

Proj. Ref. No.: **PUR22-11-1097**
 End-User: **DIVISION OF RADIOLOGY**
 Project: **SUPPLY, DELIVERY, INSTALLATION, TESTING,
 AND COMMISSIONING OF BRAND-NEW LINEAR
 ACCELERATOR SYSTEM WITH RELATED CIVIL
 WORKS FOR THE PHILIPPINE GENERAL
 HOSPITAL CANCER INSTITUTE**

Opening of Bids: **December 27, 2022**
 ABC: **PHP279,500,000.00**

Contract: **SINGLE BID**

Item No.	Qty.	UOM	Item Description	Unit Cost	Quotations (all taxes included)	
					in figures	in words
1	1	Unit	BRAND-NEW LINEAR ACCELERATOR SYSTEM WITH RELATED CIVIL WORKS FOR THE PHILIPPINE GENERAL HOSPITAL CANCER INSTITUTE	279,500,000.00		
			Project: Acquisition/Purchase of One (1) Unit Linear Accelerator (Radiotherapeutic Unit) PGH, UP Manila Project Profile: This project entails the supply, delivery, installation, testing, and commissioning of brand-new Linear Accelerator System with related civil works for the Philippine General Hospital - Cancer Institute Project Design: Refer to attached PGH- Issued Schematic Architectural Plans and Engineering Brief Description of Works for LINAC Bunker and Support Spaces			
			SCOPE OF WORK			
			I. Civil Works			
			A. Design Phase B. Construction Phase			
			II. Supply, Delivery, Installation, Testing, and Commissioning of Brand-New Linear Accelerator System			

Approved by:

Dean CHARLOTTE M. CHIONG, MD, PhD
 Chairperson

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			A. Technical Specifications of the Linear Accelerator B. Fully integrated MV CT Imaging System C. Immobilization Devices D. Oncology Information System (OIS) with Networking, Record and Verify System E. Treatment Planning System (TPS) F. LINAC Accessories G. Other requirements of the LINAC Machine H. Technical Specifications of the Dosimetry System I. Accessories and Supporting Equipment J. Installation and Testing of the Linear Accelerator K. Commissioning of the Linear Accelerator			
			I. SCOPE OF CIVIL WORKS			
			A. Design Phase			
			1. The winning proponent shall enter into a contract with the Philippine General Hospital that shall be in the nature of a Design and Build Scheme. 2. The winning bidder shall provide structural designed of project with complete Structural Analysis, signed			

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			and sealed by the registered structural engineer. The winning bidder will take into consideration in the structural design, the investigation of the following: <ol style="list-style-type: none"> a. Soil investigation b. Foundation of adjacent sides of the building (existing Cancer Institute and Ophthalmology buildings) c. Nearby fire protection pump room and its cistern, including the pipelines embedded in the ground d. Proposed design of the transfer of the Nuclear Medicine Decay Room areas. 3. The winning bidder shall prepare and submit signed and sealed complete Engineering Design Plans in 20 inch x 30 inch size of three copies, Scope of Works and Specifications of the Construction of Bunker and Facilities, including the consolidated treatment planning room, fire exit and new nuclear medicine decay room, based on the PGH issued Schematic Architectural Plans and Engineering Brief Description of Works to be approved by the OETS, the Chair of the Department of Radiology, the Deputy Director for Administration, and the Director.			

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			<p>a. An electronic (CADD file) shall also be submitted via e-mail to the end-user and the OETS.</p> <p>b. Engineering Design Plans shall include Structural Design, Architectural Design, Electrical Design, Mechanical (Airconditioning, Ventilation, Fire Pump System) Design, Telephone and LAN/IT networking Design and Plumbing (Water, Sewer and Storm Drainage System) Design.</p> <p>c. Submission of complete electrical plans, signed and sealed by a professional electrical engineer and for checking prior to endorsement by the OETS to the PGH Administration.</p> <p>d. Design for appropriate air-conditioning system (chiller type and split type) needed for</p>			

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			LINAC Bunker and Support Spaces.			
			B. Construction Phase			
			1. Permits and Bonds a. The contractor shall apply for all Government permits such as Construction Permits and Occupancy Permit and shoulder the fees hereof. To protect the existing facilities the contractor shall submit Contractor's All-Risk Insurance (CARI).			
			2. Demolition Works a. Demolition of the existing Nuclear Medicine Radioactive Waste Storage/Decay Room.			
			3. Construction and Relocation Works a. Nuclear Medicine Radioactive Waste Storage/Decay Room i. Construction of Nuclear Medicine Radioactive/Decay Room with appropriate radiation shielding a) To be constructed beside the Cancer Institute canopy area, having dimensions of			

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			500 x 400 x 500 (height) cm, with adequate distance from the Cancer Institute façade and existing pump room cistern, as indicated in the PGH-issued Schematic Architectural Plans and Engineering Brief Description of Works b) Provision of Construction of this new decay room prior to the demolition of the existing decay room. ii. Fabrication of Metal Shelving iii. Door shall be metal with radiation shielding iv. Ducted type exhaust fan with Hepa-filter v. Fabrication and installation of new exhaust duct vi. Provision of electrical supply at the decay room. vii. The decay room size or its capacity should be the same with the existing room.			

