDIA RETAINER HOLDING FRAME AND SEALER FRAME. THE MEDIA SHALL BE MICROFINE GLASS FIBER REINFORCED BY A LAMINATED SYNTHETIC BACKING. RETAINER SHALL BE OF WELDED STEEL CONSTRUCTION AND SHALL BE DESIGNED TO SUPPORT THE MULTIPLE PLEATS OF THE FILTER ELEMENT AGAINST THE DIRECTION OF AIRFLOW. THE WELDED WIRE GRID SHALL BE BONDED TO THE FILTER MEDIA.

ENCLOSURE FRAMES SHALL BE FACTORY FABRICATED OF GALVANIZED STEEL AND SHALL BE EQUIPPED WITH GASKETS AND FOUR SPRING-TYPE POSITIVE SEALING FASTENERS CAPABLE OF BEING ATTACHED OR REMOVED WITHOUT TOOLS. SEALER FRAMES SHALL BE FABRICATED OF 20 GAUGE GALVANIZED STEEL AND SHALL BE EQUIPPED WITH GASKETING MATERIAL ON THE FRAME REAR FLANGE. UNLESS OTHERWISE INDICATED, FILTER CLEAN RESISTANCE SHALL NOT EXCEED 0.70 INCHES OF WATER AT 500 FPM FACE VELOCITY.

MANUFACTURER AND MODEL: AMERICAN AIR FILTER, VARICEL DH, CAMFIL FARR, MICRETAIN

TEST AND BALANCE:

GENERAL: SHALL BE PERFORMED BY AN INDEPENDENT T&B AGENCY.

RENOVATION PROJECTS, PERFORMANCE VERIFICATION: PROVIDE A PRE-DEMOLITION TEST OF ALL AIR DEVICES AND EQUIPMENT WITHIN THE SCOPE OF WORK AREA OR AS OTHERWISE INSTRUCTED.

T&B FOR THE MECHANICAL EQUIPMENT SHALL INCLUDE:
DIFFERENTIAL PRESSURE ON FILTER(S), COOLING COIL(S), AND FAN(S)
INLET AND DISCHARGE STATIC PRESSURES
TOTAL SUPPLY CFM
TOTAL RETURN CFM
OA CFM
FAN MOTOR NAMEPLATE DATA
FAN MOTOR AMP DRAW
TEMPERATURE PROFILE

T&B REPORT SHALL BE FORWARDED TO ENGINEER BEFORE DEMOLITION OF SYSTEMS.

CERTIFICATION: THE T&B AGENCY SHALL BE A CERTIFIED MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB).
WORK INCLUDED: THE T&B AGENCY SHALL PROVIDE ALL LABOR, SUPERVISION, PROFESSIONAL SERVICES, TOOLS, TEST EQUIPMENT AND INSTRUMENTS (EXCEPT AS OTHERWISE INDICATED) TO PERFORM WORK OF THIS SECTION; INCLUDING BUT NOT LIMITED TO:

REVIEW THE AUTOMATIC TEMPERATURE CONTROL AND AIR TERMINAL UNIT SPECIFICATIONS FOR THEIR EFFECTS ON THE TESTING AND BALANCING PROCEDURES FOR THE AIR SYSTEMS.

WHERE CONDITIONS MAY EXIST IN THE SYSTEM DESIGN OR CONSTRUCTION WHICH MAY ADVERSELY AFFECT SYSTEM PERFORMANCE, IDENTIFY THE CONDITIONS AND SUBMIT RECOMMENDED CORRECTIONS IN WRITING FOR CONSIDERATION BY THE ARCHITECT.

PERFORM A COMPLETE AIR TEST AND BALANCE OF ALL HEATING, VENTILATING, AIR CONDITIONING AND EXHAUST AIR SYSTEMS SHOWN AND DESCRIBED ON THE CONTRACT DOCUMENTS.

TAB REPORT: RECORDED TEST DATA SHALL BE AT THE FINAL BALANCED CONDITION FOR EACH SYSTEM, AND SHALL BE ARRANGED BY SYSTEM USING THE APPROPRIATE DESIGNATION AS ESTABLISHED ON THE CONTRACT DOCUMENTS. 6 COPIES OF THE TYPEWRITTEN, SIGNED, BOUND AND INDEXED FINAL REPORT SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW PRIOR TO REQUEST FOR SUBSTANTIAL COMPLETION INSPECTION. THE SUBSTANTIAL COMPLETION INSPECTION SHALL NOT BE SCHEDULED UNTIL THE FINAL REPORT HAS BEEN RECEIVED AND IS ACCEPTABLE TO THE ARCHITECT. REPORT FORMAT SHALL BE SIMILAR TO FORMS APPROVED FOR USE BY SMACNA OR AABC.

MEASUREMENTS: WHERE ACTUAL MEASUREMENTS RECORDED FOR THE FINAL BALANCE SHOW DEVIATIONS OF MORE THAN 10 PERCENT FROM THE DESIGN, THE T&B AGENCY SHALL NOTE SAME IN THE REPORT AND SUBMIT RECOMMENDATIONS FOR CORRECTIVE ACTION TO THE ARCHITECT.

VIBRATION: WHERE, IN THE OPINION OF THE T&B AGENCY, THERE IS EXCESSIVE VIBRATION, MOVEMENT OR NOISE FROM ANY PIECE OF EQUIPMENT, DUCTWORK, PIPES, ETC., THE T&B AGENCY SHALL NOTE SAME IN THE REPORT AND SUBMIT RECOMMENDATIONS FOR CORRECTIVE ACTION TO THE ARCHITECT.

TEST DATA: PROVIDE TEST AND BALANCE REPORT PRIOR TO AND AFTER THE BALANCING OF EACH CONSTRUCTION PHASE. INCLUDE THE FOLLOWING DATA IN THE SYSTEMS TEST AND BALANCE REPORT:

1. FANS:
MANUFACTURER, MODEL AND SERIAL NUMBER.
TYPE OF FAN, WHEEL DIAMETER RATED CFM, MEASURED CFM DESIGN INLET AND OUTLET TOTAL
EXTERNAL STATIC PRESSURES, ACTUAL INLET AND OUTLET TOTAL AND EXTERNAL STATIC PRESSURES

2. AIR SYSTEMS (INCLUDING INLETS AND OUTLETS):
GRILLE AND OR DIFFUSER: REFERENCE NUMBER, MANUFACTURER, SYSTEM TYPE AND LOCATION.
DESIGN AND MEASURED CFM TABULATION OF DESIGN AND MEASURED CFM FOR EACH INLET OR OUTLET.
A SUMMARIZATION BY SYSTEM TO COMPARE DESIGN DATA TO ACTUAL

3. AIR HANDLING UNITS:
MANUFACTURER, MODEL AND SERIAL NUMBER
A SUMMARIZATION BY SYSTEM TO COMPARE DESIGN DATA TO ACTUAL
DESIGN AND MEASURED WATER FLOW
DESIGN AND MEASURED SUPPLY AND RETURN TEMPERATURES
DESIGN AND MEASURED AMP DRAW

5. CONTROLS: THE T&B AGENCY SHALL VERIFY THAT EACH CONTROLLER AND THE DEVICES IT CONTROLS, SUCH AS CONTROL VALVES, MOTORIZED DAMPERS, VAV BOXES, ETC;, OPERATES IN THE EXACT SEQUENCE REQUIRED.

PRODUCTS

PIPING

ALL PRESSURIZED PIPING SYSTEMS SHALL CONFORM TO ASME B31.9, CODE FOR PRESSURE PIPING, BUILDING SERVICES PIPING.

BEFORE FINAL TESTING, FLUSH PIPING SYSTEMS WITH CLEAN WATER TO REMOVE DEBRIS. DISCONNECT ALL COILS FROM SYSTEM BEFORE FLUSHING. FLUSH ALL COILS SEPARATE FROM SYSTEM. PROVIDE TEMPORARY VALVES AND DRAINS AS REQUIRED.

PRIOR TO INSULATING AND CONCEALING THE PIPING SYSTEM, APPLY A WATER PRESSURE TEST TO ALL PARTS OF EACH SYSTEM BEFORE EQUIPMENT IS CONNECTED. USE A HYDROSTATIC PRESSURE OF NOT LESS THAN 100 PSIG OR 150 PERCENT OF SYSTEM OPERATING PRESSURE WHICHEVER IS GREATER. TEST SYSTEM FOR A PERIOD NOT LESS THAN FOUR HOURS. THERE SHALL BE NO LEAKS AT ANY POINT IN THE SYSTEM AT THIS PRESSURE.

CHILLED WATER PIPING:
PROVIDE AND INSTALL PIPE AND FITTINGS AS INDICATED, INCLUDING ALL OFFSETS, FITTINGS, SLEEVES AND SIMILAR ITEMS REQUIRED BUT NOT NECESSARILY INDICATED DUE TO DRAWING SCALE FOR COMPLETE AND OPERABLE SYSTEMS. ALL PRESSURIZED PIPING SYSTEMS SHALL CONFORM TO ASME B31.9, CODE FOR PRESSURE PIPING, BUILDING SERVICES PIPING.

CHILLED WATER PIPING ABOVE TWO INCHES IN DIAMETER SHALL BE FORMED FROM WELDED, SEAMLESS ASTM A-53, GRADE B, AND STANDARD WEIGHT STEEL PIPE.

SMALLER CHILLED WATER PIPING SHALL BE FORMED FROM TYPE L, ASTM B-88, COPPER WITH FITTINGS. COLD CONDENSATE PIPING SHALL BE TYPE L COPPER.

COPPER FITTINGS SHALL BE STREAMLINED PATTERN, WROUGHT OR CAST BRASS CONFORMING TO ANSI B16.22 OR WROUGHT BRONZE CONFORMING TO ANSI B16.15.

FITTINGS SHALL AT A MINIMUM, HAVE THE SAME WALL THICKNESS AS THE CONNECTED PIPING AND SHALL BE COMPATIBLE WITH THE PIPING MATERIAL. THE USE OF FIELD FABRICATED FITTINGS IS PROHIBITED.

DIELECTRIC UNIONS OR FLANGES SHALL BE PROVIDED AT ALL JUNCTIONS OF COPPER OR BRASS PIPE OR FITTINGS AND FERROUS MATERIAL TO PREVENT ELECTROLYSIS AND GALVANIC CORROSION. WHERE COPPER OR BRASS COME IN CONTACT WITH FERROUS PIPING SYSTEMS MATERIALS, ISOLATE THE TWO MATERIALS WITH A NON-CONDUCTIVE NEOPRENE SPACER.

DIELECTRIC COUPLINGS SHALL BE RATED FOR AT LEAST 150 PERCENT OF MAXIMUM WORKING PRESSURE OF THE PIPING SYSTEM AND AT LEAST 50 F HIGHER THAN THE MAXIMUM OPERATING TEMPERATURE OF THE PIPING SYSTEM IN WHICH THEY ARE INSTALLED. COUPLINGS SHALL BE ELECTROPLATED STEEL OR BRASS WITH INERT AND NON-CORRISIVE THERMOPLASTIC LINING OR BRONZE FITTINGS.

PROVIDE DIELECTRIC INSULATING UNIONS IN PIPING 2 INCH AND SMALLER WITH THREADED OR SOLDER JOINT CONNECTIONS.

PIPE AND FITTINGS SHALL BE INSTALLED WITH A MIN. OF JOINTS AND COUPLINGS BUT WITH ADEQUATE AND ACCESSIBLE UNIONS FOR DISASSEMBLY AND MAINTENANCE REPLACEMENT VALVES AND EQUIPMENT. REDUCE SIZES WERE INDICTED USING REDUCING FITTINGS.

PIPING SHALL BE RAN WITHOUT TRAPS OR POCKETS AND A MIN. 1 INCH IN 40 FEET IN THE DIRECTION OF FLOW.

PIPING SHALL BE RAN PARALLEL TO THE WALLS AND CEILINGS WITH A MINIMUM OF 6 INCH CLEARANCE BETWEEN WALLS AND HORIZONTAL PIPING.

PIPE REQUIRING INSULATION SHALL BE INSTALLED WITH SUFFICIENT CLEARANCES TO PERMIT PROPER APPLICATION OF INSULATION.

DO NOT RUN PIPING OVER ELECTRICAL PANELS, TRANSFORMER VAULTS, ELEVATOR EQUIPMENT ROOMS OR ELECTRONIC EQUIPMENT SPACES AND ENCLOSURES.

PIPING SHALL BE INSTALLED WITH PROVISION FOR PIPE EXPANSION BOTH HORIZONTALLY AND VERTICALLY.

PIPING IDENTIFICATION:

PROVIDE PIPE IDENTIFICATION CONSISTING OF SETON SNAP-ON PLASTIC SLEEVES OR EQUAL. INDICATE SYSTEM NAME, NOMINAL PIPE SIZE, AND FLOW DIRECTION. PROVIDE PIPE IDENTIFIERS EVERY 50' IN OUTDOOR LOCATIONS AND EVERY 15' FOR INDOOR LOCATIONS. ALL FLOORS AND ROOMS THAT THE PIPING PASS THROUGH SHALL HAVE AT LEAST ONE LABEL.

PIPE INSULATION:

ACCEPTABLE INSULATION MANUFACTURERS OF FLEXIBLE ELASTOMERIC INSULATION PRODUCTS INCLUDE ARMSTRONG, HALSTEAD, MANVILLE, RUBATEX, OR SPECIFICALLY APPROVED EQUAL

INSULATION AND ACCESSORIES SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 50 OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM E84-75, NFPA 225, UL 723. AND FURTHER MUST MEET THE REQUIREMENTS OF NFPA 90-A.

PROVIDE FIRE-RETARDANT CLOSED-CELL SLIP-ON FLEXIBLE TYPE. PRODUCT SHALL HAVE CONTINUOUS OPERATIONAL TEMPERATURE LIMIT OF NOT LESS THAN 220 DEGREES F, AND A MINIMUM "F" VALUE OF ((3.70 DEGREE F/IT/HR) 12BTU/H) PER INCH THICKNESS AT 75 DEGREES F AMBIENT.

PIPE REQUIRING INSULATION SHALL BE INSTALLED WITH SUFFICIENT CLEARANCES TO PERMIT PROPER APPLICATION OF INSULATION AND MAINTAIN REQUIRED CLEARANCES.

USE FOAMGLASS PIPING INSULATION FOR THE FOLLOWING SERVICES:
CHILLED WATER LINES 1-1/2" THK, 2" PIPE SIZE & UNDER
CHILLED WATER LINES 2" THK, 2-1/2" PIPE SIZE & GREATER

JACKET SHALL BE REINFORCED KRAFT PAPER WITH ALUMINUM FOIL. PREMOLDING FITTING MATERIAL (INSERTS) SHALL BE PRECISELY CUT OR MITERED TO FIT AND TAPED TO FORM A FULLY INSULATED PIPE COVERING. USE ADHESIVE AND / OR TAPE SPECIFIED FOR TYPE OF INSULATION TO INSURE A THOROUGH VAPOR BARRIER.

PRIOR TO INSULATING AND CONCEALING THE PIPING SYSTEM, APPLY A WATER PRESSURE TEST TO ALL PARTS OF EACH SYSTEM BEFORE EQUIPMENT IS CONNECTED. USE A HYDROSTATIC PRESSURE OF NOT LESS THAN 100 PSIG OR 150 PERCENT OF SYSTEM OPERATING PRESSURE WHICHEVER IS GREATER. TEST SYSTEM FOR A PERIOD NOT LESS THAN FOUR HOURS. THERE SHALL BE NO LEAKS AT ANY POINT IN THE SYSTEM AT THIS PRESSURE.

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COA K938087

TLC Project No.: 824101

THINK. LISTEN. CREATE.

Grady MRI Chiller Concept Design

80 Jesse Hill Jr Dr SE
Atlanta, GA 30303

Consultants:

Revisions:

No.	Date	Description
A	10 JUL 24	DRAFT FOR REVIEW

Seal:

NOT FOR CONSTRUCTION

Project No.: 824101

Issue Date: 10 JULY 2024

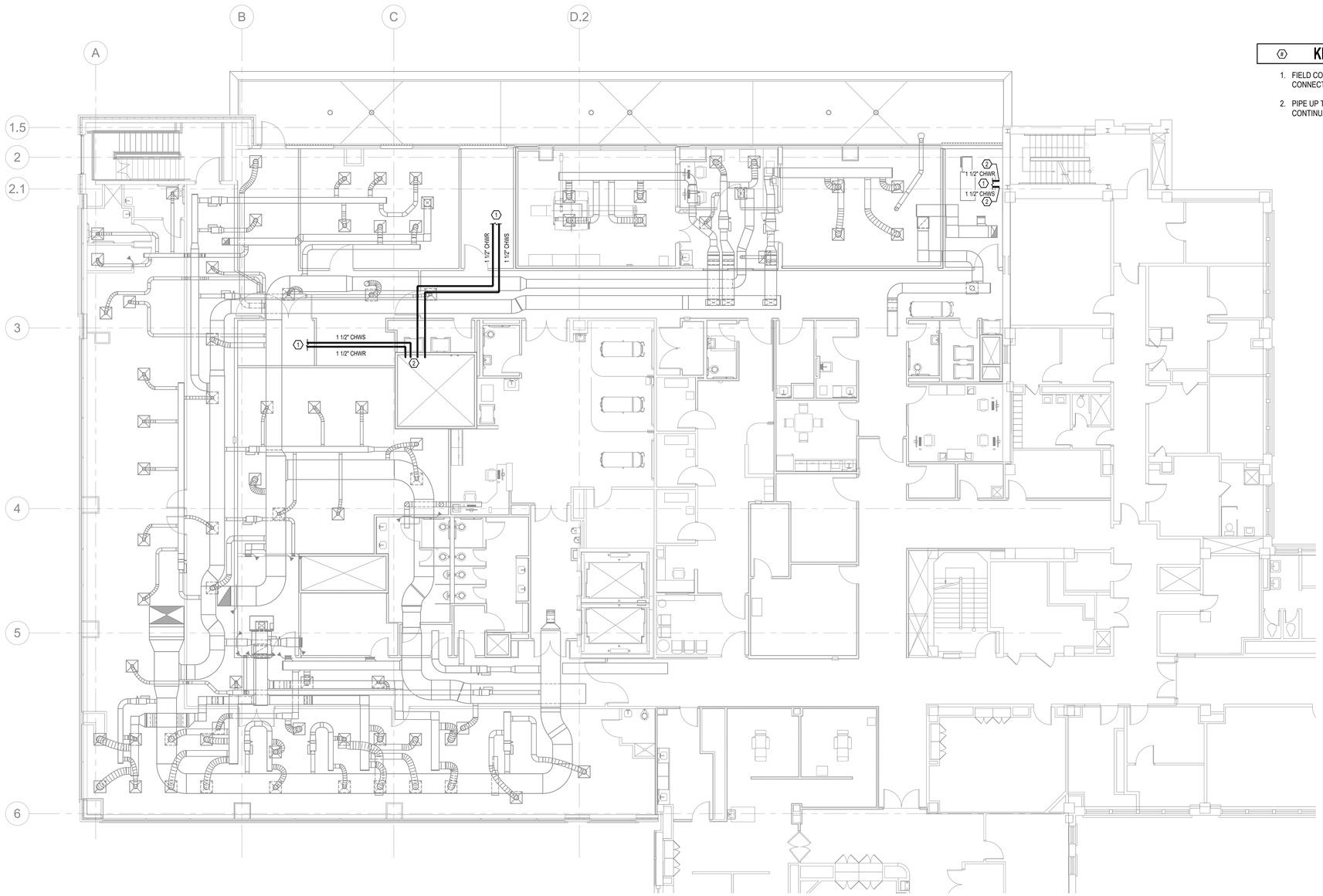
Drawn By: Christian D.

Approved By: MDM

Scale: NTS

Drawing Title:
MECHANICAL SPECIFICATIONS

Drawing No.:
M002



1 PARTIAL NEW WORK MECHANICAL PLAN - LEVEL 3
1/8" = 1'-0"

KEYNOTES

1. FIELD COORDINATE FINAL ROUTE TO PIPING CONNECTIONS.
2. PIPE UP TO 4TH FLOOR, SEE M202 FOR CONTINUATION.

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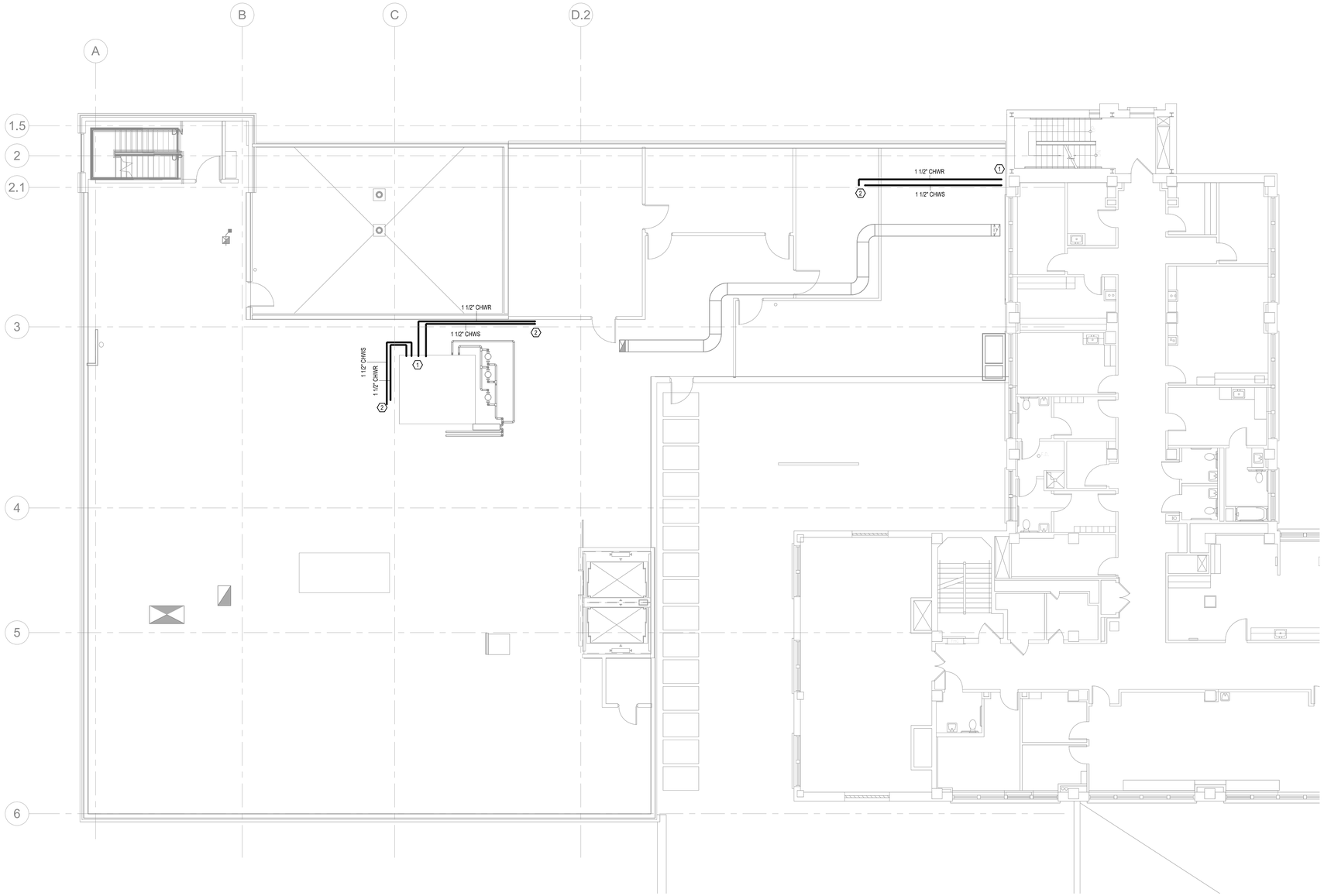
Issue Date: 10 JULY 2024
Drawn By: Christian D.
Approved By: MDM
Scale: 1/8" = 1'-0"

Drawing Title:
LEVEL 3 - NEW WORK MECHANICAL PLAN

Drawing No.:
M201



1 PARTIAL NEW WORK MECHANICAL PLAN - LEVEL 4
1/8" = 1'-0"

KEYNOTES

1. SUPPLY & RETURN PIPING UP FROM 3RD FLOOR, SEE M201 FOR CONTINUATION.
2. SUPPLY & RETURN PIPING UP THRU ROOF TO CHILLER, SEE M203 FOR CONTINUATION.

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Consultants:

Revisions:

No.	Date	Description
A	10 JUL 24	DRAFT FOR REVIEW

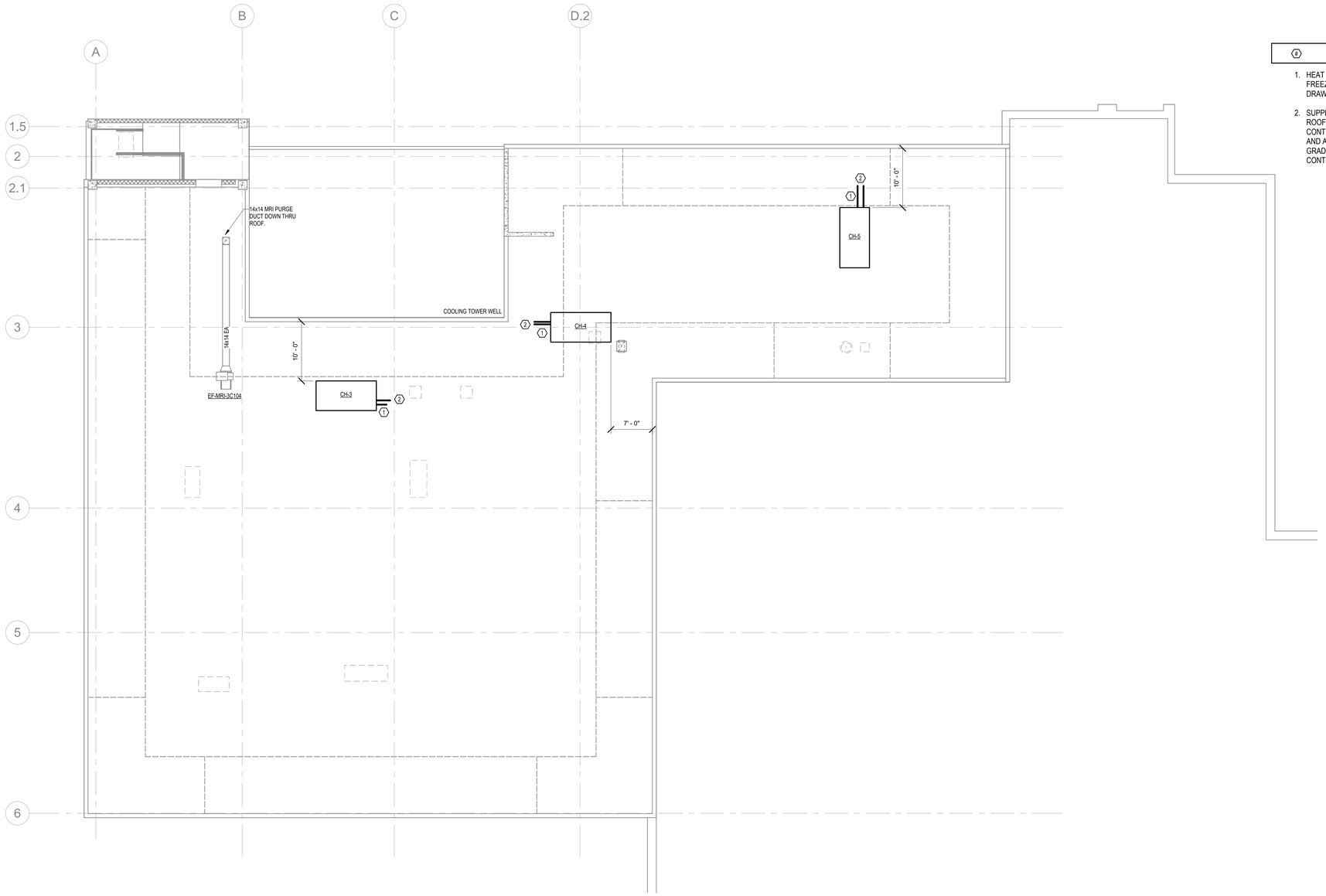
Seal:

NOT FOR CONSTRUCTION

Project No.:	824101
Issue Date:	10 JULY 2024
Drawn By:	Christian D.
Approved By:	MDM
Scale:	1/8" = 1'-0"

Drawing Title:
LEVEL 4 - NEW WORK MECHANICAL PLAN

Drawing No.:
M202



1 PARTIAL NEW WORK MECHANICAL PLAN - ROOF
1/8" = 1'-0"

KEYNOTES

1. HEAT TRACE ALL EXTERIOR PIPING FOR FREEZE PROTECTION AT 40F. SEE ELECTRICAL DRAWINGS.
2. SUPPLY AND RETURN PIPING DOWN THRU ROOF TO 4TH FLOOR. SEE M202 FOR CONTINUATION. PROVIDE PIPE DOGHOUSE AND ALL ROOF WORK, COORDINATE WITH GRADY'S PREFERRED ROOFING CONTRACTOR.

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Consultants:

Revisions:

No.	Date	Description
A	10 JUL 24	DRAFT FOR REVIEW

Seal:

NOT FOR CONSTRUCTION

Project No.: 824101

Issue Date: 10 JULY 2024

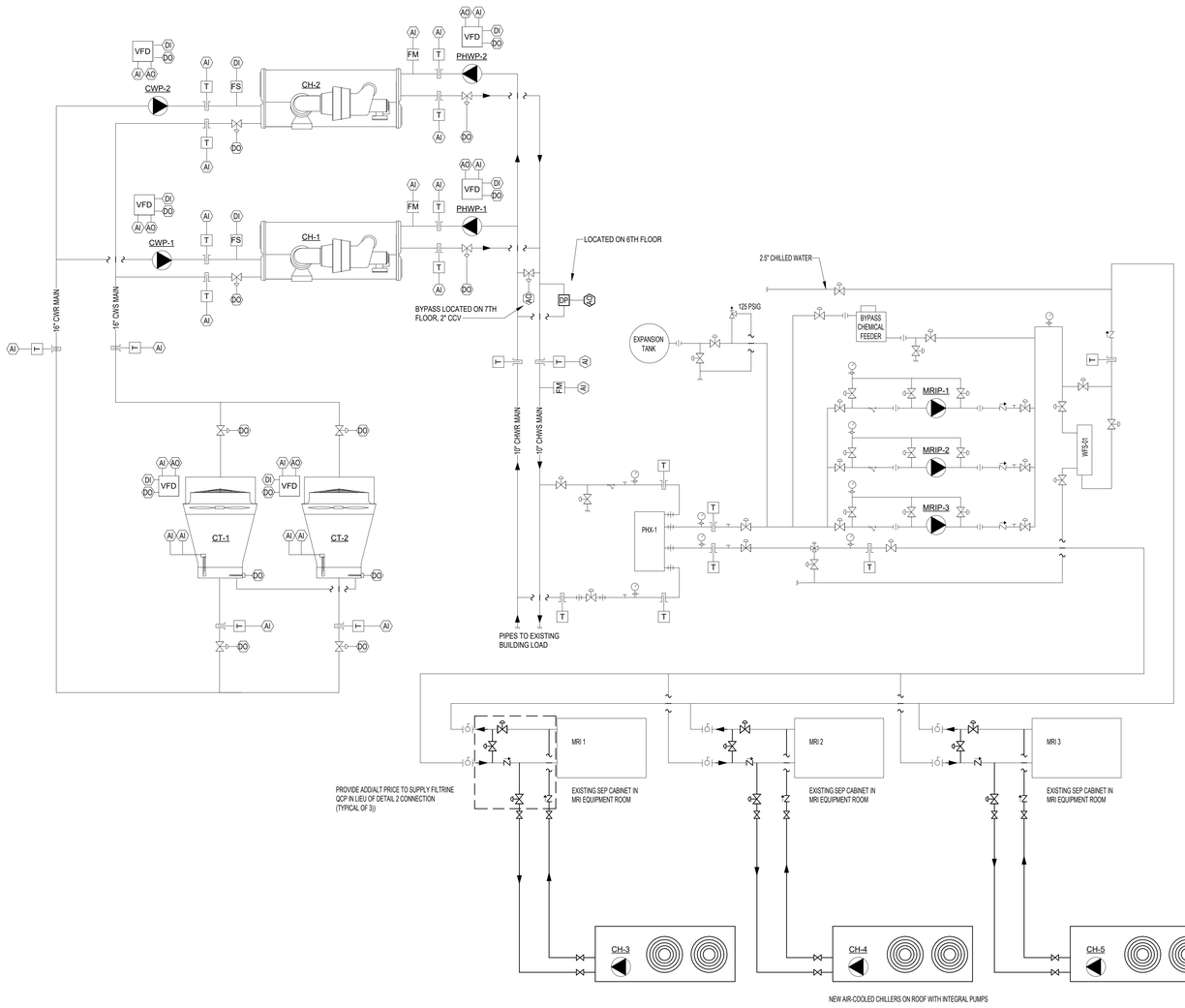
Drawn By: Christian D.

Approved By: MDM

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

Drawing Title:
ROOF LEVEL - NEW WORK MECHANICAL PLAN

Drawing No.:
M203



1 CHILLED WATER SCHEMATIC
12" = 1'-0"

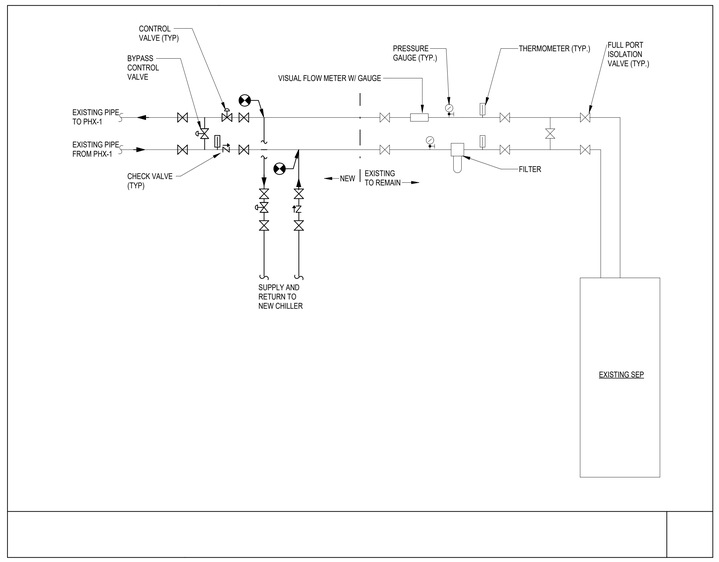
CHILLED WATER PLANT - SEQUENCE OF OPERATIONS

CHILLER START SEQUENCE:
1. THE CHILLER SHALL USE FACTORY-PROVIDED CONTROLS TO MAINTAIN THE SUPPLY WATER SETPOINT REQUIRED PER SITE-SPECIFIC MRI DRAWINGS.
2. IF ONE OF THE ALARMS LISTED BELOW TRIGGERS, THE CHILLER SHALL SHUT DOWN.

CHILLER ALARMS:
1. FAN MOTOR FAILURE.
2. PUMP MOTOR FAILURE.
3. COMPRESSOR FAILURE.
4. CHILLED WATER TEMPERATURE OUT OF RANGE.
5. FLOW RATE OUT OF RANGE.

VALVE POSITIONS:
1. THE CONTROL VALVE FROM THE NEW CHILLER SHALL BE NORMALLY OPEN, FAIL OPEN.
2. THE CONTROL VALVE FROM THE EXISTING HEAT EXCHANGER SHALL BE NORMALLY CLOSED, FAIL OPEN.
3. THE BYPASS CONTROL VALVE SHALL BE NORMALLY OPEN, SET TO MAINTAIN MINIMUM FLOW ON THE EXISTING MRIP PUMP LOOP. FAIL CLOSED.
4. WHEN A CHILLER SHUTS DOWN, THE CHILLER CONTROL VALVE CLOSES, THE HX VALVE OPENS, AND THE BYPASS VALVE CLOSES. THE OTHER BYPASS VALVES SHALL REMAIN IN PARTIAL FLOW CONDITION.

MRIP PUMP LOOP CONTROL:
1. THE PUMPS SHALL OPERATE IN LEAD/LAG CONFIGURATION TO EQUALIZE RUN TIME.
2. IN NORMAL OPERATING CONDITIONS, EACH BYPASS VALVE SHALL BE PARTIALLY OPEN TO MAINTAIN MINIMUM FLOW FOR (1) MRIP PUMP. THIS SHALL MAINTAIN THE BACK-UP COOLING SYSTEM AND THE CORRECT WATER TEMPERATURE.
3. WHEN A CHILLER SHUTS DOWN, THE MRIP SYSTEM SHALL RAMP UP TO PROVIDE MINIMUM FLOW AT THE SEP. THIS VALUE SHALL BE SET BY T&B AND WILL BE UNIQUE FOR EACH SEP.
4. AFTER REACHING MINIMUM SPEED, THE MRIP SYSTEM SHALL CONTROL TO ENTERING WATER TEMPERATURE AT THE SEP.



2 SEP CONNECTION DETAIL
NTS

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TLC Project No.: 824101

THINK. LISTEN. CREATE.

Grady MRI Chiller Concept Design

80 Jesse Hill Jr Dr SE
Atlanta, GA 30303

Consultants:

Revisions:

No.	Date	Description

Seal:

NOT FOR CONSTRUCTION

Project No.: 824101
Issue Date: 10 JULY 2024
Drawn By: Christian D.
Approved By: MDM
Scale: NTS

Drawing Title: MECHANICAL DETAILS

Drawing No.: M301

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EXISTING HEAT EXCHANGER SCHEDULE

MARK	MANUFACTURER	MODEL	TYPE	COLD SIDE						HOT SIDE						LOCATION
				SYSTEM	FLUID	FLOW (GPM)	EWT (°F)	LWT (°F)	MAX WPD (PSI)	SYSTEM	FLUID	FLOW (GPM)	EWT (°F)	LWT (°F)	MAX WPD (PSI)	
PHX-1	BELL & GOSSETT	GPX	GASKETED PLATE HX	CHW	WATER	100.0	44.0	59.9	4.50	PROCESSED CHW	WATER	100.0	64.0	48.0	4.47	LEVEL 4 MECH PENTHOUSE

NOTES:
1. STAINLESS STEEL PLATES
2. FOULING FACTOR: 0.000005
3. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS

EXISTING PUMP SCHEDULE

MARK	BASIS OF DESIGN		SYSTEM SERVED	FLUID DATA			PUMP DATA			PIPE DATA		MOTOR DATA				
	MANUFACTURER	MODEL		FLOW RATE (GPM)	HEAD (FT)	FLUID TEMP. (°F)	TYPE	IMPELLER SIZE (IN)	EFFICIENCY (%)	DISCHARGE SIZE (IN)	SUCTION SIZE (IN)	MOTOR HP	VFD	PUMP SPEED (RPM)	VOLTS	PHASE
MRIP-3	BELL & GOSSETT	e-80 2x2x9.5C	PCHW	70	75.0	48	INLINE	9.375	56.8	2	2	5	YES	1800		

NOTES:
1. SEE SPECIFICATIONS FOR OTHER APPROVED MANUFACTURERS AND ADDITIONAL REQUIREMENTS.
2. MOTORS SHALL BE HIGH EFFICIENCY AND TEFC TYPE.
3. PROVIDE PROPER PIPE TRANSITION TO PUMP INLET/OUTLET AS REQUIRED.
4. PROVIDE SUCTION DIFFUSERS AS REQUIRED.
5. PROVIDE FULL IMPELLER SIZE FOR ALL VFD DRIVEN PUMPS.
6. VFD DRIVEN PUMPS SHALL BE INVERTER DUTY.
7. PROVIDE SPRING VIBRATION ISOLATORS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

NEW AIR COOLED CHILLER SCHEDULE

MARK	BASIS OF DESIGN		COMP. TYPE	NUMBER OF COMP.	REFRIG.	BTU/H	EVAPORATOR DATA					CONDENSER DATA			ELECTRICAL DATA					
	MANUFACTURER	MODEL					EWT (°F)	LWT (°F)	FLOW (GPM)	MAX P.D. (FT)	FOULING FACTOR	DESIGN AMBIENT TEMP (°F)	NUMBER OF FANS	FAN TOTAL HP	EFFICIENCY (BTU/W.H)	IPLV.IP (BTU/W.H)	MCA	MOCP	VOLTS	PHASE
CH-3	FILTRINE	SMS-3000-330	VARIES	2		259,554	54	42	30			90	2	30			62	100	480	3
CH-4	FILTRINE	SMS-3000-330	VARIES	2		259,554	54	42	30			90	2	30			62	100	480	3
CH-5	FILTRINE	SMS-3000-330	VARIES	2		259,554	54	42	30			90	2	30			62	100	480	3

NOTES:

1. PROVIDE RAIL SYSTEM FOR ROOF MOUNTING.
2. PROVIDE WITH SINGLE-POINT POWER CONNECTION. SINGLE-POINT POWER CONNECTION SHALL INCLUDE ALL NECESSARY POWER NEEDS OF THE CHILLER. PROVIDE ANY NECESSARY STEP-DOWN TRANSFORMERS FOR COMPLETE SYSTEM.
3. PROVIDE UPS FOR CHILLER CONTROLS, SUCH THAT UPON POWER LOSS, THE CHILLER WILL RESTART AUTOMATICALLY, RESUMING ITS PREVIOUS STATUS AND SETTINGS.
4. PROVIDE LINE REACTORS FOR THE CONDENSER FAN VFDS FOR HARMONIC ISOLATION.
5. PERFORMANCE VALUES BASED ON AHRI TOLERANCES.
6. PROVIDE VARIABLE SPEED CONDENSER FANS FOR LOW AMBIENT CONTROL
7. PROVIDE CORROSION-RESISTANT BAKED ENAMEL FINISH ON CASING
8. PROVIDE FLEX CONNECTORS AND ISOLATION VALVES AT PIPE CONNECTIONS TO CHILLER INLET AND OUTLET.
9. PROVIDE FACTORY DISCONNECT AND CONTROL PANEL WITH NEMA 3R ENCLOSURE
10. PROVIDE FACTORY INSULATION.
11. PROVIDE PROTECTIVE CONDENSER GRILLES FOR PROTECTION OF CONDENSER FINS.
12. PROVIDE INTEGRAL 3 HP CENTRIFUGAL PUMP. STAINLESS STEEL CONSTRUCTION. PROVIDE RUBBER PAD ISOLATION.
13. INSULATE ALL INTERNAL PIPING AND FITTINGS WITH CLOSED CELL INSULATION.

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Approved By: MDM

Scale:

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Drawing No.: M401

APPENDIX B

ELECTRICAL SYMBOL LEGEND

BASIC MATERIALS

SYMBOL	DESCRIPTION
DEVICE ABBREVIATION TAGS:	
6C	POKE-THRU WITH 6" CORE DRILL
8C	POKE-THRU WITH 8" CORE DRILL
4G	FOUR-GANG FLOOR BOX
6G	SIX-GANG FLOOR BOX
8G	EIGHT-GANG FLOOR BOX
AV	DOUBLE DUPLEX RECEPTACLE WITH DEDICATED CIRCUIT FOR AV RACK OR CART
C	RECEPTACLE CONTROLLED PER ASHRAE 90.1 (2010); PROVIDE POWER PACK FOR RECEPTACLE CIRCUIT, TO BE CONTROLLED THROUGH LOCAL ROOM OCCUPANCY SENSOR(S); PROVIDE DEVICE WITH BLUE DOT OR UNIVERSAL POWER SYMBOL
ETR	EXISTING TO REMAIN
H	HOSPITAL GRADE
IG	ISOLATED GROUND (ORANGE DEVICE)
RL	RELOCATED
TR	TAMPER RESISTANT
TV	RECEPTACLE MOUNTED ADJACENT TO TV OUTLET, COORDINATE HEIGHT W/ ARCHITECT
U	DUPLEX RECEPTACLE WITH (2) USB PORTS
WP	WEATHERPROOF
S_a	SINGLE POLE SWITCH (SUBSCRIPT INDICATES ITEM CONTROLLED)
S_3	THREE-WAY SWITCH
S_4	FOUR-WAY SWITCH
S_K	SINGLE POLE KEY SWITCH
S_T	DIGITAL TIMER SWITCH W/ 5 MIN. WARNING FLASH
S_{OSab}	WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH, DUAL RELAY
S_{OS}	WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH
S_{VS}	WALL MOUNTED DUAL TECHNOLOGY VACANCY SENSOR SWITCH
$S_{D,OS}$	WALL MOUNTED DUAL TECHNOLOGY DIMMING/OCCUPANCY SENSOR SWITCH
S_{LV}	LOW VOLTAGE SWITCH
S_{LVO}	LOW VOLTAGE OVERRIDE SWITCH
S_{LVD}	LOW VOLTAGE OVERRIDE SWITCH WITH DIMMING
S_F	FAN SWITCH
S_M	MOTOR RATED SWITCH
S_D	DIMMER SWITCH, LINE VOLTAGE
OS	WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR
OS	CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR
DL	DAYLIGHT SENSOR CEILING MOUNTED
DL	DAYLIGHT SENSOR WALL MOUNTED
VS	VACANCY SENSOR CEILING MOUNTED
VS	VACANCY SENSOR WALL MOUNTED
PC	PHOTOCELL, MOUNTED ON ROOF FACING NORTH
J	NOTE: DIAGONAL MARKS INDICATED ON ANY DEVICE REPRESENTS DEVICE CONNECTED TO EMERGENCY CIRCUIT (RED DEVICE FOR RECEPTACLE); TYPICAL FOR ANY DEVICE IN LEGEND
	SINGLE RECEPTACLE
	DUPLEX RECEPTACLE
	TWO DUPLEX RECEPTACLES (QUAD) WITH COMMON COVERPLATE
	DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER
	TWO DUPLEX RECEPTACLES (QUAD) WITH COMMON COVER MOUNTED ABOVE COUNTER
	DUPLEX RECEPTACLE; EACH RECEPTACLE ON SEPARATE CIRCUIT (PROVIDE BREAKER WITH 2-POLE COMMON TRIP HANDLE)
	SPLIT-WIRED CONTROLLED DUPLEX RECEPTACLE
	GFCI RECEPTACLE; "WP" INDICATES CAST METAL "IN-USE" WEATHERPROOF COVER, WEATHER-RESISTANT LISTED
	TWO GFCI DUPLEX RECEPTACLES (QUAD) WITH COMMON COVERPLATE
	GFCI RECEPTACLE MOUNTED ABOVE COUNTER
	DUPLEX RECEPTACLE, CEILING MOUNTED
	TWO DUPLEX RECEPTACLES (QUAD) WITH COMMON COVERPLATE, CEILING MOUNTED
	PEDESTAL MOUNTED DUPLEX RECEPTACLE
	FLOOR BOX WITH DUPLEX RECEPTACLE WITH APPROPRIATE FLANGE
	FLOOR BOX, TWO DUPLEX RECEPTACLES (QUAD) WITH APPROPRIATE FLANGE
	MULTI-SERVICE FLOOR BOX WITH DUPLEX RECEPTACLE, VOICE/DATA/AV DEVICES (REFER TO TECHNOLOGY DRAWINGS OR OWNER'S VENDOR DRAWINGS FOR LOW VOLTAGE REQUIREMENTS)
	MULTI-SERVICE FLOOR BOX WITH TWO DUPLEX RECEPTACLES (QUAD) , VOICE/DATA/AV DEVICES (REFER TO TECHNOLOGY DRAWINGS OR OWNER'S VENDOR DRAWINGS FOR LOW VOLTAGE REQUIREMENTS)
	MULTI-SERVICE POWER & DATA FLOOR BOX WITH FURNITURE FEED CONNECTION (REFER TO TECHNOLOGY DRAWINGS OR OWNER'S VENDOR DRAWINGS FOR LOW VOLTAGE REQUIREMENTS)
	SPECIAL PURPOSE RECEPTACLE, NEMA CONFIGURATION AS NOTED
J	JUNCTION BOX WALL MOUNTED
J	JUNCTION BOX MOUNTED IN OR ABOVE CEILING OR IN STRUCTURE
J	WALL MOUNTED FURNITURE FEED POWER CONNECTION
PP	POWER POLE WITH POWER & DATA FURNITURE FEED POWER CONNECTIONS
PP	POWER POLE WITH POWER & DATA OUTLETS
P	MULTI-SERVICE POKE-THRU WITH TWO INTEGRAL DUPLEX RECEPTACLES AND VOICE/DATA/AV DEVICES (REFER TO TECHNOLOGY DRAWINGS OR OWNER'S VENDOR DRAWINGS FOR LOW VOLTAGE REQUIREMENTS), OR FURNITURE FEED CONNECTION; REFER TO POKE-THRU DETAILS
	MULTI-SERVICE RACEWAY WITH 5-20R RECEPTACLES, 18" O.C. UNLESS OTHERWISE NOTED
C	CLOCK RECEPTACLE, WALL MOUNTED
GND	GROUND BUS BAR, COPPER
SPD	SURGE PROTECTIVE DEVICE
ST	SHUNT-TRIP PUSHBUTTON; SEMI-FLUSH WALL MOUNTED UNLESS OTHERWISE NOTED; NEMA 3R FOR EXTERIOR LOCATIONS
EPO	EMERGENCY POWER OFF SHUNT-TRIP PUSHBUTTON, RED MUSHROOM HEAD, CLEAR LEXAN PROTECTIVE COVER
	OVERHEAD DOOR PUSHBUTTON CONTROL STATION
	PUSHBUTTON STATION
	MOTOR CONNECTION
MD	MOTORIZED DAMPER CONNECTION
VFD	VARIABLE FREQUENCY DRIVE
DDC	DIRECT DIGITAL CONTROL PANEL
BAS	BUILDING AUTOMATION SYSTEM CONTROL PANEL
LCP	LIGHTING CONTROL PANEL

SYMBOL	DESCRIPTION
MH	MANHOLE
PB	PULLBOX
HH	HANDHOLE
T	TRANSFORMER
ATS	AUTOMATIC TRANSFER SWITCH
30AR/NF 3R	NEMA RATING; NEMA 1 UNLESS OTHERWISE NOTED NON-FUSED DISCONNECT SWITCH, RATING AS NOTED NF = NON-FUSED AR = AMPERE RATING OF SWITCH 4X SS = NEMA 4X STAINLESS STEEL ENCLOSURE
30AR/20AF 3R	NEMA RATING; NEMA 1 UNLESS OTHERWISE NOTED FUSED DISCONNECT AF = AMPERE RATING OF FUSE AR = AMPERE RATING OF SWITCH 4X SS = NEMA 4X STAINLESS STEEL ENCLOSURE
MCP AMPERE RATING 30/3 0 3R	# OF POLES NEMA RATING; NEMA 1 UNLESS OTHERWISE NOTED COMBINATION MAGNETIC MOTOR STARTER, SIZE AS NOTED, 3-POLE UNLESS OTHERWISE NOTED 4X SS = NEMA 4X STAINLESS STEEL ENCLOSURE NEMA STARTER SIZE
	SWITCHBOARD/ SWITCHGEAR/ DISTRIBUTION PANEL
	BRANCH CIRCUIT PANELBOARD, OVER 240 VOLTS, SURFACE MOUNTED
	BRANCH CIRCUIT PANELBOARD, OVER 240 VOLTS, FLUSH MOUNTED
	BRANCH CIRCUIT PANELBOARD, UNDER 240 VOLTS, SURFACE MOUNTED
	BRANCH CIRCUIT PANELBOARD, UNDER 240 VOLTS, FLUSH MOUNTED
	CONDUIT CONCEALED ABOVE CEILING OR IN WAL
	CONDUIT EXPOSED
	CONDUIT CONCEALED IN SLAB, UNDERGROUND OR UNDER FLOOR
	CONDUIT HOMERUN TO ELECTRICAL PANEL
UP	CONDUIT TURNING UP
DN	CONDUIT TURNING DOWN
	CONDUIT STUBBED OUT OR UP
	CONDUIT CONTINUED
	FLEXIBLE CONDUIT
	CONDUIT SEAL-OFF FITTING
	GROUND OR GROUND ROD AS NOTED
	EXISTING TO BE REMOVED (HEAVY, DASHED LINE)
	EXISTING TO REMAIN (LIGHT, SOLID LINE)
	NEW (HEAVY, SOLID LINE)

FIRE ALARM / DETECTION SYSTEM

SYMBOL	DESCRIPTION
NFPA	
F	MANUAL PULL STATION
S	CEILING SMOKE DETECTOR, PHOTOELECTRIC TYPE UNLESS OTHERWISE NOTED E = ELEVATOR WITH RECALL CONTACTS I = IONIZATION
S	DUCT SMOKE DETECTOR R = RETURN S = SUPPLY
S BR	BEAM SMOKE DETECTOR BR OR R = BEAM DETECTOR RECEIVER BT OR T = BEAM DETECTOR TRANSMITTER
H	HEAT DETECTOR 135°F FIXED TEMPERATURE, UNLESS OTHERWISE NOTED, CEILING MOUNTED
R	SUPERVISED ADDRESSABLE FIRE ALARM CONTROL RELAY
	DUCT SMOKE DETECTOR REMOTE TEST SWITCH WITH INDICATING LAMP, WALL MOUNTED AT 48" AFF, UNLESS OTHERWISE NOTED
XXCD	COMBINATION SPEAKER/STROBE, WALL MOUNTED, 75CD UNLESS OTHERWISE NOTED CD = CANDELA RATING
F H	HORN ONLY, WALL MOUNTED
XXCD	STROBE, CEILING MOUNTED, 75 CD UNLESS OTHERWISE NOTED CD = CANDELA RATING
C	COMBINATION SPEAKER/STROBE , CEILING MOUNTED, 75CD UNLESS OTHERWISE NOTED CD = CANDELA RATING
S C	SPEAKER ONLY, CEILING MOUNTED
S	SPEAKER ONLY, WALL MOUNTED
	STROBE, WALL MOUNTED, 75CD UNLESS OTHERWISE NOTED
	FIREMAN'S PHONE JACK
VS	SPRINKLER TAMPER SWITCH CONNECTION
WS	SPRINKLER WATERFLOW SWITCH CONNECTION
PS	PRESSURE SWITCH CONNECTION
DH	ELECTROMAGNETIC DOOR HOLD OPEN DEVICE
FACP	FIRE ALARM CONTROL PANEL
FATC	FIRE ALARM TERMINAL CABINET
FAA	FIRE ALARM ANNUNCIATOR PANEL - FLUSH MOUNTED
EVAC	VOICE EVACUATION PANEL
MNS	MASS NOTIFICATION SYSTEM PANEL
DACT	MASS NOTIFICATION SYSTEM PANEL

LIGHTING

SYMBOL	DESCRIPTION
	STRIP FIXTURE
A 2 a ZX-X	FIXTURE TYPE FIXTURE, RECESSED, PENDANT OR SURFACE CEILING LOWER CASE LETTER INDICATES CONTROLLING SWITCH CIRCUIT NUMBER LIGHTING CONTROL ZONE NUMBER
	FIXTURE RECESSED, PENDANT OR SURFACE CEILING
	DIAGONAL HALF SHADING INDICATE FIXTURE CONNECTED TO CRITICAL CIRCUIT OR PROVIDED WITH INTEGRAL EMERGENCY BATTERY PACK; "E" AFTER FIXTURE TYPE TAG INDICATES INTEGRAL BATTERY PACK UNLESS OTHERWISE NOTED ON LIGHT FIXTURE SCHEDULE (TYPICAL FOR ALL LIGHT FIXTURE SYMBOLS) FULL SHADING INDICATE FIXTURE CONNECTED TO LIFE SAFETY CIRCUIT.
	FIXTURE, WALL MOUNTED
	RECESSED, PENDANT OR SURFACE CEILING
	WALL MOUNTED
	CEILING WALLWASHER, ACCENT LIGHT, LANDSCAPING TREE ACCENT LIGHT, FACADE LIGHT
	TRACK WITH TRACK LIGHT FIXTURE (TRIANGLES INDICATE QUANTITY OF TRACK HEADS)
	EMERGENCY TWIN-HEAD LIGHT WITH INTEGRAL BATTERY PACK, WALL MOUNTED
	LINEAR RECESSED, PENDANT OR SURFACE CEILING
	EXTERIOR POLE-MOUNTED AREA LIGHT FIXTURE, ARMS AS INDICATED ON DRAWINGS
	EXTERIOR PEDESTRIAN SIDEWALK BOLLARD OR POST-TOP LIGHT FIXTURE
	EXIT LIGHT, CEILING OR PENDANT MOUNTED; DIRECTIONAL ARROWS AS INDICATED; SHADED QUADRANT INDICATES FACE(S) OF FIXTURE
	EXIT LIGHT, WALL MOUNTED

NURSE CALL SYSTEMS

SYMBOL	DESCRIPTION
N	SINGLE PATIENT STATION
N 2	DUAL PATIENT STATION
D	DUTY STATION
S	STAFF ASSISTANCE STATION
SE	STAFF EMERGENCY STATION
SA	STAFF EMERGENCY ANNUNCIATOR
E	EMERGENCY STATION
T	TOILET EMERGENCY STATION
SH	SHOWER EMERGENCY STATION
CB	CODE BLUE EMERGENCY STATION
P	DUAL STAFF PRESENCE INDICATOR STATION
C	CORRIDOR DOME LIGHT WALL MOUNTED
Z	CORRIDOR ZONE LIGHT
CBAP	CODE BLUE ANNUNCIATOR PANEL WALL MOUNTED
NCEC	NURSE CALL EQUIPMENT CABINET
NCMS	NURSE CALL MASTER STATION
NCSS	NURSE CALL MASTER SUB-STATION
N	NURSE CALL SYSTEM CONDUIT AND WIRING

NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT.

