GOVERNMENT HOSPITALS & HEALTH FACILITIES CORPORATION TERRITORIAL HOSPITAL REDEVELOPMENT TEAM

4007 Estate Diamond Ruby
Christiansted, VI 00821
(340)-778-6311

9048 Sugar Estate
St. Thomas, VI 00802
(340)776-8311

Amendment Six (6)

IFB-001-THRT-T-023 (C) Renovation of the Charlotte Kimelman Cancer Institute
June 7, 2023

I. Insert Questions and Answers:

Questions	**Answers**
Fire Protection Plan FP001 General Note 2.2 requires schedule 40 pipe with threaded fittings for 2" and smaller pipes, this is more expensive than using schedule 10 pipe with grooved fittings. Wheatland schedule 10 pipe has a higher than 1.0 CRR. Would Wheatland schedule 10 pipe be acceptable for pipe sizes lower than 2"?	**Provide as specific on contract drawings and spec section 211313.**
Fire Protection Plan FP001 General Note 1.10 States the speed of water shall not exceed 20 ft/s to demonstrate compliance with the requirements of NFPA-13. This is not a requirement per NFPA 13, which states that there's no speed limit for the water and we would have increase pipe diameters in order to meet the limit on the maximum velocity.	**Provide as specific on contract drawings and spec section 211313.**
What type of temporary fire protection during construction will be required? will the temporary standpipe be enough, or will we be required to maintain uninterrupted fire protection from the old sprinkler system during construction?	**Provide temporary standpipe per NFPA 241.**

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Are the Wood Blocking for soffits and wooden ceilings made of fire treated as per NFPA703? If not, additional sprinkler protection within these spaces are required.	**Any wood blocking to be FRT.**
Indicate if alternate manufacturers and models will be accepted for the lighting fixtures specified on the Lighting Fixture Schedule shown on Drawing E201.	**Yes - equal alternates will be accepted.**
Indicate if the emergency generator diesel tanks (10,000gals Main Tank 250-gals Day Tank) shall be left completely filled up by the contractor.	**Yes - after testing tank shall be filled.**
Please provide the Varian Medical Systems True Beam Edition Manual & the CT Vendor Shop Drawings in order to be able to provide all customer required labor and materials for the Linear Accelerator & Simulator Rooms (See Enlarged Plan Detail #3 on Drawing E201).	**The vendor has just been awarded so shop drawings have not been created. Typicals have been provided. Contractor to coordinate with final site-specific shop drawings upon receipt.**
Please provide the size of the primary electrical feeder (15kV Cables) that will be installed from the new 1,500kVA Pad Mounted Transformer up to existing VIWAPA Utility Source (See Electrical Riser Diagram on Drawing E401).	**See sheet E-100 for the additional information requested.**
Clarify if the contractor should be responsible for furnishing and installing the New 1,500kVA Pad Mounted Transformer and its associated electrical primary feeder or if these works shall be by VIWAPA.	**Yes - contractor will be responsible for furnishing and installing the New 1,500kVA Pad Mounted Transformer and its associated electrical primary feeder.**

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Please clarify for which of the following Special Systems the wires/cables can run exposed (plenum rated) above ceilings without the use of electrical conduits and using only J-Hooks. Voice & Data Audio Visual Security (Cameras & Access Control) Nurse Call Fire Alarm Broadband Television Distributed Antenna	**Fire Alarm shall be in conduit, others listed can plenum rated on j-hooks .**
Please confirm that the existing elevator shaft will remain as mentioned in Pre-Bid Walk-Through Meeting dated 5/16/23. In addition, please verify if we are required to use the same elevator provider currently in the hospital for all new elevator cab, equipment & components identified in these bid drawings.	**Shaft to be removed and reconstructed per construction documents. See section 14 21 23.01 for scope of work. Match existing vendor for elevator in CKCI. Kone representative is Beth Taylor who has provided details for the elevator for the design team and is familiar with the scope (1-901-758-8320).**
Confirm that existing spray applied fireproofing shall remain and no new fireproofing is required on structural steel and metal decks.	**To remain and be repaired if damaged by new construction.**
Please provide the USP regulatory codes applicable to the implantation of pharmacy lab.	**USP 797 and 800 current additions.**

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New Double Door (#RLSH-1) is shown on demising wall to 2nd floor hospital space. During the Pre-Bid Walkthrough Meeting on 5/16/23, it was mentioned that an automatic overhead fire curtain will be required to conceal door so that it does not get confused with the adjacent emergency egress door. Please confirm and provide fire curtain specs and details.	**See door C2C6-B in schedule. Overhead Door Fire Rated Door or equivalent.**
Existing 2nd floor terrace has concrete pavers elevated on pedestals that are to be demolished. Confirm terrace deck consists of roof membrane, topping slab, & metal deck to remain for build-out of Exam Rooms & Nurse Stations. In addition, confirm that no modifications to the deck are required to maintain continuous transition between corridor and nurse station.	**Confirmed, per the existing building drawings, the terrace deck is a 5-1/2" composite slab on metal deck. Other than removing the curb at the transition between the outdoor terrace and interior space, no other structural modifications are anticipated. Scope will include removing existing access stair and concrete curb. Repair and float concrete surface as required to remain continuous transition appropriate for new flooring in that area. Include add alternate to repour that floor area if anticipated.**
In addition, the concrete foundation pad identified on the structural bid drawings will be used in this bid in lieu of Manufacturers recommended foundation design.	**Tanks and their connections are a delegated design by the manufacturer, foundations should be as shown on the bid drawings or the manufacturer's requirements whichever is more stringent.**
Provide the Pin location for each tank site.	**Tanks and their connections are a delegated design. This shall be determined by the tank designer.**
Please confirm that the corrosion resistant Aquastore Model 2219 (22' dia. x 19' ht.) providing 45,000 US gallons of usable storage is an acceptable tank model. Glass coating's physical properties are specially suited to municipal and industrial storage applications.	**Tank specification has already been generated by Florida AquaStore contact Gustavo Tellez at +1-561-866-6237 for more info.**

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Please confirm that Glass-Fused-to-Steel Bolted Tank manufactured in the USA (or Approved Equal) will be the only tank accepted. Is a vitrium, 3 coat, 1 fire coating with white interior in the 10-18 mils range be required for this project? If not, what alternatives will be accepted? Painted tanks should not be considered given the aggressive elements in the tank location.	**Tank specification has already been generated by Florida AquaStore contact Gustavo Tellez at +1-561-866-6237 for more info.**
Please confirm that all materials incorporated in the glass-fused-to-steel tank panels must comply with Section 4: Materials of the AWWA D103-19 standard and steels materials of unidentified analysis will NOT be accepted. If steel materials of unidentified analysis will be accepted, please confirm that all tenderers will be advised of this exception.	**Tank specification has already been generated by Florida AquaStore contact Gustavo Tellez at +1-561-866-6237 for more info.**
Please specify the type of roof structure for the tanks. Please confirm whether a free-span geodesic aluminum dome or glass-fused-to-steel roof, self- supporting from the periphery structure. Please confirm that no internal columns will be permitted.	**Tank specification has already been generated by Florida AquaStore contact Gustavo Tellez at +1-561-866-6237 for more info.**
Please confirm whether the roof structure must be provided by the same manufacturer as the tank?	**Tank specification has already been generated by Florida AquaStore contact Gustavo Tellez at +1-561-866-6237 for more info.**
Please indicate whether the results of the geotechnical survey for the tank sites are available. If so, please provide. If not, please confirm that the tenderer may make assumptions with respect to its foundation design. Should the geotechnical analysis identify subsoil conditions outside of the standard, the foundation price and tank design are subject to change.	**Geotech provided. See attached.**

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Please confirm that an interior cathodic protection system is required.	**Tank specification has already been generated by Florida AquaStore contact Gustavo Tellez at +1-561-866-6237 for more info.**
lease confirm that a glass-fused-to-steel floor design will be the only floor design accepted.	**Confirmed.**
Please confirm that the contractor should assume for bidding purposes 3000 PSF soil and no differential settlement/expansive clays for tank footer design and pricing. Confirm whether the bidder will have to perform the soils report and that the foundation will be adjusted after the soils report is obtained.	**Refer to note 3.01 on S001.**
Please confirm that the tanks should be designed as follows: Seismic Design: IBC 2018/2021/AWWA D103-19 – Seismic Site Class D – Seismic Importance Factor 1.5 Wind Design: IBC 2018/2021 w/ ASCE 7-16 - Wind Speed 200 MPH – Wind Exposure Value: C – KzT: 1.5 - see attached files (2)	**Refer to notes 2.05 (Based on US Virgin Islands Special Wind Region 2019) and 2.06 on S001.**
Confirm that interior metal framing on perimeter windowsills and header will remain.	**Yes-except for any modifications required to accommodate new layout.**
Please identify which equipment support stands on roof shall be re-used and which ones are required to be removed.	**The roof mounted railing that remains is shown on M201 where the AHUs are mounted. All other unused rooftop railing to be demolished.**
Confirm that all existing glass skylights are to be removed and replaced with new glass on existing openings.	**Contractor to remove skylight and infill roof structure. See S103 and detail C5/S403.**

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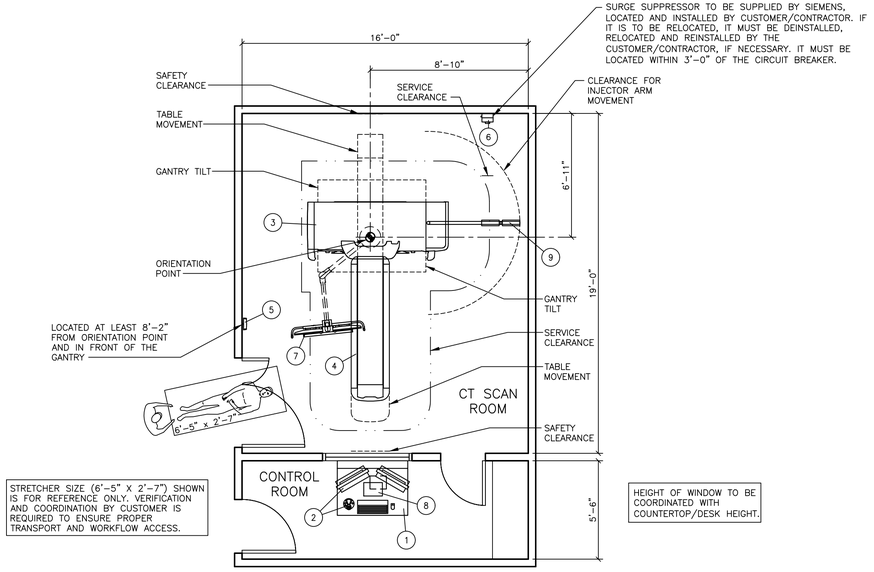
Existing Stair #2 that will be demolished has FP standpipe supplying hospital that will remain exposed along corridor C2C6 and on ground floor. Please advise.	**Corridor is on level 2 and is fed from level 2 of the existing hospital. Based on engineer survey of site the existing piping should not serve hospital.**
Please confirm scope of work for note tag 8 on Roof demo drawing.	**Roofing assemblies to be removed down to steel deck.**
The specification section 28 31 11, page 15 section 2.4 C states that only rotary decimal switches are allowed. The Siemens devices in existing Hospital do not use rotary decimal switches for address setting and this is not available with any siemens' devices. Can this part of the specification be removed?	**Siemens is not basis of design or required manufacturer – Siemens alternate for address settings can be submitted for review and acceptance.**
Drawing M602: Chiller Controls sequence of operations mentions chilled water pumps to be factory mounted on chiller by chiller manufacturer. Drawing M201 shows chiller pumps in a separate concrete pad - not as part of the chiller. Please clarify.	**Pumps are in pump room not on chiller skid. Refer to sheet M201 for details.**

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.
A COPY OF THIS AMMENDMENT MUST BE RETURNED WITH YOUR BID

"Together We Are Stronger"



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	OPERATING CONSOLE (OPTION)	(X)	79.5	---	47 1/4	36 5/8	29 3/4	1200mm
2	23" FLAT SCREEN DUAL MONITORS, KEYBOARD AND CONTROL DEVICE	(XA)	20	---	22 1/2	9 1/4	19 3/8	
3	SOMATOM GO.SIM GANTRY WITH INJECTOR ARM (OPTION)	(B)	3,582	23,203	94 1/2	39 1/4	82 3/8	
3	SOMATOM GO.OPEN PRO GANTRY WITH INJECTOR ARM (OPTION)	(B)	3,765	24,226	94 1/2	39 1/4	82 3/8	
4	PATIENT TABLE – VARIO RT	(N)	745	1,024	96 5/8	25 5/8	21 3/4	RT, MAX. HEIGHT 38"
5	WIRELESS ACCESS POINT (OPTION)	(W)	2.5	–	–	–	–	HEIGHT OFF FF: > 6'-6 3/4"
6	EATON SURGE PROTECTIVE DEVICE PANEL (OPTION)	(PA)	13.5	---	7 1/2	6 11/16	12	WALL MOUNTED
7	CARE VISION DUAL MONITOR (OPTION)	(T)	122	---	---	---	---	CEILING MOUNTED
8	MEDRAD DISPLAY CONTROL UNIT/BASE UNIT (OPTION)	(K)	---	---	---	---	---	BASE UNIT CAN BE PLACED UNDER COUNTER
9	GANTRY MOUNT MEDRAD INJECTOR (OPTION)	(I)	---	---	---	---	---	SEE MFG SPECIFICATIONS

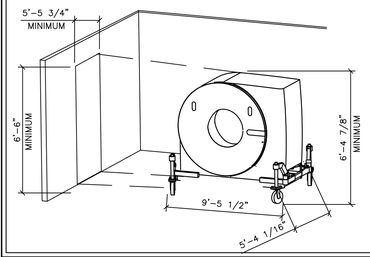
TRANSPORT AND DELIVERY NOTES

TOTAL GANTRY TRANSPORT WEIGHT: 4,182 LBS.

GANTRY WITHOUT TRANSPORT DEVICE: 3,765 LBS.
TRANSPORT DEVICE: 417 LBS.

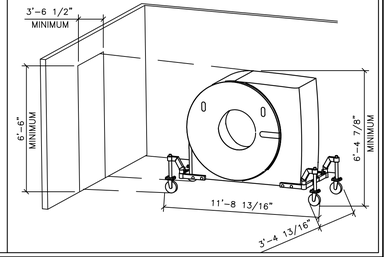
NORMAL TRANSPORT REQUIREMENTS:

DURING THE MOVEMENT OF THE GANTRY THROUGH CORRIDORS THE TRANSPORT CASTERS ARE SWIVELED OUT FOR STABILITY AS SHOWN BELOW. THE MAXIMUM WIDTH IS 5'-4 1/16" AND THE MAXIMUM LENGTH IS 9'-5 1/2" WHEN CASTERS ARE SWIVELED OUT.



NARROW SPACE TRANSPORT REQUIREMENTS:

WHEN TRANSPORTING THE GANTRY THROUGH A NARROW SPACE OR DOORWAY THE TRANSPORT CASTERS ARE SWIVELED IN AS SHOWN BELOW. THE MAXIMUM WIDTH IS 3'-4 13/16" AND THE MAXIMUM LENGTH IS 11'-8 13/16". THE GANTRY CAN FIT THROUGH A 3'-3 3/8" OPENING WHEN THE TRANSPORT ADAPTER IS REMOVED.



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) 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) 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.
8) 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.).
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 SIEMENS EQUIPMENT AND ANY ASSOCIATED SUPPORT APPARATUS.
10) 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.

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) THE SOUND SYSTEM AND INTERCOM BETWEEN THE EXAMINATION AND CONTROL ROOMS ARE TO BE LOCATED, FURNISHED AND INSTALLED BY THE CUSTOMER/CONTRACTOR.
3) ALL FURNITURE (CHAIRS, ETC.) FOR THE CONTROL ROOM ARE TO BE PROVIDED BY THE CUSTOMER.

STATE AGENCY REVIEW

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

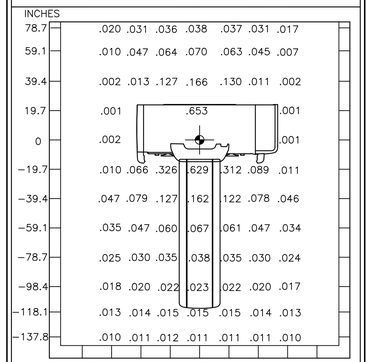
	Project Milestones To Be Completed Before Equipment Delivery	Reference Sheet
☐	Lead shielding (walls, doors, windows) complete	A-102
☐	Climate control functioning 24 hours a day, 7 days a week	A-101
☐	Delivery path verified	A-101
☐	Casework complete in exam and control rooms	A-101
☐	Floor levelness verified and within specifications	S-501
☐	Floor thickness verified and within specifications	S-501
☐	All conduits, troughs, and core drills are outside of the No Core Drill areas	E-102
☐	Carevision anchor plate installed (if applicable)	S-102
☐	Overhead injector support structure and plate installed (if applicable)	S-102
☐	Ceiling height verfied (check min. height with options)	S-102
☐	Cables runs checked to ensure maximum length is not exceeded	E-101
☐	Cables inlets installed at locations per plans	E-102
☐	Main panel and breakers installed	E-102
☐	Contractor supplied electrical cabling and pigtails installed	E-102
☐	Contractor supplied EPO's installed and functioning	E-102
☐	Contractor supplied X-Ray warning light and wiring installed	E-501
☐	Outdoor chiller unit and service switch installed (water/air option) (if applicable)	M-101
☐	Indoor chiller unit installed (water/air option) (if applicable)	M-101
☐	Water lines flushed and pressure tested (for hard-piping only) (if applicable)	M-101
☐	Additional fittings/adapters ordered for hard piping (water/air option) (if applicable)	M-101
☐	Vertical distance between indoor and outdoor unit verified (water/air option) (if applicable)	A-101
☐	Extension cables installed for chiller if standard distance exceeded between indoor and outdoor units (water/air option) (if applicable)	M-101
☐	Facility water verified to meet equipment requirements (Facility supplied water option) (if applicable)	M-101
☐	Room lighting complete and functioning	A-101
☐	All rooms containing Siemens equipment are clean and dust free	A-101
☐	Network addresses obtained for Siemens Remote Services (SRS)	A-102

RESOURCE LIST (SMS USE ONLY)

DESIGNATION	PG NUMBER	DATE
SOMATOM GO	C2–081.891.01.15.02	05.20
COMMON CT	CT00–000.891.04.20.02	10.19
COMMON CT OPTIONS	CT00–000.891.03.45.02	03.20

GO–SIM REV 4

RADIATION SCATTER

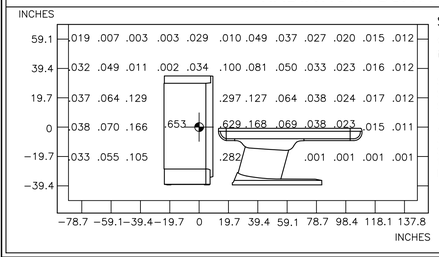


SOMATOM GO.SIM & GO.OPEN PRO

MEASUREMENT IN uGy/1 mAs SCALE 1/4"=1'-0"

STRAY RADIATION IS INDICATED ON THE BASIS OF THE SCANNER COORDINATE SYSTEM (INTERSECTION OF SCANNER AXIS WITH SCAN PLANE) AT THE MAXIMUM TUBE VOLTAGE AND MAXIMUM TOTAL COLLIMATION WIDTH. A CYLINDRICAL PMMA PHANTOM WITH A DIAMETER OF 32cm AND A LENGTH OF 15cm IS CENTERED IN THE SCAN PLANE FOR STRAY RADIATION MEASUREMENT. A 1000cm³ SPHERICAL DOSE CHAMBER WITH 140mm DIAMETER IS USED FOR THE MEASUREMENT.

RADIATION SCATTER



SOMATOM GO.SIM & GO.OPEN PRO

VERTICAL LOCAL DOSE DISTRIBUTION
MEASUREMENT IN uGy/1 mAs SCALE 1/4"=1'-0"

STRAY RADIATION IS INDICATED ON THE BASIS OF THE SCANNER COORDINATE SYSTEM (INTERSECTION OF SCANNER AXIS WITH SCAN PLANE) AT THE MAXIMUM TUBE VOLTAGE AND MAXIMUM TOTAL COLLIMATION WIDTH. A CYLINDRICAL PMMA PHANTOM WITH A DIAMETER OF 32cm AND A LENGTH OF 15cm IS CENTERED IN THE SCAN PLANE FOR STRAY RADIATION MEASUREMENT. A 1000cm³ SPHERICAL DOSE CHAMBER WITH 140mm DIAMETER IS USED FOR THE MEASUREMENT.

PLANNING REQUIREMENTS

EMERGENCY POWER OFF (EPO) BUTTONS ARE REQUIRED IN CONTROL AREA AND AT LEAST ONE LOCATION IN EXAMINATION OR SCAN ROOM.

DOOR (SAFETY) SWITCHES ARE REQUIRED ON ALL DOORS ACCESSING THE EXAMINATION ROOM IN ACCORDANCE WITH LOCAL CODES.

ENVIRONMENTAL CONDITIONS

AIR TEMPERATURE	MINIMUM 64.4°F TO 86°F MAXIMUM
RELATIVE HUMIDITY	20% TO 75%
ABSOLUTE HUMIDITY	MAXIMUM 30 G/M³ (NO CONDENSATION AT ANY TIME)
TEMPERATURE GRADIENT	MAXIMUM 6 KELVIN PER HOUR
BAROMETRIC PRESSURE	11.6 TO 15.4 PSI
INSTALLATION ALTITUDE	MAXIMUM 6562 FT. A.S.L

EXTERIOR AIR VENTS SHOULD BE EQUIPPED WITH A FILTRATION SYSTEM OF THE FILTER CLASS MERV 8 TO FILTER DUST PARTICLES >10 µm.

THE ROOM AIR SHOULD BE PROTECTED AGAINST CONTAMINATION BY HYDROGEN SULPHIDE, EVEN IN SMALL AMOUNTS. IF A DANGER OF SUCH CONTAMINATION EXISTS, CORRECTIVE ACTIONS HAVE TO BE TAKEN. E.G., EXTRACTOR FANS, SIPHON, MODIFICATION OF VENTILATION INTAKE, ETC.

NO SUNSHINE DIRECTLY ON GANTRY, INSULATION HAS TO BE APPLIED TO WINDOW (EX. CURTAIN)

FINISHED ROOM HEIGHT

FOR CT GANTRY ONLY	MINIMUM 7'-2 5/8"
FOR CT GANTRY WITH GANTRY ARM	MINIMUM 7'-10 1/2"
CAREVISION MONITOR/CEILING MOUNT	SEE DETAIL ON S-102 SHEET

SYM	DATE	DESCRIPTION
△	N/A	TYPICAL REV 4

–ISSUE BLOCK–

SIEMENS

SOMATOM GO.SIM & GO.OPEN PRO
TYPICAL FINAL DRAWING SET

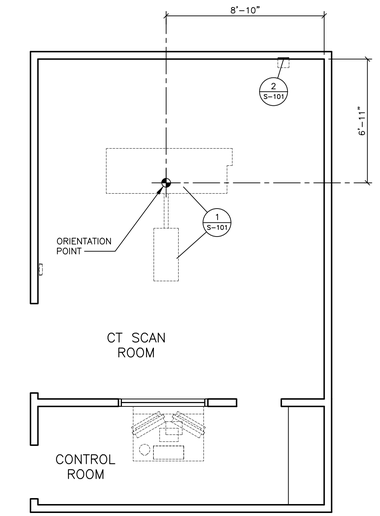
PROJECT #: 19078
SHEET OF: 1 5
DRAWN BY: L. BACH
SCALE: AS NOTED
REF. #:
DATE:
SHEET: A-101

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

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

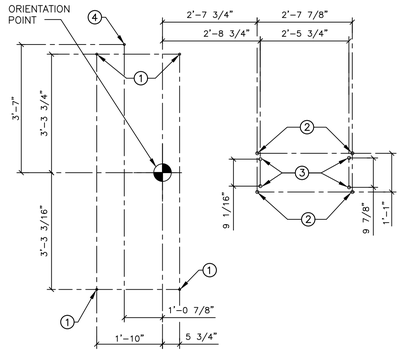


STRUCTURAL FLOOR PLAN

SCALE: 1/4" = 1'–0"

THE GANTRY AND PATIENT TABLE ARE SUPPLIED AND INSTALLED BY SIEMENS.

THE CONCRETE FLOOR MUST BE LEVEL WITHIN 3/8" MAXIMUM DEVIATION IN THE AREA AROUND THE BASE OF THE GANTRY AND THE BASE OF THE PATIENT TABLE.



① (4) 11/16"ø HOLES THROUGH THE ADJUSTABLE FEET TO MOUNT THE GANTRY TO THE FLOOR IF REQUIRED, EX. EARTHQUAKE ZONES.

② (4) 1"ø HOLES THROUGH FLOOR PLATE TO MOUNT THE PATIENT TABLE TO THE FLOOR.

③ (4) 1"ø ALTERNATE MOUNTING HOLES.

④ THIS FOOT MUST TOUCH THE FLOOR WHEN GANTRY IS TILTABLE.

MAXIMUM POSSIBLE EXTRACTION FORCE AT THESE POINTS IS 3776 POUNDS. (INCLUDES SAFETY–FACTOR 4).

FLOOR SURFACE REQUIREMENTS

THE GANTRY AND PATIENT TABLE MUST BE INSTALLED ON THE SAME PLANE. IT IS THE CUSTOMER'S RESPONSIBILITY TO MEET FLOOR LEVELNESS SPECIFICATIONS AS OUTLINED IN THIS DETAIL. THE GANTRY AND PATIENT TABLE MUST BE PLACED DIRECTLY ON THE CONCRETE FLOOR. EXISTING FLOOR COVERING IN THE AREA OF THE INSTALLATION SUPPORT SURFACE AND ATTACHMENT POINTS OF THE GANTRY AND THE ENTIRE FOOTPRINT AREA OF THE PATIENT TABLE BASE MUST BE REMOVED AND REPLACED WITH SHIMS OF THE APPROPRIATE THICKNESS. THE GANTRY AND PATIENT TABLE RESTS ON ADJUSTABLE FEET AND ANY LEVELING IS DONE WITH THE ADJUSTABLE FEET.

BOLTING REQUIREMENTS

THE WEIGHT CAPACITY OF THE FLOOR MUST BE EVALUATED BY A STRUCTURAL ENGINEER. BOLTING THE GANTRY TO THE FLOOR IS ONLY NECESSARY WHEN LOCAL OR NATIONAL REGULATIONS REQUIRE IT (EXAMPLE: EARTHQUAKE ZONES). BOLT THE GANTRY TO THE FLOOR USING ANCHORS THROUGH THE ADJUSTABLE FEET. MATERIALS FOR BOLTING MUST BE SUPPLIED ON–SITE.

THE PATIENT TABLE MUST ALWAYS BE BOLTED TO THE FLOOR THROUGH THE ATTACHMENT POINTS IN THE TABLE PEDESTAL. A DRILLING TEMPLATE AND ALL INSTALLATION MATERIALS ARE INCLUDED IN THE DELIVERY FOR STANDARD ANCHORING. ANCHOR: WURTH ANCHOR W–HAZ/S M10/25 USED WITHOUT COMPOSITE FLOORING, W–HAZ/S M10/45 USED ONLY ON VARIO RT WITHOUT COMPOSITE FLOORING OR WURTH ANCHOR W–HAZ/S M10/95 USED WITH COMPOSITE FLOORING. (MIN. CONCRETE THICKNESS 5 1/2"). DRILL AND TOOLS TO BE AVAILABLE ON–SITE. THE MINIMUM EXTRACTION FORCE OF 944 POUNDS PER ATTACHMENT POINT IS REQUIRED.

THE FOLLOWING APPROVED CHEMICAL ANCHORS MAY BE USED WHEN STANDARD ANCHORS ARE NOT POSSIBLE. TO BE SUPPLIED BY THE CUSTOMER/CONTRACTOR:

1. HILTI INJECTABLE ADHESIVE ANCHOR: HIT–RE 500–V3 HARDENING TIME AT TEMP. FROM 68°–75° – 7 HOURS
2. HILTI INJECTABLE ADHESIVE ANCHOR: HIT–HY 200–A HARDENING TIME AT TEMP. FROM 70°–86° – 30 MIN.
3. HILTI INTERNALLY THREADED INSERT: HIS–N M10X110 USE THIS SIZE WHEN REPLACING AN ANCHOR. MIN. CONCRETE THICKNESS: 6"
4. HILTI INTERNALLY THREADED INSERT: HIS–N M8X90 USED WHEN MOUNTING HOLES HAVE NOT BEEN DRILLED. MIN. CONCRETE THICKNESS: 4 3/4".

IT IS THE RESPONSIBILITY OF THE STRUCTURAL ENGINEER TO DETERMINE THE ANCHORING DEPTH AND CONCRETE STRENGTH NEEDED TO INSTALL THE TABLE BASE WITH THE SIEMENS SUPPLIED ANCHORS OR EQUIVALENT ANCHORS SPECIFIED BY THE STRUCTURAL ENGINEER AND SUPPLIED BY THE CUSTOMER/ CONTRACTOR.

1 | GANTRY AND PATIENT TABLE MOUNTING DETAIL | SCALE: 1/2"=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 STRUCTURAL INFORMATION SHOWN, AND LOCAL GOVERNING BUILDING CODES.
10) ALL ANCHORS, SUPPORTS AND BRACES FOR SECURING THE SIEMENS EQUIPMENT ON THE UNDERSIDE OF THE CONCRETE SLAB (WHETHER SUPPLIED BY SIEMENS OR CONTRACTOR) SHALL BE SECURED IN A MANNER TO PREVENT THEM FROM FALLING DURING A DE–INSTALLATION. ALL WORK FOR SECURING THESE MOUNTS SHALL BE BY THE CONTRACTOR.

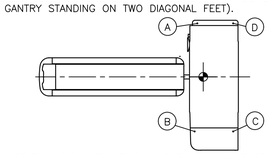
FLOOR LOADING

DESCRIPTION	
F STAT MAX	STATIC FLOOR LOAD DUE TO GANTRY'S OWN WEIGHT
AMPLITUDE F DYN	DIFFERENCE BETWEEN MINIMUM AND MAXIMUM FLOOR LOADING DURING GANTRY ROTATION

TABLE OF PARAMETERS

GANTRY MEASUREMENT POINTS	F STAT MAX (POUNDS)	AMPLITUDE FOR F DYN (POUNDS)	SUPPORT SURFACE	DIAMETER
A	771	+/– 67	2 1/2 IN²	2 1/8 IN
B	1036	+/– 67		
C	1182	+/– 67		
D	850	+/– 67		

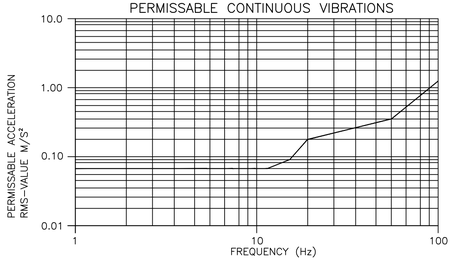
THE FLOOR STRUCTURE MUST WITHSTAND THE OCCUPIED WEIGHT OF THE GANTRY AND THE INDIVIDUAL CONTACT LOADING AREA. DURING GANTRY INSTALLATION AND LEVELING, THE MAXIMUM POSSIBLE LOAD ON ONE GANTRY FOOT IS 2219 POUNDS (WITH THE GANTRY STANDING ON TWO DIAGONAL FEET).



TOTAL STATIC LOAD, RESULTING IN THE CENTER OF GRAVITY OF THE GANTRY: 3840 POUNDS.

FLOOR AND BUILDING VIBRATIONS

PERMISSABLE CONTINUOUS VIBRATIONS

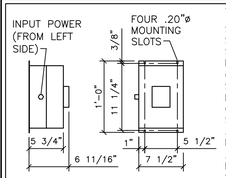


TRANSIENT VIBRATIONS (SHOCKS)

ANY TRANSIENT VIBRATION HAS TO BE LESS THAN 0.5 M/S² PEAK–TO–PEAK IN THE TIME DOMAIN. THE VIBRATIONS HAVE TO BE MEASURED WITH A SAMPLING RATE OF 1000Hz.

THE CT SYSTEM IS NOT SENSITIVE TO COMMON VIBRATIONS. IF THE CT IS AWAY FROM VIBRATIONAL SOURCES OR THE CT IS REPLACING A CT SYSTEM, THAT TO DATE, HAS NOT SHOWN IMAGE QUALITY PROBLEMS DUE TO VIBRATIONS, IT IS USUALLY NOT NECESSARY TO EXECUTE VIBRATIONAL MEASUREMENTS. IF THERE ARE ANY DOUBTS, THE FOLLOWING THRESHOLDS HAVE TO BE VERIFIED BY MEASUREMENT:
IN THE THREE SPATIAL DIRECTIONS, ACCELERATION IN VIBRATIONS AT THE MOUNTING POINTS OF THE GANTRY AND THE PATIENT TABLE MUST NOT EXCEED THE THRESHOLDS AS DESCRIBED HERE.

THE THRESHOLD IS DEFINED AS ACCELERATION RMS VALUE (ROOT MEAN SQUARE) IN M/S² OF AN FFT SPECTRUM DERIVED WITH A FREQUENCY RESOLUTION OF 1 Hz AND USING A HANNING–WINDOW. THE VIBRATIONS HAVE TO BE MEASURED WITH A SAMPLING RATE OF 1000Hz USING AN ANTI–ALIASING–FILTER WITH A LIMIT FREQUENCY OF 250Hz. THE THRESHOLD IS VALID FOR VIBRATIONS AT THE INSTALLATION LOCATION WITH A CT IN POSITION. MEASUREMENTS MUST BE TAKEN PRIOR TO THE INSTALLATION OF THE CT, THEREFORE CHANGES IN THE EIGENFREQUENCY OF THE SLAB CAUSED BY THE ADDITIONAL MASS OF THE CT MUST BE CONSIDERED WHEN COMPARING THE FREQUENCY SPECTRUM WITH THE THRESHOLD.



WEIGHT: 13.5 LBS.

SURGE SUPPRESSOR, SUPPLIED BY SIEMENS AND INSTALLED BY THE CUSTOMER/CONTRACTOR. SURGE SUPPRESSOR IS WALL MOUNTED, CONTRACTOR TO SUPPLY BACKING AND MOUNTING HARDWARE. MAINTAIN A MINIMUM OF 36" IN FRONT OF SURGE SUPPRESSOR FOR SERVICE.

PARALLEL SURGE SUPPRESSOR UNIT MUST BE LOCATED WITHIN 3 FEET CABLE RUN FROM CIRCUIT BREAKER.

EATON SPD REV 1

2 | SURGE SUPPRESSOR | SCALE: NONE

FINISHED ROOM HEIGHT

FOR CT GANTRY ONLY	MINIMUM 7'–2 5/8"
FOR CT GANTRY WITH GANTRY ARM	MINIMUM 7'–10 1/2"
CAREVISION MONITOR/CEILING MOUNT	SEE DETAIL ON S–102 SHEET

ATTENTION:

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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
△	N/A	TYPICAL REV 4

–ISSUE BLOCK–

GO–SIM REV 4

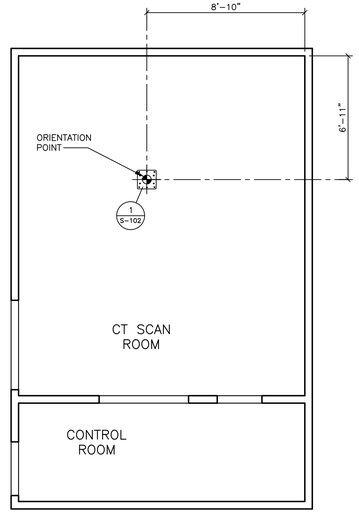
SIEMENS

SOMATOM GO.SIM & GO.OPEN PRO
TYPICAL FINAL DRAWING SET

PROJECT #: 19078
SHEET: S–101
SHEET 2 OF 5
DRAWN BY: L. BACH
SCALE: AS NOTED
REF. #:
DATE:

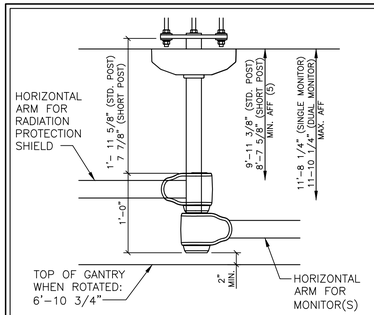
NOT FOR CONSTRUCTION – REFERENCE DOCUMENT

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

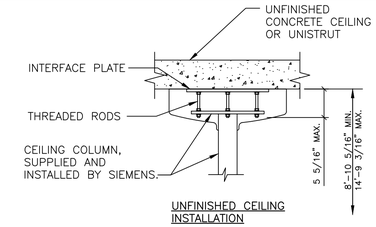


STRUCTURAL CEILING PLAN

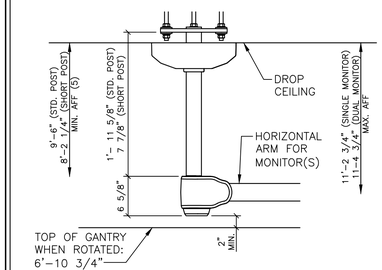
SCALE: 1/4" = 1'-0"



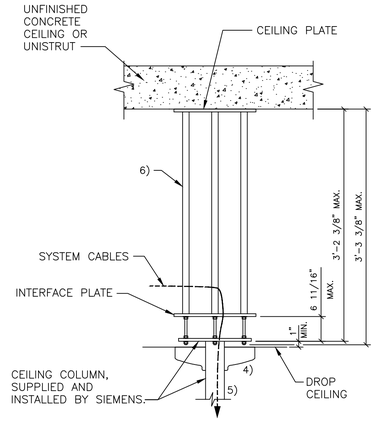
MONITOR CEILING SYSTEM (MCS) WITH TWO HORIZONTAL ARMS



UNFINISHED CEILING INSTALLATION



MONITOR CEILING SYSTEM (MCS) WITH ONE HORIZONTAL ARM

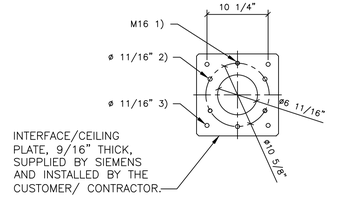


INTERMEDIATE CEILING INSTALLATION

THE WEIGHT CAPACITY OF THE CEILING MUST BE EVALUATED BY A STRUCTURAL ENGINEER.