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			viii. Should be designed to complement and match colors of the existing Cancer Institute building			
			b. Construction of Bunker and related Facilities i. Construction of the linear accelerator bunker with appropriate radiation shielding will follow IAEA or FDA-DOH specifications for a 6MV FFF stereotactic capability with a dose rate of at least 800 MU/min as required by the IAEA standards. ii. Radiation survey results of the constructed LINAC Bunker (primary and secondary walls, doors and ceiling) should be below the regulatory/international standard radiation limits (instantaneous dose rate of at most 7.5µSv/h). iii. Bunker design shall be duly evaluated and verified by the PGH in-house board-certified radiation oncology medical physicist (CROMP) and approved by			

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			the DOH-FDA before construction. iv. Installation of radiation warning lights and radiation signage shall follow DOH-FDA recommendations. v. Essential Rooms will be constructed, as follows: a) LINAC Treatment Room Construction of storage for the following: 1) Masks, breast boards, wing boards, cradles, belly board, abdomen and pelvis baseplates & thermoplastic, shoulder retractor, etc 2) Linen 3) Machine's spare parts and kit Provision for the following: 1) Overhead laser and lateral wall laser installation 2) Emergency-off switches on the			

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			walls of the treatment room 3) Base frame pit and installation, with appropriate dimensions to accommodate any winning bidder's LINAC machine 4) LINAC machine's cooling system (pipes and chillers) 5) Beam on and x-ray warning lights in the treatment room and over the treatment door, which indicate beam-on condition 6) Dimmer switch for lights 7) Slanted holes/duct for LINAC machine cables and for Physics instrument cables into the treatment console room b) LINAC Control Console Room			

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			Provision for the following: 1) countertop/ customized computer counter for LINAC console and its accessories 2) built-in, wall-mounted cabinets for storage of patient charts 3) provisions for electrical sockets, dedicated for console computers, for staff computers, and for the dosimetric devices during machine QA. 4) Elevated open shelves under the countertop for the placement of UPS and CPU units, to make more space at the table c) Consolidated Treatment Planning and Server Room 1) Renovation of the existing treatment planning room,			

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			dosimetry room, and small consultation room of the existing LINAC1 facility to a new treatment planning room. 2) Provision for the following: 3) Countertop with drawers for the treatment planning system computers 4) Bookshelves and filling cabinets for storing patient charts and documents 5) Supply and Installation of conference/ work table 6) Supply and installation of office chairs 7) Electrical re-wiring and installation of new conduits for structured cabling systems 8) Elevated open shelves under the			

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			countertop for the placement of UPS and CPU units, to make more space at the table d) Equipment & Supply Room 1) Provision of built-in cabinets for storage of machine spare parts, engineer's tools, QA tools and dosimetry equipment 2) Provision of built-in cabinet for storage of immobilization devices, linens, patient gowns and office supplies 3) Ventilation or exhaust fan for air circulation when occupied e) Electrical Room 1) Provision for the main circuit breaker, electrical line and LINAC machine's air compressor (if air compressor is			

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			required by the machine of the winning bidder). f) Integrated Patient Waiting Area at LINAC 3 Complex entrance 1) Will be able to accommodate a seating capacity of at least 8 at a given time with space for storage and transport of hospital beds and wheel chairs 2) Provision for four (4) four-seater gang chairs (8 seats) 3) Enclosure and paving 4) Roofing, to ensure no water leakage during heavy rains g) Other relocation works 1) Relocation of the existing air duct to the new nuclear medicine decay room location. 2) Relocation of the existing fire exit as			

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			approved by the Bureau of Fire Protection 3) To be constructed as a 100-cm wide walkway beside the proposed Consolidated Treatment Planning Room, as per PGH-issued Schematic Architectural Plans and Engineering Brief Description of Works 4) With provision of one-way door and ramp with railings, leading outside of relocated fire exit and existing Cancer Institute Building 5) Relocation of the related Cancer Institute and Ophthalmology building water pipelines and manholes located on proposed bunker and nuclear			

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			medicine decay room areas, as applicable h) Electrical Scope 1) Supply, installation, testing and commissioning of required/appropriate main feeder lines (Conduit pipes with cables) from designated tapping point at PGH powerhouse and LINAC control room including provision of required molded case circuit breaker at the source. 2) Supply, installation, testing and commissioning of appropriate dry-type transformer for required hospital equipment including necessary circuit breakers at the high-voltage and lowvoltage side including grounding rod and wires.			

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			3) Supply, installation, testing and commissioning of necessary lightings, switches, duplex convenience outlets, conduits, panelboards and other materials for the necessary rooms/areas covered by this project. 4) Supply, installation, testing and commissioning of necessary wirings for all airconditioning units, exhaust fans, warning lights and exit signages 5) Supply, installation, testing and commissioning of necessary controls needed for the operation and protection of equipment including uninterruptible power supply (UPS) 6) Provision of as-built electrical plan			

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			including load directory at electrical panel with signature and sealed by Project Engineer 7) Facilitation of electrical permits i) Mechanical Scope 1) Design for appropriate air-conditioning system (chiller type and split-type) needed for LINAC bunker and offices 2) Separate back-up individual airconditioners for the LINAC Bunker & Treatment Planning room, will be provided. 3) All aircon units are inverter type 4) All aircon units are wall-mounted or ceiling-type 5) All condensing units should be installed in the roof deck of the bunker and for chiller type			

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			will be aligned to the water source for easy tapping. 6) Condensate drainpipe should be embedded and tapped to the nearest drainline 7) Drainline should be in downward direction lower than the unit. 8) Aircon pipes should be insulated with rubber insulation $\frac{3}{4}$ inch wall thickness and wrapped by polyethylene tape color white. Provision of hangers for piping that will be laid above the ceiling. 9) Ventilation and exhaust must comply with all pertinent standards 10) Provision of appropriate fire protection equipment, any			

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			clear agent or any fire protection in the room. 11) There will be provision of any fire protection equipment or any clear agent suitable for LINAC/Bunker room. Installation of smoke detectors, fire alarm system, proper signage and fire exits & clearances as required by the Bureau of Fire Protection. Room labels will be installed. j) Plumbing Scope 1) Relocation of fire hydrant, sewer pipes and other related drainage lines/pipes to allow for construction of bunker facilities and nuclear medicine decay room			

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			2) Relocation of pipelines and provision of temporary water supply to affected areas to be shouldered by winning bidder during relocation 3) All piping lay-out outside the constructed bunker area and nuclear medicine decay room must be covered/cladded seamlessly attached to the wall. 4) The water chiller shall be connected to the existing water system of the hospital, with its accompanying water supply and plumbing, if applicable k) Materials testing 1) Testing of materials shall be shouldered by the contractor			