ABBREVIATIONS

A/C	AIR CONDITIONING
AC	ALTERNATING CURRENT
ABV CLG	ABOVE CEILING
ADA	AMERICANS WITH DISABILITIES ACT
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
AMP	AMPERE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASA	AMERICAN STANDARDS ASSOCIATION
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
AWG	AMERICAN WIRE GUAGE
BC	BARE COPPER
BIL	BASIC IMPULSE LEVEL
BAS	BUILDING AUTOMATION SYSTEM
BMS	BUILDING MANAGEMENT SYSTEM
BRKR OR BKR	BREAKER
C	CONDUIT OR RACEWAY
CAB	CABINET
CKT	CIRCUIT
CB	CIRCUIT BREAKER
CBM	CERTIFIED BALLAST MANUFACTURERS
CATV	CABLE TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CLEC	CLOCK EQUIPMENT CABINET
CLG	CEILING
CO	CONDUIT OR RACEWAY ONLY
COAX	COAXIAL CABLE
COND	CONDUCTOR
CONN	CONNECTION
CPU	CENTRAL PROCESSING UNIT
CRT	CATHODE RAY TERMINAL (VIDEO DISPLAY TERMINAL)
CT	CURRENT TRANSFORMER
CU	COPPER
CW	COLD WATER
DC	DIRECT CURRENT
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DF	DEMAND FACTOR
DISC	DISCONNECT
DISC SW	DISCONNECT SWITCH
DO	DRAW OUT
DN	DOWN
DPST	DOUBLE POLE SINGLE THROW
EDH	ELECTRIC DUCT HEATER
EMT	ELECTRIC METALLIC TUBING
EO	ELECTRICALLY OPERATED
EOL	END OF LINE
EOR	ENGINEER OF RECORD
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
FA	FIRE ALARM
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FATC	FIRE ALARM TERMINAL CABINET
FCU	FAN COIL UNIT
FLA	FULL LOAD AMPERES
FM	FACTORY MUTUAL
FPU	FAN POWERED UNIT
FT	FEET
GF	GROUND FAULT
GFA	GROUND FAULT ALARM
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
GND, G	GROUND
HP	HORSEPOWER
HOA	HAND-OFF-AUTOMATIC
HORIZ	HORIZONTAL
IBC	INTERNATIONAL BUILDING CODE
IC	INTERCOM
ICU	INTENSIVE CARE UNIT
IECC	INTERNATIONAL ENERGY CONSERVATION CODE
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
IES	ILLUMINATING ENGINEERING SOCIETY
IMC	INTERMEDIATE METAL CONDUIT
IN	INCHES
IPCEA	INSULATED POWER CABLE ENGINEERS ASSOCIATION
IT	INSTANTANEOUS TRIP
JB OR J-BOX	JUNCTION BOX

ABBREVIATIONS (CONT.)

KCMIL	ONE THOUSAND CIRCULAR MILS
KV	KILOVOLT
KVA	KILOVOLT AMPERES
KW	KILOWATT
KWH	KILOWATT HOURS
LBS	POUNDS
LED	LIGHT EMITTING DIODE
LP	LIGHTNING PROTECTION
LT	LIGHT
LTG	LIGHTING
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND
LSIA	LONG TIME, SHORT TIME, INSTANTANEOUS, ALARM
LSI	LONG TIME, SHORT TIME, INSTANTANEOUS
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN SERVICE DISTRIBUTION PANEL
MIC	MICROPHONE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MSB	MAIN SERVICE SWITCHBOARD
MTD	MOUNTED
MTG	MOUNTING
MTR	MOTOR
MTS	MANUAL TRANSFER SWITCH
MUX	MULTIPLEX (TRANSPONDER) PANEL
MVA	MEGA VOLT AMPS
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NF	NON-FUSED
NL	NON-LINEAR
NO	NORMALLY OPEN OR NUMBER
OL	OVERLOAD
OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
P	POLE
PB	PULLBOX
PF	POWER FACTOR
PIV	POST INDICATOR VALVE
PNL	PANEL
PR	PAIR
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYLCHLORIDE
PWR	POWER
REC, RECEPT	RECEPTACLE
REF	REFRIGERATOR
RGS, GRC	RIGID GALVANIZED STEEL CONDUIT
RLA	RUNNING LOAD AMPERES
RMS	ROOT-MEAN-SQUARE
RPM	REVOLUTIONS PER MINUTE
RTU	ROOF TOP UNIT
SCA	SHORT CIRCUIT AMPERES
SD	SMOKE DETECTOR
SEC	SECONDARY
S/N	SOLID NEUTRAL
SPD	SURGE PROTECTIVE DEVICE
SPKR	SPEAKER
SPST	SINGLE POLE SINGLE THROW
SS	STAINLESS STEEL
SST	SOLID STATE TRIP
STD	SHORT TIME TRIP
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TEL	TELEPHONE
TTB	TELEPHONE TERMINAL BOARD
TTC	TELEPHONE TERMINAL CABINET
TVEC	TELEVISION EQUIPMENT CABINET
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
UL	UNDERWRITERS LABORATORIES
UTIL	UTILITY
V	VOLT
VA	VOLTAMPERE
VAR	VOLT AMPERE REACTIVE
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE
WP	WEATHER PROOF
XFMR	TRANSFORMER
XFR	TRANSFER

ELECTRICAL SHEET INDEX

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Revisions:

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A	10 JUL 24	DRAFT FOR REVIEW

Seal:

NOT FOR CONSTRUCTION

Project No.: 824101
Issue Date: 10 JULY 2024
Drawn By: RLS
Approved By: FSS
Scale: N.T.S.
Drawing Title: ELECTRICAL SYMBOLS, LEGEND, AND INDEX
Drawing No.: E001

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FIRE ALARM SYSTEM NOTES

1. ALL FIRE ALARM EQUIPMENT IS TO BE NEW, UL LISTED FOR FIRE SERVICE, AND SHALL BE COMPATIBLE WITH THE SYSTEM BEING USED.
2. ALL WIRING AND CONDUIT IS TO CONFORM TO NEC ARTICLE 760. WIRING SHALL BE UL LISTED, MINIMUM 300V TYPE FPLP PLENUM RATED SOLID COPPER OR STRANDED COPPER WITH MAXIMUM 19 STRANDS.
3. LOW VOLTAGE CONDUCTORS: PROVIDE CONDUCTORS IN ACCORDANCE WITH NFPA 70 AND NFPA 72, AND AS RECOMMENDED BY THE FIRE ALARM SYSTEM MANUFACTURER. CONDUCTORS SHALL BE COPPER, MINIMUM NO. 14 AWG, TWISTED SHIELDED PAIR.
4. SURVIVABILITY: A 2-HOUR RATED CABLE ASSEMBLY SHALL BE PROVIDED FOR NOTIFICATION APPLIANCE CIRCUITS AND ANY OTHER CIRCUITS NECESSARY FOR THE OPERATION OF THE NOTIFICATION APPLIANCE CIRCUITS FROM THE POINT AT WHICH THEY EXIT THE CONTROL UNIT UNTIL THE POINT THAT THEY ENTER THE NOTIFICATION ZONE THAT THEY SERVE.
5. MANUAL PULL STATIONS ARE TO BE INSTALLED AT 42" TO BOTTOM OF DEVICE AND NO HIGHER THAN 48" TO HANDLE ABOVE FINISHED FLOOR.
6. PROVIDE MINIMUM 3/4" CONDUIT AND WIRING BETWEEN EACH FIRE ALARM DEVICE AND FROM LAST DEVICE TO FACP UNLESS OTHERWISE NOTED.
7. PROVIDE DUCT DETECTOR (AND FIRE ALARM RELAY WHERE APPLICABLE) CONNECTED TO FIRE ALARM SYSTEM, WITHIN 5' OF ALL DUCT PENETRATIONS THROUGH FIRE/SMOKE WALLS, WHETHER INDICATED ON ELECTRICAL OR MECHANICAL PLANS OR NOT.
8. FIRE ALARM CONTROL PANEL IS TO BE PROVIDED WITH DEDICATED 120V CIRCUIT WITH EQUIPMENT GROUND CONNECTION PER MANUFACTURER'S RECOMMENDATIONS AND ARTICLE 760 OF THE NEC. PROVIDE MINIMUM #12 AWG FOR GROUND CONNECTION. NOTE: PANEL NEUTRAL OR CONDUIT GROUND IS NOT ACCEPTABLE. 120V CIRCUIT SHALL BE FROM EMERGENCY/LIFE SAFETY BRANCH WHERE AVAILABLE.
9. SECONDARY BACK-UP POWER SHALL BE PROVIDED BY INTEGRAL BATTERIES WITHIN THE FIRE ALARM CONTROL PANEL TO SUPPLY POWER TO THE SYSTEM UNDER QUIESCENT LOAD FOR A MINIMUM OF 24 HOURS, AND THEN BE CAPABLE OF AN ADDITIONAL 15 MINUTES (5 MINUTES FOR NON VOICE SYSTEMS) ALARM OPERATION AT MAXIMUM CONNECTED LOAD.
10. ALL FIRE ALARM POWER CIRCUITS SHALL HAVE A DEDICATED 120V 20A BREAKER THAT SHALL BE RED IN COLOR AND MECHANICALLY PROTECTED (LOCKABLE IN THE "ON" POSITION), MARKED AS "FIRE ALARM CIRCUIT".
11. A SUPERVISORY SIGNAL SHALL BE ANNUNCIATED UPON ANY TAMPER SWITCH ACTIVATION. FAILURE OR REMOVAL OF ANY DETECTION OR MANUAL DEVICE SHALL ACTIVATE A TROUBLE SIGNAL.
12. A CERTIFICATION OF COMPLETION AND UL LISTING SHALL BE ISSUED AND INSTALLED ON THE FIRE ALARM CONTROL PANEL. SUBMIT NFPA RECORD OF COMPLETION FORM ALONG WITH SMOKE DETECTOR SENSITIVITY REPORT FOR ALL DETECTORS WITHIN THE PROJECT AREA TO ENGINEER AND MAKE AVAILABLE AT FINAL INSPECTION.
13. MINIMUM CANDELA RATING OF STROBES IS 75; "110" ADJACENT TO DEVICE INDICATES 110 CANDELA RATING. PROVIDE SYNCHRONIZATION OF STROBES IN ALL ADJACENT AREAS WHERE STROBES ARE VISIBLE TO EACH OTHER.
14. ALL STROBES SHALL ACTIVATE UPON INITIATION OF THE GENERAL ALARM.
15. ALL STROBES SHALL BE INSTALLED PER ADA MOUNTING HEIGHT REQUIREMENTS. WALL MOUNTED STROBES SHALL BE INSTALLED SO THAT THE BOTTOM OF THE STROBE LENS IS 80" AFF.
16. STROBES SHALL BE INSTALLED WITHIN 15' OF THE ENDS OF ALL CORRIDORS.
17. FIRE ALARM DEVICES INSTALLED OUTSIDE OR IN AREAS OPEN TO THE EXTERIOR SHALL BE WEATHERPROOF DEVICES IN APPROVED BACKBOXES.
18. SMOKE DETECTORS SHALL BE PHOTO-ELECTRIC ADDRESSABLE TYPE, UNLESS SPECIFICALLY NOTED OTHERWISE.
19. SMOKE DETECTORS ARE TO BE INSTALLED PER NFPA 72. WALL MOUNTED SMOKE DETECTORS SHALL BE MOUNTED 4"-12" BELOW THE CEILING AND AWAY FROM CORNERS.
20. SMOKE DETECTORS LOCATED IN ELEVATOR LOBBIES, ELEVATOR HOISTWAYS AND ELEVATOR MACHINE ROOMS SHALL INITIATE ELEVATOR RECALL, ACTIVATE ELEVATOR WARNING LIGHTS AND CAUSE SEPARATE AND DISTINCT VISIBLE ANNUNCIATION AT THE FIRE ALARM CONTROL PANEL AND FIRE ALARM ANNUNCIATORS.
21. DUCT DETECTORS SHALL BE PHOTO-ELECTRIC ADDRESSABLE TYPE, AND RATED FOR VELOCITIES UP TO 5000 FT/MIN.
22. HEAT DETECTORS SHALL BE ADDRESSABLE, FIXED TYPE @ 135 DEG F, UNLESS OTHERWISE NOTED.
23. FOR PROJECTS WITH AN ELEVATOR, THE ELEVATOR CONTROL PANEL SHALL HAVE TWO SIGNALS FROM THE FIRE ALARM CONTROL PANEL/ ASSOCIATED SMOKE DETECTORS - ONE FROM THE "DESIGNATED FLOOR" SMOKE DETECTOR AND ANOTHER COMBINED SIGNAL FROM THE SMOKE DETECTORS AT THE OTHER LOBBY LANDINGS AND IN THE ELEVATOR EQUIPMENT ROOM.
24. ACTIVATION OF ANY SMOKE DETECTOR IN THE ELEVATOR LOBBY OF THE DESIGNATED PRIMARY RECALL LEVEL OR ELEVATOR MACHINE ROOM SHALL ACTIVATE ALTERNATE LEVEL RECALL.
25. PRIOR TO INSTALLATION OF ELEVATOR HOISTWAY HEAT DETECTORS, VERIFY WITH LOCAL AUTHORITY HAVING JURISDICTION IF THEY ARE REQUIRED.
26. HEAT DETECTORS SHALL BE LOCATED WITHIN 24" OF SPRINKLER HEADS LOCATED IN THE ELEVATOR MACHINE ROOM AND ALL HOISTWAY SPRINKLER HEADS LOCATED 24" ABOVE THE ELEVATOR PIT FLOOR. THESE HEAT DETECTORS SHALL HAVE BOTH A LOWER TEMPERATURE RATING AND HIGHER SENSITIVITY THAN THE SPRINKLER HEADS. HEAT DETECTORS SHALL OPEN THE MAIN DISCONNECT/POWER SUPPLY TO THE ELEVATOR CONTROLLER. CONTROL CIRCUITS TO SHUT OFF ELEVATOR POWER SHALL BE MONITORED BY THE FIRE ALARM CONTROL PANEL. CONTROL MODULE SHALL BE WITHIN 3 FEET OF THE ELEVATOR CONTROLLER.
27. WHERE THERE IS A GENERATOR ON THE PROJECT, PROVIDE RELAYS AS REQUIRED FOR THE FIRE ALARM SYSTEM TO MONITOR THE FOLLOWING THREE CONDITIONS: GENERATOR RUNNING; GENERATOR FAULT; GENERATOR SWITCH NOT IN AUTO.
28. WHERE THERE IS A FIRE PUMP ON THE PROJECT, PROVIDE RELAYS AS REQUIRED FOR THE FIRE ALARM SYSTEM TO MONITOR THE FOLLOWING THREE CONDITIONS: FIRE PUMP RUNNING; FIRE PUMP LOSS OF POWER; FIRE PUMP POWER PHASE REVERSAL.
29. PROVIDE AN ADDRESSABLE FIRE ALARM SYSTEM PER NFPA AND ALL STATE AND LOCAL CODE REQUIREMENTS. COMPLY WITH NFPA 72 AND ADA REQUIREMENTS.
30. FIELD VERIFY LOCATION OF AREA SMOKE DETECTORS AND HEAT DETECTORS. DO NOT LOCATE WITHIN 36" OF AN HVAC DIFFUSER (SUPPLY OR RETURN), IN DIRECT AIR FLOW PATH, OR WITHIN 24" OF A SPRINKLER HEAD UNLESS NOTED OTHERWISE. SMOKE DETECTORS FOR DOOR RELEASE SHALL BE LOCATED ON THE CENTERLINE OF THE DOOR AND A MAXIMUM OF FIVE FEET FROM THE DOOR. THE MINIMUM DISTANCE FROM THE DOOR SHALL BE THE DEPTH OF THE WALL SECTION ABOVE THE DOOR, BUT NOT LESS THAN 12".
31. PROVIDE LABELS FOR REMOTE ALARM INDICATORS FOR DUCT MOUNTED SMOKE DETECTORS (I.E., AHU-1 SUPPLY, AHU-2 RETURN, FIRE/SMOKE DAMPER, ETC.). DUCT DETECTORS SHOULD BE LOCATED WITHIN 6 TO 10 EQUIVALENT DIAMETERS OF STRAIGHT, UNINTERRUPTED DUCTWORK. DUCT DETECTORS FOR FIRE/SMOKE DAMPERS SHOULD BE LOCATED BETWEEN THE LAST INLET OR OUTLET UPSTREAM OF THE DAMPER AND THE FIRE INLET OR OUTLET DOWNSTREAM OF THE DAMPER, AND WITHIN FIVE FEET OF THE FIRE/SMOKE WALL.
32. EQUIPMENT SHUT DOWN FIRE ALARM RELAYS SHALL BE LOCATED WITHIN THREE (3) FEET OF THE EQUIPMENT CONTROLS AND THE WIRING TO THE RELAY SHALL BE MONITORED BY THE FIRE ALARM SYSTEM.
33. ALL FIRE ALARM CABLE SHALL BE INSTALLED IN CONDUIT; NO FIRE ALARM CONDUIT SHALL BE INSTALLED UNDER SLAB. PROVIDE MANUFACTURED RED CONDUIT UNLESS OTHERWISE NOTED.
34. MINIMIZE EXPOSURE OF DETECTORS TO DIRT AND DUST FROM CONSTRUCTION. PROVIDE PLASTIC COVERS DURING CONSTRUCTION.
35. STATE CERTIFIED AND LICENSED FIRE ALARM CONTRACTOR SHALL PREPARE AND SUBMIT SIGNED AND SEALED DRAWINGS FOR THE LOCAL AUTHORITY HAVING JURISDICTION/ FIRE MARSHALL.
36. FOR RENOVATION PROJECTS, CONTRACTOR SHALL PROVIDE MEANS OF AUTOMATIC SMOKE DETECTION VIA INSTALLED SMOKE DETECTORS CONNECTED TO THE FACILITY FIRE ALARM SYSTEM FOR COVERAGE DURING NON-OCCUPIED PERIODS WITHIN THE CONSTRUCTION AREA. ALTERNATIVELY, A DOCUMENTED FIRE WATCH OF THE ENTIRE AREA PERFORMED IN INCREMENTS NO GREATER THAN ONE HOUR MAY BE PERFORMED PROVIDED THAT IT IS DOCUMENTED IN FULL ACCORDANCE WITH NFPA 72. COORDINATE ACTIVITY IN FIELD WITH GENERAL CONTRACTOR.
37. ALL NOTIFICATION DEVICES SHALL MATCH EXISTING NOTIFICATION DEVICES IN COLOR.
38. FIRE ALARM CIRCUITS SHALL MATCH EXISTING CLASS IN EXISTING BUILDINGS.
39. ALL NOTIFICATION DEVICES SHALL BE WHITE.
40. FIRE ALARM CIRCUITS SHALL BE CLASS "A",
41. NOTIFICATION DEVICES SHALL BE ADDRESSABLE ELECTRIC-VIBRATING-POLARIZED HORNS, SELECTABLE FOR HIGH OR LOW dBA OUTPUT. THEY SHALL HAVE A SOUND PRESSURE LEVEL OF 90dBA MEASURED 10 FEET FROM HORN, USING CODED SIGNAL PER NFPA 72.

APPLICABLE CODES

ALL WORK UNDER THIS DIVISION SHALL BE IN STRICT COMPLIANCE AND IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE FOLLOWING CODES AND STANDARDS INCLUDING THE REGULATIONS OF GOVERNING LOCAL, STATE, COUNTY AND OTHER APPLICABLE CODES. REFER TO SPECIFICATIONS FOR ADDITIONAL CODE REQUIREMENTS:

BUILDING CODES:
- INTERNATIONAL BUILDING CODE, 2018 ADDITION, WITH GA AMENDMENTS
- INTERNATIONAL FIRE CODE, 2018 EDITION, WITH GA AMENDMENTS
- INTERNATIONAL ENERGY CONSERVATION CODE, 2015 EDITION, WITH GA AMENDMENTS

ADDITIONAL CODES, STANDARDS, AND REQUIREMENTS
1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
2. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE).
3. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA).
4. REQUIREMENTS OF LOCAL POWER COMPANY.
5. THE AMERICANS WITH DISABILITIES ACT (ADA).
6. OWNER'S PUBLISHED DESIGN STANDARDS.

ALL MATERIALS SHALL BE NEW AND FREE OF DEFECTS, AND SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LAB, AS DEFINED BY OSHA. WHERE NO LABELING OR LISTING SERVICE IS AVAILABLE FOR CERTAIN TYPES OF EQUIPMENT, TEST DATA SHALL BE SUBMITTED TO VALIDATE THAT EQUIPMENT MEETS OF EXCEEDS AVAILABLE STANDARDS.

NATIONAL FIRE PROTECTION (NFPA) STANDARDS:
- NFPA 13, 2019 EDITION, STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS.
- NFPA 70, 2020 EDITION, NATIONAL ELECTRICAL CODE®.
- NFPA 72, 2019 EDITION, NATIONAL FIRE ALARM AND SIGNALING CODE.
- NFPA 90A, 2018 EDITION, STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS.
- NFPA 90B, 2018 EDITION, STANDARD FOR THE INSTALLATION OF WARM AIR HEATING AND AIR-CONDITIONING SYSTEMS.
- NFPA 101, 2018 EDITION, LIFE SAFETY CODE®.

ELECTRICAL GENERAL NOTES

GENERAL REQUIREMENTS

1. THE DRAWINGS AND APPLICABLE SPECIFICATIONS SHALL BE CONSIDERED SUPPLEMENTARY, ONE TO THE OTHER AND ARE CONSIDERED THE "CONTRACT DOCUMENTS". ALL WORKMANSHIP, METHODS AND/OR MATERIALS DESCRIBED OR IMPLIED BY ONE AND NOT DESCRIBED OR IMPLIED BY THE OTHER SHALL BE PROVIDED, FURNISHED OR PERFORMED AS IF IT HAD APPEARED IN BOTH SECTIONS. THE TERM "CONTRACT DOCUMENTS" DESCRIBED HEREIN IS NOT LIMITED SOLELY TO THE ELECTRICAL PORTION OF THE DRAWINGS AND SPECIFICATIONS, BUT ENCOMPASSES THE DRAWINGS AND SPECIFICATIONS OF ALL DIVISIONS AS A WHOLE.
2. THE DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW EVERY DETAIL OF CONSTRUCTION, METHODS, MATERIALS AND EQUIPMENT, OR EXACT LOCATIONS, ROUTING, ETC. THEY INDICATE THE RESULT TO BE ACHIEVED BY THE ASSEMBLAGE OF SEVERAL SYSTEMS FOR A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM. DO NOT SCALE THE CONTRACT DOCUMENTS. COORDINATE EXACT EQUIPMENT LOCATIONS WITH THE ARCHITECTURAL, CIVIL AND STRUCTURAL CONTRACT DOCUMENTS, AS WELL AS FIELD CONDITIONS, APPROVED SHOP DRAWINGS AND WORK OF ALL OTHER DIVISIONS/TRADES.
3. THE TERM "PROVIDE" USED IN THE CONTRACT DOCUMENTS INDICATES TO FURNISH AND INSTALL MATERIALS REQUIRED FOR CORRECT INSTALLATION OF A COMPLETE SYSTEM, UNLESS SPECIFICALLY NOTED OTHERWISE
4. UNLESS NOTED AS EXISTING, ALL ELECTRICAL INDICATED ON THE CONTRACT DOCUMENTS SHALL BE NEW, SHALL BE U.L. LISTED, AND SHALL BEAR A U.L. LABEL. WHERE NO U.L. LABEL OR LISTING IS AVAILABLE, THE MATERIAL SHALL BE LISTED WITH AN APPROVED, NATIONALLY RECOGNIZED ELECTRICAL TESTING AGENCY.
5. PROVIDE EXPERIENCED, QUALIFIED AND RESPONSIBLE SUPERVISION FOR ALL WORK REQUIRED BY THE CONTRACT DOCUMENTS. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, TO THE SATISFACTION OF THE ARCHITECT/ENGINEER AND OWNER.
6. CARRY ALL INSURANCE REQUIRED TO PROTECT AGAINST PUBLIC LIABILITY AND PROPERTY DAMAGE FOR THE DURATION OF THIS PROJECT
7. GUARANTEE ALL MATERIALS AND WORKMANSHIP ARE FREE FROM DEFECTS FOR A PERIOD OF NOT LESS THAN ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE ARCHITECT/ENGINEER AND OWNER, UNLESS NOTED OTHERWISE IN DIVISION 1. AT NO ADDITIONAL COSTS, PROVIDE THE CORRECTION OF ANY DEFECTS INCLUDING REPAIR OR REPLACEMENT.
8. INCLUDE ALL COSTS ASSOCIATED WITH PERMITS, LICENSES, FEES, INSPECTIONS, TESTING AND TEMPORARY POWER IN THE BID PRICE, UNLESS NOTED OTHERWISE.
9. IF HAZARDOUS MATERIALS ARE ENCOUNTERED, COMPLY WITH ALL APPLICABLE RULES, REGULATIONS AND GUIDELINES CONCERNING REMOVAL, HANDLING, DISPOSAL AND PROTECTION AGAINST ENVIRONMENTAL EXPOSURE OR POLLUTION. PROVIDE DOCUMENTATION OF SAID COMPLIANCE.
10. PROVIDE ELECTRONIC SUBMITTALS (PRODUCT DATA & SHOP DRAWINGS) FOR EACH MAJOR COMPONENT OF THE ELECTRICAL SYSTEM FOR REVIEW BY THE ARCHITECT/ENGINEER AND OWNER. MAJOR COMPONENTS INCLUDE, BUT ARE NOT LIMITED TO, RACEWAYS, BOXES, WIRE AND CABLE, EQUIPMENT, DEVICES, LIGHT FIXTURES, SWITCHGEAR, PANELBOARDS, CIRCUIT BREAKERS, SAFETY SWITCHES, FIRE ALARM SYSTEM, ETC. ALL SUBMITTALLS ARE TO BE REVIEWED AND APPROVED BY THE CONTRACTOR FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS PRIOR TO SUBMITTING TO THE ARCHITECT/ENGINEER. ALLOW A MINIMUM OF TEN (10) BUSINESS DAYS FOR REVIEW BY ARCHITECT/ENGINEER, UNLESS NOTED OTHERWISE IN DIVISION 1.
11. THE ELECTRICAL PORTION OF THE CONTRACT DOCUMENTS ARE COORDINATED WITH THE DESIGN BASIS EQUIPMENT SPECIFIED BY DIVISION 26 AND OTHER DIVISIONS. WHERE THE CONTRACTOR ELECTS TO SUBSTITUTE A PRODUCT IN LIEU OF PROVIDING THE DESIGN BASIS, AND SAID SUBSTITUTION IS ACCEPTED BY THE ARCHITECT/ENGINEER AND OWNER, THE CONTRACTOR SHALL MAKE ALL CORRECTIONS TO THE ELECTRICAL SYSTEM NECESSARY IN ORDER TO ENSURE A COMPLETE AND OPERATIONAL INSTALLATION OF THE EQUIPMENT AT NO ADDITIONAL COSTS. WHERE THE CONTRACTOR'S DESIGN SUBSTITUTION RESULTS IN THE NEED FOR THE ENGINEER TO REVISE THE CONTRACT DOCUMENTS, THE ENGINEER RESERVES THE RIGHT TO REQUEST COMPENSATION FROM THE CONTRACTOR FOR SAID SERVICES.
12. MAINTAIN A CURRENT AND ACCURATE SET OF PROJECT RECORD DOCUMENTS (AS-BUILTS) AT THE SITE THROUGHOUT THE DURATION OF THE PROJECT. RECORD DRAWINGS SHALL BE UPDATED EACH DAY TO REFLECT THE ACTUAL LOCATIONS, SIZES, ROUTING, ETC. OF EACH PORTION OF THE ELECTRICAL SYSTEM AFFECTED BY THIS WORK. A FINAL SET OF RECORD DOCUMENTS SHALL BE ISSUED TO THE ARCHITECT/ ENGINEER FOR REVIEW AND THEN SUBMITTED TO THE OWNER WITHIN 30 DAYS AFTER THE DATE OF FINAL ACCEPTANCE. PROVIDE RECORD DRAWINGS OF THE ACTUAL INSTALLATION INCLUDING SINGLE LINE DIAGRAM, POWER RISER DIAGRAM OF THE BUILDING ELECTRICAL DISTRIBUTION SYSTEM, SITE PLANS AND ALL ELECTRICAL FLOORPLANS, DETAILS, PANEL SCHEDULES, ETC.
13. PROVIDE AN OPERATING AND MAINTENANCE MANUAL TO OWNER PRIOR TO THE FINAL ACCEPTANCE. THE MANUAL SHALL INCLUDE, AS A MINIMUM, (1) SUBMITTAL DATA STATING EQUIPMENT RATING AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. ALSO PROVIDE TWO OPERATIONS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. REQUIRED ROUTINE MAINTENANCE ACTIONS AND METHOD OF OPERATION FOR EQUIPMENT SHALL BE CLEARLY IDENTIFIED, AND THE NAME, PHONE NUMBER AND ADDRESS OF AT LEAST ONE QUALIFIED SERVICE AGENCY.
14. INCLUDE ALL COSTS FOR EXCAVATION, SAW CUTTING, DIRECTIONAL BORING, CORE DRILLING, BACKFILLING, SURFACE RESTORATION, REPAIR OF FINISHES, ETC. THAT IS REQUIRED IN ORDER TO MEET THE PROJECT REQUIREMENTS.
15. INCLUDE IN BID ALL COSTS ASSOCIATED WITH TEMPORARY ELECTRICAL SERVICE AS REQUIRED FOR USE BY ALL TRADES DURING CONSTRUCTION. REMOVE TEMPORARY POWER AT THE COMPLETION OF THE PROJECT. OBTAIN AND PAY FOR ALL REQUIRED PERMITS FOR TEMPORARY POWER. ENGINEER OF RECORD SHALL BE PROVIDED WITH ADDITIONAL COMPENSATION FROM THE CONTRACTOR WHERE SIGNED & SEALED DRAWINGS ARE REQUESTED BY THE CONTRACTOR TO THE ENGINEER OF RECORD IF REQUIRED BY THE AHJ FOR THE TEMPORARY POWER.
16. LOCATE, IDENTIFY, PROTECT AND DOCUMENT ALL UTILITY LINES LOCATED WITHIN THE PROJECT BOUNDARY. FOR LOCATING SITE UTILITIES, CONTACT ALL LOCAL MUNICIPALITIES AND UTILITIES AT LEAST 48 HOURS PRIOR TO DIGGING.
17. INCLUDE IN BID THE TRANSPORT AND DISPOSAL OR RECYLING OF ALL WASTE MATERIALS GENERATED BY THIS PROJECT IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL RULES, REGULATIONS AND GUIDELINES APPLICABLE. COMPLY FULLY WITH ALL APPLICABLE STATUTES REGARDING MERCURY- CONTAINING DEVICES, AND WITH ALL LOCAL, STATE AND FEDERAL APPLICABLE GUIDELINES AT THE TIME OF DISPOSAL. PROVIDE OWNER WITH WRITTEN CERTIFICATION OF ACCEPTED DISPOSAL.

COORDINATION

1. VERIFY AND COORDINATE LOCATIONS OF ANY MISCELLANEOUS EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS (I.E., COPIERS, FAX MACHINES, PRINTERS, KITCHEN APPLIANCES, LAUNDRY APPLIANCES, PROJECTION SCREENS, SHOP TOOLS, MACHINE, ELEVATORS, ETC.) WITH APPROVED SHOP DRAWINGS, OWNER-PROVIDED CUT SHEETS, MANUFACTURER'S INSTRUCTIONS, AND EQUIPMENT NAMEPLATE INFORMATION, PRIOR TO ROUGH IN, AND PROVIDE ALL NECESSARY ELECTRICAL REQUIRED.
2. VERIFY AND COORDINATE LOCATIONS AND EXACT ELECTRICAL REQUIREMENTS FOR ALL MECHANICAL, PLUMBING AND FIRE PROTECTION EQUIPMENT PRIOR TO SUBMITTAL OF SHOP DRAWINGS OF ELECTRICAL EQUIPMENT. PROVIDE ALL NECESSARY RACEWAYS, CONDUCTORS, BOXES, EQUIPMENT, ACCESSORIES, ASSOCIATED DISCONNECT SWITCHES, CIRCUIT BREAKERS, CONTROL TRANSFORMERS, FIRE ALARM SHUTDOWN, ETC. REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. COORDINATE WITH APPROPRIATE TRADE'S APPROVED SHOP DRAWINGS, MANUFACTURER'S INSTRUCTIONS, AND EQUIPMENT NAMEPLATE INFORMATION, PRIOR TO ROUGH IN, AND PROVIDE ALL NECESSARY ELECTRICAL REQUIRED, UNLESS NOTED OTHERWISE.
3. THIS PROJECT REQUIRES COORDINATION DRAWINGS BY THE CONTRACTOR. PARTICIPATE IN THE COORDINATION DRAWING PREPARATION PROCESS AND PROVIDE ALL NECESSARY INFORMATION REQUIRED TO COORDINATE ALL TRADE INFORMATION.
4. ALL WORK ON THE ELECTRICAL SYSTEM REQUIRED BY THE CONTRACT DOCUMENTS SHALL BE COORDINATED WITH THE WORK OF ALL OTHER DIVISIONS/TRADES PRIOR TO COMMENCEMENT OF WORK. AVOID INTERFERENCES WITH THE PROGRESS OF OTHER DIVISIONS/TRADES.
5. WHERE WALLS ARE OF TILT-UP OR PRE-CAST CONSTRUCTION, PROVIDE COORDINATION FOR EXACT DIMENSIONS AND OPENINGS REQUIRED FOR ALL ELECTRICAL COMPONENTS INSTALLED WITHIN SUCH WALLSDURING THE SHOP DRAWING REVIEW PROCESS OF THE WALLS, PRIOR TO CONSTRUCTION OF THE WALLS.
6. LOCATIONS OF VFD'S, DISCONNECTS, MOTOR STARTERS, ETC. FOR HVAC EQUIPMENT ARE DIAGRAMMATIC ON THE PLAN DRAWINGS. EXACT LOCATIONS ARE TO BE COORDINATED WITH CONTRACTOR'S COORDINATION DRAWINGS PRIOR TO ROUGH-IN TO ENSURE PROPER NEC CLEARANCES AND APPROPRIATE MOUNTING SURFACE.
7. REFER TO ARCHITECTURAL, MECHANICAL, PLUMBING, FIRE PROTECTION, CIVIL, LANDSCAPE, INTERIOR DESIGN, TECHNOLOGY, STRUCTURAL, AND VENDOR EQUIPMENT DRAWINGS FOR RELATED INFORMATION AND ADDITIONAL INSTALLATION REQUIREMENTS TO BE PERFORMED AS PART OF THE WORK.
8. WHERE A DISCREPANCY OR CONFLICT IS FOUND BETWEEN ONE DRAWING AND ANOTHER, OR BETWEEN A DRAWING AND APPLICABLE SPECIFICATIONS, NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY IN WRITTEN FORM. IN GENERAL, THE MOST STRINGENT REQUIREMENT SHALL GOVERN UNLESS THE DISCREPANCY CONFLICTS WITH APPLICABLE CODES OR OWNER'S DESIGN STANDARDS, WHEREIN THE CODE OR OWNER'S DESIGN STANDARDS SHALL GOVERN.
9. CAREFULLY EXAMINE THOSE PORTIONS OF THE BUILDING AND/OR SITE AFFECTED BY THIS WORK PRIOR TO SUBMITTING BID PRICE, SO AS TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT MAY AFFECT EXECUTION OF THE WORK. SUBMISSION OF A BID PRICE SHALL BE CONSTRUED AS EVIDENCE THAT SUCH EXAMINATION HAS BEEN MADE. LATER CLAIMS FOR LABOR, EQUIPMENT AND/OR MATERIALS REQUIRED DUE TO DIFFICULTIES ENCOUNTERED THAT COULD HAVE BEEN REASONABLY OBSERVED WILL NOT BE RECOGNIZED.
10. COORDINATE ALL PROJECT SCHEDULING AND PHASING REQUIREMENTS WITH ARCHITECT/ENGINEER AND OWNER PRIOR TO SUBMITTING BID PRICE. THIS PROJECT MAY REQUIRE PHASING SEQUENCES AND POTENTIAL PREMIUM TIME WORK AND ALL COSTS FOR SUCH SHALL BE INCLUDED IN THE BID PRICE. PROVIDE ADEQUATE WORK FORCE AND EQUIPMENT, AND INCLUDE PREMIUM TIME AS MAY BE REQUIRED IN ORDER TO ADHERE TO THE PROJECT SCHEDULE. ADDITIONALLY, ENSURE THAT LONG LEAD ITEMS DO NOT IMPACT THE PROJECT'S SCHEDULE OR PHASING.
11. ANY TEMPORARY INTERRUPTION OF POWER REQUIRED FOR THE SYSTEM TIE-IN OR SWITCHOVER FOR ANY PORTION OF THE ELECTRICAL SYSTEM SHALL BE PRE-APPROVED IN WRITING BY THE OWNER AND SCHEDULED IN ADVANCE.
12. COORDINATE EXACT REQUIREMENTS WITH THE LOCAL UTILITY COMPANIES AND PROVIDERS (ELECTRIC, TELEPHONE, CABLE TV, ETC.) AND INCLUDE ALL COSTS FOR PROVIDING TEMPORARY AND PERMANENT SERVICES REQUIRED FOR THIS PROJECT IN THE BID PRICE. BID PRICE SHALL INCLUDE, BUT NOT BE LIMITED TO, EXCAVATION, RACEWAYS, BACKFILL, EQUIPMENT, EQUIPMENT PADS, BACKBOARDS, METERS, GROUNDING, UTILITY ENGINEERING AND IMPACT FEES.
13. CONDUCT WORK OPERATIONS AND DEBRIS REMOVAL IN A MANNER THAT ENSURES MINIMUM INTERFERENCE WITH NORMAL BUSINESS OPERATIONS, TRAFFIC, PARKING, ETC. ONGOING IN ADJACENT OCCUPIED SPACES OR FACILITIES. PROVIDE ALL THAT IS REQUIRED TO EFFECTIVELY PROTECT SURROUNDING OCCUPANTS, EQUIPMENT, FINISHES, FURNITURE, ETC. FROM DAMAGE OR EXCESSIVE NOISE THROUGHOUT THE DURATION OF THIS PROJECT. CONTRACTOR IS RESPONSIBLE FOR ANY LOSSES OR ANY DAMAGE RESULTING FROM THE FAILURE TO ADHERE TO THIS REQUIREMENT. RESTORE DAMAGED ELEMENTS TO ORIGINAL CONDITION TO THE SATISFACTION OF THE ARCHITECT/ENGINEER AND OWNER, AT NO ADDITIONAL COSTS. REPORT OF ANY SUCH OCCURRENCE TO THE ARCHITECT/ENGINEER AND OWNER IMMEDIATELY AND AWAIT WRITTEN DIRECTION PRIOR TO PROCEEDING WITH REPAIRS.
14. COORDINATE THE LOCATION OF ALL LIGHT FIXTURES, DEVICES AND BOXES WITH WINDOWS, MIRRORS, MILLWORK, CABINETS, GLASS CURTAIN WALLS, AND GLASS WALLS PRIOR TO INSTALLATION OF CONDUITS OR BOXES. REVIEW ALL CONTRACT DRAWINGS TO ASCERTAIN ANY CONFLICTS PRIOR TO BIDDING. OBTAIN CLARIFICATION FROM THE ARCHITECT/ENGINEER PRIOR TO BID. CONTRACTOR SHALL NOT BE ENTITLED TO ADDITIONAL COMPENSATION FOR WORK REQUIRED TO RELOCATE OUTLET BOXES OR RACEWAYS FOR COORDINATION WITH OTHER TRADE'S WORK.

GROUNDING

1. FIRE PROTECTION PIPING SHALL NOT BE USED FOR GROUNDING.
2. ALL FEEDERS AND BRANCH CIRCUITS SHALL INCLUDE AN EQUIPMENT GROUND CONDUCTOR. METAL RACEWAYS SHALL NOT BE USED AS THE SOLE EQUIPMENT GROUND.
3. WHERE A PHASE CONDUCTOR IS INCREASED IN SIZE DUE TO VOLTAGE DROP, THE EQUIPMENT GROUND CONDUCTOR SHALL BE INCREASED IN SIZE PROPORTIONATELY.
4. PROVIDE A GROUND BUS BAR IN EACH ELECTRICAL ROOM AND TELECOMMUNICATIONS / IDF/ MDF ROOM FOR ALL NEW CONSTRUCTION AND NEW ROOMS IN EXISTING CONSTRUCTION, AND IN EXISTING CONSTRUCTION WHERE THERE IS NONE INSTALLED WITHIN AN EXISTING ROOM.

ELECTRICAL EQUIPMENT

1. EQUIPMENT SHALL BE OF MATERIALS SUITABLE FOR AND RATED FOR THE ENVIRONMENT IN WHICH THEY ARE TO BE INSTALLED. ALL COMPONENTS OF THE ELECTRICAL SYSTEM LOCATED OUTDOORS OR INDOORS WHERE EXPOSED TO SIGNIFICANT MOISTURE SHALL BE WEATHERPROOF, NEMA 3R, AS A MINIMUM, WHETHER INDICATED ON THE CONTRACT DRAWINGS OR NOT.
2. TERMINATION PROVISIONS FOR ALL ELECTRICAL EQUIPMENT (PANELBOARDS, SWITCHBOARD, TRANSFORMERS, DISCONNECT SWITCHES, MOTOR CONTROLLERS, AUTOMATIC TRANSFER SWITCHES, ENCLOSED CIRCUIT BREAKERS, BUSWAYS, ETC.) SHALL BE LISTED AND IDENTIFIED FOR USE WITH MINIMUM 75 DEG. F CONDUCTORS IN ACCORDANCE WITH NEC.
3. WORKING CLEARANCES FOR ELECTRICAL EQUIPMENT SHALL BE IN COMPLIANCE WITH NEC.
4. THE ELECTRICAL DEDICATED EQUIPMENT SPACE EXTENDING FROM FLOOR TO 6' ABOVE ELECTRICAL EQUIPMENT OR TO THE STRUCTURAL CEILING, WHICHEVER DISTANCE IS LOWER, WITH A WIDTH AND DEPTH OF THE PANELBOARD OR SWITCHBOARD MUST BE CLEAR OF ALL PIPING, DUCTS, ARCHITECTURAL APPURTENANCES AND OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION IN ACCORDANCE WITH NEC.
5. PROVIDE A REINFORCED CONCRETE PAD, SIZED 4" LARGER IN ALL DIRECTIONS THAN THE FOOTPRINT OF THE EQUIPMENT, AND 4" HIGH, FOR ALL FREESTANDING, FLOOR-MOUNTED ELECTRICAL EQUIPMENT. PROVIDE VIBRATION ISOLATORS AND/OR ANCHORS PER MANUFACTURER'S INSTRUCTIONS.
6. PROVIDE HACR RATED CIRCUIT BREAKER FOR ALL HVAC EQUIPMENT.
7. ALL PANELBOARDS OR DISCONNECT SWITCHES LOCATED IN KITCHEN AREAS SHALL BE STAINLESS STEEL (COVER AND DOOR WHERE PANEL IS FLUSH MOUNTED; PANEL BOX, COVER & DOOR WHERE SURFACE MOUNTED).
8. PROVIDE SURGE PROTECTION DEVICE FOR ALL MAIN SERVICE EQUIPMENT, PANELBOARDS SERVING SENSITIVE ELECTRONIC EQUIPMENT (DATA RACKS) OR COMPUTERS, EMERGENCY SWITCHBOARDS AND PANELBOARDS, LIGHTING PANELS SERVING EXTERIOR LIGHTING, POWER CIRCUITS OR LOW VOLTAGE (FIRE ALARM, TELECOMMUNICATIONS) EXITING THE BUILDING. PROVIDE MINIMUM 30A/3P BREAKER IN BRANCH CIRCUIT PANELBOARDS AND 60A/3P IN DISTRIBUTION PANELBOARDS OR SWITCHBOARDS, UNLESS NOTED OTHERWISE, OR PER THE SPD MANUFACTURER'S RECOMMENDATIONS FOR SURGE PROTECTION DEVICE.
9. PROVIDE ARC ENERGY REDUCING MAINTENANCE SWITCH FOR ANY BREAKER RATED (OR ABLE TO BE ADJUSTED TO) 1200A OR HIGHER UNLESS OTHER ARC ENERGY REDUCTION MEANS MEETING NEC 240.87 IS INDICATED ON DRAWINGS/SPECIFICATIONS OR OTHERWISE PROVIDED.

ELECTRICAL DEVICES OUTLET BOXES, JUNCTION BOXES

1. LIGHT SWITCHES SHALL BE MOUNTED 48 INCHES ABOVE FINISHED FLOOR TO CENTER LINE OF DEVICE, UNLESS NOTED OTHERWISE.
2. RECEPTACLES, VOICE/DATA OUTLETS AND WALL FURNITURE FEEDS SHALL BE MOUNTED 18 INCHES ABOVE FINISHED FLOOR TO CENTER LINE OF DEVICE, UNLESS NOTED OTHERWISE. ABOVE COUNTER RECEPTACLES SHALL BE MOUNTED 6" ABOVE BACK SPLASH TO CENTERLINE OF DEVICE, UNLESS NOTED OTHERWISE.
3. IT IS THE INTENT THAT ALL DEVICE OUTLET BOXES (POWER AND SYSTEMS) BE FLUSH MOUNTED IN WALLS, CEILINGS OR FLOORS, AND JUNCTION BOXES FLUSH MOUNTED IN WALLS, CEILINGS, OR FLOORS, OR CONCEALED ABOVE ACCESSIBLE CEILINGS, AND NOT SURFACE MOUNTED, UNLESS SPECIFICALLY NOTED ON THE CONTRACT DRAWINGS, OR UNLESS THE ARCHITECT/ENGINEER GRANTS WRITTEN PERMISSION.
4. ALL COMPONENTS OF THE ELECTRICAL SYSTEM (INCLUDE RACEWAYS, ELECTRICAL EQUIPMENT, OUTLET BOXES, JUNCTION BOXES, ETC.) LOCATED IN A HAZARDOUS (CLASSIFIED) LOCATION SHALL BE APPROVED FOR USE IN SAID LOCATION, AS DEFINED BY THE NEC, WHETHER INDICATED ON THE CONTRACT DOCUMENTS OR NOT.
5. ALL DEVICES SHALL BE MOUNTED VERTICALLY, UNLESS NOTED OTHERWISE.
6. ALL RECEPTACLES SHALL BE MOUNTED SUCH THAT THE GROUND PIN IS MOUNTED UP.
7. WHERE DEVICES ARE SHOWN IN WALLS BACK-TO-BACK ON OPPOSITE SIDES, INSTALL SO THAT THEY ARE SEPARATED BY AT LEAST 12".
8. RECEPTACLES OR JUNCTION BOXES FOR ELECTRIC WATER COOLERS AND VENDING MACHINES SHALL BE LOCATED DIRECTLY BEHIND SAID APPLIANCE, CONCEALED FROM DIRECT VIEW. RECEPTACLES AND/OR HARD WIRED EQUIPMENT CONNECTIONS SHALL BE PROTECTED BY A READILY ACCESSIBLE GFCI FEED-THRU DEVICE LOCATED IMMEDIATELY ADJACENT TO THE APPLIANCE OR BE PROTECTED BY GFCI BREAKER IN THE PANELBOARD. ALL GFCI DEVICES MUST BE READILY ACCESSIBLE PER THE NEC.
9. ALL EXTERIOR RECEPTACLES OR RECEPTACLES LOCATED IN AREAS SUBJECT TO MOISTURE (PARKING GARAGE, WASHDOWN AREAS IN KITCHEN, ETC) SHALL BE GFCI TYPE. ALL EXTERIOR RECEPTACLES SHALL WE PROVIDED WITH CAST METAL, IN-USE COVER UNLESS NOTED OTHERWISE.
10. ALL RECEPTACLES LOCATED IN KITCHENS, BATHROOMS, MECHANICAL ROOMS, JANITOR CLOSETS, ELEVATOR SHAFTS, ELEVATOR EQUIPMENT ROOMS, FOR ELEVATOR SUMP PUMP(S) OR INSTALLED WITHIN 6' OF THE INSIDE FACE OF A SINK, SHALL BE GFCI TYPE OR GFCI PROTECTED.
11. ALL RECEPTACLES LOCATED IN CHILD-CARE FACILITIES, DWELLING UNITS, HOTEL/MOTEL GUEST ROOMS, PEDIATRIC CLINICS OR PEDIATRIC CAREA AREAS, AND OTHER AREAS AS REQUIRED BY NEC AND LOCAL CODE REQUIREMENTS SHALL BE TAMPER RESISTANT.
12. WHEN ELECTRICAL BOXES ARE LOCATED IN VERTICAL FIRE-RESISTIVE ASSEMBLIES, THEY SHALL BE INSTALLED WITHOUT AFFECTING THE FIRE CLASSIFICATION. ALL OF THE FOLLOWING CONDITIONS SHALL BE MET:
    - A. ALL ELECTRICAL BOXES SHALL BE METALLIC.
    - B. BOX OPENING SHALL OCCUR ONLY ON ONE SIDE OF FRAMING SPACE.
    - C. BOX OPENING SHALL NOT EXCEED 16 SQUARE INCHES.
    - D. ALL CLEARANCES BETWEEN OUTLET BOX AND GYPSUM BOARD SHALL BE COMPLETELY FILLED WITH JOINT COMPOUND (OR OTHER APPROVED MATERIAL).
    - E. PROVIDE A WALL AROUND OUTLETS LARGER THAN 16 SQUARE INCHES. THE INTEGRITY OF THE WALL RATING SHALL BE MAINTAINED.
    - F. THE TOTAL AGGREGATE SURFACE AREA OF THE BOXES SHALL NOT EXCEED 100 SQUARE INCHES PER 100 SQUARE FEET.
    - G. OUTLET BOXES LOCATED ON OPPOSITE SIDES OF FIRE RESISTIVE ASSEMBLIES SHALL BE SEPARATED BY A MINIMUM HORIZONTAL DISTANCE OF 24 INCHES.
    - H. OUTLET BOXES SHALL BE SECURELY FASTENED TO WALL FRAMING MEMBERS.
    - I. THE OPENING IN THE GYPSUM BOARD FACING SHALL BE CUT NOT TO EXCEED 1/8 INCH BETWEEN THE EDGES OF THE OUTLET BOX AND THE EDGES OF THE OPENING.

RACEWAYS

1. FLEXIBLE METAL CONDUIT AND LIQUIDTIGHT FLEXIBLE METAL CONDUIT (FMC & LFMC) SHALL NOT BE USED IN LENGTHS THAT EXCEED 6'-0" UNLESS SPECIFICALLY NOTED OTHERWISE, OR UNLESS THE ARCHITECT/ENGINEER GRANTS WRITTEN PERMISSION.
2. ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS, INCLUDING LOW VOLTAGE SYSTEMS, SHALL BE INSTALLED IN A COMPLETE RACEWAY SYSTEM (CONDUIT) UNLESS SPECIFICALLY NOTED OTHERWISE.
3. THE USE OF ELECTRICAL NON-METALLIC TUBING (ENT) AND LIQUIDTIGHT FLEXIBLE NON-METALLIC CONDUIT (LFNC) ARE PROHIBITED UNLESS SPECIFICALLY NOTED OTHERWISE, OR UNLESS THE ARCHITECT/ENGINEER OR OWNER GRANTS WRITTEN PERMISSION.
4. CONNECTIONS TO TRANSFORMERS, AHU'S, AND PUMPS SHALL BE WITH LIGUIDTIGHT, FLEXIBLE METAL CONDUIT.
5. NO PVC CONDUIT MAY BE USED INSIDE OF BUILDING UNLESS ROUTED UNDERGROUND, AND UNLESS NOTED OTHERWISE.
6. ALL CONDUIT TERMINATIONS AT TERMINAL BOARDS ARE TO HAVE GROUNDING BUSHINGS AT CONDUIT ENDS.
7. ALL CONDUITS ARE TO BE CONCEALED UNLESS IMPOSSIBLE DUE TO EXISTING CONDITIONS (I.E.,EXPOSED CEILINGS, BUILDING EXTERIOR WALL RUNS). CONCEAL ALL CONDUITS ABOVE CEILINGS OR IN WALLS AND MILLWORK. WHERE EXISTING CONDITIONS DICTATE THAT CONDUITS CANNOT BE CONCEALED, NOTIFY ARCHITECT/ENGINEER PRIOR TO INSTALLING CONDUIT FOR RESOLUTION TO ROUTING.
8. SEAL ALL PENETRATIONS AND OPENINGS MADE DURING EXECUTION OF WORK IN FIRE-RATED AND SMOKE-RATED WALLS. WALLS SHALL BE SEALED WITH UL-APPROVED PRODUCT WITH THE SAME OR GREATER RATING OF WALL PENETRATED.
9. PROVIDE ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS AND ROOFS WHERE REQUIRED. COORDINATE LOCATIONS AND SIZES WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS, FIELD CONDITIONS AND WORK OF ALL OTHER DIVISIONS/TRADES. ALL OPENINGS ARE TO BE SEALED WATERTIGHT.
10. ALL RACEWAYS THAT TURN UP THROUGH THE SLAB OR INTO ELECTRICAL EQUIPMENT FROM UNDERGROUND SHALL BE RIGID GALVANIZED STEEL (RGS) WITH BITUMASTIC COATING FOR AT LEAST THE FINAL 18" LENGTH. THE USE OF NON-METALLIC CONDUIT ABOVE GRADE IS PROHIBITED.
11. PANEL SCHEDULES AND FLOOR PLANS MAY INDICATE DEDICATED HOMERUNS FOR EACH BRANCH CIRCUIT. BRANCH CIRCUITS MAY BE GROUPED IN A COMMON HOMERUN WHERE THE HOMERUN DOES NOT EXCEED 3 PHASE CONDUCTORS, 3 NEUTRAL CONDUCTORS, AND 1 EQUIPMENT GROUND. THE HOMERUN RACEWAY SIZE AND CONDUCTOR SIZE SHALL BE INCREASED AS NECESSARY TO COMPLY WITH THE NEC FOR 40% MAXIMUM FILL AND DERATING REQUIREMENTS.
12. PROVIDE SEAL OFF FITTINGS, APPROVED FOR SUCH USE, WHERE RACEWAYS PENETRATE BETWEEN A DRY, CONDITIONED ENVIRONMENT AND THE EXTERIOR OR OTHER WET ENVIRONMENTS AND ADDITIONAL AREAS WHERE CONDUITS PASS FROM WARM TO COLD LOCATIONS SUCH AS WALK-IN COOLERS OR FREEZERS, BOILER ROOMS, ETC.
13. PROVIDE POLYOLEFIN JET-LINE #232 (NYLON PULL STRING) IN EACH EMPTY CONDUIT WITH ENGRAVED METAL TAG INDICATING CONDUIT DESIGNATION.
14. ALL HOMERUNS SHALL BE IN 3/4" RACEWAY MINIMUM. 1/2" RACEWAY IS ACCEPTABLE FOR A SINGLE CIRCUIT FROM THE HOMERUN TO REMAINING DEVICES.
15. CONTRACTOR SHALL USE COMPRESSION FITTINGS ONLY FOR EMT CONDUIT.
16. WHERE RACEWAYS ARE INSTALLED IN SLABS, THE MINIMUM SPACING, MAXIMUM RACEWAY SIZE, AND ANY OTHER STRUCTURAL LIMITATIONS SHALL BE COORDINATED WITH THE STRUCTURAL DRAWINGS AND THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION.

CONDUCTORS

1. ALL WIRE SHALL BE SIZED AS SHOWN ON THE DRAWINGS. IF NO WIRE SIZE IS SHOWN, THEN WIRE SHALL BE #12 AWG.
2. BRANCH CIRCUITS SHALL BE INCREASED IN SIZE AS REQUIRED TO COMPENSATE FOR VOLTAGE DROP FROM LENGTH OF CIRCUIT DUE TO FIELD ROUTING. FINAL INSTALLATION SHALL NOT EXCEED A MAXIMUM OF 3% VOLTAGE DROP FOR BRANCH CIRCUITS. REFER TO VOLTAGE DROP TABLE BELOW FOR CONDUCTOR SIZES FOR BRANCH CIRCUITS AS FOLLOWS:
    - A. 120V, 20A CIRCUITS SHALL BE:
        - i. #12 FROM 0-70 FT
        - ii. #10 FROM 71-115FT
        - iii. #8 FROM 116-180FT
    - B. 277V, 20A CIRCUITS SHALL BE:
        - i. #12 FROM 0-140FT
        - ii. #10 FROM 141-220FT
        - iii. #8 FROM 221-350FT

    ANYTHING LONGER THAN THE ABOVE SHALL BE SUBMITTED TO THE ENGINEER WITH CALCULATIONS FOR APPROVAL.
3. ALL CONDUCTORS IN CABINETS MUST BE CAREFULLY FORMED AND HARNESSED SO THAT EACH CONDUCTOR DROPS OFF DIRECTLY OPPOSITE TO TERMINAL.
4. ALL WIRE SIZES ARE BASED ON AMPACITIES FOR 60 DEG F TEMPERATURE RATING FROM 0-100A AND 75 DEG. F TEMPERATURE RATING LISTED IN NEC FOR 100A AND ABOVE.
5. ALL CONDUCTORS SHALL BE COPPER, THHN/THWN; SOLID FOR #10 AWG AND SMALLER; STRANDED FOR #8 AWG AND LARGER.
6. CONDUCTORS USED IN WET LOCATIONS, INCLUDING BUT NOT LIMITED TO UNDERGROUND CONDUITS/ DUCTBANKS AND EXTERIOR CONDUITS SHALL COMPLY WITH NEC 310.10 AND BE LISTED FOR USE IN WET LOCATIONS.
7. ALL POWER CIRCUITS HAVE BEEN DESIGNED TO MEET 2% OR LESS VOLTAGE DROP FOR FEEDERS, AND 3% OR LESS VOLTAGE DROP FOR BRANCH CIRCUITS.