1) THREE M16 THREADED HOLES FOR THE THREADED RODS IN THE CEILING PLATE.
2) THREE 11/16" THREADED HOLES FOR THE THREADED RODS IN THE INTERFACE PLATE.
3) FOUR 11/16" HOLES FOR MOUNTING TO UNFINISHED CEILING.
4) CANOPY "SMALL" – ø1'-2 3/16"
"BIG" – ø1'-11 5/8"
"BIG" CANOPY IS MANDATORY FOR UNFINISHED CEILING INSTALLTION.
5) STANDARD CEILING COLUMN CAN BE PARTIALLY INSTALLED ABOVE THE DROP CEILING TO GAIN MORE DISTANCE TO THE GANTRY TO ACCOMMODATE A LOWER CEILING. SHORTENING OF THE CEILING COLUMN IS NOT PERMITTED. LENGTH OF CEILING COLUMN IS 1'-11 5/8".
6) SPACER SLEEVES CONTAINING THREADED RODS SUPPLIED BY SIEMENS AND INSTALLED BY THE CUSTOMER/CONTRACTOR. THREADED RODS ARE SUPPLIED IN 3'-3 3/8" LENGTHS AND MAY BE SHORTENED TO ACCOMMODATE CEILING HEIGHT.

4 ANCHORS ARE INCLUDED IN THE DELIVERY VOLUME, HILTI HST 3 M16 OR FISCHER FAZ II 16/25. EXTRACTION FORCE IS MIN. 1,349 LBS. AT EACH CEILING MOUNTING POINT.



1	CARE VISION MONITOR CEILING MOUNT DETAIL	SCALE: NONE

FINISHED ROOM HEIGHT	
FOR CT GANTRY ONLY	MINIMUM 7'-2 5/8"
FOR CT GANTRY WITH GANTRY ARM	MINIMUM 7'-10 1/2"
CAREVISION MONITOR/CEILING MOUNT	SEE DETAIL ON S-102 SHEET

GO-SIM REV 4

SYM	DATE	DESCRIPTION
△	N/A	TYPICAL REV 4

-ISSUE BLOCK-

SIEMENS

SOMATOM GO.SIM & GO.OPEN PRO
TYPICAL FINAL DRAWING SET

PROJECT #: 19078
SHEET: S-102
SHEET 3 OF 5
DRAWN BY: L. BACH
SCALE: AS NOTED
REF. #:
DATE:

ATTENTION:

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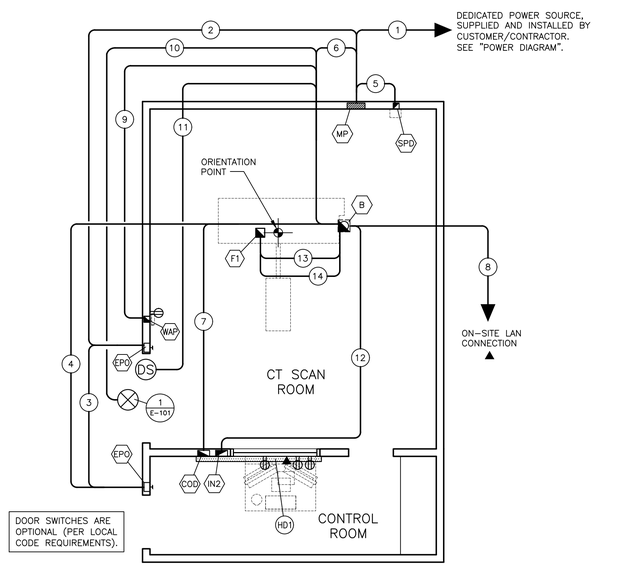
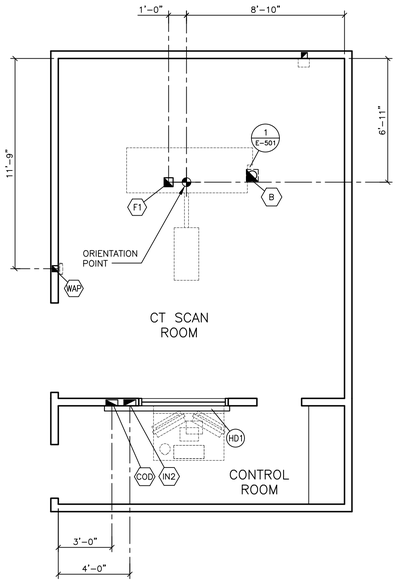
- THIS DRAWING DOES NOT PROVIDE RADIATION SHIELDING REQUIREMENTS FOR X-RAY AND ASSOCIATED EQUIPMENT. THE CUSTOMER IS RESPONSIBLE FOR CONSULTING WITH A REGISTERED RADIATION PHYSICIST TO SPECIFY RADIATION PROTECTION.

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION



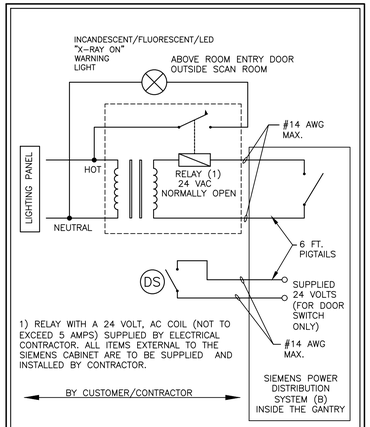
ELECTRICAL RACEWAY PLAN

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



ELECTRICAL DIMENSION PLAN

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



X-RAY WARNING LIGHTS AND DOOR SWITCH SCHEMATIC

1	AUXILIARY WIRING	SCALE: NONE

POWER REQUIREMENTS

SYSTEM	SUPPLY VOLTAGE (VOLTS)	POWER CONSUMPTION (kVA)	SUPPLY IMPEDANCE (mΩ)	MAIN CIRCUIT BREAKER (AMPS)
GANTRY WITH PATIENT TABLE	3ø 480/277Y ±10%	SEE BELOW	≤ 300	125

POWER CONSUMPTION OF GANTRY WITH PATIENT TABLE
OPERATING FOR 4 SEC. ≤ 115 kVA
OPERATING FOR 10 SEC. ≤ 100 kVA
OPERATING FOR 30 SEC. ≤ 75 kVA
OPERATING FOR 50 SEC. ≤ 63 kVA
OPERATING FOR 100 SEC. ≤ 40 kVA
STAND-BY - ≤ 3 kVA

IF AN ON-SITE TRANSFORMER IS REQUIRED TO OBTAIN CT OPERATING VOLTAGE, IT MUST BE OF SUFFICIENT CAPACITY AND CHARACTERISTICS TO MAINTAIN SUPPLY VOLTAGE AND IMPEDENCE REQUIREMENTS (TRANSFORMER AND CONDUCTORS).

DO NOT CONNECT ANY EXTERNAL USERS TO THE CT POWER LINES.

THE EXAMINATION ROOM SHOULD BE EQUIPPED WITH AT LEAST ONE EMERGENCY POWER OFF (PANIC) BUTTON.

SYMBOLS

ALL MAY NOT APPLY

	MAIN PANEL OR ENCLOSURE BY CUSTOMER/CONTRACTOR
	OPENING IN RACEWAY OR TRENCHDUCT
	PULLBOX IN (FLOOR/WALL/CEILING)
	OPENING IN ACCESS FLOORING
	WARNING LIGHT (X-RAY ON)
DS	DOOR SAFETY SWITCH
EPO	(EPO) EMERGENCY POWER OFF BUTTON
	TRENCHDUCT
	CEILING DUCT
	UNDER FLOOR DUCT
	SURFACE DUCT
	VERTICAL DUCT
	ETHERNET CONNECTION TO CUSTOMER'S INFORMATION SYSTEMS NETWORK (VERIFY WITH SMS PROJECT MANAGER).
	110 VOLT, 20 AMP, HOSPITAL GRADE DUPLEX OUTLET UNLESS OTHERWISE STATED.
	110 VOLT, 20 AMP, HOSPITAL GRADE QUAD OUTLET
L6-30R	SPECIAL PURPOSE RECEPTACLE

ELECTRICAL LEGEND

SYM	SIZE	DESCRIPTION	REMARKS
		SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR	
B	AS REQUIRED	PULL BOX MOUNTED BELOW FLOOR SLAB WITH A 5"ø CONDUIT RUNNING THROUGH THE FLOOR SLAB ENDING FLUSH WITH THE FINISHED FLOOR IN SHOWN LOCATION.	GANTRY CABLE ACCESS
CVA	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL AT THE FLOOR LINE IN CONTROL AREA IN SHOWN LOCATION PROVIDED WITH 3"ø OPENING IN FINISHED COVER.	
EPO	---	EMERGENCY POWER OFF BUTTON. EXACT LOCATIONS TO BE DETERMINED BY CUSTOMER/CONTRACTOR.	SEE POWER SCHEDULE
F1	AS REQUIRED	PULL BOX MOUNTED ABOVE FINISHED CEILING.	CARE VISION MONITOR CEILING MOUNT
IVC	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL AT FLOORLINE. THERE SHOULD ALSO BE AN ETHERNET CONNECTION AND (2) OUTLETS LOCATED NEAR THE PULL BOX TO SUPPLY 110/220 VAC.	INJECTOR CONTROL
MP	---	MAIN PANEL WITH MAIN BREAKER. EXACT LOCATION DETERMINED BY CUSTOMER/CONTRACTOR.	SEE POWER SCHEDULE.
SPD	AS REQUIRED	PULL BOX MOUNTED FLUSH WITH FINISHED WALL PROVIDED WITH 2"ø OPENING IN FINISHED COVER. THE SURGE PROTECTIVE DEVICE MUST BE LOCATED WITHIN 3 FEET CABLE RUN FROM CIRCUIT BREAKER, AT HEIGHT DETERMINED BY CUSTOMER/ CONTRACTOR.	SEE DETAIL S-101
WAP	8" x 8" x 4"	PULLBOX MOUNTED FLUSH WITH FINISHED WALL AT WIRELESS ACCESS POINT LOCATION AND 110 VOLT DUPLEX OUTLET. HEIGHT OFF FF: > 6'-6 3/4"	WIRELESS ACCESS POINT
HB1	6" x 3-1/2"	ELECTRICAL DUCT RUN HORIZONTALLY ON THE WALL AT THE FLOOR LINE AND SURFACE MOUNTED ON FINISHED WALL AS SHOWN FOR EXCESS CABLE STORAGE. LENGTH: 7'-0".	RACEWAY
1	AS REQUIRED	CONDUIT FROM POWER SOURCE TO "MP" SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
2	AS REQUIRED	CONDUIT FROM "MP" TO "EPO" SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
3	AS REQUIRED	CONDUIT FROM "EPO" TO "EPO" SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
4	AS REQUIRED	CONDUIT FROM "EPO" TO "B" SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
5	AS REQUIRED	CONDUIT FROM "MP" TO "SPD" SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
6	AS REQUIRED	CONDUIT FROM "MP" TO "B".	SEE POWER SCHEDULE
7	3"ø	CONDUIT FROM "B" TO "COD".	MAX. CONDUIT LENGTH 82'-0"
8	1"ø	CONDUIT (IF NEEDED) FROM "B" TO ON-SITE LAN	MAX. CONDUIT LENGTH 82'-0"
9	1"ø	CONDUIT FROM "B" TO "WAP".	MAX. CONDUIT LENGTH 66'-0"
10	AS REQUIRED	CONDUIT FROM "B" TO "WARNING LIGHT", SIZED BY ELECTRICAL ENGINEER OF RECORD.	
11	AS REQUIRED	CONDUIT FROM "B" TO "DS", SIZED BY ELECTRICAL ENGINEER OF RECORD.	
12	2-1/2"ø	CONDUIT FROM "IN2" TO "B".	MAX. CONDUIT LENGTH 100'-0"
13	2-1/2"ø	CONDUIT FROM "B" TO "F1".	MAX. CONDUIT LENGTH 65'-0"
14	2-1/2"ø	CONDUIT FROM "B" TO "F1".	MAX. CONDUIT LENGTH 101'-0"

CONTRACTOR SUPPLIED CABLES

FROM	VIA	TO	DESCRIPTION	REMARKS
POWER SOURCE	1	MP	3-PHASE CONDUCTORS, 1 NEUTRAL, 1 GROUND. SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
MP	2	EPO	DETERMINED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
EPO	3	EPO	DETERMINED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
EPO	4	B	DETERMINED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
MP	5	SPD	3-PHASE CONDUCTORS, 1 NEUTRAL AND 1 GROUND. SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
MP	6	B	3 PHASE CONDUCTORS, 1 NEUTRAL AND 1 GROUND. SIZED BY ELECTRICAL ENGINEER OF RECORD.	SEE POWER SCHEDULE
B	10	WARNING LIGHT	DETERMINED BY ELECTRICAL ENGINEER OF RECORD.	
B	11	DS	DETERMINED BY ELECTRICAL ENGINEER OF RECORD.	

SIEMENS SUPPLIED CABLES

FROM	VIA	TO	DESCRIPTION	REMARKS
B	7	COD	POWER AND DATA CABLES.	MAXIMUM LENGTH 88'-0"
B	8	ON-SITE LAN	ETHERNET CABLE	MAXIMUM LENGTH 88'-0"
B	9	WAP	ETHERNET CABLE	MAXIMUM LENGTH 72'-0"
IN2	12	B	MEDRAD INJECTOR CABLE	MAXIMUM LENGTH 100'-0"
B	13	F1	POWER CABLE	MAXIMUM LENGTH 68'-0"
B	14	F1	CONTROL CABLE	MAXIMUM LENGTH 104'-0"

CONDUIT LENGTH CALCULATIONS

IF SITE SPECIFIC CONDITIONS EXCEED THE FOLLOWING ASSUMED VALUES THEN ADDITIONAL LENGTH MUST BE SUBTRACTED BY THE ELECTRICAL CONTRACTOR FROM THE MAXIMUM CONDUIT LENGTHS LISTED.

IF DUCT LOCATIONS ARE ALTERED FROM THE SHOWN LAYOUT IT IS THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO RECALCULATE THE MAXIMUM CONDUIT LENGTHS.

ASSUMED VALUES USED IN CALCULATING STATED MAXIMUM CONDUIT LENGTHS:
VERTICAL DUCTS - 10'-0"
FLOOR PENETRATIONS - 3'-0"

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.

FINISHED ROOM HEIGHT

FOR CT GANTRY ONLY	MINIMUM 7'-2 5/8"
FOR CT GANTRY WITH GANTRY ARM	MINIMUM 7'-10 1/2"
CAREVISION MONITOR/CEILING MOUNT	SEE DETAIL ON S-102 SHEET

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 WITH 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 THE 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 THE 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 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 STRCTURE. THOSE THAT ARE NOT INDICATED OR INTERFER 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 INSTALLERS PULL SIEMENS SUPPLIED CABLES AT CUSTOMER'S 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 INSTALLERS PULL SIEMENS SUPPLIED CABLES AT CUSTOMER'S 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 A MINIMUM 10 FEET 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.

ATTENTION:

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- 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
△	N/A	TYPICAL REV 4

-ISSUE BLOCK-

GO-SIM REV 4

SIEMENS

SOMATOM GO.SIM & GO.OPEN PRO

TYPICAL FINAL DRAWING SET

SCALE: AS NOTED | REF. #:

PROJECT #: 19078

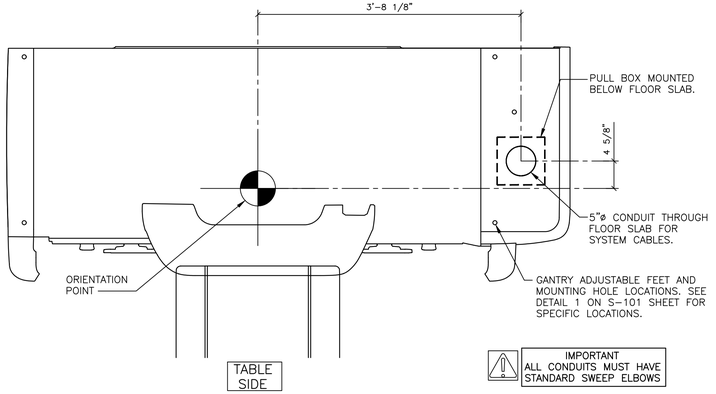
SHEET OF 4 5

DRAWN BY: L. BACH

DATE:

SHEET: E-101

NOT FOR CONSTRUCTION - REFERENCE DOCUMENT -

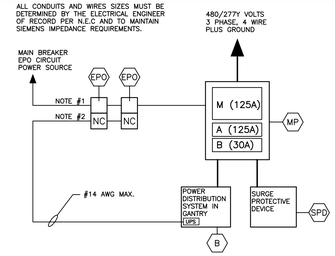


PLAN VIEW OF GANTRY CABLE INLETS

1 **GANTRY OPENINGS** SCALE: 1"=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.

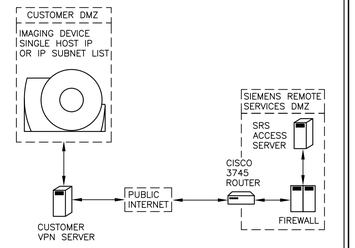


ITEM	QTY	DESCRIPTION				
MP	1	MAIN PANEL WITH CIRCUIT BREAKERS FLUSH OR SURFACE MOUNTED.				
M	1	MAIN BREAKER MUST HAVE TRIPPING DEVICE SO WHEN ANY EPO IS PRESSED THE BREAKER TRIPS.				
		MAIN BREAKER AMPS: 125				
		VOLTS	PHASES	NEUTRAL	GROUND	TOTAL WIRES
		480/277Y	3	1	1	5
A	1	BREAKER AMPS: 125 (FOR GANTRY "B")				
		VOLTS	PHASES	NEUTRAL	GROUND	TOTAL WIRES
		480/277Y	3	1	1	5
B	1	BREAKER AMPS: 30 (FOR SURGE PROTECTIVE DEVICE "SPD") (THIS BREAKER WILL NOT BE NEEDED IF THE SURGE PROTECTIVE DEVICE IS NOT PURCHASED)				
		VOLTS	PHASES	NEUTRAL	GROUND	TOTAL WIRES
		480/277Y	3	1	1	5
PHASE AND NEUTRAL WIRES TO BE SAME SIZE. GROUND PER NEC. 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 MAIN 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 CT (B) UPS ONLY. THE EPOs 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.				
UNLESS OTHERWISE NOTED, ALL ITEMS LISTED IN THIS SCHEDULE SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR. REV 1						

SIEMENS REMOTE SERVICE

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

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



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.

GO-SIM REV 4

ATTENTION:

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SYM	DATE	DESCRIPTION
△	N/A	TYPICAL REV 4

-ISSUE BLOCK-

SIEMENS

SOMATOM GO.SIM & GO.OPEN PRO
TYPICAL FINAL DRAWING SET

SCALE: AS NOTED | REF. #:

PROJECT #: 19078

SHEET OF 5 5

DRAWN BY: L. BACH

DATE:

SHEET: E-501

REFERENCE DOCUMENT - NOT FOR CONSTRUCTION

Since 1967
JACA & SIERRA
Testing Laboratory | Geotechnical Engineers

REVISION No.1 - GEOTECHNICAL REPORT

CHARLOTTE KIMELMAN CANCER INSTITUTE
ST. THOMAS, US VIRGIN ISLANDS

Submitted to:

Mr. Agyei Gregory, *Territorial Hospital Redevelopment Team*

Prepared by:

Manuel E. Candelario Cosme, MSCE, PE

Date: August 11, 2022

Job no. 8398

This document contains 38 pages including cover.

US Army Corps of Engineers Validated Laboratory

AASHTO ACCREDITED

CERTIFIED NMSDC MBE 2021

Table of Content

GEOTECHNICAL REPORT

CHARLOTTE KIMELMAN CANCER INSTITUTE
ST. THOMAS, USVI

1.0 INTRODUCTION:

This report presents the results of the geotechnical exploration conducted for the Charlotte Kimelman Cancer Institute located in St. Thomas, USVI. *Jaca & Sierra Engineering, PSC* was contracted by the *Territorial Hospital Redevelopment Team* to provide geotechnical recommendations for a renovation project. The existing structure will remain, while selective interior areas and equipment will be demolished to be renovated. The scope of work was based "Request For Proposal" with solicitation No. RFP 004-THRT-T-022-(P) which states the report requirements for the geotechnical services.

Figure 1 presents a satellite image of the approximate project site location.

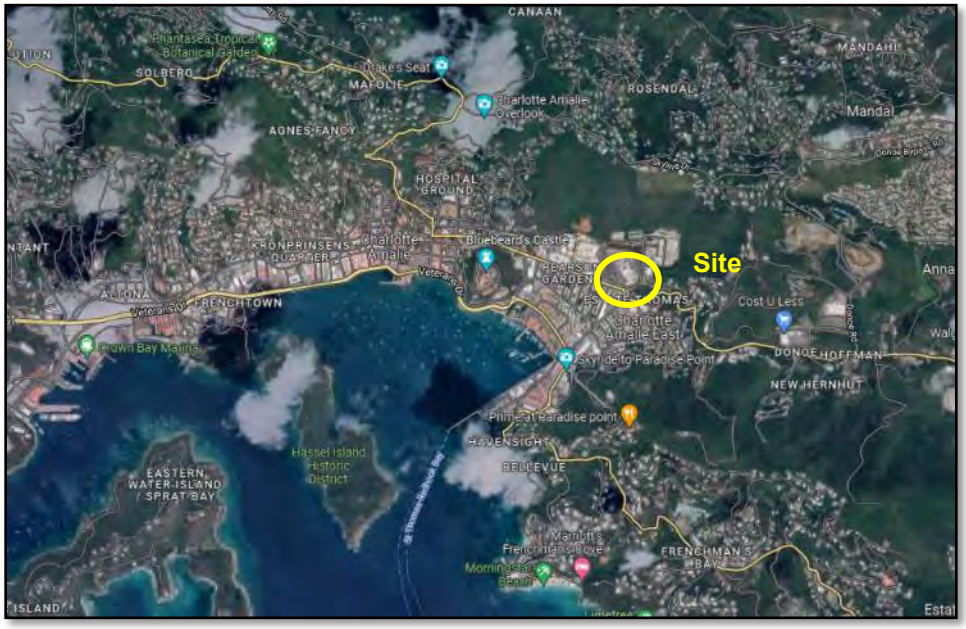

Figure 1: Satellite Image of Project Site (18.339626° -64.914273°) Satellite Imagery obtained from Google Earth)

2.0 SCOPE OF WORK AND RESULTS:

The field work consisted in three borings to depths that varied between 15 to 100 feet below ground surface. In situ testing and soil sampling were achieved by means of the Standard Penetration Test (SPT) with automatic hammer and split spoon sampler method in general accordance with ASTM D 1586. Subsurface drilling was executed also in general accordance with ASTM D 1452 using a CME-55 trailer mounted drill rig and Casing Advancer System (NQ) or Hollow Stem Augers. The figure below shows the approximate locations of the boreholes.

Figure 2: Approximate Boring Locations

The soil samples were secured in closed plastic bags and transported to our laboratory for visual-manual description (ASTM D2488) and moisture content determination (ASTM D2216). Soil classification tests (ASTM D422 and ASTM D1140 for particle size analysis and ASTM D4318 for Atterberg limits) were performed in selected samples. The field and laboratory information were gathered to prepare boring logs, which reveal the stratigraphy and soil properties at the locations of the borings.

3.0 SUBSOIL GENERALIZED CONDITIONS:

3.1 Site Geology:

The Virgin Islands are of volcanic origin, including Cretaceous volcanic rock and limestone that were intruded and metamorphosed by nearby dioritic plutons. The geologic formations at the project site are Alluvium and the Louisenhoj Formation (Kl). The Kl formation consist mostly of stratified rocks of igneous intrusive (keratophyre) volcaniclastic nature. Basaltic lava and breccias are also part of this geologic structure.

The Louisenhoj formation is characterized by strongly cemented volcanic conglomerate, breccia, volcanic wacke, shale, andesite, basalt, tuff and rare limestone. However, most of the soil samples were residual soils as evidenced by the high SPT N-values and stiffness of the samples. The figure below presents a portion of the Geologic Map of St. Thomas.

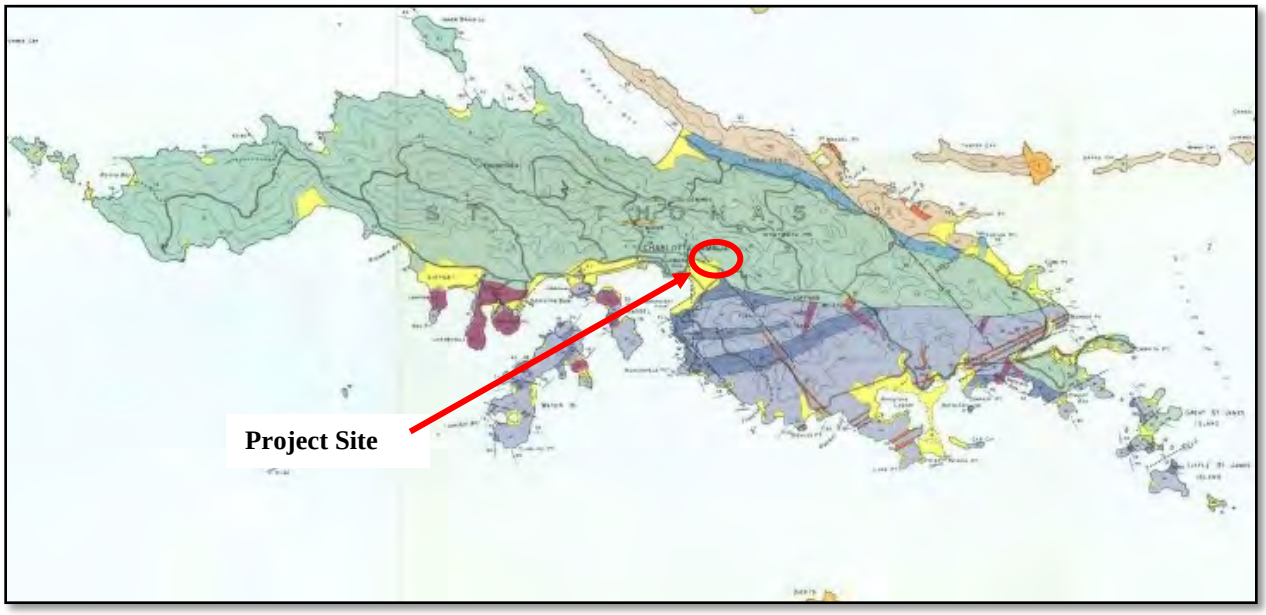

Figure 3: Geologic Map of St. Thomas (Geology by D.W. Rankin. US Geological Survey "Virgin Islands Report")

3.2 Soil Stratigraphy:

The site stratigraphy is mostly homogeneous characterized by residual soils transitioning to weathered rock and volcanic rock at the final depth of the borings. The strata were described as follows:

Stratum no. 1 – Residual Soils

Most of the soil profile is composed of residual soils that vary in composition from silty sand to clayey sand and with a high content of rock fragments (generally between 20 to 40% of the sample). This layer extends to a depth that varies from 14 to 79 feet, depending on the boring location. The Standard Penetration Test (SPT) N-values within this layer vary from 18 to 77 bpf (blows per foot), but are mostly higher than 30 bpf, for a dense to very dense relative density.

Stratum no. 2 – Volcanic Rock

The residual soils transition to a denser state described as weathered rock showing SPT refusal N-values (N>50 blows per 6 inches of penetration). These samples were mostly described as silty sand with rock fragments. The drilling augers met refusal shortly thereafter, and rock coring was performed at boring no.1 to reach the target depth of 100 feet, as required in the RFP. The rock cores had a recover percentage of 86 to 100. The Rock Quality Designation (RQD) varied between 75 to 86 percent, which represents a "good" quality of hard rock. The samples were described as siltstone igneous rocks of the Louisenhoj formation.

3.3 Groundwater Conditions:

There was no evidence of the presence of groundwater within the depth drilled at the locations the borings performed. Groundwater is not expected to be of concern during excavations and construction of shallow foundations. However, groundwater may rise due to long rain events. Also, perched or temporary bodies of water might be found trapped within the upper fill deposits or along the zone of transition between fill and the native soils. If perched or temporary bodies of water are found, it should be managed by means of direct pumping.

The presented information corresponds to a general interpretation of the subsoil conditions of the explored area. For a more detailed description regarding the soil profile, refer to the enclosed boring logs presented in Appendix B.

3.4 Site Classification:

In order to generate the values necessary to plot the Seismic Design Response Spectrum, the American Society of Civil Engineers (ASCE 7-16) *Standard for Minimum Design Loads for Buildings and Other Structures* is referenced to determine the design spectral response accelerations both for 0.2 and 1 second periods (S_{DS} and S_{D1}).

According to the analysis of the relative ground density based on the SPT "N" values, the **site classification is type "D"** which corresponds to a *stiff soil.* According to ASCE 7-16 sites with such classification, and with mapped maximum considered earthquake spectral response acceleration parameter at one-second period (S_1) greater than or equal to 0.200 g, will require a site-specific ground motion hazard analysis. Exceptions to these requirements exist such as for structures having fundamental periods of vibration equal to or less than 0.5s. However, the project's structural engineers have

confirmed that such exception applies since estimated values of fundamental periods do not exceed 0.5 seconds. Therefore, the design spectral response has been determined in accordance with Section 20.3 and the corresponding values of Fa and Fv.

The design parameters corresponding to the site coordinates are:

- Mapped spectral response acceleration at short period, $\boldsymbol{S_s}$ **= 1.234**;
- Mapped spectral response acceleration at a one (1) second period, $\boldsymbol{S_1}$ **= 0.431**;
- Design spectral response acceleration at a short (0.2 sec.) period, $\boldsymbol{S_{DS}}$ **= 0.828**;
- Design spectral response acceleration at a one (1) second period, $\boldsymbol{S_{D1}}$ **= 0.451**;
- Peak Ground Acceleration, **PGA = 0.49**.
- $\boldsymbol{PGA_M}$ **= 0.544**.

4.0 GEOTECHNICAL RECOMMENDATIONS:

According to project documents, the existing Cancer Institute will be demolished and a new facility will be placed in the footprint area of the existing building. The purpose of the geotechnical investigation was to address the following items as stated by the client in "RFP 004-THRT-T-022-(P)":

- *Foundation recommendations for the support of columns, walls, and slabs;*
- *Anticipated settlements;*
- *Soil compaction requirements;*
- *Slope stability;*
- *Seismic site classification;*
- *Modulus of sub-grade reaction for the design of slabs-on-grade;*
- *Elevation of water table and recommendations regarding the management of groundwater both during construction and for the completed project;*
- *Evaluation of potential of difficult excavation or rock blasting;*
- *Discussion of anticipated temporary bracing and underpinning;*
- *Analysis of soils to ascertain presence of potentially expansive, deleterious, chemically active, or corrosive materials or conditions.*

4.1 Foundation Recommendations:

As per "RFP 004-THRT-T-022-(P)" the anticipated foundation loads (service) for the project are: 150 kips at interior columns; 75 kips at exterior columns; and 12 kips/foot at load bearing walls. The soil profile uncovered consists of dense residual soils that are adequate for the use of shallow foundations without the need of underpinning. Columns over square footings, and load bearing walls over continuous footings can be designed for a net allowable bearing capacity, qa, of 3,000 psf. The bottom of the foundations can be placed at 3 feet below existing grade.

The slabs-on-grade can be designed considering a modulus of subgrade reaction, k, of 150 psi/inch.

The bearing capacities provided above consider total settlement not exceeding 1 inch. Settlements due to consolidation of clayey strata are not expected.

4.2 Slope Stability:

The new structure is considered to occupy the footprint area of the existing structure. Within this perimeter, there are no slopes that would require a slope-stability analysis.

4.3 Excavations:

All of the recommended earthwork as part of the site preparation for the main building, will entail excavations that could extend approximately 3 to 4 feet below the existing grade. At this location (main building footprint) conventional excavation equipment can be used for such purposes. No other mayor excavations are expected beyond this area, other than the excavations required for site grading and preparation.

All excavations within a depth of 5 feet can be handled with conventional excavation equipment as well. No explosives will be required for rock blasting. Rock breaking hammers or chisels will not be necessary.

4.4 Adequacy of In-situ soils:

ASTM D4829 "Standard Test Method for Expansion Index of Soils" was performed on samples from borings no.2 and no.3 taken at a depth of 0-1.5 feet and 0-3.5 feet, respectively. The soil sample from boring no.2 resulted with an Expansion Index, EI, of 63, while the sample from boring no.3 resulted with an EI of 33. Both of these expansion index values classify as a "low-to-medium" potential of expansion.

As for chemically active or corrosive materials, laboratory tests such as soil resistivity (ASTM G 187), pH (ASTM 4972) and measurements of sulfate content (ASTM D 516-90), chloride (ASTM C 1152) were performed to evaluate the degree of corrosivity. The table below presents the results of such tests for each of the samples tested.

Table 1: Summary of Results

Boring no.	Depth (ft)	Soil Class. AASHTO	pH $CaCl_2$	pH Water	Resistivity (ohm*cm)	Sulfate (ppm)	Chloride (ppm)
1	0 – 30.5	A-6; A-2-6	7.6	8.1	13,832	11.8	73.3
3	0 – 25.5	A-2-4; A-6	7.7	8.3	12,376	10.8	80.2

The American Concrete Institute (ACI) provides a criteria for the severity of potential sulfate exposure on concrete. The sulfate content resulted in a *Negligible* degree of corrosivity for both tested samples. According to the ACI these levels of sulfate, do not require any special design considerations. Therefore, the cement type, water-to-cementitious material ratio, and the minimum unconfined compressive strength are not specified and shall be established by the designer.

Table 2 below summarizes the results following the guidelines established by National Association of Corrosion Engineers (NACE) International, American Water Works Association (AWWA) and Federal Highway Administration (FHWA) to determine soil corrosivity potential.

Table 2: Soil corrosivity potential based on NACE, AWWA and FHWA guidelines.

Test	Unit	Borings no.1			Borings no.3		
		Result	**NACE**	**AWWA**	**Result**	**NACE**	**AWWA**
Sulfate	ppm	11.8	-	-	10.8	-	-
Chloride	ppm	73.3	2	-	80.2	2	-
Sulfide	-	-	-	-	-	-	-
Oxidation/ Reduction	mV	-	-	-	-	-	-
Resistivity	ohm-cm	13,832	0	0	12,376	0	0
pH H_2O	-	8.1	0	0	8.3	0	0
pH $CaCl_2$	-	7.6	0	0	7.7	0	0
Moisture	-	8	-	1	7	-	1
Soil Description	-	Silty Sand	2	-	Sandy Clay	3	-
NACE Total Points		***4 (Mild Corrosivity)***			***5 (Moderate Corrosivity)***		
AWWA Total Points		***1 (No Corrosion)***			***1 (No Corrosion)***		
FHWA Potential		***Non-Aggressive***			***Non-Aggressive***		

**Note: Sulfides, redox potential and stray current tests were not performed.*

Based on the guidelines provided in Table 2 above, native soils are considered as mildly-to-moderately corrosive. The results included above correspond to native soils. Imported fill material must also be tested for corrosion potential.

5.0 FILL PLACEMENT GUIDELINES:

It is assumed that the Finished Floor Elevation (FFE) will be close to the existing ground elevation. If after site preparation fill is needed to reach final grade, then the following guidelines must be followed.

5.1 Site Preparation and Excavation:

Site preparation for new structures shall consist of clearing and grubbing (i.e. removal of all vegetation, topsoil, roots and foreign debris within the upper 6 to 12 inches of subsoil). Clearing and grubbing procedures shall be extended a minimum horizontal distance of 3 feet beyond the perimeter of the existing structures. This procedure will also entail excavating demolition of existing structures and removal/excavation of current foundations. Any existing abandoned underground utilities, substructures, foreign debris and/or other unsuitable material encountered during excavations shall be completely removed and replaced with new fill material. Any known active underground utilities within the footprint of the new structures shall be relocated.

After clearing and grubbing, the exposed grade shall be roller compacted and then proof rolled with loaded truck for detection of weak spots. Any weak spots encountered have to be excavated and replaced with new fill material properly placed and compacted following the "Fill Placement Guidelines" in subsection below.