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			1) Telephone and IT Networking Scope 1) Complete installation of all network cabling, conduits, wirings, switches, and circuit breakers will be compatible with any winning bidder's requirement. 2) Establishment of connections from the Linear Accelerator Machine to the existing CT scanner machines (16-slice Discovery RT & 16-slice Somatom Emotion) that are located in the Cancer Institute Building. 3) Telecommunication cables shall be Category 6			
			4. Post-construction requirements a. The winning bidder shall prepare and submit signed and sealed completed As-Built Plans in 20 inch x 30 inch size of three hard copies, Scope of Works and Specifications of the Construction of Bunker and Facilities, including the consolidated treatment planning room, fire exit and new nuclear medicine			

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			decay room, to be received by the OETS, the Chair of the Department of Radiology, the Deputy Director for Administration, and the Director. i. An electronic form (CADD file) shall also be submitted via e-mail to the end-user and the OETS. b. As-Built Plans shall include Structural Design, Architectural Design, Electrical Design, Mechanical (Airconditioning, Ventilation, Fire Pump System) Design, Telephone and LAN/IT Networking Design and Plumbing (Water, Sewer and Storm Drainage System) Design. c. Submission of complete electrical plans, signed and sealed by a professional electrical engineer and for checking prior to endorsement by the OETS to the PGH Administration. d. Design for air-conditioning system (chiller type and split type) for LINAC Bunker and Support Spaces.			
			II. SUPPLY, DELIVERY, INSTALLATION, TESTING, AND COMMISSIONING OF BRAND-NEW LINEAR ACCELERATOR SYSTEM			
	1		A. Technical Specifications of the Linear Accelerator			

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			1. Tight isocenter alignment, at least 1 mm isocenter accuracy for the following: a. Gantry isocenter accuracy b. Radiation beam axis with the rotation of the gantry 2. Fully/Completely digitally-controlled system 3. Waveguide and filter design allow at least one (1) photon energy 4. Allows for online remote diagnostic monitoring of the LINAC machine and treatment planning system during the warranty period; post warranty remote diagnostic monitoring will be the option of the procuring entity 5. Beam Energy: Photon Energy - 6MV 6. Power Source: Magnetron or Klystron as power source 7. Back-up Power Supply: Uninterrupted Power Supply (UPS) to support the Linear Accelerator Machine and all its accessories for at least 15 minutes in case of power failure (as provided by a third-party supplier) 8. Dose Rate and Beam Stability 6 MV Photon: Dose rate of at least 800 MU/min at Dmax 9. Gantry a. Gantry Rotation Range: continuous rotation or minimum of 0 ±185° b. Gantry Rotation Accuracy: at least 0.5° c. Gantry Rotation Reproducibility: not greater than 0.5° d. Gantry Maximum Rotational Speed: at least 4.0 RPM e. Gantry Display: Digital			

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			Display f. Digital display must be visible inside the bunker and treatment console 10. Bore size: at least 85 cm in diameter 11. Multileaf Collimators (MLC): a. Functionality specification - binary interlaced (64 leaves) or multi-layered (114 leaves) - equivalent to the users' bid specifications -that could treat a maximum target field size of at least 28cm x 28 cm. b. Leaf width resolution: not greater than 6.25 mm c. Maximum leaf travel speed: at least 5 cm/s d. Leaf beam transmission: ≤ 0.5% e. MLC control must be fully integrated with the digital control system; if not, an interface between MLC and existing network system shall be provided 12. Couch a. At least three (3) degrees of freedom (longitudinal/Y, lateral/X, vertical/Z) b. Electrical and mechanical control of couch motion c. Couch weight limit (supporting patient weight): at least 200 kilograms d. Couch travel range: i. Lateral: at least ±3 cm ii. Vertical: at least -40cm iii. Longitudinal: at least +160cm e. Couch travel range accuracy: ± 2mm f. Couch capable of the following treatment techniques:			

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			i. Intensity Modulated Radiation Therapy (IMRT) ii. Image Guided Radiation Therapy (IGRT) iii. Volumetric Modulated Arc Therapy (VMAT)/ RapidArc/ Helical g. With controls for manual motion and emergency off buttons on both sides of the couch h. Carbon fiber material; free of metal and radiationopaque materials i. Two (2) lock bars 13. Treatment Delivery Technique Capability a. Field in Field b. IMRT c. IGRT d. VMAT/RapidArc/Helical 14. Imaging Technique Capability a. MV Computed Tomography (MV CT) b. Should be ready for future upgrade of kV Computed Tomography (kV CT) c. Includes couch mount for imaging i. Adjustment for AP, lateral, and vertical movement ii. Locks for adjustments to ensure stability 15. Control Console a. The computerized control console, consisting of several workstations depending on the manufacturer.			

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			i. All the functions and modes of the accelerator shall be software controlled. ii. Console shall provide controls that must be activated in order for the accelerator to become operational in any of its various modes of operation. iii. All modes and functions of the accelerator shall also be operated manually in case of any software malfunction. iv. There shall be UPS per computer system with at least 15-minute working time. b. Able to do auto-field sequencing integrated with oncology information system c. Integrated with oncology information system to display patient setup, treatment verification, and recording of treatment history into the OIS and file d. Integrated with oncology information system for imaging of treated fields before, during, and after the treatment for verification requirements e. Integrates use of the linear accelerator, MLC, MV imaging system, kV imaging system or separate workstations for MV imaging system and kV imaging system			