IDENTIFICATION

1. PROVIDE TYPED PANEL DIRECTORIES FOR ALL NEW PANELBOARDS, AND EXISTING PANELBOARDS AFFECTED BY THIS PROJECT. DIRECTORIES SHALL REFLECT PROJECT AS- BUILT CONDITIONS FOR ALL BRANCH CIRCUITS. DIRECTORIES SHALL INCLUDE WHERE EACH PANEL IS FED FROM. ADDITIONALLY, EACH BRANCH CIRCUIT LOAD DESCRIPTION SHALL INCLUDE THE ROOM NUMBER(S) FOR EACH LOAD (I.E., RECEPTACLES-RMS 501,503). ROOM NUMBERS SHALL BE BASED ON ACTUAL ROOM SIGNAGE INSTALLED IN FIELD. COORDINATE EXACT ROOM NUMBERS WITH ARCHITECT/ENGINEER AND OWNER PRIOR TO COMPLETION OF PANELDIRECTORIES.
2. PROVIDE ENGRAVED PLASTIC LAMINATE NAME TAGS ON EACH SWITCHBOARD, SWITCHGEAR, DISTRIBUTION PANEL, PANELBOARD, MOTOR CONTROL CENTER, SAFETY SWITCH, ENCLOSED CIRCUIT BREAKER, CABINET, STEP-DOWN TRANSFORMER, TRANSFER SWITCH, ETC., AND ANY OTHER MAJOR COMPONENT OF THE ELECTRICAL SYSTEM.
3. PROVIDE ENGRAVED PLASTIC LAMINATE NAME TAGS FOR EACH DISTRIBUTION BREAKER OR BRANCH CIRCUIT BREAKER IN SWITCHGEAR, SWITCHBOARDS, MOTOR CONTROL CENTERS AND OTHER DISTRIBUTION EQUIPMENT. NAME TAG SHALL INCLUDE LOAD DESCRIPTION AND ROOM NUMBER FOR EACH LOAD.
4. ARC FLASH DANGER/WARNING LABELS SHALL BE APPLIED TO SWITCHBOARD, PANELBOARDS, AND EQUIPMENT CONTROLLERS PER NEC.
5. PROVIDE LABELS ON THE INSIDE OF EACH DEVICE COVERPLATE, IDENTIFYING THE PANEL(S)/ CIRCUIT NUMBER(S) DEVICE IS CONNECTED TO.
6. PROVIDE NEATLY, HANDWRITTEN IDENTIFICATION ON THE EXTERIOR COVER OF ALL JUNCTION BOXES, PULLBOXES AND WIREWAYS, IDENTIFYING THE PANEL(S)/ CIRCUIT NUMBER(S) CONTAINED WITHIN.
7. PROVIDE A PERMANENT SIGN ON THE MAIN ELECTRICAL ROOM DOOR TO THE BUILDING STATING THAT THE MAIN SERVICE DISCONNECTING MEANS IS LOCATED INSIDE.
8. PROVIDE A PERMANENT LABEL ON ALL PANELBOARDS, SWITCHBOARDS, SWITCHGEAR, MOTOR CONTROL CENTERS AND DISTRIBUTION PANELS STATING "DO NOT WORK ON EQUIPMENT WHILE ENERGIZED. LOCK-OUT TAG-OUT REQUIRED".
9. PROVIDE REQUIRED IDENTIFICATION PER ANSI STANDARDS, NEC REQUIREMENTS, AND OWNER'S PUBLISHED DESIGN STANDARDS WHERE APPLICABLE.
10. PROVIDE ENGRAVED PHENOLIC LABEL ON ALL NEW SERVICE EQUIPMENT TO INDICATE THE MAXIMUM AVAILABLE FAULT CURRENT AND THE DATE THE FAULT CURRENT CALCULATION WAS PERFORMED. PROVIDE LABEL ON ALL EXISTING SERVICE EQUIPMENT WHEN MODIFICATIONS OCCUR THAT AFFECT THE MAXIMUM AVAILABLE FAULT CURRENT AT THE SERVICE.

LIGHTING

1. LIGHT FIXTURES SUPPORTED BY CEILING GRID SHALL BE SUPPORTED AS FOLLOWS: LIGHT FIXTURES WEIGHING LESS THAN 10 POUNDS SHALL HAVE 12-GAUGE HANGER WIRE CONNECTED FROM THE LIGHT FIXTURE TO THE STRUCTURE ABOVE. LIGHT FIXTURES WEIGHING 10 POUNDS OR MORE SHALL HAVE (2) 12-GAUGE HANGER WIRES ATTACHED AT OPPOSITE CORNERS OF THE LIGHT FIXTURE TO THE STRUCTURE ABOVE.
2. COORDINATE EXACT LOCATIONS OF LIGHT FIXTURES IN LAY-IN AND GYPBOARD CEILINGS WITH ARCHITECTURAL REFLECTED CEILING PLANS, AND WALL MOUNTED EXTERIOR AND INTERIOR LIGHT FIXTURES WITH ARCHITECTURAL ELEVATIONS PRIOR TO INSTALLATION. WHERE THE QUANTITY OF LIGHTS DIFFERS BETWEEN THE ARCHITECTURAL RCP AND THE ELECTRICAL LIGHTING PLANS, PROVIDE THE HIGHEST QUANTITY OF FIXTURES IN THE BID PRICE. THE DISCREPANCY IN QUANTITY SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER. THE HIGHEST QUANTITY SHALL BE CIRCUITED TO THE LOCAL ROOM OR AREA LIGHTING CIRCUITS AND LIGHTING CONTROL DEVICES, UNLESS OTHERWISE DIRECTED IN WRITING BY THE ARCHITECT/ENGINEER.
3. VERIFY ACTUAL CEILING CONSTRUCTION TYPE AS DEFINED ON THE ARCHITECTURAL DRAWINGS AND FURNISH ALL LIGHT FIXTURES WITH THE CORRECT MOUNTING DEVICES WHETHER OR NOT SUCH VARIATIONS ARE INDICATED BY THE LIGHT FIXTURE CATALOG NUMBER. VERIFY THE DEPTH OF ALL RECESSED LIGHT FIXTURES WITH THE ARCHITECTURAL DRAWINGS PRIOR TO ORDERING LIGHT FIXTURES. ANY DISCREPANCIES THAT WOULD CAUSE THE RECESSED LIGHT FIXTURES NOT TO FIT INTO CEILING SHALL BE REPORTED TO ARCHITECT/ENGINEER PRIOR TO ORDERING.
4. LIGHT FIXTURES RECESSED IN FIRE-RATED CEILINGS SHALL BE PROVIDED WITH APPROVED FIRE-RATED ENCLOSURE WITH A FIRE RATING EQUAL TO THAT OF THE CEILING. PROVIDE A MINIMUM OF 3" CLEARANCE FROM SIDES AND TOP OF RECESSED LIGHT FIXTURES.
5. MODIFY ALL LIGHT FIXTURE CATALOG NUMBERS AS REQUIRED TO COORDINATE WITH THE LIGHTING BRANCH CIRCUIT VOLTAGES INDICATED. COORDINATE THE CATALOG NUMBERS WITH THE EXACT FIXTURE MOUNTING AND TRIM REQUIRED BY THE CEILING IN WHICH EACH FIXTURE IS BEING INSTALLED.
6. ALL LIGHT FIXTURES SHALL BE PROVIDED COMPLETE WITH LAMPS, UNLESS OTHERWISE NOTED.
7. ALL EXIT LIGHTS, LIGHT FIXTURES INDICATED WITH UNSWITCHED CIRCUIT (NIGHTLIGHT N/L), EMERGENCY TWIN-HEAD FIXTURES WITH INTEGRAL BATTERY PACKS, AND BATTERY PACKS INTEGRAL TO LIGHT FIXTURES, SHALL BE WIRED AHEAD OF ANY LOCAL SWITCHING OR LIGHTING CONTROLS.
8. PROVIDE UL WET LABEL OR IP67 RATED LIGHT FIXTURES FOR ALL FIXTURES LOCATED OUTSIDE OR IN PARKING GARAGES, IN SHOWERS, OR OPEN STRUCTURES.
9. EXTERIOR LIGHTING BALLASTS/DRIVERS SHALL HAVE A MINMUM STARTING TEMPERATURE OF -40 DEGREE C, AND A NORMAL AMBIENT OPERATING TEMPERATURE OF 40 DEGREE C.
10. PROVIDE FUSING FOR ALL EXTERIOR LIGHT FIXTURES, OR FIXTURES IN PARKING GARAGES OR OPEN STRUCTURES.
11. PROVIDE ALL TEMPORARY NORMAL LIGHTING, EMERGENCY LIGHTING AND EXIT SIGNS REQUIRED DURING THE PROJECT CONSTRUCTION PHASE.
12. COORDINATE EXACT FOUNDATION AND/OR COMPACTING REQUIREMENTS FOR ALL POLE MOUNTED LIGHT FIXTURES WITH MANUFACTURER'S AND/OR INSTALLER'S STRUCTURAL ENGINEER. POLE BASES SHALL MEET OR EXCEED ALL WIND LOAD RATINGS, GUST FACTORS, IMPORTANCE FACTORS, ETC. REQUIRED BY NATIONAL AND/OR LOCAL CODES. SHOP DRAWINGS SHALL INCLUDE STRUCTURAL DRAWINGS FOR ALL POLE BASES, POLE, ASSEMBLY AND OVERTURN CALCULATIONS REQUIRED IN THIS PROJECT, SIGNED AND SEALED BY A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE PROJECT STATE.
13. REFER TO LIGHT FIXTURE SCHEDULE FOR LIGHT FIXTURE TYPES, DESCRIPTIONS, CATALOG NUMBERS AND ADDITIONAL INFORMATION PERTINENT TO THE LIGHT FIXTURE OR INSTALLATION THEREOF.
14. COORDINATE LIGHT FIXTURE TRIM TYPE AND FINISH COLOR WITH ARCHITECT PRIOR TO ORDERING.
15. EACH LIGHTING CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL.

HEALTHCARE NOTES

ADDITIONAL PROJECT REQUIREMENTS

1. THE EQUIPMENT GROUNDING TERMINAL BARS OF THE NORMAL AND ESSENTIAL ELECTRICAL SYSTEM PANELBOARDS SERVING THE SAME PATIENT VICINITY SHALL BE BONDED TOGETHER WITH AN INSULATED, CONTINUOUS, COPPER CONDUCTOR NOT SMALLER THAN #10 AWG.
2. CRITICAL AND LIFE SAFETY LIGHT SWITCHES SHALL BE ROUTED IN CONDUIT AND BOXES OTHER THAN THAT FOR NORMAL BRANCH. ESSENTIAL SYSTEM SWITCHES SHALL BE RED IN COLOR.
3. MAINTAIN SEPARATION AMONG EACH TYPE OF ESSENTIAL AND NON-ESSENTIAL POWER WIRING. LIFE SAFETY, CRITICAL, EQUIPMENT, AND NORMAL WIRING SHALL BE INSTALLED TO MAINTAIN NEC REQUIRED SEPARATION OF EACH BRANCH OF ESSENTIAL POWER.
4. PATIENT CARE AREAS SHALL BE PROVIDED WITH GROUNDING IN ACCORDANCE WITH NEC 517.
5. NON-METALLIC RACEWAYS SHALL NOT BE USED TO SERVE ANY PATIENT CARE SPACE. ALL WIRING SHALL BE MECHCANICALLY PROTECTED BY INSTALLATION IN METALLIC RACEWAYS.
6. CONTRACTOR SHALL PERFORM A COMPLETE EQUIPOTENTIAL GROUND TEST IN ACCORDANCE WITH NFPA 99. TEST ALL METAL CONDUCTIVE SURFACES LIKELY TO BECOME ENERGIZED WITHIN ALL PATIENT CARE AREAS. TEST ALL LARGE CONDUCTIVE SURFACES LIKELY TO BECOME ENERGIZED WITHIN A VOLUME DEFINED AS 6 FOOT FROM THE PATIENT BED HORIZONTALLY OR 7 FOOT 6 INCHES VERTICALLY AS FOLLOWS:
    - A. LARGE METAL SURFACES NOT LIKELY TO BE ENERGIZED, WHICH DO NOT REQUIRE TESTING:
        - i. WINDOW FRAMES
        - ii. DOOR FRAMES
        - iii. FLOOR DRAINS
        - iv. MOVEABLE METAL CABINETS
    - B. VOLTAGE AND IMPEDANCE MEASUREMENTS SHALL BE TAKEN WITH RESPECT TO A REFERENCE POINT,WHICH SHALL BE ONE OF THE FOLLOWING:
        - i. THE GROUND BUS OF THE PANELBOARD OR ISOLATED POWER SYSTEM PANEL SUPPLYING THE PATIENT CARE AREA.
        - ii. GROUNDING POINT, IN OR NEAR THE ROOM UNDER TEST, THAT IS ELECTRICALLY REMOTE FROM THE RECETPACLES.
        - iii. GROUNDING CONTACT OF A RECEPTACLE THAT IS POWERED FROM A DIFFERENT BRANCH CIRCUIT FROM THE RECEPTACLE UNDER TEST.
    - C. TEST METHOD:
        - i. MEASURE VOLTAGE FROM REFERENCE POINT TO CONDUCTIVE SURFACES AND ALL RECEPTACLE GROUND CONTACTS.
        - ii. MEASURE IMPEDANCE BETWEEN REFERENCE POINT AND RECEPTACLE GROUND CONTACTS.
        - iii. CHECK FOR PROPER POLARITY
        - iv. IDENTIFY THE REFERENCE GROUND FOR EACH ROOM ON THE GROUND TEST REPORT.
    - D. MAXIMUM ACCEPTABLE VALUES:
        - i. VOLTAGE: 20mV
        - ii. IMPEDANCE 0.1ohm
    - E. EQUIPMENT:
        - i. MILLIVOLT METER WITH 1kohm IMPEDANCE AND PROPER FREQUENCY RESPONSE, IN ACCORDANCE WITH NFPA 99.
        - ii. POLARITY TESTER
    - F. GROUND TEST REPORT:
        - i. SUBMIT COMPLETE TYPED GROUND TEST REPORT
        - ii MAKE COPIES AVAILABLE AT THE FINAL INSPECTION
        - iii. ENSURE METER USED FOR EQUIPOTENTIAL TESTING IS ON-SITE DURING FINAL INSPECTION TO DEMONSTRATE A SAMPLING OF TEST LOCATIONS PER AUTHORITY HAVING JURISDICTION.

WHERE THERE IS A DISCREPANCY BETWEEN ABOVE GENERAL NOTES AND SPECIFICATIONS, WHERE APPLICABLE, SPECIFICATIONS SHALL BE FOLLOWED

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COA K938087

TLC Project No.: 824101
THINK. LISTEN. CREATE.

Grady MRI Chiller Concept Design

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Atlanta, GA 30303

Consultants:

Revisions:

No.	Date	Description
A	10 JUL 24	DRAFT FOR REVIEW

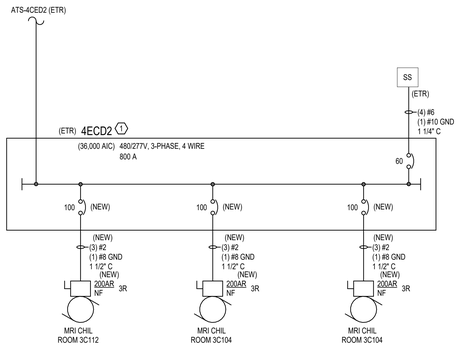
Seal:

NOT FOR CONSTRUCTION

Project No.:	824101
Issue Date:	10 JULY 2024
Drawn By:	RLS
Approved By:	FSS
Scale:	N.T.S.

Drawing Title:
ELECTRICAL NOTES AND SPECIFICATIONS

Drawing No.:
E002



EQUIPMENT BRANCH

1 Existing Partial One-Line Diagram
N.T.S

ONE-LINE DIAGRAM SYMBOL LEGEND

SYMBOL	DESCRIPTION
Panel Name (65,000 AIC) 277/480V, 3-PHASE, 4 WIRE 1200 A	SWITCHBOARD OR DITRIBUTION BOARD
	MOTOR
	CIRCUIT BREAKER

KEYNOTES

1 PROVIDE 30 DAY ELECTRICAL LOAD READING OF PANEL AS REQUIRED BY NEC.

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Drawn By: RLS
Approved By: FSS
Scale: N.T.S

Drawing Title:
PARTIAL ONE-LINE DIAGRAM

Drawing No.:
E003

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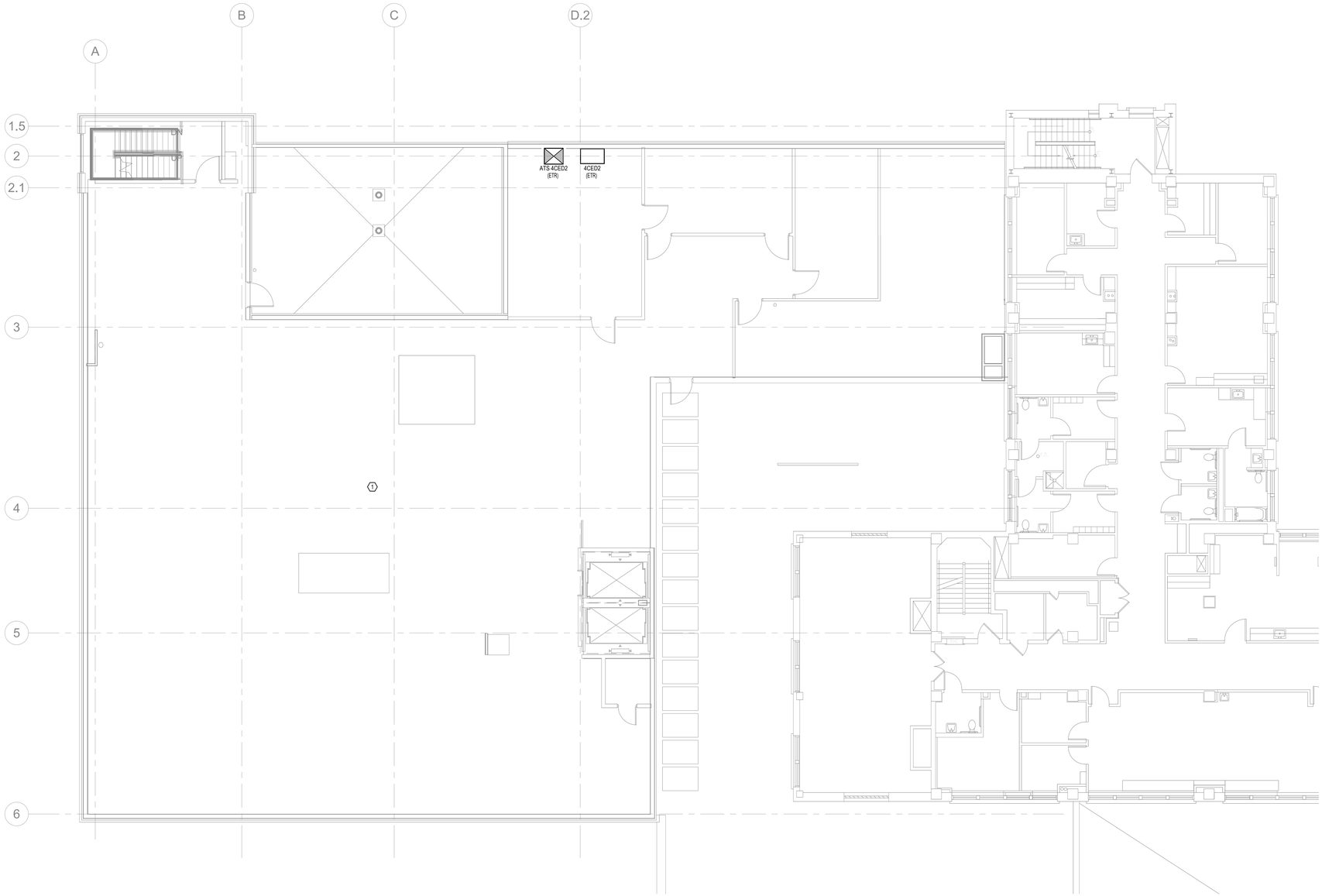

1 PARTIAL NEW WORK POWER PLAN - LEVEL 4
1/8" = 1'-0"

KEYNOTES

1 ALTERNATE LOCATION FOR CH-2.

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Revisions:

No.	Date	Description
A	10 JUL 24	DRAFT FOR REVIEW

Seal:

NOT FOR CONSTRUCTION

Project No.: 824101

Issue Date: 10 JULY 2024

Drawn By: RLS

Approved By: FSS

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

Drawing Title: PARTIAL LEVEL 4 - NEW WORK POWER PLAN

Drawing No.: E202

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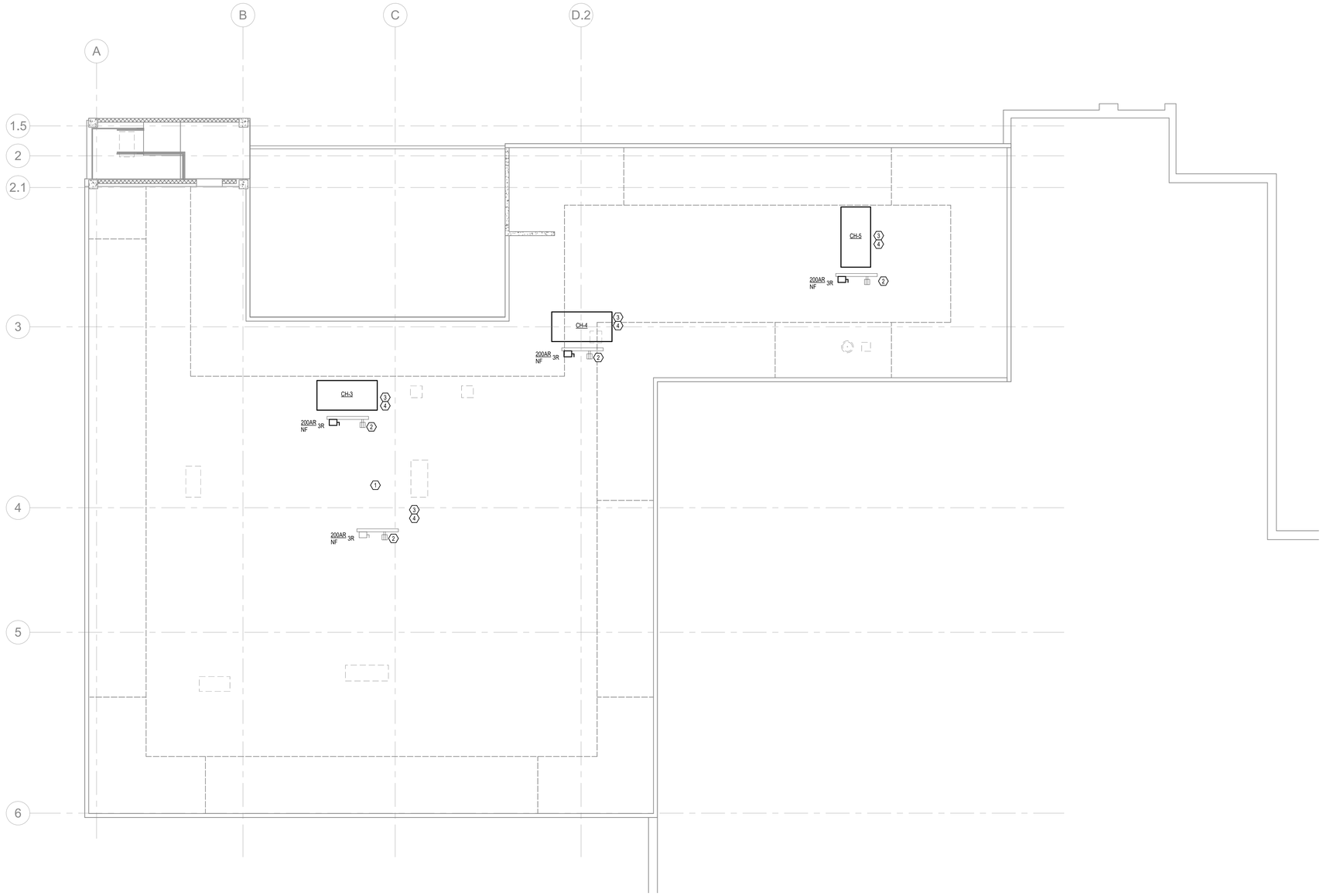


1 PARTIAL NEW WORK POWER PLAN - ROOF
1/8" = 1'-0"

GENERAL LIGHTNING PROTECTION NOTES:

1. PROVIDE COMPLETE UL LISTED, LPI CERTIFIED LIGHTNING PROTECTION SYSTEM IN FULL COMPLIANCE WITH THE LATEST EDITION OF NFPA 780 FOR NEW PORTION OF BUILDING AND EXISTING PORTION INDICATED. PROVIDE AIR TERMINALS ON ALL ROOF MOUNTED MECHANICAL EQUIPMENT, AS REQUIRED. BOND ALL METALLIC BODIES WITHIN AREAS CALCULATED BY NFPA 780.
2. ALL ROOF MOUNTED EQUIPMENT SHALL BE ALUMINUM. ALL DOWN CONDUCTORS AND GROUND RODS SHALL BE COPPER. ALL DOWN CONDUCTORS SHALL BE CONTAINED IN MINIMUM 1" PVC CONDUIT.
3. SUBMIT COMPLETE SHOP DRAWINGS SHOWING ROOF LAYOUT, DOWN LOCATIONS, GROUND ROD LOCATIONS, ETC. AS WELL AS ALL CONNECTION DETAILS TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL PERFORM ALL REQUIRED RESISTANCE AND CONTINUITY TESTING AFTER INSTALLATION IS COMPLETED.
4. COORDINATE EXACT LOCATION OF ALL ROOFTOP MECHANICAL EQUIPMENT WITH DIVISION 23 PRIOR TO INSTALLATION AND ROUGH-IN. FIELD LOCATIONS SHALL DICTATE.

KEYNOTES

1. ALTERNATE LOCATION FOR CH-2 AND DISCONNECT.
2. PROVIDE WEATHER PROOF WHILE IN USE ALUMINUM COVER. WIRE TO 120V BRANCH CIRCUIT FOR EQUIPMENT BRANCH USING 2#10, 1#10 GROUND IN 3/4" CONDUIT.
3. CONTRACTOR SHALL CONNECT NEW EQUIPMENT TO EXISTING LIGHTNING PROTECTION. PROVIDE UL CERTIFIED SYSTEM.
4. PROVIDE 277, 30A GFCI PROTECTED CIRCUIT FOR HEAT TRACING OF MECHANICAL PIPES. COORDINATE WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH IN. INCREASE BREAKER SIZE AS NECESSARY. PROVIDE WIRE SIZE PER NEC.

TLC ENGINEERING SOLUTIONS
4360 Chamblee Dunwoody Rd, Ste 210
Atlanta, GA 30341
P 707.451.6757
www.tlc-engineers.com

COA K938087

TLC Project No.: 824101
THINK. LISTEN. CREATE.

Grady MRI Chiller Concept Design

80 Jesse Hill Jr Dr SE
Atlanta, GA 30303

Consultants:

Revisions:

No.	Date	Description
A	10 JUL 24	DRAFT FOR REVIEW

Seal:

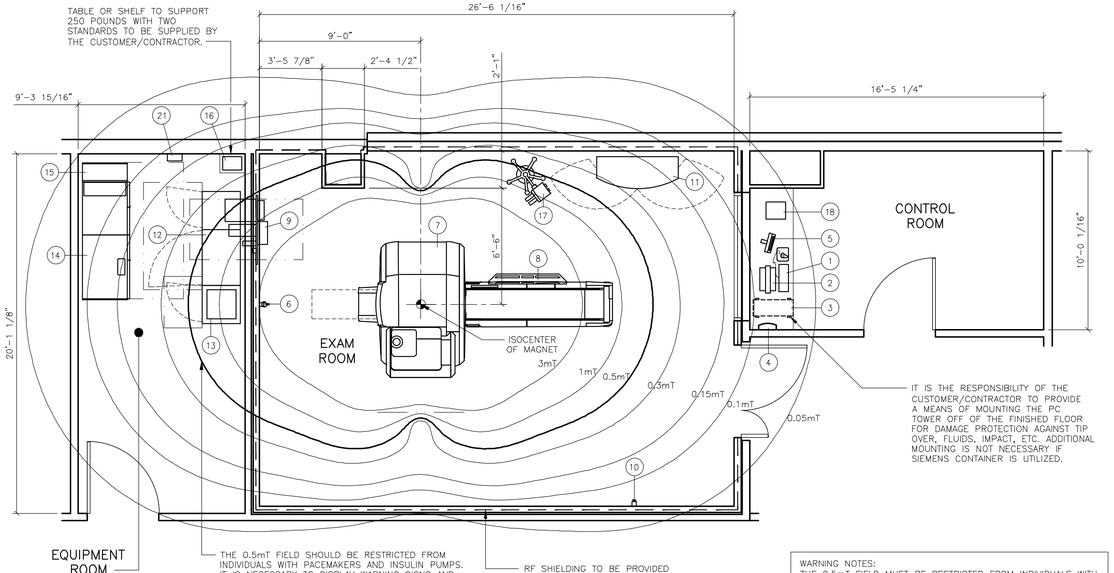
NOT FOR CONSTRUCTION

Project No.: 824101
Issue Date: 10 JULY 2024
Drawn By: RLS
Approved By: FSS
Scale: 1/8" = 1'-0"

Drawing Title:
PARTIAL ROOF LEVEL - NEW WORK POWER PLAN

Drawing No.:
E203

APPENDIX C



IF A CLOSET IS DESIRED TO CONCEAL THE FILTER PLATE AND CABLE CONNECTIONS, IT IS TO BE DESIGNED AND SPECIFIED AND PROVIDED BY THE CUSTOMER OR THEIR REPRESENTATIVE. 30 1/4" CLEARANCE IS REQUIRED FOR SERVICE AND CABLING.

THIS SET OF FINAL DRAWINGS IS REFLECTIVE OF THE LATEST SALES CONFIGURATION. ANY CHANGES TO THIS SALES CONFIGURATION MAY REQUIRE A REVISION TO THIS PROJECT PLAN. IF REQUESTED, SIEMENS WILL PRODUCE A REVISED SET OF FINAL DRAWINGS TO REFLECT THE CHANGES, HOWEVER SIEMENS IS NOT RESPONSIBLE FOR ANY CONSTRUCTION COSTS ASSOCIATED WITH THE CHANGES THAT OCCUR FROM THIS PLAN MODIFICATION.

CHILLER TO BE SUPPLIED, LOCATED AND INSTALLED BY CUSTOMER/CONTRACTOR. REFER TO MANUFACTURER'S INFORMATION.

THERE SHALL BE A SEPARATE RF ROOM PENETRATION PANEL FOR NON-SIEMENS EQUIPMENT. THE OUTSIDE EQUIPMENT MANUFACTURER (OEM) WILL SPECIFY ANY AND ALL FILTER AND PENETRATION REQUIREMENTS.

WARNING NOTES:
THE 0.5mT FIELD MUST BE RESTRICTED FROM INDIVIDUALS WITH PACEMAKERS OR INSULIN PUMPS IN ACCORDANCE WITH LOCAL CODES, FOR EXAMPLE FENCES WITH WARNING SIGNS, OR MAGNETIC ROOM SHIELDING TO REDUCE THE FIELD.

MAGNETIC FIELD WARNING
PLEASE BE AWARE THAT DURING THE CALIBRATION PHASE OF YOUR MRI INSTALLATION, YOUR NEW MAGNET WILL BE AT FULL FIELD STRENGTH AND ALL NECESSARY PRECAUTIONS WHEN WORKING IN THE VICINITY OF STRONG MAGNETIC FIELDS MUST BE TAKEN. WHEN THE CALIBRATION OF THE MAGNET OVERLAPS WITH FINAL CONSTRUCTION ACTIVITIES, THERE IS THE POSSIBILITY OF THE INTRODUCTION OF FERROUS MAGNETIC OBJECTS BY WORKERS INTO THE MR ROOM. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ENSURE THAT ALL PRECAUTIONS ARE TAKEN TO ENSURE THAT THIS DOES NOT HAPPEN, AS EQUIPMENT DAMAGE AND SERIOUS BODILY INJURY COULD OCCUR.

QUENCH VENT SPECIFICATIONS:
THE QUENCH VENT REQUIREMENTS AND SPECIFICATION DETAILED ON SHEET M-501 MUST BE MET.

EQUIPMENT LEGEND

NO	DESCRIPTION	SMS SYM	WEIGHT (LBS)	BTU/HR TO AIR	DIMENSIONS (INCHES) W	D	H	REMARKS
1	MRC KEYBOARD	KB	5	---	27 1/4	10 1/8	1 3/4	ON CONSOLE/COUNTER
2	COLOR MONITOR FOR MRC	MC	22	239	18 5/16	16 15/16	4 3/4	ON CONSOLE/COUNTER
3	HOST PC MRC	MPC	49	2,389	11	27	18 1/8	
4	ALARM BOX	AB	2	---	9	4	9	
5	PATIENT MONITOR (OPTION)	PM	30	---	13	8	12 1/2	
6	PATIENT SUPERVISION CAMERA (OPTION)	PSC	3	---	3 1/8	6 3/4	6 3/4	WALL MOUNTED
7	AERA MAGNET WITH COVERS, COILS, ELECTRONICS	EB	10,093	7,506	91	170	86	
8	PATIENT TABLE (MOBILE)	PT	529	---	29 1/2	97 1/4	21-41	MOBILE TABLE
9	RF-FILTER PLATE	FI	287	853	46 1/2	35 1/8	21 5/8	
10	MAGNET STOP	MS	1	---	3	5	3	
11	SURFACE COIL CART (OPTION)	SCC	110	---	55 1/8	21 1/8	47 5/8	WEIGHT WITHOUT COILS
12	ELECTRONICS CABINET (GPA/EPC CABINET)	EPC	3,307	3,412	61 1/2	26	77 1/2	
13	SEP CABINET	SEP	750	3,412	25 5/8	25 5/8	73 5/8	
14	POWERWARE 9390 U.P.S. WITH BATTERY (OPTION)	UPS	5,880	43,800	78 3/8	32	74	
15	POWERWARE 9390 ISOLATION TRANSFORMER (OPTION)	IT	1,100		12	32	74	
16	POWERWARE 9130 UPS (OPTION)	UPS	76	1,257	8 3/8	12 7/8	16 1/4	
17	MEDRAD ICBC INJECTOR STAND AND HEAD (OPTION)	IH	37.5	---	19 1/4	21 1/2	52 1/4	INJECTOR ON STAND
18	MEDRAD ICBC INJECTOR CRU (OPTION)	IU	7.9	---	12	10 1/2	10 7/8	ON CUSTOMERS COUNTER
19	MEDRAD ICBC INJECTOR POWER SUPPLY (OPTION)	IU	3.5	---	10	5	3 1/4	OUTSIDE 5mT FIELD

PROTECTING THE MAGNETIC FIELD

THE SIEMENS MR SYSTEM UTILIZES A SUPERCONDUCTIVE MAGNET WITH AN EXTREMELY HOMOGENOUS FIELD WITHIN THE MAGNET TO PROVIDE DISTORTION FREE IMAGING. THE PRESENCE OF FERROMAGNETIC MATERIAL WITHIN THE VICINITY OF THE MAGNET CAN ADVERSELY AFFECT THE UNIFORMITY OF THE USEFUL MAGNETIC FIELD. THIS APPLIES TO STATIONARY FERROUS MATERIAL (STRUCTURAL STEEL) WHICH IS TO BE MINIMIZED. STATIONARY STEEL COMPENSATION MAY BE ACHIEVED BY MAGNET POSITIONING AND SELECTIVE USE OF SHIMS. DISTORTION CAUSED BY MOVING FERROMAGNETIC OBJECTS (MOTOR VEHICLES, ELEVATORS) IS MORE DIFFICULT TO COMPENSATE AND MAY REQUIRE THE USE OF MAGNETIC SHIELDING.

REV 0

PROTECTING THE ENVIRONMENT

PROTECTING THE IMMEDIATE ENVIRONMENT FROM THE EFFECT OF THE MAGNETIC FIELD REQUIRES CONSIDERATION. INFORMATION STORED ON MAGNETIC DATA CARRIERS SUCH AS DISCS, TAPES AND CARDS MAY BE ERASED IF NEAR THE MAGNET. CAUTION WITH REGARD TO HEART PACEMAKERS MUST BE EXERCISED. MOST PACEMAKER UNITS EMPLOY A REED RELAY WHICH MAY CHANGE OPERATING MODE WHEN EXPOSED TO AN EXTERNAL MAGNETIC FIELD. PACEMAKER USERS MUST BE KEPT AT A SPECIFIED DISTANCE FROM THE MAGNET WHICH IS DETERMINED BY THE MAGNET FIELD STRENGTH.

REV 0

MAGNET SITING REQUIREMENTS

IT MUST BE ENSURED THAT THE MAGNET IS LOCATED SO THAT THE STABILITY AND HOMOGENEITY OF THE MAGNETIC FIELD ARE NOT ADVERSELY AFFECTED BY EXTRANEOUS FIELDS AND STATIC OR DYNAMIC FERROMAGNETIC OBJECTS.

X/Y AND Z AXIS	SOURCE OF INTERFERENCE
4'-2"	FLOOR STEEL REINFORCEMENT<20 LBS./ FT^2 IRON BEAMS < 66 LBS./FT.
16'-1" / 19'-1"	STRETCHERS UP TO 110 LBS.
13'-1"	WATER COOLING UNIT (CHILLER)
17'-5" / 21'-40"	TRANSPORT DEVICES UP TO 440 LBS.
18'-5" / 24'-8"	VEHICLES UP TO 2,000 LBS.
20'-5" / 29'-7"	ELEVATORS, TRUCKS UP TO 10,000 LBS.
39'-5"/26'-2"	AC TRANSFORMERS LESS THAN 100 KVA
39'-5"/29'-7"	AC TRANSFORMERS LESS THAN 250 KVA
42'-7"/32'-10"	AC TRANSFORMERS LESS THAN 650 KVA
45'-11"/36'-2"	AC TRANSFORMERS LESS THAN 1600 KVA
9'-10"/6'-6"	AC CABLES, MOTORS LESS THAN 100 AMPS
19'-9"/6'-7"	AC CABLES, MOTORS LESS THAN 250 AMPS
29'-7"/36'-2"	AC CABLES, MOTORS LESS THAN 1000 AMPS

FOR IRON OBJECTS LOCATED UP TO 45° FROM THE Z AXIS, THE DISTANCES FOR THE Z AXIS MUST BE USED. REDUCTION IS POSSIBLE WITH STEEL SHIELDING.

MAGNETIC FRINGE FIELDS

MAGNETIC FIELDS MAY AFFECT THE FUNCTION OF DEVICES IN THE VICINITY OF THE MAGNET. THESE DEVICES MUST BE OUTSIDE CERTAIN MAGNETIC FIELDS. THE DISTANCES LISTED ARE FROM THE MAGNET ISOCENTER AND DO NOT CONSIDER ANY MAGNETIC ROOM SHIELDING.

X/Y AND Z AXIS	DEVICES
6'-1" / 9'-2" 3.0mT	SMALL MOTORS, WATCHES, CAMERAS, CREDIT CARDS, MAGNETIC DATA CARRIERS (SHORT-TERM EXPOSURE)
7'-3" / 11'-6" 1.0mT	COMPUTERS, MAGNETIC DISK DRIVES, OSCILLOSCOPES, PROCESSORS
8'-3" / 13'-2" 0.5mT	CARDIAC PACEMAKERS, X-RAY TUBES, INSULIN PUMPS, B/W MONITORS, MAGNETIC DATA CARRIERS (LONG-TERM STORAGE)
9'-9" / 16'-1" 0.2mT	SIEMENS CT SCANNERS
10'-4" / 17'-1" 0.15mT	COLOR MONITORS, SIEMENS LINEAR ACCELERATORS
13'-1" / 22'-3" 0.05mT	X-RAY IMAGE INTENSIFIERS, GAMMA CAMERAS, PET/CYCLOTRON, ELECTRON MICROSCOPES, LINEAR ACCELERATORS

THE OWNER/USER IS TO VERIFY THE LOCATION OF THE 0.5mT FIELD AND ENSURE THAT IT IS MAINTAINED AS A RESTRICTED AREA.

ARCHITECTURAL NOTES

1) ALL PRELIMINARY EQUIPMENT LAYOUTS SUBMITTED BY SIEMENS MEDICAL SOLUTIONS, INC. (SMS HEREAFTER) ARE BASED ON THE RECOMMENDED SPACE NECESSARY FOR THE OPERATION AND SERVICEABILITY OF THE EQUIPMENT BEING PROPOSED. SMS WILL NOT SUBMIT AN EQUIPMENT LAYOUT THAT IS NOT IN THE BEST INTEREST OF BOTH THE CUSTOMER AND SMS. ALL EQUIPMENT LAYOUTS ARE BASED EITHER ON AN ACTUAL SITE LOCATION SURVEY OR ARCHITECTURAL DRAWINGS SUPPLIED TO SMS. SMS WILL NOT BE RESPONSIBLE FOR ANY ALTERATIONS THAT ENCROACH WITHIN DESIGNATED SAFETY AND SERVICE CLEARANCE ZONES AS INDICATED ON DRAWINGS (IE. PIPE CHASES, VENTILATION DUCTS, CASEWORK, AND SOFFITS, ETC.) MADE BY THE CUSTOMER OR REQUIRED BY A CUSTOMER'S ARCHITECTURAL FIRM ONCE PRELIMINARY DRAWINGS HAVE BEEN SUBMITTED AND APPROVED. DO NOT ALTER ANY SPECIFICATIONS AND/OR DIMENSIONS WITHOUT CONTACTING AND RECEIVING WRITTEN CONFIRMATION FROM SMS PROJECT MANAGER.
2) SMS IS NOT AN ARCHITECTURAL OR ENGINEERING FIRM. DRAWINGS SUPPLIED BY SMS ARE NOT CONSTRUCTION DRAWINGS. THEREFORE, THESE DRAWINGS ARE TO BE USED ONLY FOR INFORMATION TO COMPLEMENT ACTUAL CONSTRUCTION DRAWINGS AVAILABLE FROM A CUSTOMER APPOINTED ARCHITECTURAL REPRESENTATIVE OR A CUSTOMER'S ENGINEERING DESIGN GROUP. THE CUSTOMER'S ARCHITECT AND GENERAL CONTRACTOR SHALL BE ULTIMATELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE CODES AND PROFESSIONAL DESIGN REQUIREMENTS.
3) THE CUSTOMER IS RESPONSIBLE FOR ALL ROOM AND AREA PREPARATION COSTS, PROFESSIONAL FEES, PERMITS, REPORTS, AND INSPECTION FEES.
4) EQUIPMENT WARRANTIES, EXPRESSED OR IMPLIED ON THE PART OF SMS SHALL BE CONTINGENT UPON STRICT COMPLIANCE WITH THE ARCHITECTURAL, STRUCTURAL, ELECTRICAL, MECHANICAL AND RECOMMENDATIONS AND REQUIREMENTS CONTAINED IN THESE DRAWINGS, UNLESS SPECIFIED OTHERWISE.
5) ALL DIMENSIONS SHOWN ARE TAKEN FROM FINISHED SURFACES UNLESS SPECIFIED OTHERWISE.
6) 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. ACTUAL PROTECTION REQUIREMENTS SHALL BE SPECIFIED BY A REGISTERED RADIATION PHYSICIST AT CUSTOMER'S ENGAGEMENT AND EXPENSE. RESPONSIBILITY FOR ALL INFORMATION AS TO THE ROOM LOCATION, USE, AND NUMBER OF ANTICIPATED EXAMINATIONS TO BE PERFORMED PER TIME PERIOD SHALL BE PROVIDED TO THE PHYSICIST BY THE CUSTOMER. THE CUSTOMER SHALL FURTHER TAKE ALL RESPONSIBILITY IN THE COMMUNICATION AND COORDINATION OF ACTIVITIES OF THE RADIATION PHYSICIST AND THE ARCHITECTURAL REPRESENTATIVE.
7) SMS SHALL BE RESPONSIBLE FOR SMS EQUIPMENT INSTALLATION AND CALIBRATION, CONNECTION AND INSTALLATION OF SMS PROVIDED CABLES, AND CONNECTION OF CONTRACTOR PROVIDED WIRES TO SMS EQUIPMENT. IN THE EVENT THAT SPECIFIC TRADE RULES OR LICENSE REQUIREMENTS PROHIBIT THIS, THE CUSTOMER SHALL INITIATE THE SERVICES OF APPROVED OTHER CONTRACTORS AND PAY FOR SELECTED, APPROVED PARTIES TO PERFORM THIS WORK WITH JOB SUPERVISION TO BE PROVIDED BY SMS. CALIBRATION WHEN ACCOMPLISHED OUTSIDE OF NORMAL INSTALLATION SEQUENCES DUE TO CONTRACTOR OR TRADE RULE ACTIONS OR REQUIREMENTS SHALL BE SUPPORTED BY, CHARGED TO, AND ACCEPTED BY THE CUSTOMER AS AN ADDITIONAL INSTALLATION EXPENSE.
8) THE CUSTOMER SHALL VERIFY WITH SMS PROJECT MANAGER FINAL INSTALLATION DRAWINGS THE LOCATIONS AND TRAVEL OF ALL ANCILLARY EQUIPMENT TO BE CEILING OR WALL MOUNTED (IE: O.R. LIGHTS, MEDICAL GAS COLUMNS, PHYSIOLOGICAL MONITORING INJECTORS, CRT PLATFORMS, SPRINKLER HEADS, SMOKE DETECTORS, ELECTRICAL OUTLETS, HVAC GRILLES, SPEAKERS, AND GENERAL ROOM LIGHTING, ETC.).
9) THE GENERAL CONTRACTOR/CUSTOMER SHALL BE RESPONSIBLE FOR ALL FINAL PAINT, TOUCH-UP AND ANY COSMETIC OR TRIM WORK WHICH NEEDS TO BE OR IS REQUIRED TO BE COMPLETED AFTER THE INSTALLATION OF THE SMS EQUIPMENT AND ANY ASSOCIATED SUPPORT APPARATUS.

SITE READINESS GUIDELINES

THE FOLLOWING GENERAL CONDITIONS ARE NECESSARY TO HAVE THE STATUS OF "READY SITE".

1) PROPER POWER AVAILABLE AT SIEMENS EQUIPMENT POWER CABINET LOCATION AND ALL POWER OUTLETS FUNCTIONING.
2) AIR CONDITIONING/HUMIDIFICATION SYSTEMS COMPLETE, TESTED, AND FUNCTIONING PROPERLY ACCORDING TO SIEMENS SPECIFICATIONS.
3) PROPER LIGHTING INSTALLED AND FUNCTIONING.
4) PLUMBING COMPLETE EXCEPT FOR ANY FINAL CONNECTIONS TO SIEMENS EQUIPMENT.
5) ALL CABLE TRAYS/DUCTS/CONDUITS CORRECTLY SIZED, LOCATED, AND INSTALLED ACCORDING TO THE SIEMENS DRAWINGS.
6) ALL REINFORCEMENT PLATES/UNISTRUT INSTALLED AS REQUIRED.
7) ROOM FOR EQUIPMENT INSTALLATION AND IMMEDIATE VICINITY IS DUST-FREE AND IS TO REMAIN SO FOR THE DURATION OF THE INSTALLATION.
8) A SECURE AREA (APPROXIMATELY 10' x 10') IS AVAILABLE AT EQUIPMENT DELIVERY FOR PARTS AND INSTALLATION TOOLS.
9) CUSTOMER SUPPLIED CAMERAS AND PROCESSORS INSTALLED.
10) CUSTOMER APPROVAL FOR SIEMENS REMOTE SERVICES (SRS) CONNECTION, AND CUSTOMER'S I.T. CONTACT INFORMATION AND IP ADDRESSES ESTABLISHED.
11) WALLS TO BE PRIMED AND PAINTED, FLOORS TO BE TILED EXCEPT IN AREAS OF THE EQUIPMENT BASE PLATES.

IF THESE CONDITIONS ARE NOT MET, THE SIEMENS PROJECT MANAGER AND THE DESIGNATED SIEMENS INSTALLATION SUPERVISOR SHALL RESCHEDULE THE INSTALLATION START DATE. NOTE: ADDITIONAL COST MAY BE INCURRED BY THE CUSTOMER/CONTRACTOR AND DELIVERY DATES MAY NEED TO BE RESCHEDULED, WHEN THE SIEMENS SITE READINESS GUIDELINES ARE NOT MET.

RESOURCE LIST (SMS USE ONLY)

DESIGNATION	PG NUMBER	DATE
PLANNING GUIDE	M7-010.891.01.08.02	08.14

AERA REV 8

ARCHITECTURAL EQUIPMENT PLAN

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

ROOM MEASUREMENTS

ALL ROOM MEASUREMENTS AND ROOM DETAIL SPECIFICATIONS MUST BE VERIFIED ON SITE PRIOR TO BEGINNING ANY CONSTRUCTION WORK.

CONSTRUCTION REQUIREMENTS

THE CUSTOMER/CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL CONSTRUCTION MATERIALS INCLUDING ELECTRICAL AND MECHANICAL DEVICES REQUIRED BY SIEMENS SPECIFICATIONS AND TO ENSURE THAT THE MATERIAL USED INSIDE THE RF-SHIELDING IS AS FREE OF FERROMAGNETIC PROPERTIES AS POSSIBLE. ANY FERROUS MATERIAL INSIDE THE EXAM ROOM MAY BECOME A MISSILE AND CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT. FERROUS ITEMS INSIDE THE EXAM ROOM ARE THE LIABILITY OF THE CONTRACTOR AND/OR INSTALLER.

REV 1

STATE AGENCY REVIEW

PRIOR TO SIEMENS EQUIPMENT INSTALLATION, APPROVAL OF CONSTRUCTION OR STRUCTURAL MODIFICATIONS FOR DIAGNOSTIC OR THERAPEUTIC PURPOSES, MUST BE OBTAINED BY THE CUSTOMER FROM THE APPROPRIATE STATE AGENCY, IF APPLICABLE.

DC LIGHTING

THE MAGNETIC FIELD ADVERSELY AFFECTS THE OPERATING LIFE OF LIGHT BULBS LOCATED IN THE IMMEDIATE VICINITY OF THE MAGNET. THE FILAMENT IN THE BULBS OSCILLATES WITH THE FREQUENCY OF THE POWER SUPPLY. LIGHTS IN THE VICINITY OF THE MAGNET CONNECTED TO A DC POWER SUPPLY CAN REDUCE THIS EFFECT. RESIDUAL DC RIPPLE SHOULD BE LESS THAN 5%.

REV 0

MAGNETIC FIELD WARNING

PLEASE BE AWARE THAT DURING THE CALIBRATION PHASE OF THE MRI INSTALLATION, THE MAGNET WILL BE AT FULL FIELD STRENGTH AND ALL NECESSARY PRECAUTIONS WHEN WORKING IN THE VICINITY OF STRONG MAGNETIC FIELDS MUST BE TAKEN. WHEN THE CALIBRATION OF THE MAGNET OVERLAPS WITH FINAL CONSTRUCTION ACTIVITIES, THERE IS THE POSSIBILITY OF THE INTRODUCTION OF FERROUS MAGNETIC OBJECTS BY WORKERS INTO THE MR ROOM. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ENSURE THAT ALL PRECAUTIONS ARE TAKEN TO ENSURE THAT THIS DOES NOT HAPPEN, AS EQUIPMENT DAMAGE AND SERIOUS BODILY INJURY COULD OCCUR.

REV 0

STATIC DISSIPATIVE FLOORING

SIEMENS RECOMMENDS "STATIC DISSIPATIVE" FLOOR COVERING WITH AN ELECTRICAL RESISTANCE OF $\leq 10^9$ OHMS IN ALL AREAS WHERE SIEMENS EQUIPMENT IS INSTALLED. A STATIC DISSIPATIVE FLOOR REDUCES THE RISK OF STATIC ELECTRIC DISCHARGES THAT MAY DAMAGE SENSITIVE EQUIPMENT AND COMPONENTS.

REV 0

CASEWORK & ACCESSORY NOTES

1) ALL CASEWORK IS EITHER EXISTING OR IS TO BE DESIGNED, DETAILED, FURNISHED AND INSTALLED BY THE CUSTOMER AND/OR CONTRACTOR. FOLLOW DESIGN RECOMMENDATIONS INCLUDED HEREWITH, AS THEY ARE ESSENTIAL FOR THE SUCCESSFUL INSTALLATION & OPERATION OF THE SIEMENS EQUIPMENT.

2) ALL FURNITURE (CHAIRS, ETC.) FOR THE CONTROL ROOM ARE TO BE PROVIDED BY THE CUSTOMER.

REV 0

TRANSPORTING REQUIREMENTS

LARGEST ITEM – MAGNET – 10,361 LBS.

MINIMUM MAGNET DIMENSIONS WITH TRANSPORT WHEELS UNDER MAGNET:

7'-7" HIGH X 7'-7" WIDE X 5'-2" DEEP WITHOUT TABLE SUPPORT, 6'-0" DEEP WITH TABLE SUPPORT.

THE ROOF HATCH/DELIVERY OPENING SHOULD BE 4" LARGER.

TO TRANSPORT THE GPA/EPC CABINET (3,307 POUNDS) A MINIMUM ROOM HEIGHT OF 6'-9" IS REQUIRED, 6'-3" WITH WHEELS REMOVED, 6'-1" WITH WHEELS AND MAINS CONNECTION REMOVED.

NOISE LEVELS

SYSTEM ROOM	NOISE LEVEL / dB(A)
CONTROL ROOM	<55
EXAMINATION ROOM	XJ GRADIENTS 83.1 OVER 8 HOUR AVERAGE 101.5 MAXIMUM MEASURED IN THE EXAM ROOM XQ GRADIENTS 86.1 OVER 8 HOUR AVERAGE 108.2 MAXIMUM MEASURED IN 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.

ENVIRONMENTAL/POWER AUDIT

AS AN INDICATION OF OUR COMMITMENT TO QUALITY, SIEMENS MAY, AT NO COST TO YOUR FACILITY, CHECK THE OPERATING ENVIRONMENT AFTER SYSTEM TURNOVER TO DETERMINE IF THE REQUIREMENTS FOR TEMPERATURE, HUMIDITY, POWER, AND GROUNDING ARE MET AS PER SIEMENS' PUBLISHED SPECIFICATIONS. SIEMENS WILL GENERATE A WRITTEN REPORT DETAILING THE ENVIRONMENTAL AND ELECTRICAL CONDITION OF THE SITE AFTER TURNOVER AND WILL SHARE THE REPORT WITH YOU. IN THE EVENT WE IDENTIFY ANY ENVIRONMENTAL/POWER DEFICIENCIES AT THE SITE, YOUR FACILITY WILL BE REQUESTED TO CORRECT DEFICIENCIES WITHIN THIRTY (30) DAYS. SHOULD ANY CORRECTIVE ACTIONS BE NECESSARY, AND UPON REQUEST, SIEMENS WILL PROVIDE GUIDANCE IN AN EFFORT TO FACILITATE RESOLUTION. PLEASE BE ADVISED THAT AFTER 30 DAYS NOTICE ANY REPAIR OR MAINTENANCE SERVICES NECESSITATED BY SEVERE DEFICIENCIES WILL FALL OUTSIDE YOUR WARRANTY COVERAGE.

CEILING HEIGHTS

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

MAGNET CO-SITING

MINIMUM DISTANCE MAGNET-MAGNET (SIEMENS)

	0.2T	0.35T	1.0T	1.5T	3.0T
0.2T	32'-9"	32'-9"	16'-5"	19'-9"	32'-9"
0.35T	32'-9"	32'-9"	16'-5"	19'-9"	32'-9"
1.0T	16'-5"	16'-5"	14'-10"	16'-5"	19'-9"
1.5T	19'-9"	19'-9"	16'-5"	16'-5"	19'-9"
3.0T	32'-9"	32'-9"	19'-9"	19'-9"	19'-9"

DO NOT RAMP ONE MAGNET WHILE THE OTHER IS RUNNING APPLICATIONS. SHIM IS ONLY OPTIMIZED WHEN BOTH MAGNETS ARE RAMPED UP DURING THE SHIMMING PROCEDURE.

WHEN CO-SITING AN MR SYSTEM WITH A MAGNETIC NAVIGATION SYSTEM THE MINIMUM DISTANCE FOR CLINICAL IMAGING IS 98'-6", FOR SPECTROSCOPY THE MINIMUM SEPARATION IS 121'-5".

REV 0

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.