Site preparation works shall be coordinated with the consultant geotechnical engineer to monitor earthwork in progress and to direct any required variations on the provided recommendations, if deemed necessary. Different subsoil conditions may be found within the project site area, especially in unexplored zones between and beyond boring locations. Therefore, the final extensions of site preparation will be determined

on field during earthwork operations. A geotechnical engineering technician is recommended to monitor proper implementation of these measures.

Footing excavations shall be maintained in a dry state. Runoff shall be diverted away from open excavations. Water stagnation shall be avoided as this may affect the soil bearing capacity.

The project contractor is responsible for providing safe excavation environment for working personnel in accordance to pertinent OSHA regulations at the time of construction.

5.2 Fill Placement Guidelines:

A controlled fill construction procedure shall be performed wherever new fill material is required. The fill placement guidelines are the following:

1. The area of the proposed fill placement shall be cleared of vegetation, topsoil, roots and foreign debris (i.e. clearing and grubbing). The exposed grade, prior to placement of fill, shall be compacted and then proof rolled to detect weak spots. Any weak spots encountered have to be excavated and replaced with new fill material.

2. The fill soil material shall consist of well-graded granular fill complying with A-2-4, A-1-b or A-1-a soil classification as per AASHTO (SM, SW, GM or GW according to USCS). The consultant geotechnical engineer should approve this soil material. Boulders within fill for structures should be discarded. Maximum coarse aggregate size should be 6 inches. Fill material shall be well-graded and should not consist of just gravel, crushed stone or poorly graded sand. In-situ excavated soils can be reused as new fill material if are in compliance with these requirements.

3. The fill material shall be placed in layers not exceeding 8 inches of thickness, as measured before compaction, on a surface free of water. Fill layer lifts shall be reduced to 6 to 4 inches when using portable compaction equipment such as walk-behind roller, plate, or tamper. Each layer shall be compacted to a minimum of 95% based on its maximum dry density determined from a modified Proctor compaction test following ASTM D1557.

4. A full-time resident geotechnical engineering technician is recommended for earthwork monitoring during clearing and grubbing, excavations and new fill material placement until the final grade is reached including the performance of in-place density tests using nuclear method per ASTM D6938.

The construction of the fill layer shall be made under the direct supervision of the field technician. The presence of the field technician shall be continuous from the initiation of site clearing until the final grade is reached. The field technician shall confirm that the fill construction was made in conformity with these specifications.

6.0 REPORT LIMITATIONS:

Note that the recommendations provided herein are based on test borings performed at specific locations, which are considered to be representative of the subsoil conditions within the project site. However, different conditions might be found during excavations and construction. In such instances, we shall be notified to proceed with a field visual inspection in order to formulate the corresponding solution. If this occurs, an extension of our contracted services will be requested.

In the event that the current project concept is altered, a copy of the new design must be provided to us in order to submit revised recommendations or perform

additional borings, if deemed necessary. Thereafter we can evaluate additional general design and construction recommendations.

We wish to thank you for the opportunity of submitting this geotechnical engineering report.

Cordially,
JACA & SIERRA ENGINEERING, PSC

Manuel E. Candelario Cosme, MSCE, PE
Geotechnical Engineer & Partner
USVI Engineering License #0-50396-1B

Enclosures
Appendix A: Boring Locations Plan
Appendix B: Boring Logs
Appendix C: Laboratory Test Results

Appendix A: Boring Locations Plan

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
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Boring Location Plan (Satellite Imagery)

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Charlotte Kimelman Cancer Institute, St. Thomas, USVI

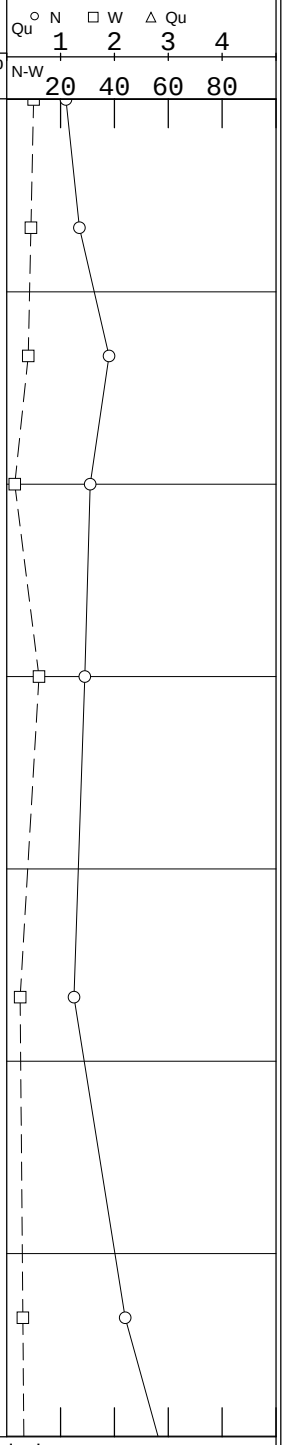
Appendix B: Boring Logs

SUBSURFACE EXPLORATION LOG

BORING NUMBER: 1

DRILLING LOG	**PROJECT** Charlotte Kimelman	**JOB** 8389	SHEET 1 **OF** 5
LOCATION ST Thomas, BVI		**DRILLER/DRILL RIG** S. Perez / CME-55 Autom. Hammer	
COORDINATES		**DATE** **Started** 6/4/22	**Completed** 6/4/22
DESCRIPTION M. Candelario		**TOP ELEVATION (M)**	
GROUNDWATER (FT) **Initial** **Final**		**ENGINEER** M. Candelario	
DRILLING METHOD Hollow-Stem Auger 2.25" ID		**FINAL DEPTH (FT)** 100	

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%
0.00	0	FILL: Clayey sand trace gravel, medium light, yellowish brown		0	5 10 12	22	10			
-0.61	2	SILTY SAND with gravel some clay, medium, light yellowish brown		2	13 14 13	27	9			
	3				11 15 23	38	8			
	6				12 15 16	31	3			
-2.74	9	CLAYEY SAND with gravel, medium, reddish yellowish brown		9	11 17 12	29	12			
	12									
-4.27	14	SILTY SAND with gravel, medium to dense, yellowish brown		14	8 13 12	25	5			
	15									
	18				12 19 25	44	6			



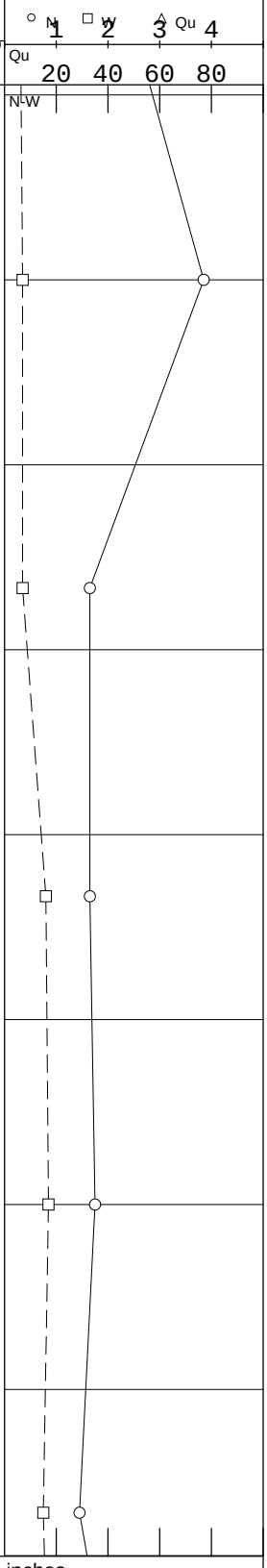
"SPT N" - Number of blows required to drive the sampling spoon a distance of 12 inches with a 140 lbs hammer falling 30 inches.
"W" - Natural moisture content in percentage of dry weight.
"Qu" - Unconfined compressive strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "RQD" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A P in the unconfined compressive strength test indicates the use of the pocket penetrometer.
▽ Initial groundwater level depth.
▼ Final groundwater level depth.

SUBSURFACE EXPLORATION LOG

BORING NUMBER: 1

DRILLING LOG (CONT. SHEET) | **PROJECT** Charlotte Kimelman | **JOB** 8389 | **OF** 5

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%
	21									
	24				24 47 30	77	7			
	27									
	30				16 15 18	33	7			
	33									
-10.37		34								
	36	CLAYEY SAND with gravel, medium, reddish yellowish brown			8 12 21	33	16			
-11.89		39								
	39	SILTY SAND with gravel some clay, medium, reddish yellowish brown			10 16 19	35	17			
	42									
-13.41		44								
		CLAYEY SAND with gravel, medium to			14 16	29	15			



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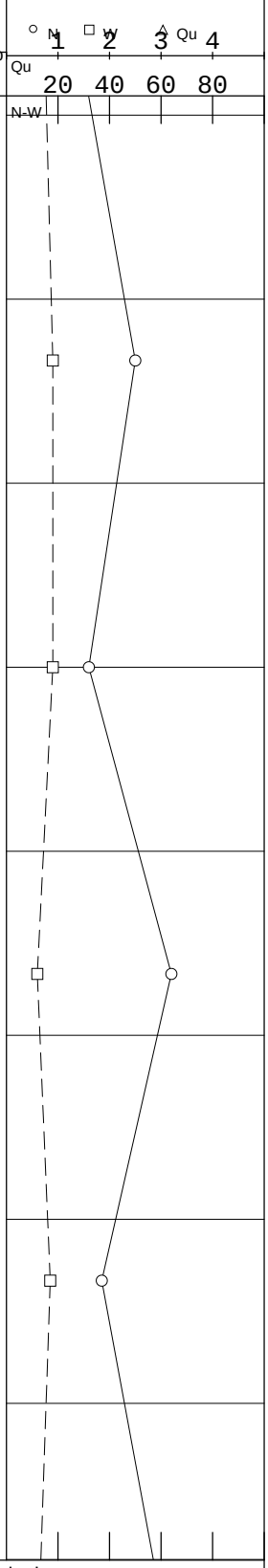
Initial groundwater level depth.
Final groundwater level depth.

SUBSURFACE EXPLORATION LOG

BORING NUMBER: 1

DRILLING LOG (CONT. SHEET) | **PROJECT** Charlotte Kimelman | **JOB** 8389 | **OF** 5

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%
	45	dense, reddish yellowish brown			13					
	48				21 50/3"	50/ 3"	18			
	51									
	54				11 13 19	32	18			
	57									
	60				13 33 31	64	12			
	63									
	66				6 17 20	37	17			



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"Rc" - Core recovery in percent for each successive run. "RQD" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A P in the unconfined compressive strength test indicates the use of the pocket penetrometer.

▽ Initial groundwater level depth.
▼ Final groundwater level depth.

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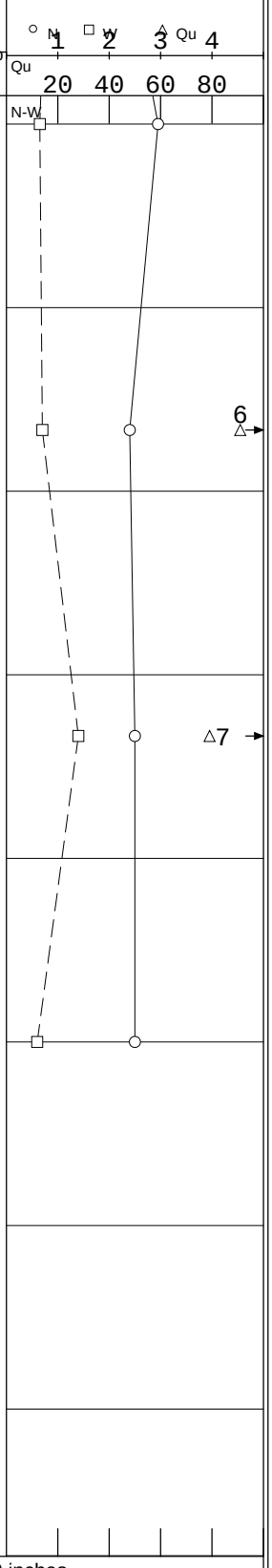
SUBSURFACE EXPLORATION LOG

BORING NUMBER: 1

DRILLING LOG (CONT. SHEET) | **PROJECT** Charlotte Kimelman | **JOB** 8389 | **OF** 5

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%
	69	Some as above... very dense, yellowish brown			17 25 34	59	13			
	72									
		Some as above... dense			17 20 28	48	14	6		
	75									
	78									
-24.09				79						
		HIGHLY WEATHERED rock, sampled as: silty sand with rock fragments, yellowish brown, black			20 50/6"	50/ 6"	28	7		
	81									
-25.61				84						
	84	IGNEOUS ROCK: Basalt some carbonate veins, strong to very strong, moderately weathered intensely to slightly fractured, bluish gray, brown, yellowish brown			50/2"	50/ 2"	12		86	86
	87									
	90								100	78



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"Qu" - Unconfined compressive strength in tons per square foot.
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Initial groundwater level depth.
Final groundwater level depth.

SUBSURFACE EXPLORATION LOG

BORING NUMBER: 1

DRILLING LOG (CONT. SHEET) | **PROJECT** Charlotte Kimelman | **JOB** 8389 | **OF** 5

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%	○ N □ W △ Qu 1 2 3 4 Qu 20 40 60 80 N-W
	93										
	96								100	75	
	99										
		End of Boring...									
	102										
	105										
	108										
	111										
	114										

"SPT N" - Number of blows required to drive the sampling spoon a distance of 12 inches with a 140 lbs hammer falling 30 inches.
"W" - Natural moisture content in percentage of dry weight.
"Qu" - Unconfined compressive strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "RQD" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A P in the unconfined compressive strength test indicates the use of the pocket penetrometer.
▽ Initial groundwater level depth.
▼ Final groundwater level depth.

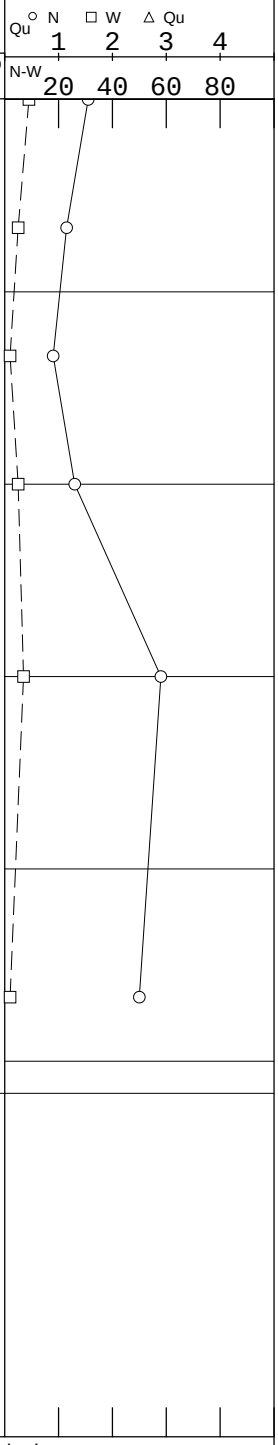
SUBSURFACE EXPLORATION LOG

BORING NUMBER: 2

DRILLING LOG	PROJECT	JOB	SHEET
	Charlotte Kimelman	8389	1 OF 1

LOCATION ST Thomas, BVI	**DRILLER/DRILL RIG** S. Perez / CME-55 Autom. Hammer
COORDINATES	**DATE** **Started** 5/31/22 **Completed** 5/31/22
DESCRIPTION M. Candelario	**TOP ELEVATION (M)**
GROUNDWATER (FT) **Initial** **Final**	**ENGINEER** M. Candelario
DRILLING METHOD Hollow-Stem Auger 2.25" ID	**FINAL DEPTH (FT)** 15.5

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%
0.00	0	SANDY CLAY some gravel, hard, yellowish brown	0–2		6 12 19	31	9			
-0.61		CLAYEY SAND some gravel, very stiff, yellowish brown	2–4		11 10 13	23	5			
-1.22	3	SILTY SAND some rock fragments, very stiff, yellowish brown	4–6		8 10 8	18	2			
	6	Same as above... some gravel, hard	6–9		13 14 12	26	5			
-2.74	9	CLAYEY SAND some rock fragments, very dense, reddish brown	9–14		9 32 26	58	7			
-4.27	12	WEATHERED rock sampled as: rock fragments with silty sand, hard, very pale brown	14–15		50/2"	50/2"	2			
	15	End of Boring...								
	18									



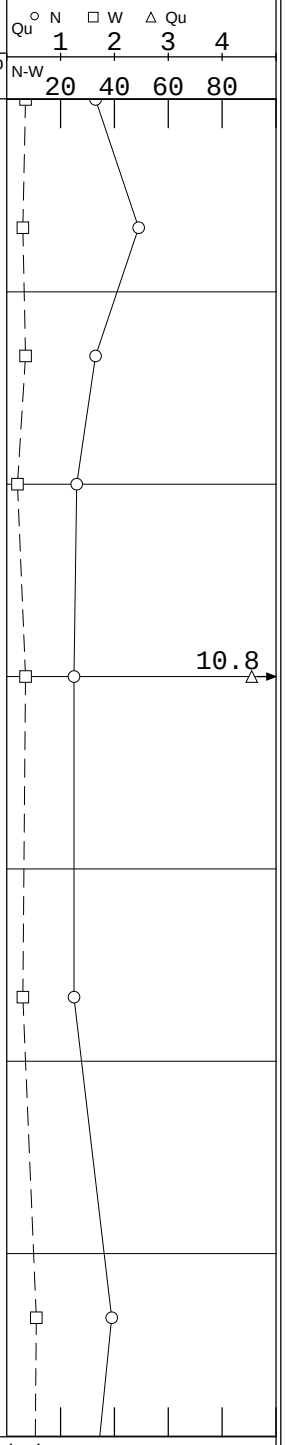
"SPT N" - Number of blows required to drive the sampling spoon a distance of 12 inches with a 140 lbs hammer falling 30 inches.
"W" - Natural moisture content in percentage of dry weight.
"Qu" - Unconfined compressive strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "RQD" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A P in the unconfined compressive strength test indicates the use of the pocket penetrometer.
▽ Initial groundwater level depth.
▼ Final groundwater level depth.

SUBSURFACE EXPLORATION LOG

BORING NUMBER: 3

DRILLING LOG	**PROJECT** Charlotte Kimelman	**JOB** 8389	SHEET 1 OF 2
LOCATION	ST Thomas, BVI	**DRILLER/DRILL RIG**	S. Perez / CME-55 Autom. Hammer
COORDINATES		**DATE** **Started** 5/31/22	**Completed** 5/31/22
DESCRIPTION	M. Candelario	**TOP ELEVATION (M)**	
GROUNDWATER (FT)	**Initial** **Final**	**ENGINEER**	M. Candelario
DRILLING METHOD	Hollow-Stem Auger 2.25" ID	**FINAL DEPTH (FT)**	30.5

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%
0.00	0	SANDY CLAY some gravel, hard, yellowish brown	0		8 13 20	33	7			
					19 26 23	49	6			
	3	Same as above...trace gravel			10 15 18	33	7			
-1.83	6	SILTY SAND with rock fragments, very stiff, yellowish brown	6		16 16 10	26	4			
-2.74	9	SANDY CLAY trace gravel, reddish brown	9		7 11 14	25	7	10.8		
	12									
-4.27		SILTY SAND with rock fragments, medium, yellowish brown	14		11 13 12	25	6			
	15									
	18									
-5.79		SANDY CLAY trace gravel, hard, strong brown	19		10 20 19	39	11			



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"W" - Natural moisture content in percentage of dry weight.
"Qu" - Unconfined compressive strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "RQD" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A P in the unconfined compressive strength test indicates the use of the pocket penetrometer.

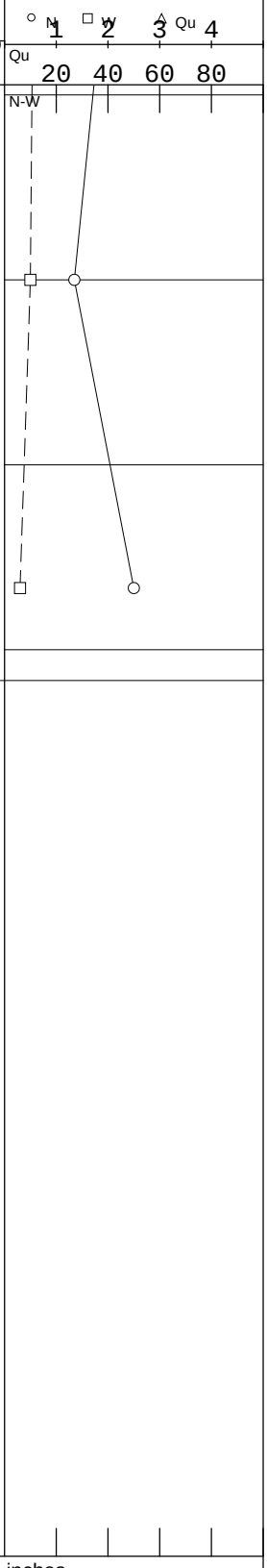
▽ Initial groundwater level depth.
▼ Final groundwater level depth.

SUBSURFACE EXPLORATION LOG

BORING NUMBER: 3

DRILLING LOG (CONT. SHEET) | **PROJECT** Charlotte Kimelman | **JOB** 8389 | **OF** 2

Elev. (m)	Depth (ft)	Description	Legend	Sample	Blows	SPT N	W	Qu	RC%	RQD%
	21									
	24				6 12 15	27	10			
	27									
-8.84		29								
		WEATHERED rock sampled as: rock fragments with silty sand, hard, very pale brown, light gray			50/3"	50/3"	6			
	30	End of Boring...								
	33									
	36									
	39									
	42									



"SPT N" - Number of blows required to drive the sampling spoon a distance of 12 inches with a 140 lbs hammer falling 30 inches.
"W" - Natural moisture content in percentage of dry weight.
"Qu" - Unconfined compressive strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "RQD" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A P in the unconfined compressive strength test indicates the use of the pocket penetrometer.
Initial groundwater level depth.
Final groundwater level depth.

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Appendix C: Laboratory Test Results

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
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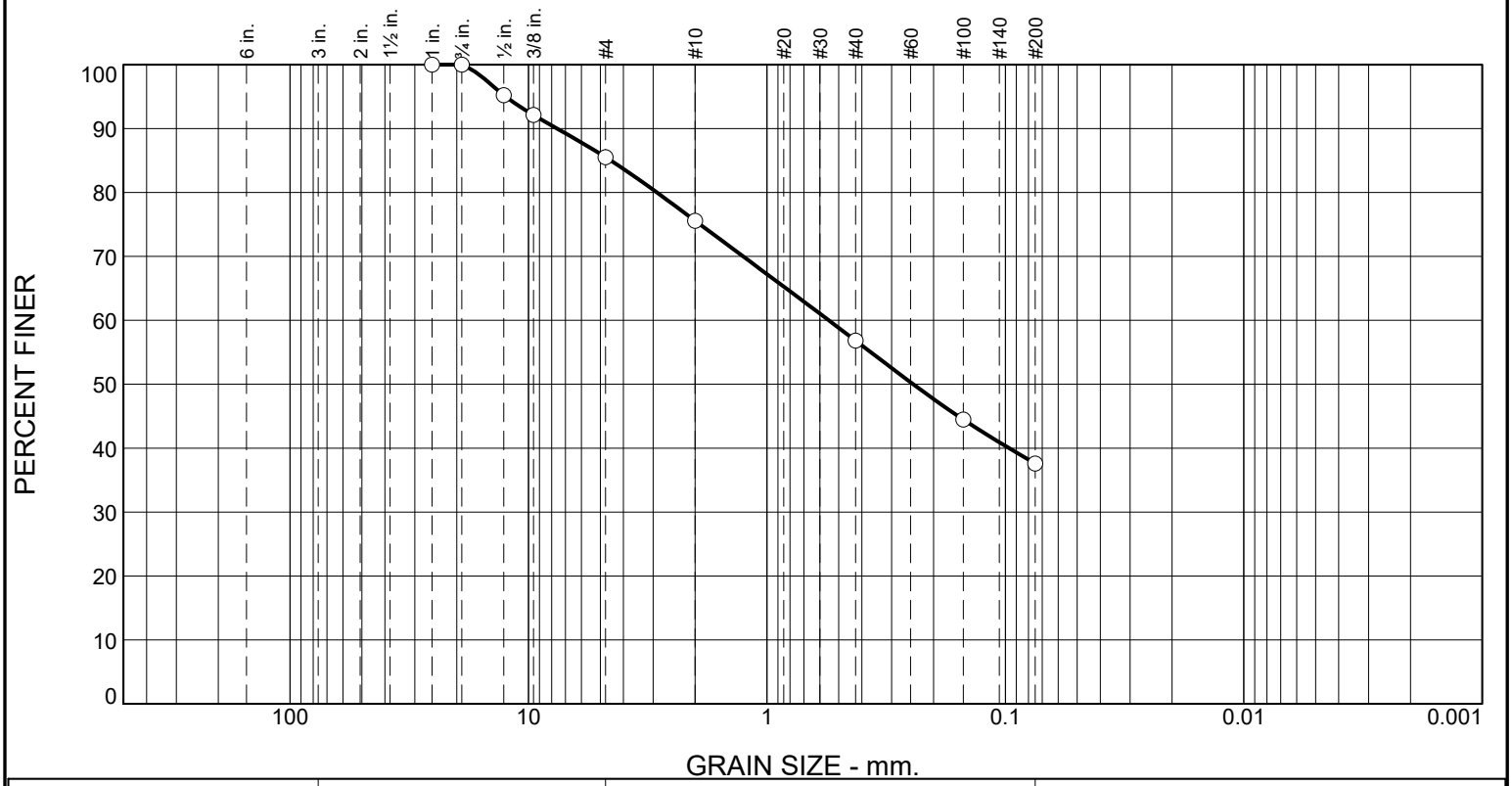
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.5	9.9	18.8	19.2	37.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
.75	100.0		
.5	95.2		
.375	92.1		
#4	85.5		
#10	75.6		
#40	56.8		
#100	44.5		
#200	37.6		

* (no specification provided)

Material Description

Clayey sand

Atterberg Limits (ASTM D 4318)

PL= 13 **LL=** 31 **PI=** 18

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-6(2)

Coefficients

D_{90}= 7.5891 D_{85}= 4.5197 D_{60}= 0.5504
D_{50}= 0.2434 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/11/22 **Date Tested:** 7/26/22

Tested By: C. Criquit

Checked By: Manuel Candelario, MSCE, PE

Title: Geotechnical Engineer

Source of Sample: Project Site **Depth:** 2-5.5' **Date Sampled:**

Sample Number: Bo. 1

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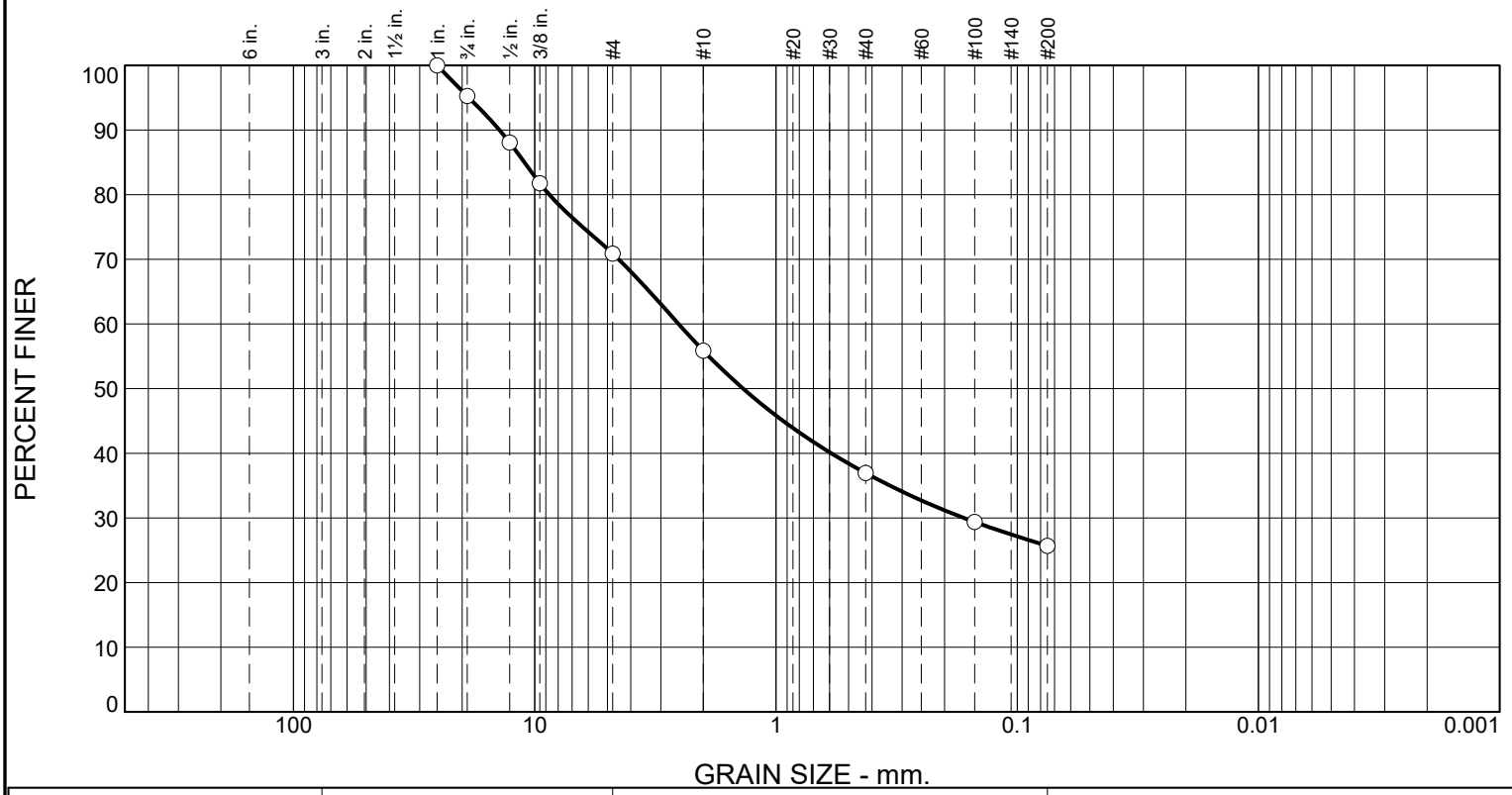
Client: Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

Project No: 8389 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.7	24.4	15.0	19.0	11.2	25.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
.75	95.3		
.5	88.1		
.375	81.8		
#4	70.9		
#10	55.9		
#40	36.9		
#100	29.4		
#200	25.7		

* (no specification provided)

Material Description

Clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 14 **LL=** 31 **PI=** 17

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-6(1)

Coefficients

D_{90}= 14.0017 D_{85}= 11.0454 D_{60}= 2.5323
D_{50}= 1.3691 D_{30}= 0.1665 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/11/22 **Date Tested:** 7/25/22

Tested By: C. Manzan

Checked By: Manuel Candelario, MSCE, PE

Title: Geotechnical Engineer

Source of Sample: Project Site **Depth:** 9-10.5' **Date Sampled:**

Sample Number: Bo. 1

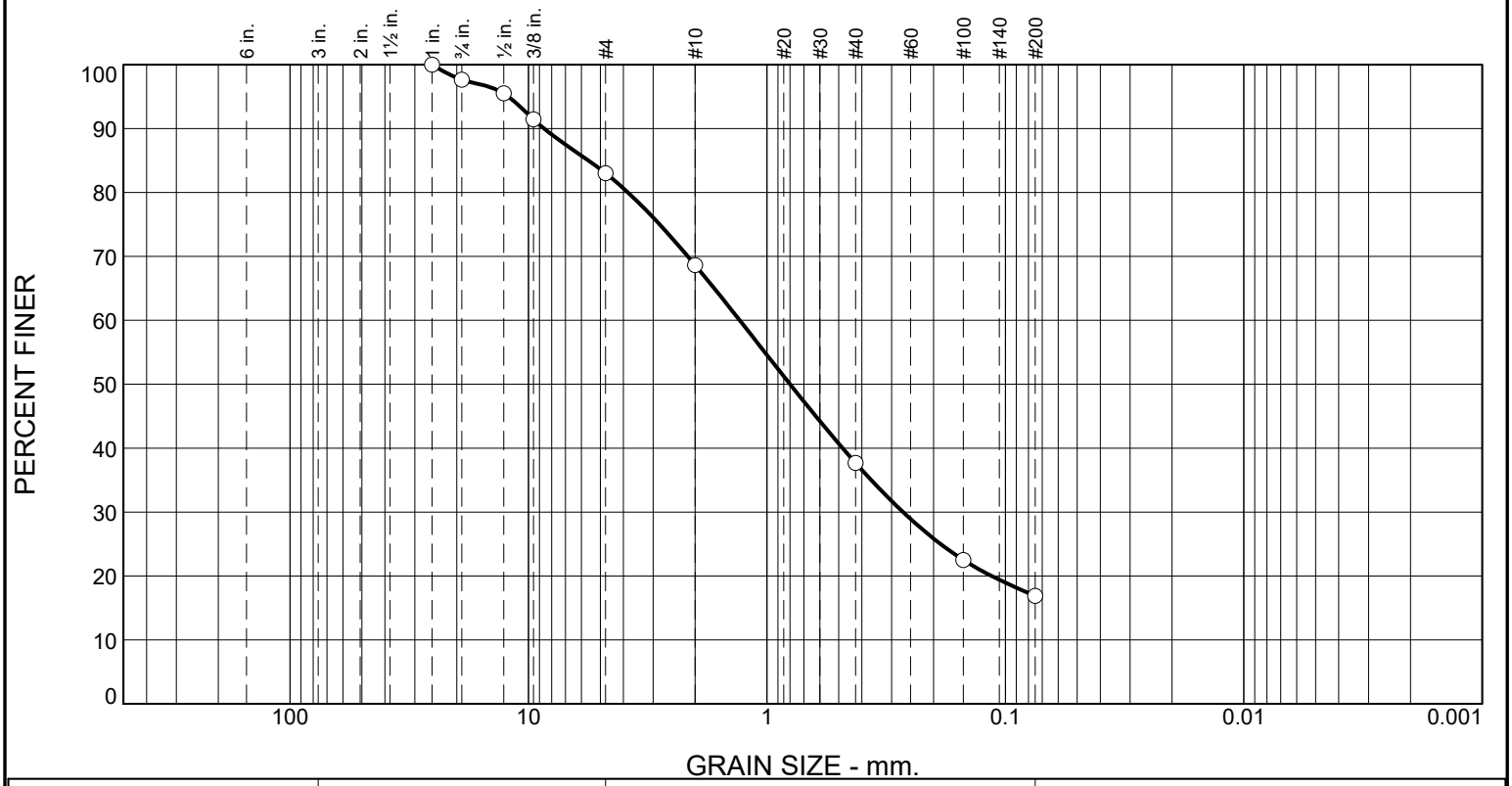
JACA & SIERRA Since 1967
Testing Laboratory | Geotechnical Engineers

Client: Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

Project No: 8389 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.4	14.6	14.4	30.9	20.8	16.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
.75	97.6		
.5	95.5		
.375	91.4		
#4	83.0		
#10	68.6		
#40	37.7		
#100	22.5		
#200	16.9		

* (no specification provided)

Material Description

Clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 13 **LL=** 24 **PI=** 11

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-6(0)

Coefficients

D_{90}= 8.5983 D_{85}= 5.6061 D_{60}= 1.3007
D_{50}= 0.7999 D_{30}= 0.2686 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/11/22 **Date Tested:** 7/25/22