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	1		B. Fully integrated MV CT Imaging System			
			<ol style="list-style-type: none"> 1. Maximum planar imaging size: at least 28 x 28 cm² 2. Active imaging area: at least 40 x 40 cm² 3. Image and treatment coincidence: ≤ 1.0mm 4. MV CT reconstruction resolution: 1.08mm x 1.08mm x 2mm voxel size 5. MV CT scan diameter: at least 25 cm 6. MV CT spatial linearity accuracy: ± 0.5mm 7. Viewable Pixels: at least 1280 x 1280 8. Dose per MV CT acquisition: maximum of 5 MU 9. Hounsfield Uniformity: ±50 HU 10. Full integration with Oncology Information system, network and database. Should also be compatible with other (3rd party) oncology information systems. 11. Includes application software and acquisition workspace <ol style="list-style-type: none"> a. Online and offline matching and image evaluation b. Match verification tools and image matching tools (blend, color blend, spyglass window, split window)" 12. Or equivalent MV CT that can produce the same result as with the end user's bid specifications 			

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			C. Immobilization Devices			
			1. Head, neck and shoulder devices			
			a. Baseplate			
	2		i. Head			
	2		ii. Head, Neck, and Shoulder			
			iii. Standard angulation			
			1) Carbon fiber material			
			2) MRI compatible			
	2		iv. Tilting angulation: (for Head & Neck only): Carbon fiber material			
			b. Thermoplastic mask			
	30		i. Head masks			
	30		ii. Head, neck and shoulder masks			
			c. Head rest			
	2		i. One (1) set of Head rests, with six (6) different sizes/neck angulations (A-F)			
			ii. Adult prone			
	2		iii. Pediatric sets			
	2		1) prone			
	2		2) supine			
			iv. No transmission correction needed for high energy beams			
	1		d. Shoulder retractor			

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	2		2. Chest and breast immobilizer			
	2		a. Breast board; carbon fiber material			
	10		b. Wing board: Black ABS material			
	10		c. Vacuum/ compressor Immobilizer			
	1		i. Whole / Full body			
	20		ii. Half body			
			iii. Vacuum /compressor pump			
			iv. Breast thermoplastic mask compatible with the breast board and needed accessories as prescribed for use by the manufacturer			
	1		3. Abdomen and pelvis immobilizers			
	2		a. Belly board: carbon fiber material			
	20		b. Abdomen and pelvis immobilization system with abdomen and pelvis baseplate: carbon fiber material			
	2		c. Reinforced thermoplastics compatible with the abdomen and pelvis baseplate			
	1		d. Knee support			
	4		4. Other devices			
	1		a. Patient transfer board			
	1		b. Patient restraint belts			
			c. Calipers: with parallel arms and calibrated in cm			

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	1		d. Set of multipurpose support cushions and wedges i. One (1) set of five (5) different shapes and a hand/finger positioner in a complete set of six (6).			
	2		e. Bolus/tissue equivalent build up material, at least 30 cm x 30 cm			
	2		i. 0.5 cm thickness			
	2		ii. 1 cm thickness			
	2		iii. 1.5cm thickness			
	1		f. Water Bath. i. Digital water bath accommodates all thermoplastic sizes including Type-S (Head, Neck & Shouders) and HipFix thermoplastics, with Pan Liner to prevent thermoplastics from sticking to the bottom of the water bath.			
	1		ii. ii. Water Bath Cart. Able to provide an easy, efficient way to transfer a water bath between treatment rooms.			
			D. Oncology Information System with Networking, Record and Verify System			

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	1		1. LINAC Server a. High storage capacity server that can store at least 10000 patients' data b. Monitor: not smaller than 20" LCD monitor c. Uninterrupted power supply with at least 15 minutes working capacity d. With appropriate port hubs and all necessary network connections as prescribed by the manufacturer e. To be placed in the proposed Treatment Planning Room f. Must be of the latest model and latest software version by the manufacturer.			
	3		2. Workstations a. To be placed at Treatment Control Room, CT-Scan Control Console of Brachytherapy Facility, and Consultation Room b. Processor: Current generation of at least Intel i5 c. Current generation chipset d. Memory: not smaller than 16GB, DDR4 RAM e. Has the current generation Intel HD graphics f. Has keyboard, mouse, and USB terminals			

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			<ul style="list-style-type: none"> g. Storage: not smaller than 1TB h. Optical drive DVD – writer i. Display 23” LED j. Must be of the latest model by the manufacturer. k. UPS with at least 15 minutes working time capacity for every workstation <p>3. OIS Software includes the following:</p> <ul style="list-style-type: none"> a. Patient data administration and electronic medical record b. Independent treatment verification c. Treatment and port image review d. Time planner/scheduler e. Electronic patient RT chart f. Chart audit and checking/assessment g. Capable to archive and restore Patient data h. Must be of the latest software version by the manufacturer. <p>4. Provision for remote access to the distributor for remote service and diagnosis; including cabled high-speed internet connection.</p>			
			E. Treatment Planning System			
			<ul style="list-style-type: none"> 1. Contouring <ul style="list-style-type: none"> a. Supports contouring templates that list structures of interest 			

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			b. Boolean operations (such as AND, OR, XOR, AND NOT) with structures to create complex structure definitions or equivalent contouring tools (margin, subtraction and addition) c. Advanced contouring tools with patient identity information should be available d. Automatic segmentation/ contouring based on electron density values for different organs should be included 2. Image Registration a. Image registration support includes CT scan, MRI, and PET via DICOM b. Able to do image fusion c. Patient data acquisition through DICOM import facility from CT Scan, CT, MRI and PET 3. Planning, Dose Calculation, and Optimization a. Treatment planning for photon and electron beam of all energies in the therapeutic range b. Able to do treatment plans for conventional, 3D-conformal, (Field-in-Field)			

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			IMRT,VMAT/RapidArc/Helical (licenses to compute included) <ol style="list-style-type: none"> i. IMRT Planning License: utilizing sliding window, large field, and step and shoot technique ii. VMAT/RapidArc/Helical Planning License with multi-arc fields capabilities c. Includes advanced dose calculation algorithms for Monte Carlo equivalent photon calculation (such as Monte Carlo, AcurosXB enhancement), if applicable. d. Inverse planning software for IMRT and VMAT/ RapidArc/ Helical e. Can utilize graphics processing unit for plan optimization f. Capable of multi-criteria optimization, or its equivalent g. Able to display target and critical structure motions using 4D tools for respiratory-gated treatment plans for IMRT and VMAT/RapidArc/Helical <ol style="list-style-type: none"> i. 4D image series are displayed as movie 			