SYM	DATE	DESCRIPTION
1	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

-ISSUE BLOCK-

PROJECT MANAGER: MICHAEL POWERS
TEL: (770) 330-1781 EXT:
VMAIL:
FAX: (770) 369-8232
EMAIL: michael.powers@siemens.com

SIEMENS

GRADY HEALTH SYSTEM

191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

PROJECT #: 1500201

SHEET OF 1 10

DRAWN BY: F. CARUSO

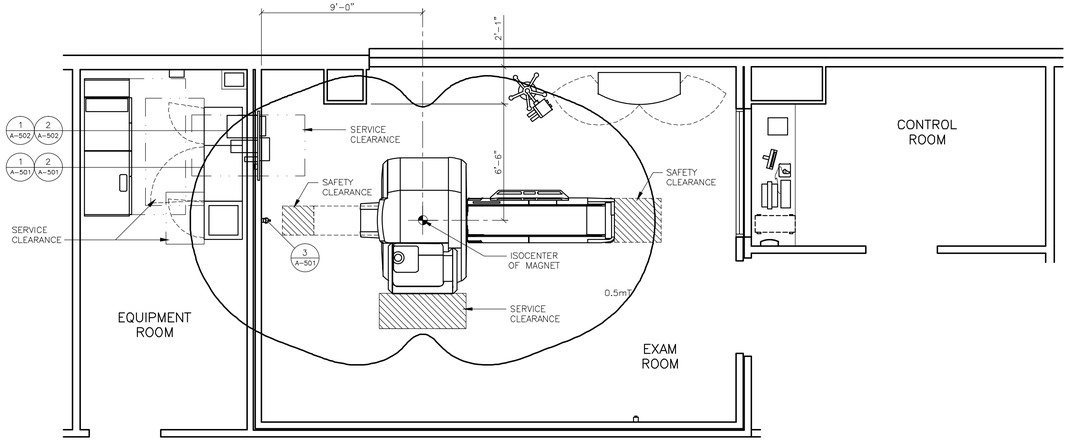
SCALE: AS NOTED

REF. #: T-49M1UW

DATE: 03/18/15

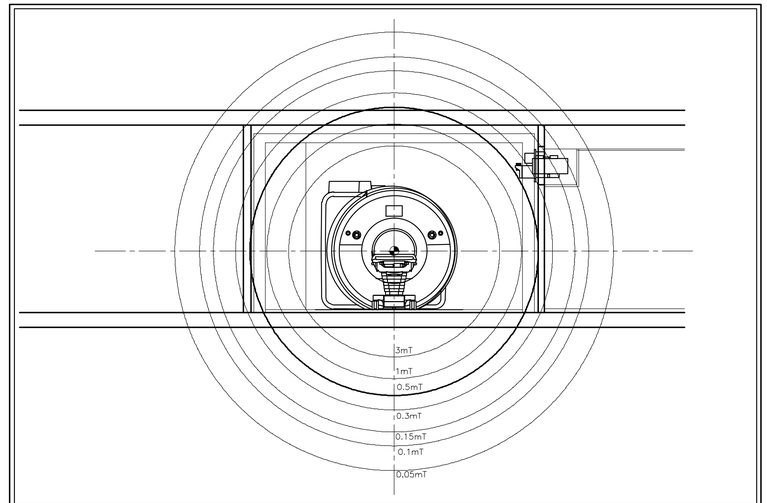
SHEET: A-101

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

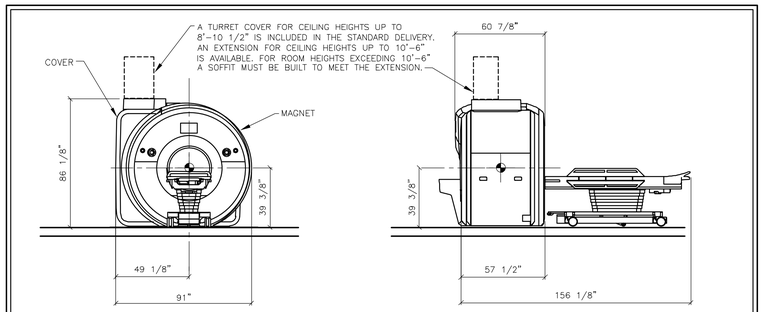


SAFETY/SERVICE CLEARANCE PLAN

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

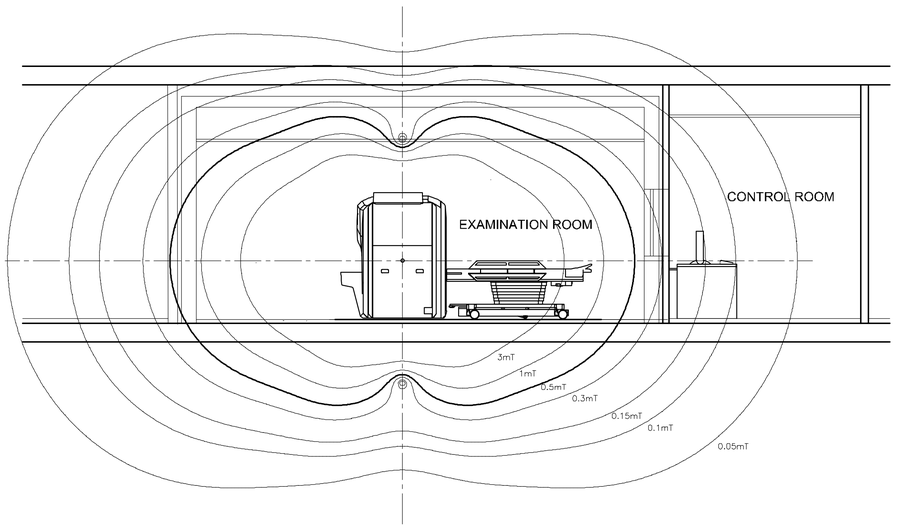


– AERA FRONT ELEVATION — SCALE: 1/4"=1'-0"



FRONT ELEVATION — SIDE ELEVATION

– AERA MAGNET — SCALE: NONE



– AERA SIDE ELEVATION — SCALE: 1/4"=1'-0"

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

AERA REV 8

SYM	DATE	DESCRIPTION
3	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

PROJECT MANAGER: MICHAEL POWERS
TEL: (770) 330-1781
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SIEMENS

GRADY HEALTH SYSTEM

191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

PROJECT #: 1500201
SHEET OF: 2 10
DRAWN BY: F. CARUSO
SCALE: AS NOTED
REF. #: 1-49M1UW
DATE: 03/18/15
SHEET: A-102

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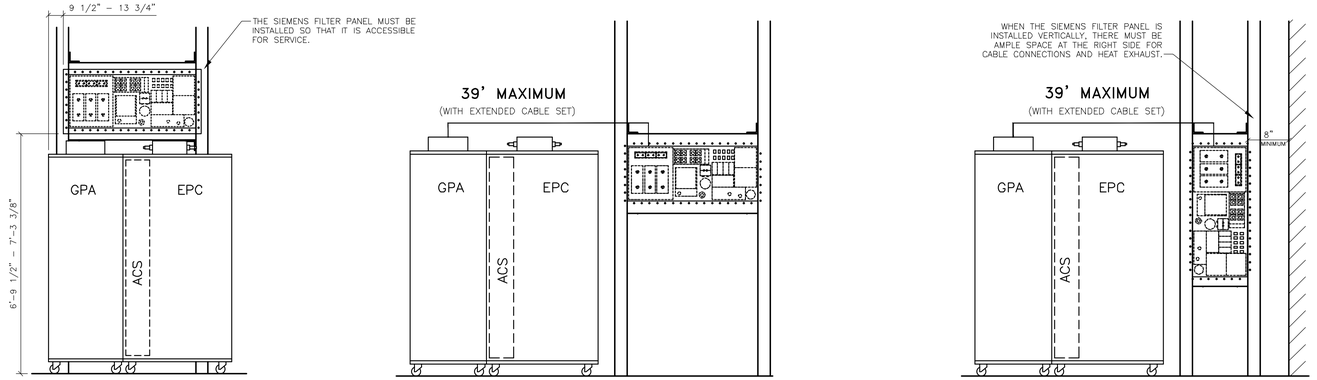
– THIS DRAWING DOES NOT PROVIDE RADIATION SHIELDING REQUIREMENTS FOR X-RAY AND ASSOCIATED EQUIPMENT. THE CUSTOMER IS RESPONSIBLE FOR CONSULTING WITH A REGISTERED RADIATION PHYSICIST TO SPECIFY RADIATION PROTECTION.

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT



RECOMMENDED INSTALLATION

ALTERNATE INSTALLATION

ALTERNATE INSTALLATION

1 **ELECTRONICS CABINET AND RF FILTER PLATE FRONT VIEW** SCALE: 1/2"=1'-0"

SURFACE COIL SIZES

COIL NAME	POUND WEIGHT	INCHES		
		LENGTH	WIDTH	HEIGHT
BODY COIL 18	4	15 1/8	23 1/4	3
HEAD/NECK COIL 20	11	17 3/8	13	14 5/8
SPINE COIL 32	24	47 1/4	19 1/4	3
FLEX COIL LARGE 4	1.2	20 3/8	8 7/8	–
FLEX COIL SMALL 4	1	14 3/8	6 7/8	–
PERIPHERAL ANGIO 36	18	33 7/8	26	11
HAND/WRIST COIL 16	6	13 1/8	8 1/2	4 1/2
HAND/WRIST COIL BASE	4	20 5/8	12 3/8	1 1/4
FOOT/ANKLE COIL 16	7	16 1/8	13	15 3/8
FOOT/ANKLE COIL BASE	15	16 3/4	13 1/8	15 1/8
SHOULDER COIL LARGE 16	15	15	17	19
SHOULDER COIL SMALL 16	15	12	17	19
CP EXTREMITY	15	16	10 5/8	11 3/8
TX.RX 15 CHANNEL KNEE	15	10 1/8	14 1/8	12 1/4
BI BREAST COIL 4 CH.	23	34 5/8	18 1/2	8 1/4
AI BREAST COIL 16 CH.	24	28	18 1/2	7 7/8
SENTINELLE VANGUARD IMMOBILIZER	45	43 1/4	22 7/8	11

RECOMMENDED INSTALLATION

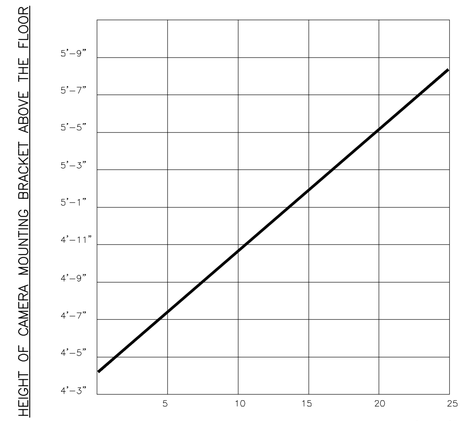
ALTERNATE INSTALLATION

MINIMUM ROOM HEIGHT INSTALLATION

2 **ELECTRONICS CABINET AND RF FILTER PLATE SIDE VIEW** SCALE: 1/2"=1'-0"

PATIENT VIDEO MONITORING

IT IS IMPORTANT TO VISUALLY MONITOR THE PATIENT DURING AN MR EXAM. IF OPERATING PERSONNEL CANNOT VISUALLY OBSERVE THE PATIENT THROUGH AN RF ROOM WINDOW VIDEO CAMERAS ARE OPTIONALLY AVAILABLE FROM SIEMENS. THE CAMERA INSIDE THE EXAM ROOM WILL HAVE TO BE INSTALLED ON THE FINISHED WALL. THE CAMERA WALL BRACKET IS PART OF THE DELIVERY. MOUNTING SCREWS AND DOWELS SHOULD BE PROVIDED LOCALLY. THE CHART BELOW SHOWS SUGGESTED MOUNTING HEIGHTS RELATED TO THE WALL DISTANCE FROM THE MAGNET COVER.



REV 0

3 **PATIENT SUPERVISION CAMERA** SCALE: NONE

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT

AERA REV 8

ATTENTION:

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SYM	DATE	DESCRIPTION
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SIEMENS

GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

PROJECT #: 1500201

SHEET: A-501

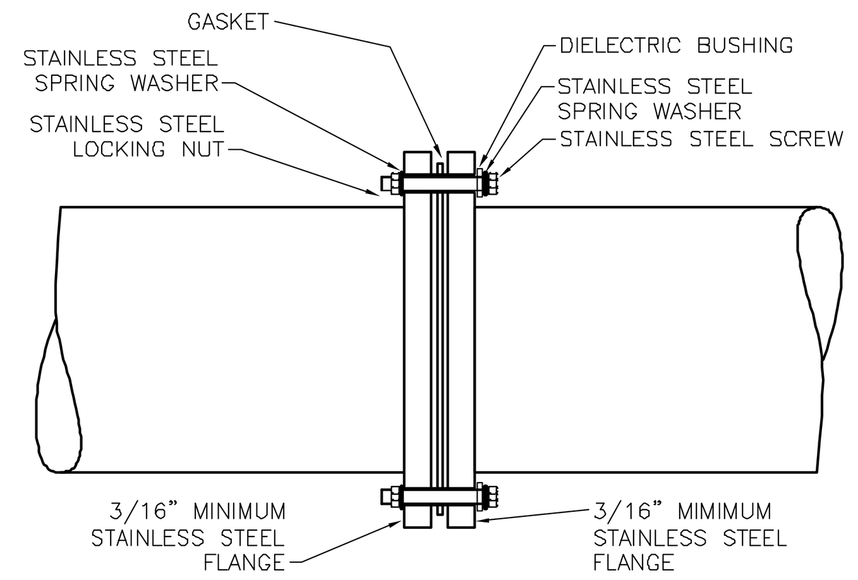
SHEET 3 OF 10

DRAWN BY: F. CARUSO

SCALE: AS NOTED

REF. #: 1-49M1UW

DATE: 03/18/15

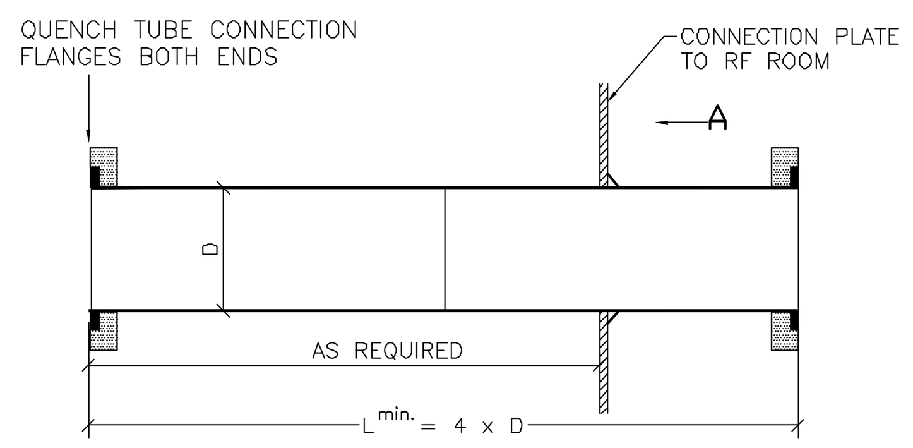


DIELECTRIC ISOLATION HAS TO BE INSTALLED TO AVOID ELECTRICAL NOISE BEING PICKED UP BY LOOPS BETWEEN THE MAGNET, THE QUENCH TUBE, THE RF ROOM, AND THE BUILDING.

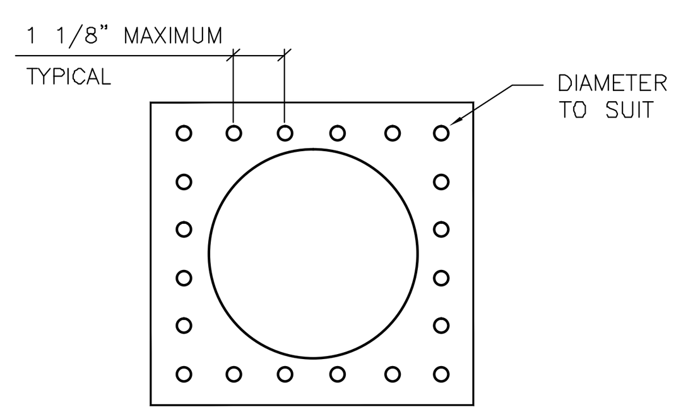
IT IS NECESSARY TO HAVE ONE DIELECTRIC ISOLATION OF THE QUENCH TUBE INSIDE THE RF ROOM (PROVIDED BY SIEMENS AT THE MAGNET) AND ONE OUTSIDE THE RF ROOM (PROVIDED BY THE QUENCH TUBE MANUFACTURER).

REV 0

–	DIELECTRIC ISOLATION	NO SCALE



D = INTERNAL WAVE GUIDE DIAMETER
(D </= 11 13/16")
L = WAVE GUIDE LENGTH



VIEW A

THE RF CABIN FEED THROUGH NEEDS TO CONFORM TO CERTAIN GEOMETRIC CONSTRAINTS IN ORDER TO GUARANTEE THE RF INTEGRITY OF THE RF CABIN.

AS A FUNCTION OF INTERNAL PIPE DIAMETER, THE FOLLOWING APPLIES TO MINIMUM PIPE LENGTH FOR FREQUENCIES UP TO 128 MHz AND 110 dB ATTENUATION.

DEPENDING ON RF CABIN DESIGNS, RF SEALS CAN BE REQUIRED BETWEEN THE MOUNTING FLANGE AND THE RF CABIN.

QUENCH TUBE RF CABIN FEED THROUGH

REV 0

–	WAVE GUIDE	NO SCALE

RF DOOR OPENING

IN THE EVENT OF A CATASTOPHIC 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".

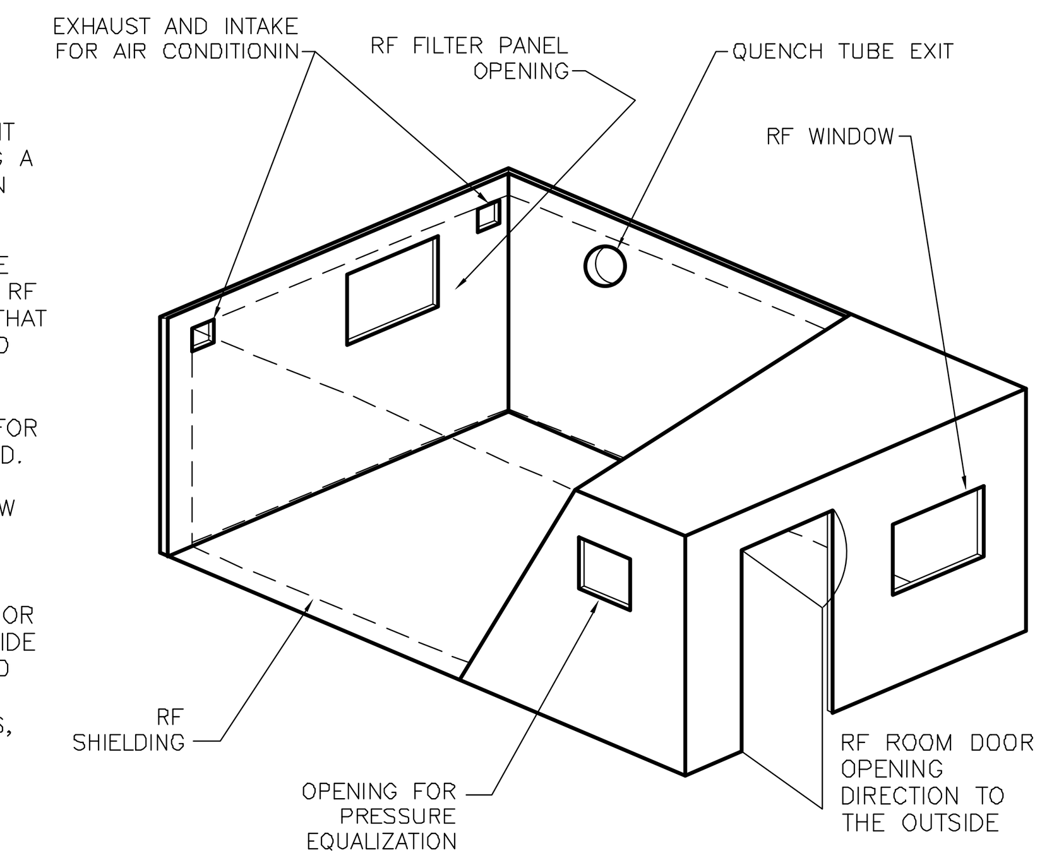
TO ENSURE UNOBSTRUCTED VENTING, THIS OPENING CANNOT BE SUBDIVIDED. THIS MEANS THAT, FOR EXAMPLE, RF SEALED HONEYCOMB GRIDS ARE NOT PERMITTED.

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 CLOSES 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.



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

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. 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. 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). 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 0

EXAM ROOM INTERIOR NOTES

1) ONLY NON–MAGNETIC MATERIALS ARE TO BE USED AND INSTALLED IN THE RF ROOM.

2) A SUSPENDED CEILING MUST BE STATICALLY SUSPENDED, NOT SUSPENDED WITH MOVABLE CLAMPS, SPRINGS, ETC.

3) CORRUGATED RODS IN SUSPENDED CEILINGS MUST BE INSTALLED SECURELY. GALVANIC CONTENT BETWEEN THE CORRUGATED 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 0

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.

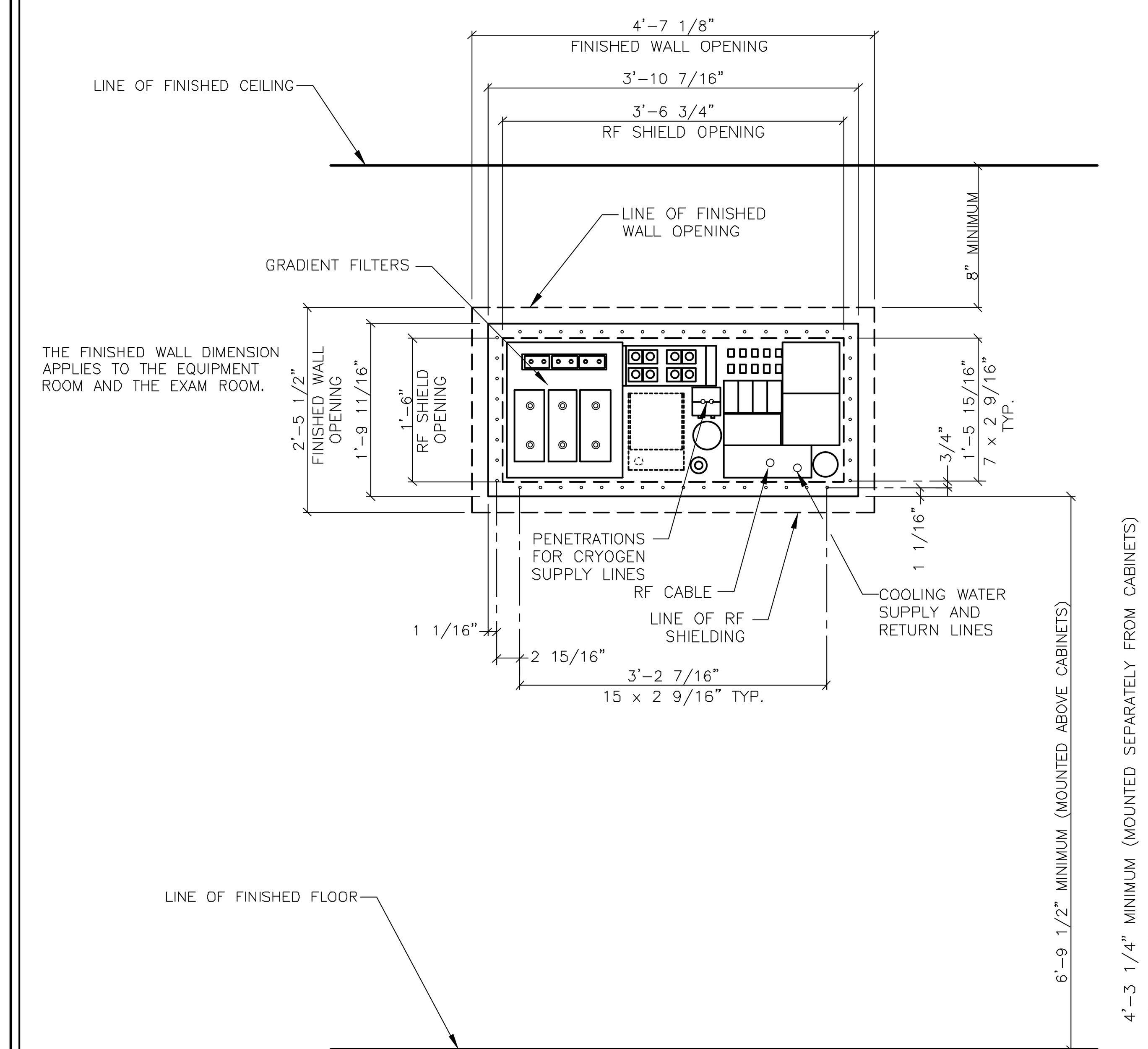
REV 0

FILTER PLATE GENERAL NOTES

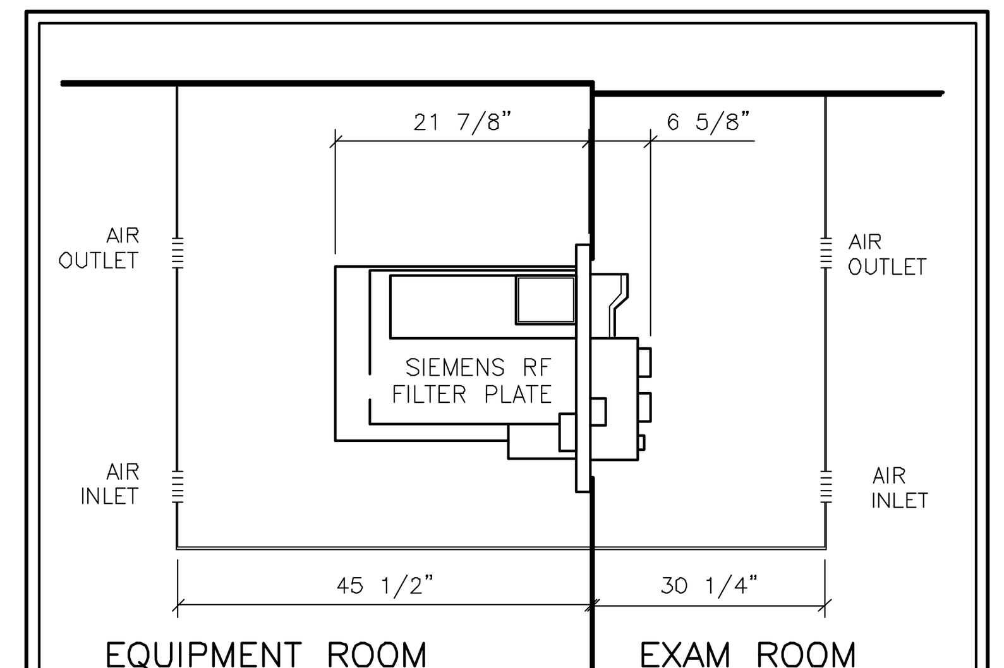
1) STRUCTURAL SUPPORT AND INTEGRATION OF THE SIEMENS SUPPLIED AND INSTALLED FILTER PLATE WITH MAGNETIC AND RF SHIELDING SHALL BE SPECIFIED, DETAILED AND NOTED BY THE RF AND MAGNETIC SHIELDING MANUFACTURER(S) WITH OVERALL COORDINATION WITH SIEMENS SITE SPECIFIC RECOMMENDATIONS TO BE THE RESPONSIBILITY 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

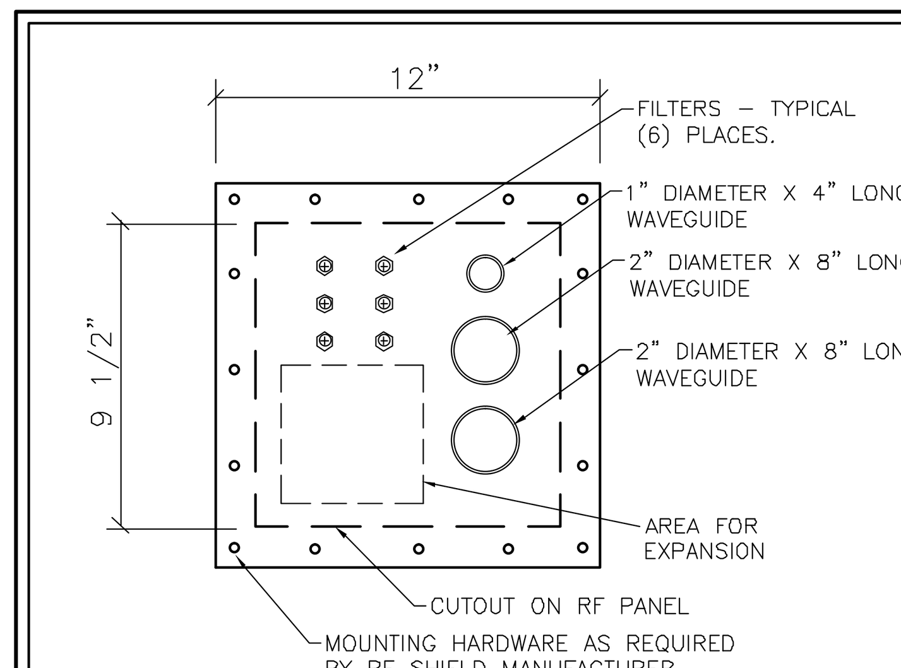


1	EQUIPMENT ROOM SIDE FILTER PLATE ELEVATION	SCALE: 3/4"=1'–0"



IF A COVER IS DESIRED TO CONCEAL THE FILTER PANEL INSIDE THE EXAM ROOM (NOT INCLUDED IN DELIVERY), IT IS NECESSARY TO HAVE VENTILATION AND PROPER CLEARANCE FOR CABLING AND SERVICE. RECOMMENDED SIZE IS 4'–4" WIDE. THERE SHOULD BE A MINIMUM 8" CLEAR FROM THE TOP OF THE FILTER TO THE CEILING ABOVE.

2	FILTER PANEL COVERS	NO SCALE



NON–SIEMENS EQUIPMENT REQUIRING RF ROOM PENETRATION REQUIRES A SEPARATE PENETRATION PANEL BE PROVIDED BY THE CUSTOMER AND INSTALLED BY THE RF ROOM MANUFACTURER. SIEMENS FILTER PANEL IS RESERVED FOR SIEMENS PRODUCTS AND FUTURE UPGRADES ONLY.

TYPICAL OEM (ORIGINAL EQUIPMENT MANUFACTURER) EQUIPMENT MAY INCLUDE, BUT NOT BE LIMITED TO, INJECTORS, fMRI, AND SAFETY RELATED ITEMS. SPECIFIC EQUIPMENT MANUFACTURERS WILL HAVE DETAILED INFORMATION REGARDING REQUIRED PENETRATIONS. ABOVE IS AN EXAMPLE OF A PENETRATION PANEL THAT WILL MEET MANY REQUIREMENTS. THE PENETRATION PANEL SHALL BE LOCATED IN CLOSE PROXIMITY TO THE SIEMENS FILTER PANEL AND BE COMPLIANT WITH ALL SIEMENS RF ROOM REQUIREMENTS.

REV 0

–	OEM FILTER PANEL	NO SCALE

AERA
REV 8

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SYM	DATE	DESCRIPTION
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–ISSUE BLOCK–

PROJECT MANAGER: MICHAEL POWERS
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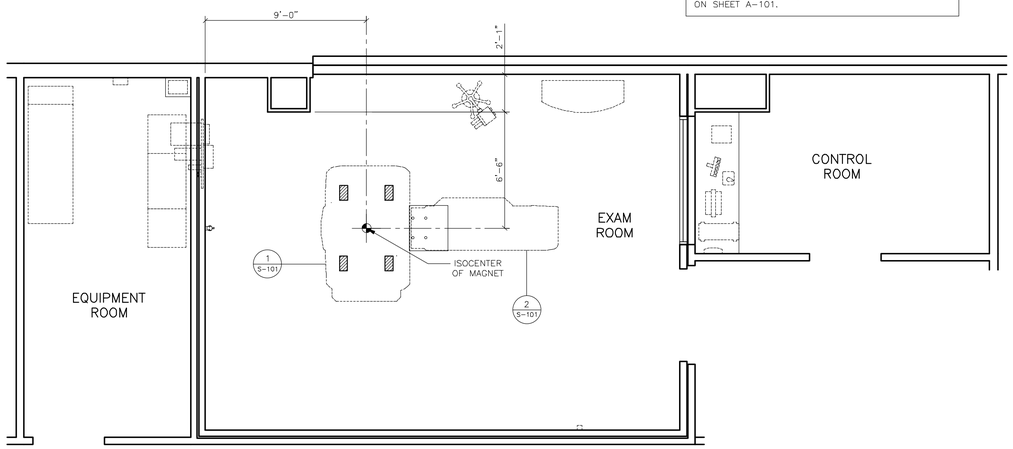
SIEMENS

GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

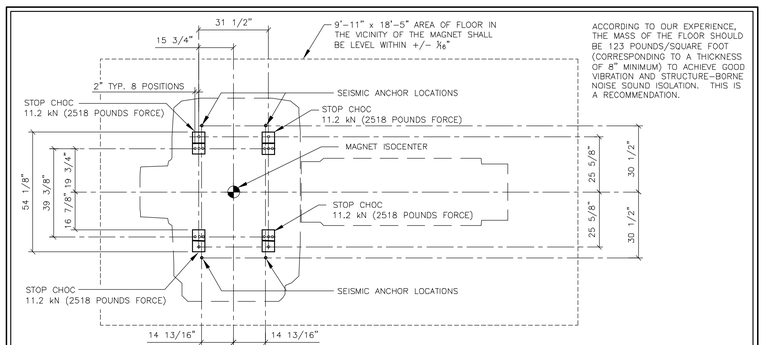
PROJECT #: 1500201
SHEET 4 OF 10
DRAWN BY: F. CARUSO
SCALE: AS NOTED
REF. #: 1–49M1UW
DATE: 03/18/15
SHEET: A-502

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



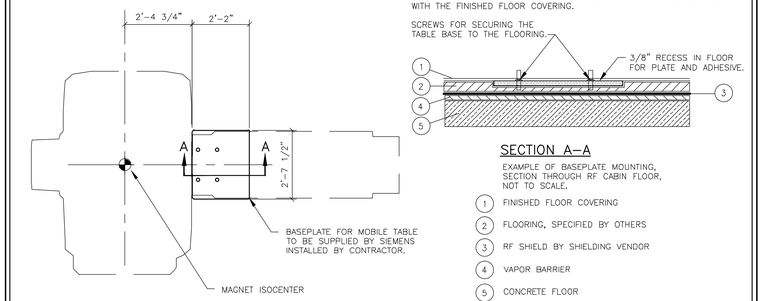
STRUCTURAL FLOOR PLAN

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.

1 | AERA MAGNET BASE DETAIL | SCALE: 3/8"=1'-0"



SECTION A-A

EXAMPLE OF BASEPLATE MOUNTING, SECTION THROUGH RF CABIN FLOOR, NOT TO SCALE.

1. FINISHED FLOOR COVERING
2. FLOORING, SPECIFIED BY OTHERS
3. RF SHIELD BY SHIELDING VENDOR
4. VAPOR BARRIER
5. CONCRETE FLOOR

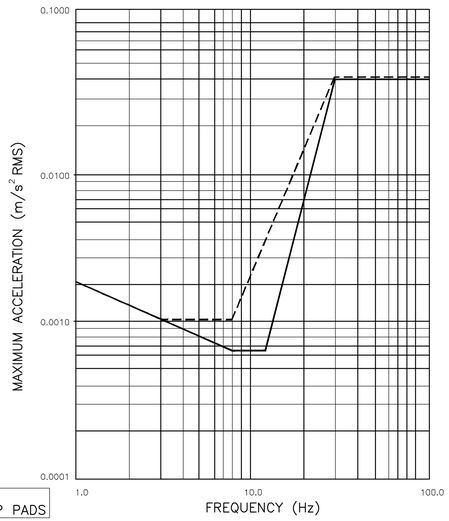
2 | BASEPLATE FOR MOBILE PATIENT TABLE | SCALE: 3/8"=1'-0"

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/s^2 OR −80 dB(G) G=9.81 m/s^2

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 MULITIPLIED BY 4 (OR 12 dB).

CONTACT SIEMENS PROJECT MANAGER FOR MORE DETAILS.



– | PERMISSIBLE ACCELERATION | SCALE: NONE

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 BOTTOM SIDE OF THE UNISTRUT CEILING GRID AND ANY CEILING MOUNTED SUPPORT PLATES ARE TO BE INSTALLED FLUSH WITH THE FINISHED CEILING. THE CUSTOMER/CONTRACTOR SHALL ALSO PROVIDE COVERSTRIPS FOR THE UNISTRUT.

8) 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.

9) 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.

CEILING HEIGHTS

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

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.

SYM	DATE	DESCRIPTION
0	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

AERA REV 8

PROJECT MANAGER: MICHAEL POWERS
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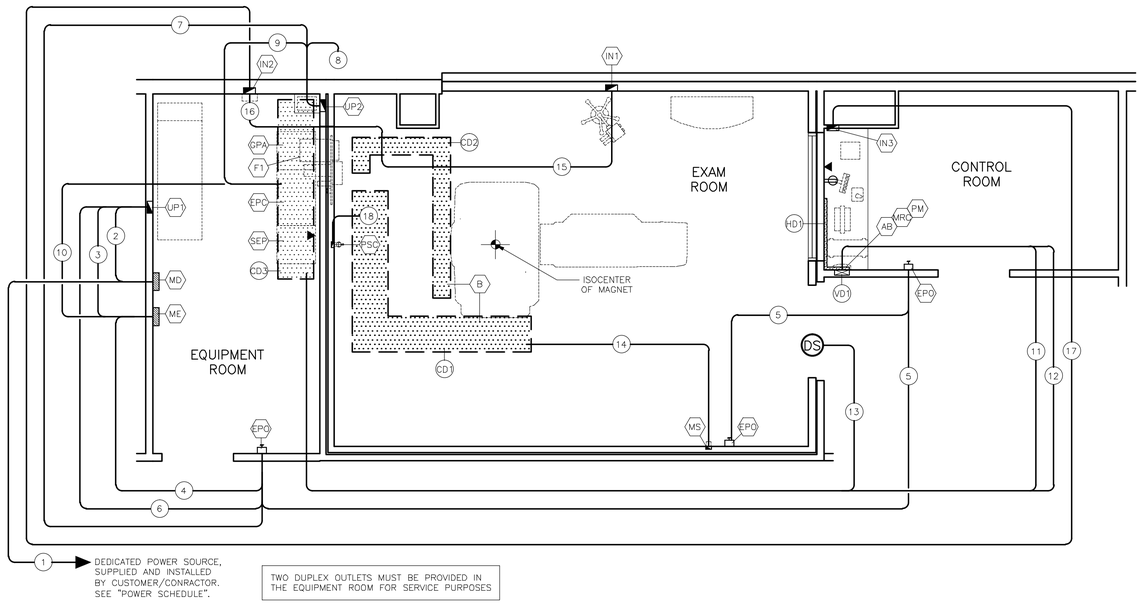
SIEMENS

GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

PROJECT #: 1500201
SHEET OF: 5 10
DRAWN BY: F. CARUSO
DATE: 03/18/15
SCALE: AS NOTED
REF. #: 1-49M1UW

SHEET: S-101

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



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 TRENCHDUCT
	PULLBOX IN (FLOOR/WALL/CEILING)
	OPENING IN ACCESS FLOORING
DS	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 (VERIFY WITH SMS PROJECT MANAGER).
	110 VOLT, 20 AMP, HOSPITAL GRADE DUPLEX OUTLET LOCATED NEAR THE ETHERNET CONNECTION.

CONTRACTOR SUPPLIED CABLES

FROM	VIA	TO	DESCRIPTION	REMARKS
SOURCE	1	MD	(3) PHASE CONDUCTORS, (1) FULL SIZE EQUIPMENT GROUND WIRE TO BE SIZED BY ELECTRICAL CONTRACTOR/ENGINEER.	
MD	2	UP1	(3) PHASE CONDUCTORS, (1) FULL SIZE EQUIPMENT GROUND WIRE TO BE SIZED BY ELECTRICAL CONTRACTOR/ENGINEER.	
UP1	3	ME	(3) PHASE CONDUCTORS, (1) FULL SIZE EQUIPMENT GROUND WIRE TO BE SIZED BY ELECTRICAL CONTRACTOR/ENGINEER.	
ME	4	EPO	DETERMINED BY ELECTRICAL CONTRACTOR.	
EPO	5	EPO	DETERMINED BY ELECTRICAL CONTRACTOR.	
EPO	6	UP1	DETERMINED BY ELECTRICAL CONTRACTOR.	
EPO	7	UP2	DETERMINED BY ELECTRICAL CONTRACTOR.	
ME	10	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.	

ELECTRICAL LEGEND

SYM	SIZE	DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR	REMARKS
AB	3"ø	OPENING IN FACE OF VERTICAL DUCT 5'–0" ABOVE FINISHED FLOOR IN LOCATION TO BE COORDINATED WITH THE ARCHITECT.	ALARM BOX
EA EA EA	18" x 18"	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	ELECTRONICS CABINETS
G	AS REQUIRED	LOCATION FOR CABLES TO DROP OUT OF BOTTOM OF RACEWAY.	MAGNET CABLE ACCESS
EA	----	EMERGENCY POWER OFF BUTTONS, MOUNTED WITH CENTERLINE AT 5'–0" ABOVE FINISHED FLOOR. ALL PARTS ARE TO BE NONFERROUS 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
IN1	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
IN2	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN EQUIPMENT ROOM, 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
IN3	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
MD	----	MAIN FUSIBLE DISCONNECT. EXACT LOCATION DETERMINED BY CUSTOMER/CONTRACTOR	SEE POWER SCHEDULE
ME	----	MAIN ENCLOSURE WITH MAIN BREAKER. EXACT LOCATION DETERMINED BY CUSTOMER/CONTRACTOR.	SEE POWER SCHEDULE
MRC PM	4" x 4"	OPENING IN FACE OF RACEWAY IN SHOWN LOCATION.	HOST COMPUTER/PATINET MONITOR
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
PA	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL REFER TO HEIGHT CHART A–501–3. THE PULL BOX CAN BE MOUNTED AT APPROXIMATELY 5'–0" ABOVE THE FINISHED FLOOR IN MOST CASES, DEPENDING ON THE DISTANCE FROM THE MAGNET TO THE WALL.	PATIENT SUPERVISION CAMERA
SEP	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL AT FLOOR LINE IN SHOWN LOCATION PROVIDED WITH 2"ø OPENING IN FINISHED COVER.	POWERWARE 9130
EPC	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER AND EATON INSTALLATION MANUAL IN SHOWN LOCATION PROVIDED WITH 2"ø OPENING IN FINISHED COVER.	POWERWARE 9390
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–501/2
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–501/2
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–501/2
WM	4" x 2"	WIREMOLD 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 MAIN DISCONNECT (MD)	SEE POWER SCHEDULE, SHEET E–102
2	AS PER NEC	CONDUIT FROM "MD" TO "UP1"	SEE POWER SCHEDULE, SHEET E–102
3	AS PER NEC	CONDUIT FROM "UP1" TO "ME".	SEE POWER SCHEDULE, SHEET E–102
4	AS PER NEC	CONDUIT FROM "ME" TO "EPO".	SEE POWER SCHEDULE, SHEET E–102
5	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
6	AS PER NEC	CONDUIT FROM "EPO" TO "UP1".	SEE POWER SCHEDULE, SHEET E–102
7	AS PER NEC	CONDUIT FROM "EPO" TO "UP2".	SEE POWER SCHEDULE, SHEET E–102
8	(1) 3/4"ø	SURFACE MOUNTED FLEX CONDUIT FROM "UP2" TO SIEMENS PROVIDED UPS/EPO CONTROL BOX.	MAXIMUM LENGTH 4 FEET
9	(1) 1"ø	CONDUIT FROM "UP2" TO "EPC".	MAXIMUM LENGTH 29 FEET
10	(1) 2"ø	CONDUIT FROM "ME" TO END AT "EPC" VIA FLEX CONDUIT. THERE MUST BE A DIELECTRIC SEPARATION BETWEEN THE CONDUIT AND THE CONNECTION AT THE SIEMENS EPC CABINET.	SEE POWER SCHEDULE, SHEET E–102
11	(2) 2 1/2"ø	CONDUIT FROM "VD1" (MRC) TO "CD3" (EPC).	60' MAXIMUM CONDUIT LENGTH
12	(1) 1 1/2"ø	CONDUIT FROM "VD1" (AB) TO "CD3" (EPC).	60' MAXIMUM CONDUIT LENGTH
13	(1) 1/2"ø	CONDUIT FROM "DS" TO "CD3" (EPC).	55' MAXIMUM CONDUIT LENGTH
14	(1) 3/4"ø	CONDUIT FROM "MS" TO "CD1" (WIRES TO MAGNET) TO BE NON–FERROUS WHEN INSIDE THE RF ROOM.	20' MAXIMUM CONDUIT LENGTH
15	(2) 2"ø	NON–FERROUS CONDUITS FROM NEAR "F1" TO "IN1" FOR INJECTOR CABLES.	NOT TO EXCEED 50 FEET
16	(2) 2"ø	CONDUITS FROM NEAR FILTER LOCATION TO "IN2".	
17	(1) 1"ø	CONDUIT FROM "IN2" TO "IN3" FOR INJECTOR CABLES.	NOT TO EXCEED 200 FEET
18	(1) 1"ø	NON–FERROUS CONDUIT FROM "PSC" TO "CD1".	

ELECTRICAL NOTES

1) COMPLIANCE: ELECTRICAL WORK SHALL BE IN COMPLIANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA–70), O.S.H.A. REGULATIONS, AS WELL AS APPLICABLE REGULATIONS OF CITY, COUNTY, STATE AND FEDERAL AGENCIES. PROVIDE MATERIALS AND EQUIPMENT THAT COMPLY TO ANSI, IEEE AND NEMA STANDARDS, WHERE APPLICABLE. PROVIDE ONLY MATERIALS AND PRODUCTS THAT ARE U.L. LISTED AND LABELED. CUSTOMER'S/CONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF NECA STANDARD OF INSTALLATION.
2) QUALITY ASSURANCE: THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN THE FIELD TO INSURE THAT THE NEW WORK WILL FIT TO 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 SMS 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 SMS PROJECT MANAGER.
3) POWER SUPPLY SOURCE: POWER SUPPLIES FOR SIEMENS MEDICAL SOLUTIONS EQUIPMENT SHALL BE DEDICATED SERVICES KEPT ENTIRELY FREE AND INDEPENDENT OF ALL OTHER BUILDING WIRING AND EQUIPMENT, SUCH AS: ELEVATORS, GENERATORS, PUMPS, HVAC SYSTEMS, ETC. THE CONTRACTOR SHALL COORDINATE THIS WORK WITH THE CUSTOMER/UTILITY COMPANY FIELD REPRESENTATIVE.
4) WORK FURNISHED BY CUSTOMER/CONTRACTOR: WORK NOT PROVIDED BY SIEMENS MEDICAL SOLUTIONS 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, WARNING LIGHTS, WIRING, WIRING DEVICES, CONNECTORS, LIGHTING EQUIPMENT AND GROUNDING.
5) RACEWAY AND CONDUIT NOTES: ALL ITEMS IN THE MAGNET ROOM SHALL BE NON–FERROUS. RACEWAY SHALL BE ELECTRIC METALLIC TUBING (EMT) FOR RIGID CONDUIT WORK, OR WHERE SHORT OFF–SET CONNECTIONS ARE REQUIRED LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE USED. FIELD BENDS SHALL NOT BE LESS THAN AS SHOWN IN TABLE 346–10 OF THE NATIONAL ELECTRICAL CODE. PROVIDE A JETLINE "SUPER TRUE TAPE", OR EQUIVALENT CONDUIT MEASURING TAPE FISH LINE IN ALL RACEWAYS AND CONDUITS.
CONDUIT BODIES SHALL NOT BE USED. WHERE A CONDUIT ENTERS A BOX, FITTING, OR OTHER ENCLOSURE, AN INSULATED THROAT CONNECTOR SHALL BE PROVIDED TO PROTECT THE WIRE FROM ABRASION. CONNECTORS SHALL BE DOUBLE SET SCREW TYPE, STEEL CONCRETE TIGHT.
KEEP RACEWAYS AT LEAST 6 INCHES AWAY FROM PARALLEL RUNS OF FLUES OR STEAM AND HOT WATER PIPES. INSTALL RACEWAY RUNS ABOVE WATER AND STEAM PIPES PROVIDED THAT CABLE RUN DISTANCES ARE MAINTAINED. USE TEMPORARY CLOSURES TO PREVENT FOREIGN MATTER FROM ENTERING RACEWAY.
CONDUIT RUNS ARE SHOWN SCHEMATICALLY. INSTALL CONDUIT WITH 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 MEDICAL SYSTEMS CABLES DO NOT EXCEED THE SPECIFIED MAXIMUM DISTANCES AS SHOWN ON THE ELECTRICAL DETAILS.
PROVIDE ENCLOSED METAL RACEWAY SYSTEM (WIRE DUCT) WHERE SHOWN ON DRAWINGS WITH DIVIDERS TO SEPARATE THE DUCT (FOR POWER AND SIEMENS MEDICAL SOLUTIONS CABLING). DIVIDERS AND CROSSOVER PIECES TO BE PROVIDED AS NECESSARY. FOR UL CERTIFIED 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 IN 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. CONTRACTORS MUST PROVIDE PULL STRINGS FOR ALL CONDUIT AND WIRE DUCT/RACEWAY. 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 90 DEGREE ELBOW OR TEE 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 INSTALLED IN METAL RACEWAY, 600 VOLT CLASS, STRANDED TYPE THHN–THWN, SINGLE CONDUCTOR ANNEALED COPPER FOR A MAXIMUM OPERATING TEMPERATURE OF 75° C (165° F). SIZED AS INDICATED. THE CUSTOMER/CONTRACTOR SHALL LEAVE MINIMUM 10 FT. WIRE TAILS AT ALL OUTLET POINTS WITH WIRE IDENTIFICATION TAGGED AT BOTH ENDS FOR FINAL CONNECTION BY SIEMENS MEDICAL SOLUTIONS.
7) IN ADDITION TO THE CIRCUIT BREAKER LOAD CURRENT RATING, CONSIDERATION MUST ALSO BE GIVEN TO SELECTING CIRCUIT BREAKERS THAT HAVE A HIGH ENOUGH SHORT CIRCUIT CURRENT WITHSTAND RATING TO SAFELY COORDINATE WITH THE POWER SYSTEM AVAILABLE SHORT CIRCUIT CURRENT, GENERALLY, WHEN THE 480 VOLT, 3 PHASE, MR EQUIPMENT IS SERVED FROM A POWER SUPPLY SYSTEM THAT IS PROVIDED WITH A 500 kVA OR SMALLER TRANSFORMER, A STANDARD 14,000 RMS AMPERE WITHSTAND RATED CIRCUIT BREAKER WILL BE ADEQUATE. HOWEVER, IF THE POWER SUPPLY SYSTEM TRANSFORMER IS LARGER THAN 500 kVA, THEN THE CIRCUIT BREAKERS HAVING A SHORT CIRCUIT WITHSTAND RATING GREATER THAN 14,000 RMS AMPERES MAY BE REQUIRED.

CEILING HEIGHTS

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

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.
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– 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.

SYM	DATE	DESCRIPTION
1	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

AERA REV 8

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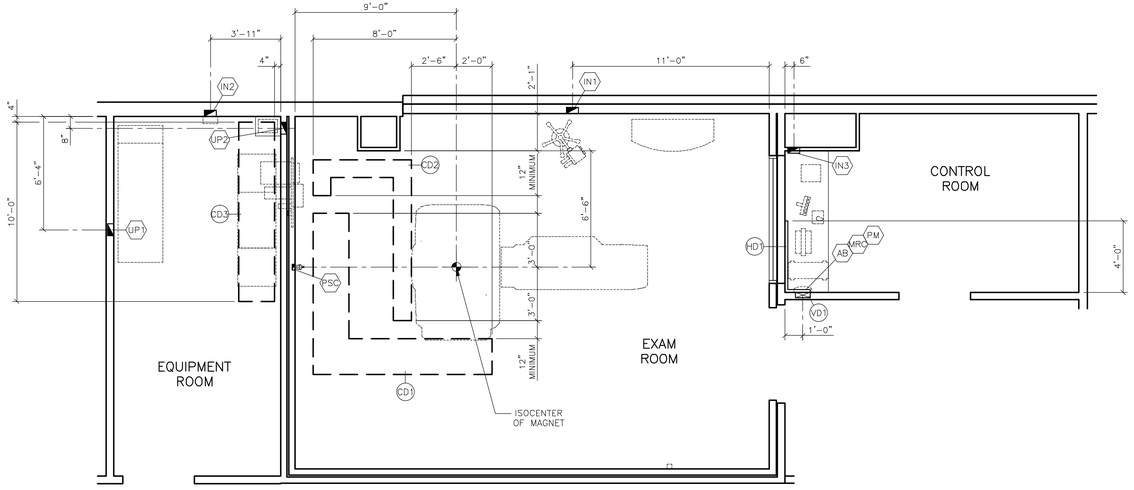
SIEMENS

GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

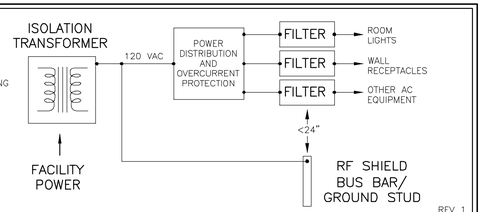
PROJECT #: 1500201
SHEET: E-101
SHEET OF 6 10
DRAWN BY: F. CARUSO
SCALE: AS NOTED
REF. #: 1–49M1UW
DATE: 03/18/15

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



ELECTRICAL DIMENSION PLAN

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



THE ELECTRICAL GROUND FOR ANY AUXILIARY EQUIPMENT USED BY THE OWNER MUST BE ISOLATED FROM THE ELECTRICAL GROUND FOR THE SIEMENS EQUIPMENT. CONNECTION OF THE GROUND TO BUILDING STEEL, FOR EXAMPLE, TO THE SIEMENS EQUIPMENT GROUND IS NOT PERMITTED AND WILL CAUSE A GROUND LOOP. IF A GROUND LOOP DOES EXIST THE ELECTRICAL CONTRACTOR WILL HAVE TO INSTALL AN ISOLATION TRANSFORMER AS DESCRIBED HERE.

REV 1

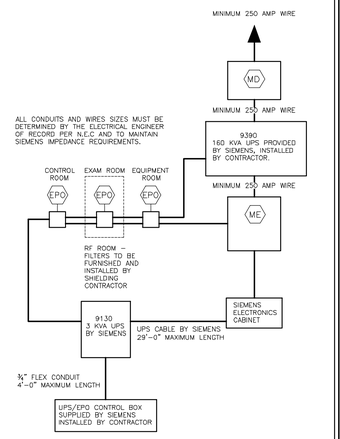
– AUXILIARY AC POWER FOR EXAMINATION ROOM — SCALE: NONE

POWER QUALITY NOTES

1) IT IS THE CUSTOMER'S RESPONSIBILITY TO COMPLY WITH THE POWER QUALITY REQUIREMENTS FOR SIEMENS MEDICAL SYSTEMS EQUIPMENT.
2) THE ELECTRICAL FEEDER TO THE SIEMENS MEDICAL SYSTEMS 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.
3) THE ELECTRICAL FEEDER TO THE IMAGING SYSTEM MUST BE RUN DIRECTLY TO A MAIN FACILITY DISTRIBUTION PANEL OR TO THE FACILITY SERVICE ENTRANCE, WITH NO OTHER LOADS POWERED FROM THIS FEEDER.
4) IN ORDER TO COMPLY WITH IMAGING SYSTEM POWER QUALITY REQUIREMENTS, ADDITIONAL POWER CONDITIONING DEVICES MAY BE REQUIRED. EXAMPLES INCLUDE VOLTAGE REGULATORS, TRANSFORMERS, SURGE PROTECTIVE DEVICES, FILTERS, AND/OR UNINTERRUPTIBLE POWER SUPPLIES (UPS). RECOMMENDED FOR THE INSTALLATION OF ELECTRONIC EQUIPMENT CAN BE FOUND IN IEEE STANDARD 1100–1999 "POWERING AND GROUNDING ELECTRONIC EQUIPMENT:
5) POWER CONDITIONING DEVICES NOT APPROVED BY SIEMENS MEDICAL SYSTEMS MAY NOT BE COMPATIBLE WITH THE MAGNETOM SYSTEM. "FERRORESONANT" POWER CONDITIONING EQUIPMENT RE-APPLIED FROM PREVIOUS GENERATION SYSTEMS IS ALSO GENERALLY EXCLUDED DUE TO HIGHER POWER REQUIREMENTS OF THE NEWER SYSTEMS.
6) INCOMING SOURCE POWER WIRES MUST BE SEPARATED FROM ANY SIEMENS CABLING BY A MINIMUM OF 12".

REV 0

POWER SCHEDULE



ITEM	QTY	DESCRIPTION
MD	1	MAIN FUSIBLE DISCONNECT, 400 AMPS, FLUSH OR SURFACE MOUNTED. FUSED BY ENGINEER OF RECORD PER EATON POWERWARE PLANNING GUIDE. SIEMENS PROJECT MANAGER TO PROVIDE EATON POWERWARE PLANNING GUIDE.
ME	1	MAIN ENCLOSURE WITH MAIN BREAKER FLUSH OR SURFACE MOUNTED. MAIN BREAKER MUST HAVE A TRIPPING DEVICE SO WHEN ANY EPO IS PRESSED THE MAIN BREAKER TRIPS. THIS TRIPPING DEVICE CONTROL CIRCUIT MUST BE OF FAIL–SAFE DESIGN. THE CONTROL CIRCUIT FOR THE EPO'S MUST HAVE AN ENERGY STORAGE SOURCE SO THAT THE CONTROL CIRCUIT NEVER LOSES POWER.
		MAIN BREAKER AMPS: SEE POWER REQUIREMENTS
		VOLTS / PHASES / NEUTRAL / GROUND / TOTAL WIRES: 480 / 3 / 0 / 1 / 4 (NOTE 1)
		1) ALL WIRES MUST BE SAME SIZE.
EPO	VARIES	EMERGENCY POWER OFF BUTTON WITH PROTECTIVE COVER THAT PREVENTS ACCIDENTAL ACTIVATION OF THE EPO BUTTON. THE EPO MUST BE OF FAIL–SAFE DESIGN. THE CONTROL CIRCUIT FOR THE EPO'S MUST HAVE AN ENERGY STORAGE SOURCE SO THAT THE CONTROL CIRCUIT NEVER LOSES POWER. ALL EPO'S ARE TO BE LATCHING TYPE AND MUST BE RESET BEFORE MAIN BREAKER CAN BE RESET. IF ANY OPTIONAL UPS EQUIPMENT IS PROVIDED BY SIEMENS, THE CUSTOMER/CONTRACTOR SHALL PROVIDE AN ADDITIONAL CONTACT IN EACH EPO AND PROVIDE SEPARATE WIRING FOR AN ADDITONAL EPO CIRCUIT AS REQUIRED. PLEASE COORDINATE THE TYPE OF CONTACT REQUIRED FOR THE UPS CIRCUIT WITH SIEMENS PROJECT MANAGER. THE EPO'S MUST BE INSTALLED BY A QUALIFIED ELECTRICAL CONTRACTOR ACCORDING TO NATIONAL ELECTRICAL CODE, STATE AND LOCAL REGULATIONS. MEASURES SHOULD BE TAKEN TO DESIGN THE CIRCUIT IN SUCH A WAY THAT IT WILL ALWAYS WORK WHEN THE MEDICAL EQUIPMENT IS POWERED. THE CUSTOMER IS SOLELY RESPONSIBLE FOR THE IMPLEMENTATION OF THE EPOs AND THEIR ASSOCIATED CIRCUITS AND MUST MAKE THE FINAL DETERMINATION CONSIDERING ALL SITE CONDITIONS AND REGULATORY FACTORS. EACH EPO MUST HAVE 2 SETS OF CONTACTS.