Tested By: C. Manzan

Checked By: Manuel Candelario, MSCE, PE

Title: Geotechnical Engineer

Source of Sample: Project Site **Depth:** 4-7.5' **Date Sampled:**

Sample Number: Bo. 2

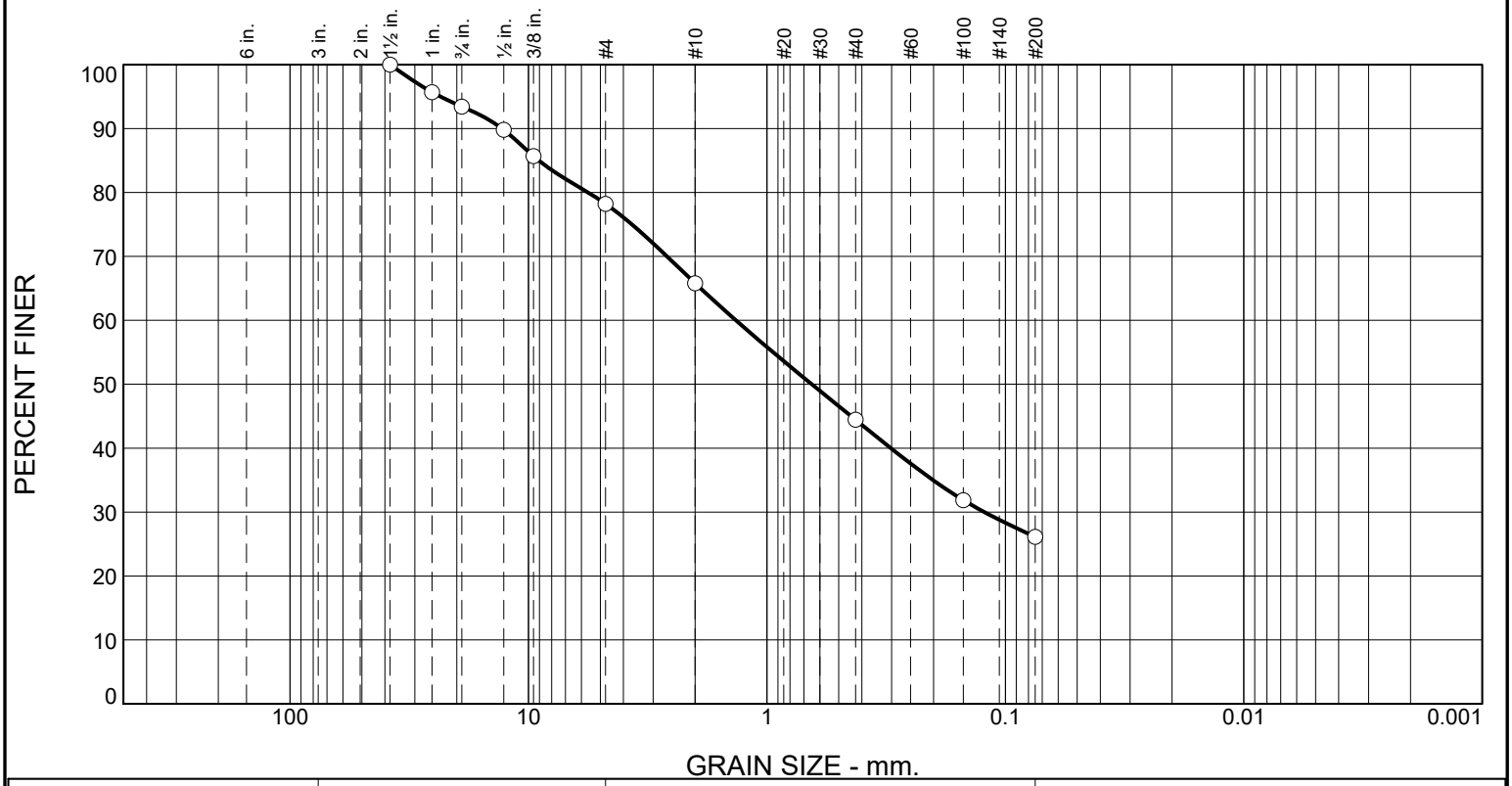
JACA & SIERRA Since 1967
Testing Laboratory | Geotechnical Engineers

Client: Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

Project No: 8389 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.6	15.2	12.4	21.4	18.3	26.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	95.7		
.75	93.4		
.5	89.8		
.375	85.7		
#4	78.2		
#10	65.8		
#40	44.4		
#100	31.9		
#200	26.1		

* (no specification provided)

Material Description

Clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 14 **LL=** 29 **PI=** 15

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-6(1)

Coefficients

D_{90}= 12.8892 D_{85}= 9.0531 D_{60}= 1.3496
D_{50}= 0.6484 D_{30}= 0.1226 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/11/22 **Date Tested:** 7/26/22

Tested By: J. Freire

Checked By: Manuel Candelario, MSCE, PE

Title: Geotechnical Engineer

Source of Sample: Project Site **Depth:** 9-10.5' **Date Sampled:**

Sample Number: Bo. 2

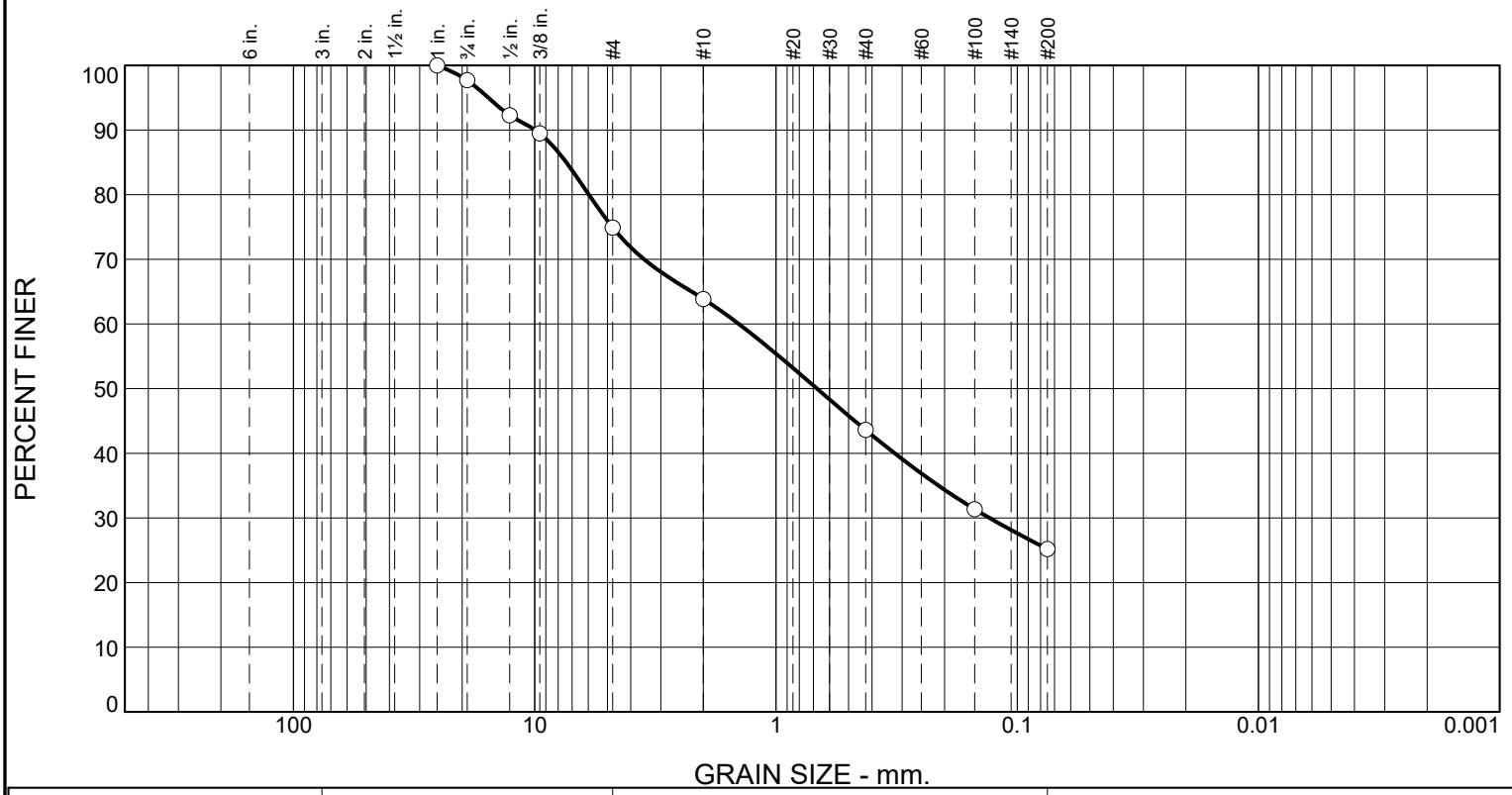
JACA & SIERRA Since 1967
Testing Laboratory | Geotechnical Engineers

Client: Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

Project No: 8389 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.3	22.8	11.0	20.3	18.4	25.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
.75	97.7		
.5	92.3		
.375	89.5		
#4	74.9		
#10	63.9		
#40	43.6		
#100	31.3		
#200	25.2		

* (no specification provided)

Material Description

Clayey sand with gravel

Atterberg Limits (ASTM D 4318)

PL= 16 **LL=** 25 **PI=** 9

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 9.9408 D_{85}= 7.4011 D_{60}= 1.4265
D_{50}= 0.6760 D_{30}= 0.1304 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/11/22 **Date Tested:** 7/25/22

Tested By: C. Manzan

Checked By: Manuel Candelario, MSCE, PE

Title: Geotechnical Engineer

Source of Sample: Project Site **Depth:** 6-7.5' **Date Sampled:**

Sample Number: Bo. 3

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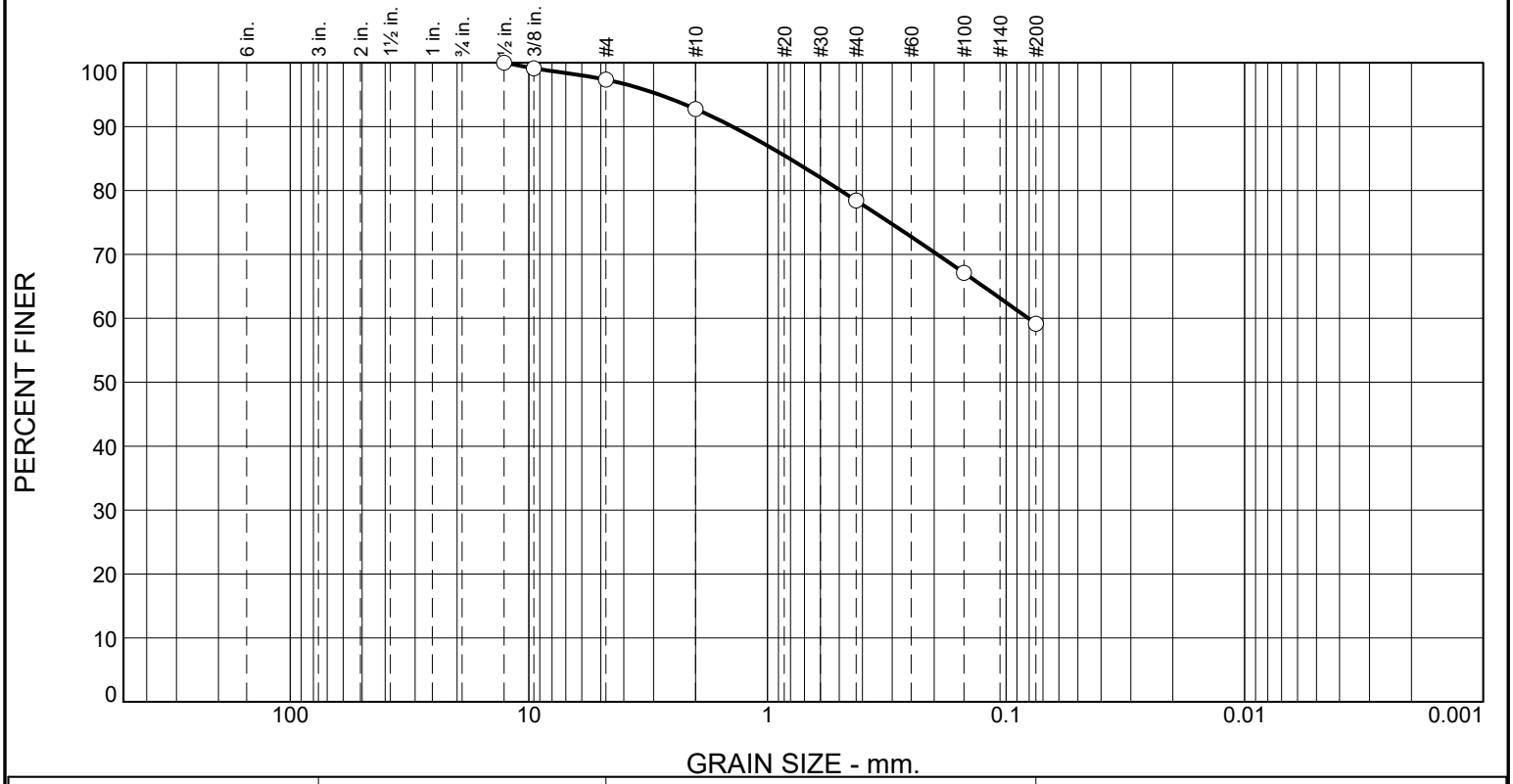
Testing Laboratory | Geotechnical Engineers

Client: Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

Project No: 8389 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.7	4.5	14.4	19.2	59.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.5	100.0		
.375	99.1		
#4	97.3		
#10	92.8		
#40	78.4		
#100	67.1		
#200	59.2		

* (no specification provided)

Material Description

Sandy lean clay

Atterberg Limits (ASTM D 4318)

PL= 13 **LL=** 29 **PI=** 16

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(6)

Coefficients

D_{90}= 1.4030 D_{85}= 0.8092 D_{60}= 0.0806
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/11/22 **Date Tested:** 7/22/22

Tested By: C. Criquit

Checked By: Manuel Candelario, MSCE, PE

Title: Geotechnical Engineer

Source of Sample: Project Site **Depth:** 9-10.5' **Date Sampled:**

Sample Number: Bo. 3

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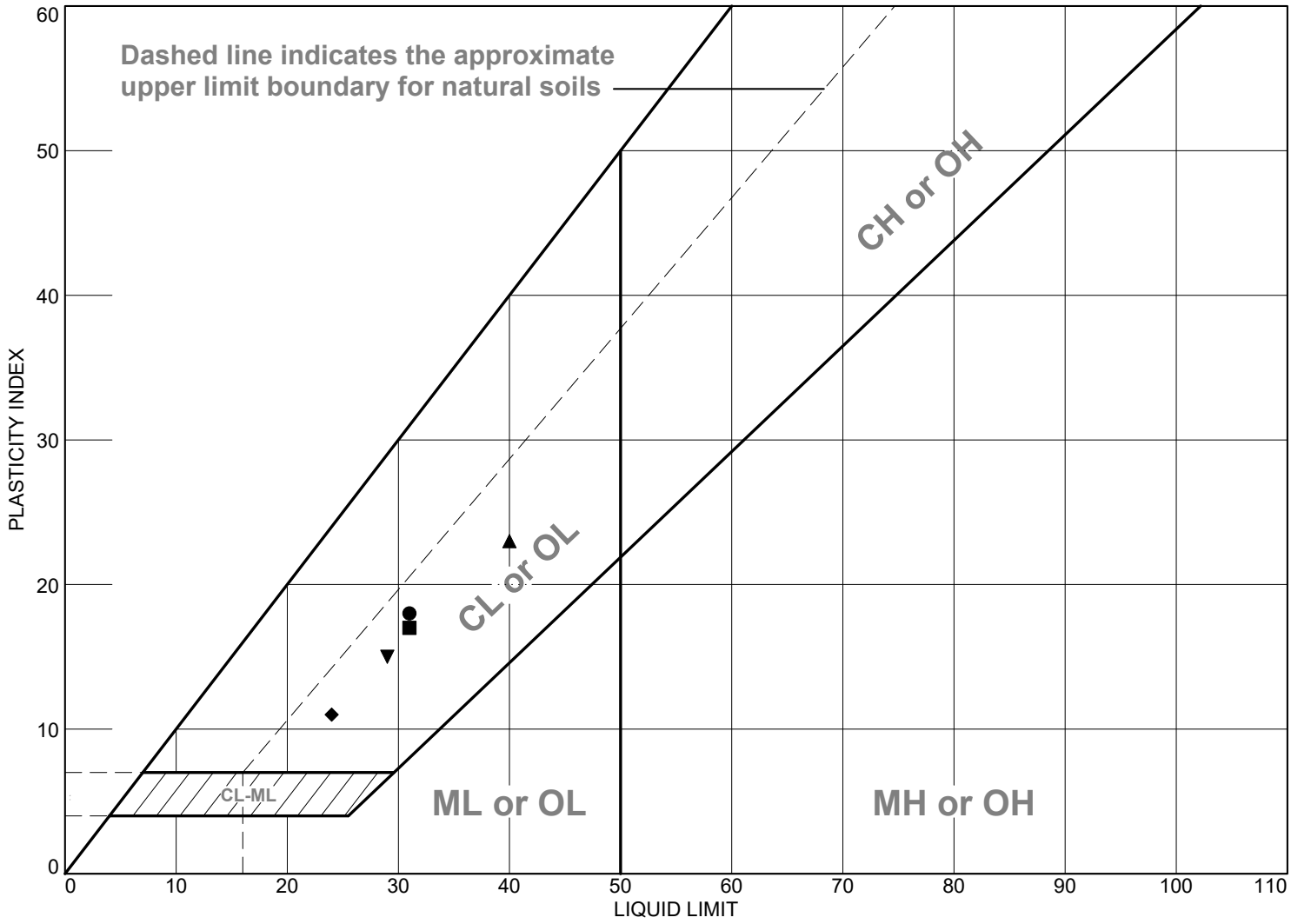
Testing Laboratory | Geotechnical Engineers

Client: Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

Project No: 8389 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Clayey sand	31	13	18	56.8	37.6	SC
■	Clayey sand with gravel	31	14	17	36.9	25.7	SC
▲		40	17	23			
◆	Clayey sand with gravel	24	13	11	37.7	16.9	SC
▼	Clayey sand with gravel	29	14	15	44.4	26.1	SC

Project No. 8389 **Client:** Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

Remarks:

● **Source of Sample:** Project Site **Depth:** 2-5.5' **Sample Number:** Bo. 1

■ **Source of Sample:** Project Site **Depth:** 9-10.5' **Sample Number:** Bo. 1

▲ **Source of Sample:** Project Site **Depth:** 0-1.5' **Sample Number:** Bo. 2

◆ **Source of Sample:** Project Site **Depth:** 4-7.5' **Sample Number:** Bo. 2

▼ **Source of Sample:** Project Site **Depth:** 9-10.5' **Sample Number:** Bo. 2

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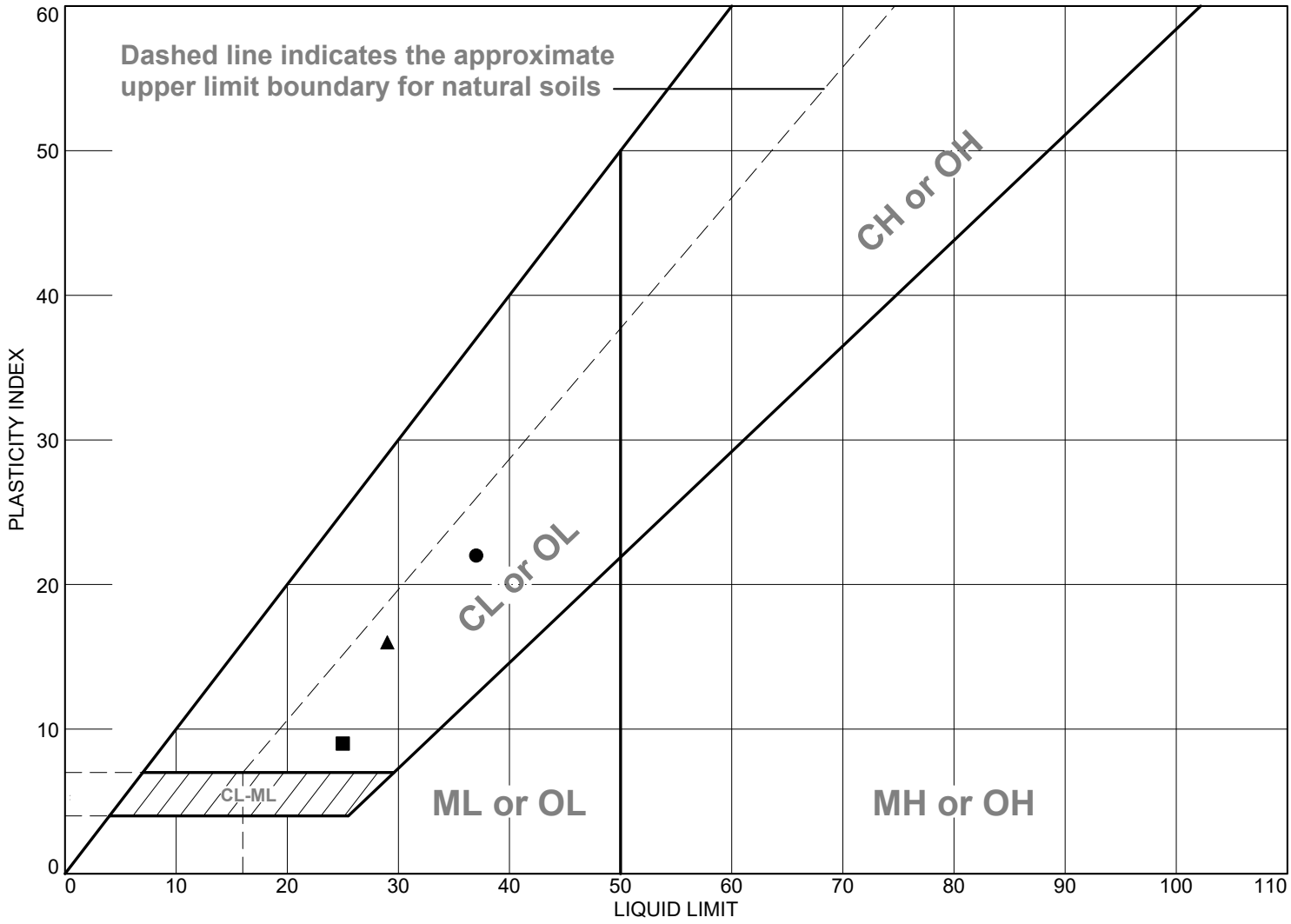
Testing Laboratory | Geotechnical Engineers

Figure

Tested By: E. Cordova **Checked By:** Manuel Candelario, MSCE, PE

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		37	15	22			
■	Clayey sand with gravel	25	16	9	43.6	25.2	SC
▲	Sandy lean clay	29	13	16	78.4	59.2	CL

Project No. 8389 **Client:** Territorial Hospital Redevelopment Team

Project: Charlotte Kimelman Cancer Institute, St. Thomas, USVI

● **Source of Sample:** Project Site **Depth:** 0-3.5' **Sample Number:** Bo. 3

■ **Source of Sample:** Project Site **Depth:** 6-7.5' **Sample Number:** Bo. 3

▲ **Source of Sample:** Project Site **Depth:** 9-10.5' **Sample Number:** Bo. 3

Remarks:

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Since 1967
Testing Laboratory | Geotechnical Engineers

Figure

Tested By: ● E. Cordova ■ C. Criquit ▲ C. Criquit **Checked By:** Manuel Candelario, MSCE, PE

Job No.: 8389

Date report: August 3, 2022

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

PH OF SOIL (ASTM D 4972)

Cliente:	Territorial Hospital Redevelopment Team
Project:	Charlotte Kimelman Cancer Institute, St, Thomas, USVI
Sample Secured and Transported by:	J&S
Date of Receipt of Test Sample:	7/11/2022
Date Test was Performed:	7/28/2022
Test Performed by:	Y. Reyes

Test Results:

Boring Sample	Depth	Date	PH in water	PH in $CaCl_2$
Bo. 1	0-30.5'	7/28/2022	8.1	7.6
Bo. 3	0-1.5', 4-5.5', 14-25.5'	7/28/2022	8.3	7.7

Respectfully Submitted,
JACA & SIERRA ENGINEERING, PSC

Manuel Candelario, MSCE, PE

Laboratory Engineer

To: JACA & SIERRA
PO BOX 363116
SAN JUAN PR 00936-3116

Attn: MRS. M. ALAMO
Source: **BO. 1 (0-30.6')**
UNKNOWN

Project Name: INTERNAL
Facility: CHARLOTTE KIMELMAN
Description: SOIL - Grab
Client Ref. #: N/A

eqlab
ENVIRONMENTAL QUALITY LABORATORIES, INC.

Laboratory Test Report

Sample Number:	**3687049**	Collected Date & Time:	**07/26/2022** 10:19	Date of Report:	07/29/2022
Work Order:	208-01-71	Received Date & Time:	07/26/2022 13:58	Collected By:	MALAMO
Delivery Slip:	2022-09222	Temperature at Arrival:	ROOM TEMPERATURE	Eqlab Rep.:	ELAZARO
Folder Number:	325493			Proposal Number:	28299 - 1

Remarks:

					Limits			Analysis			Prep Method		
Parameter	Method	Results	Units	DQ	MDL	MRL	MCL	Date	Time	By	Date	By	Method
+ Chloride	EPA 300.0 A	73.3	mg/Kg	--	0.50	5.00	--	07/28/2022	16:51	GVM	--	--	N/A
+ Sulfate	EPA 300.0 A	11.8	mg/Kg	--	0.50	5.00	--	07/28/2022	16:51	GVM	--	--	N/A

Certified by Laboratory Director

ND = Not Detected MCL = Maximum Contaminant Level BDL = Below Detection Limit DNI = Does Not Ignite MDL = Minimum Detection Limit N/A = Not Applicable
MO = Monitoring Only MRL = Minimum Reporting Level PTRL = Pattern Recognition Level. All results are calculated on a wet weight basis unless otherwise stated. All results relate only to this sample.
+ = Parameter is not accredited under EQLab's NELAP Certification

ACCREDITED IN ACCORDANCE WITH nelac

The results presented herein meet all NELAC requirements.
Refer to eqlab certification number E87783 at www.eqlab.com.

ENVIRONMENTAL QUALITY LABORATORIES, INC.
60 E STREET, MINILLAS INDUSTRIAL PARK, BAYAMON, PR 00959
PO BOX 11458 SANTURCE, PR 00910-1458 TEL. (787) 288-6420 FAX (787) 288-6465 www.eqlab.com

PRDOH Certified
EPA ID PR00014

To: JACA & SIERRA
PO BOX 363116
SAN JUAN PR 00936-3116

Attn: MRS. M. ALAMO
Source: **BO. 3(0-1.6')(4-5.0')(14-25.6) UNKNOWN**

Project Name: INTERNAL
Facility: CHARLOTTE KIMELMAN
Description: SOIL - Grab
Client Ref. #: N/A

eqlab ENVIRONMENTAL QUALITY LABORATORIES, INC.

Laboratory Test Report

Sample Number:	**3687050**	Collected Date & Time:	**07/26/2022** 09:58	Date of Report:	07/29/2022
Work Order:	208-01-71	Received Date & Time:	07/26/2022 13:58	Collected By:	MALAMO
Delivery Slip:	2022-09222	Temperature at Arrival:	ROOM TEMPERATURE	Eqlab Rep.:	ELAZARO
Folder Number:	325493			Proposal Number:	28299 - 1

Remarks:

					Limits			Analysis			Prep Method		
Parameter	Method	Results	Units	DQ	MDL	MRL	MCL	Date	Time	By	Date	By	Method
+ Chloride	EPA 300.0 A	80.2	mg/Kg	--	0.50	5.00	--	07/28/2022	16:51	GVM	--	--	N/A
+ Sulfate	EPA 300.0 A	10.8	mg/Kg	--	0.50	5.00	--	07/28/2022	16:51	GVM	--	--	N/A

Certified by Laboratory Director

ND = Not Detected MCL = Maximum Contaminant Level BDL = Below Detection Limit DNI = Does Not Ignite MDL = Minimum Detection Limit N/A = Not Applicable
MO = Monitoring Only MRL = Minimum Reporting Level PTRL = Pattern Recognition Level. All results are calculated on a wet weight basis unless otherwise stated. All results relate only to this sample.
+ = Parameter is not accredited under EQLab's NELAP Certification

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60 E STREET, MINILLAS INDUSTRIAL PARK, BAYAMON, PR 00959
PO BOX 11458 SANTURCE, PR 00910-1458 TEL. (787) 288-6420 FAX (787) 288-6465 www.eqlab.com

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The results presented herein meet all NELAC requirements.
Refer to eqlab certification number E87783 at www.eqlab.com.

PRDOH Certified
EPA ID PR00014

varian

TRUEBEAM / VITALBEAM

PRODUCT PLANNING GUIDE

P/N: P1026768-04

PPG-HT-D NOVEMBER 2020

Introduction to the Varian Product Planning Guide (PPG)

(Adobe© Acrobat .PDF format)

Language of Origin

The origin of this publication is of English-language, the English version should always be considered the master.

Conventions

The dimension and tolerance format is shown as SI followed by Imperial units in brackets – Metric [Imperial], the default is cm [inches] unless otherwise noted. Tolerances are given where critical, otherwise, general tolerances from ISO 4463-1: 1989 should be used.

All listed component weights are within a ±5% tolerance, not including system cabling or coolant., if applicable.

Limitation of Liability

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Varian Medical Systems

https://www.varian.com

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Release Notes (please see the Revision History for a list detailed of changes)

EXECUTIVE SUMMARY

Intended Audience

The intended audiences of this PPG are any Varian external customers or their representatives.

Purpose

This document is designed to assist customers and their representatives to understand the minimum requirements to enable a Varian TrueBeam/VitalBeam to be installed. This document is a reference for the machine and site planning and does not cover specific site conditions that may require additional detailed design or safety solutions.

The information herein will be useful to project managers, architectural and site planners, construction engineers, contractors' trade personnel, and others. Good site preparation and coordination between Varian and the customer's representative is essential for smooth and efficient machine installation.

It is important to finalize the detailed design of the site configuration before construction is started. Once the site is completed, it will be difficult, and costly to make revisions.

Document Structure

This document has four main sections:

Product Overview	- System pictures, identification of deliverables, shielding, and references.
Varian System	- Varian delivered parts, size, weight, and limitations.
Customer Requirements	- Room sizes, utility, and environmental requirements in trade sections.
Project Management	- Contractor tasks, durations, and responsibilities.

Project Planning

Once an order is placed, Varian will assign an Installation Project Manager (PM) to assist the customer and their representatives with the installation of the TrueBeam/VitalBeam system. Refer to 4 Project Management for more information.

Typical Lead-times and Durations

Min. lead-time from Customer order – **~ 4 months** (+ 1-month shipment for non-US orders)
Cable lengths required – **6 weeks** before delivery (+ 1-month shipment for non-US orders)
Third-party products (Power Conditioner, Chiller, Lasers, etc.) – **12 weeks**
BaseFrame installation – **2 days**
Concrete cure time before machine install – **4 weeks** recommended.
Standard Installation (including rig and acceptance) – **4 weeks**
SuperFast Installation (including rig and acceptance) – **2 weeks**
Accelerator Commissioning - approximately **6 weeks**, may vary.

Table 4-1 shows the detailed process and responsibilities for each major project milestone.

Site Readiness

The room must be clinically ready, meeting all the requirements within the PPG. All services and utilities must be available with the final finishes completed. The [1] Varian Accelerator Pre-Installation Checklist is used to measure compliance. Any tasks that are NOT complete must be approved by the Varian PM before the machine can be delivered. The Varian engineer must have exclusive possession of the treatment area during machine installation.

REVISION HISTORY

REV	DATE	DESCRIPTION OF CHANGE	AUTHOR NAME

C	October 2020	• Updated cover page
		• Removed Project Planning paragraphs from page 3, duplicated in Section 4
		• Updated the Typical Lead-times and Durations on page 3
		• Moved Note from page 9 to Section 3.1.2
		• Removed 1.3 Glossary and Abbreviations
		• Revised metric dimensions in Figure 2-1
		• Moved Turntable weight from Table 2-2 to Table 2-1
		• Added new Note on monitors to 2.5
		• Revised 2.6.1 MCB description text and removed duplicate information
		• Removed Note from 2.6.2, duplicate information
		• Updated Figure 2-8, added hinges
		• Moved Notice from 2.7.2 to 3.2.4
		• Moved bullet points from 2.7.3 to Notice in 3.1.4.2
		• Moved Note to 2.7.4 descriptive text
		• Moved bullet points from 2.7.4 to Notice in 3.1.4.1
		• Moved Notice 2.7.4 to 3.1.4.1
		• Moved bullet points from 2.7.5 to Notice in 3.1.4.3
		• Removed bullet on another set of IRMs, duplicate
		• Revised the Warning from 213 [7'-0"] to 203 [6'-8"] in 2.7.5
		• Added Support Document reference to Notice in 3.1
		• Section 3.1.1
		  • Corrected detail metric dimension from 305cm to 30.5cm
		  • Added bullet on pit depth variation
		  • Added bullet for cooling line reference
		• Revised the shaded area required for minimum floor clearances
		• Separated recommended and minimum ISO to rear wall dimensions
		• Revised the Caution in 3.1.2.1, moved text to create a new Note on obstruction consideration
		• Updated Figure 3-5, front clearance, added Console Cabinet outline
		• Updated Figure 3-6, flipped LV camera to reflect sample layout
		• Moved bullet points from 3.1.4 to 3.1.4.1
		• Moved bullet points from 3.1.4 to 3.1.4.2
		• Revised Table 3-1, removed LV camera lens column, revised Front Wall to Sagittal Wall
		• Added new Section 3.1.4.1 CCTV Cameras
		• Added new Section 3.1.4.2 Laser Mounting Plates
		• Moved IRM wall mount bullet to 2.7.5
		• Revised 3.2.2, removed duplicate specifications, removed isolation transformer Note
		• Section 3.2.3
		• Removed Conduit Access and Labeling, 3.2.3
		• Added wiring and cable key
		• Updated Table 3-3 and Figure 3-9
		• Moved Note for 1-phase for accessories to 3.2.5.1
		• Added Note for customer wiring from MCB to Modulator.
		• Removed Conduit Access, 3.2.4
		• Added new Section 3.2.4.1 RJB Customer Connections
			DKU

		• Moved Dedicating Grounding Section in front of Cable Containment
		• Revised 3.2.6 description, moved text to Caution, removed duplicate text
		• Updated Figure 3-12, added Laser Plates and RJB
		• Revised 3.2.7 bullets
		  • Removed place components shortest path
		  • Removed verify room penetrations
		  • Moved “conduit must be shorter than cable” to new Note
		• Added maximum run length to Table 3-4
		• Added new Section 3.2.8 Cable Access
		• Moved room lighting to Section 3.2.9, moved power requirement Note to Figure 3-10
		• Moved 3.2.10.1 warning light requirements to bullet points
		• Revised 3.2.10.1 aural indicator Note to a Notice
		• Revised 3.2.10.3 EMO Switch to EMO Button
		• Moved 3.2.10.3 EMO Button requirement to a bullet point
		• Added new Section 3.2.10.4 for Emergency Disconnect Button
		• Removed Table on Safety Devices, moved options to bullet points, 3.2.10.5
		• Moved treatment room Wi-Fi bullet to a Note, Section 3.2.11
		• Added maximum input pressure to Table 3-8
		• Updated Figure 3-16, added Varian hose kit and stand entry point
		• Added do not locate floor drains in Notice, Section 3.3.1
		• Added new Section 3.3.2 Cooling Line Access
		• Added new Section 3.3.4 Optional Plumbing Considerations
		• Moved 3.4.1 Ventilation requirements to bullet points, removed duplicate Note
		• Revised the 3.7.1 Flooring requirement, changed from “static dissipative” to “Anti-Static”, removed the resistance range.
		• Added new Figure 3-18, for flooring voids
		• Removed text from Section 3.7.2, duplicated requirement in 3.1.2.2
		• Revised 4.1 Responsibilities description
		• Revised 4.3 BaseFrame customer materials to “S2” and to “~1.6 cu. yds.”
		• Added new Notice to Appendix A Section 2 Rigging
		• Revised 2.1 Standard rigging weight to “6123kg [13,500lb]”	

D	November 2020	• 2.5, Removed monitor risers • 3.1.4.3, Added optical imager reference to the longitudinal axis line • Table 3-2, Console Current, added neutral • Table 3-4, Revised AC Door Interlock to 120 VAC • 3.2.5, Revised from 24 VDC to 24 VAC • 3.2.10.5, Revised Light Curtain, controls door interlock circuits • 3.2.11, Added WiFi in the control area • 3.7.4, Revised the Fire Protection statement	DKU

TABLE OF CONTENTS

1 OVERVIEW

The Varian TrueBeam is the only system specifically designed to deliver both radiotherapy and radiosurgery. A sophisticated and highly intelligent technology, this breakthrough system unlocks the ability to do tailored ground-breaking treatments with unprecedented ease, versatility, and speed. The TrueBeam system brings together state-of-the-art, real-time imaging with the ability to deliver higher doses with high precision. Because of this intelligent design, physicians can treat more complex cases and more patients. As sophisticated as it is, the TrueBeam system has been developed for ease of use. Designed with an emphasis on efficiency, the TrueBeam system is easy for a technician or a clinician to learn and operate.

VitalBeam is a new cost-effective technology package for offering high-quality, high-throughput radiation therapy, and for expanding clinical capabilities over time. VitalBeam leverages the best of Varian's technology; incorporating many of the innovations we developed for our popular TrueBeam radiosurgery system to enhance precision, safety, and speed of treatment. It is a flexible and upgradeable system that affordably meets the clinical needs today as they grow in the future. Each of the five VitalBeam configurations offers up to three photons and four electron energy levels for flexibility in treatment. Customers can choose to start with one configuration and add capabilities over time, at a pace that suits them. It is distinct from our versatile TrueBeam radiotherapy and radiosurgery platform in that VitalBeam is optimized for advanced radiotherapy while TrueBeam systems were designed to handle both.