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			loops and as blended or blinking images ii. 4D image displays supports CT, PET/CT, PET It should also be ready for future upgrade to support images from a kV imaging system h. Capable of adaptive treatment planning i. Support regular and irregular fields for all types of beam modifiers such as bolus, MLCs, tissue compensator, and asymmetric beam j. Capable of making tissue inhomogeneity correction (as per electron density), irregular point dose calculation and auto contouring as per CT data. k. Able to provide enhance organ at risks (OARs) and target overlap and small structure management. 4. Plan Evaluation and Analysis a. Side by side plan comparison b. DVH for multiple plans in one plot, DVH for any multiple structure volumes in one plot c. Differential or cumulative dose volume histogram			

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			d. Absolute or relative scale for the structure volume axis of DVH plot e. Plan summation/subtraction for external beam plans, can store summed plans f. Electronic plan approval 5. Quality Assurance a. Able to do portal dosimetry calculation for VMAT/RapidArc/Helical and IMRT fields on electronic portal imaging device/MV system, or its equivalent b. Supports In-Vivo Estimation Dosimetry for IMRT/VMAT/RapidArc/Helical treatment plans i. Capable of automatic accumulation and evaluation of recalculated daily delivered doses ii. Can qualitatively assess areas of over-dosing and under-dosing due to anatomical changes and imperfect set up iii. Can provide DVH comparison of actual delivered dose to planned delivered dose			

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	2		6. System administration utilities including back-up, archive, and restore			
	2		7. Workstations a. Calculation workstation/treatment planning system with physics license and UPS with at least 15 minutes working time capacity for every workstation with licenses. With medical grade display not smaller than 23". b. Non calculation workstation/contouring station with contouring license and UPS with at least 15 minutes working time capacity for every workstation with licenses. With medical grade display not smaller than 23". c. Must be of the latest model and latest software version by the manufacturer.			
	1		8. Printers a. Heavy duty laser monochromatic printer with two (2) additional sets of ink			
	1		b. Heavy duty laser colored printer with two (2) additional sets of ink			
			9. Able to import/export patient image, contours, and plan data to/from the			

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			existing Treatment Planning System of the Division of Radiation of Oncology 10. Supports DICOM-RT import/export of at least DICOM images or higher and radiotherapy images, structures, plans, dose matrix, dose points, fluence, dMLC for IMRT, blocks, compensators, etc. 11. Import filters include image transfer via LAN, CD-ROM, film scanner, digitizer for non-CT based patients (brachytherapy films and irregular images) and dosimetric beam data from all brand name water phantoms (e.g. Sun Nuclear, IBA, PTW, etc.)			
			F. LINAC Accessories			
	1		Laser Alignment System for the LINAC Machine (Four Cross Laser System)			
			G. Other requirements of the LINAC Machine			
	1		1. Leaded bunker door should comply with the shielding requirements of the machine offered			
	1		2. Set of patient intercom system in the treatment room and control console			
	1		3. CCTV Camera system: High resolution six (6)-piece camera system (two cameras for the main treatment area, one for the maze, 2 for the reception/waiting area, and one for the corridor) with three (3) views			

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	1		4. Intercom in the Treatment Console shall be connected to the existing Intercom system (i.e. connection to Reception Area, CT Console Rooms (at LINAC and brachytherapy facilities), Treatment Planning Room)			
	1		5. Set of radiation warning lights above the LINAC room door connected to the treatment machine			
	2		6. Water chillers; specifications as prescribed by the manufacturer, if applicable to the machine offered by the winning bidder			
	1		7. Air compressor if required by the manufacturer; specifications as prescribed by the manufacturer			
	5		8. Dehumidifiers (three (3) for the treatment room, one (1) for the treatment planning room, and one (1) for the equipment/dosimetry storage room) a. 20 Liter capacity b. Wheel-mounted c. Automatic adjustable humidistat d. Water tank full indicator with auto shut-off e. Ozone friendly refrigerant, frost-free f. 100% CFC g. At least ¼ hp, 220-240 V			

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 Project: **SUPPLY, DELIVERY, INSTALLATION, TESTING,
 AND COMMISSIONING OF BRAND-NEW LINEAR
 ACCELERATOR SYSTEM WITH RELATED CIVIL
 WORKS FOR THE PHILIPPINE GENERAL
 HOSPITAL CANCER INSTITUTE**

Opening of Bids: **December 27, 2022**
 ABC: **PHP279,500,000.00**

Contract: **SINGLE BID**

Item No.	Qty.	UOM	Item Description	Unit Cost	Quotations (all taxes included)	
					in figures	in words
			H. Technical Specifications of the Dosimetry System			
	1		1. Radiation Field Analyzer or Beam Scanner <ul style="list-style-type: none"> a. Advanced 3D computer-controlled radiation scanning system to measure dose distribution comprised of: <ul style="list-style-type: none"> i. 3D mechanics with scanning volume accommodate the beam data requirements by the TPS to be delivered by the winning bidder ii. Calibrated high-precision mechanics with built-in levelling frame iii. Can fit inside the Linear Accelerator Bore iv. Water phantom carriage with electrically operated telescopic lift v. Water reservoir carriage with bi-directional pump (fill and drain water) vi. Control unit with built in electrometer vii. Hand-held control 			

Approved by:

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 Chairperson

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	1		viii. Set of detector holders for the dosimeter supplied by the winning bidder			
			b. Fast, accurate, simple and easy setup scanning system c. Storage case and dust cover			
	1		2. Advanced acquisition and analysis software with laptop computer system, or equivalent a. Support of all international and industry protocol (such as IAEA, AAPM, etc) b. Compatible with all commercial radiation treatment planning systems c. License for installation of the software on up to (3) three additional workstations d. Can measure electron and photon profiles, depth dose curves and TMR/TPR e. Flexible ASCII tables including export to MS Excel f. Capability for radiation treatment planning software specific measurement queue creation and data conversion to the treatment planning system			
	1		3. Farmer Type Ion Chamber, or equivalent			

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			a. Farmer Type ionization chamber 0.6 cc with acrylic walls and graphited with a PMMA protective cover, Co-60 build-up cap, waterproof and fully guarded, calibrated in a standards laboratory in terms of absorbed dose to water b. Ionization chamber model must be included in IAEA TRS 277/ 382/ 398 protocols c. With ion chamber holder or adapter for absolute measurements in water phantom and existing check source			
	1 1 2		4. Ionization Chambers for Small Field Dosimetry, or equivalent a. Ion chambers with the following volume, cylindrical, waterproof and fully guarded: i. Not bigger than 0.015 cc Cavity Volume with graphite central electrode ii. Not bigger than 0.04 cc Cavity Volume iii. Not bigger than 0.125cc Cavity Volume b. With ion chamber holder or adapter for absolute measurements in water phantom and existing check source			

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1			5. Therapy Dose Meter (Electrometer) <ul style="list-style-type: none"> a. Must be compatible with the delivered ionization chambers, calibrated in a standards laboratory <ul style="list-style-type: none"> i. Power supply is 220-240 V, stable and high accuracy in the measurements, with display of accumulated charge and dose, varying bias voltage with V1/V2 ratio equal or greater than 3, dose rate, exposure time, leakage and other important information that ensure validity of the instruments and with possibility of reverse polarity b. With calibration certificate, electrometer technical and user manual c. Complete with necessary accessories and carrying case 			
2			6. Detector Extension Cables <ul style="list-style-type: none"> a. Low noise triaxial cable on reel not shorter than 20 meters b. Low radiation leakage cable and resistant against radiation damage 			

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					in figures	in words
	1		7. Barometer Digital, with selectable unit of pressures, 1 hPa or 0.5 mmHg minimum scale, calibrated in a standard laboratory, with calibration certificate, technical data and user manuals in english			
	1		8. Thermometer Digital, with selectable unit of temperature, 0.5 C min scale calibrated in Standards Laboratory, with calibration certificate, technical data and user manual in English			
	1		9. Hygrometer Digital, calibrated in SI units in a Standards Laboratory, with calibration certificate, technical data and user manuals in English			
	1		10. Desiccator cabinet, at least 4 levels, with at least 114 Liters Capacity with humidity and temperature indicators and controls, calibrated to SI units, 220-240V			
	100		11. Gafchromic verification films: at least 30 x 43cm ²			
	1		12. Digital level: magnetic horizontal, vertical and diagonal bubble level; durable			
	1		13. Patient Plan Verification Dosimetry System a. For volumetric modulated RT patient treatment plan verification (at least 3D)			

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					in figures	in words
			b. Matrix detector grid c. Able to do the following analyse: i. 2D dose analysis: compare data or absolute dose data using Distance to Agreement (DTA), Gamma (Y) and Gradient Compensation ii. Control point analysis (VMAT/ RapidArc/ Helical): individual control points and user-defined arc sections can be analyzed for a full arc or sub arc. iii. Equivalent VMAT/ RapidArc/ Helical Analysis system: verification of VMAT/ RapidArc/ Helical plans using densities of ROIs from a TPS calculate SSD, geometric and effective depth automatically for VMAT/ RapidArc/ Helical and IMRT plans iv. MLC analysis: evaluate the difference between the planned and delivered MLC pattern d. Include detector array, compatible phantom and software capable of DVH QA analysis			
	1		14. Chamber matrix for measurement of radiotherapy beam, or equivalent a. Measure fields up to a size of at least 20 cm x 20 cm ² b. Analysis parameters shall include dose output, flatness, symmetry, field size, light-			

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					in figures	in words
			radiation field coincidence, penumbra, dose rate and beam center			
	1		15. Radiation Survey Meter a. Battery-operated ionization radiation survey meter b. Digital, accurate, auto ranging, zeroing with warm up of less than 2 minutes c. Units of measurement are indicated at all times and capable of showing messages for unit operating conditions d. Radiation detected: alpha, beta, gamma and x-ray, 0-2 Sv/hr e. Calibrated in SI units f. With calibration certificates and user manual			
			I. Accessories and Supporting Equipment			

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					in figures	in words
			1. Air Conditioning System			
			a. Air Conditioning Units			
			i. 1.5 T Air Conditioning Unit			
			1) To be placed in the following rooms:			
	2		a. Treatment Planning Room & Server Room			
	1		b. Treatment Console			
	1		c. LINAC Bunker			
	1		d. Equipment Dosimetry Room			
	2		e. Patient Waiting Area			
			2) Wall-mounted or ceiling-mounted			
			3) Inverter-type compressor			
	2		ii. 3T Air Conditioning Unit			
			1) To be placed in the LINAC Bunker			
			2) Ceiling-mounted or wall-mounted			
			3) Inverter-type compressor			
			2. Fire Extinguisher:			
			a. To be placed in the following areas:			
	1		i. LINAC Bunker			
	1		ii. Treatment Console			
			b. Green Type HCFC			
	1		3. Fire Alarm & Detector:			
			a. Battery-type and with audio alarm			
			b. To be placed in areas as recommended by Bureau of Fire Protection			
	10		4. Foot Stools			
			a. Stainless steel			
			b. With skid-resistant rubber mat			
			c. Two-step			