ALL ITEMS LISTED IN THIS SCHEDULE SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR.

REV 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.
VOLTAGE UNBALANCE:2% MAXIMUM DIFFERENCE BETWEEN PHASES

FREQUENCY:	60 Hz ± 1.0 Hz
LINE IMPEDENCE:	< 95 mOHMS
STAND BY POWER CONSUMPTION	9.0 kW
TYPICAL POWER CONSUMPTION DURING EXAM	20.1 kW
CONNECTION VALUE	110 kVA
MOMENTARY POWER	114 kVA
MR SYSTEM BREAKER SIZE	150 AMPS
RECOMMENDED UPS EATON 9390	160 kVA
UPS SYSTEM BREAKER SIZE	250 AMPS
ALL BREAKERS ARE RATED AT 100%	

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

1) 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.

2) 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.

3) 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.

4) 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.

5) 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,R200D) PROVIDES GENERAL GUIDELINES FOR SIZING CONDUCTORS, TRANSFORMERS, AND ELECTRICAL SYSTEMS FOR MEDICAL IMAGING SYSTEMS.

6) 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.

7) 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

CHILLER POWER REQUIREMENTS

KKT ECO CHILLER	480 VOLTS, 3–PHASE 60 AMPS
KKT MEDIX X 60 CHILLER	480 VOLTS, 3–PHASE 75 AMPS
DIMPLEX 14 TON CHILLER	480 VOLTS, 3–PHASE 70 AMPS
DIMPLEX 20 TON CHILLER	480 VOLTS, 3–PHASE 95 AMPS

REFER TO CHILLER MANUFACTURER'S INFORMATION

ELECTRICAL INSTALLATION NOTES

1) 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.

2) 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.

3) 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.

4) THE EMERGENCY POWER OFF (EPO) BUTTONS ARE TO BE MUSHROOM TYPE WITH PUSH LOCK AND PULL TO RELEASE.

5) 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.

6) 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.

7) 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

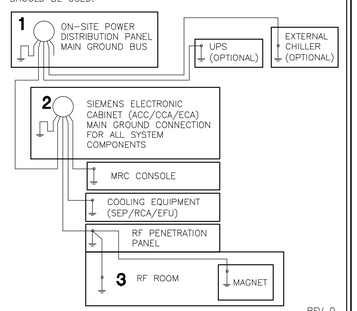
EQUIPMENT GROUND CONDUCTOR TO COMPLY WITH THE FOLLOWING:

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

MR GROUNDING NOTES

THE INTERNAL GROUND WIRING OF THE MR SYSTEM MUST BE INSTALLED WITH MINIMUM GROUND LOOPS. THIS IS TO PREVENT NOISE CURRENTS AND GENERAL DISTURBANCES FROM FLOWING THROUGH THE GROUNDING PATH.

TO ACHIEVE SUCH GROUNDING, THREE MAJOR GROUND POINTS SHOULD BE USED.



REV 0

AERA REV 8

SYM	DATE	DESCRIPTION
0	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

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SIEMENS

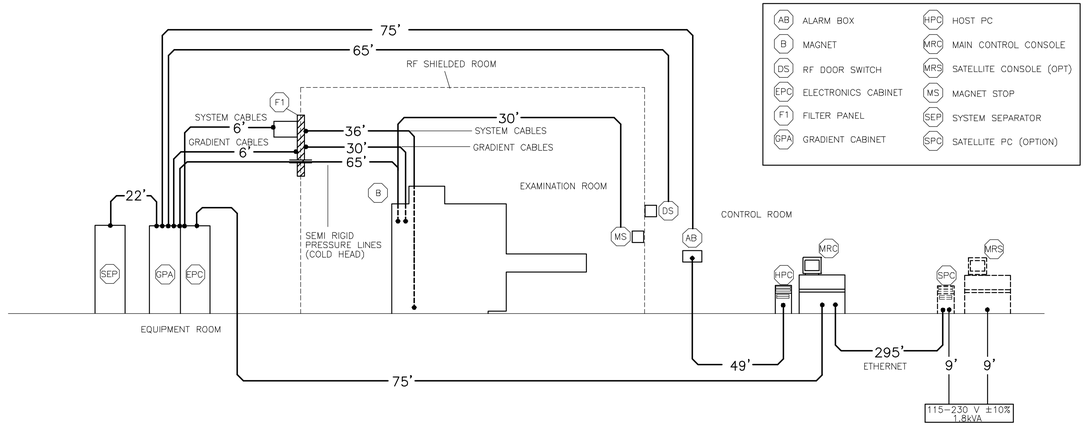
GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

PROJECT #: 1500201
SHEET: E-102
SHEET 7 OF 10
DRAWN BY: F. CARUSO
SCALE: AS NOTED
REF. #: 1–49M1UW
DATE: 03/18/15

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.

NOT FOR CONSTRUCTION – REFERENCE DOCUMENT



11M/2M CABLE SET (GRADIENT CABLES INSIDE THE RF ROOM ARE 6 FEET SHORTER THAN SYSTEM CABLES)

REV 0

1	SIEMENS SYSTEM CABLING – FREE CABLE LENGTHS	SCALE: NONE

CONDUITS AND RACEWAYS

1) ALL POWER CONDUCTORS SUPPLIED BY THE CUSTOMER/ CONTRACTOR SHALL BE INSTALLED IN METAL RACEWAY, 600 VOLT CLASS, STRANDED TYPE THHN–THWN, 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

SIEMENS REMOTE SERVICES (SRS)

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.

SRS REQUIRES ONE OF THE FOLLOWING CONNECTION METHODS:

(PREFERRED) VPN CONNECTION

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.

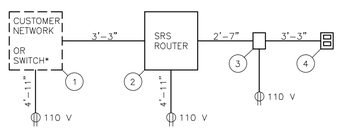
(OPTIONAL) SRS ROUTER CONNECTION

– THE SRS ROUTER IS SUPPLIED BY SIEMENS AND INSTALLED AT THE CUSTOMER'S SITE, WHILE STILL REMAINING THE PROPERTY OF SIEMENS. THE CUSTOMER'S NETWORK ADMINISTRATOR AND SIEMENS REMOTE SERVICES SHALL DETERMINE THE TYPE AND LOCATION OF THE SRS ROUTER REQUIRED.

– THE SRS ROUTER IS CONNECTED TO AN ANALOG MODEM THAT IS SUPPLIED BY SIEMENS, WHICH THEN IN TURN IS CONNECTED TO AN ANALOG PHONE LINE THAT IS SUPPLIED BY THE CUSTOMER. ONE SRS ROUTER ALLOWS REMOTE DIAGNOSTICS TO MULTIPLE MEDICAL SYSTEMS.

– THE SRS ROUTER SHOULD BE INSTALLED IN A SECURE LOCATION (CUSTOMER'S NETWORK COMPUTER ROOM) THAT HAS LIMITED ACCESS. IT CAN BE LOCATED ON A SHELF, TABLE, OR IN A CABINET. THE CONNECTION CABLES (WITH INDICATED LENGTHS BELOW) ARE INCLUDED WITH DELIVERY.

SRS ROUTER CONNECTION DIAGRAM



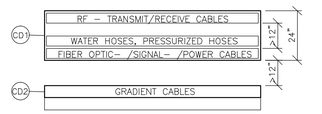
NOTE: ALL POWER OUTLETS ARE SUPPLIED/INSTALLED BY CUSTOMER.

1. ETHERNET SWITCH OR HUB, SUPPLIED BY CUSTOMER
2. SRS ROUTER, SUPPLIED BY SIEMENS (SIZE: 11.2"W X 8.7"D X 5.5"H, WEIGHT: 2 LBS.)
3. ANALOG MODEM, SUPPLIED BY SIEMENS
4. ANALOG PHONE LINE, SUPPLIED BY CUSTOMER

* OPTIONAL SWITCH AND CABLES ARE NOT INCLUDED, BUT CAN BE ORDERED FROM SIEMENS.

	SIEMENS REMOTE SERVICE	SCALE: NONE

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"

REV 0

2	CABLE SEPARATION	SCALE: NONE

LIGHTING GUIDELINES

EXAM, CONTROL, AND EVALUATION ROOMS:

1) THE ROOM LIGHTING MUST REMAIN FUNCTIONAL WHEN THE MR SYSTEM IS SWITCHED OFF AND/OR WHEN EMERGENCY SHUTDOWN BUTTONS ARE ACTIVATED.

2) IT MUST BE POSSIBLE TO CONTROL THE INTENSITY OF ILLUMINATION OF APPROXIMATELY 46 FOOT–CANDLES THROUGH GROUP CONNECTION. ALL LIGHTS IN THE EXAMINATION ROOM ARE CONNECTED TO A COMMON SWITCH IN THE CONTROL ROOM. THERE SHOULD BE SEPARATE SWITCHES IN THE EXAMINATION ROOM FOR THE GROUPS OF LIGHTS ABOVE AND NEAR THE PATIENT TABLE, AS WELL AS FOR THE GROUP OF LIGHTS ABOVE THE MAGNET. THE LOCATION OF THESE SWITCHES IS AT THE OWNER'S DISCRETION.

EXAMINATION ROOM:

1) THE MAGNETIC FIELD ADVERSELY AFFECTS THE OPERATING LIFE OF LIGHT BULBS LOCATED IN THE IMMEDIATE VICINITY OF THE MAGNET, THE FILAMENT IN THE BULB OSCILLATES WITH THE FREQUENCY OF THE POWER SUPPLY. DURING SCANNING, IT IS RECOMMENDED THAT LIGHT FIXTURES IN THE VICINITY OF THE MAGNET (IN EXAMINATION ROOM) BE CONNECTED TO A DC VOLTAGE SUPPLY. THE RESIDUAL RIPPLE OF THE DIRECT VOLTAGE SHOULD BE ±5%. WHEN INSTALLING THE LIGHT SOCKET, ENSURE THAT THE POLARITY IS CORRECT.

2) FLUORESCENT LIGHTS, ENERGY–SAVING LIGHTS, AND DIMMERS ARE NOT PERMITTED.

CONTROL AND EVALUATION ROOM:

FOLLOW THE APPROPRIATE GUIDELINES FOR LIGHTING IN ROOMS WITH MONITOR WORKSTATIONS.

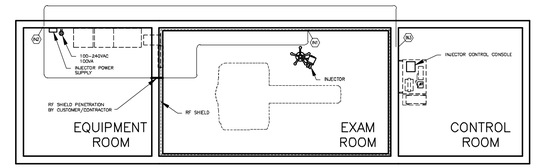
EQUIPMENT ROOM:

ILLUMINATION INTENSITY SHOULD BE APPROXIMATELY 46 FOOT–CANDLES.

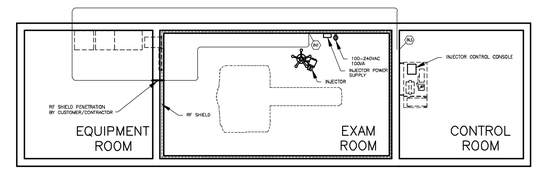
REV 0

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 EQUIPMENT ROOM, OR OPTIONALLY WITHIN THE SCAN ROOM. IN EITHER SITUATION A PENETRATION OF THE RF SHIELD, SEPARATE FROM THE SIEMENS FILTER PANEL, IS REQUIRED.



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



METHOD 2 INJECTOR POWER SUPPLY IN EXAM ROOM, ELECTRICAL SUPPLY IN EXAM ROOM, PENETRATION TO INCLUDE WAVEGUIDE.

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.

REV 1

–	MRI CONTRAST INJECTOR	SCALE: NONE

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

AERA REV 8

SYM	DATE	DESCRIPTION
0	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

PROJECT MANAGER: MICHAEL POWERS
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SIEMENS

GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

PROJECT #: 1500201
SHEET: E-501
SHEET OF 8 10
DRAWN BY: F. CARUSO
SCALE: AS NOTED
REF. #: 1–49M1UW
DATE: 03/18/15

ATTENTION:

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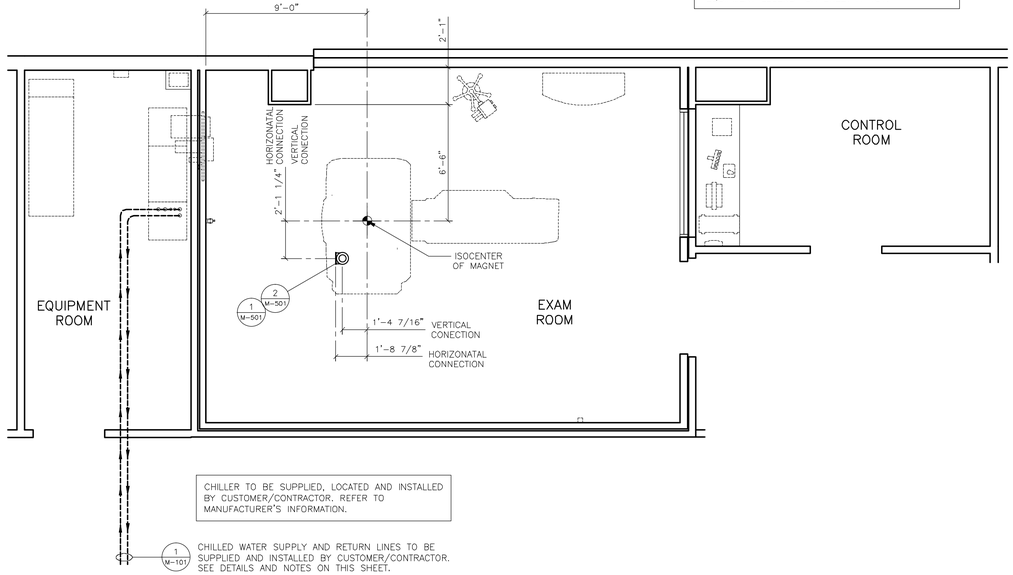
REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

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.

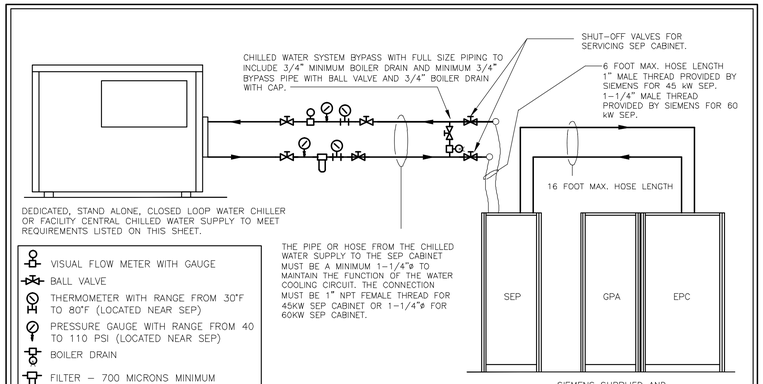
3) THE HEAT INTO THE EXAM ROOM IS LESS THAN 10,236 BTU/HR. THE HEAT INTO THE EQUIPMENT ROOM IS LESS THAN 3,412 BTU/HR. THIS HEAT DISSIPATION IS FROM THE SIEMENS EQUIPMENT ONLY, AUXILIARY SUPPORT EQUIPMENT (ie. UPS) AND LIGHTING MUST BE CONSIDERED FOR TOTAL HEAT LOADS.

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 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.



NOTES:

ALL PIPING AND PLUMBING FIXTURES SHALL BE FURNISHED, INSTALLED, PRESSURE TESTED AND CHARGED BY THE MECHANICAL 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 CHILLER AN AUTOMATIC DEAERATION DEVICE (AIR VENT) WITH BALL VALVE MUST BE INSTALLED BY THE MECHANICAL CONTRACTOR.

LEAK TEST ALL PIPING WITH A MIXTURE OF R–22 TRACE GAS AND NITROGEN. DO NOT PERFORM LEAK TEST WITH WATER.

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 IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL 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 TO THE SEP/IFP MUST BE LABELED TO SHOW FLOW DIRECTION AND CONTENT (WATER/GLYCOL).

A TAP WATER SUPPLY MUST BE AVAILABE WITHIN 45' OF THE SEP/IFP AND CHILLER CONNECTION FOR FILLING THE CIRCUIT.

1 PIPING SCHEMATIC FOR FACILITY PROVIDED CHILLED WATER — SCALE: NONE

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, EPC 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.

CHILLED WATER REQUIREMENTS

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	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 µm

FOR INSTALLATION OF A DIMPLEX CHILLER, IT IS THE RESPONSIBILITY OF THE CUSTOMER/MECHANICAL CONTRACTOR TO PROVIDE A MIXTURE OF WATER WITH 40% ETHYLENE GLYCOL OR 50% PROPYLENE GLYCOL PRIOR TO CHILLER START UP. DO NOT USE AUTOMOTIVE ANTI–FREEZE.

DIMPLEX CHILLERS USE 70–100 GALLONS PLUS THE PIPE LENGTH.

CONTRACTOR TO PROVIDE 65–95 GALLONS OF DE–MINERALIZED WATER. DO NOT USE TAP WATER.

FOR INSTALLATION OF A KKT 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.

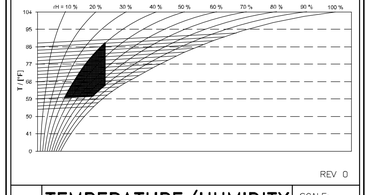
THE AMOUNT OF THE MIXTURE MUST FILL THE CHILLER, MR SYSTEM AND PIPING (SUPPLY AND RETURN), SEE EXAMPLES BELOW.

(1) GALLON OF UNDILUTED 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.



REV 0

– TEMPERATURE/HUMIDITY — SCALE: NONE

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.

4) ALL PENETRATIONS IN THE RF CABIN/SHIELD SHALL BE THROUGH A WAVE GUIDE TO BE EQUIPPED WITH A SIEMENS APPROVED 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 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 0

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

AERA REV 8

SYM	DATE	DESCRIPTION
1	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

PROJECT MANAGER: MICHAEL POWERS
TEL: (770) 330–1781
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SIEMENS

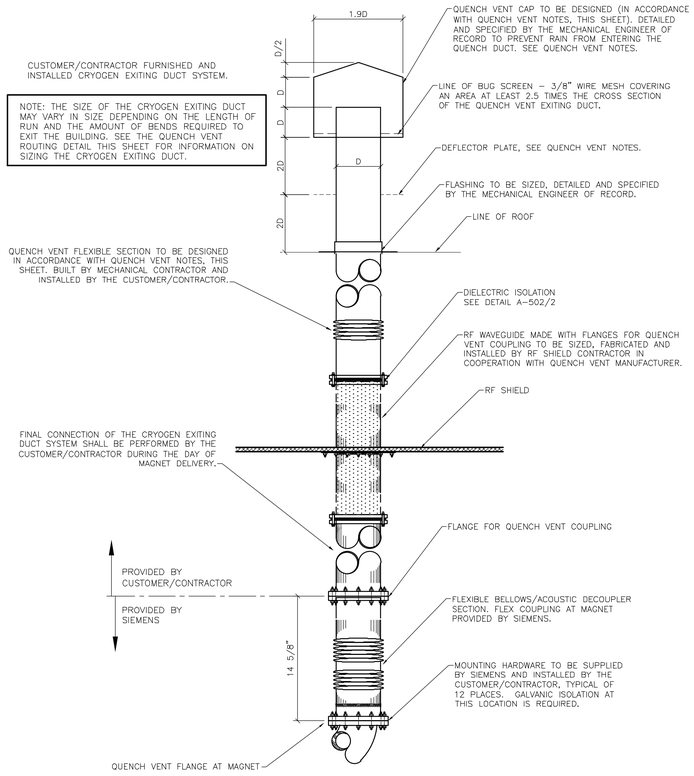
GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

PROJECT #: 1500201
SHEET: M-101
SHEET 9 OF 10
DRAWN BY: F. CARUSO
SCALE: AS NOTED
REF. #: I–49M1UW
DATE: 03/18/15

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.

REFERENCE DOCUMENT – NOT FOR CONSTRUCTION



CRYOGEN EXITING DUCT SYSTEM NOTES:

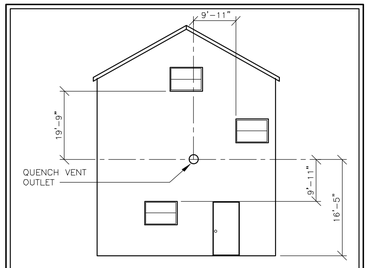
1) THE MECHANICAL ENGINEER OR RECORD SHALL BE RESPONSIBLE FOR THE DESIGN, DETAIL AND SPECIFICATION OF THE CRYOGEN EXITING DUCT SYSTEM WITH ALL WORK TO PERFORMED BY THE CUSTOMER/CONTRACTOR UNLESS SPECIFIED OTHERWISE.

2) TAKE PROPER PRECAUTIONS WHEN FIELD WELDING IN THE VICINITY OF LIQUIFIED/FROZEN OXYGEN.

3) UNLESS SPECIFIED OTHERWISE ALL MATERIAL AND WORK SHALL BE PERFORMED BY THE CUSTOMER/CONTRACTOR WITH FINAL CONNECTION OF THE CRYOGEN EXITING DUCT SYSTEM TO THE SIEMENS MAGNET TO BE PERFORMED BY THE CUSTOMER/CONTRACTOR UNDER SIEMENS' SUPERVISION.

4) THE DIAMETER OF THE CRYOGEN EXITING DUCT MAY VARY WITH ACTUAL ROUTING.

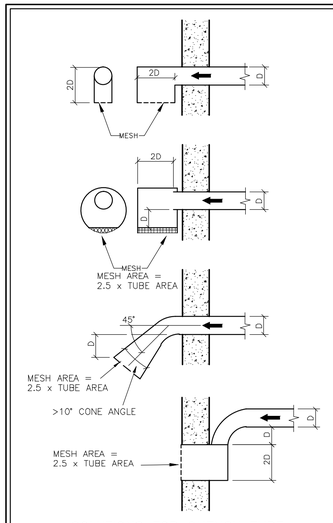
–	CRYOGEN EXITING DUCT SYSTEM DETAIL	SCALE: NO SCALE



IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET MUST BE TURNED DOWN BY NOT LESS THAN THE LINE OF THE 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.

OUTLET SAFETY CLEARANCES REV 0

–	QUENCH VENT	NO SCALE

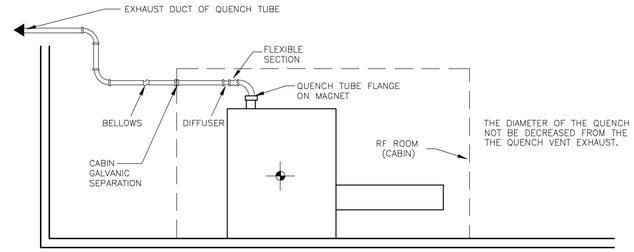


SOLUTIONS FOR QUENCH TUBE EXITING THROUGH A WALL

SEE QUENCH VENT NOTES REV 0

–	HORIZONTAL OUTLET	SCALE: NONE

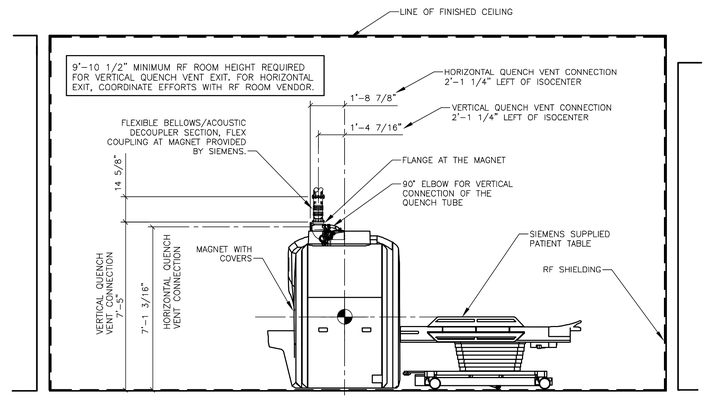
THE QUENCH VENT CONSISTS OF STRAIGHT SECTIONS AND ELBOW OF A DETERMINED DIAMETER AND LENGTH, FROM THE MAGNET QUENCH VALVE TO THE EXHAUST OUTSIDE THE BUILDING. IT SHALL BE DESIGNED BY THE MECHANICAL CONTRACTOR TO WITHSTAND A MAXIMUM PRESSURE OF 6.5 PSI (SEE QUENCH VENT NOTES–THIS SHEET). THE QUENCH VENT DESIGN MUST PASS THE QUENCH VENT CALCULATOR, PROVIDED BY THE SIEMENS PROJECT MANAGER. A SUCCESSFUL DESIGN WILL COMBINE THE LENGTH OF TUBE, DIAMETER OF TUBE, AND NUMBER OF ELBOWS SO THAT THE MAXIMUM PRESSURE IS NOT EXCEEDED.



–	QUENCH VENT DESIGN	NO SCALE

THE EQUIPMENT CONFIGURATION SHOWN ON THESE ELEVATIONS REPRESENT "TYPICAL" INSTALLATION CONDITIONS.

THE QUENCH VENT IS TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. IT MAY BE CONNECTED TO THE FLANGE AT THE MAGNET HORIZONTALLY OR VERTICALLY AND SHOULD BE DESIGNED, CONSTRUCTED AND INSTALLED AS PER THE INSTRUCTIONS ON THIS SHEET.



THE LOCATION, PITCH, AND MOUNTING HEIGHT ABOVE FINISHED FLOOR FOR THE MECHANICAL SYSTEMS SHALL BE SPECIFIED, DETAILED AND NOTED BY THE MECHANICAL ENGINEER OF RECORD. ALL MECHANICAL SYSTEM LOCATIONS SHALL BE COORDINATED WITH THE LOCATION OF THE CABLE TRAYS AS SHOWN ON THE 1/4" SCALE ELECTRICAL PLAN.

NOTE: COMPRESSOR LINES RUNNING FROM THE COMPRESSOR OR SEP CABINET TO THE MAGNET COLD HEAD SHALL BE ELECTRICALLY ISOLATED WITH 1/2" ARMAFLEX OR EQUAL, SUPPLIED BY CONTRACTOR AND INSTALLED BY SIEMENS. LENGTH REQUIRED SHALL BE COORDINATED WITH SIEMENS FIELD SERVICE ENGINEER AT TIME OF EQUIPMENT INSTALLATION.

1	MAGNET SIDE ELEVATION	NO SCALE

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 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.

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 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.

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.

7) 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 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 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 THE DIAMETER OF THE RAIN GUARD 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.

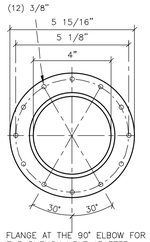
12) TO AVOID INJURY FROM COLD BURNS AND ASPHYXIATION ACCESS TO THE QUENCH VENT MUST BE RESTRICTED BY 9'–11" ON EACH SIDE AND BELOW, AND 19'–9" ABOVE WITH WARNING SIGNS. THE EXIT MUST NOT BE LOCATED WHERE HELIUM GAS COULD BE DRAWN INTO AN AIR INLET OR OPEN WINDOW. A WARNING MUST BE PLACED NEAR THE QUENCH VENT OUTLET.

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. TO AVOID RF DISTURBANCES THE INSULATION MUST NOT MAKE ELECTRICAL CONTACT WITH THE WAVEGUIDE.

14) 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.

15) 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 2

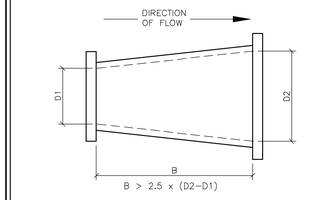


FLANGE AT THE 90° ELBOW FOR THE QUENCH VENT ADAPTER

CONNECTION OF THE QUENCH VENT PIPE TO FLANGE TO BE DESIGNED, DETAILED, AND SPECIFIED BY THE MECHANICAL ENGINEER OF RECORD TO BE FABRICATED AND INSTALLED BY THE MECHANICAL CONTRACTOR UNDER SIEMENS SUPERVISION. THE 90° ELBOW IS PART OF THE DELIVERY VOLUME, THE TWO FLANGES ARE IDENTICAL.

CONNECTING FLANGE REV 0

2	QUENCH VENT	NO SCALE



EXPANSION TO A GREATER DIAMETER TUBE CAN BE ACCOMPLISHED BY USE OF A DIFFUSER. THE DIFFUSER MUST MEET QUENCH VENT REQUIREMENTS AND THE GEOMETRIC PARAMETERS SHOWN HERE. THE DIAMETER OF THE PIPE SHOULD NEVER DECREASE IN THE DIRECTION OF FLOW. REV 0

–	QUENCH VENT DIFFUSER	NO SCALE

CRYOGEN NOTES

1) "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 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. REV 0

HELIUM CONTENT

LITERS AT 100%	1,280	
TYPICAL BOIL OFF RATE	0.0 L/HR	FOR TYPICAL CLINICAL USE, DEPENDING ON SEQUENCES AND OPERATING TIME.
TYPICAL REFILL INTERVAL	10 YEARS	

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 3.3% PER DAY.

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.

SYM	DATE	DESCRIPTION
1	03/18/15	R101RA VERSION DATED 01/19/15 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

PROJECT MANAGER: MICHAEL POWERS
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SIEMENS

GRADY HEALTH SYSTEM
191 PEACHTREE ST., ATLANTA, GA 30303
MRI SUITE – MAGNETOM AERA W/MOBILE TABLE

AERA REV 8

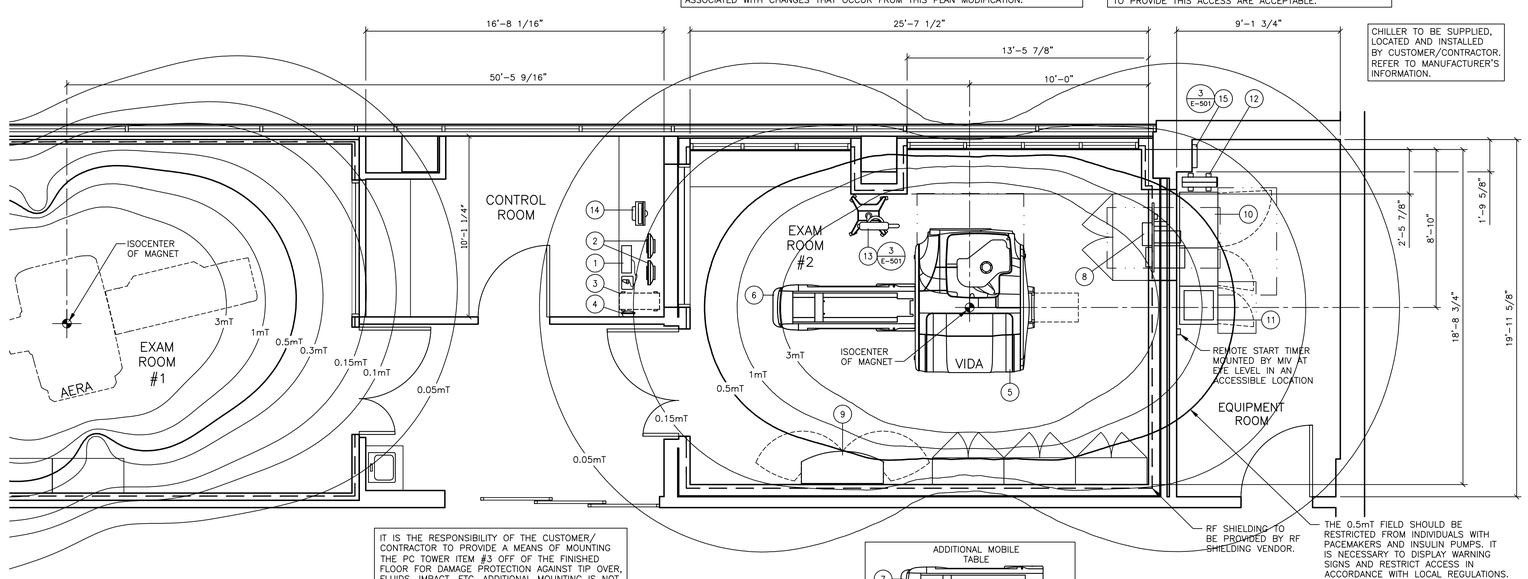
PROJECT #:	SHEET:
1500201	M-501
SHEET OF 10 10	DRAWN BY: F. CARUSO
SCALE: AS NOTED	REF. #: T–49M1UW
DATE: 03/18/15	

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT

THIS SET OF FINAL DRAWINGS IS REFLECTIVE OF THE LATEST SALES CONFIGURATION. IT HAS BEEN MODIFIED TO REFLECT ANTICIPATED CHANGES TO YOUR CONFIGURATION. IF REQUESTED CHANGES ARE NOT IMPLEMENTED, A REVISION WILL BE REQUIRED. ADDITIONAL CHANGES TO THIS SALES CONFIGURATION MAY ALSO REQUIRE A REVISION TO THIS DRAWING SET. SIEMENS IS NOT RESPONSIBLE FOR CONSTRUCTION COSTS ASSOCIATED WITH CHANGES THAT OCCUR FROM THIS PLAN MODIFICATION.

IF CLOSET IS DESIRED TO CONCEAL FILTER PLATE ITEM #8 AND CABLE CONNECTIONS IN EXAM ROOM, IT IS TO BE DESIGNED, SPECIFIED AND PROVIDED BY THE CUSTOMER OR THEIR REPRESENTATIVE. A 30 1/4" CLEARANCE IS REQUIRED FOR SERVICE AND CABLING. DOORS THAT OPEN TO PROVIDE THIS ACCESS ARE ACCEPTABLE.

CHILLER TO BE SUPPLIED, LOCATED AND INSTALLED BY CUSTOMER/CONTRACTOR. REFER TO MANUFACTURER'S INFORMATION.



IT IS THE RESPONSIBILITY OF THE CUSTOMER/ CONTRACTOR TO PROVIDE A MEANS OF MOUNTING THE PC TOWER ITEM #3 OFF OF THE FINISHED FLOOR FOR DAMAGE PROTECTION AGAINST TIP OVER, FLUIDS, IMPACT, ETC. ADDITIONAL MOUNTING IS NOT NECESSARY IF SIEMENS CONTAINER IS UTILIZED.

ADDITIONAL MOBILE TABLE

ITEMS TO BE LOCATED AT A LATER DATE

THERE SHALL BE A SEPARATE RF ROOM PENETRATION PANEL FOR NON-SIEMENS EQUIPMENT. THE OUTSIDE EQUIPMENT MANUFACTURER (OEM) WILL SPECIFY ANY AND ALL FILTER AND PENETRATION REQUIREMENTS.

ARCHITECTURAL EQUIPMENT PLAN

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

EQUIPMENT LEGEND

NO	DESCRIPTION	SMS SYM	WEIGHT (LBS)	BTU/HR TO AIR	DIMENSIONS (INCHES) W	D	H	REMARKS
1	MRC KEYBOARD	—	5	---	27 1/4	10 1/8	1 3/4	ON CUSTOMER'S COUNTER
2	COLOR MONITOR FOR MRC	—	22	239	18 5/16	16 15/16	4 3/4	ON CUSTOMER'S COUNTER
3	HOST PC MRC	MX	49	2,390	11	27	18 1/8	BELOW COUNTER TOP
4	ALARM BOX	AB	2	---	9	4	9	WALL MOUNTED
5	VIDA MAGNET IN OPERATION	B	16,204	9,383	96 1/2	80 5/8	89	
6	PATIENT TABLE (MOBILE)	—	529	---	29 1/2	97 1/4	21-41	
7	ADDITIONAL PATIENT TABLE (MOBILE)	—	529	---	29 1/2	97 1/4	21-41	
8	RF-FILTER PLATE (HORIZONTAL)	F1	287	853	46 1/2	35 1/8	21 5/8	WALL MOUNTED
9	SURFACE COIL CART	XX	110	---	55 1/8	21 1/8	47 5/8	WEIGHT WITHOUT COILS
10	GPA/EPC ELECTRONICS CABINET (XQ GRADIENTS)	PX	3,307	<3,412	61 1/2	26	77 1/2	
11	SEP CABINET	EP	701	<3,412	25 5/8	25 5/8	73 5/8	
12	LIEBERT GXT4 UPS WITH BATTERY	PX	164	1,121	17	23 5/8	6 3/4	
13	MRXPERION INJECTOR STAND AND HEAD	MX	94	---	23 3/8	28 3/8	71 7/8	INJECTOR ON STAND
14	MRXPERION iCBC INJECTOR CRU	MX	17.6	---	15 3/4	10 1/4	13 1/2	ON CUSTOMERS COUNTER
15	MRXPERION iCBC INJECTOR POWER SUPPLY	MX	6	---	15 3/8	3 3/8	15 1/2	LOCATED IN EXAM ROOM OUTSIDE 5mT FIELD

PROTECTING THE MAGNETIC FIELD

THE SIEMENS MR SYSTEM UTILIZES A SUPERCONDUCTIVE MAGNET WITH AN EXTREMELY HOMOGENOUS FIELD WITHIN THE MAGNET TO PROVIDE DISTORTION FREE IMAGING. THE PRESENCE OF FERROMAGNETIC MATERIAL WITHIN THE VICINITY OF THE MAGNET CAN ADVERSELY AFFECT THE UNIFORMITY OF THE USEFUL MAGNETIC FIELD. THIS APPLIES TO STATIONARY FERROUS MATERIAL (STRUCTURAL STEEL) WHICH IS TO BE MINIMIZED. STATIONARY STEEL COMPENSATION MAY BE ACHIEVED BY MAGNET POSITIONING AND SELECTIVE USE OF SHIMS. DISTORTION CAUSED BY MOVING FERROMAGNETIC OBJECTS (MOTOR VEHICLES, ELEVATORS) IS MORE DIFFICULT TO COMPENSATE AND MAY REQUIRE THE USE OF MAGNETIC SHIELDING.

REV 0

PROTECTING THE ENVIRONMENT

PROTECTING THE IMMEDIATE ENVIRONMENT FROM THE EFFECT OF THE MAGNETIC FIELD REQUIRES CONSIDERATION. INFORMATION STORED ON MAGNETIC DATA CARRIERS SUCH AS DISCS, TAPES AND CARDS MAY BE ERASED IF NEAR THE MAGNET. CAUTION WITH REGARD TO HEART PACEMAKERS MUST BE EXERCISED. MOST PACEMAKER UNITS EMPLOY A REED RELAY WHICH MAY CHANGE OPERATING MODE WHEN EXPOSED TO AN EXTERNAL MAGNETIC FIELD. PACEMAKER USERS MUST BE KEPT AT A SPECIFIED DISTANCE FROM THE MAGNET WHICH IS DETERMINED BY THE MAGNET FIELD STRENGTH.

REV 0

MAGNET SITING REQUIREMENTS

IT MUST BE ENSURED THAT THE MAGNET IS LOCATED SO THAT THE STABILITY AND HOMOGENEITY OF THE MAGNETIC FIELD ARE NOT ADVERSELY AFFECTED BY EXTRANEOUS FIELDS AND STATIC OR DYNAMIC FERROMAGNETIC OBJECTS.

X & Y AXES	Z AXIS	SOURCE OF INTERFERENCE
4'-4"		FLOOR STEEL REINFORCEMENT<20 LBS./ FT²
4'-4"		IRON BEAMS < 67 LBS./FT.
18'-1"	21'-4"	MOVING METAL UP TO 110 LBS.
13'-1"		WATER COOLING UNIT (CHILLER)
19'-9"	23'-0"	MOVING METAL UP TO 440 LBS.
21'-4"	26'-3"	MOVING METAL UP TO 2,000 LBS.
23'-0"	31'-2"	ELEVATORS, TRUCKS UP TO 10,000 LBS.
13'-2"		AC TRANSFORMERS UP TO 650 KVA
16'-5"		AC TRANSFORMERS UP TO 1600 KVA
5'-0"	5'-0"	AC CABLES, MOTORS LESS THAN 100 AMPS
5'-0"	5'-0"	AC CABLES, MOTORS LESS THAN 250 AMPS
8'-3"	8'-3"	AC CABLES, MOTORS LESS THAN 1000 AMPS

FOR IRON OBJECTS LOCATED UP TO 45° FROM THE Z AXIS, THE DISTANCES FOR THE Z AXIS MUST BE USED. REDUCTION IS POSSIBLE WITH STEEL SHIELDING.

MAGNETIC FRINGE FIELDS

MAGNETIC FIELDS MAY AFFECT THE FUNCTION OF DEVICES IN THE VICINITY OF THE MAGNET. THESE DEVICES MUST BE OUTSIDE CERTAIN MAGNETIC FIELDS. THE DISTANCES LISTED ARE FROM THE MAGNET ISOCENTER AND DO NOT CONSIDER ANY MAGNETIC ROOM SHIELDING.

FIELD	X & Y	Z AXIS	DEVICES
3.0mT	7'-2"	10'-8"	SMALL MOTORS, WATCHES, CAMERAS, CREDIT CARDS, MAGNETIC DATA CARRIERS.
1.0mT	8'-1"	13'-4"	COMPUTERS, MAGNETIC DISK DRIVES, OSCILLOSCOPES, PROCESSORS
0.5mT	8'-7"	15'-2"	CARDIAC PACEMAKERS, X-RAY TUBES, INSULIN PUMPS, B/W MONITORS, MAGNETIC DATA CARRIERS (LONG-TERM STORAGE)
0.2mT	10'-3"	18'-9"	SIEMENS CT SCANNERS
0.15mT	11'-0"	20'-1"	CRT MONITORS, SIEMENS LINEAR ACCELERATORS
0.05mT	15'-9"	26'-7"	X-RAY IMAGE INTENSIFIERS, GAMMA CAMERAS, PET/CYCLOTRON, ELECTRON MICROSCOPES, LINEAR ACCELERATORS

THE OWNER/USER IS TO VERIFY THE LOCATION OF THE 0.5mT FIELD AND ENSURE THAT IT IS MAINTAINED AS A RESTRICTED AREA.

OEM ACCESSORY ITEMS

FOR OEM (OUTSIDE EQUIPMENT MANUFACTURER) ITEMS THAT ARE SOLD AS ACCESSORIES TO THE SIEMENS MR SYSTEM (INJECTORS, LASER LIGHTS, ELASTOGRAPHY, CHILLERS, UPS, ETC.), PLEASE REFER TO THE SIEMENS PROJECT MANAGER AND THE ACTUAL EQUIPMENT VENDOR FOR TECHNICAL INFORMATION AND INSTALLATION REQUIREMENTS.

REV 1

EXAM ROOM LIGHTING

THE MAGNETIC FIELD ADVERSELY AFFECTS THE OPERATING LIFE OF LIGHT BULBS LOCATED IN THE IMMEDIATE VICINITY OF THE MAGNET. THE FILAMENT IN THE BULBS OSCILLATES WITH THE FREQUENCY OF THE POWER SUPPLY. LIGHTS IN THE VICINITY OF THE MAGNET CONNECTED TO A DC POWER SUPPLY CAN REDUCE THIS EFFECT. RESIDUAL DC RIPPLE SHOULD BE LESS THAN 5%.

REV 2

NOISE LEVELS

SYSTEM ROOM	NOISE LEVEL / dB(A)
CONTROL ROOM	<55
EXAMINATION ROOM	XQ GRADIENTS 87.4 dB(A) – 8 HOUR AVERAGE 102.9 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.

CASEWORK & ACCESSORY NOTES

1) ALL CASEWORK IS EITHER EXISTING OR IS TO BE DESIGNED, DETAILED, FURNISHED AND INSTALLED BY THE CUSTOMER AND/OR CONTRACTOR. FOLLOW DESIGN RECOMMENDATIONS INCLUDED HEREWITH, AS THEY ARE ESSENTIAL FOR THE SUCCESSFUL INSTALLATION & OPERATION OF THE SIEMENS EQUIPMENT.

2) ALL FURNITURE (CHAIRS, ETC.) FOR THE CONTROL ROOM ARE TO BE PROVIDED BY THE CUSTOMER.

REV 0

CONSTRUCTION REQUIREMENTS

THE CUSTOMER/CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL CONSTRUCTION MATERIALS INCLUDING ELECTRICAL AND MECHANICAL DEVICES REQUIRED BY SIEMENS SPECIFICATIONS AND TO ENSURE THAT THE MATERIAL USED INSIDE THE RF-SHIELDING IS AS FREE OF FERROMAGNETIC PROPERTIES AS POSSIBLE. STEEL WALL STUDS ARE PERMITTED BUT MUST BE SECURED PROPERLY. ANY FERROUS MATERIAL INSIDE THE EXAM ROOM MAY BECOME A MISSILE AND CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT. FERROUS ITEMS INSIDE THE EXAM ROOM ARE THE LIABILITY OF THE CONTRACTOR AND/OR INSTALLER.

REV 2

MAGNET CO-SITING

MINIMUM DISTANCE MAGNET-MAGNET (SIEMENS)

	0.2T	0.35T	1.0T	1.5T	3.0T
0.2T	32'-9"	32'-9"	16'-5"	19'-9"	32'-9"
0.35T	32'-9"	32'-9"	16'-5"	19'-9"	32'-9"
1.0T	16'-5"	16'-5"	14'-10"	16'-5"	19'-9"
1.5T	19'-9"	19'-9"	16'-5"	16'-5"	19'-9"
3.0T	32'-9"	32'-9"	19'-9"	19'-9"	19'-9"

DO NOT RAMP ONE MAGNET WHILE THE OTHER IS RUNNING APPLICATIONS. SHIM IS ONLY OPTIMIZED WHEN BOTH MAGNETS ARE RAMPED UP DURING THE SHIMMING PROCEDURE.

WHEN CO-SITING AN MR SYSTEM WITH A MAGNETIC NAVIGATION SYSTEM THE MINIMUM DISTANCE FOR CLINICAL IMAGING IS 98'-6", FOR SPECTROSCOPY THE MINIMUM SEPARATION IS 121'-5".

REV 0

MAGNETIC FIELD WARNING

PLEASE BE AWARE THAT DURING THE CALIBRATION PHASE OF THE MRI INSTALLATION, THE MAGNET WILL BE AT FULL FIELD STRENGTH AND ALL NECESSARY PRECAUTIONS WHEN WORKING IN THE VICINITY OF STRONG MAGNETIC FIELDS MUST BE TAKEN. WHEN THE CALIBRATION OF THE MAGNET OVERLAPS WITH FINAL CONSTRUCTION ACTIVITIES, THERE IS THE POSSIBILITY OF THE INTRODUCTION OF FERROUS MAGNETIC OBJECTS BY WORKERS INTO THE MR ROOM. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ENSURE THAT ALL PRECAUTIONS ARE TAKEN TO ENSURE THAT THIS DOES NOT HAPPEN, AS EQUIPMENT DAMAGE AND SERIOUS BODILY INJURY COULD OCCUR.

REV 0

CEILING HEIGHTS

MAGNET EXAMINATION ROOM: 7'-11" MINIMUM

EQUIPMENT ROOM: 7'-3" MINIMUM

ALL ANCILLARY AREAS: 6'-11" MINIMUM

PROJECT MILESTONES

	PROJECT MILESTONES TO BE COMPLETED BEFORE EQUIPMENT DELIVERY	REFERENCE SHEET
☐	DELIVERY PATH VERIFIED, COORDINATED DELIVERY PATH CLOSE UP PRIOR TO CALIBRATION	A-102
☐	COORDINATE RF ROOM CONSTRUCTION/ROOM FINISH PRIOR TO CALIBRATION	A-102
☐	FLOOR LEVEL MEETS SIEMENS SPECIFICATIONS AND ALL BASEPLATES INSTALLED	S-101
☐	RF ROOM TEST COMPLETED AND MEETS SIEMENS SPECIFICATIONS	A-502
☐	ALL RACEWAY, CONDUITS AND JUNCTION BOXES INSTALLED	E-101
☐	ALL PLUMBING INSTALLED AND TESTED	M-101
☐	POWER DISTRIBUTION COMPLETED PER SYSTEM REQUIREMENTS	E-102
☐	ALL EPO BUTTONS INSTALLED AND TESTED	E-101
☐	MR COMPATIBLE LIGHTING AND CEILING GRIDS INSTALLED IN MAGNET ROOM	A-101
☐	CONTROL ROOM COMPLETED ENOUGH TO FACILITATE THE INSTALLATION	A-101
☐	CHILLED WATER SUPPLY AVAILABLE AND MEETS SIEMENS SPECIFICATIONS	M-101
☐	HVAC SYSTEM COMPLETE, TESTED AND WORKING PER SIEMENS SPECIFICATIONS	M-101
☐	QUENCH PIPE CONSTRUCTED AND INSTALLED PER SIEMENS SPECIFICATIONS	M-501
☐	ETHERNET CONNECTION INSTALLED AND IN OPERATION AT THE SHOWN LOCATIONS	E-101

STATE AGENCY REVIEW

PRIOR TO SIEMENS EQUIPMENT INSTALLATION, APPROVAL OF CONSTRUCTION OR STRUCTURAL MODIFICATIONS FOR DIAGNOSTIC OR THERAPEUTIC PURPOSES, MUST BE OBTAINED BY THE CUSTOMER FROM THE APPROPRIATE STATE AGENCY, IF APPLICABLE.

RESOURCE LIST (SMS USE ONLY)

DESIGNATION	PG NUMBER	DATE
PLANNING GUIDE	M11-030.891.01.03.02	11/19
MAGNETIC SHIELDING CALCULATIONS	89727-1357201	05/21
MAGNETIC SHIELDING CALCULATIONS	89727-1357686	05/21

VIDA REV 16

SYM	DATE	DESCRIPTION
2	06/25/21	COMPLETE NEW SET OF DWGS BASED ON LATEST WALL BACKGROUNDS/
2	06/25/21	MODIFIED MAGNET GAUSS FIELDS TO REFLECT LATEST SHLD CALCS./
2	06/25/21	ALL LAYOUTS, LEGENDS NOTES & DETAILS UPDATED ACCORDINGLY
1	05/11/21	NEW WALL BACKGROUNDS/ ADD CASEWORK & SHIFT MAGNET
0	06/25/21	2003356RRA DATED 09/10/20 APPROVED BY CUSTOMERS FOR FINALS

-ISSUE BLOCK-

PROJECT MANAGER: PATRICK RUIZ
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EMAIL: patrick.ruiz@siemens-healthineers.com

SIEMENS

GRADY MEMORIAL HOSPITAL CORPORATION

80 JESSE HILL JUNIOR DRIVE, SOUTH EAST, ATLANTA, GA 30303

MRI ROOM #2 – MAGNETOM VIDA XQ GRADIENTS

PROJECT #: 2003356

SHEET 1 OF 10

DRAWN BY: D. BRISTOE

SCALE: AS NOTED

REF. #: 30238438

DATE: 06/25/21

SHEET: A-101

ATTENTION:

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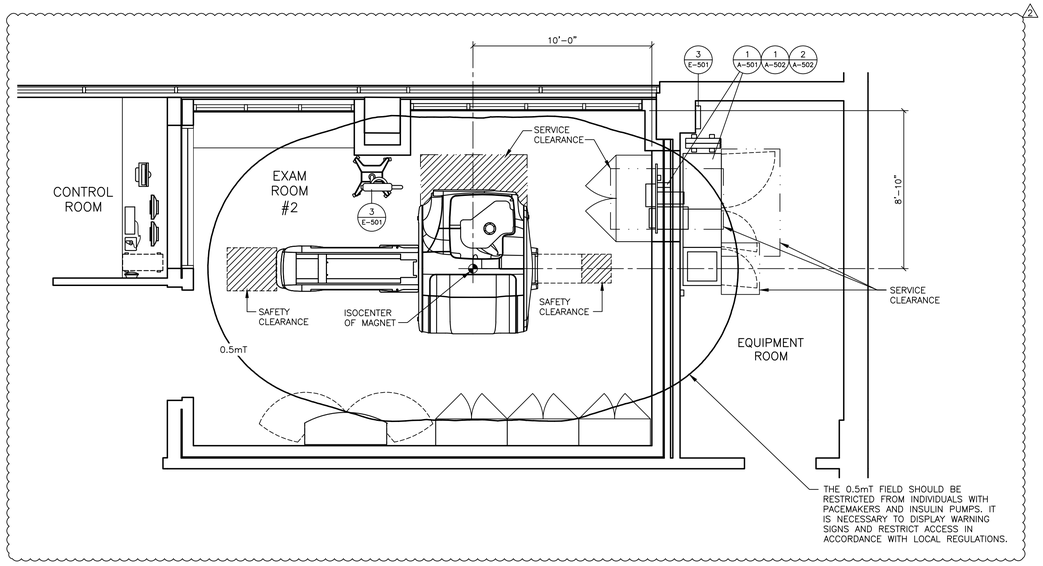
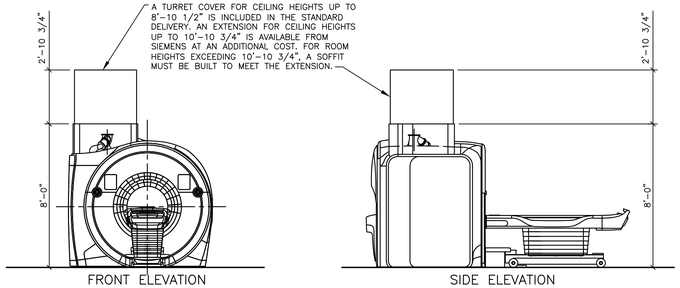
- ALL DIMENSIONS SHOWN ON THIS DRAWING ARE FROM FINISHED SURFACES.
- THIS DRAWING DOES NOT PROVIDE RADIATION SHIELDING REQUIREMENTS FOR X-RAY AND ASSOCIATED EQUIPMENT. THE CUSTOMER IS RESPONSIBLE FOR CONSULTING WITH A REGISTERED RADIATION PHYSICIST TO SPECIFY RADIATION PROTECTION.

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

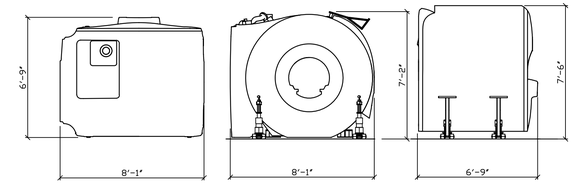


SAFETY/SERVICE CLEARANCE PLAN

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



– VIDA MAGNET HEIGHT — SCALE: NONE



MAGNET DIMENSIONS

LARGEST ITEM – MAGNET – 15,873 LBS.
MINIMUM TRANSPORT OPENING IN THE WALL: 7'–0" WIDE X 7'–8 $\frac{5}{8}$" HIGH.
MINIMUM TRANSPORT OPENING IN THE CEILING: 7'–0" X 8'–4 $\frac{1}{2}$"

TO TRANSPORT THE GPA/EPC CABINET (3,638 POUNDS)
A MINIMUM ROOM HEIGHT OF 6'–9" IS REQUIRED,
6'–3" WITH WHEELS REMOVED, 6'–1" WITH WHEELS
AND MAINS CONNECTION REMOVED.

THE MAXIMUM LOAD AND WIDTH OF DOORS AND OPENINGS MUST BE CONSIDERED FOR DELIVERY OF THE SYSTEM PARTS AND DELIVERY OF CRYOGENS. THE STRUCTURAL ENGINEER IS RESPONSIBLE FOR THE FLOOR LOADING OF THE TRANSPORTATION ROUTES.
THE TRANSPORT ROUTE FOR THE MAGNET MUST NOT EXCEED AN ANGLE OF 15° (FOR EXAMPLE, ON A RAMP).
THE RF DOOR AND COMPLETE PATH FROM EXAM ROOM TO THE EXTERIOR OF THE BUILDING MUST HAVE A MINIMUM CLEARANCE OF 40". THIS IS REQUIRED FOR REPLACEMENT PARTS AND HELIUM FILLS.