Figure 1-1 VitalBeam Stand, Gantry, and Couch

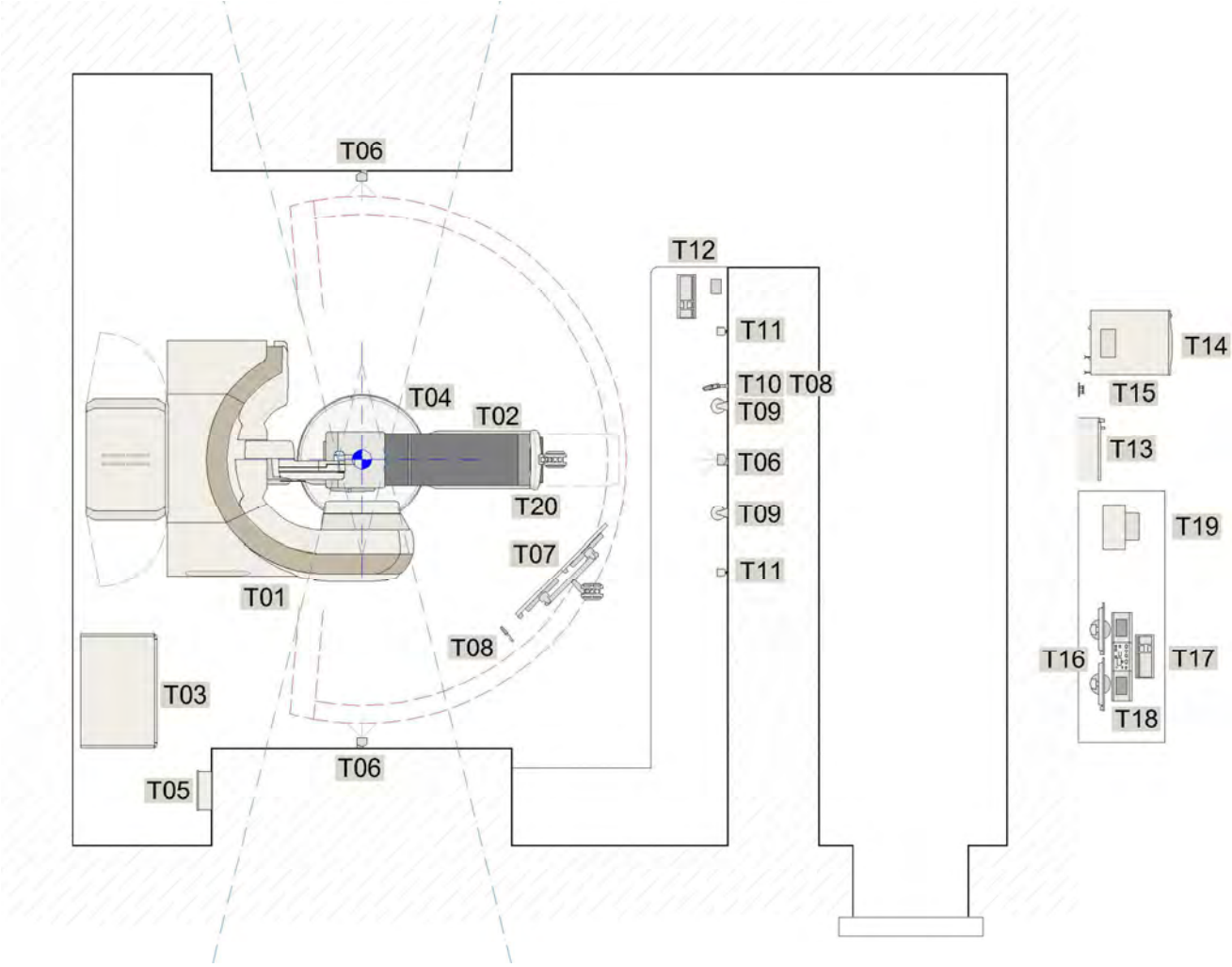


Figure 1-2 TrueBeam/VitalBeam System Components *(sample layout)*

Table 1-1 TrueBeam System Components			
T01	Stand & Gantry	**T11**	Speaker *(x2)*
T02	Treatment Couch	**T12**	USB Hub & Service Keyboard
T03	Modulator Cabinet	**T13**	Main Circuit Breaker, MCB *(opt. check SO)*
T04	BaseFrame	**T14**	Console Cabinet
T05	Relay Junction Box	**T15**	IEC 60309 Power Outlet *(opt. check SO)*
T06	Positioning Laser *(x4, opt. check SO)*	**T16**	System Monitors *(x2, Treat and Image)*
T07	In-Room Monitor Set *(Dual Screen)*	**T17**	Control Console, Keyboard, and Mouse
T08	Patient Microphone	**T18**	CCTV Monitor *(x2)*
T09	CCTV Camera *(x2)*	**T19**	Printer
T10	Live View Camera	**T20**	Optical Imaging Camera *(opt. check SO)*

1.1 SHIELDING

Varian Medical Systems shall have no approval or other responsibility for any matter affecting or related to the adequacy of the radiation protection walls and barriers or related safety devices. All radiation shielding designs must meet codes and regulations of all Authorities Having Jurisdiction (AHJ) and must be approved by the Customer's or Facility's Physicist of Record and shall be the sole responsibility of the Customer/Facility. The hours of operation, patient workload, accelerator energy, and the shielding materials should all be taken into consideration when calculating shielding requirements. Severe injury or death can result from improper radiation shielding.

- Consideration should be taken when locating linear accelerator equipment in the proximity of Magnetic Resonance Imaging (MRI) units or other magnetic field generating equipment.
- The TrueBeam/VitalBeam Accelerator and associated video monitors should be located outside of the 100 µT (1 Gauss) magnetic field.

1.2 REFERENCES

These support reference documents and other more detailed documents are available from the Varian Planning Department or your Varian PM.

[1] Varian Accelerator Pre-Installation Checklist

[2] SD–HT–Moving Modulator

[3] SD–HT–MCB Panel

[4] SD–HT–Seismic

[5] D26947 TrueBeam/VitalBeam External Cooling Water Recommendations

2 VARIAN SYSTEM DIMENSIONS

2.1 STAND, GANTRY, AND COUCH

The Stand, Gantry, and Couch are the main functional components of the machine that the users and patients will have contact with. Isocenter is the primary reference point for Varian equipment in the treatment room.

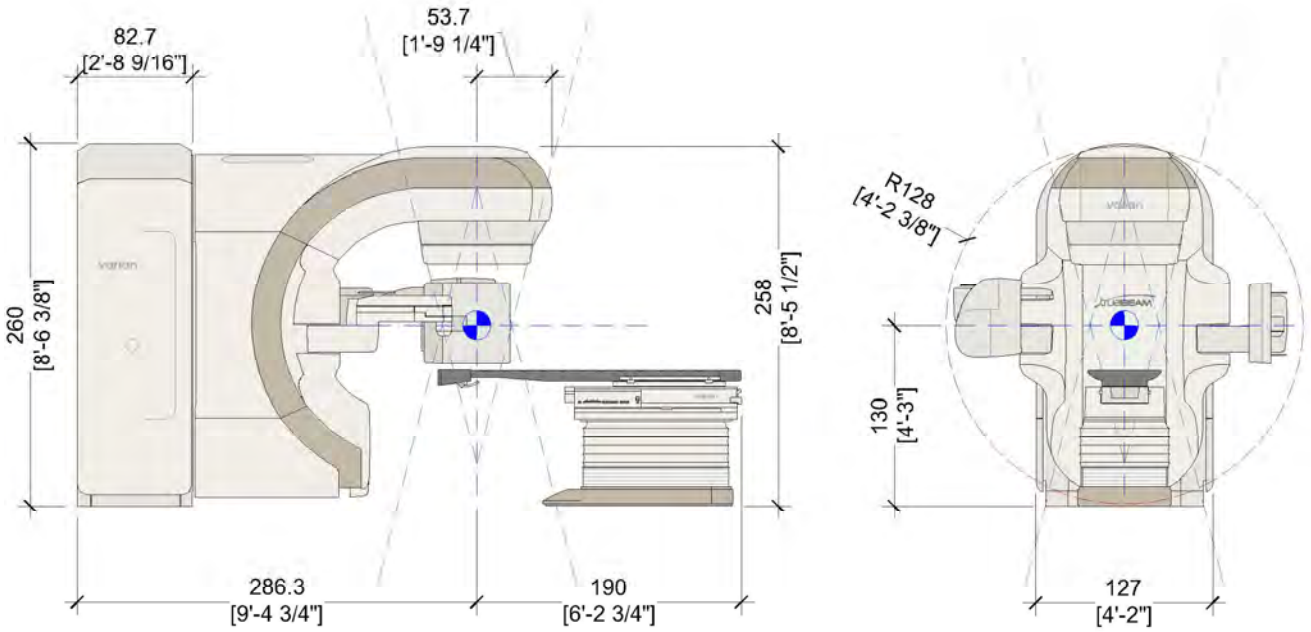


Figure 2-1 TrueBeam/VitalBeam Stand, Gantry, and Couch (Side and Front View)

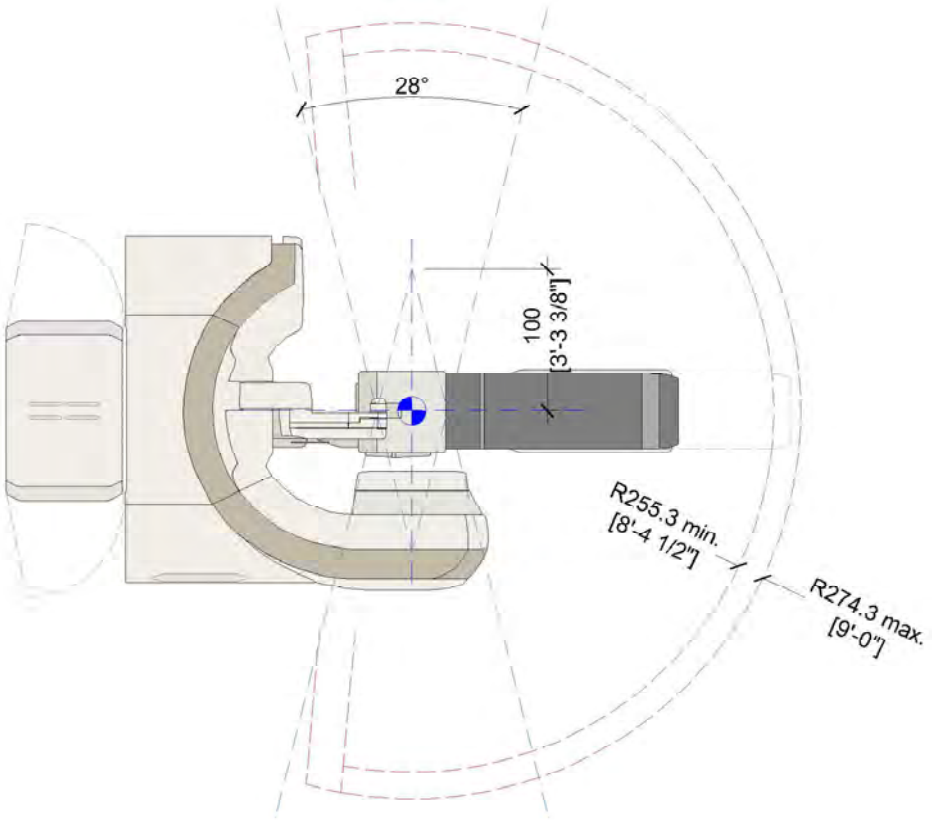


Figure 2-2 Couch Radius, Primary Beam Angle and Source to Isocenter Distance

Table 2-1 Treatment System Weights		
Description	**Kg**	**Lb**
Stand and Gantry	8507	18754
Couch and Couch Top	627	1382
Turntable Assembly	391	862
Total System excluding BaseFrame	9525	20998

2.2 BASEFRAME

The BaseFrame is used to connect the Stand, Gantry, and Couch to the building. It is installed into a recessed equipment pit below the finished floor and held in place with concrete.

The BaseFrame is secured to the pit slab to avoid floating during final concrete placement. Non-Seismic anchors are provided and installed at the red dots indicated in the plan view. See Section 3.1.1 and Section 4.3 for more information.

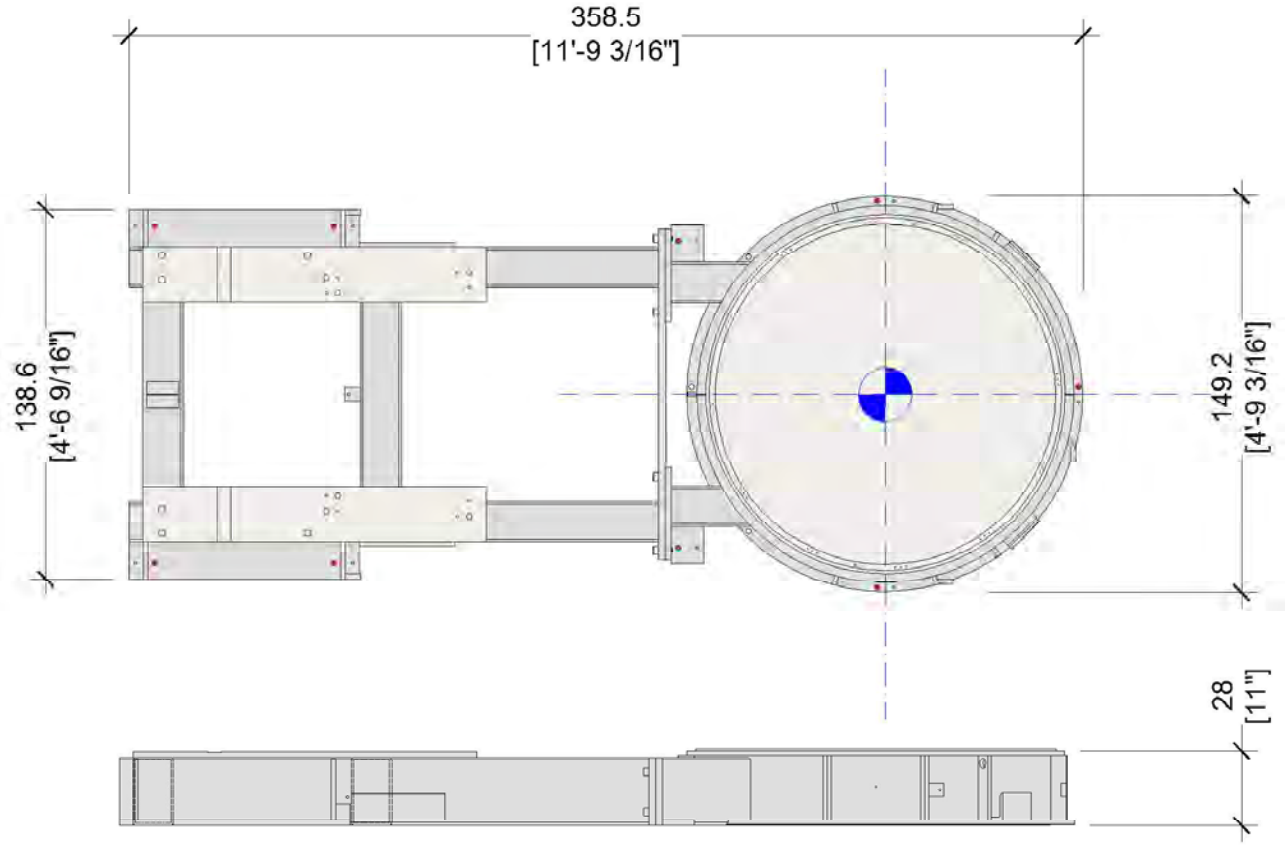


Figure 2-3 Universal BaseFrame (Plan and Side View)

For Varian machine replacements, the existing BaseFrame may be able to be reused, the Varian Planning Department or Varian Sales can provide more information.

Table 2-2 BaseFrame Weight		
Description	**Kg**	**Lb**
BaseFrame	757	1669

2.3 MODULATOR

The Modulator is the power supply cabinet to the TrueBeam system. The Modulator cabinet may be located either in the treatment room or remotely. Ventilation, acoustics, service provisions, and cable length must be considered in the final placement. See Section 3.1.3 for the required clearances.

NOTICE **Do not locate the Modulator in the primary beam path.**

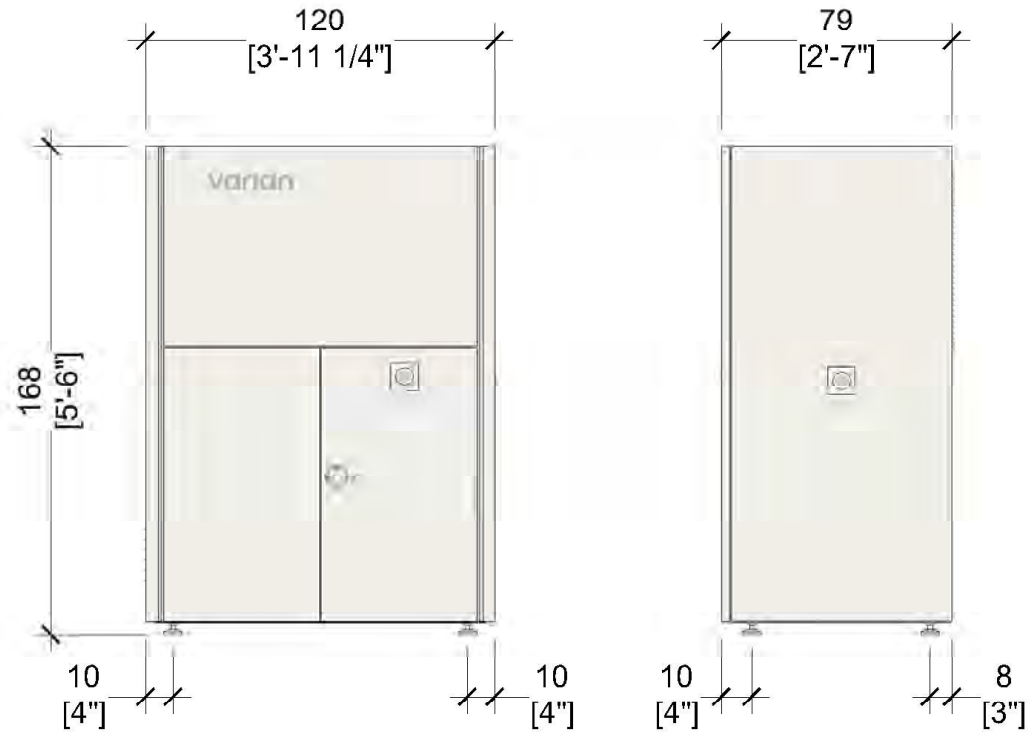


Figure 2-4 Modulator Size (Front and Side View)

An optional Moving Modulator Kit is available that permits the Modulator Cabinet to be installed in areas that cannot meet the required service clearance area, as shown in Figure 3-4. This kit positions one side of the Modulator Cabinet closer to the wall during clinical use while allowing it to be rolled away from the wall for service. This kit can be ordered from the Varian PM. There is a requirement for a service pit below the modulator to manage the interconnection power cables. The Varian Planning Department or Varian PM can provide more information, [2] SD–HT–Moving Modulator.

Table 2-3 Modulator Weight

Description	Kg	Lb
Modulator	900	1985

2.4 CONSOLE CABINET

The Console Cabinet houses rack-mounted computers and imaging equipment required to run the system and user interface. It is powered from the Main Circuit Breaker panel (MCB). See Table 3-2 and 3.2.5.2 Control Area for details on the specific electrical requirements for the cabinet.

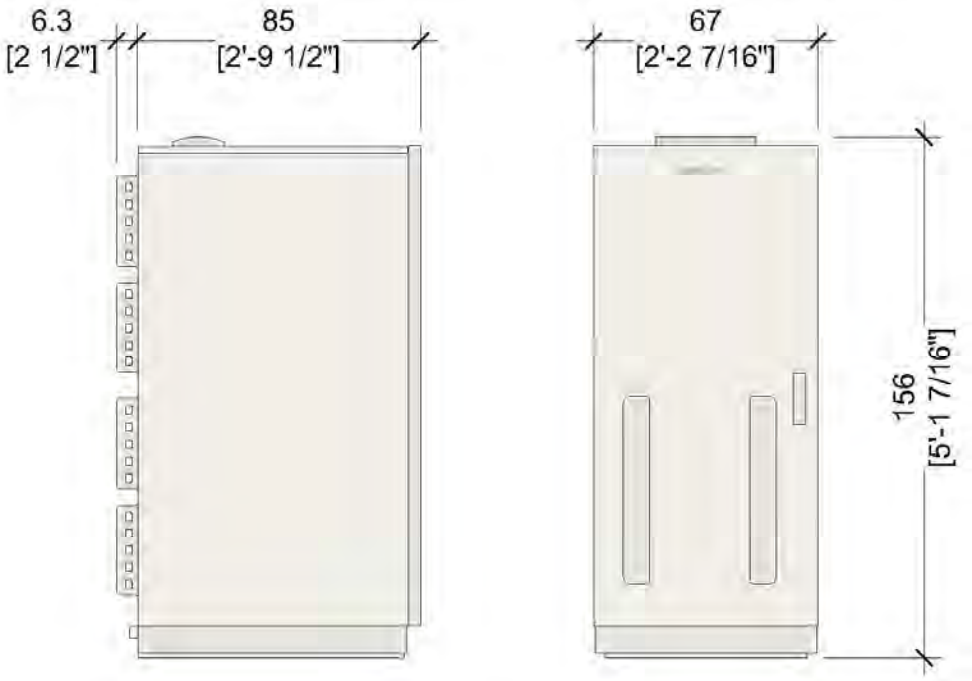


Figure 2-5 Console Cabinet Dimensions (Front and Side View)

Table 2-4 Console Cabinet Weight		
Description	**Kg**	**Lb**
Console Cabinet	290	640

2.5 CONSOLE

The Console is used to operate the TrueBeam/VitalBeam. The components consist of:

(2) System Monitors (Treat and Image), (1) Control Console, (1) Standard Keyboard and Mouse, and (2) CCTV Monitors.

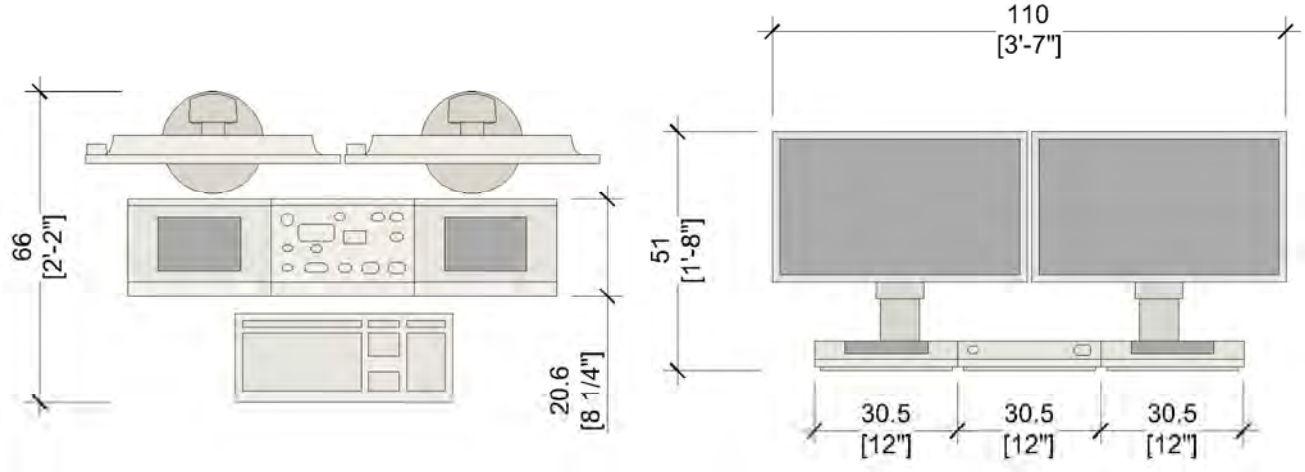


Figure 2-6 Console Desk Layout

The System and CCTV monitors are powered from the Console Cabinet.

2.6 MCB AND CABLES

2.6.1 MAIN CIRCUIT BREAKER (MCB), SALES OPTION

The MCB panel is the main distribution point for power to the TrueBeam/VitalBeam system. The MCB panel includes safety features to properly control power to the system and depending on the model, may offer additional safety circuits. The Varian Planning Department or Varian PM can provide more specific information based on the MCB manufacturer and model, refer to [3] SD-HT-MCB Panel.

- Provides a single point of connection for the site's 3-phase power to the TrueBeam/VitalBeam System
- Splits the mains power into two independent switchable power outputs
  - To the Modulator Cabinet
  - To the Control Cabinet
- Provides for various system safety features:
  - Overcurrent protection for the outputs
  - Mains Incoming Power Switch (non-emergency)
  - Emergency Disconnect Button
  - System Start

The MCB panel and IEC 60309 receptacle are not a standard part of the TrueBeam/VitalBeam system but can be supplied by Varian as part of the equipment order. If the MCB is not part of the equipment sales order, then it can be ordered directly from the manufacturer. The Varian Planning Department or Varian PM can provide more information.

2.6.2 CABLES

This section shows you the point to point connection and the maximum cable length available for the Varian-supplied system cables. See 3.2.7 Cable Containment.

Table 2-5 TrueBeam/VitalBeam System Cables				
Cable Route	**Maximum Cable Length**	**# of Cables**	**Start**	**Finish**
A	30m [100']	12	**T01** - Stand	**T03** - Modulator
B	45m [150']	18		**T14** - Console Cabinet
C	45m [150']	7		**T17** – Control Console
D	45m [150']	1	**T14** - Console Cabinet	**T20** - Optical Imaging Camera
E	30m [100']	2 (up to x4)	**T14** - Console Cabinet	**T07** - In-Room Monitor
F_1	15m [50']	3		**T17** - Control Console
F_2	15m [50']	6		**T16** - System Monitors
F_3	15m [50']	2		**T18** - CCTV Monitor
G	15m [50']	1		**T13** - MCB
H	45m [150']	1	**T13** - MCB	**T03** - Modulator
I	45m [150']	2	**T05** - RJB	**T01** - Stand
J	45m [150']	2	**T08** - Microphone	**T17** - Control Console
K	38m [125']	1	**T14** - Console Cabinet	**T10** - Live View Camera
L	45m [150']	2	**T11** - Speaker	**T17** - Control Console
M	45m [150']	2 (up to x6)	**T09** - CCTV Camera	**T18** - CCTV Monitor
N	45m [150']	1	**T14** - Console Cabinet	**T12** - USB Hub, Treatment Room
O	7.5m [25']	1		**T19** - Printer

Table 2-6 Customer Specified Cables				
P	as required	3	**T13** - MCB	**T03** - Modulator
Q	as required	4		**T15** - IEC Outlet

2.7 PRE-INSTALLATION KIT (PIK)

The PIK consists of Varian-provided mounting brackets, plates, posts, and electrical components. This kit is ordered and shipped to the site by the Varian PM for the customer to install before the TrueBeam/VitalBeam delivery. The Varian-supplied components must be installed per local code and regulations using Customer-provided and appropriately-sized mounting hardware engineered to support a combined maximum load as shown in Table 2-7.

Table 2-7 Pre-Installation Kit Weights

	Bracket Weight		Supporting Weight	
Description	**Kg**	**Lb**	**Kg**	**Lb**
Console Cabinet Bracket	22	49	See Section 2.4	
Relay Junction Box (RJB)	N/A		11	24
Laser Mounting Plates	1	2.2	≤ 2.6	≤ 5.7
CCTV Cameras	1	2.2	2	4.5
Mounting Plates & Post - IRM	16	35	32	70
Mounting Plates & Posts - Optical Imager	13	29	13.6	30
Live View Camera	0.5	1	3.2	7
Speakers	N/A		2.3	5

2.7.1 CONTROL CABINET BRACKET

Varian provides a floor positioning bracket plate that must be attached to the floor under the Console Cabinet. This provides stops and locking pins to prevent the cabinet from moving unintentionally.

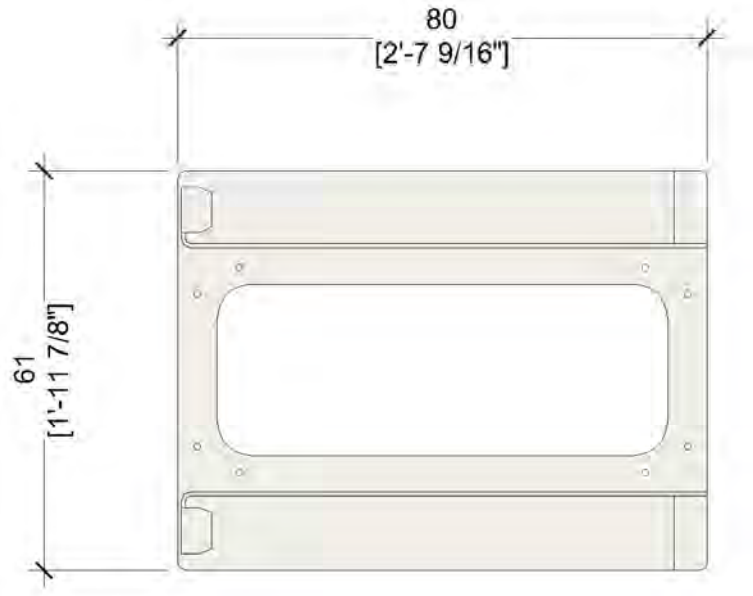


Figure 2-7 Floor Bracket for Console Cabinet

2.7.2 RELAY JUNCTION BOX

The Relay Junction Box (RJB) is a factory assembled and tested control panel that provides a central interface connection point between the TrueBeam/VitalBeam Accelerator and the treatment room main room lights, system status warning lights, patient positioning lasers, door interlocks, and remote emergency off push buttons. Refer to 3.2.4 Relay Junction Box (RJB) for more information.

- The door hinges are on the left side of the RJB.

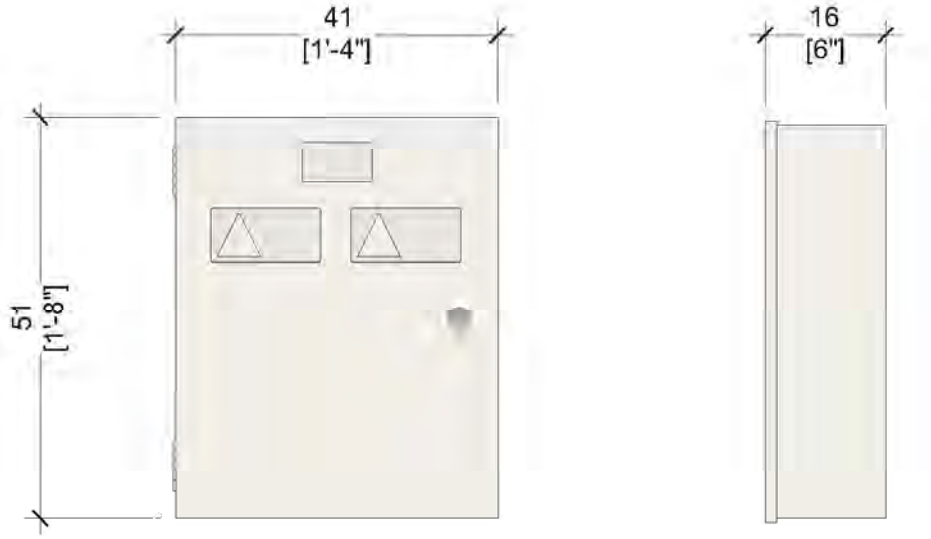


Figure 2-8 Relay Junction Box (Front and Side View)

2.7.3 LASER MOUNTING PLATES

The patient is aligned to the accelerator's isocenter with positioning lasers. The lasers are powered and controlled by a common circuit that is connected to the RJB.

- Four steel Laser Mounting Plates are provided. (2) side lasers at isocenter height, (1) ceiling laser directly above isocenter, and (1) sagittal wall laser, refer to 3.1.4.2 Laser Mounting Plates.

Lasers are not a standard part of the TrueBeam/VitalBeam system but may be supplied by Varian as part of the equipment order. Contact Varian Sales or the Varian Planning Department for more information on available options.

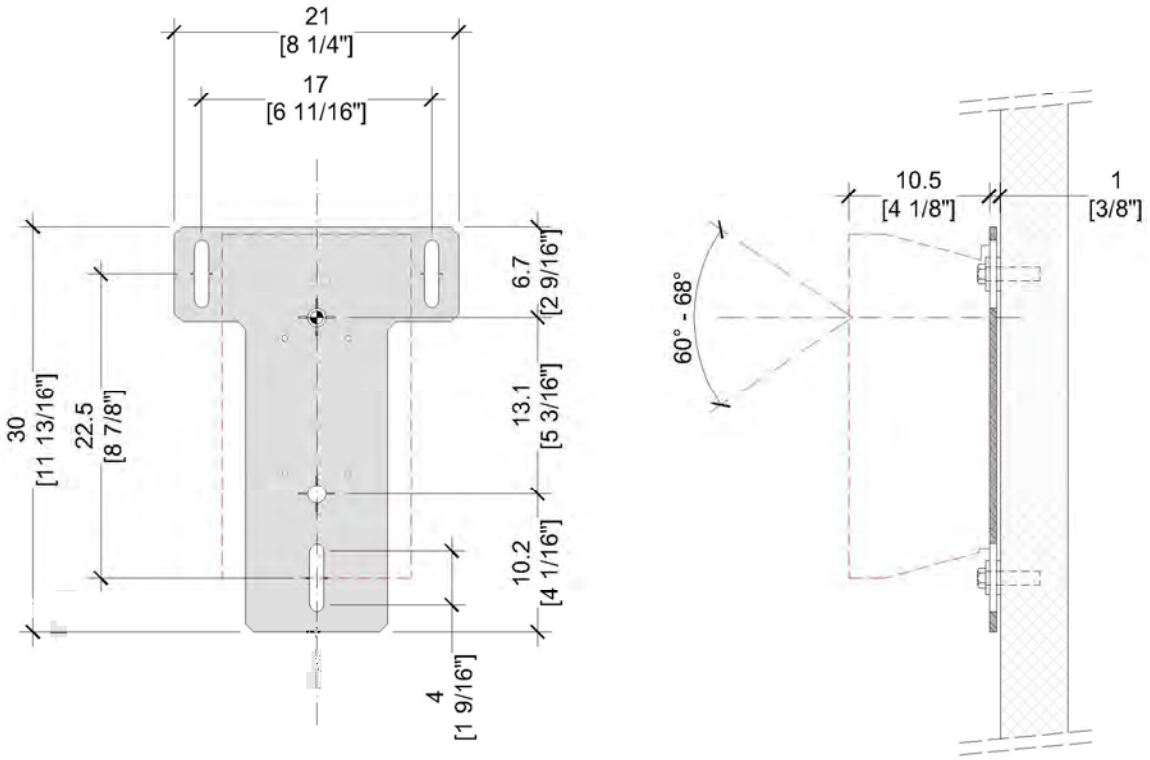


Figure 2-9 Laser Mounting Plate

2.7.4 MOTIONVIEW CCTV CAMERAS

A Closed-Circuit Television (CCTV) system is required for safe operation. It is critical to patient safety that the therapist always maintain visual contact with the patient, see Figure 3-6 and Section 4.5 for more information.

- A two-camera MotionView CCTV camera system is standard with TrueBeam/VitalBeam.
- Additional two-camera MotionView CCTV camera systems may be purchased as an option, up to a maximum of 6 cameras.
- Each CCTV camera has a dedicated monitor in the console area, see 2.5 Console.

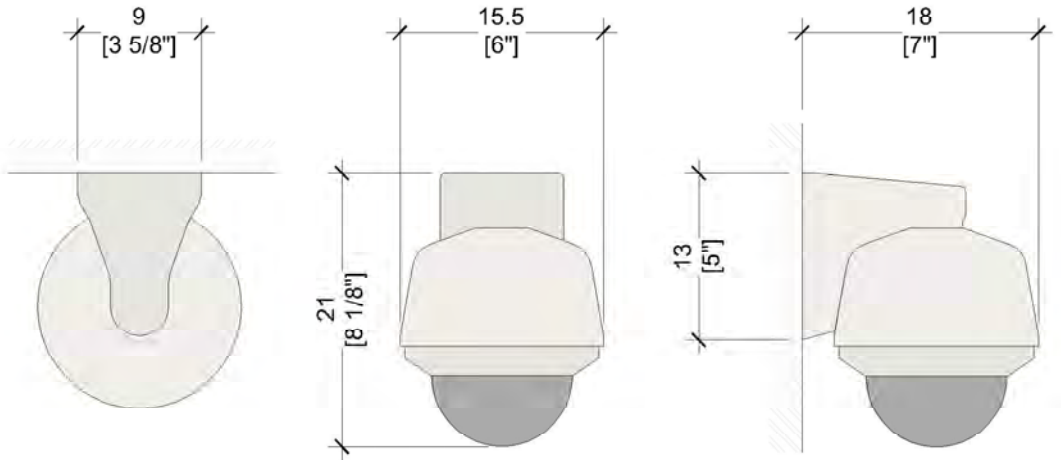


Figure 2-10 CCTV Camera Mounts (Plan, Front and Side Views)

2.7.5 OPTICAL IMAGER AND IN-ROOM MONITOR MOUNTING POSTS

An aluminum ceiling mounting plate, configurable post, and mounting bracket are provided as part of the PIK for installing the Optical Imaging Single Gating (SGC) or Dual (NDI), camera and the Dual In-Room Monitors (IRM's).