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					in figures	in words
	1		5. Thermometer with Hygrometer (combined) for the LINAC Bunker			
	1		a. Digital			
			b. Wall-mounted			
			c. Measurement range humidity: 5%-95% RH or better			
			d. Measurement range temperature: 0°-55.0°C or better			
	10		6. Electrical Extension Cord			
			a. Heavy duty 8 ft cord			
			b. Provides protection from power surges, spikes and AC contamination			
			c. At least four (4) surge-protected outlets			
	10		7. Emergency Lights: to be placed in areas as required by Bureau of Fire			
			a. Heavy duty			
			b. Automatic			
			c. LED type			
			d. Fire-retardant casing			
	1		8. Exhaust Fan			
	5		a. To be placed in the LINAC bunker			
			b. To be placed in areas recommended by the Hospital Infection Control Unit			
	1		9. MRI-Compatible Wheeled Stretcher			
			a. Manual backrest with 1 mm thick stainless-steel top			
			b. Fixed height			
			c. Rubber bumper on all sides			
			d. Sliding side rails			
			e. Fixed IV pole			
			f. With two sets patient restraints			

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	2		g. Heavy duty 8" caster wheels with brakes and ball bearing h. Diagonal oxygen tank holder			
	4		10. MRI-Compatible Wheelchair a. Non-ferrous wheelchair b. With IV pole and E-cylinder			
	1		11. Computer Set Desktops a. Current generation i7 or higher b. Current generation chipset c. Memory 16GB, DDR4 RAM or higher d. Intel HD graphics; keyboard, mouse, USB terminals e. Local Storage of at least 1 TB. Hard disk drive and solid-state drive are both acceptable f. Optical drive DVD – writer g. Has wifi card for wireless connectivity h. Monitor should be at least 21" LED i. Network interface 10/100/1000 MB ethernet j. Operating System: Current generation Windows Professional 64bit k. Microsoft Office lifetime license			
	30		12. Stretcher a. length: 2000 mm at least b. width: 550 mm at least c. lightweight with IV stand and collapsible railing d. working load: at least 160 kg 13. Office chairs			

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	1		a. Ergonomic b. Adjustable arms c. Pneumatic seat height adjustmant d. Built-in lumbar support e. Seat swivel f. Weight rated up to 250 lbs 14. Stool bar chair a. Cushioned seat b. Armless c. Pneumatic seat height adjustment d. Weight rated up to 250 lbs.			
			J. Installation and Testing of Linear Accelerator			
			To be reckoned upon issuance of certificate of inspection and work accomplished from the OETS.			
			K. Commissioning of the Linear Accelerator			
			To be reckoned after the winning bidder has issued the acceptance indicating that all applicable and required tests have been satisfactorily met.			
Total Approved Budget for the Contract:				Php279,500,000.00		

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TERMS & CONDITIONS:

A. Requirement/s if declared as Lowest/Single Calculated Bids

1. Presentation of Technical data sheet/manuals and presentation of prototype equipment within seven (7) calendar days after receipt of Notice of Lowest/Single Calculated Bid.
 - a. Product presentation in an institution with the same brand and model of the following:
 - i. Technical Specifications of the Linear Accelerator Machine
 - ii. Fully integrated MV CT Imaging System
 - iii. Treatment Planning System
 - iv. Immobilization Devices
 - v. Dosimetry System
 - vi. Oncology Information System with Networking, Record and Verify System

B. Requirement/s if awarded the contract

1. Submission of conformed, signed and sealed, architectural and engineering plans for bunker, treatment planning room, fire exit and nuclear medicine decay room, including electrical, mechanical, plumbing, air conditioning, lighting, and networking plans based on the PGH-issued Schematic Architectural Plans and Engineering Brief Description of Works with approval of the OETS, end-user, and hospital administration.
 - a. The winning proponent shall enter into a contract with the Philippine General Hospital that shall be in the nature of a Design and Build Scheme.
 - b. For infrastructure projects, the following maybe required as applicable:
 - i. PCAB License (as applicable to the projects)
 - ii. Bill of Quantities/Materials (as applicable)
 - c. All developments and concerns on civil works shall be coordinated with the PGH-assigned Project Engineer from the OETS.
 - i. Shall include training of staff on the safe use of provided equipment.
2. Project Completion Period: Delivery, installation, testing and commissioning of the Linear Accelerator Machine and accessories, including design and construction of related infrastructure work in 500 calendar days upon receipt of the Notice to Proceed.

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- a. An extension shall be allowed, equivalent to the number of calendar days between the submission of the Architectural and Engineering Design Proposal and its approval by the in-house certified radiation oncology medical physicist, the OETS, the Chair of the Department of Radiology, the Deputy Director for Administration, and the Director.
3. Project Site: Cancer Institute, Philippine General Hospital, Taft Avenue, Manila
4. Place of Installation: Nuclear Medicine Decay Room and Linear Accelerator Unit Complex, Cancer Institute, Philippine General Hospital, Taft Avenue, Manila
5. Duration of the Warranty for each component of the system.
 - a. Warranty period shall commence from the date of PGH Certificate of Acceptance signed by the enduser. At least three (3) year warranty on all parts and service of all equipment purchased (to start after the release of PGH certificate of acceptance), as follows:
 - i. Linear Accelerator (LINAC) Machine including:
 - a. Radiation Oncology Information System (OIS)
 - b. Treatment Planning System
 - c. Immobilization Equipment
 - d. LINAC Accessories
 - e. Dosimetry Equipment and Accessories - Complete set of Dosimetry System
 - b. Linear Accelerator Machine Downtime
 - i. Maximum downtime of twenty-four (24) working days in a year and not exceeding two days in a month; with corresponding penalty for delays (Php 200,000.00/day – based on approximate equivalent daily income of 50 IMRT patients using a computed rate of Php 4,000), which shall be compensated by extending the warranty equivalent to the amount computed from the accumulated downtime exceeding the maximum duration stated above.
 - ii. Definition of Machine Downtime:
 - a. Start of downtime: once reported to the winning bidder
 - b. End of downtime: once the winning bidder has given clearance to resume operations
 - c. The lifespan of the Linear Accelerator power source must be least three (3) years. If a lifespan of less than three (3) years, the power source should be replaced without additional cost to the institution in case of failure