– MAGNETOM VIDA TRANSPORT REQUIREMENTS — SCALE: 1/4"=1'–0"

ARCHITECTURAL NOTES

1) ALL PRELIMINARY EQUIPMENT LAYOUTS SUBMITTED BY SIEMENS HEALTHCARE ARE BASED ON THE RECOMMENDED SPACE NECESSARY FOR THE OPERATION AND SERVICEABILITY OF THE EQUIPMENT BEING PROPOSED. SIEMENS WILL NOT SUBMIT AN EQUIPMENT LAYOUT THAT IS NOT IN THE BEST INTEREST OF BOTH THE CUSTOMER AND SIEMENS. ALL EQUIPMENT LAYOUTS ARE BASED EITHER ON AN ACTUAL SITE SURVEY OR ARCHITECTURAL DRAWINGS SUPPLIED TO SIEMENS. SIEMENS WILL NOT BE RESPONSIBLE FOR ANY ALTERATIONS THAT ENCROACH WITHIN DESIGNATED SAFETY AND SERVICE CLEARANCE ZONES AS INDICATED ON DRAWINGS (I.E., PIPE CHASES, VENTILATION DUCTS, CASEWORK, AND SOFFITS, ETC.) MADE BY THE CUSTOMER OR REQUIRED BY A CUSTOMER'S ARCHITECTURAL FIRM ONCE PRELIMINARY DRAWINGS HAVE BEEN SUBMITTED AND APPROVED, DO NOT ALTER ANY SPECIFICATIONS AND/OR DIMENSIONS WITHOUT CONTACTING AND RECEIVING WRITTEN CONFIRMATION FROM SIEMENS PROJECT MANAGER.
2) SIEMENS HEALTHCARE IS NOT AN ARCHITECTURAL OR ENGINEERING FIRM. DRAWINGS SUPPLIED BY SIEMENS ARE NOT CONSTRUCTION DRAWINGS. THEREFORE, THESE DRAWINGS ARE TO BE USED ONLY FOR INFORMATION TO COMPLEMENT ACTUAL CONSTRUCTION DRAWINGS AVAILABLE FROM A CUSTOMER APPOINTED ARCHITECTURAL REPRESENTATIVE OR A CUSTOMER'S ENGINEERING DESIGN GROUP. THE CUSTOMER'S ARCHITECT AND GENERAL CONTRACTOR SHALL BE ULTIMATELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE CODES AND PROFESSIONAL DESIGN REQUIREMENTS INCLUDING OSHA/NEC SAFETY CLEARANCE REQUIREMENTS IN ADDITION TO SIEMENS–REQUIRED SAFETY/SERVICE CLEARANCES SHOWN.
3) THE CUSTOMER IS RESPONSIBLE FOR ALL ROOM AND AREA PREPARATION COSTS, PROFESSIONAL FEES, PERMITS, REPORTS, AND INSPECTION FEES.
4) EQUIPMENT WARRANTIES, EXPRESSED OR IMPLIED ON THE PART OF SIEMENS SHALL BE CONTINGENT UPON STRICT COMPLIANCE WITH THE ARCHITECTURAL, STRUCTURAL, ELECTRICAL, MECHANICAL AND RECOMMENDATIONS AND REQUIREMENTS CONTAINED IN THESE DRAWINGS, UNLESS SPECIFIED OTHERWISE.
5) ALL DIMENSIONS SHOWN ARE FROM FINISHED SURFACES UNLESS SPECIFIED OTHERWISE.
6) SIEMENS HEALTHCARE SHALL BE RESPONSIBLE FOR SIEMENS EQUIPMENT INSTALLATION, CALIBRATION, CONNECTION AND INSTALLATION OF SIEMENS PROVIDED CABLES. THE CUSTOMER/ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR TERMINATIONS OF CUSTOMER/ELECTRICAL CONTRACTOR–SUPPLIED CABLES TO SIEMENS EQUIPMENT. IN THE EVENT THAT SPECIFIC TRADE RULES OR LICENSE REQUIREMENTS PROHIBIT THIS, THE CUSTOMER SHALL INITIATE THE SERVICES OF APPROVED OTHER CONTRACTORS AND PAY FOR SELECTED, APPROVED PARTIES TO PERFORM THIS WORK WITH SUPERVISION PROVIDED BY SIEMENS. CALIBRATION WHEN ACCOMPLISHED OUTSIDE OF NORMAL INSTALLATION SEQUENCES DUE TO CONTRACTOR OR TRADE RULE ACTIONS OR REQUIREMENTS SHALL BE SUPPORTED BY, CHARGED TO, AND ACCEPTED BY THE CUSTOMER AS AN ADDITIONAL INSTALLATION EXPENSE.
7) THE CUSTOMER SHALL COORDINATE WITH SIEMENS PROJECT MANAGER THE LOCATIONS AND TRAVEL OF ALL ANCILLARY EQUIPMENT TO BE CEILING OR WALL MOUNTED (I.E.: O.R. LIGHTS, MEDICAL GAS COLUMNS, PHYSIOLOGICAL MONITORING INJECTORS, CRT PLATFORMS, SPRINKLER HEADS, SMOKE DETECTORS, ELECTRICAL OUTLETS, HVAC GRILLES, SPEAKERS, AND GENERAL ROOM LIGHTING, ETC.).
8) THE GENERAL CONTRACTOR/CUSTOMER SHALL BE RESPONSIBLE FOR ALL FINAL PAINT, TOUCH–UP AND ANY COSMETIC OR TRIM WORK WHICH NEEDS TO BE OR IS REQUIRED TO BE COMPLETED AFTER THE INSTALLATION OF THE SIEMENS EQUIPMENT AND ANY ASSOCIATED SUPPORT APPARATUS.
9) CUSTOMER/CONTRACTOR MUST ASSIST SIEMENS INSTALLERS WITH INSTALLATION OF EQUIPMENT ABOVE 14'–0". REFER TO THE ELECTRICAL NOTES ON SIEMENS SHEET E–101 FOR MORE DETAILS.

REV 0

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.

COIL NAME	POUND WEIGHT	INCHES LENGTH	WIDTH	HEIGHT	DIAMETER
MATRIX COILS					
BIOMATRIX HEAD/NECK 20	13	16 3/4	14 5/8	15 1/8	–
BIOMATRIX SPINE 32	24	47 1/4	19 1/4	2 1/2	–
BODY 18	26	15 1/4	19 1/8	23 1/4	–
FLEX LARGE 4	2	20 1/4	8 7/8	–	–
FLEX SMALL 4	1	14 1/2	6 7/8	–	–
COMBINATION OF ALL COILS IS POSSIBLE.					

VIDA
REV 16

SYM	DATE	DESCRIPTION
2	06/25/21	COMPLETE NEW SET OF DWGS BASED ON LATEST WALL BACKGROUNDS/
2	06/25/21	MODIFIED MAGNET GAUSS FIELDS TO REFLECT LATEST SHLD CALCS./
2	06/25/21	ALL LAYOUTS, LEGENDS NOTES & DETAILS UPDATED ACCORDINGLY
1	05/11/21	NEW WALL BACKGROUNDS/ ADD CASEWORK & SHIFT MAGNET
0	06/25/21	2003356RRA DATED 09/10/20 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

PROJECT MANAGER: PATRICK RUIZ
TEL: (770) 402–1365 EXT:
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SIEMENS

GRADY MEMORIAL HOSPITAL CORPORATION

80 JESSE HILL JUNIOR DRIVE, SOUTH EAST, ATLANTA, GA 30303
MRI ROOM #2 – MAGNETOM VIDA XQ GRADIENTS

PROJECT #: 2003356
SHEET: A-102
SHEET OF 2 10
DRAWN BY: D. BRISTOE
DATE: 06/25/21
SCALE: AS NOTED
REF. #: 30238438

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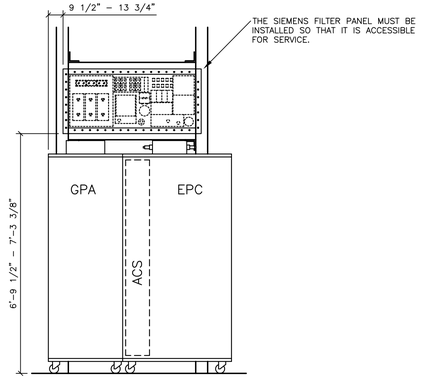
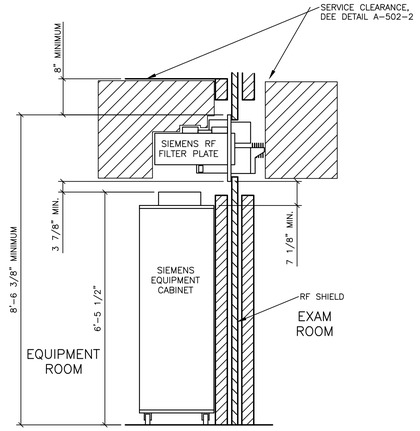
– ALL DIMENSIONS SHOWN ON THIS DRAWING ARE FROM FINISHED SURFACES.
– THIS DRAWING DOES NOT PROVIDE RADIATION SHIELDING REQUIREMENTS FOR X–RAY AND ASSOCIATED EQUIPMENT. THE CUSTOMER IS RESPONSIBLE FOR CONSULTING WITH A REGISTERED RADIATION PHYSICIST TO SPECIFY RADIATION PROTECTION.

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT



VIEW FROM EQUIPMENT ROOM SIDE

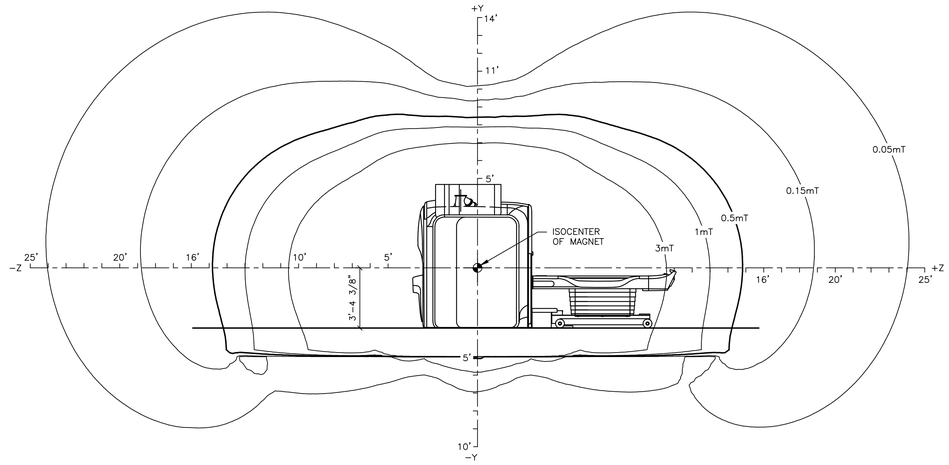


SECTION VIEW

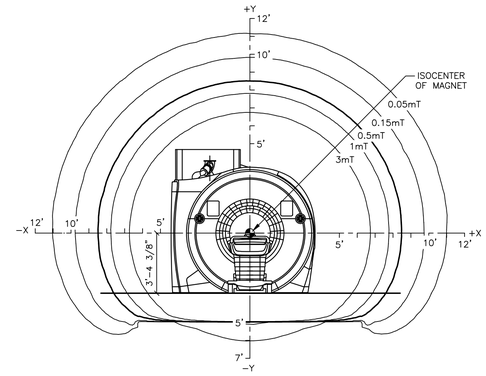
IN THIS STANDARD INSTALLATION THE SIEMENS FILTER PANEL IS INSTALLED DIRECTLY ABOVE THE ELECTRONIC CABINET. THE RELATIONSHIP AS DIMENSIONED ABOVE IS CRITICAL FOR THE CONNECTION OF SUPPORTING CABLES.

TO USE THE 2 METER CABLE SET, THE DISTANCE FROM THE RF SHIELD TO THE BACK OF THE SIEMENS ELECTRONICS CABINET CANNOT EXCEED 2'-11"

1 | FILTER PANEL AND ELECTRONICS CABINET INSTALLATION | SCALE: 1/2"=1'-0"



– | MAGNETOM VIDA FIELDS – SIDE ELEVATION | SCALE: 1/4"=1'-0"



– | MAGNETOM VIDA MAGNETIC FIELDS – FRONT ELEVATION | SCALE: 1/4"=1'-0"

VIDA REV 16

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GRADY MEMORIAL HOSPITAL CORPORATION

80 JESSE HILL JUNIOR DRIVE, SOUTH EAST, ATLANTA, GA 30303
MRI ROOM #2 – MAGNETOM VIDA XQ GRADIENTS

SCALE: AS NOTED | REF. #: 30238438

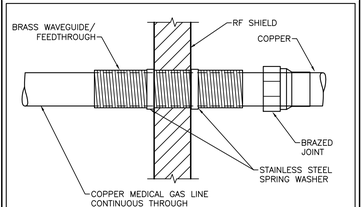
PROJECT #: 2003356

SHEET OF 3 10 | DRAWN BY: D. BRISTOE

DATE: 06/25/21

SHEET: A-501

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



THE MEDICAL GAS FEED THROUGH SHOULD BE AS CLOSE TO THE SIEMENS FILTER PANEL AS POSSIBLE. WITHIN 3 FEET IS STRONGLY RECOMMENDED.

THE FINAL MEDICAL GAS CONNECTION TO THE WAVEGUIDE CANNOT BE MADE UNTIL GROUND ISOLATION MONITORING IS COMPLETE.

THE MEDICAL GAS MUST BE GROUNDED TO THE WAVEGUIDE AND RF SHIELD.

REV 0

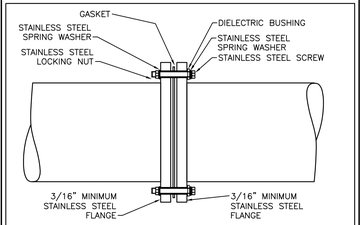
–	MEDICAL GAS EXAMPLE	NO SCALE

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

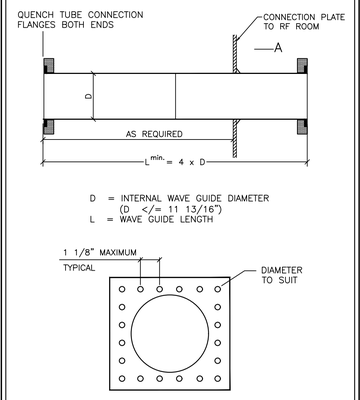


DIELECTRIC ISOLATION HAS TO BE INSTALLED TO AVOID ELECTRICAL NOISE BEING PICKED UP BY LOOPS BETWEEN THE MAGNET, THE QUENCH TUBE, THE RF ROOM, AND THE BUILDING.

IT IS NECESSARY TO HAVE ONE DIELECTRIC ISOLATION OF THE QUENCH TUBE INSIDE THE RF ROOM (PROVIDED BY SIEMENS AT THE MAGNET) AND ONE OUTSIDE THE RF ROOM (PROVIDED BY THE QUENCH TUBE MANUFACTURER).

REV 0

–	DIELECTRIC ISOLATION	NO SCALE



VIEW A

THE RF CABIN FEED THROUGH NEEDS TO CONFORM TO CERTAIN GEOMETRIC CONSTRAINTS IN ORDER TO GUARANTEE THE RF INTEGRITY OF THE RF CABIN.

AS A FUNCTION OF INTERNAL PIPE DIAMETER, THE FOLLOWING APPLIES TO MINIMUM PIPE LENGTH FOR FREQUENCIES UP TO 128 MHz AND 110 dB ATTENUATION.

DEPENDING ON RF CABIN DESIGNS, RF SEALS CAN BE REQUIRED BETWEEN THE MOUNTING FLANGE AND THE RF CABIN.

QUENCH TUBE RF CABIN FEED THROUGH

REV 0

–	WAVE GUIDE	NO SCALE

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".

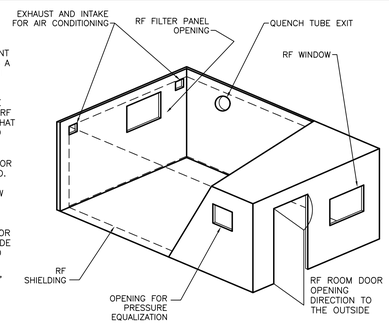
TO ENSURE UNOBSTRUCTED VENTING, THIS OPENING CANNOT BE SUBDIVIDED. THIS MEANS THAT, FOR EXAMPLE, RF SEALED HONEYCOMB GRIDS ARE NOT PERMITTED.

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 OUT SWING 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 CLOSES 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.



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 $\geq$ 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

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

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 CONTENT 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.

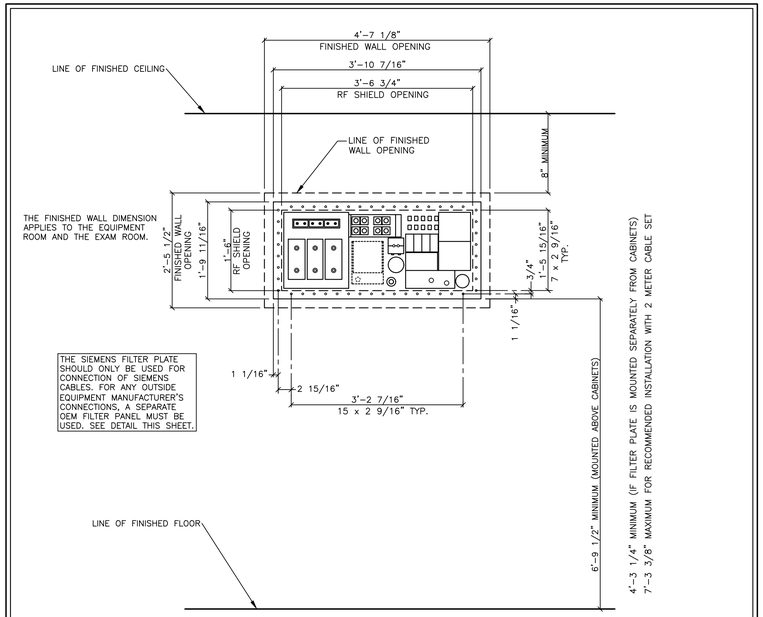
REV 1

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.

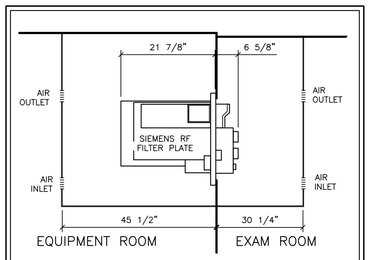
2) THE FILTER PLATE FRAME, RF FILTER PLATE BLANK, RF GASKET AND MOUNTING HARDWARE FOR THE PURPOSES OF TESTING THE INTEGRITY OF THE RF ENCLOSURE PRIOR TO THE INSTALLATION OF THE SIEMENS SUPPLIED AND INSTALLED RF FILTER PLATE SHALL BE PROVIDED AND INSTALLED BY THE SHIELDING CONTRACTOR(S) UNLESS SPECIFIED OTHERWISE.

REV 0



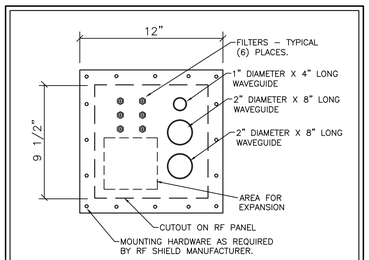
REV 0

1	EQUIPMENT ROOM SIDE FILTER PLATE ELEVATION	SCALE: 3/4"=1'–0"



IF A COVER IS DESIRED TO CONCEAL THE FILTER PANEL INSIDE THE EXAM ROOM (NOT INCLUDED IN DELIVERY), IT IS NECESSARY TO HAVE VENTILAITON AND PROPER CLEARANCE FOR CABLING AND SERVICE. RECOMMENDED SIZE IS 4'–4" WIDE. THERE SHOULD BE A MINIMUM 8" CLEAR FROM THE TOP OF THE FILTER TO THE CEILING ABOVE.

2	FILTER PANEL COVERS	NO SCALE



NON–SIEMENS EQUIPMENT REQUIRING RF ROOM PENETRATION REQUIRES A SEPARATE PENETRATION PANEL BE PROVIDED BY THE CUSTOMER AND INSTALLED BY THE RF ROOM MANUFACTURER. SIEMENS FILTER PANEL IS RESERVED FOR SIEMENS PRODUCTS AND FUTURE UPGRADES ONLY.

TYPICAL OEM (ORIGINAL EQUIPMENT MANUFACTURER) EQUIPMENT MAY INCLUDE, BUT NOT BE LIMITED TO, INJECTORS, fMRI, AND SAFETY RELATED ITEMS. SPECIFIC EQUIPMENT MANUFACTURERS WILL HAVE DETAILED INFORMATION REGARDING REQUIRED PENETRATIONS. ABOVE IS AN EXAMPLE OF A PENETRATION PANEL THAT WILL MEET MANY REQUIREMENTS. THE PENETRATION PANEL SHALL BE LOCATED IN CLOSE PROXIMITY TO THE SIEMENS FILTER PANEL AND BE COMPLIANT WITH ALL SIEMENS RF ROOM REQUIREMENTS.

REV 0

–	OEM FILTER PANEL	NO SCALE

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VIDA
REV 16

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PROJECT #: 2003356

SHEET: A-502

SHEET OF 4 10

DRAWN BY: D. BRISTOE

SCALE: AS NOTED

REF. #: 30238438

DATE: 06/25/21

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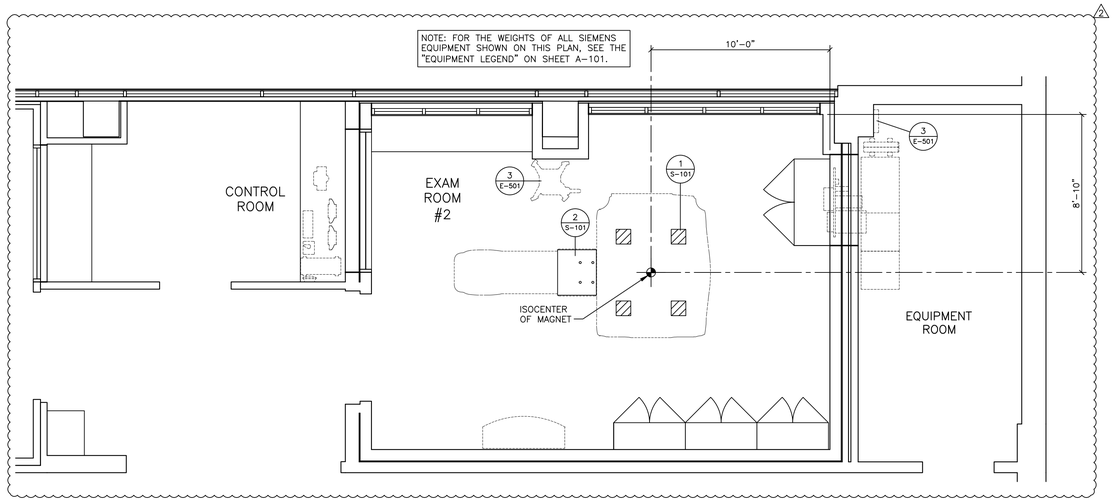
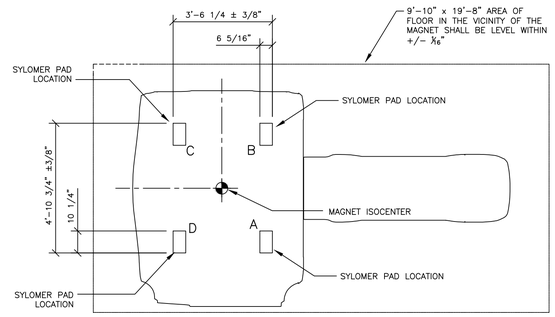


STRUCTURAL FLOOR PLAN

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



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A – 3,968 POUNDS
B – 3,772 POUNDS
C – 4,603 POUNDS
D – 3,640 POUNDS

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/s^2 OR ~80 dB(G) G=9.81 m/s^2

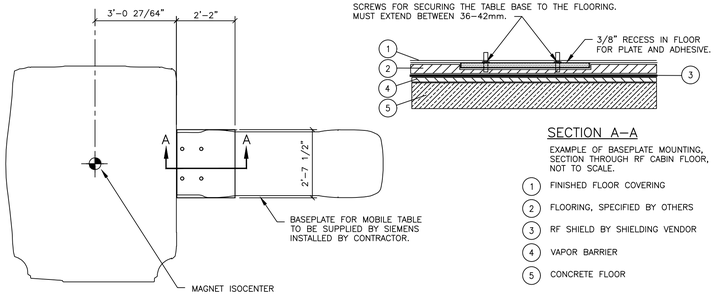
THE REQUIREMENT FOR a_{max} IS MEASURED AS MAXIMUM RMS VALUE PER FREQUENCY COMPONENT <0.5Hz IN THE FOURIER TRANSFORMATION OF THE RECORDED SIGNAL (SPECTRUM).

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.

1 **MAGNETOM VIDA BASE DETAIL** SCALE: 3/8"=1'-0"



SECTION A-A

EXAMPLE OF BASEPLATE MOUNTING, SECTION THROUGH RF CABIN FLOOR, NOT TO SCALE.

1. FINISHED FLOOR COVERING
2. FLOORING, SPECIFIED BY OTHERS
3. RF SHIELD BY SHIELDING VENDOR
4. VAPOR BARRIER
5. CONCRETE FLOOR

2 **BASEPLATE FOR MOBILE PATIENT TABLE** 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 BOTTOM SIDE OF THE UNISTRUT CEILING GRID AND ANY CEILING MOUNTED SUPPORT PLATES ARE TO BE INSTALLED FLUSH WITH THE FINISHED CEILING. THE CUSTOMER/CONTRACTOR SHALL ALSO PROVIDE COVERSTRIPS FOR THE UNISTRUT.

8) 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.

9) 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.

FLOOR LOADING TABLE

	POUNDS
MAGNET AND PATIENT TABLE	16,513
MAGNET ONLY FLOOR LOADING	16,204
LOAD DISTRIBUTION PER SHIM PLATE	SEE DETAIL 1
PATIENT	550

CEILING HEIGHTS

MAGNET EXAMINATION ROOM:	7'-11" MINIMUM
EQUIPMENT ROOM:	7'-3" MINIMUM
ALL ANCILLARY AREAS:	6'-11" MINIMUM

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.

SYM	DATE	DESCRIPTION
2	06/25/21	COMPLETE NEW SET OF DWGS BASED ON LATEST WALL BACKGROUNDS/
2	06/25/21	MODIFIED MAGNET GAUSS FIELDS TO REFLECT LATEST SHLD CALCS./
2	06/25/21	ALL LAYOUTS, LEGENDS NOTES & DETAILS UPDATED ACCORDINGLY
1	05/11/21	NEW WALL BACKGROUNDS/ ADD CASEWORK & SHIFT MAGNET
0	06/25/21	2003356RRA DATED 09/10/20 APPROVED BY CUSTOMERS FOR FINALS

-ISSUE BLOCK-

PROJECT MANAGER: PATRICK RUIZ
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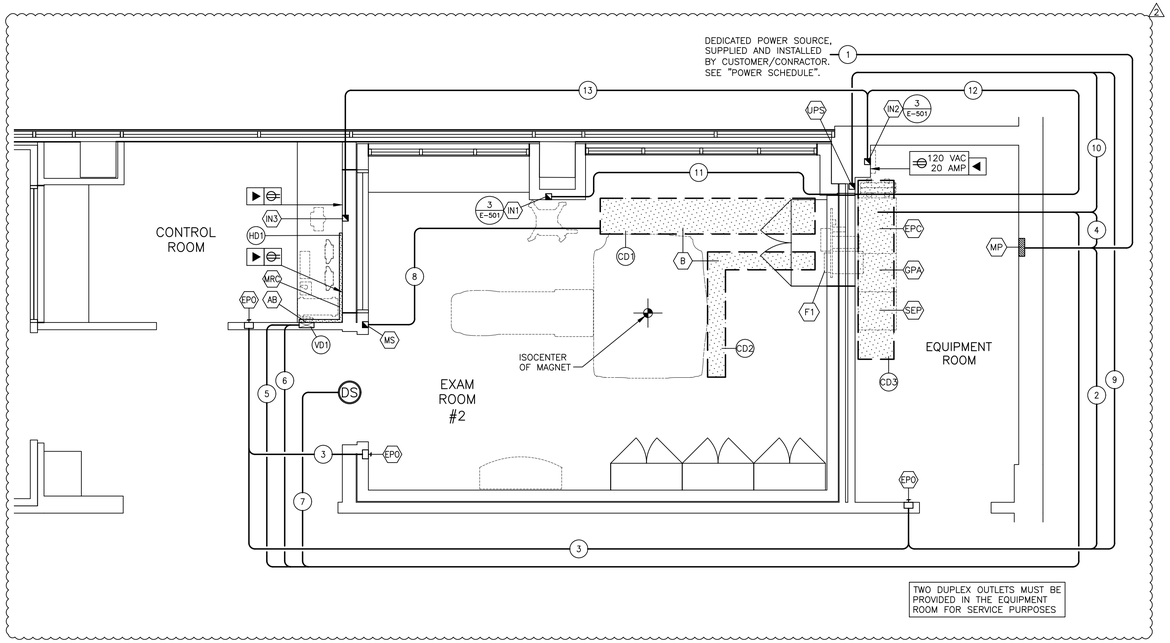
SIEMENS

GRADY MEMORIAL HOSPITAL CORPORATION
80 JESSE HILL JUNIOR DRIVE, SOUTH EAST, ATLANTA, GA 30303
MRI ROOM #2 – MAGNETOM VIDA XQ GRADIENTS

PROJECT #: 2003356
SHEET: S-101
SHEET 5 OF 10
DRAWN BY: D. BRISTOE
SCALE: AS NOTED
REF. #: 30238438
DATE: 06/25/21

VIDA REV 16

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



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 TRENCHDUCT
	PULLBOX IN (FLOOR/WALL/CEILING)
	OPENING IN ACCESS FLOORING
DS	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

ELECTRICAL LEGEND

SYM	SIZE	DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR	REMARKS
AB	3"ø	OPENING IN FACE OF VERTICAL DUCT 5'-0" ABOVE FINISHED FLOOR IN LOCATION TO BE COORDINATED WITH THE ARCHITECT.	ALARM BOX
EPA EPB EPC		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
EPO	----	EMERGENCY POWER OFF BUTTONS, MOUNTED WITH CENTERLINE AT 5'-0" ABOVE FINISHED FLOOR. ALL PARTS ARE TO BE NONFERROUS 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
IN1	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
IN2	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN EQUIPMENT ROOM, 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
IN3	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
MP	----	MAIN PANEL WITH MAIN BREAKER. EXACT LOCATION DETERMINED BY CUSTOMER/CONTRACTOR	SEE POWER SCHEDULE
MRC	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 GXT4 UPS
(101)	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. A 12" SEPARATION BETWEEN CD1 AND CD2 MUST BE MAINTAINED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/2
(102)	12"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. A 12" SEPARATION BETWEEN CD2 AND CD1 MUST BE MAINTAINED. DO NOT LOCATE THIS CABLE TRAY ABOVE THE MAGNET.	CABLE TRAY SEE DETAIL E-501/2
(103)	24"x4"	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-501/2
(W1)	4" x 2"	HORIZONTAL DUCT SURFACE MOUNTED ON WALL IN CONTROL AREA AT FLOOR LINE AS SHOWN, FINISHED TO MATCH WALLS.	
(W1)	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 MAIN PANEL "MP"	SEE POWER SCHEDULE, SHEET E-102
(2)	AS PER NEC	CONDUIT FROM "MP" TO "EPO"	SEE POWER SCHEDULE, SHEET E-102
(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 "MP" 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.	SEE POWER SCHEDULE, SHEET E-102
(5)	(2) 2 1/2"ø	CONDUIT FROM "VD1" (MRC) TO "CD3" (EPC)	NOT TO EXCEED 60 FT.
(6)	(1) 1 1/2"ø	CONDUIT FROM "VD1" (AB) TO "CD3" (EPC)	NOT TO EXCEED 60 FT.
(7)	(1) 1/2"ø	CONDUIT FROM "DS" TO "CD3" (EPC)	NOT TO EXCEED 60 FT.
(8)	(1) 3/4"ø	CONDUIT FROM "MS" TO "CD1" (WIRES TO MAGNET) TO BE NON-FERROUS WHEN INSIDE THE RF ROOM.	NOT TO EXCEED 20 FT.
(9)	(1) 3/4"ø	CONDUIT FROM "EPO" TO "UPS"	
(10)	(1) 2"ø	CONDUIT FROM "UPS" TO "CD3" (EPC)	MAXIMUM LENGTH 29 FEET
(11)	(1) 2"ø	NON-FERROUS CONDUIT FROM "IN1" TO RF PENETRATION/FILTER PANEL (LOCATED NEAR "F1"). CABLES RUN FROM INJECTOR AT "IN1" THRU RF PENETRATION/FILTER PANEL TO INJECTOR POWER SUPPLT AT "IN2". REFER TO MANUFACTURERS SPECIFICATIONS FOR ACTUAL ELECTRICAL REQUIREMENTS.	NOT TO EXCEED 30 FEET IN EXAM ROOM
(12)	(1) 2"ø	CONDUIT FROM RF PENETRATION/FILTER PANEL (LOCATED NEAR "F1") TO "IN2. CABLES RUN FROM INJECTOR AT "IN1" THRU RF PENETRATION/FILTER PANEL TO INJECTOR POWER SUPPLT AT "IN2". REFER TO MANUFACTURERS SPECIFICATIONS FOR ACTUAL ELECTRICAL REQUIREMENT	NOT TO EXCEED 10 FEET OUTSIDE EXAM ROOM
(13)	(1) 2"ø	CONDUIT FROM "IN2" TO "IN3" FOR INJECTOR CABLES.	NOT TO EXCEED 150 FEET

CONTRACTOR SUPPLIED CABLES

FROM	VIA	TO	DESCRIPTION	REMARKS
SOURCE	1	MP	(3) PHASE CONDUCTORS, (1) FULL SIZE EQUIPMENT GROUND WIRE TO BE SIZED BY ELECTRICAL CONTRACTOR/ENGINEER.	
MP	2	EPO	DETERMINED BY ELECTRICAL CONTRACTOR.	
EPO	3	EPO	DETERMINED BY ELECTRICAL CONTRACTOR.	
MP	4	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
EPO	9	UPS	DETERMINED BY ELECTRICAL CONTRACTOR.	6 FOOT TAILS

CEILING HEIGHTS

MAGNET EXAMINATION ROOM:	7'-11" MINIMUM
EQUIPMENT ROOM:	7'-3" MINIMUM
ALL ANCILLARY AREAS:	6'-11" MINIMUM

ELECTRICAL NOTES

1) COMPLIANCE: ELECTRICAL WORK SHALL BE IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE (NFPA-70), O.S.H.A. REGULATIONS, AS WELL AS APPLICABLE REGULATIONS OF CITY, COUNTY, STATE AND FEDERAL AGENCIES. PROVIDE MATERIALS AND EQUIPMENT THAT COMPLY TO ANSI, IEEE AND NEMA STANDARDS AND ARE U.L. LISTED AND LABELED. THE CUSTOMER'S/CONTRACTOR'S WORK AND ALL EQUIPMENT INSTALLED SHALL COMPLY WITH THE CURRENT EDITION OF NATIONAL ELECTRICAL CODE ADOPTED/ENFORCED BY THE AUTHORITY HAVING JURISDICTION.

2) QUALITY ASSURANCE: THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN THE FIELD TO INSURE THAT THE NEW WORK WILL FIT INTO 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 FROM A MEDICAL IMAGING PANEL OR BUILDING SERVICE EQUIPMENT THAT IS A GROUNDED 3 OR 4-WIRE "WYE" SOURCE PER THE SPECIFIC EQUIPMENT OPERATION REQUIREMENTS. A DEDICATED CIRCUIT SHALL BE PROVIDED THAT IS KEPT ENTIRELY FREE AND INDEPENDENT OF ALL OTHER BUILDING WIRING. NO ELEVATORS, GENERATORS, PUMPS, HVAC OR SIMILAR EQUIPMENT SHALL BE CONNECTED TO THE SAME CIRCUIT OR MEDICAL IMAGING PANEL THAT SERVES THE SIEMENS HEALTHCARE EQUIPMENT. IF THE POWER SUPPLY SOURCE DOES NOT MEET THE SPECIFIC SIEMENS EQUIPMENT POWER REQUIREMENTS, THE CONTRACTOR SHALL PROVIDE THE NECESSARY EQUIPMENT REQUIRED TO ESTABLISH THE POWER SUPPLY IN ACCORDANCE WITH THE REQUIRED POWER SUPPLY PARAMETERS OF THE SIEMENS EQUIPMENT. THE CONTRACTOR SHALL COORDINATE THIS WORK WITH THE CUSTOMER AND/OR UTILITY COMPANY FIELD REPRESENTATIVE.

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, BUT IS NOT LIMITED TO, THE FOLLOWING, UNLESS NOTED OTHERWISE: ELECTRICAL RACEWAYS AND DUCTS, WIRING TROUGHS, PULL BOXES, CONDUITS, CIRCUIT BREAKERS, ACCESS PANELS, EMERGENCY OFF BUTTONS, DOOR SWITCHES, WARNING LIGHTS, WIRING, WIRING DEVICES, CONNECTORS, LIGHTING EQUIPMENT AND GROUNDING.

5) RACEWAY AND CONDUIT NOTES: ALL ITEMS IN THE MAGNET ROOM SHALL BE NON-FERROUS. ALL CONDUITS SHALL BE INSTALLED IN COMPLIANCE WITH THE CURRENT ENFORCED EDITION OF THE NATIONAL ELECTRICAL CODE.

CONDUIT BODIES SHALL NOT BE USED. WHERE A CONDUIT ENTERS A BOX, FITTING, OR OTHER ENCLOSURE, AN INSULATED THROAT CONNECTOR SHALL BE PROVIDED TO PROTECT THE WIRE FROM ABRASION. ALL CONNECTORS FOR EMT SHALL BE COMPRESSION OR DOUBLE SET SCREW TYPE.

KEEP RACEWAYS AT LEAST 6 INCHES AWAY FROM PARALLEL RUNS OF FLUES OR STEAM AND HOT WATER PIPES. INSTALL RACEWAY RUNS ABOVE WATER AND STEAM PIPES PROVIDED THAT CABLE RUN DISTANCES ARE MAINTAINED. USE TEMPORARY CLOSURES TO PREVENT FOREIGN MATTER FROM ENTERING RACEWAY.

CONDUIT RUNS ARE SHOWN SCHEMATICALLY. INSTALL CONDUIT WITH 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 THE ELECTRICAL DETAILS. LISTED CONDUIT SIZES FOR SIEMENS-SUPPLIED CABLES MUST BE MAINTAINED IN ORDER TO ENABLE THE TOTAL CABLE BUNDLE INCLUDING CONNECTORS TO BE PULLED THROUGH WITHOUT DAMAGE.

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

PROVIDE WIRE DUCT/RACEWAY WITH ACCESSIBLE REMOVABLE COVERS. LOCATIONS OF BUILDING MATERIAL OPENINGS (I.E. ACCESS PANELS) TO BE CUT IN FIELD ARE TO BE COORDINATED WITH THE DRAWING REQUIREMENTS AND BUILDING STRUCTURE. THOSE THAT ARE NOT INDICATED OR INTERFERE WITH BUILDING ELEMENTS SHALL 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. CONTRACTORS MUST PROVIDE PULL STRINGS FOR ALL CONDUIT AND WIRE DUCT/RACEWAY. 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 (SUCH AS A 90 DEGREE ELBOW OR TEE) IN 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: ALL WIRING INSTALLED SHALL BE 600 VOLT CLASS, STRANDED TYPE THHN/THWN-2, SINGLE CONDUCTOR ANNEALED COPPER FOR A MAXIMUM OPERATING TEMPERATURE OF 90° C (194° F). SIZED AS INDICATED INSTALLED IN METAL RACEWAYS. THE CUSTOMER/CONTRACTOR SHALL LEAVE MINIMUM 10 FT. OF WIRE TAILS AT ALL OUTLET POINTS WITH WIRE IDENTIFICATION TAGGED AT BOTH ENDS FOR FINAL CONNECTION BY THE CUSTOMER/ELECTRICAL CONTRACTOR.

7) SHORT CIRCUIT REQUIREMENTS: ALL CIRCUIT BREAKERS SUPPLIED FOR THE SIEMENS EQUIPMENT REQUIREMENTS SHALL BE RATED HIGHER THAN THE SHORT CIRCUIT AVAILABLE AT THE TERMINALS OF THE ELECTRICAL EQUIPMENT AS DETERMINED BY THE ENGINEER OF RECORD, BUT NOT LESS THAN 35,000A RMS SYMMETRICAL AT 480V, 3-PHASE, 60 HERTZ. THE CONTRACTOR SHALL OBTAIN THE CORRECT SHORT CIRCUIT CURRENT RATING OF ALL THE NEW EQUIPMENT FOR INSTALLATION FROM THE ENGINEER OF RECORD.

VIDA REV 16

ATTENTION:

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- 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.
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-ISSUE BLOCK-

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SIEMENS

GRADY MEMORIAL HOSPITAL CORPORATION

80 JESSE HILL JUNIOR DRIVE, SOUTH EAST, ATLANTA, GA 30303
MRI ROOM #2 – MAGNETOM VIDA XQ GRADIENTS

PROJECT #: 2003356

SHEET: E-101

SHEET 6 OF 10

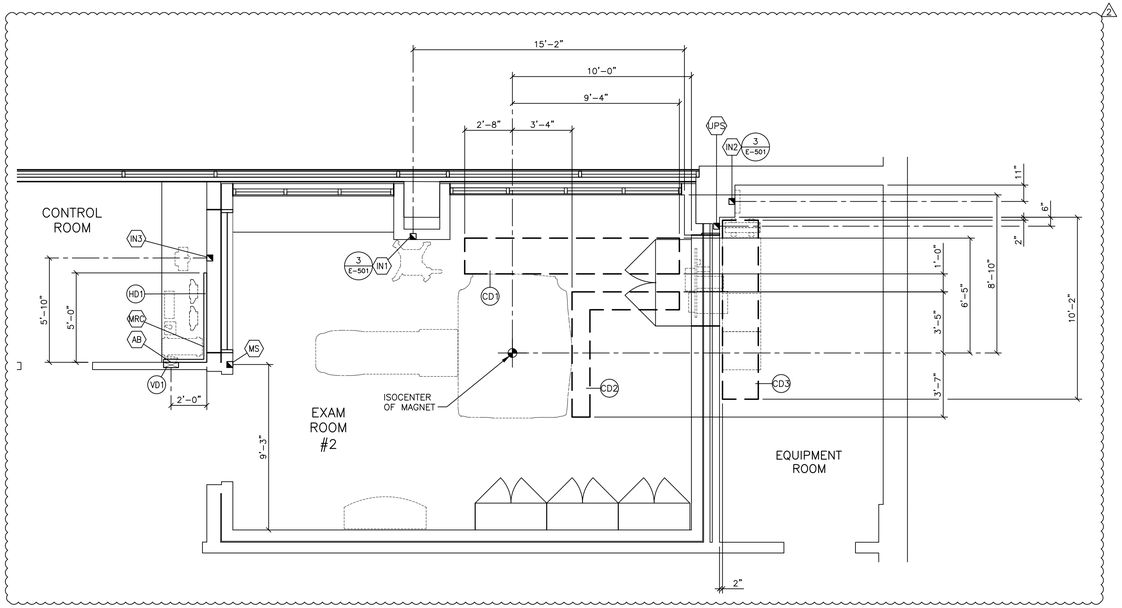
DRAWN BY: D. BRISTOE

SCALE: AS NOTED

REF. #: 30238438

DATE: 06/25/21

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT -

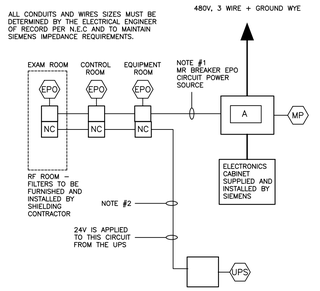


ELECTRICAL DIMENSION PLAN

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

POWER SCHEDULE

ALL CONDUITS AND WIRES SIZES MUST BE DETERMINED BY THE ELECTRICAL ENGINEER OF RECORD PER N.E.C AND TO MAINTAIN SIEMENS IMPEDANCE REQUIREMENTS.



ITEM	QTY	DESCRIPTION
MP	1	MAIN PANEL WITH MAIN BREAKER FLUSH OR SURFACE MOUNTED.
A	1	MR SYSTEM BREAKER MUST HAVE TRIPPING DEVICE SO WHEN ANY EPO IS PRESSED THE BREAKER TRIPS.
		MR BREAKER AMPS: SEE POWER REQUIREMENTS
		VOLTS / PHASES / NEUTRAL / GROUND / TOTAL WIRES
		480 / 3 / 0 / 1 / 4 (NOTE 1)
1) ALL WIRES MUST BE SAME SIZE. NOTE: UNLESS OTHERWISE NOTED ALL BREAKERS WILL BE 80% RATED.		
EPO	VARIES	NOTE 1 – EPO CIRCUIT #1 MAIN CIRCUIT BREAKER EMERGENCY POWER OFF BUTTON WITH PROTECTIVE COVER THAT PREVENTS ACCIDENTAL ACTIVATION. THE EPO MUST BE OF FAIL-SAFE DESIGN, ALL EPO'S TO HAVE MECHANICAL LATCHING MECHANISM. EPO MUST BE RESET BEFORE MR BREAKER CAN RESUME OPERATION. CONTACTS AND WIRING CONFIGURATION TO BE DESIGNED BY ELECTRICAL ENGINEER OF RECORD. NOTE 2 – EPO CIRCUIT #2 EPO CONTACTS TO BE NORMALLY CLOSED, WIRED IN SERIES, CONNECTED TO GXT4 UPS ONLY. THE EPO'S MUST BE INSTALLED BY A QUALIFIED ELECTRICAL CONTRACTOR ACCORDING TO NATIONAL ELECTRICAL CODE, STATE AND LOCAL REGULATIONS. THE CUSTOMER IS SOLELY RESPONSIBLE FOR THE IMPLEMENTATION OF THE EPO'S AND THEIR ASSOCIATED CIRCUITS AND MUST MAKE THE FINAL DETERMINATION CONSIDERING ALL SITE CONDITIONS AND REGULATORY FACTORS.

UNLESS OTHERWISE NOTED, ALL ITEMS LISTED IN THIS SCHEDULE SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR.

REV 1

POWER QUALITY NOTES

1) IT IS THE CUSTOMER'S RESPONSIBILITY TO COMPLY WITH THE POWER QUALITY REQUIREMENTS FOR SIEMENS MEDICAL SYSTEMS EQUIPMENT.
2) THE ELECTRICAL FEEDER TO THE SIEMENS MEDICAL SYSTEMS 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.
3) THE ELECTRICAL FEEDER TO THE IMAGING SYSTEM MUST BE RUN DIRECTLY TO A MAIN FACILITY DISTRIBUTION PANEL OR TO THE FACILITY SERVICE ENTRANCE, WITH NO OTHER LOADS POWERED FROM THIS FEEDER.
4) IN ORDER TO COMPLY WITH IMAGING SYSTEM POWER QUALITY REQUIREMENTS, ADDITIONAL POWER CONDITIONING DEVICES MAY BE REQUIRED. EXAMPLES INCLUDE VOLTAGE REGULATORS, TRANSFORMERS, SURGE PROTECTIVE DEVICES, FILTERS, AND/OR UNINTERRUPTIBLE POWER SUPPLIES (UPS). RECOMMENDED FOR THE INSTALLATION OF ELECTRONIC EQUIPMENT CAN BE FOUND IN IEEE STANDARD 1100-1999 "POWERING AND GROUNDING ELECTRONIC EQUIPMENT:
5) POWER CONDITIONING DEVICES NOT APPROVED BY SIEMENS MEDICAL SYSTEMS MAY NOT BE COMPATIBLE WITH THE MAGNETOM SYSTEM. "FERRORESONANT" POWER CONDITIONING EQUIPMENT RE-APPLIED FROM PREVIOUS GENERATION SYSTEMS IS ALSO GENERALLY EXCLUDED DUE TO HIGHER POWER REQUIREMENTS OF THE NEWER SYSTEMS.
6) INCOMING SOURCE POWER WIRES MUST BE SEPARATED FROM ANY SIEMENS CABLING BY A MINIMUM OF 12".

REV 0

CEILING HEIGHTS

MAGNET EXAMINATION ROOM:	7'-11" MINIMUM
EQUIPMENT ROOM:	7'-3" MINIMUM
ALL ANCILLARY AREAS:	6'-11" MINIMUM

POWER REQUIREMENTS

VOLTAGE VARIATION:480 VAC ±10% FOR ALL LINE AND LOAD CONDITIONS
VOLTAGE UNBALANCE: 2% MAXIMUM DIFFERENCE BETWEEN PHASES

FREQUENCY:	60 Hz ± 1.0 Hz
LINE IMPEDENCE:	<150 mOHMS
POWER CONSUMPTION READY FOR MEASUREMENT CHILLER/SEP	8.35kW/1.8kW
POWER CONSUMPTION TYPICAL EXAM CHILLER/SEP	27.42kW/1.8kW
CONNECTION VALUE	84 kVA
MOMENTARY POWER	135 kVA
MR SYSTEM BREAKER SIZE (A)	150 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

1) 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.

2) 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.

3) 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.

4) 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.

5) 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.

6) 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.

7) 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

1) 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.

2) 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.

3) 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.

4) THE EMERGENCY POWER OFF (EPO) BUTTONS ARE TO BE MUSHROOM TYPE WITH PUSH LOCK AND PULL TO RELEASE.

5) 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.

6) 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.

7) 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.

REV 1

GROUNDING NOTES

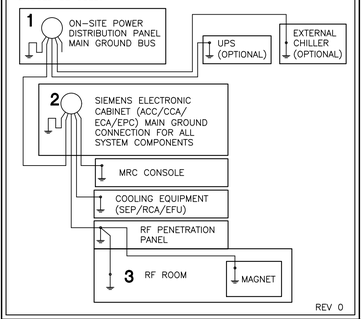
EQUIPMENT GROUNDING CONDUCTOR TO COMPLY WITH THE FOLLOWING:

1) SIZE GROUNDING WIRE TO SIEMENS EQUIPMENT PER POWER SCHEDULE REQUIREMENTS.
2) DERIVED FROM THE ELECTRICAL SERVICE, TRANSFORMER OR MAIN DISTRIBUTION PANEL FEEDING THE SIEMENS EQUIPMENT.
3) RUN IN THE SAME CONDUIT, TROUGH OR RACEWAY AS THE PHASE CONDUCTORS.
4) CONTINUOUS, WITH NO BREAKS OR USE OF CONDUIT, CHASSIS OR EARTH AS THE SOLE GROUNDING PATH.
5) BONDED TO CHASSIS AND/OR CONDUIT IN ACCORDANCE WITH THE NEC REQUIREMENTS.
6) MINIMIZE CONNECTIONS OR TERMINALS TO ENSURE CONTINUITY OVER THE LIFE OF THE INSTALLATION.
7) AS A NORM, THERE SHOULD NOT BE ANY CURRENT PRESENCE ON THE GROUND CONDUCTOR, BUT IT IS ACCEPTABLE TO HAVE <u>≤500mA</u> DURING OPERATION OF THE IMAGING EQUIPMENT.

MR GROUNDING NOTES

THE INTERNAL GROUND WIRING OF THE MR SYSTEM MUST BE INSTALLED WITH MINIMUM GROUND LOOPS. THIS IS TO PREVENT NOISE CURRENTS AND GENERAL DISTURBANCES FROM FLOWING THROUGH THE GROUNDING PATH.

TO ACHIEVE SUCH GROUNDING, THREE MAJOR GROUND POINTS SHOULD BE USED.



REV 0

VIDA
REV 16

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0	06/25/21	2003356RRA DATED 09/10/20 APPROVED BY CUSTOMERS FOR FINALS

-ISSUE BLOCK-

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PROJECT #: 2003356
SHEET: E-102
SHEET 7 OF 10
DRAWN BY: D. BRISTOE
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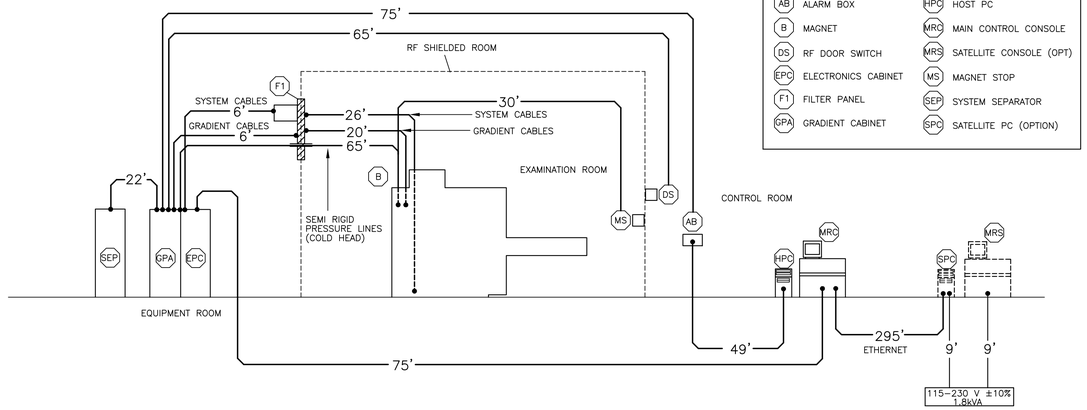


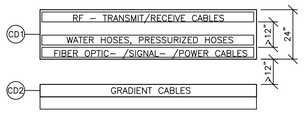
AB ALARM BOX
B MAGNET
DS RF DOOR SWITCH
EPC ELECTRONICS CABINET
F1 FILTER PANEL
GPA GRADIENT CABINET
HPC HOST PC
MRC MAIN CONTROL CONSOLE
MRS SATELLITE CONSOLE (OPT)
MS MAGNET STOP
SEP SYSTEM SEPARATOR
SPC SATELLITE PC (OPTION)

8M/2.5M CABLE SET (GRADIENT CABLES INSIDE THE RF ROOM ARE 6 FEET SHORTER THAN SYSTEM CABLES)

REV 0

1 **SIEMENS SYSTEM CABLING – FREE CABLE LENGTHS** SCALE: NONE

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.

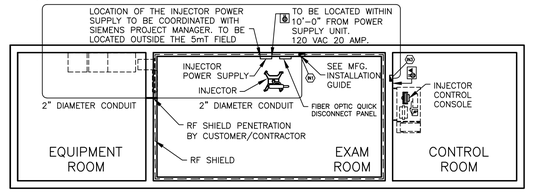
THE BENDING RADIUS FOR THE CABLES MUST BE MAINTAINED.
TRANSMITTER CABLE – 5" WHEN BENT ONCE.
TRANSMITTER CABLE – 14.25 WHEN BENT SEVERAL TIMES.
FIBER OPTIC CABLE – 6"
GRADIENT CABLE – 5.5" (ONLY WITH EXTENDED CABLE SET)
FIBER OPTIC CABLE FOR PATIENT OBSERVATION – 2"

REV 0

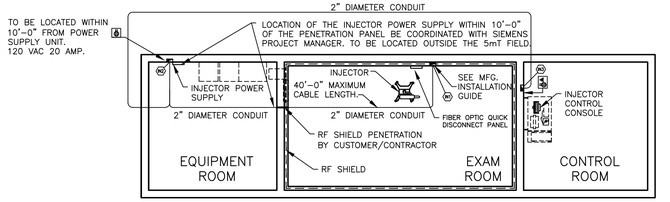
2 **CABLE SEPARATION** SCALE: NONE

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 EQUIPMENT ROOM OR IN THE EXAM 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.

REV 2

3 **MRXPERION MRI CONTRAST INJECTOR** SCALE: NONE

CONDUITS AND RACEWAYS

1) ALL POWER CONDUCTORS SUPPLIED BY THE CUSTOMER/ CONTRACTOR SHALL BE INSTALLED IN METAL RACEWAY, 600 VOLT CLASS, STRANDED TYPE THHN–THWN, 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'.

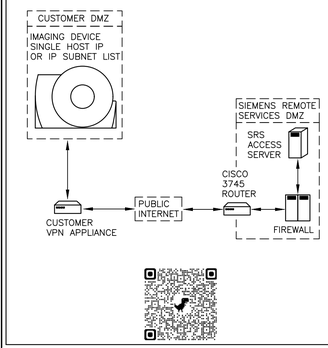
REV 0

SIEMENS SMART 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 SMART REMOTE SERVICES TO DETERMINE BEST IMPLEMENTATION FOR YOUR SITE. CONTACT:

IMCPTSCSRS.DL@SIEMENS–HEALTHINEERS.COM.



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VIDA REV 16

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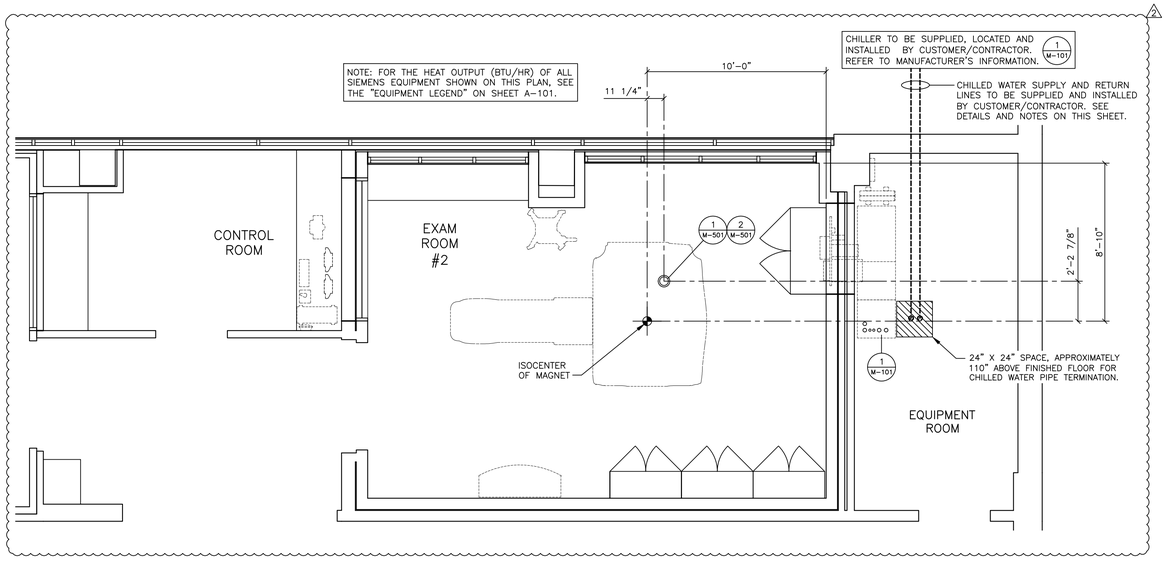
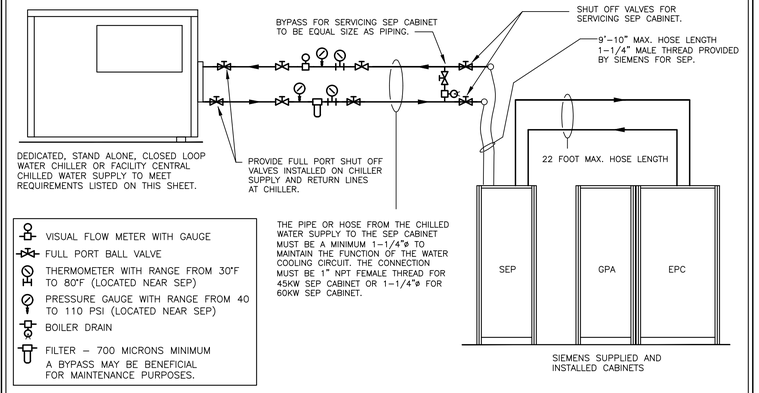


MECHANICAL PLAN

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



NOTES:

ALL PIPING AND PLUMBING FIXTURES SHALL BE FURNISHED, INSTALLED, PRESSURE TESTED AND CHARGED BY THE MECHANICAL 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 CHILLER AN AUTOMATIC DEAERATION DEVICE (AIR VENT) WITH BALL VALVE MUST BE INSTALLED BY THE MECHANICAL CONTRACTOR.

SYSTEM MUST BE PROVEN TO BE FREE FROM LEAKAGE.

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 IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL 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 TO THE SEP MUST BE LABELED TO SHOW FLOW DIRECTION AND CONTENT (WATER/GLYCOL).