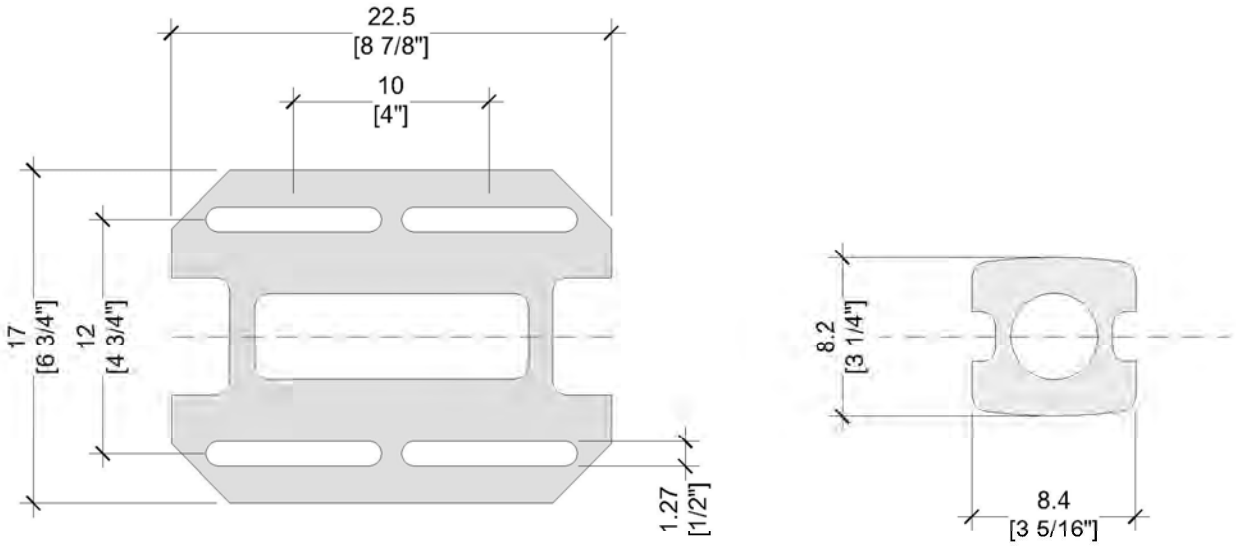


Figure 2-11 Ceiling Mounting Plate and Post Section

- Post length can be configured in 15cm [6"] increments between the minimum and maximum post length, refer to Figure 2-12 IRM and Optical Camera Mounting Heights.
- See Figure 3-7 Treatment Room Ceiling Mounted Components (Plan) for mounting locations.
- The IRMs may be wall-mounted. Contact the Varian PM to order wall mount brackets.

One set of ceiling-mounted Dual IRM displays is included as part of the standard TrueBeam/VitalBeam equipment package. An additional set of Dual IRM displays can be purchased as an option, verify with the final sales order, or the Varian PM.

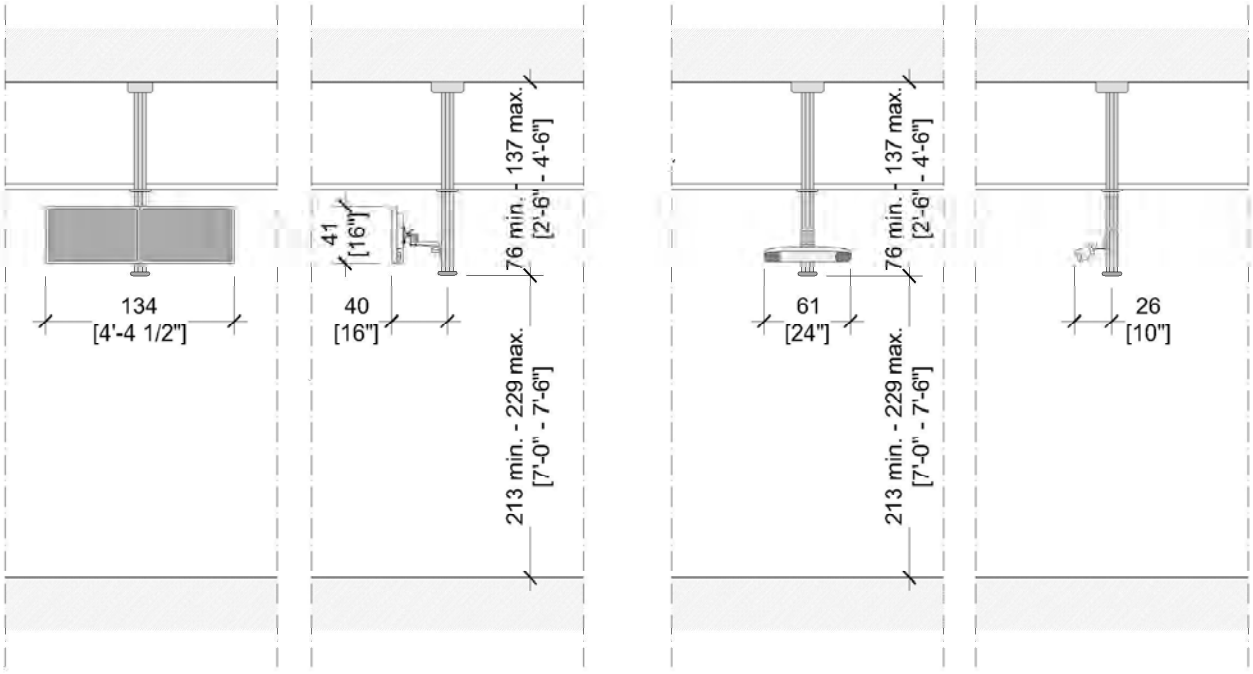


Figure 2-12 IRM and Optical Camera Mounting Heights

WARNING **The customer must maintain a minimum clearance of at least 203cm [6'-8"] between the floor and ceiling-mounted equipment.**

2.7.6 LIVE VIEW CAMERA MOUNT

The Live View (LV) Camera is a radiation-hardened system that enables monitoring of the TrueBeam/VitalBeam and the patient, the system provides proximity information while the machine is moving to help prevent injury to the patient.

- A wall-mount post is Varian-provided, Customer-installed.
- The LV camera is Varian-installed.
- See Figure 3-6 Treatment Room Sagittal Wall (Elevation) for mounting post location.

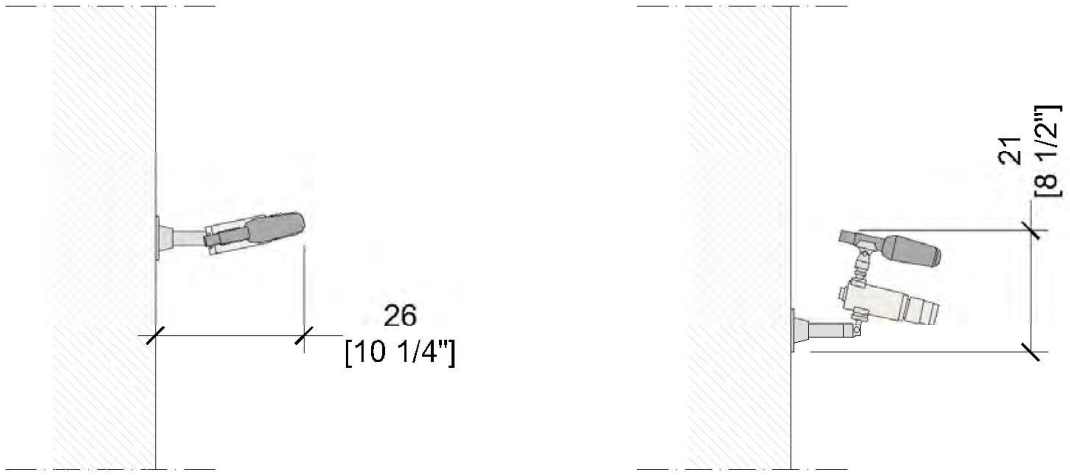


Figure 2-13 Live View Camera Wall Mount (Plan and Side View)

2.7.7 SPEAKERS AND MICROPHONE

Two speakers and two microphones are a standard part of the TrueBeam/VitalBeam system that provide intercom and audio services in the treatment room, operated by the Control Console.

- The microphones are Varian-installed, typically one is installed on the LV Camera and one is installed to the false ceiling grid, near the IRM.
- The speakers are Customer-installed
- See Figure 3-6 Treatment Room Sagittal Wall (Elevation)

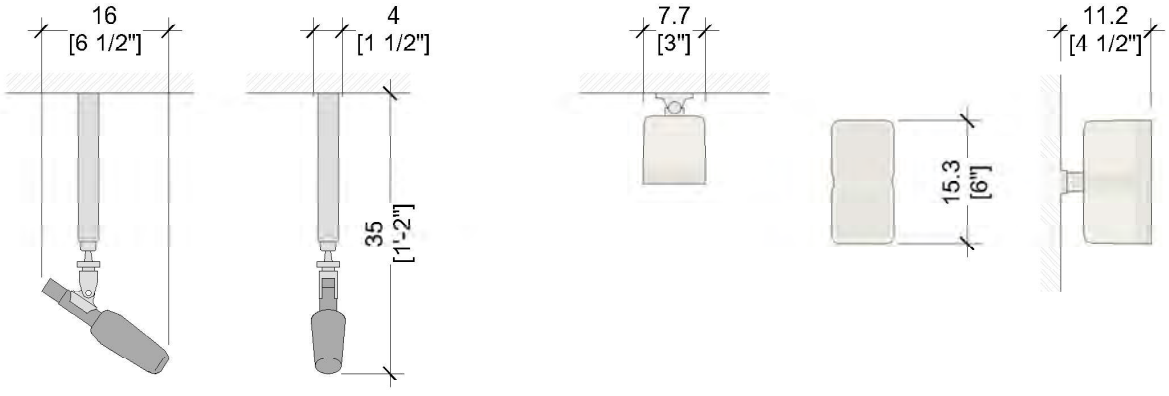


Figure 2-14 Microphone and Speaker Side and Front Elevations

3.1 SPATIAL

NOTICE

It is the customer's responsibility to determine the quantity, size, and type of mounting hardware required to adequately and seismically anchor the Varian-provided components to the floor, walls, and ceiling per local, state, and national codes and regulations.

3.1.1 BASEFRAME PIT

WARNING

The BaseFrame is supplied with mounting hardware that is NOT suitable for sites subject to seismic activity. It is the responsibility of the customer to provide a qualified structural engineer to determine the quantity, size, and type of mounting hardware required for seismically anchoring the Varian-provided components to the pit floor, refer to [4] SD–HT–Seismic for sample calculations.

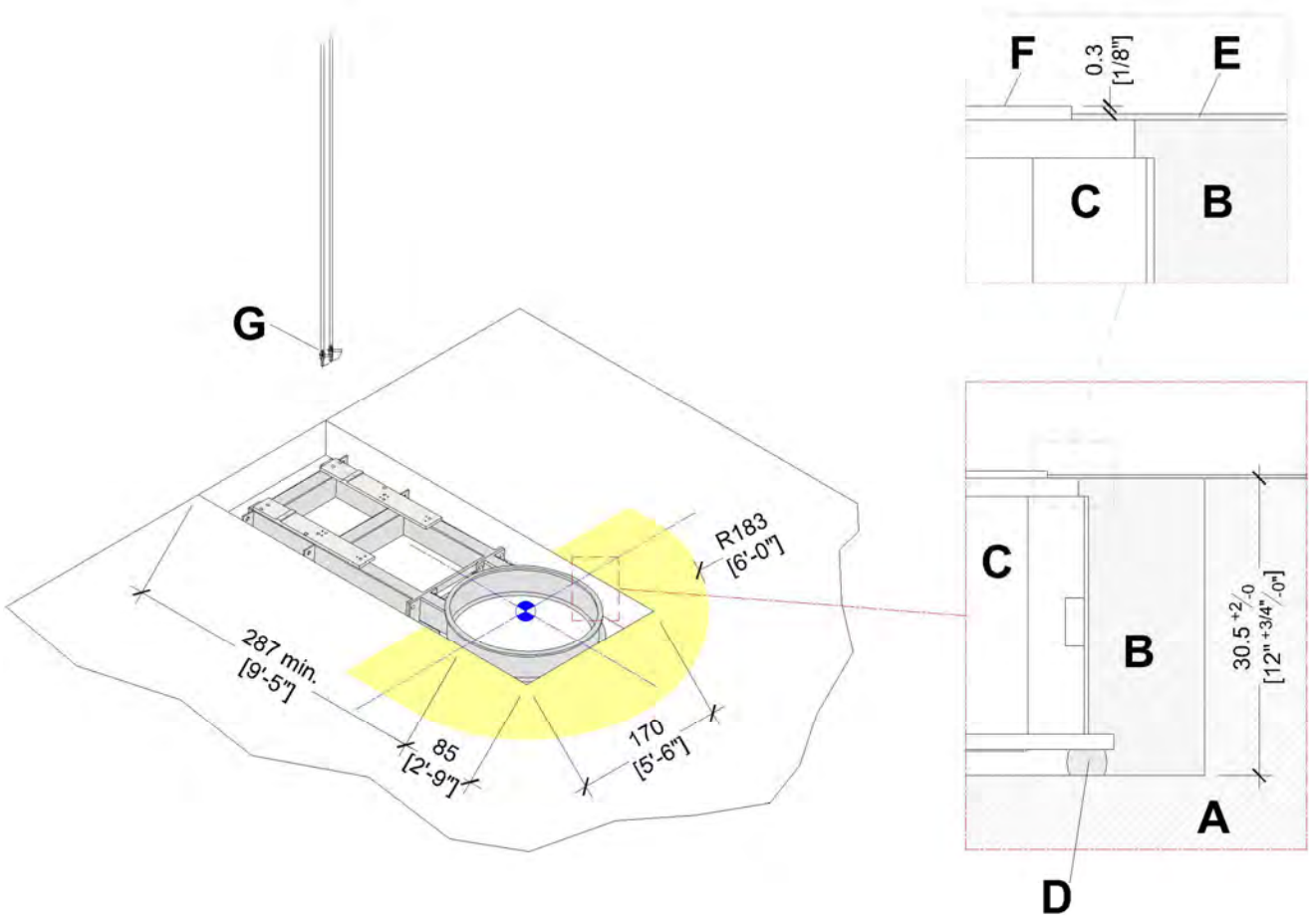


Figure 3-1 Minimum BaseFrame Pit Dimensions

A	Structural Concrete (by Customer)	**E**	Finished Flooring (by Customer)
B	Backfill Concrete (by Customer)	**F**	Turntable Trim Ring, BaseFrame
C	BaseFrame (by Varian)	**G**	Chilled Water Supply and Return Isolation Valves (by Customer)
D	Foam Backer (by Varian)		

- The pit floor shall be designed by a qualified structural engineer capable of carrying the total weight of the fully assembled accelerator, see Table 2-1 and Table 2-2.
- The yellow shaded area must be level to the top of the outer ring of the BaseFrame within ±3mm [±1/8”] for a radius of 183cm [6’-0”] from isocenter.
- The BaseFrame pit depth shall not vary more than 6mm [1/4"].
- All exposed concrete shall be suitably sealed before the BaseFrame Installation.
- Access for cables and chilled water must be considered before backfilling the pit with concrete.
- Refer to 3.3.2 Cooling Line Access for details to the chilled water connection point.
- See Section 4.3 BaseFrame Installation, for a detailed explanation of the installation procedure.

3.1.2 MINIMUM TREATMENT ROOM CLEARANCES

It is the customer’s responsibility to ensure that the site-specific design documents for the Varian system to be installed complies with any applicable local, regional, and national codes and regulations.

Compliance must address but is not limited to proper egress, adequate separation of services, and required clearances for equipment with hazardous voltages.

The customer is responsible for the safety of the equipment layout in the Control Area and Treatment Room, particularly with the ceiling and wall-mounted equipment.

3.1.2.1 FLOOR CLEARANCES

The area highlighted in Figure 3-2 shows the operational and service clearances required for the TrueBeam/VitalBeam Stand, Gantry, and Couch.

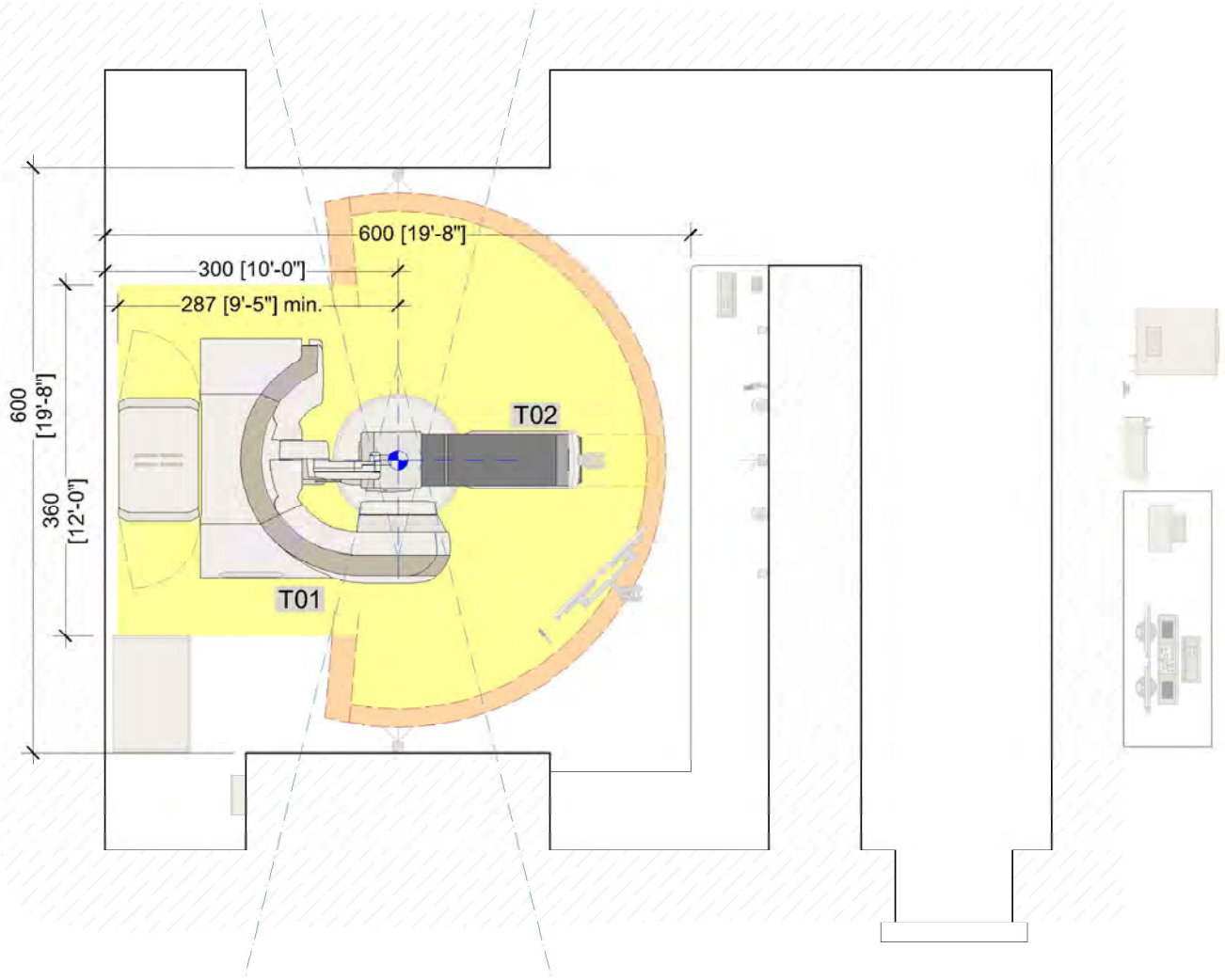


Figure 3-2 Minimum Room Clearances

CAUTION

The maximum couch arc allows complete rotation of the Couch Top at full retraction. Obstructions inside the minimum required couch arc are unacceptable, as they can result in injury to patients and medical personnel as well as equipment damage.

- Refer to Figure 2-2 for the minimum and maximum couch arc radii

Obstructions between the minimum required couch arc and the maximum couch arc may be considered provided they are reviewed and approved by Varian and the Customer. In specific situations, such as dynamic stereotactic treatment, a larger area may be required.

3.1.2.2 OVERHEAD CLEARANCES

The area highlighted in Figure 3-3 shows the overhead installation, operational, and service clearances required for the TrueBeam/VitalBeam Stand, Gantry, and ceiling-mounted components.

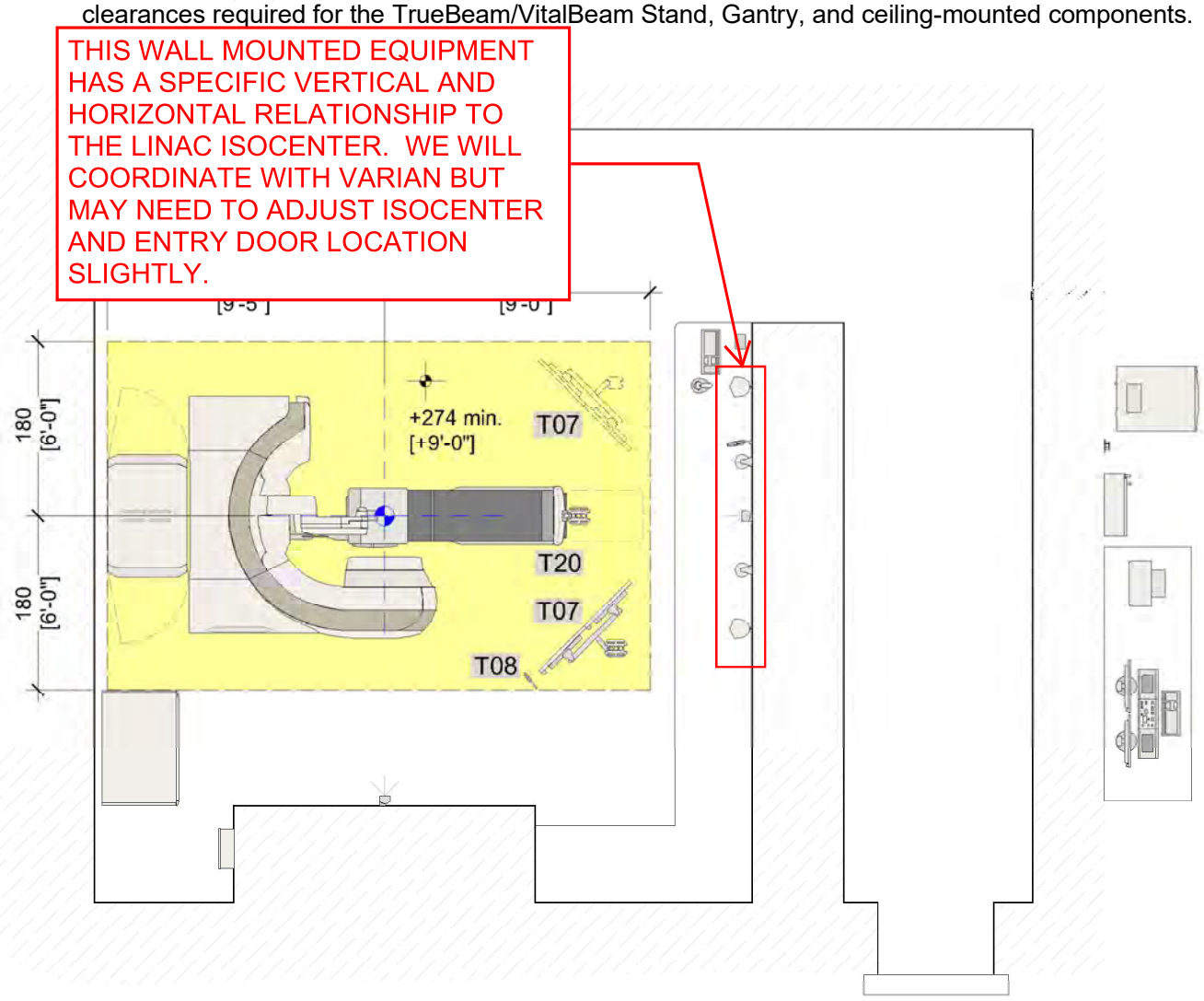


Figure 3-3 Minimum Overhead Clearances

- Provide 274cm [9'-0"] minimum clearance from the finished floor to the finished ceiling.
- Additional clearance height will be required for the ceiling laser that is mounted directly above isocenter.

3.1.3 CABINET CLEARANCES

The area highlighted in Figure 3-4 and Figure 3-5 provides the operational, cabling, and service clearances required for the Modulator and the Console Cabinet. Refer to 2.3 Modulator and 2.4 Console Cabinet for more information.

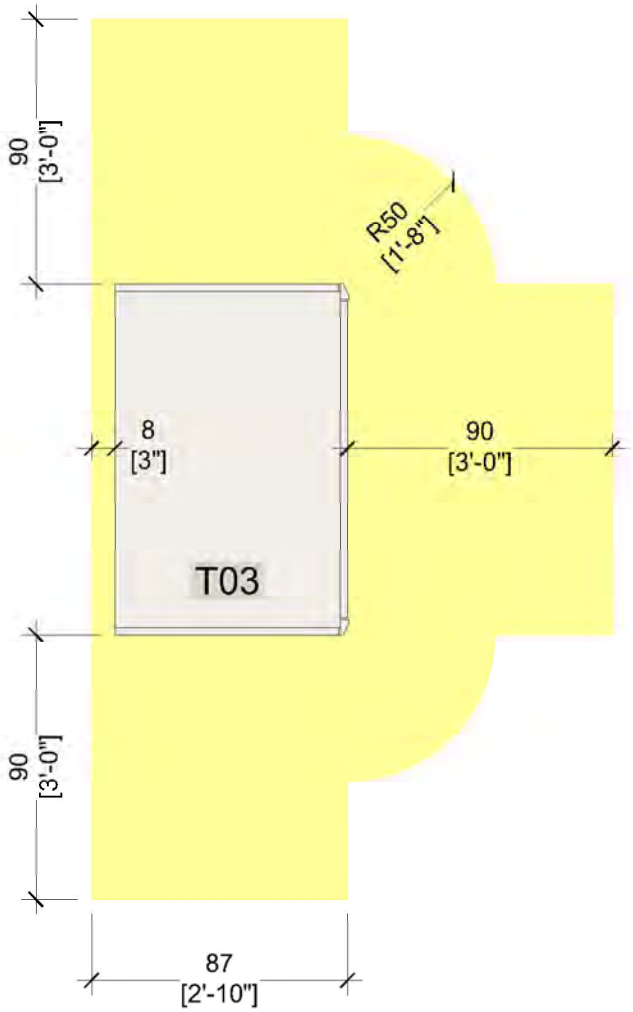


Figure 3-4 Modulator Service Clearances

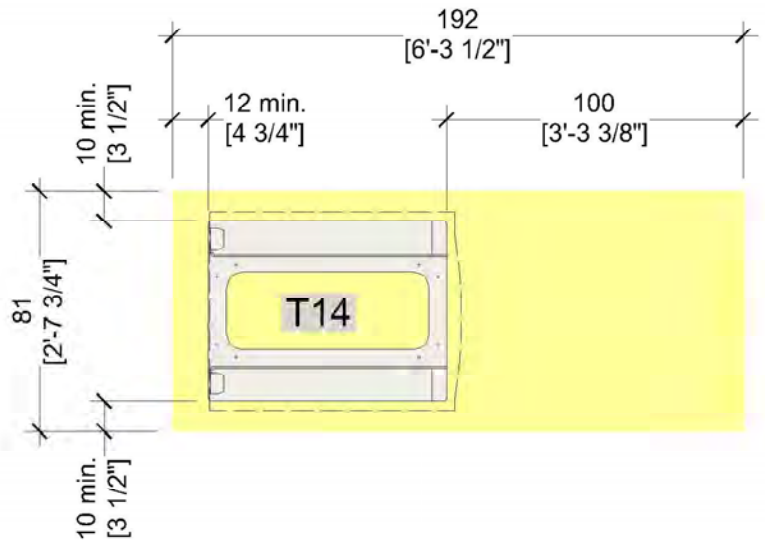


Figure 3-5 Console Cabinet Service Clearances

3.1.4 ACCESSORY COMPONENTS LOCATIONS

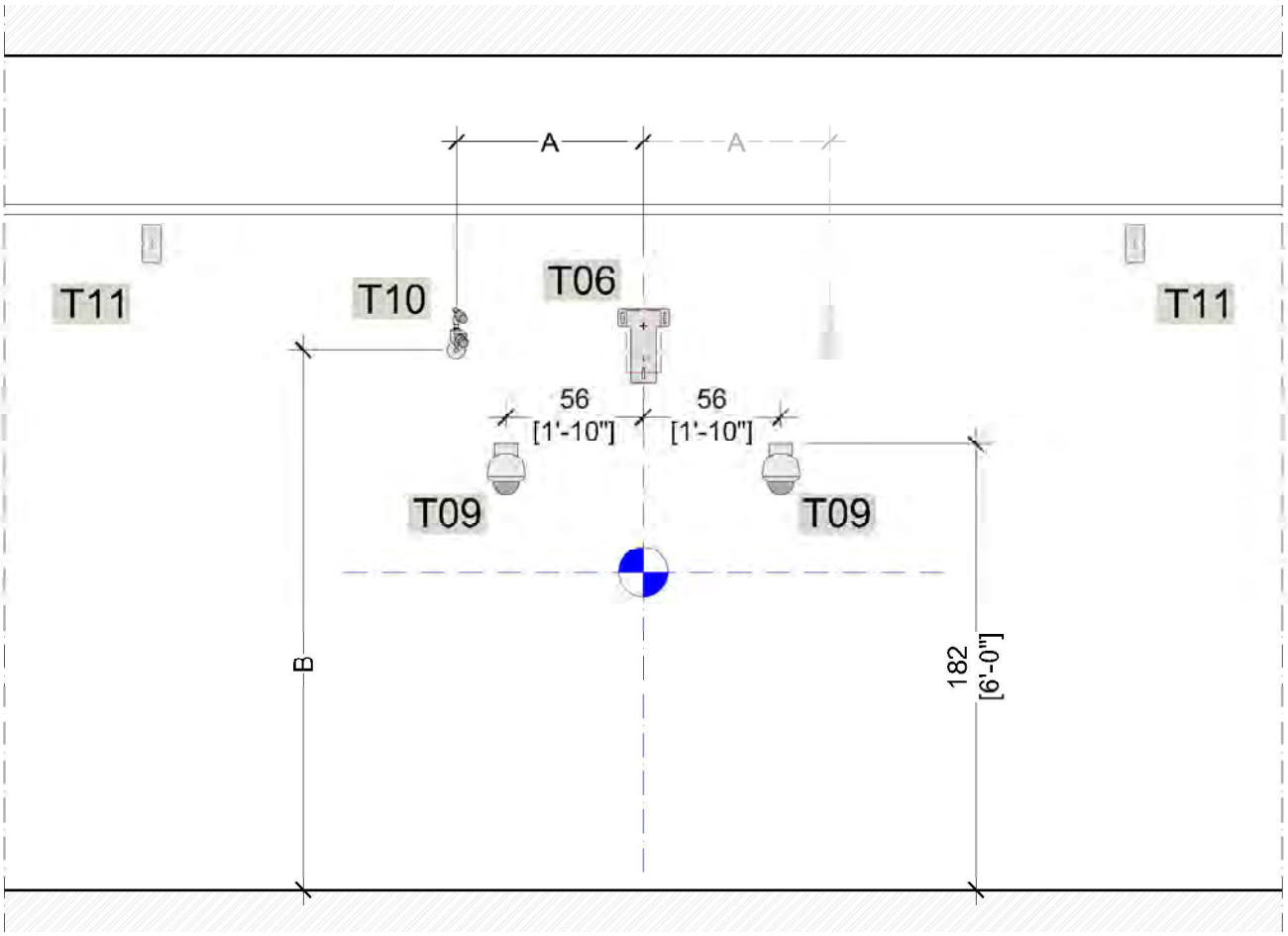


Figure 3-6 Treatment Room Sagittal Wall (Elevation)

- Wall mount the LV camera on either side of isocenter, refer to Table 3-1 for the installation area for the LV camera (**T10**).
- Wall mount the Speakers (**T11**) towards the front of the treatment room outside the primary beam path. The installation location is Customer preference.
- The primary Microphone (**T08**) will be Varian-installed on the LV camera.
- The secondary microphone will be Varian-installed to the false ceiling typically near the ceiling-mounted IRMs using the 25mm [1”] T-bar clip post (not shown), see Figure 2-14.
- Refer to Table 2-7 for component weights, provide structural support as required.

Table 3-1 Live View Camera Post Installation Area

Distance from Isocenter to Sagittal Wall	Dimension "A" from The Sagittal Plane	Dimension "B" from Finished Floor
260 - 300cm [8'-6" - 9'-10"]	50 - 100cm [1'-8" - 3'-3"]	200 - 220cm [6'-6" - 7'-3"]
300 - 350cm [9'-10" - 11'-6"]	50 - 100cm [1'-8" - 3'-3"]	210 - 240cm [7'-0" - 7'-10"]
350 - 400cm [11'-6" - 13'-2"]	50 - 150cm [1'-8" - 4'-11"]	220 - 250cm [7'-2" - 8'-2"]
400 - 610cm [13'-2" - 20'-0"]	50 - 150cm [1'-8" - 4'-11"]	230 - 270cm [7'-6" - 8'-10"]

3.1.4.1 MOTIONVIEW CCTV CAMERAS

The MotionView CCTV camera housing is wall-mounted by the customer. The CCTV cameras are Varian-installed.

- The primary MotionView CCTV (**T09**) two-camera system location shown in Figure 3-6 is MANDATORY for patient safety.
- If additional MotionView CCTV camera systems are purchased, the installation location is Customer preference (not shown).

NOTICE

Do not locate the CCTV cameras in the primary beam path.

3.1.4.2 LASER MOUNTING PLATES

- The sagittal Laser Mounting Plate (**T06**) installation height is variable, 230cm [7'-6"] is the recommended height to avoid any obstructions with the laser alignment beam, see Figure 3-6. Consult with the laser manufacturer and customer on the desired elevation.
- Install the two side Laser Mounting Plates at 130cm [4'-3"] above the finished floor (not shown).
- Install the ceiling Laser Mounting Plate directly above isocenter, the mounting plate may be installed parallel or perpendicular to isocenter.

The Sagittal Laser may be installed vertically (shown) or horizontally, depending on the laser model. Contact the Varian PM or laser manufacturer on installation orientation options.

NOTICE

The mounting structure must be vibration-free and accessible for service.

DO NOT mount to wood, gypsum board, light gauge steel framing, or suspended ceiling grid.

The mounting plate has two isocenter alignment holes for installation flexibility.

3.1.4.3 IRM AND OPTICAL IMAGER

- The IRMs (**T08**) in Figure 3-7, may be located on either side of isocenter, typically on the opposite side of the maze entrance, refer to Section 2.7.5 and Section 4.5 for more information.
- The Optical Imager is located along the longitudinal axis line of the couch.

NOTICE

The mounting structure must be vibration-free and accessible for service.

DO NOT mount to wood, gypsum board, light gauge steel framing, or suspended ceiling grid.

Orient the plate's long centerline parallel with the longitudinal axis line of the couch.

DO NOT locate the IRMs inside or within 60cm [24"] of the primary beam path.

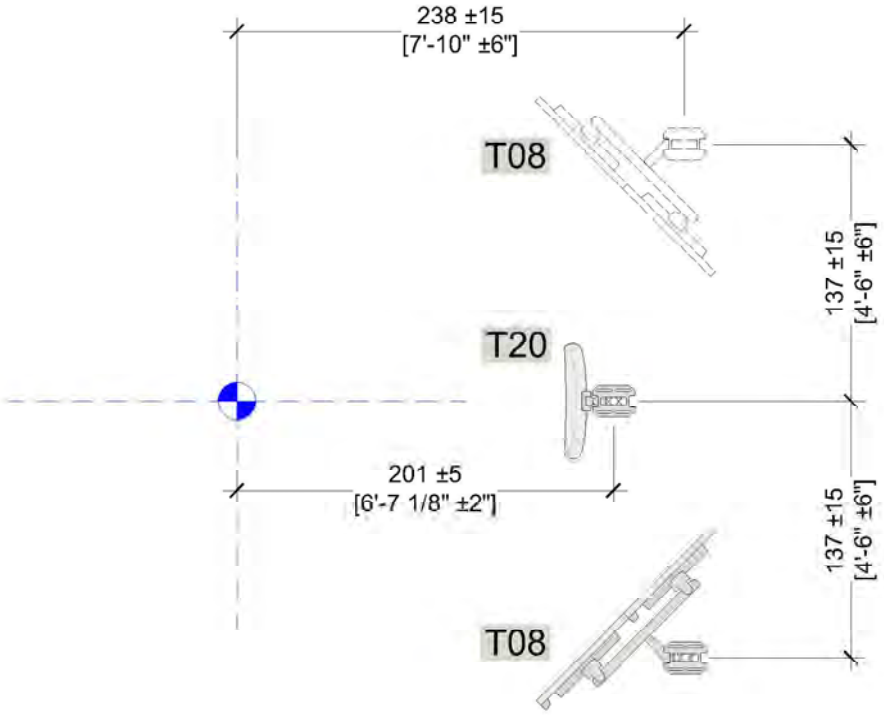


Figure 3-7 Treatment Room Ceiling Mounted Components (Plan)

3.1.5 CONTROL AREA LAYOUT

Figure 3-8 is a generic layout, component positioning may vary per site-specific conditions, consult with the Customer on the desired layout, and if any additional space is required.

- See Figure 3-5 for Console Cabinet Clearance requirements.
- Refer to Table 2-5 for maximum cable lengths from the Console Cabinet to the desktop components.