1 PIPING SCHEMATIC FOR FACILITY PROVIDED CHILLED WATER — SCALE: NONE

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 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

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. CHILLED WATER CAN ALSO BE SUPPLIED BY A CHILLER PROVIDED BY SIEMENS.

A SEPARATOR CABINET (SEP) OR INTERFACE PANEL (IFP) MUST BE INCLUDED WITH THE SIEMENS ORDER. THE PIPE SIZE BETWEEN THE WATER SUPPLY AND SEP MUST MEET MANUFACTURER AND SIEMENS REQUIREMENTS; LARGER DIAMETER PIPE MAY BE REQUIRED DUE TO LENGTH OF RUN. FLOW AND PRESSURE REQUIREMENTS MUST BE MET.

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.

27 GALLONS OF DISTILLED/DE-IONIZED WATER MUST BE PROVIDED AND INSTALLED BY CUSTOMER/CONTRACTOR FOR FILLING THE SECONDARY CHILLED WATER CIRCUIT.

SEE MANUFACTURER'S REQUIREMENTS FOR GLYCOL AND WATER QUALITY TO BE PROVIDED AND FILLED BY CUSTOMER/CONTRACTOR.

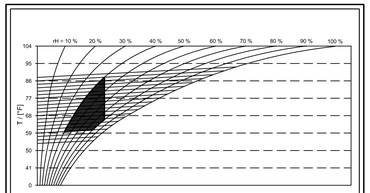
THE SUPPLY AND RETURN CHILLED WATER PIPES MUST BE LABELED. THE LOCATION OF THE LABELS MUST BE AT ALL CONNECTION AND REFILLING POINTS AND MUST CONTAIN FLOW DIRECTION AND CONTENTS.

CHILLED WATER REQUIREMENTS

XQ GRADIENTS

WATER REQUIREMENTS TO BE MEASURED AT THE SEP CABINET.

FLOW RATE:	26.42 GPM ±2.5GPM
WATER TEMPERATURE:	42.8°F – 57.2°F
BTU DISCHARGE TO THE WATER	204,911 BTU/HR
WATER PRESSURE	MAXIMUM 87 PSI
LOSS OF PRESSURE FOR SEP CABINET	<8.7 PSI AT 29 GPM
CHILLED WATER ACIDITY RANGE	6 pH TO 8 pH
CHILLED WATER QUALITY	200 ppm CHLORINE 200 ppm SUPPHATE
FILTRATION	700 µm



REV 0

– TEMPERATURE/HUMIDITY — SCALE: NONE

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

ENVIRONMENTAL REQUIREMENTS

1) AIR CONDITIONING IS TO PROVIDE A TEMPERATURE OF 70°F ±5°F IN THE CONTROL & EQUIPMENT ROOMS 65°F-71°F IN EXAM ROOM. 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 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.

CEILING HEIGHTS

MAGNET EXAMINATION ROOM:	7'-11" MINIMUM
EQUIPMENT ROOM:	7'-3" MINIMUM
ALL ANCILLARY AREAS:	6'-11" MINIMUM

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.

SYM	DATE	DESCRIPTION
2	06/25/21	COMPLETE NEW SET OF DWGS BASED ON LATEST WALL BACKGROUNDS/
2	06/25/21	MODIFIED MAGNET GAUSS FIELDS TO REFLECT LATEST SHLD CALCS./
2	06/25/21	ALL LAYOUTS, LEGENDS NOTES & DETAILS UPDATED ACCORDINGLY
1	05/11/21	NEW WALL BACKGROUNDS/ ADD CASEWORK & SHIFT MAGNET
0	06/25/21	2003356RRA DATED 09/10/20 APPROVED BY CUSTOMERS FOR FINALS

-ISSUE BLOCK-

VIDA REV 16

PROJECT MANAGER: PATRICK RUIZ
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SIEMENS

GRADY MEMORIAL HOSPITAL CORPORATION

80 JESSE HILL JUNIOR DRIVE, SOUTH EAST, ATLANTA, GA 30303

MRI ROOM #2 – MAGNETOM VIDA XQ GRADIENTS

PROJECT #: 2003356

SHEET: M-101

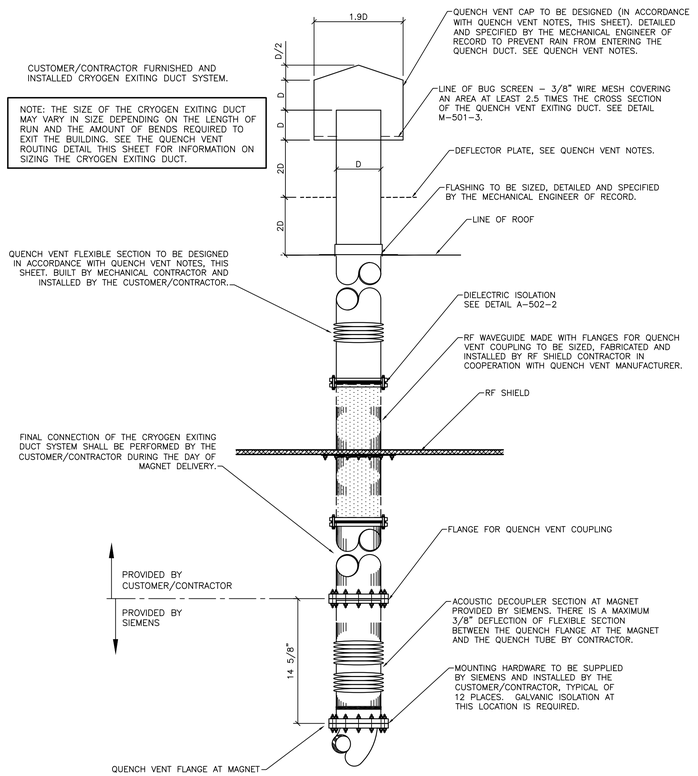
SHEET 9 OF 10

DRAWN BY: D. BRISTOE

SCALE: AS NOTED

REF. #: 30238438

DATE: 06/25/21



CRYOGEN EXITING DUCT SYSTEM NOTES:

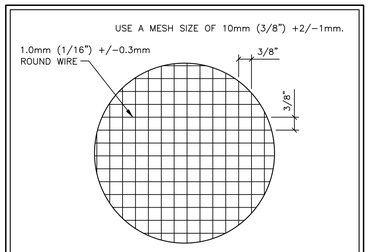
1) THE MECHANICAL ENGINEER OF RECORD SHALL BE RESPONSIBLE FOR THE DESIGN, DETAIL AND SPECIFICATION OF THE CRYOGEN EXITING DUCT SYSTEM WITH ALL WORK TO PERFORMED BY THE CUSTOMER/CONTRACTOR UNLESS SPECIFIED OTHERWISE.

2) TAKE PROPER PRECAUTIONS WHEN FIELD WELDING IN THE VICINITY OF LIQUEFIED/FROZEN OXYGEN.

3) UNLESS SPECIFIED OTHERWISE ALL MATERIAL AND WORK SHALL BE PERFORMED BY THE CUSTOMER/CONTRACTOR WITH FINAL CONNECTION OF THE CRYOGEN EXITING DUCT SYSTEM TO THE SIEMENS MAGNET TO BE PERFORMED BY THE CUSTOMER/CONTRACTOR UNDER SIEMENS' SUPERVISION.

4) THE DIAMETER OF THE CRYOGEN EXITING DUCT MAY VARY WITH ACTUAL ROUTING.

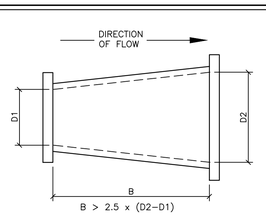
– CRYOGEN EXITING DUCT SYSTEM DETAIL — SCALE: NO SCALE



A SQUARE, STAINLESS STEEL WIRE MESH MUST BE FITTED TO ALL OUTLETS. THE AREA OF THE MESH MUST BE >2.5 TIMES THE AREA OF THE QUENCH VENT OUTLET.

REV 1

3 QUENCH VENT MESH — NO SCALE



EXPANSION TO A GREATER DIAMETER TUBE CAN BE ACCOMPLISHED BY USE OF A DIFFUSER. THE DIFFUSER MUST MEET QUENCH VENT REQUIREMENTS AND THE GEOMETRIC PARAMETERS SHOWN HERE. THE DIAMETER OF THE PIPE SHOULD NEVER DECREASE IN THE DIRECTION OF FLOW.

REV 0

– QUENCH VENT DIFFUSER — NO SCALE

CRYOGEN NOTES

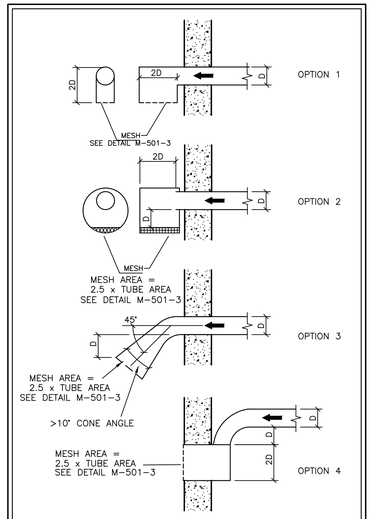
1) "CRYOGENS" IS A TERM USED TO IDENTIFY THE REFRIGERANT USED TO MAKE THE MAGNET "SUPER-CONDUCTING", IN THIS APPLICATION, LIQUID AND GASEOUS HELIUM. SPECIAL CARE MUST BE TAKEN DURING THE TRANSFILLING OF THE MAGNET WITH CRYOGENS AND NORMAL EXHAUST OF CRYOGENS FROM THE SYSTEM. ASIDE FROM THE OBVIOUS DANGER 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.

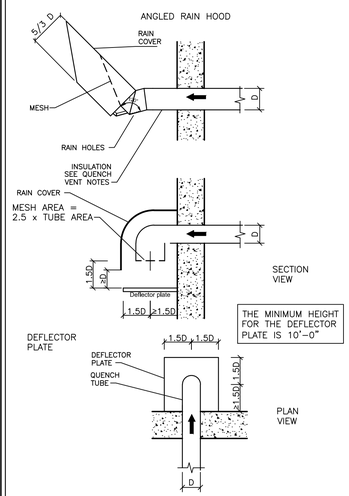
3) HELIUM GAS CYLINDERS MAY BE USED DURING THE INITIAL FILLING OF HELIUM INTO THE MAGNET. THE FACILITY IN WHICH THESE MAY BE USED NEEDS TO HAVE THE ABILITY TO TEMPORARILY STORE AND SECURE THESE CYLINDERS THAT WILL PREVENT THEM FROM INADVERTENTLY FALLING OVER.

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

REV 0



OPTIONS FOR QUENCH TUBE EXITING THROUGH A WALL



SEE QUENCH VENT NOTES

REV 1

– HORIZONTAL OUTLET — SCALE: NONE

QUENCH VENT NOTES

QUENCH VENT DESIGN INSTRUCTIONS

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 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.

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 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.

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.

7) 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 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 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.

12) 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 IT'S ENTIRE LENGTH FOR EXTREMELY COLD HELIUM GAS – AUTHORIZED PERSONNEL ONLY.

13) 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 O 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.

15) 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.

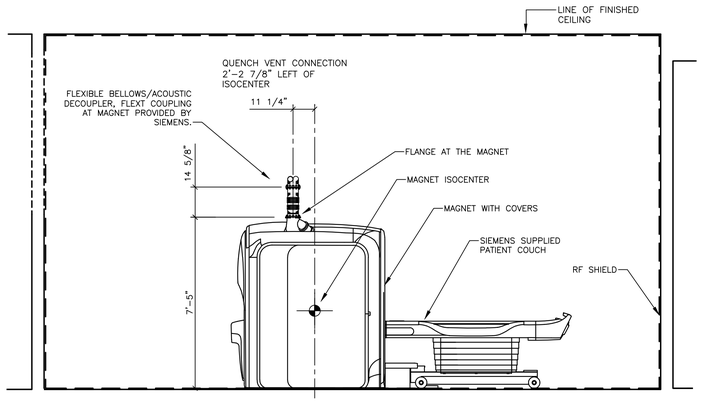
DOCUMENTATION

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

THE EQUIPMENT CONFIGURATION SHOWN ON THESE ELEVATIONS REPRESENT "TYPICAL" INSTALLATION CONDITIONS.

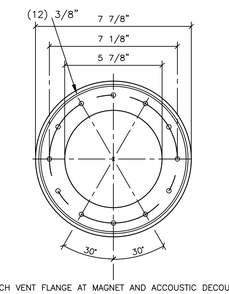
THE QUENCH VENT IS TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. IT MAY BE CONNECTED TO THE FLANGE AT THE MAGNET HORIZONTALLY OR VERTICALLY AND SHOULD BE DESIGNED, CONSTRUCTED AND INSTALLED AS PER THE INSTRUCTIONS ON THIS SHEET.



THE LOCATION, PITCH, AND MOUNTING HEIGHT ABOVE FINISHED FLOOR FOR THE MECHANICAL SYSTEMS SHALL BE SPECIFIED, DETAILED AND NOTED BY THE MECHANICAL ENGINEER OF RECORD. ALL MECHANICAL SYSTEM LOCATIONS SHALL BE COORDINATED WITH THE LOCATION OF THE CABLE TRAYS AS SHOWN ON THE 1/4" SCALE ELECTRICAL PLAN.

FOR HORIZONTAL CONNECTION, A 90° ELBOW MUST BE PROVIDED BY CUSTOMER/CONTRACTOR TO MATCH DIAMETER OF THE FLEXIBLE SECTION.

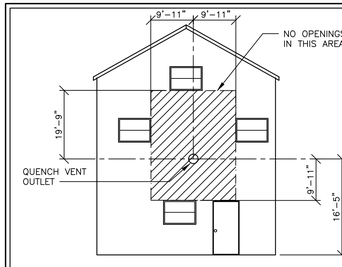
1 MAGNET SIDE ELEVATION — NO SCALE



QUENCH VENT FLANGE AT MAGNET AND ACCOUSTIC DECOUPLER.

CONNECTION OF THE QUENCH VENT PIPE TO SIEMENS SUPPLIED FLANGE TO BE DESIGNED, DETAILED, AND SPECIFIED BY THE MECHANICAL ENGINEER OF RECORD. TO BE FABRICATED AND INSTALLED BY THE MECHANICAL CONTRACTOR UNDER SIEMENS SUPERVISION.

2 QUENCH VENT FLANGE — NO SCALE



IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET MUST BE TURNED DOWN BY NOT LESS THAN THE LINE OF THE 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.

OUTLET SAFETY CLEARANCES — REV 1

– QUENCH VENT — NO SCALE

HELIUM CONTENT

LITERS AT 100%	1,511	LIQUID HELIUM WEIGHT 417 LB.
TYPICAL BOIL OFF RATE	0.0 L/HR	FOR TYPICAL CLINICAL USE, DEPENDING ON SEQUENCES AND OPERATING TIME.
TYPICAL REFILL INTERVAL	N.A.	

WITHOUT THE COLD HEAD RUNNING THE LIQUID HELIUM BOIL OFF IS APPROXIMATELY 3.5% PER 24 HOURS.

VIDA REV 16

SYM	DATE	DESCRIPTION
6	06/25/21	COMPLETE NEW SET OF DWGS BASED ON LATEST WALL BACKGROUNDS/
5	06/25/21	MODIFIED MAGNET GAUSS FIELDS TO REFLECT LATEST SHLD CALCS./
4	06/25/21	ALL LAYOUTS, LEGENDS NOTES & DETAILS UPDATED ACCORDINGLY
3	05/11/21	NEW WALL BACKGROUNDS/ ADD CASEWORK & SHIFT MAGNET
2	06/25/21	2003356RRA DATED 09/10/20 APPROVED BY CUSTOMERS FOR FINALS

–ISSUE BLOCK–

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SIEMENS

GRADY MEMORIAL HOSPITAL CORPORATION
80 JESSE HILL JUNIOR DRIVE, SOUTH EAST, ATLANTA, GA 30303
MRI ROOM #2 – MAGNETOM VIDA XQ GRADIENTS

PROJECT #: 2003356
SHEET: M-501
SHEET OF: 10 OF 10
DRAWN BY: D. BRISTOE
SCALE: AS NOTED
REF. #: 30238438
DATE: 06/25/21

ATTENTION:

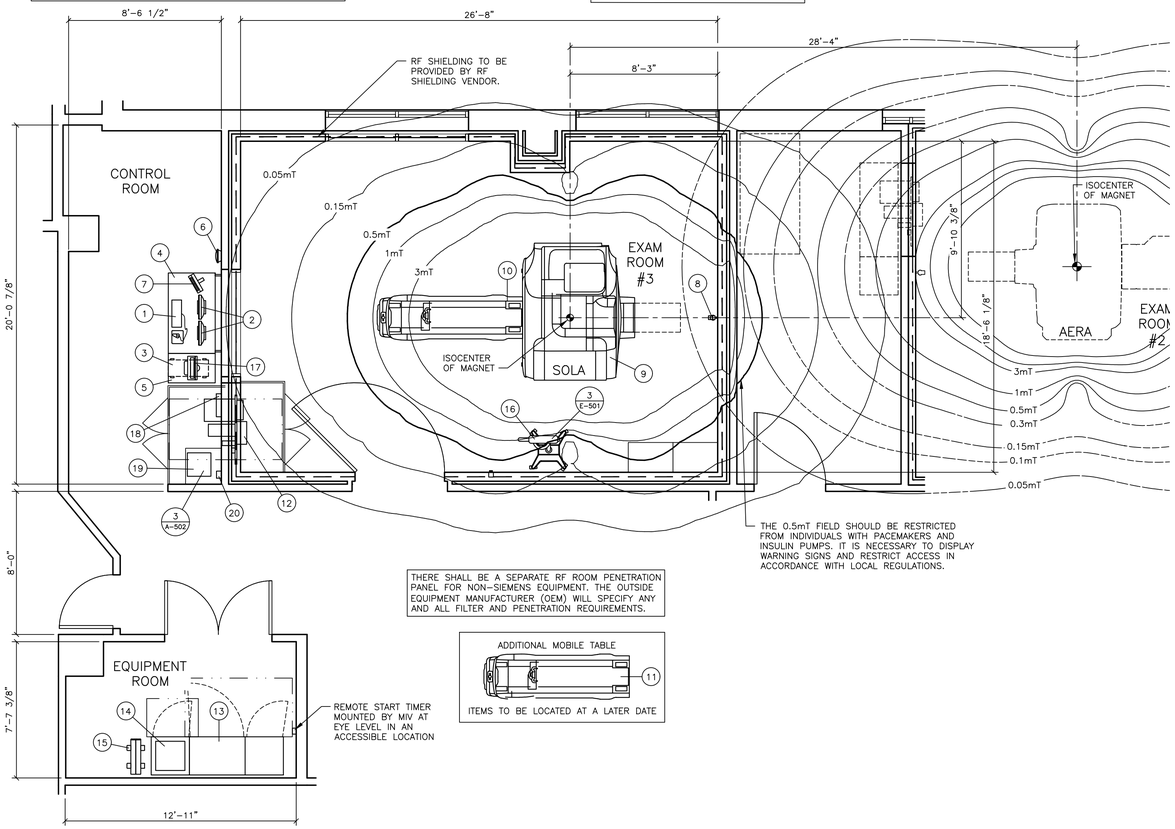
– THIS DRAWING IS DESIGNED TO CONFORM TO FEATURES AND EQUIPMENT REQUIREMENTS PRESENTED AT THE TIME OF THEIR PREPARATION. SINCE BOTH THESE FACTORS ARE SUBJECT TO DESIGN MODIFICATION, THEY ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.
– THIS SET OF PLANS REPRESENTS A COMPLETE SET OF DETAILS AND SHOULD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

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT

THIS SET OF FINAL DRAWINGS IS NOT REFLECTIVE OF THE LATEST SALES CONFIGURATION. IT HAS BEEN MODIFIED TO REFLECT ANTICIPATED CHANGES TO YOUR CONFIGURATION. IF REQUESTED CHANGES ARE NOT IMPLEMENTED, A REVISION WILL BE REQUIRED. ADDITIONAL CHANGES TO THIS SALES CONFIGURATION MAY ALSO REQUIRE A REVISION TO THIS DRAWING SET. SIEMENS IS NOT RESPONSIBLE FOR CONSTRUCTION COSTS ASSOCIATED WITH CHANGES THAT OCCUR FROM THIS PLAN MODIFICATION.

CHILLER TO BE SUPPLIED, LOCATED AND INSTALLED BY CUSTOMER/CONTRACTOR. REFER TO MANUFACTURER'S INFORMATION.

IF CLOSET IS DESIRED TO CONCEAL FILTER PLATE ITEM #12 AND CABLE CONNECTIONS IN EXAM ROOM, IT IS TO BE DESIGNED, SPECIFIED AND PROVIDED BY THE CUSTOMER OR THEIR REPRESENTATIVE. A 30 1/4" CLEARANCE IS REQUIRED FOR SERVICE AND CABLING. DOORS THAT OPEN TO PROVIDE THIS ACCESS ARE ACCEPTABLE.



THERE SHALL BE A SEPARATE RF ROOM PENETRATION PANEL FOR NON-SIEMENS EQUIPMENT. THE OUTSIDE EQUIPMENT MANUFACTURER (OEM) WILL SPECIFY ANY AND ALL FILTER AND PENETRATION REQUIREMENTS.

ADDITIONAL MOBILE TABLE

ITEMS TO BE LOCATED AT A LATER DATE

ARCHITECTURAL EQUIPMENT PLAN

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

EQUIPMENT LEGEND

NO	DESCRIPTION	SMS SYM	WEIGHT (LBS)	BTU/HR TO AIR	DIMENSIONS (INCHES) W	D	H	REMARKS
1	MRC KEYBOARD		5	---	27 1/4	10 1/8	1 3/4	ON CONSOLE/COUNTER
2	COLOR MONITOR FOR MRC		22	239	18 5/16	4 3/4	16 15/16	ON CONSOLE/COUNTER
3	HOST PC MRC	MK	49	2,389	11	27	18 1/8	
4	MRC OPERATING CONSOLE TABLE		132	---	54 3/8	31 1/2	27-46	ADJUSTABLE HEIGHT
5	CONTAINER FOR HOST PC 500		238	---	19 5/8	31 1/2	28 3/8	
6	ALARM BOX	AD	2	---	9	4	9	
7	PATIENT MONITOR	PM	9	---	13	8	12 1/2	
8	PATIENT SUPERVISION CAMERA	CA	3	---	3 1/8	6 3/4	6 3/4	WALL MOUNTED
9	SOLA MAGNET IN OPERATION		8,779	7,506	91	170	86	
10	PATIENT TABLE (MOBILE)		529	---	29 1/2	97 1/4	21-41	
11	ADDITIONAL PATIENT TABLE (MOBILE)		529	---	29 1/2	97 1/4	21-41	
12	RF-FILTER PLATE	F1	287	853	46 1/2	35 1/8	21 5/8	
13	ELECTRONICS CABINET (GPA/EPC CABINET)	GPA	3,307	<3,412	61 1/2	26	77 1/2	
14	SEP CABINET	SEP	750	<3,412	25 5/8	25 5/8	73 5/8	
15	LIEBERT GXT4 UPS WITH BATTERY	EPC	164	1,121	17	23 5/8	6 3/4	
16	MRXPERION INJECTOR STAND AND HEAD	IW	94	---	23 3/8	28 3/8	71 7/8	INJECTOR ON STAND
17	MRXPERION ICBC INJECTOR CRU	IN	17.6	---	15 3/4	10 1/4	13 1/2	ON CUSTOMERS COUNTER
18	MRXPERION ICBC INJECTOR POWER SUPPLY	IO	6	---	15 3/8	3 3/8	15 1/2	LOCATED IN CONTROL ROOM CLOSET OUTSIDE 5mT FIELD
19	ELASTOGRAPHY ACTIVE DRIVER	ELS	53.5	---	15 3/4	15 3/4	6	PROVIDE SHELF
20	ELASTOGRAPHY TRIGGER BOX	TB	---	---	3 1/4	4 3/4	4 3/4	IN CONTROL ROOM CLOSET

PROTECTING THE MAGNETIC FIELD

THE SIEMENS MR SYSTEM UTILIZES A SUPERCONDUCTIVE MAGNET WITH AN EXTREMELY HOMOGENOUS FIELD WITHIN THE MAGNET TO PROVIDE DISTORTION FREE IMAGING. THE PRESENCE OF FERROMAGNETIC MATERIAL WITHIN THE VICINITY OF THE MAGNET CAN ADVERSELY AFFECT THE UNIFORMITY OF THE USEFUL MAGNETIC FIELD. THIS APPLIES TO STATIONARY FERROUS MATERIAL (STRUCTURAL STEEL) WHICH IS TO BE MINIMIZED. STATIONARY STEEL COMPENSATION MAY BE ACHIEVED BY MAGNET POSITIONING AND SELECTIVE USE OF SHIMS. DISTORTION CAUSED BY MOVING FERROMAGNETIC OBJECTS (MOTOR VEHICLES, ELEVATORS) IS MORE DIFFICULT TO COMPENSATE AND MAY REQUIRE THE USE OF MAGNETIC SHIELDING.

REV 0

PROTECTING THE ENVIRONMENT

PROTECTING THE IMMEDIATE ENVIRONMENT FROM THE EFFECT OF THE MAGNETIC FIELD REQUIRES CONSIDERATION. INFORMATION STORED ON MAGNETIC DATA CARRIERS SUCH AS DISCS, TAPES AND CARDS MAY BE ERASED IF NEAR THE MAGNET. CAUTION WITH REGARD TO HEART PACEMAKERS MUST BE EXERCISED. MOST PACEMAKER UNITS EMPLOY A REED RELAY WHICH MAY CHANGE OPERATING MODE WHEN EXPOSED TO AN EXTERNAL MAGNETIC FIELD. PACEMAKER USERS MUST BE KEPT AT A SPECIFIED DISTANCE FROM THE MAGNET WHICH IS DETERMINED BY THE MAGNET FIELD STRENGTH.

REV 0

MAGNETIC FRINGE FIELDS

MAGNETIC FIELDS MAY AFFECT THE FUNCTION OF DEVICES IN THE VICINITY OF THE MAGNET. THESE DEVICES MUST BE OUTSIDE CERTAIN MAGNETIC FIELDS. THE DISTANCES LISTED ARE FROM THE MAGNET ISOCENTER AND DO NOT CONSIDER ANY MAGNETIC ROOM SHIELDING.

FIELD	X & Y	Z AXIS	DEVICES
3.0mT	6'-1"	9'-2"	SMALL MOTORS, WATCHES, CAMERAS, CREDIT CARDS, MAGNETIC DATA CARRIERS.
1.0mT	7'-3"	11'-7"	COMPUTERS, MAGNETIC DISK DRIVES, OSCILLOSCOPES, PROCESSORS
0.5mT	8'-3"	13'-2"	CARDIAC PACEMAKERS, X-RAY TUBES, INSULIN PUMPS, B/W MONITORS, MAGNETIC DATA CARRIERS (LONG-TERM STORAGE)
0.15mT	10'-4"	17'-4"	SIEMENS CT SCANNERS
0.1mT	11'-2"	19'-1"	CRT MONITORS, SIEMENS LINEAR ACCELERATORS
0.05mT	13'-6"	22'-8"	X-RAY IMAGE INTENSIFIERS, GAMMA CAMERAS, PET/CYCLOTRON, ELECTRON MICROSCOPES, LINEAR ACCELERATORS

THE OWNER/USER IS TO VERIFY THE LOCATION OF THE 0.5mT FIELD AND ENSURE THAT IT IS MAINTAINED AS A RESTRICTED AREA.

MAGNET SITING REQUIREMENTS

IT MUST BE ENSURED THAT THE MAGNET IS LOCATED SO THAT THE STABILITY AND HOMOGENEITY OF THE MAGNETIC FIELD ARE NOT ADVERSELY AFFECTED BY EXTRANEOUS FIELDS AND STATIC OR DYNAMIC FERROMAGNETIC OBJECTS.

X & Y AXES	Z AXIS	SOURCE OF INTERFERENCE
4'-2"		FLOOR STEEL REINFORCEMENT<20 LBS./ FT^2 IRON BEAMS < 66 LBS./FT.
16'-1"	19'-1"	MOVING METAL UP TO 110 LBS.
13'-1"		WATER COOLING UNIT (CHILLER)
17'-5"	21'-4"	MOVING METAL UP TO 440 LBS.
18'-1"	24'-8"	MOVING METAL UP TO 2,000 LBS.
20'-5"	29'-7"	ELEVATORS, TRUCKS UP TO 10,000 LBS.
13'-1"	13'-1"	AC TRANSFORMERS LESS THAN 650 KVA
16'-5"	16'-5"	AC TRANSFORMERS LESS THAN 1600 KVA
5'-0"	5'-0"	AC CABLES, MOTORS LESS THAN 250 AMPS
8'-3"	8'-3"	AC CABLES, MOTORS LESS THAN 1000 AMPS

FOR IRON OBJECTS LOCATED UP TO 45° FROM THE Z AXIS, THE DISTANCES FOR THE Z AXIS MUST BE USED. REDUCTION IS POSSIBLE WITH STEEL SHIELDING.

ARCHITECTURAL NOTES

1) ALL PRELIMINARY EQUIPMENT LAYOUTS SUBMITTED BY SIEMENS HEALTHCARE ARE BASED ON THE RECOMMENDED SPACE NECESSARY FOR THE OPERATION AND SERVICEABILITY OF THE EQUIPMENT BEING PROPOSED. SIEMENS WILL NOT SUBMIT AN EQUIPMENT LAYOUT THAT IS NOT IN THE BEST INTEREST OF BOTH THE CUSTOMER AND SIEMENS. ALL EQUIPMENT LAYOUTS ARE BASED EITHER ON AN ACTUAL SITE SURVEY OR ARCHITECTURAL DRAWINGS SUPPLIED TO SIEMENS. SIEMENS WILL NOT BE RESPONSIBLE FOR ANY ALTERATIONS THAT ENCROACH WITHIN DESIGNATED SAFETY AND SERVICE CLEARANCE ZONES AS INDICATED ON DRAWINGS (I.E., PIPE CHASES, VENTILATION DUCTS, CASEWORK, AND SOFFITS, ETC.) MADE BY THE CUSTOMER OR REQUIRED BY A CUSTOMER'S ARCHITECTURAL FIRM ONCE PRELIMINARY DRAWINGS HAVE BEEN SUBMITTED AND APPROVED. DO NOT ALTER ANY SPECIFICATIONS AND/OR DIMENSIONS WITHOUT CONTACTING AND RECEIVING WRITTEN CONFIRMATION FROM SIEMENS PROJECT MANAGER.
2) SIEMENS HEALTHCARE IS NOT AN ARCHITECTURAL OR ENGINEERING FIRM. DRAWINGS SUPPLIED BY SIEMENS ARE NOT CONSTRUCTION DRAWINGS. THEREFORE, THESE DRAWINGS ARE TO BE USED ONLY FOR INFORMATION TO COMPLEMENT ACTUAL CONSTRUCTION DRAWINGS AVAILABLE FROM A CUSTOMER APPOINTED ARCHITECTURAL REPRESENTATIVE OR A CUSTOMER'S ENGINEERING DESIGN GROUP. THE CUSTOMER'S ARCHITECT AND GENERAL CONTRACTOR SHALL BE ULTIMATELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE CODES AND PROFESSIONAL DESIGN REQUIREMENTS INCLUDING OSHA/NEC SAFETY CLEARANCE REQUIREMENTS IN ADDITION TO SIEMENS-REQUIRED SAFETY/SERVICE CLEARANCES SHOWN.
3) THE CUSTOMER IS RESPONSIBLE FOR ALL ROOM AND AREA PREPARATION COSTS, PROFESSIONAL FEES, PERMITS, REPORTS, AND INSPECTION FEES.
4) EQUIPMENT WARRANTIES, EXPRESSED OR IMPLIED ON THE PART OF SIEMENS SHALL BE CONTINGENT UPON STRICT COMPLIANCE WITH THE ARCHITECTURAL, STRUCTURAL, ELECTRICAL, MECHANICAL AND RECOMMENDATIONS AND REQUIREMENTS CONTAINED IN THESE DRAWINGS, UNLESS SPECIFIED OTHERWISE.
5) ALL DIMENSIONS SHOWN ARE FROM FINISHED SURFACES UNLESS SPECIFIED OTHERWISE.
6) SIEMENS HEALTHCARE SHALL BE RESPONSIBLE FOR SIEMENS EQUIPMENT INSTALLATION, CALIBRATION, CONNECTION AND INSTALLATION OF SIEMENS PROVIDED CABLES. THE CUSTOMER/ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR TERMINATIONS OF CUSTOMER/ELECTRICAL CONTRACTOR-SUPPLIED CABLES TO SIEMENS EQUIPMENT. IN THE EVENT THAT SPECIFIC TRADE RULES OR LICENSE REQUIREMENTS PROHIBIT THIS, THE CUSTOMER SHALL INITIATE THE SERVICES OF APPROVED OTHER CONTRACTORS AND PAY FOR SELECTED, APPROVED PARTIES TO PERFORM THIS WORK WITH SUPERVISION PROVIDED BY SIEMENS. CALIBRATION WHEN ACCOMPLISHED OUTSIDE OF NORMAL INSTALLATION SEQUENCES DUE TO CONTRACTOR OR TRADE RULE ACTIONS OR REQUIREMENTS SHALL BE SUPPORTED BY, CHARGED TO, AND ACCEPTED BY THE CUSTOMER AS AN ADDITIONAL INSTALLATION EXPENSE.
7) THE CUSTOMER SHALL COORDINATE WITH SIEMENS PROJECT MANAGER THE LOCATIONS AND TRAVEL OF ALL ANCILLARY EQUIPMENT TO BE CEILING OR WALL MOUNTED (I.E.: O.R. LIGHTS, MEDICAL GAS COLUMNS, PHYSIOLOGICAL MONITORING INJECTORS, CRT PLATFORMS, SPRINKLER HEADS, SMOKE DETECTORS, ELECTRICAL OUTLETS, HVAC GRILLES, SPEAKERS, AND GENERAL ROOM LIGHTING, ETC.).
8) THE GENERAL CONTRACTOR/CUSTOMER SHALL BE RESPONSIBLE FOR ALL FINAL PAINT, TOUCH-UP AND ANY COSMETIC OR TRIM WORK WHICH NEEDS TO BE OR IS REQUIRED TO BE COMPLETED AFTER THE INSTALLATION OF THE SIEMENS EQUIPMENT AND ANY ASSOCIATED SUPPORT APPARATUS.
9) CUSTOMER/CONTRACTOR MUST ASSIST SIEMENS INSTALLERS WITH INSTALLATION OF EQUIPMENT ABOVE 14'-0". REFER TO THE ELECTRICAL NOTES ON SIEMENS SHEET E-101 FOR MORE DETAILS.

REV 0

CONSTRUCTION REQUIREMENTS

THE CUSTOMER/CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL CONSTRUCTION MATERIALS INCLUDING ELECTRICAL AND MECHANICAL DEVICES REQUIRED BY SIEMENS SPECIFICATIONS AND TO ENSURE THAT THE MATERIAL USED INSIDE THE RF-SHIELDING IS AS FREE OF FERROMAGNETIC PROPERTIES AS POSSIBLE. STEEL WALL STUDS ARE PERMITTED BUT MUST BE SECURED PROPERLY. ANY FERROUS MATERIAL INSIDE THE EXAM ROOM MAY BECOME A PROJECTILE AND CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT. FERROUS ITEMS INSIDE THE EXAM ROOM ARE THE LIABILITY OF THE CONTRACTOR AND/OR INSTALLER.

REV 3

STATE AGENCY REVIEW

PRIOR TO SIEMENS EQUIPMENT INSTALLATION, APPROVAL OF CONSTRUCTION OR STRUCTURAL MODIFICATIONS FOR DIAGNOSTIC OR THERAPEUTIC PURPOSES, MUST BE OBTAINED BY THE CUSTOMER FROM THE APPROPRIATE STATE AGENCY, IF APPLICABLE.

MAGNETIC FIELD WARNING

PLEASE BE AWARE THAT DURING THE CALIBRATION PHASE OF THE MRI INSTALLATION, THE MAGNET WILL BE AT FULL FIELD STRENGTH AND ALL NECESSARY PRECAUTIONS WHEN WORKING IN THE VICINITY OF STRONG MAGNETIC FIELDS MUST BE TAKEN. WHEN THE CALIBRATION OF THE MAGNET OVERLAPS WITH FINAL CONSTRUCTION ACTIVITIES, THERE IS THE POSSIBILITY OF THE INTRODUCTION OF FERROUS MAGNETIC OBJECTS BY WORKERS INTO THE MR ROOM. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ENSURE THAT ALL PRECAUTIONS ARE TAKEN TO ENSURE THAT THIS DOES NOT HAPPEN, AS EQUIPMENT DAMAGE AND SERIOUS BODILY INJURY COULD OCCUR.

REV 0

EXAM ROOM LIGHTING

THE MAGNETIC FIELD ADVERSELY AFFECTS THE OPERATING LIFE OF LIGHT BULBS LOCATED IN THE IMMEDIATE VICINITY OF THE MAGNET. THE FILAMENT IN THE BULBS OSCILLATES WITH THE FREQUENCY OF THE POWER SUPPLY. LIGHTS IN THE VICINITY OF THE MAGNET CONNECTED TO A DC POWER SUPPLY CAN REDUCE THIS EFFECT. RESIDUAL DC RIPPLE SHOULD BE LESS THAN 5%.

REV 2

MAGNET CO-SITING

MINIMUM MAGNET TO MAGNET DISTANCE (SIEMENS)

	7.0T	3.0T	1.5T	1.0T	0.35T	0.2T
DISTANCE	32'-9"	19'-9"	19'-9"	19'-9"	32'-9"	32'-9"

TWO MAGNETS WITH THE SAME FREQUENCY ALIGNED IN THE Z AXES WILL REQUIRE MORE SEPARATION DUE TO INCREASED RF COUPLING BETWEEN THE TWO SYSTEMS. THIS IS EVALUATED INDIVIDUALLY.

DO NOT RAMP ONE MAGNET WHILE THE OTHER IS RUNNING APPLICATIONS. SHIM IS ONLY OPTIMIZED WHEN BOTH MAGNETS ARE RAMPED UP DURING THE SHIMMING PROCEDURE.

WHEN CO-SITING AN MR SYSTEM WITH A MAGNETIC NAVIGATION SYSTEM THE MINIMUM DISTANCE FOR CLINICAL IMAGING IS 98'-6", FOR SPECTROSCOPY THE MINIMUM SEPARATION IS 121'-5".

REV 0

OEM ACCESSORY ITEMS

FOR OEM (OUTSIDE EQUIPMENT MANUFACTURER) ITEMS THAT ARE SOLD AS ACCESSORIES TO THE SIEMENS MR SYSTEM (INJECTORS, LASER LIGHTS, ELASTOGRAPHY, CHILLERS, UPS, ETC.), PLEASE REFER TO THE SIEMENS PROJECT MANAGER AND THE ACTUAL EQUIPMENT VENDOR FOR TECHNICAL INFORMATION AND INSTALLATION REQUIREMENTS.

REV 1

PROJECT MILESTONES

PROJECT MILESTONES TO BE COMPLETED BEFORE EQUIPMENT DELIVERY		REFERENCE SHEET
☐	DELIVERY PATH VERIFIED	A-102
☐	FLOOR LEVEL MEETS SIEMENS SPECIFICATIONS AND ALL BASEPLATES INSTALLED	S-101
☐	RF ROOM TEST COMPLETED AND MEETS SIEMENS SPECIFICATIONS	A-502
☐	ALL RACEWAY, CONDUITS AND JUNCTION BOXES INSTALLED	E-101
☐	ALL PLUMBING INSTALLED AND TESTED	M-101
☐	POWER SCHEDULE COMPLETED	E-102
☐	ALL EPO BUTTONS INSTALLED AND TESTED	E-101
☐	MR COMPATIBLE LIGHTING AND CEILING GRIDS INSTALLED IN MAGNET ROOM	A-101
☐	CONTROL ROOM COMPLETED ENOUGH TO FACILITATE THE INSTALLATION	A-101
☐	CHILLED WATER SUPPLY AVAILABLE AND MEETS SIEMENS SPECIFICATIONS	M-101
☐	MR COMPATIBLE LIGHTING AND CEILING GRIDS INSTALLED IN MAGNET ROOM	A-101
☐	HVAC SYSTEM COMPLETE, TESTED AND WORKING PER SIEMENS SPECIFICATIONS	M-101
☐	QUENCH PIPE CONSTRUCTED AND INSTALLED PER SIEMENS SPECIFICATIONS	M-501
☐	ETHERNET CONNECTION INSTALLED AND IN OPERATION AT THE SHOWN LOCATIONS	E-101

CASEWORK & ACCESSORY NOTES

1) ALL CASEWORK IS EITHER EXISTING OR IS TO BE DESIGNED, DETAILED, FURNISHED AND INSTALLED BY THE CUSTOMER AND/OR CONTRACTOR. FOLLOW DESIGN RECOMMENDATIONS INCLUDED HEREWITH, AS THEY ARE ESSENTIAL FOR THE SUCCESSFUL INSTALLATION & OPERATION OF THE SIEMENS EQUIPMENT.

2) ALL FURNITURE (CHAIRS, ETC.) FOR THE CONTROL ROOM ARE TO BE PROVIDED BY THE CUSTOMER.

REV 0

RESOURCE LIST (SMS USE ONLY)

DESIGNATION	PG NUMBER	DATE
PLANNING GUIDE	M11-010.891.01.03.02	11.19

SOLA REV 14

CEILING HEIGHTS

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

ATTENTION:

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- 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.

SYM	DATE	DESCRIPTION
0	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

-ISSUE BLOCK-

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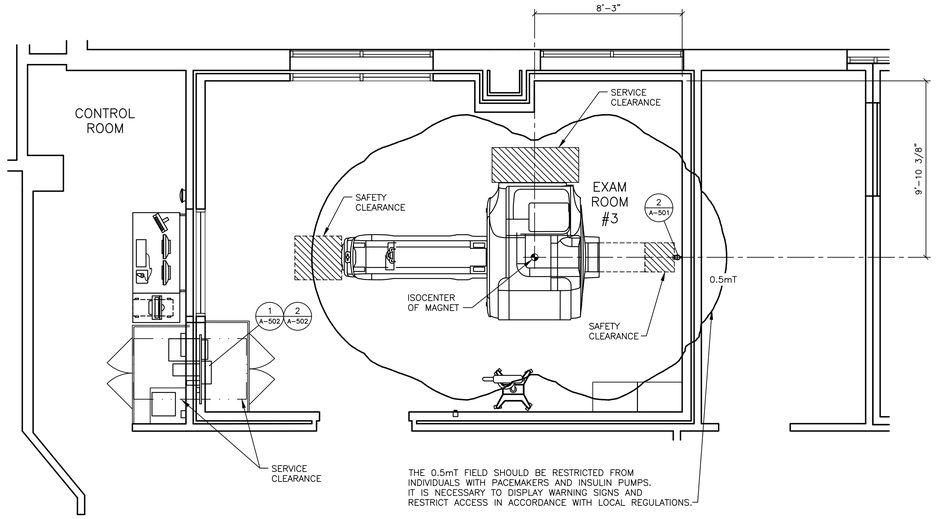
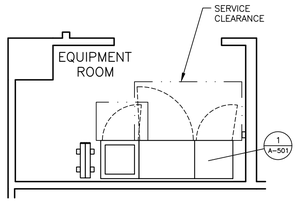
SIEMENS

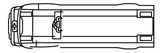
GRADY HEALTH SYSTEM
80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE - MRI 3 - MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757
SHEET: A-101
SHEET 1 OF 10
DRAWN BY: D. BRISTOE
SCALE: AS NOTED
REF. #: 30261311
DATE: 06/06/22

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT

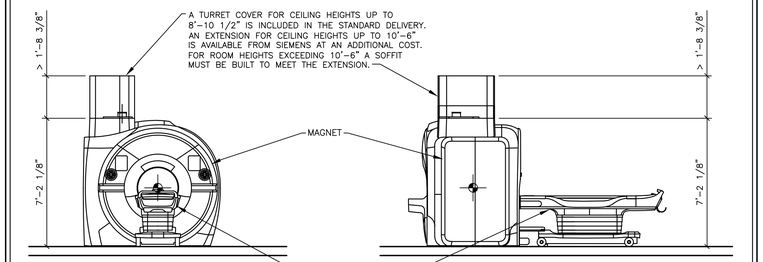




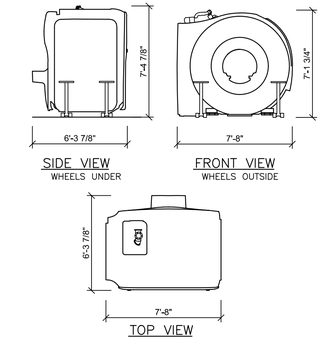


SAFETY/SERVICE CLEARANCE PLAN

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



–	SOLA MAGNET HEIGHT	SCALE: NONE



LARGEST ITEM – MAGNET – 8,779 LBS.

THE MINIMUM TRANSPORT HEIGHT OF 7'-1 3/4" DIMENSION CAN BE REDUCED TO 7'-0 3/4" BY REMOVING THE CABLE TRANSPORT SUPPORT.

THE ROOF HATCH/DELIVERY OPENING SHOULD BE 4" LARGER THAN THE TRANSPORT DIMENSIONS.

TO TRANSPORT THE GPA/EPC CABINET (2,822 POUNDS) A MINIMUM ROOM HEIGHT OF 6'-6" IS REQUIRED, 6'-3" WITH WHEELS REMOVED, 6'-1" WITH WHEELS AND MAINS CONNECTION REMOVED.

THE RF DOOR AND COMPLETE PATH FROM EXAM ROOM TO THE EXTERIOR OF THE BUILDING MUST HAVE A MINIMUM CLEARANCE OF 40". THIS IS REQUIRED FOR REPLACEMENT PARTS AND HELIUM FILLS.

REV 0

–	TRANSPORT DETAIL	NO SCALE

NOISE LEVELS XQ GRADIENTS

SYSTEM ROOM	NOISE LEVEL / dB(A)
CONTROL ROOM	<55
EXAMINATION ROOM	80.6 dB(A) – 8 HOUR AVERAGE 101.8 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. 03/19/18

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

ATTENTION:

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- 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.

SYM	DATE	DESCRIPTION
2	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

–ISSUE BLOCK–

PROJECT MANAGER: PATRICK RUIZ
TEL: (770) 402-1365
VMAIL: EXT:
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SIEMENS

GRADY HEALTH SYSTEM
80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE – MRI 3 – MAGNETOM SOLA XQ GRADIENTS

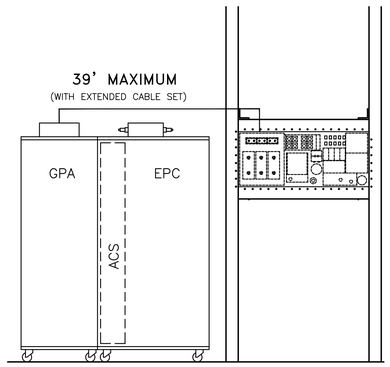
SCALE: AS NOTED
REF. # 30261311

PROJECT #: 2200757
SHEET OF 2 10
DRAWN BY: D. BRISTOE
DATE: 06/06/22

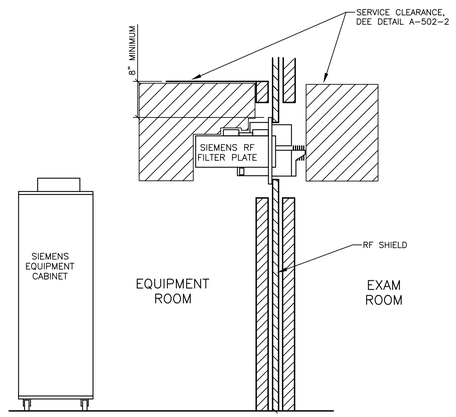
SHEET: A-102

SOLA REV 14

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



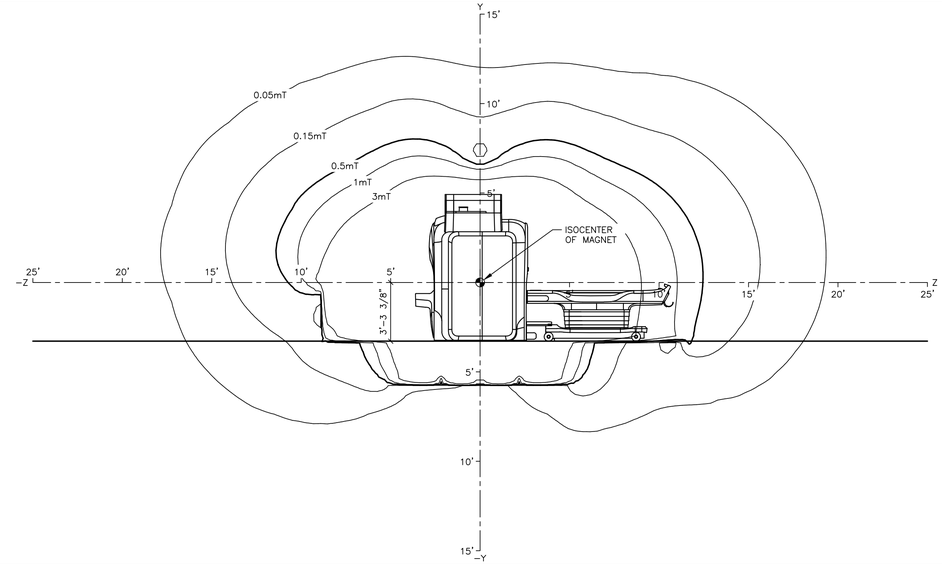
REMOTE INSTALLATION



SECTION VIEW

FOR A REMOTE INSTALLATION THE SIEMENS FILTER PANEL AND ELECTRONICS CABINET ARE LOCATED SEPARATELY FROM EACH OTHER. THE MAXIMUM CABLE LENGTH BETWEEN THE TWO IS 39 FEET. TWO CABLE TRAYS WILL BE REQUIRED TO MAINTAIN THE REQUIRED SEPARATION OF THE SIEMENS CABLES.

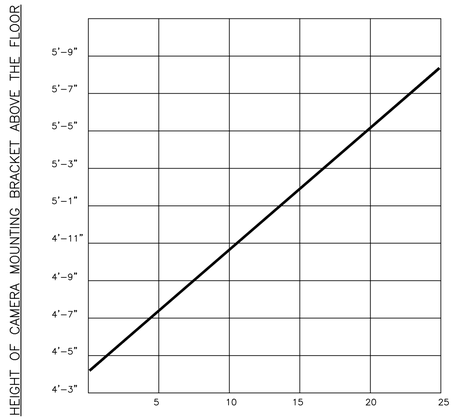
1 | FILTER PANEL AND ELECTRONICS CABINET INSTALLATION | SCALE: 1/2"=1'-0"



– | SOLA MAGNETIC FIELDS – SIDE ELEVATION | SCALE: 1/4"=1'-0"

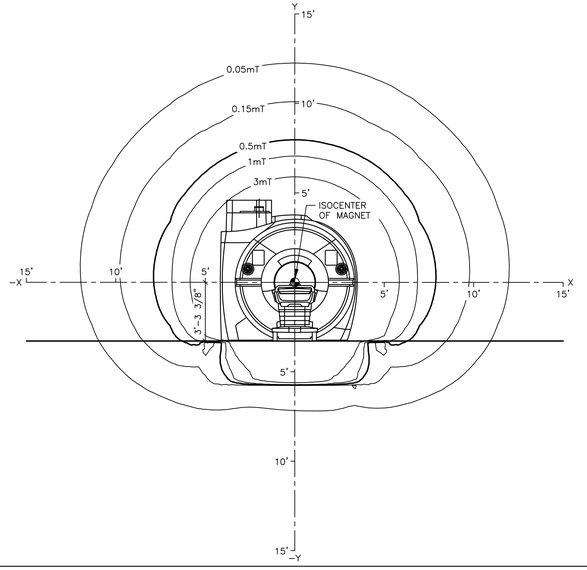
PATIENT VIDEO MONITORING

IT IS IMPORTANT TO VISUALLY MONITOR THE PATIENT DURING AN MR EXAM, IF OPERATING PERSONNEL CANNOT VISUALLY OBSERVE THE PATIENT THROUGH AN RF ROOM WINDOW VIDEO CAMERAS ARE OPTIONALLY AVAILABLE FROM SIEMENS. THE CAMERA INSIDE THE EXAM ROOM WILL HAVE TO BE INSTALLED ON THE FINISHED WALL. THE CAMERA WALL BRACKET IS PART OF THE DELIVERY. MOUNTING SCREWS AND DOWELS SHOULD BE PROVIDED LOCALLY. THE CHART BELOW SHOWS SUGGESTED MOUNTING HEIGHTS RELATED TO THE WALL DISTANCE FROM THE MAGNET COVER.



REV 0

2 | PATIENT SUPERVISION CAMERA | SCALE: NONE



– | SOLA MAGNETIC FIELDS – FRONT ELEVATION | SCALE: 1/4"=1'-0"

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SIEMENS

GRADY HEALTH SYSTEM

80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE – MRI 3 – MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757

SHEET: A-501

SHEET 3 OF 10

DRAWN BY: D. BRISTOE

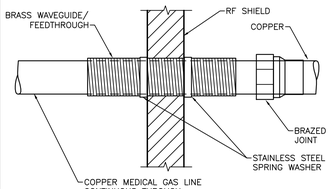
SCALE: AS NOTED

REF. #: 30261311

DATE: 06/06/22

SOLA REV 14

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



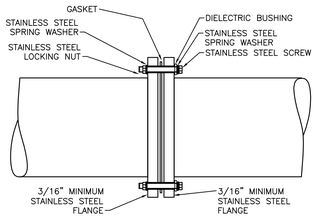
THE MEDICAL GAS FEED THROUGH SHOULD BE AS CLOSE TO THE SIEMENS FILTER PANEL AS POSSIBLE. WITHIN 3 FEET IS STRONGLY RECOMMENDED.

THE FINAL MEDICAL GAS CONNECTION TO THE WAVEGUIDE CANNOT BE MADE UNTIL GROUND ISOLATION MONITORING IS COMPLETE.

THE MEDICAL GAS MUST BE GROUNDED TO THE WAVEGUIDE AND RF SHIELD.

REV 0

–	MEDICAL GAS EXAMPLE	NO SCALE



DIELECTRIC ISOLATION HAS TO BE INSTALLED TO AVOID ELECTRICAL NOISE BEING PICKED UP BY LOOPS BETWEEN THE MAGNET, THE QUENCH TUBE, THE RF ROOM, AND THE BUILDING.

IT IS NECESSARY TO HAVE ONE DIELECTRIC ISOLATION OF THE QUENCH TUBE INSIDE THE RF ROOM (PROVIDED BY SIEMENS AT THE MAGNET) AND ONE OUTSIDE THE RF ROOM (PROVIDED BY THE QUENCH TUBE MANUFACTURER).

REV 0

–	DIELECTRIC ISOLATION	NO SCALE

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

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 CONTENT 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

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".

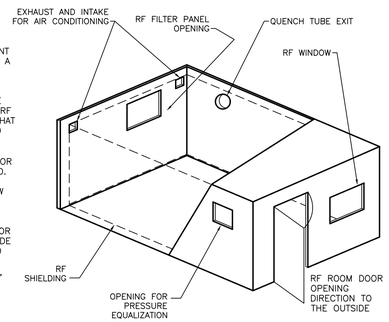
TO ENSURE UNOBSTRUCTED VENTING, THIS OPENING CANNOT BE SUBDIVIDED. THIS MEANS THAT, FOR EXAMPLE, RF SEALED HONEYCOMB GRIDS ARE NOT PERMITTED.

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 OUT SWING 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 CLOSES 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.



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.

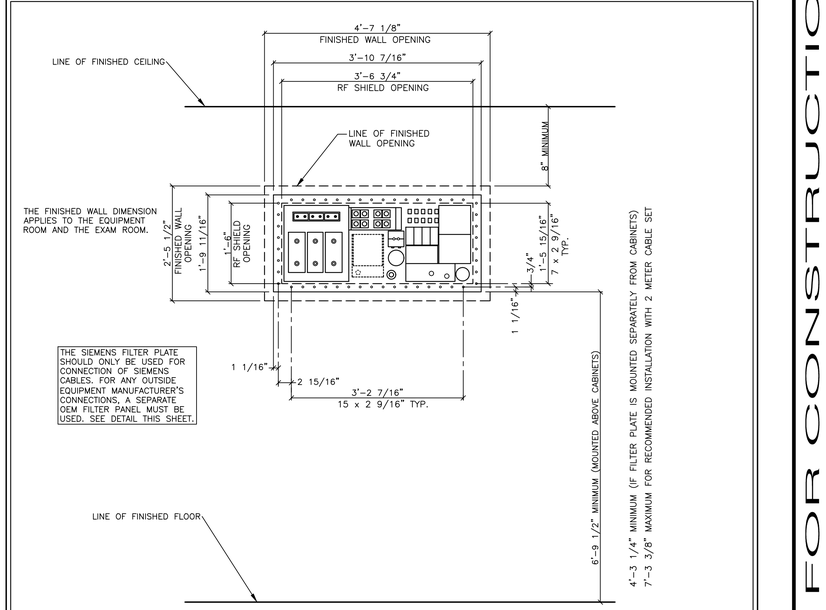
THE RF DOOR IS AN IMPORTANT COMPONENT FOR GOOD IMAGE QUALITY AS WELL AS SAFETY, THE OWNER/OPERATOR OF THE MR SYSTEM MUST MAINTAIN THE RF ROOM AS INSTRUCTED BY THE RF ROOM MANUFACTURER IN ORDER TO GUARANTEE CORRECT FUNCTION OF THE RF DOOR.

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.

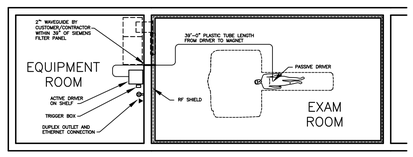
REV 0

–	SAFETY INFORMATION – PRESSURE EQUALIZATION	SCALE: NONE



REV 0

1	EQUIPMENT ROOM SIDE FILTER PLATE ELEVATION	SCALE: 3/4"=1'–0"



IN ELASTOGRAPHY, THE TRIGGER BOX CREATES PRESSURE WAVES WITH THE ACTIVE DRIVER, WHICH IS TRANSFERRED TO THE PASSIVE DRIVER VIA PLASTIC TUBING.