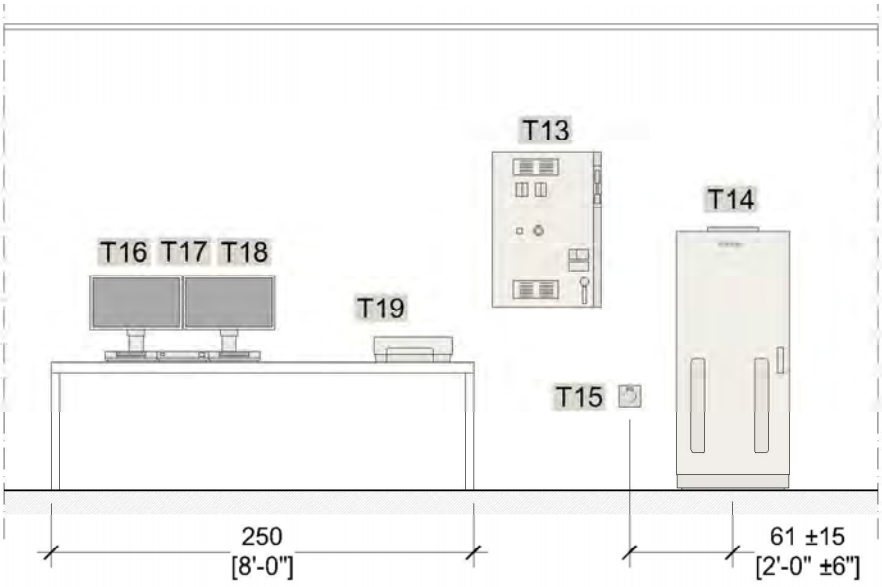


Figure 3-8 Generic Control Console Layout

If additional MotionView CCTV camera systems are on the final sales order, provide additional space at the Control Console for the extra CCTV monitors.

3.2 ELECTRICAL

3.2.1 POWER REQUIREMENTS

Table 3-2 System Power Requirements	
Input Voltage	200VAC, 208VAC, 240VAC, 380VAC, **400VAC**, 415VAC, or **480VAC** (nominal), Line-to-line, 5-wire (3-phase, neutral, and ground [equal in size to the conductors]).
System Current	100A @ 400V 50Hz or 80A @ 480V 60Hz
Console Current	20A @ 208-230V (50/60Hz) (1-phase, neutral, and ground, via the MCB panel)
Line Voltage Regulation	±5%. This is the maximum allowable steady-state deviation from the nominal value selected. Sinusoidal with less than 5% total harmonic distortion.
Maximum Phase Voltage Imbalance	3% of the nominal value. This is the maximum difference between any 2-phase voltages when operating at full load (Beam-On).
Input Frequency	50 or 60 Hz ±1 Hz.
Electrical Loads	7kVA in Stand-By state, 48kVA in Beam-On state. (Including console, 3kVA)
Long-Time Load	48kVA (Including console, 3kVA)
Power Factor	Equal to or greater than 90% The load is inductive and can exhibit a non-sinusoidal current waveform
Source Impedance	2.5% maximum For 45kVA: 208VAC = 24.0mOhm; 400VAC = 88.8mOhm For 48kVA: 208VAC = 22.5mOhm; 400VAC = 83.3mOhm
Max. Fault Current	10,000A.
Mandatory Grounding	See 3.2.6 Dedicated Ground/Protective Earth Requirements

Caution should be taken when powering the TrueBeam/VitalBeam from the same distribution source as elevators, HVAC equipment, and other phase-controlled loads, because of potential adverse effects on the operation of the X-ray equipment.

3.2.2 POWER CONDITIONING REQUIREMENTS

The equipment is sensitive to line voltage variations and source impedance. A complete survey of the electrical supply should be conducted before the equipment installation and a copy of this survey should be sent to the Varian PM for the equipment file. Isolation transformers and/or power conditioners are required where the electrical power requirements specified in Table 3-2 cannot be met.

Transients lasting no more than a few cycles will not cause harm if limited to the specified steady-state line voltage regulation. Transient suppression is required where larger, long-lasting or frequent transients occur as these can cause interruption of operation and/or equipment damage.

3.2.3 MAIN CIRCUIT BREAKER (MCB) PANEL

- Wall mount the MCB panel.
- Insight and within 3m [10'-0"] of the TrueBeam/VitalBeam Console Cabinet.

Table 3-3 Generic MCB Components	
A	Circuit Breaker 1
B	Circuit Breaker 2
C	K1 Contact
D	Transformer *(optional per A input voltage)*
E	Circuit Breaker 3
F	K3 Contact
G	Transformer
H	Start Button
I	Emergency Disconnect Button

Customer-provided wiring

Varian-provided cables

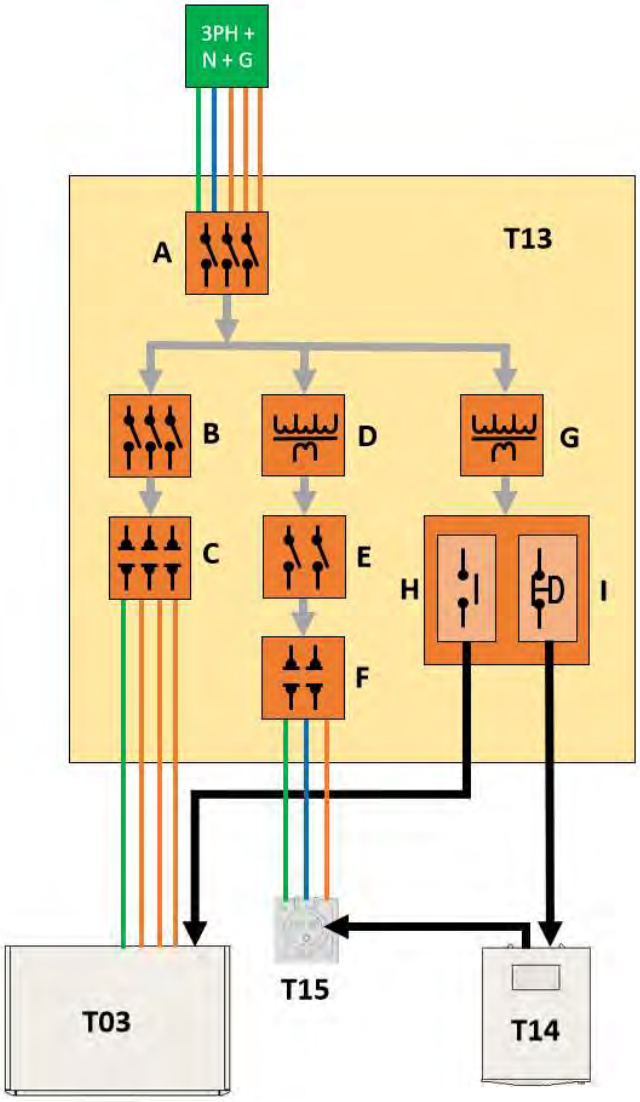


Figure 3-9 Generic MCB Panel Components

The Customer wiring from the MCB (**T13**) to the Modulator (**T03**) shall be 4-wire (3-phase and ground).

3.2.4 RELAY JUNCTION BOX (RJB)

- Wall mount the RJB in the treatment room at a standing height from the finished floor for service accessibility.
- The RJB may be surface-mounted or semi-recessed, up to a maximum of 12cm [4 3/4”].

NOTICE **Do not locate the RJB in the primary beam path.**

3.2.4.1 RJB CUSTOMER CONNECTIONS

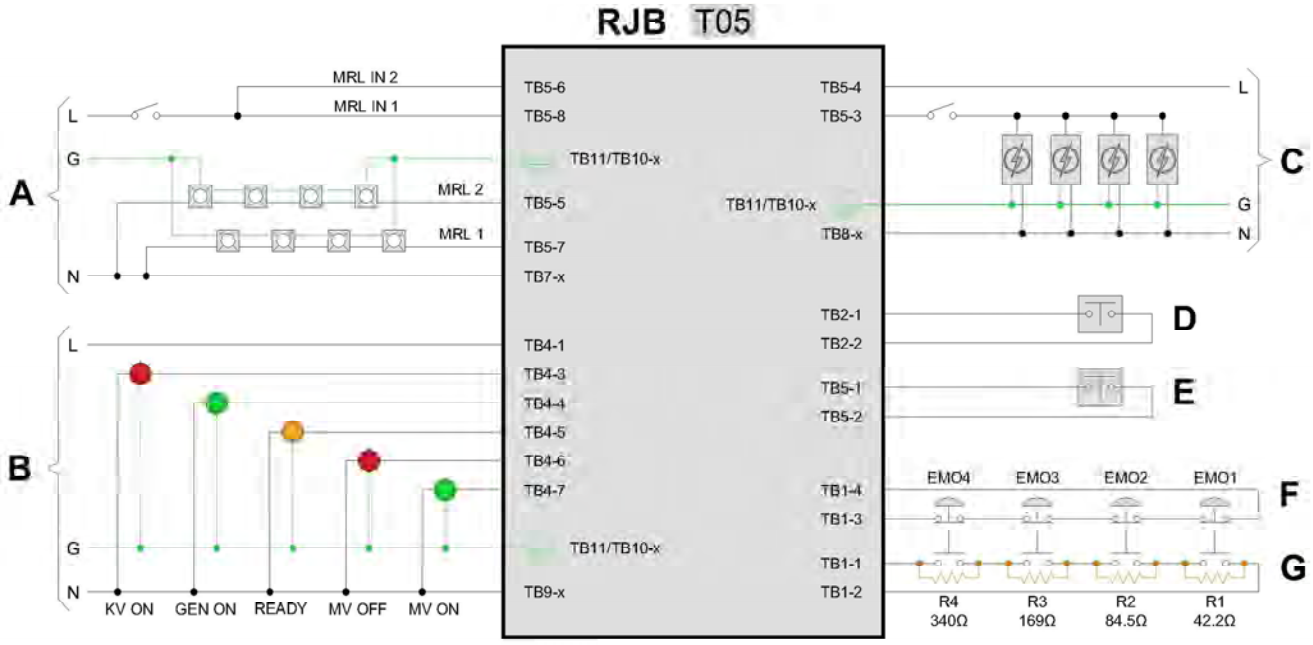


Figure 3-10 RJB Customer Connections

Table 3-4 RJB Connections			
A	Main Room Lights	100 – 277 VAC (50/60Hz), 20A maximum	see 3.2.9 Room Lighting
B	Warning Lights	100 – 250 VAC (50/60Hz), 10A maximum	see 3.2.10.1 Warning Lights
C	Lasers Power Outlet	100 – 250 VAC (50/60Hz), 10A maximum	see 3.2.5.1 Treatment Room
D	DC Door Interlock	24 VDC provided by Varian	see 3.2.10.2 Door Interlock Switches
E	AC Door Interlock	120 VAC provided by Varian	
F	EMO, “safety loop”, Normally Closed	24 VDC provided by Varian	see 3.2.10.3 Emergency Off
G	EMO, “sensor loop”, Normally Open	24 VDC provided by Varian	

Additional 24 VDC system interlocks are available in the RJB, contact Varian Planning or Varian PM for more information.

3.2.5 POWER OUTLETS

3.2.5.1 TREATMENT ROOM

- (1) Standard power outlet within 92cm [3'-0"] of each Laser (**T06**), controlled from the RJB (**T05**)
- (1) Standard power outlet, within 122cm [4'-0"] of each IRM (**T07**)
- (1) Standard power outlet within 30cm [1'-0"] of each CCTV camera (**T09**)
    - (Optionally the CCTV cameras can be powered by a Customer-provided 24VAC source)
- (1) Standard power outlet for the USB Hub (**T12**)

The 1-phase power to some accessory items can be provided by the MCB, depending on the design and functionality of the MCB. Contact Varian Planning or Varian PM for more information.

3.2.5.2 CONTROL AREA

- (1) IEC 60309 outlet, blue, 30-32A connector.
    - 1-phase, N, and G see Figure 3-8 and Figure 3-9.
- (1) Standard power outlet for the Printer (**T19**).
- Provide additional convenience power outlets as required by the Customer.

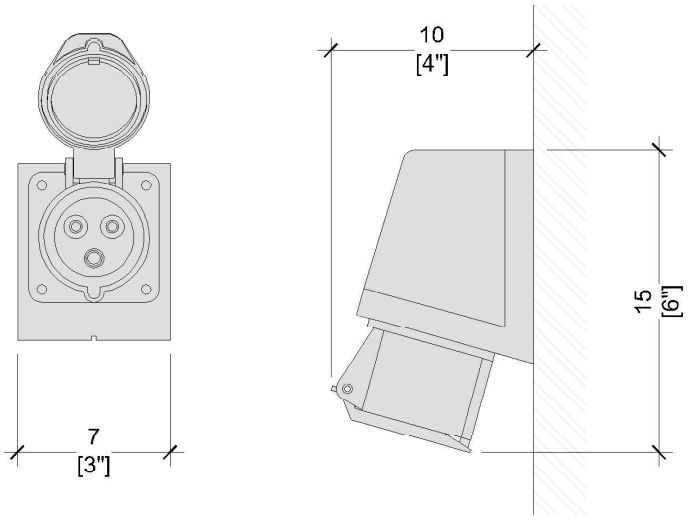


Figure 3-11 Console Cabinet - IEC 60309 Outlet

NOTICE

Do not install the IEC outlet directly behind the Console Cabinet. Locate to either side of the Console Cabinet.

3.2.6 DEDICATED GROUND/PROTECTIVE EARTH REQUIREMENTS

The TrueBeam/VitalBeam accelerator requires two Ground/Protective Earth (G/PE) circuits. The first circuit is part of the main power supply and provides grounding for the TrueBeam/VitalBeam Accelerator's major system components. Varian provides and installs the internal grounding cable between the Stand/Gantry, Modulator, Couch, and the Console Cabinet. The Customer provides the ground from the MCB (**T13**) to the Modulator (**T03**) in Figure 3-12, for more information refer to 3.2.3 Main Circuit Breaker (MCB) Panel.

CAUTION

The customer-provided G/PE conductor for the main power supply must meet or exceed code requirements and be equal in size to the supply/power conductors but, no smaller than 16mm2 [#6 AWG].

Ground all Varian equipment through the "Hospital Grid System." Do not use water supply piping for ground.

The second G/PE circuit is for the wall- and ceiling-mounted TrueBeam/VitalBeam accessory components that are located at or below 250cm [8'-2 1/2"] from the finished floor.

The Contractor shall install a G/PE conductor, 6 mm2 [10 AWG] minimum, from each of the components in Figure 3-12 to the facility's main ground. This grounding system provides compliance with IEC 60101 and -01. This G/PE conductor can be combined with the cable runs outlined in 3.2.7 Cable Containment.

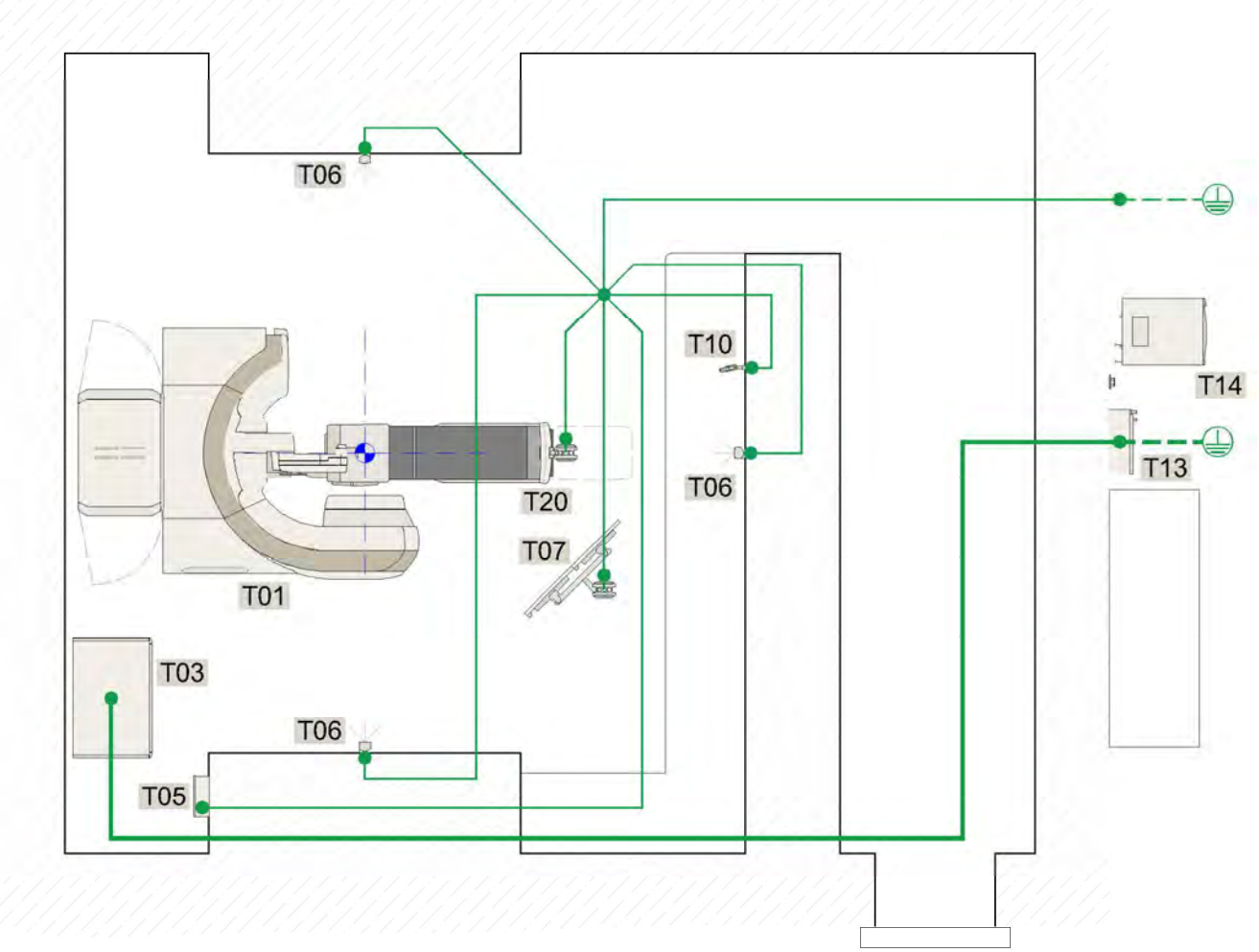


Figure 3-12 Ground/Earthing Conductor Diagram

- RJB (**T05**)
- LV Camera and Microphone (**T10**)
- IRMs and Post (**T07**)
- Optical Imaging Camera and Post (**T20**)
- Laser Mounting Plates (**T06**)

3.2.7 CABLE CONTAINMENT

NOTICE

The customer is responsible for ensuring that the cable installation meets applicable local codes and requirements. This might affect the choice of cable routes, number of conduits/ducts, specifications of mains power and data cables, and the choice of installation locations of system components.

The customer shall provide conduit or raceway duct for all system cables, as described in this section.

System cables are not plenum rated.

System cables shall not be permanently installed through a walking path.

- All underground conduits must be properly sealed so they are dry and watertight.
- Terminate conduits with insulating bushings or similar means to protect cables from abrasion.
- Conduit bends shall have a radius no less than 6 times the conduit's diameter.
- There shall be no more than three 90-degree bends per conduit (or equivalent).
- Reference Table 2-5 TrueBeam/VitalBeam System Cables for maximum cable lengths.

Cable conduit/duct route must be shorter than the maximum cable length, allow 3m [10'-0"] of excess cable at each end for connection and service, unless otherwise noted.

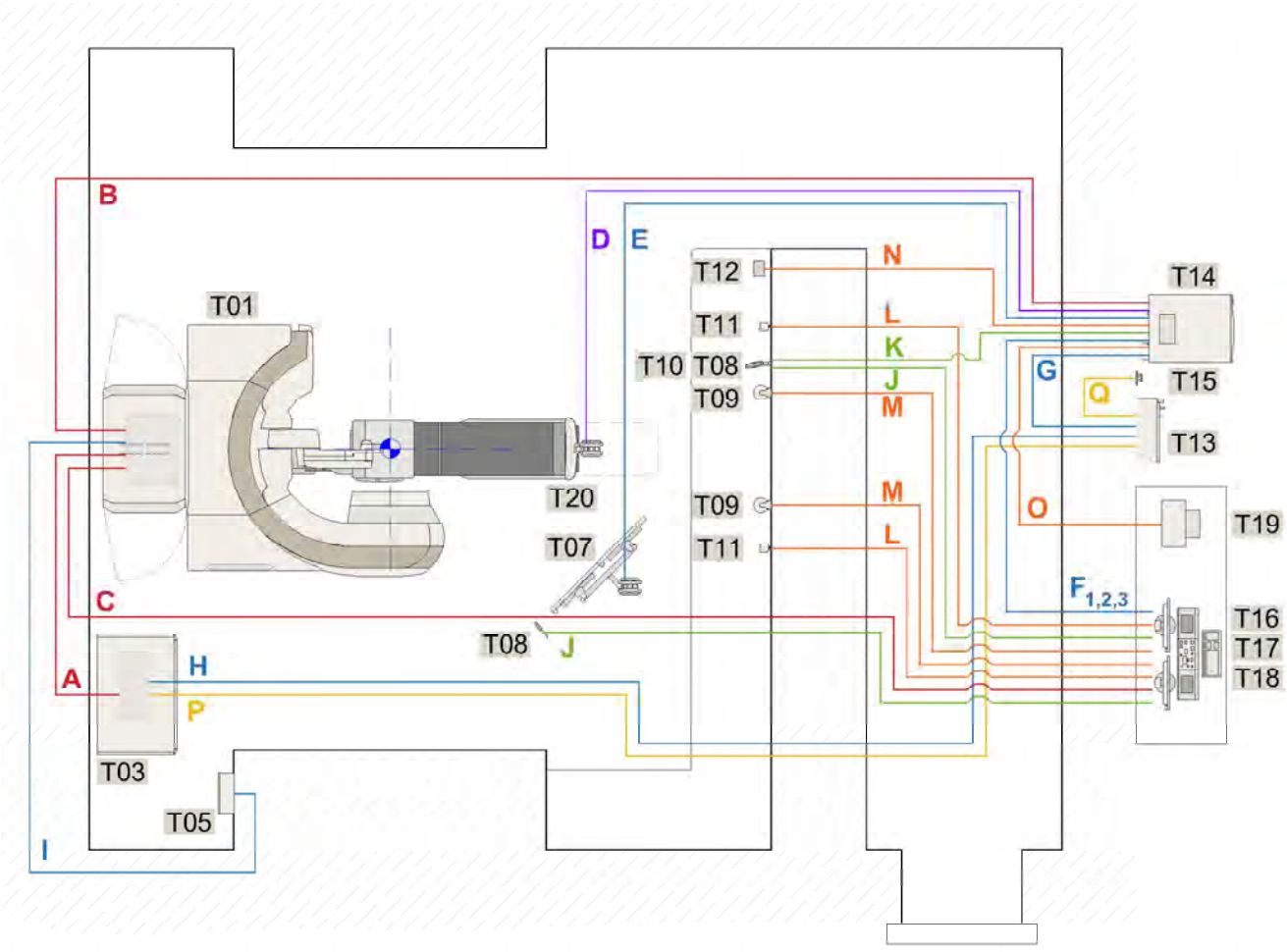


Figure 3-13 Containment Identification

Table 3-5 Minimum Recommended Containment Sizes					
Minimum Conduit Size Ø	**Cable Route**	**Conduit Quantity**	**Maximum Run Length**	**Start**	**Finish**
100mm [4”]	**A**	3	24m [80’]	**T01** - Stand	**T03** - Modulator
	B	3	38m [125’]		**T14** - Console Cabinet
	C	1	38m [125’]		**T17** - Control Console
75mm [3”]	**D**	1	38m [125’]	**T14** - Console Cabinet	**T20** - Optical Imaging Camera
50mm [2”]	**E**	1 (up to x2)	24m [80’]	**T14** - Console Cabinet	**T07** - In-Room Monitor
	F_1	1	n/a		**T17** - Control Console
	F_2	1	n/a		**T16** - System Monitors
	F_3	1	n/a		**T18** - CCTV Monitor
	G	1	11m [36’]		**T13** - MCB
	H	1	41m [135’]	**T13** - MCB	**T03** - Modulator
	I	2	41m [135’]	**T05** - RJB	**T01** - Stand
32mm [1.25”]	**J**	1	41m [135’]	**T17** - Control Console	**T08** - Microphone
	K	1	35m [115’]	**T14** - Console Cabinet	**T10** - Live View Camera
25mm [1”]	**L**	2	41m [135’]	**T17** - Control Console	**T11** - Speaker
	M	2 (up to x6)	41m [135’]	**T09** - CCTV Camera	**T18** - CCTV Monitor
	N	1	41m [135’]	**T14** - Console Cabinet	**T12** - USB Hub
	O	1	n/a		**T19** - Printer
Customer Specified	**P**	1	41m [135’]	**T13** - MCB	**T03** - Modulator
	Q	1	per site		**T15** - IEC Outlet

The information above is the minimum conduit size required to install the cables and provide separation requirements for functional operation.

Other options are acceptable to achieve these system interconnections in existing or new installations. Larger conduits may be used to group cables together to optimize the cable runs between the control area and treatment room before separating to their final locations, per local codes and regulations. The Varian Planning Department can provide more information on these options.

Cable Runs F1, F2, F3, and O may be bundled together and run below the countertop, it is recommended to provide a wire management system for cable protection and aesthetics

3.2.8 CABLE ACCESS

Cable access zones to the BaseFrame and Modulator are indicated in Figure 3-14, refer to Figure 3-1 for BaseFrame pit depth.

- Zone **A** is accessible from below the pit slab or from the rear through Zone **B**.
  - The maximum dimension for zone **A**, from front to back, is shown below.
  - Underground conduits must be a minimum of 15cm [6”] below the top of the BaseFrame pit slab.
- Zone **B** is centered on the BaseFrame.
  - The minimum width for zone **B** is shown below, coordinate with the chilled water access, see Figure 3-17.
- Zone **C** is accessible from below the Modulator, refer to Figure 3-4 for Modulator clearances.

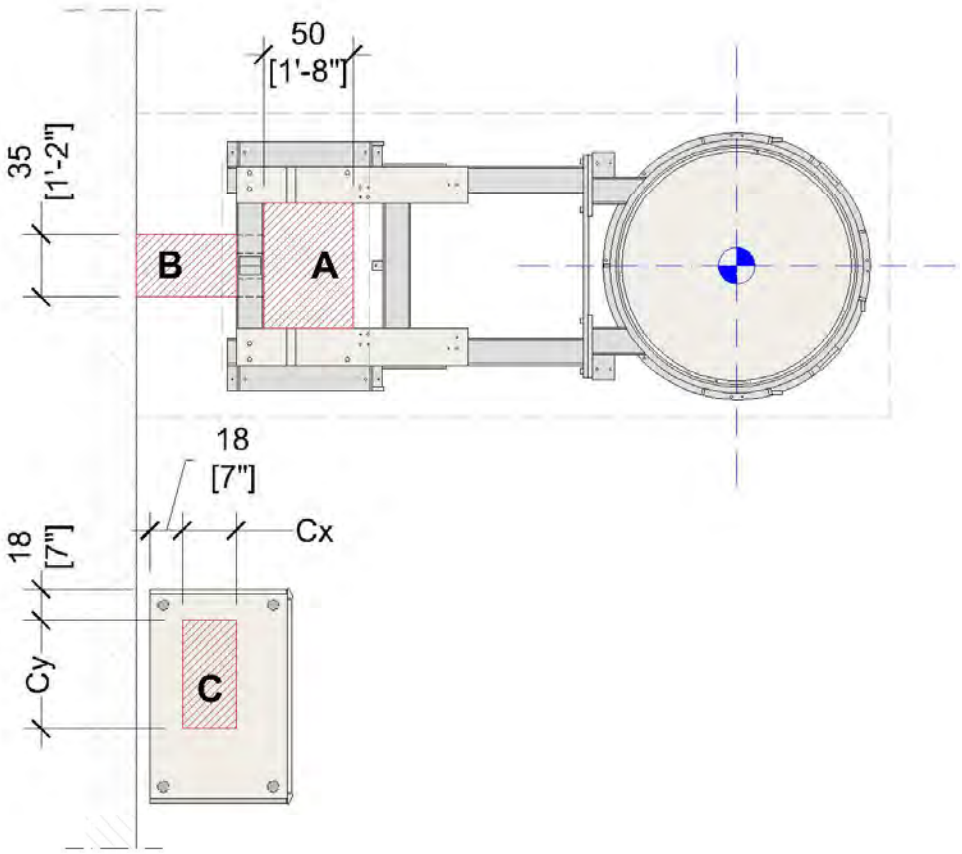


Figure 3-14 BaseFrame and Modulator Cable Access

Table 3-6 Modulator Zone C		
Cx	**Cy**	**C Depth**
30 – 45cm [12” – 18”]	60 – 80cm [24” – 30”]	15 – 30cm [6” – 12”]

NOTICE

If the isocenter to rear wall is less than 335cm [11’-0”] contact the Varian Planning Department when using zone B for cable access for assistance.

Excess cable storage must be considered when sizing the Modulator cable access zone C.

3.2.9 ROOM LIGHTING

Main room lights are used for general illumination and room maintenance. Typically, the main room lights are controlled (on/off) from the treatment couch during patient setup through voltage-free contacts located in the RJB, refer to Figure 3-10.

Setup lights are normally dimmable fixtures that allow the intensity to be adjusted by the therapists while aligning the patient to the laser lights. The setup lights are typically located above and to either side of the treatment couch. Their control is independent of the equipment.

Room lighting can be configured in multiple ways as defined by the customer's requirements. Contact the Varian Planning Department for more details.

3.2.10 EMERGENCY AND SAFETY DEVICES

To meet safety regulations, the following customer-provided safety device systems must be installed per the customer's Radiation Safety Officer and to comply with regional regulatory agency requirements.

3.2.10.1 WARNING LIGHTS

System warning lights are required inside and outside the treatment room to indicate beam-on/beam-off conditions. They may be required to blink when the beam is on. Colored (usually red) lights must be placed such that one is visible from any point in the treatment room. There are five individual warning light circuits available in the RJB, refer to Figure 3-10.

- Provide an individual warning light for each circuit.
- Incandescent lamp load, 60W maximum, each circuit.
- 5A maximum, resistive load, including any short duration switching transients.
- LED fixtures are acceptable, the inrush current for all fixtures must be less than the rating above.
- Fluorescent fixtures are not allowed.
- Combination signs with superimposed lettering are not allowed.

If a greater load is required, these circuits can be used to control separate, customer-provided relays.

Table 3-7 Warning Lights	
Beam READY	Illuminates to show the MV system has no open interlocks and is ready to treat.
Beam ON	Illuminates during MV beam treatment, mandatory.
Beam OFF	Illuminates when the accelerator is not in a radiation-generating state.
Generator ON	Illuminated to show the KV system is ready to image the patient.
X-Ray ON	Illuminates during KV imaging, mandatory for accelerators with On-Board Imaging.

To comply with IEC 60601-2-1: 2009 +A1:2014 aural indicator requirements (Clause # 201.10.1.2.101.10) the customer shall provide and install a suitable aural indicator in parallel with any warning lights connected to the RJB.

3.2.10.2 DOOR INTERLOCK SWITCHES

Safety door interlock switches are mandatory for all installations to ensure the room doors are closed during accelerator operation. Provide two normally open type switches, one 24VDC (1 mA typical load) and one 120VAC (500 mA typical load) switch, refer to Figure 3-10.

For paired entry doors, an additional set of door interlock switches (24VDC and 120VAC) is required to be wired in series.

For secondary neutron doors, a 24VDC switch should be independently wired to the neutron door inputs in the RJB.

3.2.10.3 EMERGENCY OFF BUTTON

The Emergency-Off (EMO) button will remove the mains power from the Accelerator and Modulator while still allowing power to the Console Cabinet UPS. EMO buttons are built into the Accelerator Stand (x2), Couch (x2), Control Console (x1), and Modulator (x3).

Additional EMO buttons, Customer-provided, are typically required in the treatment room, consult with the hospital's Radiation Safety Officer to verify the site requirements. Locate the EMO buttons to avoid unintentional activation.

- Provide an Allen-Bradley 800T-FX6AV or equivalent, two-pole, dry contact type, manual reset.

Four buttons can be identified by sequentially rated resistors that are Varian-provided, contractor-installed across the "sensor loop" contacts, refer to Figure 3-10 and Section 4.5.

WARNING **Do not locate the EMO buttons in the primary beam path.**

3.2.10.4 EMERGENCY DISCONNECT BUTTON

An Emergency Disconnect Button must be mounted in the control area. When activated it will remove mains power from all system components -- Accelerator, Modulator, and the Console Cabinet. This button may be integrated into the MCB panel, refer to 2.6.1 Main Circuit Breaker (MCB) for more information.

3.2.10.5 OPTIONAL SAFETY DEVICES

The following optional safety devices are Customer-provided and installed.

- Light Curtain – Optional sensing method to control the AC and DC door interlock circuits.
- Last Person Out (LPO) – A low voltage, timer switch used with the door interlock system to ensure the treatment room is clear.

3.2.11 NETWORK

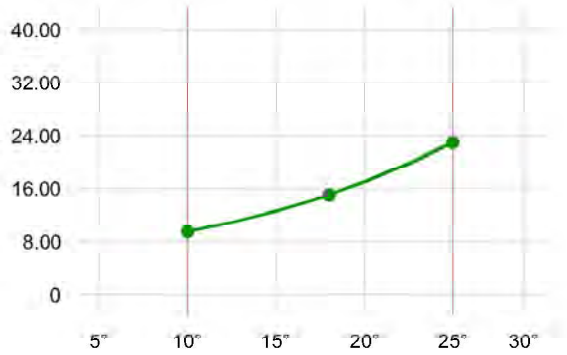
- Provide (1) network outlet near the Console Cabinet (**T14**), (3) additional outlets (recommended).
- Cat 5e cable (minimum), CAT 6 (recommended).
- Bandwidth 100Mbps, full duplex 100BASE-T (minimum), 1Gbit/s or higher (recommended).
- The RJ-45 jack must meet TIA/EIA-568-A wiring pattern.

- Varian recommends isolating the Oncology domain from the Enterprise Network.
- The Console Cabinet (**T14**) requires a static IP address.
- Refer to Varian network configuration guide - MICAP, contact Varian PM for document details.

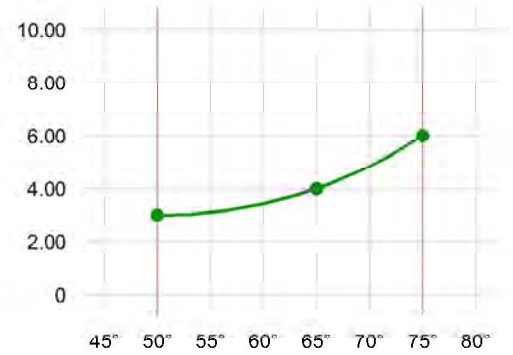
Wi-Fi is recommended in the control area and treatment room for training, education, and serviceability.

3.3 PLUMBING

Table 3-8 Coolant Requirements and Heat Loads	
Ideal Coolant Flow	18° C. at 15 LPM [65° F. at 4 GPM]
Flow Range	10 - 23 LPM [3 - 6 GPM]
Incoming Coolant Temperature Range	10 – 25° C [50 - 75° F]
Glycol Content of Coolant	Not to exceed 50%
Minimum, Low Power Coolant Heat Load *(Required, 24 hours)*	2 kW (6,830 Btu/hr)
On State Coolant Heat Load *(no energy selected)*	10 kW (34,152 Btu/hr)
Ready/Energy Select State Coolant Heat Load	12.5 kW (42,690 Btu/hr)
Maximum, Beam-On Coolant Heat Load	25 kW (85,379 Btu/hr)
Normal Treatment Cycle Coolant Heat Load	13.3 kW (45,422 Btu/hr)
Pressure Differential between the Inlet and Outlet Fittings at the TrueBeam Stand *(while in the Ready State)*	Adjusted to between: 0.7 bar and 1.7 bar @ 11.4 – 18.9 LPM [10 PSI and 24 PSI @ 3.0 – 5.0 GPM]
Maximum Input Pressure	6.9 bar [100 PSI]
Pressure Drop *(under maximum heat load conditions)*	1.7 bar [24 PSI]
Average Water Temperature Rise *(during all states w/closed bypass valve)*	15° C [27° F]



Liters/Minute - Incoming Coolant, Celsius



[Gallons/Minute - Incoming Coolant, Fahrenheit]

Figure 3-15 Chilled Water Flow Rates

NOTICE

To prevent equipment damage due to condensation, ensure the incoming coolant temperature lower bound is above the dew point in the facility.

3.3.1 CHILLED WATER

The cooling water requirement can be satisfied with a Closed-Loop system (Facility Central Plant Chilled Water or a Dedicated Chiller Unit) or a One-Pass system (Domestic "City" Water). The design could also be a combination of methods to provide greater resilience and redundancy. This design detail is the responsibility of the customer's design team and water quality professional.

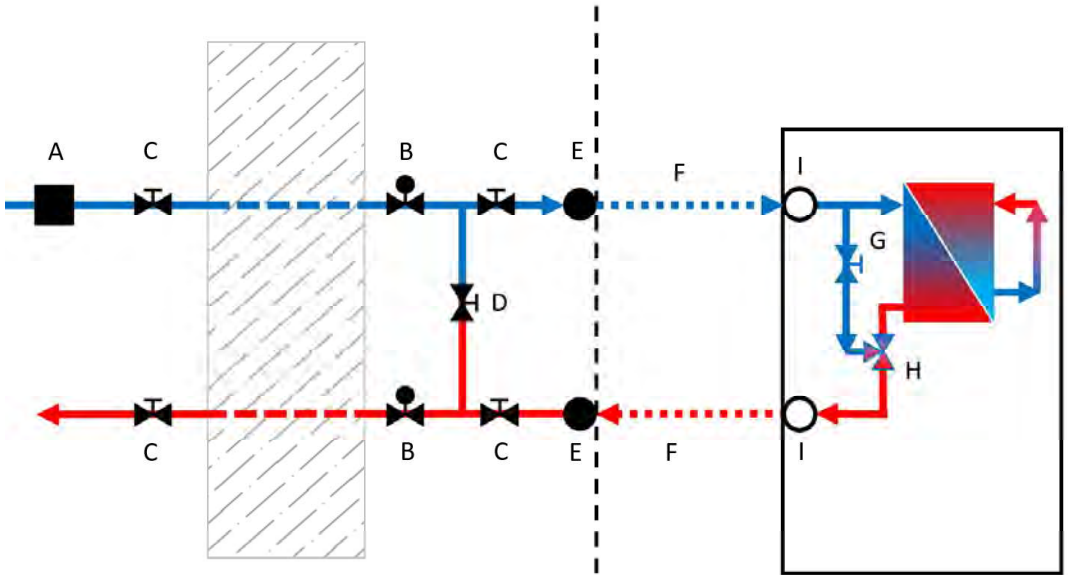


Figure 3-16 Coolant System Schematic

- Chilled water supply must not exceed the maximum inlet pressure shown in Table 3-8, controlled by a pressure regulator (**A**).
- Terminate piping with isolation valves (**C**) and a 1" FNPT Plug (**E**).
- An optional machine bypass valve (**D**) may be installed.
- Provide a minimum of one flow meter (**B**), may be installed on the supply or return line.
- Install additional isolation valves (**C**) in an accessible location outside the treatment room.
- Copper piping is recommended, install a filter/strainer for dissimilar metals.
- A Varian-provided, Contractor-installed flexible hose kit (**F**) is used to connect the piping to the accelerator at the Stand entry point (**I**).
- A bypass valve is located inside the system stand (**G**). This valve is open for Closed-Loop systems and closed for One-Pass systems.
- The modulating control valve (**H**) inside the system stand maintains an internal coolant loop temperature of 40°C [104°F].

If a Closed-Loop system is designed with domestic water (One-Pass) emergency backup, it is recommended to provide a means to notify the user that the accelerator bypass valve should be closed in the event the emergency backup system is used.

NOTICE

Do not route water piping directly above the accelerator or modulator. Inadvertent leaks may occur and can seriously damage the accelerator and mechanical systems.

Do not locate floor drains in the treatment room.

3.3.2 COOLING LINE ACCESS

Install isolation valves for the chilled water supply and return lines on the rear wall behind the Stand, refer to Figure 3-16 Coolant System Schematic.

- 290cm [9'-6"] is the maximum distance for the path of the Varian-provided hose (**F**) from the isolation valves (**C**, **E**) to the Stand entry point (**I**).
- The Varian-provided hose must be installed against the BaseFrame at (**I**). There is approximately 5cm [2"] clearance to enter the Stand under the rear cover.

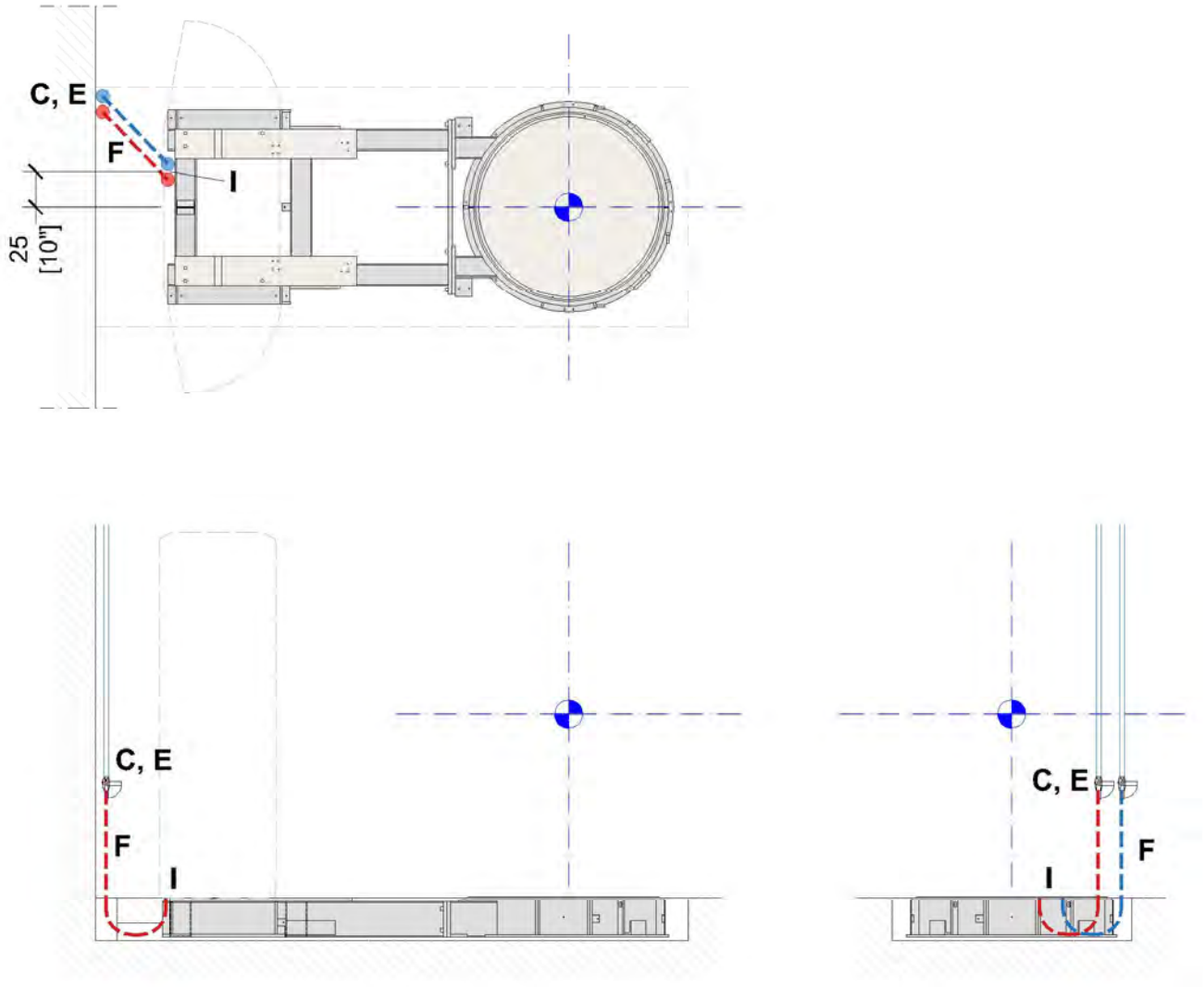


Figure 3-17 Cooling Line Access – Plan, Side, and Front

If the isocenter to rear wall dimension is less than 335cm [11'-0"] the isolation valves must be located to the side of the BaseFrame pit for accessibility.

The valve location (**C**) must not restrict the Stand door from opening to 90 degrees.

3.3.3 CHILLED WATER QUALITY

Table 3-9 Minimum Coolant Water Quality	
Quality	**Value**
Appearance	Clean, colorless, non-turbid, and disinfected; closed-loop systems should be treated with a corrosion inhibitor, which may add color.
Heterotrophic Plate Count (HPC) (CFU/ml)	<10,000
pH	7.0 – 10.0
Total Hardness (ppm $CaCO_3$)	>75

Experience has shown that some water supplies have caused excessive corrosion and frequent replacement of the internal heat exchanger. Consult a water treatment professional to design facility water quality specifications to prevent damage to the heat exchanger from corrosion, scale, biofilms, or other common issues. These specifications should include monitoring characteristics (for example pH, conductivity, total dissolved solids, chlorides, and hardness) to maintain values appropriate for the site's corrosion inhibitor and disinfection solutions. Ideal value ranges will vary depending on local conditions.

When glycol is added to external facility water, propylene glycol is preferred (due to its better environmental safety record compared to other glycols) at a strength not to exceed 50% by volume (v/v).

External water (from city or facility) may require secondary disinfection (in addition to any bleach/chlorine/chloramine reserve present) to avoid biofilm formation in the Accelerator's heat exchanger. Seek advice from a water treatment professional.

The water coolant specification in this section does not apply to the Accelerator's internal coolant water loop. Contact the Varian Help Desk at 1-(888)-Varian5 (827-4265) for information.

3.3.4 OPTIONAL PLUMBING CONSIDERATIONS

- A sink with running hot and cold water is highly recommended in treatment rooms.
- For convenience, a hose spigot is recommended to fill the water phantom.
- A sink drain is recommended to service the TrueBeam/VitalBeam' s internal cooling system and drain the water phantom.

3.4 ENVIRONMENTAL SPECIFICATIONS

- Ambient temperature range - 16° to 27°C [60° to 80°F]
- Humidity range - 30% to 75% Relative Humidity, Non-condensing
- Maximum allowable temperature shift of the Optical Imager from time of calibration to time of treatment - +/-2.0°C [+/-3.6°F]. This applies to the Stereotactic Optical Imager only.

3.4.1 VENTILATION

Accelerators will produce detectable levels of ozone under certain conditions.

- Four to six air changes per hour are typically required to maintain undetectable levels.
- Fresh air should be used as part of the HVAC design.
- Maintain a minimum ventilation space above the Modulator of 10cm [4”]

Table 3-10 Stand Heat Load

TrueBeam/VitalBeam Condition	kW	BTU/Hr
During Ready and Beam-On States	7.25	24,760
During No Mode State	1.5	5,119
During Power Save State	1.0	3,413

Table 3-11 Modulator Heat Load

Modulator Condition	kW	BTU/Hr
During Beam-On State	5.25	17,930
During other States	0.5	1,707

Table 3-12 Console Cabinet Heat Load

Description	kW	BTU/Hr
Control Console Cabinet	1.1	3,753
Optional ARIA workstation and monitor	0.5	1,707

The customer shall provide a means to remove the heat generated from the components listed in the Tables above.

3.5 ACOUSTIC

There are no recognized acoustical standards for therapy rooms. The primary sound source on TrueBeam/VitalBeam systems is the Modulator Cabinet. Varian has encountered no acoustical problems when the Modulator is in the treatment room. The patients are in the room for a very short time and observations indicate that some seem reassured by the changing sound levels as the machine goes through its cycles. If noise is a concern, the use of acoustically absorbent materials is recommended. The Modulator Cabinet can be located outside the treatment room. Access for service and safety must be considered along with the cooling requirements and cable length.

3.6 VIBRATION

The TrueBeam/VitalBeam is susceptible to vibration, creating self-resonance in the 2 - 10 Hertz range. Most installations are at or below grade, so vibration is normally not an issue. Equipment locations that should be considered in the overall design; large compressors or generators, elevators, and train lines. Contact the Varian Planning Department for more information on assessing site-specific situations.

3.7 FINISHES

3.7.1 FLOORING

The TrueBeam/VitalBeam contains electronic components that are sensitive to electrostatic discharge (ESD). Floor finishes used in the treatment room, maze, and control area should be selected to ensure they have “Anti-Static” properties that meet local and national codes. Carpet is not recommended as it can make gurney movement difficult and present an infection control risk. The floor finish should not have a propensity to create static electricity exceeding 2.0 kV at 20% relative humidity when measured using standard methods.

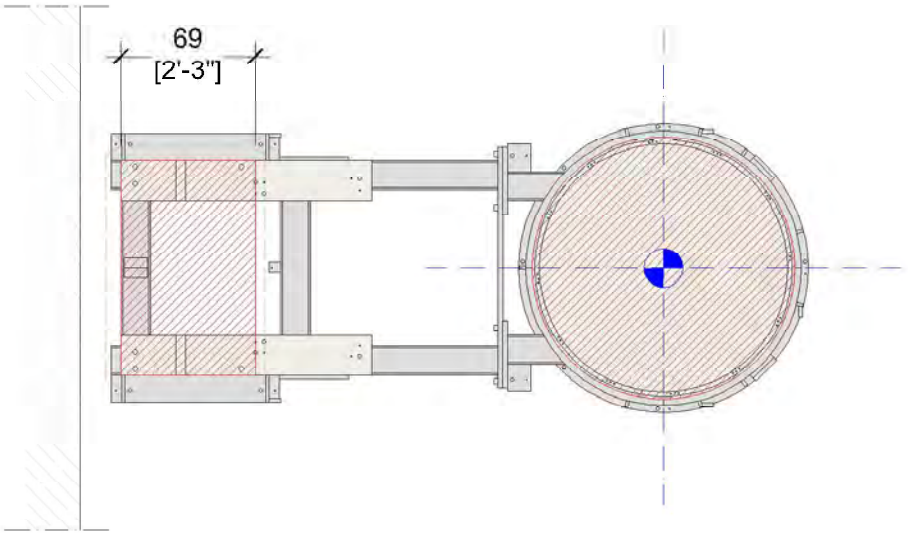


Figure 3-18 Finished Flooring Voids at the BaseFrame

Do not install the final flooring in the hatched area over the Stand mounting pads or inside the turntable trim ring.

It is recommended that the final floor covering be installed before the equipment is delivered, refer to 4.6 Delivery and RIG.

3.7.2 CEILING

There is no finished ceiling type specification. However, experience has shown there is a benefit of using a 60cm x 120cm [24” x 48”] or 60cm x 60cm [24” x 24”] lay-in acoustical tile ceiling. Among its benefits are easy access to above ceiling structures/systems and cables, low repair, acoustical attenuation, and the aesthetic benefits of modern ceiling grids and tiles. The ceiling grid layout must take into consideration the location of the overhead laser and the mounting posts for IRM and ceiling-mounted camera systems. If a solid ceiling is used, an access panel for service is required.

3.7.3 ACCESSORY STORAGE

It's recommended that custom cabinetry be built to store any patient immobilization devices and accessories for the accelerator. Due to differences in treatment practices, the exact quantity and types of accessories vary with each site, contact the Varian PM. Verify the requirements and storage preferences with the Customer.

3.7.4 FIRE PROTECTION

The fire protection system must comply with all local codes and regulations.

NOTICE

Sprinklers inside the treatment room are discouraged. Their discharge or inadvertent leakage into the couch pit or the Stand and Gantry can cause extensive equipment damage and shutdowns.

Consult with a local fire protection specialist so a code-compliant detector/extinguisher solution can be designed for the treatment room.

Heat detectors or photoelectric smoke detectors are preferred over ionization-type detectors due to the potential for false alarms.

If fire sprinklers are required by local authorities, do not locate sprinkler heads above the equipment. A pre-action sprinkler system, controlled by an independent detection system is preferred however if a wet pipe system is used, recessed high-temperature heads should be considered to reduce the chance of accidental breakage. If a chemical system is used, the safety of nonambulatory patients should be considered.

4 PROJECT MANAGEMENT

4.1 RESPONSIBILITIES

All pre-installation dates for Varian deliverables and milestones are scheduled by the Varian PM, based on an agreement between the customer and the Varian PM and communications with Varian Planning and Sales. The Varian PM will communicate regularly with the customer throughout all phases of the project. Also, the Varian PM will perform site inspection visits to help answer questions during the construction progress.

Site visits are commonly held for the Initial Site Meeting/Project Kick-off, the BaseFrame Pre-Installation Inspection or the BaseFrame installation, and the Pre-Installation Inspection. This final site visit typically occurs 10-14 days before the rig date to verify site readiness is at 100% completion as defined by the [2] Varian Accelerator Pre-Installation Checklist.

= Critical STOP/GO Inspections = Varian Install dates per customer schedule = Work by others

Table 4-1 Sample Project Schedule

Task *(estimated weeks)*	**1**	**...**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**...**
Place Machine Order	X																	
Design/Construction *(varies)*																		
BF Pre-Installation Inspection																		
BaseFrame Installation																		
Concrete Cure Time																		
MCB Installed																		
PIK Delivered & Installed																		
Pre-Installation Inspection																		
Machine Delivery *(weekend)*																		
Machine RIG *(weekend)*																		
System Installation																		
Machine Acceptance																		

4.2 OBJECTIVES

At a minimum, the items listed below must be completed before the Final Inspection can be performed by Varian so the equipment is released for delivery. Varian's installation timeline is based on these items being completed. The complete [2] Varian Accelerator Pre-Installation Checklist can be provided by the Varian PM on request.

- The treatment room and control area is finished to a clinical standard and is dust-free with no other construction trades having access.
- The customer has applied for obtained and signed all licenses and approvals required for this installation.
- A clear, load-bearing rig path exists – ensure all clearances from the unloading/staging area to the vault meet the minimum requirements.
- A live hospital network (internet access) with the Record and Verify system available.
- MICAP survey has been completed and submitted.
- All electrical requirements are completed including live permanent power, cable containment, wiring, circuit breaker, power conditioner, and power outlets.
- All safety-related items are installed and connected.
- The chilled water supply at the accelerator is tested and fully operational.
- Treatment and control room HVAC system is tested and fully operational.
- Flooring and casework are installed or prepared as previously agreed.

4.3 BASEFRAME INSTALLATION

Sub Project No.	**1**	This document's primary purpose is to provide an overview of the roles and responsibilities of Varian and the Customers appointed contractors during the installation. It should be read in conjunction with the PPG-HT. If you have any doubts, then ask the Varian PM for clarification.
Task Name	**Varian BaseFrame Installation**	
Task Overview	To deliver, level, anchor, shutter/formwork and pour mass concrete to complete the installation of the accelerator BaseFrame. The installation must occur a minimum of one month before machine delivery.	
Prerequisites	• BaseFrame pit concrete must be cured, per the Site-Specific Drawings (SSD). • The treatment room must be watertight • The floor around the isocenter must be level per 3.1.1 BaseFrame Pit of the PPG. • Power and lighting must be available in the room • Isocenter and the finished floor level (FFL) are defined. • An approved delivery path must be available • Customer Sub-contractors must be available. • Seismic calculations and fixings available (If required)	

Responsibilities	**Task**	**Varian**	**Customer**
	Schedule a delivery date	**X**	**X**
	Seismic calculations and anchors as required		**X**
	Suitability of pit base to support machine		**X**
	Provide suitable delivery route		**X**
	Inspect delivery route, treatment room & pit.	**X**	
	Deliver BaseFrame, unpack and move to the treatment room	**X**	
	Mark isocenter and FFL project the isocenter lines up the walls 1.5m [5'-0"]		**X**
	Establish the highest point of the floor to FFL		**X**
	Level and anchor the BaseFrame into the pit recess	**X**	
	Provide and weld seismic brackets on to the BaseFrame (if required)		**X**
	Install seismic anchors (if required)		**X**
	Build Shutter/formwork per the SSD		**X**
	Backfill with concrete, do not vibrate.		**X**
	Re-check BaseFrame level	**X**	
	Disposal of Varian packing material		**X**

Duration	2 days
Customer Supplied Resources & Materials	Single-phase power and light in the treatment room Carpentry contractor for shuttering or formwork plus material required Concrete/grout contractor to install concrete/grout of spec - C30, Slump 80 (consist S2) – aggregate 10mm ~ 1.2 m^2 [2000psi, 6-7" slump, 3/8" aggregate ~ 1. 6 yds^3] Welding contractor for seismic brackets plus approved anchors.
Results	BaseFrame installed to meet level and alignment specification with no grout/concrete contamination of the mounting pads, turntable tub, or ducts. All Varian packing material removed from the site.
Acceptance	Acceptance document filled in by Varian and returned - RIG-BF.

4.4 MCB AND RJB

Sub Project No.	2	This document's primary purpose is to provide an overview of the roles and responsibilities of Varian and the Customers appointed contractors during the installation. It should be read in conjunction with the PPG-HT. If you have any doubts, then ask the Varian PM for clarification.
Task Name	**Main Circuit Breaker (MCB) and Relay Junction Box (RJB)**	
Task Overview	To accept delivery of Varian-provided MCB panel and IEC outlet (if supplied) and RJB, install them in their final position and connect the incoming supply and room interface cables. Note - If the customer or contractor wishes to build or use another MCB then this needs to be agreed with the Varian PM in advance.	
Prerequisites	• The treatment room must be watertight. • Site-Specific Drawings (SSD) for the location of MCB & RJB • Isolated power source available • Mains incoming wire installed. • Dedicated earth termination bar installed	

Responsibilities	**Task**	**Varian**	**Customer**
	Schedule delivery date	**X**	**X**
	Unpack RJB and MCB (if supplied)		**X**
	Install the RJB, MCB, and IEC outlet per the SSD		**X**
	Install cable containment		**X**
	Connect to an isolated power source		**X**
	Install power to console cabinet per PPG		**X**
	Wire peripherals to RJB		**X**
	Testing as defined by Varian and local regulations		**X**
	Dispose of Varian packing materials		**X**

Duration	Customer defined
Customer Supplied Resources & Materials	General contractor to unbox and mount the MCB and RJB, using appropriate mounting hardware Electrical contractor to connect the incoming power and peripherals. Materials for installing, containment, interconnection, and finishing. Materials for console power connection per PPG
Results	MCB and RJB installed – incoming power supply connected and the power supply cable ready for connection to Modulator. IEC Outlet is installed near the Console Cabinet and wired to the MCB.
Acceptance	Inspected by Varian Project Manager, Pre-Installation checklist

4.5 PRE-INSTALLATION KIT (PIK)

Sub Project No.	**3**	This document's primary purpose is to provide an overview of the roles and responsibilities of Varian and the Customers appointed contractors during the installation. It should be read in conjunction with the PPG-HT. If you have any doubts, then ask the Varian PM for clarification.
Task Name	**Installation of the Pre-Installation Kit (PIK)**	
Task Overview	To take receipt of the Varian provided PIK, assemble components, and install them in their final position.	
Prerequisites	• Scheduled delivery date • BaseFrame installed and accepted • Ceiling height defined • Isocenter lines are marked on walls for the laser mounting plates • Site-specific plans available for component locations • Cable containment installed	

Responsibilities	**Task**	**Varian**	**Customer**
	Schedule delivery date for PIK	**X**	**X**
	Install Console Cabinet floor bracket		**X**
	Install laser mounting plates to walls and ceiling		**X**
	Install CCTV housings onto the wall		**X**
	Install speakers onto the wall		**X**
	Install optical imager camera plate and post		**X**
	Install In-room monitor plate and post(s)		**X**
	Install identification resistors into EMO switches		**X**
	Provide cable containment end to end distances and install pull string		**X**

Duration	1-2 Days dependent on options
Customer Supplied Resources & Materials	Electrical contractor for running cables. Mounting hardware for Console Cabinet positioning bracket. Mounting hardware for Optical Imaging camera and IRM ceiling mounting plate. Mounting hardware for Laser mounting plates
Results	All Varian-provided mounting plates and brackets are installed. Posts are configured to meet the height requirements.
Acceptance	Inspected by Varian Project Manager, Pre-Installation checklist

4.6 DELIVERY AND RIG

Sub Project No.	**4**	This document's primary purpose is to provide an overview of the roles and responsibilities of Varian and the Customers appointed contractors during the installation. It should be read in conjunction with the PPG-HT. If you have any doubts, then ask the Varian PM for clarification.		
Task Name	RIG			
Task Overview	Installation of the Machine and Peripherals			
Prerequisites	• Sub-projects 1 – 3 completed • System cables pulled in the conduits • Storage locations for spares and accessories • Power cable (customer supplied) in modulator pull box • Electrical supply available, lockout tag of electrical supply. • Network point available			
Responsibilities	**Task**		**Varian**	**Customer**
	Schedule delivery date for the system		**X**	**X**
	Risk assessments and method statements		**X**	
	City Permits (street closures), if required			**X**
	Crane, if required			**X**
	Designated area for the delivery truck			**X**
	Ensure the RIG path is structurally suitable			**X**
	Lay floor protection internally		**X**	**X**
	Unload/Unpack system and move into the room		**X**	
	Install machine		**X**	
	Connect power			**X**
	Connect cooling			**X**
	Commissioning supplied peripherals		**X**	
	Return transportation metalwork		**X**	
Duration	5 Days			
Customer Supplied Resources & Materials	Access to the site for out of hours working Contractors to connect power and water			
Results	Machine delivered and installed			
Acceptance	Inspected by RIG Contractor and PM – RIG-HT			

4.7 RADIATION AND SAFETY

Sub Project No.	**5**	This document's primary purpose is to provide an overview of the roles and responsibilities of Varian and the Customers appointed contractors during the installation. It should be read in conjunction with the PPG-HT. If you have any doubts, then ask the Varian PM for clarification.		
Task Name	Radiation and Safety Surveys			
Task Overview	Completion of Radiation and Safety Forms			
Prerequisites	• All facility services are fully operational • Machine installed • Room clinically ready			
Responsibilities	**Task**		**Varian**	**Customer**
	Arrange date for IPA		**X**	**X**
	Perform IPA		**X**	**X**
	Critical Exam (safety interlocks etc. Europe).		**X**	
	Failure correction			**X**
	Radiation survey (Room shielding)			**X**
Duration	2 Days			
Customer Supplied Resources & Materials	RPA or physicist availability Radiation meter Neutron meter Water tank and CC13 chambers or equivalent Dosimetry equipment and chambers			
Results	Passed IPA - passed Radiation Survey and Critical Exam.			
Acceptance	Performed by Installer and Customer – IPA-HT			

APPENDIX A SHIPPING AND RIGGING INFORMATION

1 CRATE WEIGHTS AND SIZES

Description	Metric		Imperial	
	Weight (kg)	H x W x D (cm)	Weight (lb)	H x W x D (in)
Gantry	4990	295 x 157 x 224	11001	116 x 62 x 88
Stand	1890	165 x 150 x 224	4167	65 x 59 x 88
Counterweight	2710	117 x 114 x 163	5975	46 x 45 x 64
Modulator	1090	150 x 109 x 224	2403	59 x 43 x 88
Mold Kit	60	71 x 71 x 56	132	28 x 28 x 22
2 in 1 Console Cabinet	470	124 x 107 x 185	1036	49 x 42 x 73
Box Generator	140	119 x 69 x 74	309	47 x 27 x 29
Covers – 1/3	250	196 x 119 x 185	550	77 x 47 x 73
Covers – 2/3	130	127 x 112 x 152	287	50 x 44 x 60
Covers – 3/3	260	259 x 86 x 145	573	102 x 34 x 57
Box AA	230	122 x 122 x 114	507	48 x 48 x 45
Box BB, BML1, DD	240	135 x 94 x 81	529	53 x 37 x 32
Box B	120	135 x 94 x 81	265	53 x 37 x 32
Box CC	80	135 x 94 x 81	176	53 x 37 x 32
Box D	116	145 x 102 x 66	256	57 x 40 x 26
Box E	48	81 x 81 x 66	106	32 x 32 x 26
Box EE, BML2	30	109 x 28 x 48	66	43 x 11 x 19

2 RIGGING INFORMATION

NOTICE

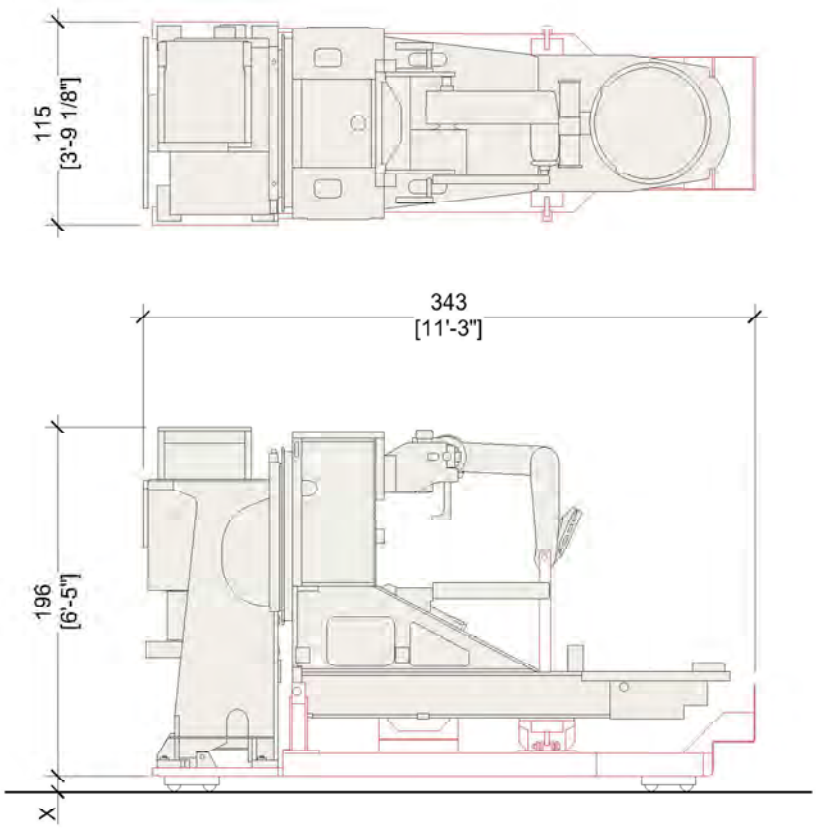
In 2-1 Standard Configuration and 2-3 Optional "Factory Break" Configuration the dimension for "X" is variable, dependent on the rigging equipment (skates or dollies).

The recommended door clearance height is 213cm [7'-0"].

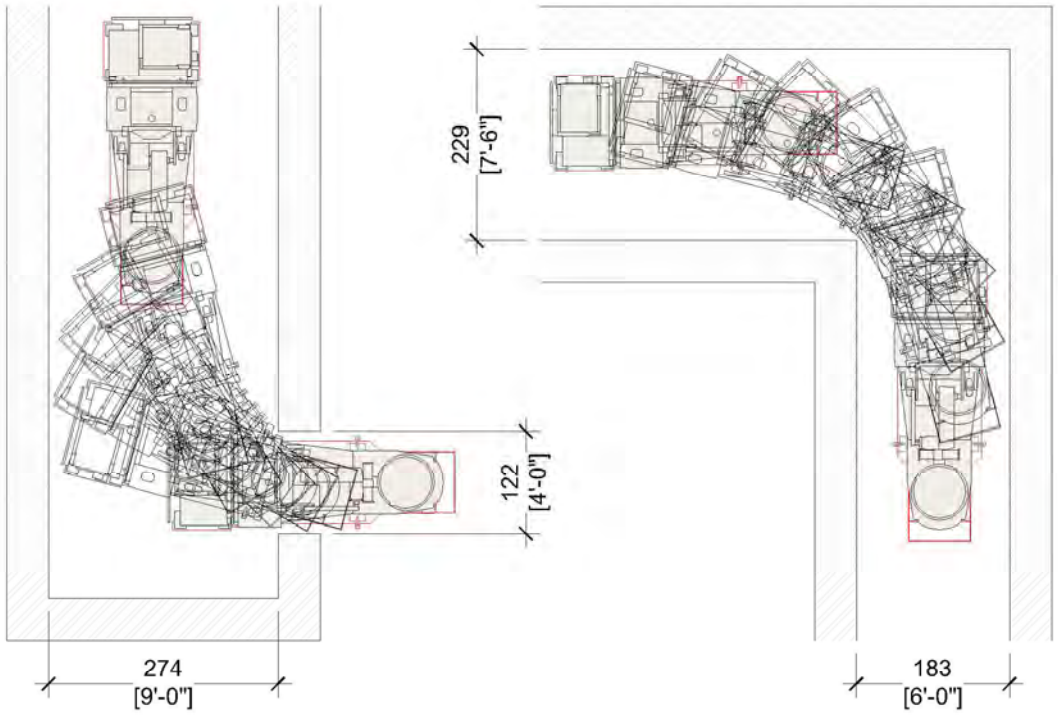
2.1 STANDARD CONFIGURATION

Connected Stand and Gantry (uncrated) with shipping red iron.

- Weight 6123 kg [13,500 lb]



2-1 Standard Configuration

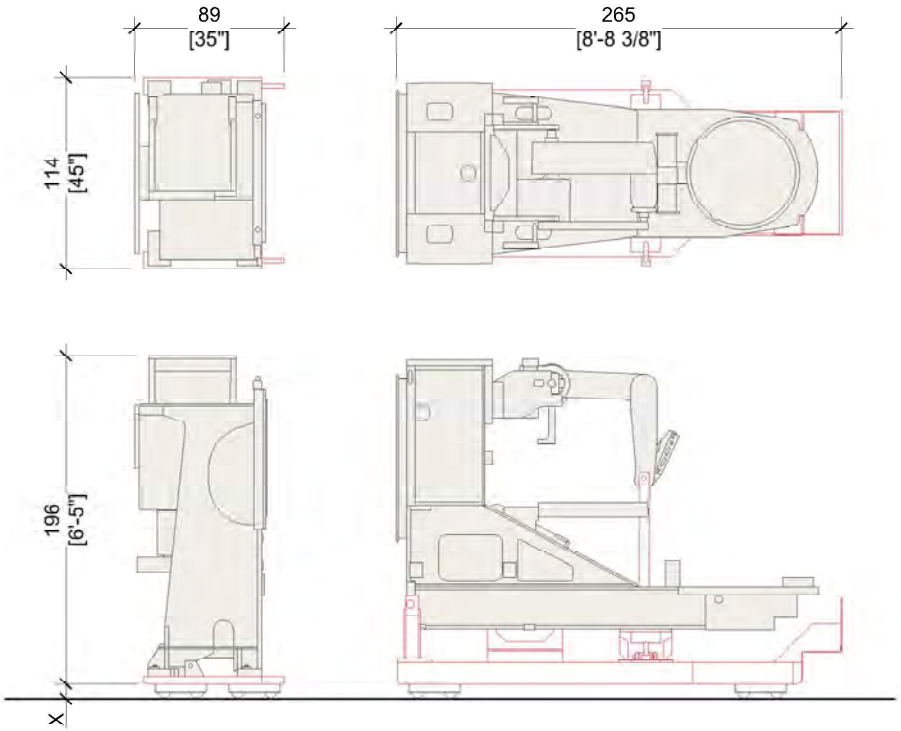


2-2 Standard Configuration Tracking Route

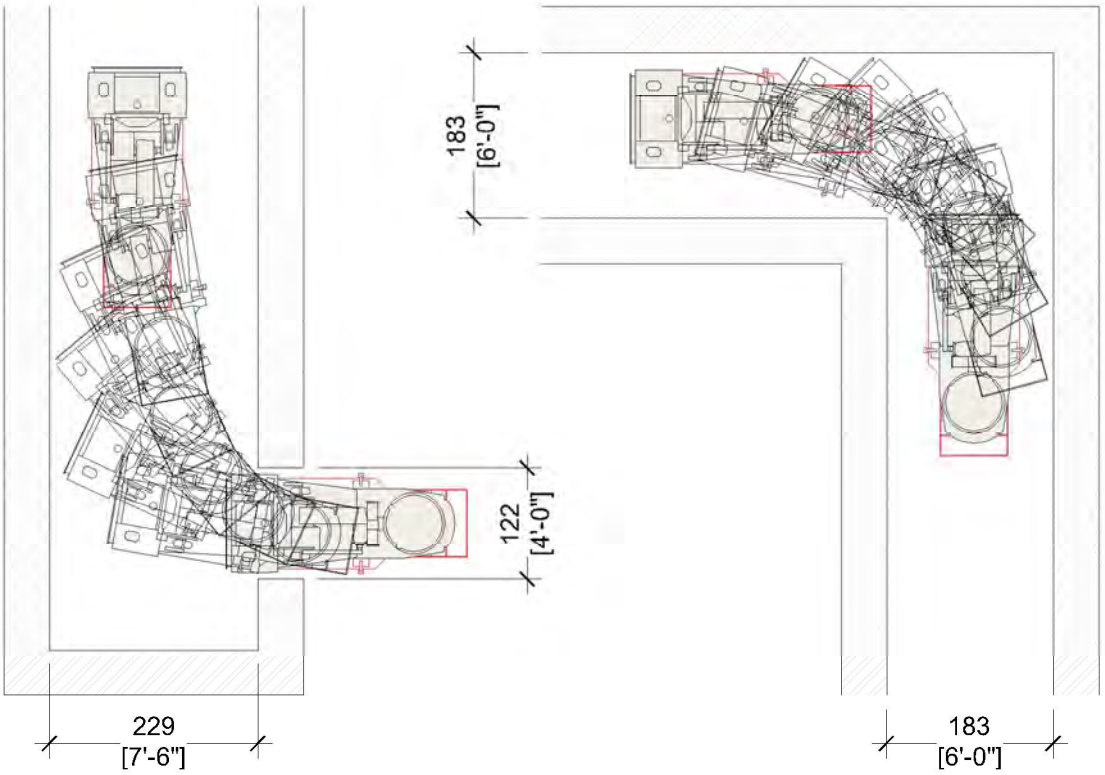
2.2 “FACTORY BREAK” CONFIGURATION

Separated Stand and Gantry (uncrated) with shipping red iron.

- Gantry Rigging Weight 4658 kg [10,270 lb]
- Stand Rigging Weight 1465 kg [3,230 lb]



2-3 Optional "Factory Break” Configuration



2-4 Tracking Route for "Factory Beak” Configuration