A 2" WAVEGUIDE MUST BE PROVIDED BY THE CUSTOMER/CONTRACTOR TO PASS THE PLASTIC TUBING FROM THE EQUIPMENT ROOM TO THE EXAM ROOM.

THE PROVIDED COAX CABLE FROM THE TRIGGER BOX TO THE ACTIVE DRIVER HAS A MAXIMUM 50 FOOT LENGTH.

REV 2

3	ELASTOGRAPHY	SCALE: NONE

RF SHIELDING

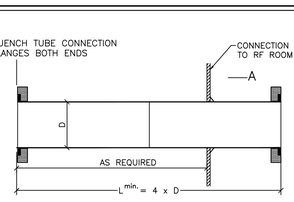
1) THE EXAMINATION AREA MUST BE SHIELDED TO PROVIDE A REDUCTION OF RADIO FREQUENCY WAVES EMANATING FROM EXTERNAL TRANSMITTERS. THE REQUIRED ATTENUATION IS 90dB IN THE FREQUENCY RANGE OF 15–128 MHz. IF CO–SITING TWO SYSTEMS EACH ROOM SHOULD BE 100 dB.

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 $\geq$ 100 OHMS.

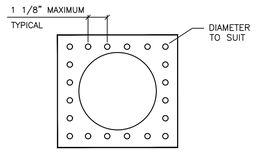
3) ALL ELECTRICAL LINES INTO THE RF ROOM MUST BE ROUTED THROUGH RF FILTERS (PROVIDED BY RF SHIELDING SUPPLIER). ALL ELECTRICALLY NON–CONDUCTIVE SUPPLY LINES (E.G. FIBER OPTIC CABLES, OR HOSES) INTO THE RF ROOM MUST BE ROUTED THROUGH RF SEALED WAVE GUIDES (PROVIDED BY RF SHIELDING SUPPLIER).

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



D = INTERNAL WAVE GUIDE DIAMETER (D </= 11 13/16")
L = WAVE GUIDE LENGTH



VIEW A

THE RF CABIN FEED THROUGH NEEDS TO CONFORM TO CERTAIN GEOMETRIC CONSTRAINTS IN ORDER TO GUARANTEE THE RF INTEGRITY OF THE RF CABIN.

AS A FUNCTION OF INTERNAL PIPE DIAMETER, THE FOLLOWING APPLIES TO MINIMUM PIPE LENGTH FOR FREQUENCIES UP TO 128 MHz AND 110 dB ATTENUATION.

DEPENDING ON RF CABIN DESIGNS, RF SEALS CAN BE REQUIRED BETWEEN THE MOUNTING FLANGE AND THE RF CABIN.

QUENCH TUBE RF CABIN FEED THROUGH

REV 0

–	WAVE GUIDE	NO SCALE

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.

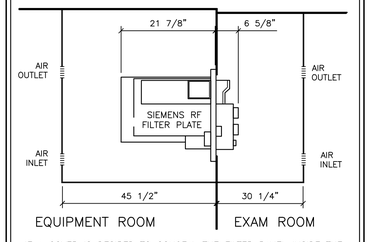
REV 0

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.

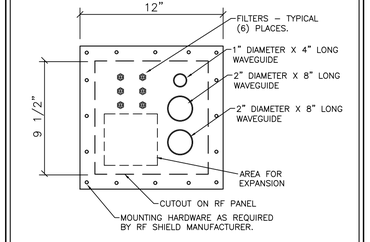
REV 0



IF A COVER IS DESIRED TO CONCEAL THE FILTER PANEL INSIDE THE EXAM ROOM (NOT INCLUDED IN DELIVERY), IT IS NECESSARY TO HAVE VENTILATION AND PROPER CLEARANCE FOR CABLING AND SERVICE. RECOMMENDED SIZE IS 4'–4" WIDE. THERE SHOULD BE A MINIMUM 8" CLEAR FROM THE TOP OF THE FILTER TO THE CEILING ABOVE.

12/18/09

2	FILTER PANEL COVERS	NO SCALE



NON–SIEMENS EQUIPMENT REQUIRING RF ROOM PENETRATION REQUIRES A SEPARATE PENETRATION PANEL BE PROVIDED BY THE CUSTOMER AND INSTALLED BY THE RF ROOM MANUFACTURER. SIEMENS FILTER PANEL IS RESERVED FOR SIEMENS PRODUCTS AND FUTURE UPGRADES ONLY.

TYPICAL OEM (ORIGINAL EQUIPMENT MANUFACTURER) EQUIPMENT MAY INCLUDE, BUT NOT BE LIMITED TO, INJECTORS, fMRI, AND SAFETY RELATED ITEMS. SPECIFIC EQUIPMENT MANUFACTURERS WILL HAVE DETAILED INFORMATION REGARDING REQUIRED PENETRATIONS. ABOVE IS AN EXAMPLE OF A PENETRATION PANEL THAT WILL MEET MANY REQUIREMENTS. THE PENETRATION PANEL SHALL BE LOCATED IN CLOSE PROXIMITY TO THE SIEMENS FILTER PANEL AND BE COMPLIANT WITH ALL SIEMENS RF ROOM REQUIREMENTS.

REV 0

–	OEM FILTER PANEL	NO SCALE

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–ISSUE BLOCK–

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TEL: (770) 402–1365
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SIEMENS

GRADY HEALTH SYSTEM

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MRI SUITE – MRI 3 – MAGNETOM SOLA XQ GRADIENTS

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SHEET: A-502

SHEET OF 4 10

DRAWN BY: D. BRISTOE

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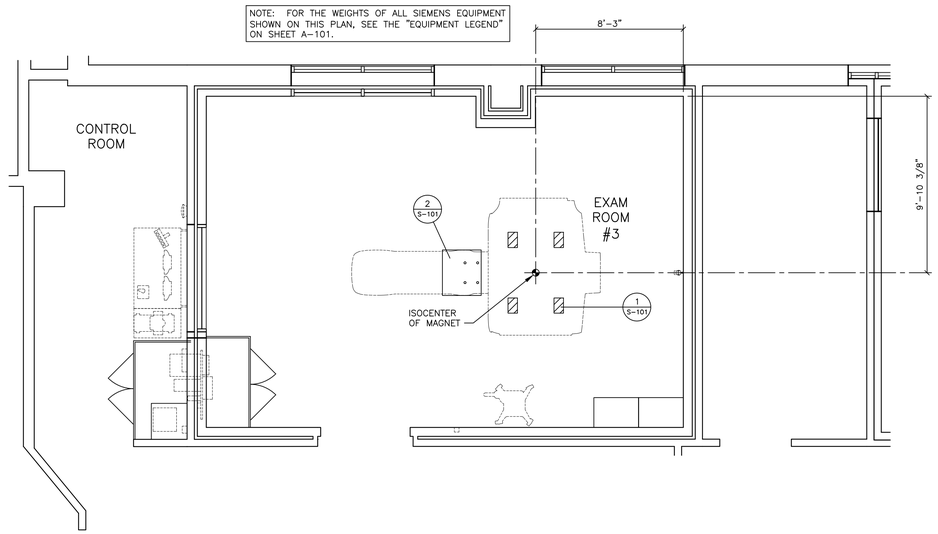
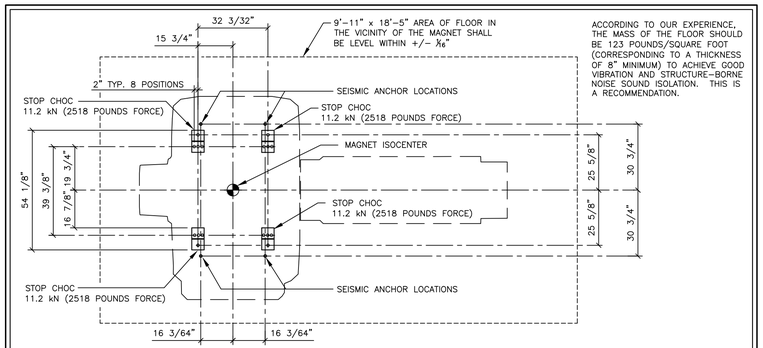


STRUCTURAL FLOOR PLAN

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/s^2 OR -80 dB(G) G=9.81 m/s^2

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.

1 **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.

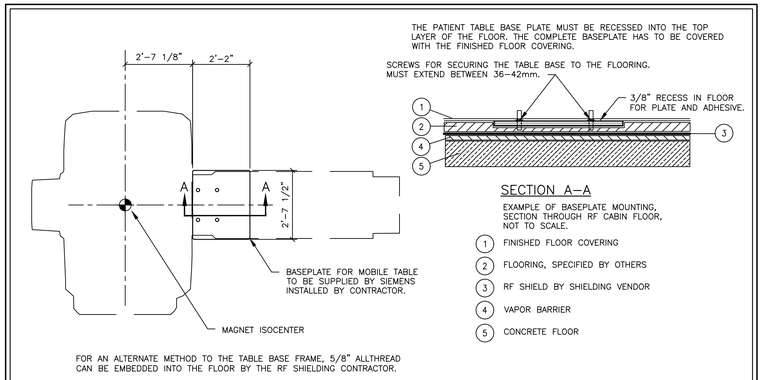
4) ALL STRUCTURAL SUPPORT DETAILS SHOWN ARE SAMPLE DETAILS BASED UPON TYPICAL AND STANDARD BUILDING PRACTICES AND ARE NOT INTENDED AS ACTUAL CONSTRUCTION DETAILS. ALL CONSTRUCTION DETAILS AND SUPPORT CALCULATIONS SHALL BE PREPARED BY A PROFESSIONAL STRUCTURAL ENGINEER AT THE CUSTOMER'S EXPENSE. IN THE 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.



FOR AN ALTERNATE METHOD TO THE TABLE BASE FRAME, 5/8" ALLTHREAD CAN BE EMBEDDED INTO THE FLOOR BY THE RF SHIELDING CONTRACTOR.

2 **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

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.

SYM	DATE	DESCRIPTION
1	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

-ISSUE BLOCK-

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SIEMENS

GRADY HEALTH SYSTEM

80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE - MRI 3 - MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757

SHEET: S-101

SHEET OF 5 10

DRAWN BY: D. BRISTOE

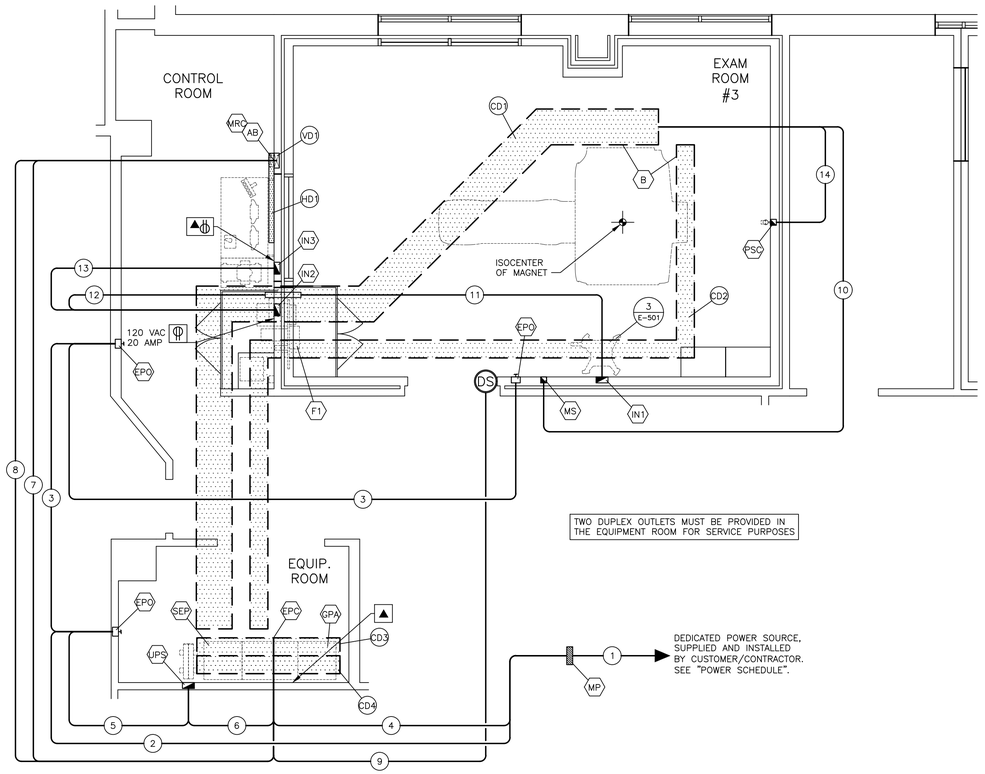
SCALE: AS NOTED

REF. #: 30261311

DATE: 06/06/22

SOLA REV 14

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



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 TRENCHDUCT
	PULLBOX IN (FLOOR/WALL/CEILING)
	OPENING IN ACCESS FLOORING
DS	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

ELECTRICAL LEGEND

SYM	SIZE	DESCRIPTION SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR	REMARKS
AB	3"ø	OPENING IN FACE OF VERTICAL DUCT 5'-0" ABOVE FINISHED FLOOR IN LOCATION TO BE COORDINATED WITH THE ARCHITECT.	ALARM BOX
EPA EPB EPC	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
EPO	----	EMERGENCY POWER OFF BUTTONS, MOUNTED WITH CENTERLINE AT 5'-0" ABOVE FINISHED FLOOR. ALL PARTS ARE TO BE NONFERROUS 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
IN1	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
IN2	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL IN EQUIPMENT ROOM, 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
IN3	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
MP	----	MAIN PANEL WITH MAIN BREAKER. EXACT LOCATION DETERMINED BY CUSTOMER/CONTRACTOR	SEE POWER SCHEDULE
MRC	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
PSC	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL REFER TO HEIGHT CHART A-501-3. THE PULL BOX CAN BE MOUNTED AT APPROXIMATELY 5'-0" ABOVE THE FINISHED FLOOR IN MOST CASES, DEPENDING ON THE DISTANCE FROM THE MAGNET TO THE WALL.	PATIENT SUPERVISION CAMERA
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 GXT4 UPS
VD1	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
CD1	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
CD2	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
CD4	12"x4"	ALUMINUM LADDER TRAY, MOUNTED AT HEIGHT COORDINATED WITH SIEMENS PROJECT MANAGER IN EQUIPMENT ROOM. A 12" SEPARATION BETWEEN CD3 AND CD4 MUST BE MAINTAINED.	CABLE TRAY SEE DETAIL E-501/1
HD1	4" x 2"	HORIZONTAL DUCT SURFACE MOUNTED ON WALL IN CONTROL AREA AT FLOOR LINE AS SHOWN, FINISHED TO MATCH WALLS.	
VD1	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 MAIN PANEL "MP".	SEE POWER SCHEDULE, SHEET E-102
2	AS PER NEC	CONDUIT FROM "MP" TO "EPO".	SEE POWER SCHEDULE, SHEET E-102
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 "MP" 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.	SEE POWER SCHEDULE, SHEET E-102
5	(1) 3/4"ø	CONDUIT FROM "EPO" TO "UPS".	
6	(1) 2"ø	CONDUIT FROM "UPS" TO "CD3" (EPC)	MAXIMUM LENGTH 29 FEET
7	(2) 2 1/2"ø	CONDUIT FROM "VD1" (MRC) TO "CD3" (EPC).	NOT TO EXCEED 54 FT.
8	(1) 1 1/2"ø	CONDUIT FROM "VD1" (AB) TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
9	(1) 1/2"ø	CONDUIT FROM "DS" TO "CD3" (EPC).	NOT TO EXCEED 60 FT.
10	(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.
11	(1) 2"ø	NON-FERROUS CONDUITS FROM NEAR "F1" TO "IN1" FOR INJECTOR CABLES.	NOT TO EXCEED 40 FEET
12	(1) 2"ø	CONDUITS FROM NEAR FILTER LOCATION TO "IN2".	
13	(1) 2"ø	CONDUIT FROM "IN2" TO "IN3" FOR INJECTOR CABLES.	NOT TO EXCEED 150 FEET
14	(1) 1"ø	NON-FERROUS CONDUIT FROM "PSC" TO "CD1".	

CONTRACTOR SUPPLIED CABLES

FROM	VIA	TO	DESCRIPTION	REMARKS
SOURCE	1	MP	(3) PHASE CONDUCTORS, (1) FULL SIZE EQUIPMENT GROUND WIRE TO BE SIZED BY ELECTRICAL CONTRACTOR/ENGINEER.	
MP	2	EPO	DETERMINED BY ELECTRICAL CONTRACTOR.	
EPO	3	EPO	DETERMINED BY ELECTRICAL CONTRACTOR.	
MP	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
EPO	5	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

ELECTRICAL NOTES

1) COMPLIANCE: ELECTRICAL WORK SHALL BE IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE (NFPA-70), O.S.H.A. REGULATIONS, AS WELL AS APPLICABLE REGULATIONS OF CITY, COUNTY, STATE AND FEDERAL AGENCIES. PROVIDE MATERIALS AND EQUIPMENT THAT COMPLY TO ANSI, IEEE AND NEMA STANDARDS AND ARE U.L. LISTED AND LABELED. THE CUSTOMER'S/CONTRACTOR'S WORK AND ALL EQUIPMENT INSTALLED SHALL COMPLY WITH THE CURRENT EDITION OF NATIONAL ELECTRICAL CODE ADOPTED/ENFORCED BY THE AUTHORITY HAVING JURISDICTION.

2) QUALITY ASSURANCE: THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN THE FIELD TO INSURE THAT THE NEW WORK WILL FIT INTO 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 FROM A MEDICAL IMAGING PANEL OR BUILDING SERVICE EQUIPMENT THAT IS A GROUNDED 3 OR 4-WIRE 'WYE' SOURCE PER THE SPECIFIC EQUIPMENT OPERATION REQUIREMENTS. A DEDICATED CIRCUIT SHALL BE PROVIDED THAT IS KEPT ENTIRELY FREE AND INDEPENDENT OF ALL OTHER BUILDING WIRING. NO ELEVATORS, GENERATORS, PUMPS, HVAC OR SIMILAR EQUIPMENT SHALL BE CONNECTED TO THE SAME CIRCUIT OR MEDICAL IMAGING PANEL THAT SERVES THE SIEMENS HEALTHCARE EQUIPMENT. IF THE POWER SUPPLY SOURCE DOES NOT MEET THE SPECIFIC SIEMENS EQUIPMENT POWER REQUIREMENTS, THE CONTRACTOR SHALL PROVIDE THE NECESSARY EQUIPMENT REQUIRED TO ESTABLISH THE POWER SUPPLY IN ACCORDANCE WITH THE REQUIRED POWER SUPPLY PARAMETERS OF THE SIEMENS EQUIPMENT. THE CONTRACTOR SHALL COORDINATE THIS WORK WITH THE CUSTOMER AND/OR UTILITY COMPANY FIELD REPRESENTATIVE.

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, BUT IS NOT LIMITED TO, THE FOLLOWING, UNLESS NOTED OTHERWISE: ELECTRICAL RACEWAYS AND DUCTS, WIRING TROUGHS, PULL BOXES, CONDUITS, CIRCUIT BREAKERS, ACCESS PANELS, EMERGENCY OFF BUTTONS, DOOR SWITCHES, WARNING LIGHTS, WIRING, WIRING DEVICES, CONNECTORS, LIGHTING EQUIPMENT AND GROUNDING.

5) RACEWAY AND CONDUIT NOTES: ALL ITEMS IN THE MAGNET ROOM SHALL BE NON-FERROUS. ALL CONDUITS SHALL BE INSTALLED IN COMPLIANCE WITH THE CURRENT ENFORCED EDITION OF THE NATIONAL ELECTRICAL CODE.

CONDUIT BODIES SHALL NOT BE USED. WHERE A CONDUIT ENTERS A BOX, FITTING, OR OTHER ENCLOSURE, AN INSULATED THROAT CONNECTOR SHALL BE PROVIDED TO PROTECT THE WIRE FROM ABRASION. ALL CONNECTORS FOR EMT SHALL BE COMPRESSION OR DOUBLE SET SCREW TYPE.

KEEP RACEWAYS AT LEAST 6 INCHES AWAY FROM PARALLEL RUNS OF FLUES OR STEAM AND HOT WATER PIPES. INSTALL RACEWAY RUNS ABOVE WATER AND STEAM PIPES PROVIDED THAT CABLE RUN DISTANCES ARE MAINTAINED. USE TEMPORARY CLOSURES TO PREVENT FOREIGN MATTER FROM ENTERING RACEWAY.

CONDUIT RUNS ARE SHOWN SCHEMATICALLY. INSTALL CONDUIT WITH 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 THE ELECTRICAL DETAILS. LISTED CONDUIT SIZES FOR SIEMENS-SUPPLIED CABLES MUST BE MAINTAINED IN ORDER TO ENABLE THE TOTAL CABLE BUNDLE INCLUDING CONNECTORS TO BE PULLED THROUGH WITHOUT DAMAGE.

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

PROVIDE WIRE DUCT/RACEWAY WITH ACCESSIBLE REMOVABLE COVERS. LOCATIONS OF BUILDING MATERIAL OPENINGS (I.E. ACCESS PANELS) TO BE CUT IN FIELD ARE TO BE COORDINATED WITH THE DRAWING REQUIREMENTS AND BUILDING STRUCTURE. THOSE THAT ARE NOT INDICATED OR INTERFERE WITH BUILDING ELEMENTS SHALL 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. CONTRACTORS MUST PROVIDE PULL STRINGS FOR ALL CONDUIT AND WIRE DUCT/RACEWAY. IN-FLOOR OR 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 (SUCH AS A 90 DEGREE ELBOW OR TEE) IN 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: ALL WIRING INSTALLED SHALL BE 600 VOLT CLASS, STRANDED TYPE THHN/THWN-2, SINGLE CONDUCTOR ANNEALED COPPER FOR A MAXIMUM OPERATING TEMPERATURE OF 90° C (194° F). SIZED AS INDICATED INSTALLED IN METAL RACEWAYS. THE CUSTOMER/CONTRACTOR SHALL LEAVE MINIMUM 10 FT. OF WIRE TAILS AT ALL OUTLET POINTS WITH WIRE IDENTIFICATION TAGGED AT BOTH ENDS FOR FINAL CONNECTION BY THE CUSTOMER/ELECTRICAL CONTRACTOR.

7) SHORT CIRCUIT REQUIREMENTS: ALL CIRCUIT BREAKERS SUPPLIED FOR THE SIEMENS EQUIPMENT REQUIREMENTS SHALL BE RATED HIGHER THAN THE SHORT CIRCUIT AVAILABLE AT THE TERMINALS OF THE ELECTRICAL EQUIPMENT AS DETERMINED BY THE ENGINEER OF RECORD, BUT NOT LESS THAN 35,000A RMS SYMMETRICAL AT 480V, 3-PHASE, 60 HERTZ. THE CONTRACTOR SHALL OBTAIN THE CORRECT SHORT CIRCUIT CURRENT RATING OF ALL THE NEW EQUIPMENT FOR INSTALLATION FROM THE ENGINEER OF RECORD.

SOLA REV 14

ATTENTION:

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- THIS SET OF PLANS REPRESENTS A COMPLETE SET OF DETAILS AND SHOULD NOT BE SEPARATED.
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SYM	DATE	DESCRIPTION
0	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

-ISSUE BLOCK-

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SIEMENS

GRADY HEALTH SYSTEM

80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE - MRI 3 - MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757

SHEET: E-101

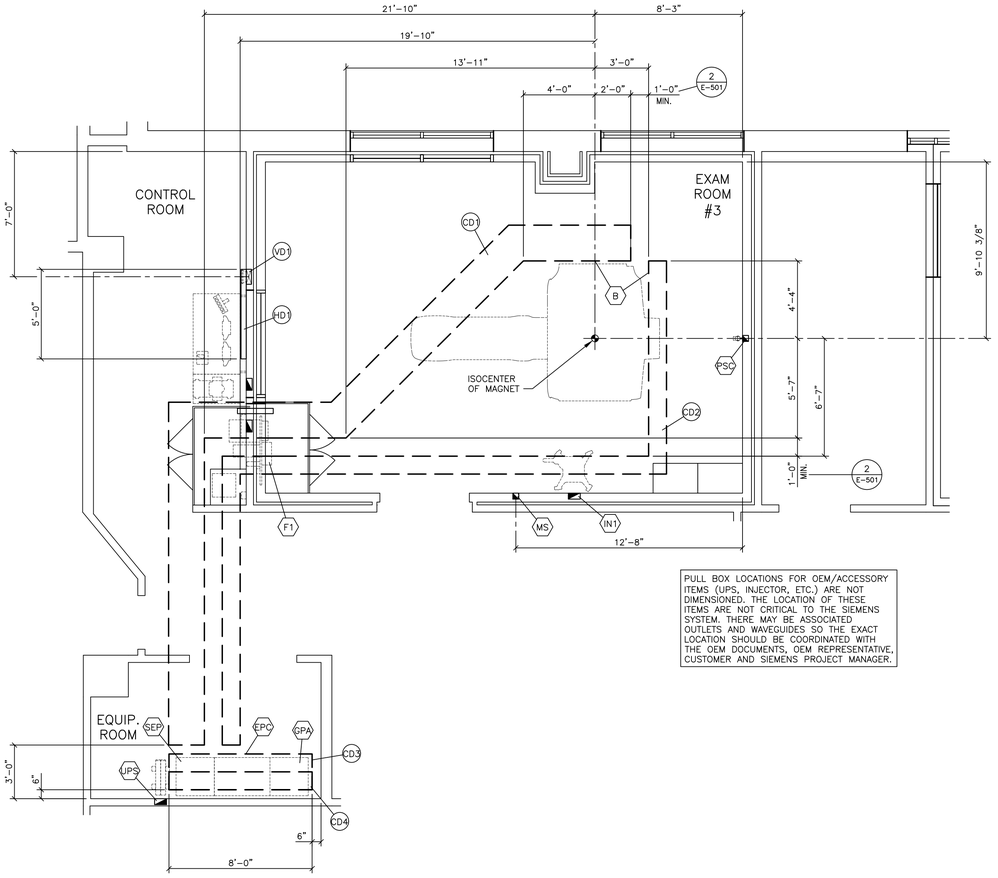
SHEET 6 OF 10

DRAWN BY: D. BRISTOE

SCALE: AS NOTED

REF. #: 30261311

DATE: 06/06/22



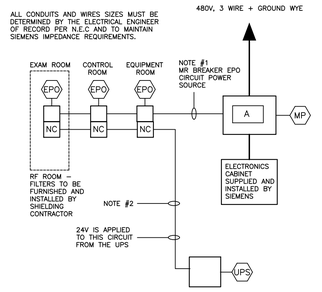
PULL BOX LOCATIONS FOR OEM/ACCESSORY ITEMS (UPS, INJECTOR, ETC.) ARE NOT DIMENSIONED. THE LOCATION OF THESE ITEMS ARE NOT CRITICAL TO THE SIEMENS SYSTEM. THERE MAY BE ASSOCIATED OUTLETS AND WAVEGUIDES SO THE EXACT LOCATION SHOULD BE COORDINATED WITH THE OEM DOCUMENTS, OEM REPRESENTATIVE, CUSTOMER AND SIEMENS PROJECT MANAGER.

ELECTRICAL DIMENSION PLAN

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

POWER SCHEDULE

ALL CONDUITS AND WIRES SIZES MUST BE DETERMINED BY THE ELECTRICAL ENGINEER OF RECORD PER N.E.C AND TO MAINTAIN SIEMENS IMPEDANCE REQUIREMENTS.



ITEM	QTY	DESCRIPTION
MP	1	MAIN PANEL WITH MAIN BREAKER FLUSH OR SURFACE MOUNTED.
A	1	MR SYSTEM BREAKER MUST HAVE TRIPPING DEVICE SO WHEN ANY EPO IS PRESSED THE BREAKER TRIPS.
		MR BREAKER AMPS: SEE POWER REQUIREMENTS

VOLTS	PHASES	NEUTRAL	GROUND	TOTAL WIRES
480	3	0	1	4 (NOTE 1)

1) ALL WIRES MUST BE SAME SIZE.
NOTE: UNLESS OTHERWISE NOTED ALL BREAKERS WILL BE 80% RATED.

EPO	VARIES	NOTE 1 – EPO CIRCUIT #1 MAIN CIRCUIT BREAKER EMERGENCY POWER OFF BUTTON WITH PROTECTIVE COVER THAT PREVENTS ACCIDENTAL ACTIVATION. THE EPO MUST BE OF FAIL-SAFE DESIGN, ALL EPO'S TO HAVE MECHANICAL LATCHING MECHANISM. EPO MUST BE RESET BEFORE MR BREAKER CAN RESUME OPERATION. CONTACTS AND WIRING CONFIGURATION TO BE DESIGNED BY ELECTRICAL ENGINEER OF RECORD. NOTE 2 – EPO CIRCUIT #2 EPO CONTACTS TO BE NORMALLY CLOSED, WIRED IN SERIES, CONNECTED TO 9130 UPS ONLY. THE EPO'S MUST BE INSTALLED BY A QUALIFIED ELECTRICAL CONTRACTOR ACCORDING TO NATIONAL ELECTRICAL CODE, STATE AND LOCAL REGULATIONS. THE CUSTOMER IS SOLELY RESPONSIBLE FOR THE IMPLEMENTATION OF THE EPO'S AND THEIR ASSOCIATED CIRCUITS AND MUST MAKE THE FINAL DETERMINATION CONSIDERING ALL SITE CONDITIONS AND REGULATORY FACTORS.

UNLESS OTHERWISE NOTED, ALL ITEMS LISTED IN THIS SCHEDULE SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR.

REV 0

POWER QUALITY NOTES

1) IT IS THE CUSTOMER'S RESPONSIBILITY TO COMPLY WITH THE POWER QUALITY REQUIREMENTS FOR SIEMENS MEDICAL SYSTEMS EQUIPMENT.
2) THE ELECTRICAL FEEDER TO THE SIEMENS MEDICAL SYSTEMS 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.
3) THE ELECTRICAL FEEDER TO THE IMAGING SYSTEM MUST BE RUN DIRECTLY TO A MAIN FACILITY DISTRIBUTION PANEL OR TO THE FACILITY SERVICE ENTRANCE, WITH NO OTHER LOADS POWERED FROM THIS FEEDER.
4) IN ORDER TO COMPLY WITH IMAGING SYSTEM POWER QUALITY REQUIREMENTS, ADDITIONAL POWER CONDITIONING DEVICES MAY BE REQUIRED. EXAMPLES INCLUDE VOLTAGE REGULATORS, TRANSFORMERS, SURGE PROTECTIVE DEVICES, FILTERS, AND/OR UNINTERRUPTIBLE POWER SUPPLIES (UPS). RECOMMENDED FOR THE INSTALLATION OF ELECTRONIC EQUIPMENT CAN BE FOUND IN IEEE STANDARD 1100-1999 "POWERING AND GROUNDING ELECTRONIC EQUIPMENT.
5) POWER CONDITIONING DEVICES NOT APPROVED BY SIEMENS MEDICAL SYSTEMS MAY NOT BE COMPATIBLE WITH THE MAGNETOM SYSTEM. "FERRORESONANT" POWER CONDITIONING EQUIPMENT RE-APPLIED FROM PREVIOUS GENERATION SYSTEMS IS ALSO GENERALLY EXCLUDED DUE TO HIGHER POWER REQUIREMENTS OF THE NEWER SYSTEMS.
6) INCOMING SOURCE POWER WIRES MUST BE SEPARATED FROM ANY SIEMENS CABLING BY A MINIMUM OF 12".

REV 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
VOLTAGE UNBALANCE: 2% MAXIMUM DIFFERENCE BETWEEN PHASES

VOLTAGE:	480V – 3 PHASE
FREQUENCY:	60 Hz ± 1.0 Hz
LINE IMPEDANCE:	<140 mOHMS
CONNECTION VALUE	88 kVA
SHORT TIME POWER (LESS THAN 3 SECONDS)	104 kVA
MR SYSTEM BREAKER SIZE (A)	125 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

1) 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.

2) 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.

3) 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.

4) 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.

5) 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.

6) 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.

7) 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

1) 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.

2) 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.

3) 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.

4) THE EMERGENCY POWER OFF (EPO) BUTTONS ARE TO BE MUSHROOM TYPE WITH PUSH LOCK AND PULL TO RELEASE.

5) 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.

6) 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.

7) 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.

REV 1

GROUNDING NOTES

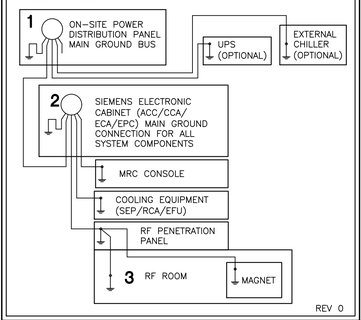
EQUIPMENT GROUNDING CONDUCTOR TO COMPLY WITH THE FOLLOWING:

1) SIZE GROUNDING WIRE TO SIEMENS EQUIPMENT PER POWER SCHEDULE REQUIREMENTS.
2) DERIVED FROM THE ELECTRICAL SERVICE, TRANSFORMER OR MAIN DISTRIBUTION PANEL FEEDING THE SIEMENS EQUIPMENT.
3) RUN IN THE SAME CONDUIT, TROUGH OR RACEWAY AS THE PHASE CONDUCTORS.
4) CONTINUOUS, WITH NO BREAKS OR USE OF CONDUIT, CHASSIS OR EARTH AS THE SOLE GROUNDING PATH.
5) BONDED TO CHASSIS AND/OR CONDUIT IN ACCORDANCE WITH THE NEC REQUIREMENTS.
6) MINIMIZE CONNECTIONS OR TERMINALS TO ENSURE CONTINUITY OVER THE LIFE OF THE INSTALLATION.
7) 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.

MR GROUNDING NOTES

THE INTERNAL GROUND WIRING OF THE MR SYSTEM MUST BE INSTALLED WITH MINIMUM GROUND LOOPS. THIS IS TO PREVENT NOISE CURRENTS AND GENERAL DISTURBANCES FROM FLOWING THROUGH THE GROUNDING PATH.

TO ACHIEVE SUCH GROUNDING, THREE MAJOR GROUND POINTS SHOULD BE USED.



REV 0

SOLA
REV 14

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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.

SYM	DATE	DESCRIPTION
0	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

-ISSUE BLOCK-

PROJECT MANAGER: PATRICK RUIZ
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SIEMENS

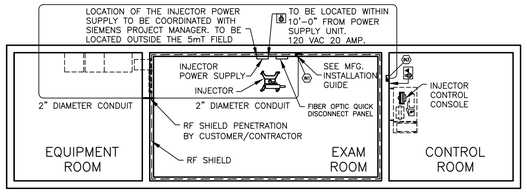
GRADY HEALTH SYSTEM
80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE – MRI 3 – MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757
SHEET OF 7 10
DRAWN BY: D. BRISTOE
SCALE: AS NOTED
REF. #: 30261311
DATE: 06/06/22
SHEET: E-102

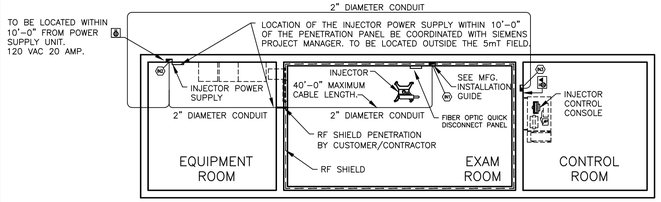
NOT FOR CONSTRUCTION - REFERENCE DOCUMENT

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 EQUIPMENT ROOM OR IN THE EXAM 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.



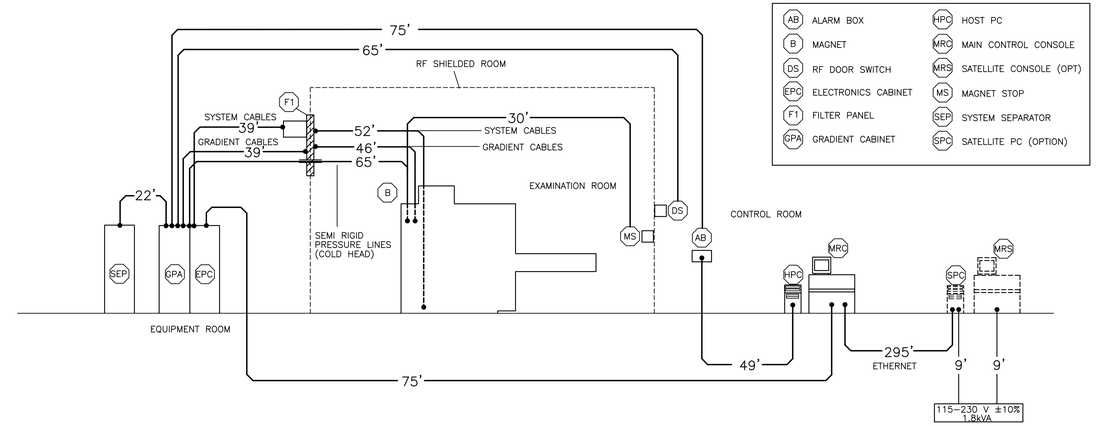
METHOD 2 INJECTOR POWER SUPPLY IN EQUIPMENT ROOM, ELECTRICAL SUPPLY IN EQUIPMENT ROOM, PENETRATIONS TO INCLUDE WAVEGUIDES.

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.

REV 2

3	MRXPERION MRI CONTRAST INJECTOR	SCALE: NONE

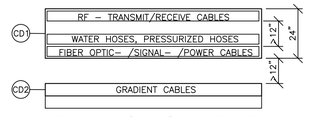


12M/16M CABLE SET (GRADIENT CABLES INSIDE THE RF ROOM ARE 6 FEET SHORTER THAN SYSTEM CABLES)
FOR CABLE SETS WITH A COMBINED LENGTH OF MORE THAN 20M, A 30 M HIGH PRESSURE KIT MUST BE ORDERED.

REV 0

1	SIEMENS SYSTEM CABLING – FREE CABLE LENGTHS	SCALE: NONE

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"

REV 0

2	CABLE SEPARATION	SCALE: NONE

CABLE PROTECTION

CABLES ARE NOT PLENUM RATED. ALL CABLES MUST BE ROUTED IN CABLE DUCTS OR CABLE CONDUITS.

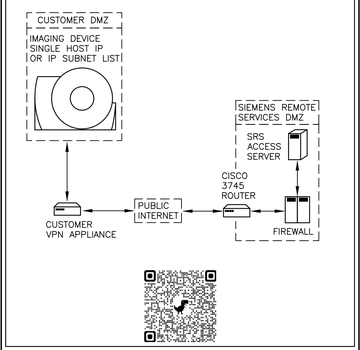
04/13/21

SIEMENS SMART 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 SMART REMOTE SERVICES TO DETERMINE BEST IMPLEMENTATION FOR YOUR SITE. CONTACT:

IMCPTSCSRS.DL@SIEMENS-HEALTHINEERS.COM.



CONDUITS AND RACEWAYS

1) ALL POWER CONDUCTORS SUPPLIED BY THE CUSTOMER/CONTRACTOR SHALL BE INSTALLED IN METAL RACEWAY, 600 VOLT CLASS, STRANDED TYPE THHN-THWN, 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

SOLA REV 14

SYM	DATE	DESCRIPTION
0	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

-ISSUE BLOCK-

PROJECT MANAGER: PATRICK RUIZ
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SIEMENS

GRADY HEALTH SYSTEM
80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE – MRI 3 – MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757
SHEET: E-501
SHEET OF 8 10
DRAWN BY: D. BRISTOE
SCALE: AS NOTED
REF. #: 30261311
DATE: 06/06/22

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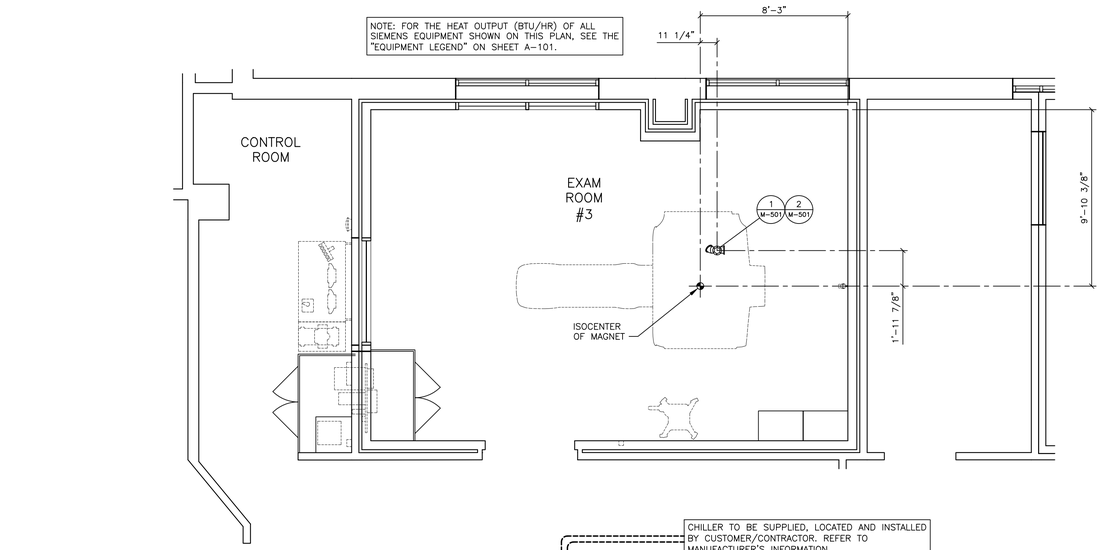
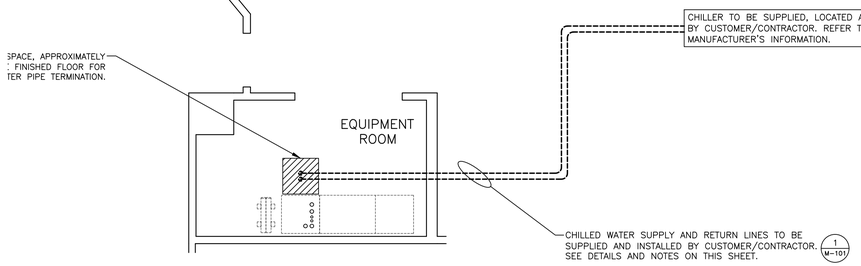




MECHANICAL PLAN

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 (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.

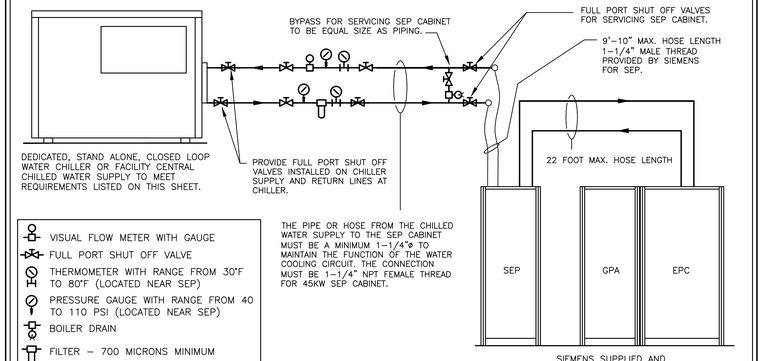
5) THE AIR INTAKE OF THE AIR CONDITIONING SYSTEM MUST NOT BE LOCATED IN THE VICINITY OF THE QUENCH VENT EXHAUST.

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

CEILING HEIGHTS

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



NOTES:

ALL PIPING AND PLUMBING FIXTURES SHALL BE FURNISHED, INSTALLED, PRESSURE TESTED AND CHARGED BY THE MECHANICAL 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 CHILLER AN AUTOMATIC DEAERATION DEVICE (AIR VENT) WITH BALL VALVE MUST BE INSTALLED BY THE MECHANICAL CONTRACTOR.

SYSTEM MUST BE PROVEN TO BE FREE FROM LEAKAGE.

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 IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL 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 TO THE SEP MUST BE LABELED TO SHOW FLOW DIRECTION AND CONTENT (WATER/GLYCOL).

1 PIPING SCHEMATIC FOR FACILITY PROVIDED CHILLED WATER — SCALE: NONE

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. CHILLED WATER CAN ALSO BE SUPPLIED BY A CHILLER PROVIDED BY SIEMENS.

A SEPARATOR CABINET (SEP) OR INTERFACE PANEL (IFP) MUST BE INCLUDED WITH THE SIEMENS ORDER. THE PIPE SIZE BETWEEN THE WATER SUPPLY AND SEP MUST MEET MANUFACTURER AND SIEMENS REQUIREMENTS; LARGER DIAMETER PIPE MAY BE REQUIRED DUE TO LENGTH OF RUN. FLOW AND PRESSURE REQUIREMENTS MUST BE MET.

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.

27 GALLONS OF DISTILLED/DE–IONIZED WATER MUST BE PROVIDED AND INSTALLED BY CUSTOMER/CONTRACTOR FOR FILLING THE SECONDARY CHILLED WATER CIRCUIT.

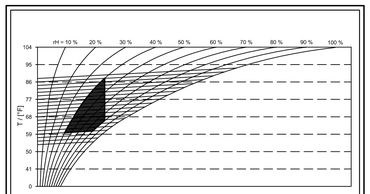
SEE MANUFACTURER'S REQUIREMENTS FOR GLYCOL AND WATER QUALITY TO BE PROVIDED AND FILLED BY CUSTOMER/CONTRACTOR.

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.

CHILLED WATER REQUIREMENTS

XQ 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	204,911 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	700 µm



– TEMPERATURE/HUMIDITY — SCALE: NONE

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 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

SOLA REV 14

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.

SYM	DATE	DESCRIPTION
0	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

–ISSUE BLOCK–

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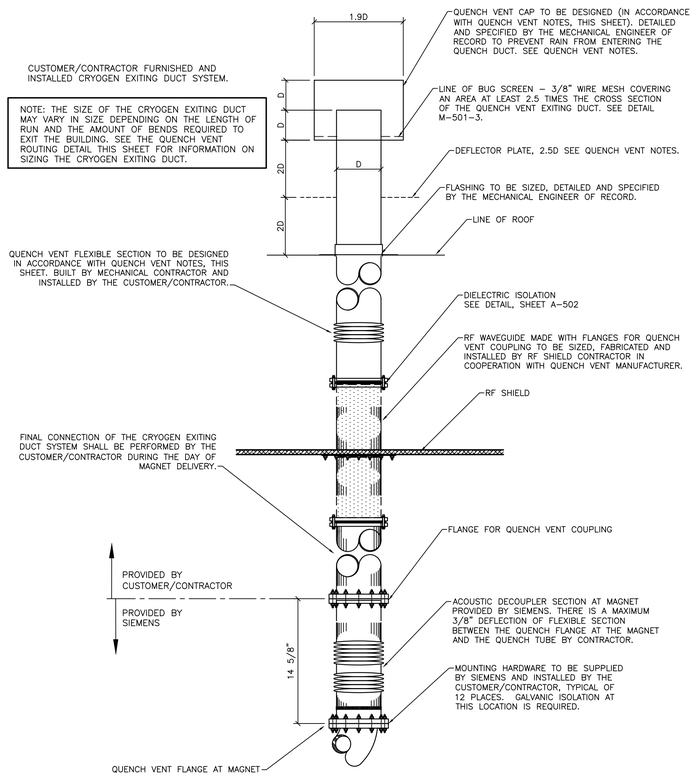
SIEMENS

GRADY HEALTH SYSTEM
80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE – MRI 3 – MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757
SHEET: M-101
SHEET OF 9 10
DRAWN BY: D. BRISTOE
SCALE: AS NOTED
REF. #: 30261311
DATE: 06/06/22

REFERENCE DOCUMENT – NOT FOR CONSTRUCTION



CRYOGEN EXITING DUCT SYSTEM NOTES:

1) THE MECHANICAL ENGINEER OF RECORD SHALL BE RESPONSIBLE FOR THE DESIGN, DETAIL AND SPECIFICATION OF THE CRYOGEN EXITING DUCT SYSTEM WITH ALL WORK TO PERFORMED BY THE CUSTOMER/CONTRACTOR UNLESS SPECIFIED OTHERWISE.

2) TAKE PROPER PRECAUTIONS WHEN FIELD WELDING IN THE VICINITY OF LIQUEFIED/FROZEN OXYGEN.

3) UNLESS SPECIFIED OTHERWISE ALL MATERIAL AND WORK SHALL BE PERFORMED BY THE CUSTOMER/CONTRACTOR WITH FINAL CONNECTION OF THE CRYOGEN EXITING DUCT SYSTEM TO THE SIEMENS MAGNET TO BE PERFORMED BY THE CUSTOMER/CONTRACTOR UNDER SIEMENS' SUPERVISION.

4) THE DIAMETER OF THE CRYOGEN EXITING DUCT MAY VARY WITH ACTUAL ROUTING.

REV 0

– QUENCH VENT DUCT SYSTEM DETAIL — SCALE: NO SCALE

CRYOGEN NOTES

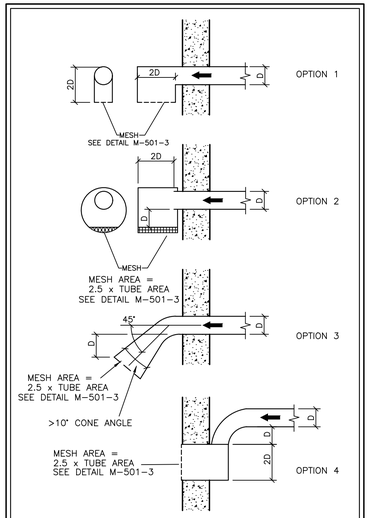
1) "CRYOGENS" IS A TERM USED TO IDENTIFY THE REFRIGERANT USED TO MAKE THE MAGNET "SUPER-CONDUCTING", IN THIS APPLICATION, LIQUID AND GASEOUS HELIUM. SPECIAL CARE MUST BE TAKEN DURING THE TRANSFILLING OF THE MAGNET WITH CRYOGENS AND NORMAL EXHAUST OF CRYOGENS FROM THE SYSTEM. ASIDE FROM THE OBVIOUS DANGER 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.

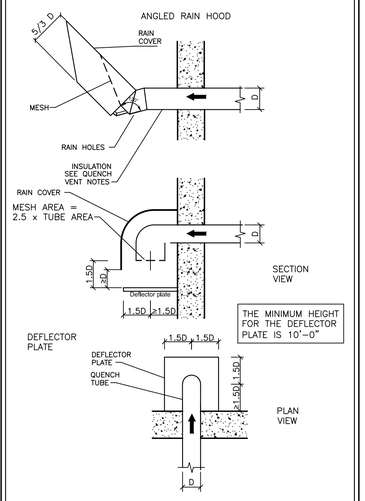
3) HELIUM GAS CYLINDERS MAY BE USED DURING THE INITIAL FILLING OF HELIUM INTO THE MAGNET. THE FACILITY IN WHICH THESE MAY BE USED NEEDS TO HAVE THE ABILITY TO TEMPORARILY STORE AND SECURE THESE CYLINDERS THAT WILL PREVENT THEM FROM INADVERTENTLY FALLING OVER.

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

REV 0



OPTIONS FOR QUENCH TUBE EXITING THROUGH A WALL



SEE QUENCH VENT NOTES

REV 1

– HORIZONTAL OUTLET — SCALE: NONE

QUENCH VENT NOTES

QUENCH VENT DESIGN INSTRUCTIONS

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 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.

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 MINIMUM). 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" OF STRAIGHT SECTIONS, 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 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 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.

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.

7) 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 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 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.

12) 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 IT'S ENTIRE LENGTH FOR EXTREMELY COLD HELIUM GAS – AUTHORIZED PERSONNEL ONLY.

13) 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 INSIDE THE BUILDING. 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 INSULATION MUST NOT TOUCH THE MAGNET COVERS. TO AVOID RF DISTURBANCES THE INSULATION MUST NOT MAKE ELECTRICAL CONTACT WITH THE WAVEGUIDE.

15) 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.

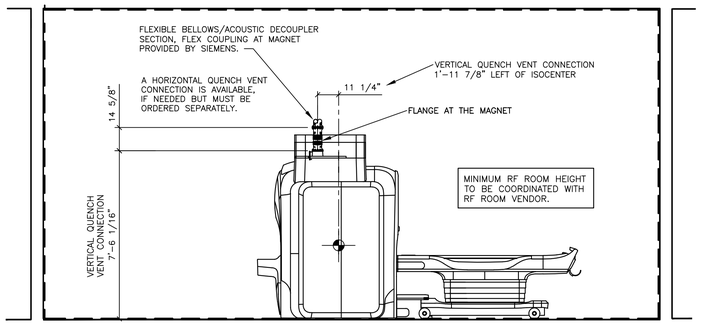
DOCUMENTATION

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 8

THE EQUIPMENT CONFIGURATION SHOWN ON THESE ELEVATIONS REPRESENT "TYPICAL" INSTALLATION CONDITIONS.

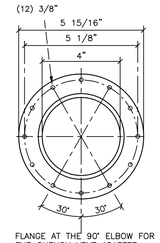
THE QUENCH VENT IS TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. IT MAY BE CONNECTED TO THE FLANGE AT THE MAGNET HORIZONTALLY OR VERTICALLY AND SHOULD BE DESIGNED, CONSTRUCTED AND INSTALLED AS PER THE INSTRUCTIONS ON THIS SHEET.



THE LOCATION, PITCH, AND MOUNTING HEIGHT ABOVE FINISHED FLOOR FOR THE MECHANICAL SYSTEMS SHALL BE SPECIFIED, DETAILED AND NOTED BY THE MECHANICAL ENGINEER OF RECORD. ALL MECHANICAL SYSTEM LOCATIONS SHALL BE COORDINATED WITH THE LOCATION OF THE CABLE TRAYS AS SHOWN ON THE 1/4" SCALE ELECTRICAL PLAN.

NOTE: COMPRESSOR LINES RUNNING FROM THE COMPRESSOR FOR SEP CABINET TO THE MAGNET COLD HEAD SHALL BE ELECTRICALLY ISOLATED WITH 1/2" ARMAFLEX OR EQUAL, SUPPLIED BY CONTRACTOR AND INSTALLED BY SIEMENS. LENGTH REQUIRED SHALL BE COORDINATED WITH SIEMENS FIELD SERVICE ENGINEER AT TIME OF EQUIPMENT INSTALLATION.

1 MAGNET SIDE ELEVATION — NO SCALE



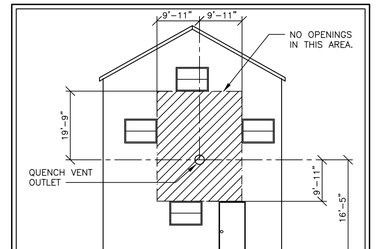
FLANGE AT THE 90° ELBOW FOR THE QUENCH VENT ADAPTER

CONNECTION OF THE QUENCH VENT PIPE TO FLANGE TO BE DESIGNED, DETAILED, AND SPECIFIED BY THE MECHANICAL ENGINEER OF RECORD TO BE FABRICATED AND INSTALLED BY THE MECHANICAL CONTRACTOR UNDER SIEMENS SUPERVISION. THE 90° ELBOW IS PART OF THE DELIVERY VOLUME, THE TWO FLANGES ARE IDENTICAL.

CONNECTING FLANGE

REV 0

2 QUENCH VENT — NO SCALE

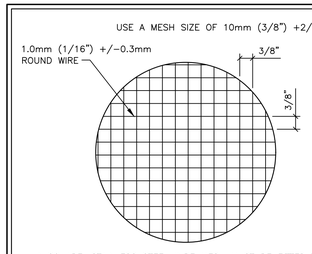


IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET MUST BE TURNED DOWN BY NOT LESS THAN THE LINE OF THE DIAMETER TO PREVENT RAIN INGRESS. THE EXIT MUST BE SITUATED WHERE IT CANNOT BE BLOCKED BY DRIFTING SNOW.
TO AVOID RISK OF INJURY FROM COLD BURNS AND ASPHYXIATION, ACCESS TO THE QUENCH VENT 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.

OUTLET SAFETY CLEARANCES

REV 1

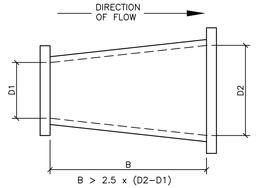
– QUENCH VENT — NO SCALE



A SQUARE, STAINLESS STEEL WIRE MESH MUST BE FITTED TO ALL OUTLETS. THE AREA OF THE MESH MUST BE >2.5 TIMES THE AREA OF THE QUENCH VENT OUTLET.

REV 1

3 QUENCH VENT MESH — NO SCALE



EXPANSION TO A GREATER DIAMETER TUBE CAN BE ACCOMPLISHED BY USE OF A DIFFUSER. THE DIFFUSER MUST MEET QUENCH VENT REQUIREMENTS AND THE GEOMETRIC PARAMETERS SHOWN HERE. THE DIAMETER OF THE PIPE SHOULD NEVER DECREASE IN THE DIRECTION OF FLOW.

REV 0

– QUENCH VENT DIFFUSER — NO SCALE

HELIUM CONTENT

MAXIMUM LIQUID FILL	1,356 LITERS	
TYPICAL BOIL OFF RATE	0.0 L/HR	FOR TYPICAL CLINICAL USE, DEPENDING ON SEQUENCES AND OPERATING TIME.
TYPICAL REFILL INTERVAL	NA	

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.

SOLA REV 14

SYM	DATE	DESCRIPTION
1	06/06/22	2200757RD DATED 05/17/22 APPROVED BY CUSTOMER FOR FINALS

–ISSUE BLOCK–

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SIEMENS

GRADY HEALTH SYSTEM
80 JESSE HILL JR DR SE, ATLANTA, GA 30303
MRI SUITE – MRI 3 – MAGNETOM SOLA XQ GRADIENTS

PROJECT #: 2200757

SHEET: M-501

SHEET OF 10 10

DRAWN BY: D. BRISTOE

SCALE: AS NOTED

REF. #: 30261311

DATE: 06/06/22

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.

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