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- d. Free quarterly preventive maintenance during the warranty period. Warranty period shall commence from the date of PGH Certificate of Acceptance signed by the end-user, after installation, testing and commissioning
 - e. Support from the LINAC manufacturer application specialist shall be provided free-of-charge within the duration of the warranty.
 - f. The supplier agrees to enter into a service level agreement with the Philippine General Hospital. Undertaking must be submitted.
 - g. Guarantee for availability of after sales service and spare parts for ten (10) years after warranty period
 - h. Guarantee that the installation of a system for remote access to the Oncology Information System provided by a third-party supplier authorized by the winning bidder, would not render such warranty void.
 - i. Quotation of the Annual Preventive Maintenance Cost after the warranty period expires shall be provided.
6. Manuals of all equipment and accessories: The supplier must provide original hard copy (not photocopy) and soft copy of operators and service manuals in English Language upon delivery.
7. Compatibility with the existing machines and equipment of Division of Radiation Oncology Department of Radiology
- a. Treatment Couch - Fully compatible with the existing immobilization devices and accessories
 - b. Immobilization Devices - Lock bars and baseplates must be compatible with all existing immobilization devices, the treatment couch, and the CT simulator couch
 - c. Dosimetry System - All chambers and electrometer must be of the same connector design with the existing dosimetry system (Existing chambers and electrometer Triax BNC, Jack & Plug, as per sample)
8. Connectivity with the existing machines and equipment of Division of Radiation Oncology Department of Radiology
- a. Oncology Information System
 - i. Should be connected to the IGRT device and should be able to import MV, kV, and volumetric DICOM images

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- ii. Able to accept and read DICOM CT images from the existing 16 Slice Somatom Emotion and Discovery RT of the Radiation Oncology Division of UPPGH from external devices (such as CD, DVD, or Flash Drive)
- iii. Should be connected to the purchased linear accelerator (to verify that the machine is set up according to plan and automatically records actual set-up parameters)
- iv. Should be connected the treatment planning system
- v. OIS can be connected with the existing OIS of the LINAC at CI in the future and would not void the warranty
- b. Treatment Planning System - Workstations integrated to the LINAC console through the OIS network/record and verify system
- 9. Requirements on Dosimetry System
 - a. Calibration certificates and technical specifications of all dosimetry equipment, including survey meters and ionization chambers
 - b. All dosimeters for absolute dosimetry must be included in IAEA TRS 277/382/398 protocols
- 10. Users' training for Radiotherapy Personnel on all unit systems delivered by the supplier's foreign physicists and application specialists, which include the following:
 - a. Data gathering and encoding/uploading of data to the TPS to be done by the in-house medical physicists shall be guided by the unit manufacturer application specialist/physicist.
 - b. Manufacturer application specialists/physicists who can speak English fluently. The in-house medical physicist reserves the right to refuse the presence of manufacturer's physicist if he/she cannot be understood. The supplier is obliged to send another one.
 - c. Notarized undertaking from the supplier that they will provide training for five (5) radiation oncologists and two (2) medical physicists in USA, Canada, or Western Europe for at least 3 days; training/s shall be provided no later than the duration of the warranty period. Permit to travel and to conduct training must be approved by public health officials of both countries.
 - d. Four months training for four (4) radiologic technologists in a radiation therapy facility with the same or higher model and capabilities of the equipment purchased; if the same or higher model is not available in the country, the Applications Specialist should be present and assist during the first month of actual clinical operations.
 - e. Training of radiologic technologists should be conducted before the acceptance of the machine.

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- f. One (1) hospital engineer (on-site) to be provided before the acceptance testing of the purchased equipment.
- g. Two-week on-site applications training for the Radiology Staff and OETS Technical Personnel.
11. Supplier will indicate brand, model, country of origin, and manufacturing date of all equipment to be delivered.
12. All equipment and accessories to be delivered and to be supplied must be of the latest model by the manufacturer. All software must be of the latest version by the manufacturer.
13. One manufacturer application specialist/ physicist assistance for one month during the commissioning.
14. Free upgrades of all software (i.e. console version, TPS version) shall be included in the preventive maintenance of the machine by the supplier.
15. Acceptance Procedures and Parameters.
 - a. Certificate of completion of all civil works including electrical, mechanical, plumbing, air conditioning, lighting, and networking plans from the OETS.
 - b. Successful radiation protection survey and evaluation (RPSE), performance testing, and commissioning of the LINAC Machine by the Food and Drug Administration (FDA) and Center for Device Regulation, Radiation Health and Research (DOH-CDRRHR).
 - c. Licensing
 - i. Satisfactorily complied with requirements for license to operate of the Department of Health - Food and Drug Administration - Center for Device Regulation, Radiation Health and Research (DOH-FDACDRRHR)
 - ii. To be reckoned upon issuance of commissioning report by the PGH inhouse board-certified Radiation Oncology Medical Physicist.
 - d. Initial Clinical Use:
 - i. To be reckoned upon receipt of the license to operate issued by the Department of Health - Food and Drug Administration - Center for Device Regulation, Radiation Health and Research (DOH-FDACDRRHR)
 - ii. Completed treatment of the following:
 - a. At least six (6) IMRT procedures
 - b. At least six (6) VMAT or RapidArc or Helical procedures

C. Requirements to be submitted by the bidder for bid opening

Approved by:

Dean CHARLOTTE M. CHIONG, MD, PhD
Chairperson

(Signature over Printed Name of President / Gen. Manager)

(Name & Address of Company)

Proj. Ref. No.: **PUR22-11-1097**
End-User: **DIVISION OF RADIOLOGY**
Project: **SUPPLY, DELIVERY, INSTALLATION, TESTING,
AND COMMISSIONING OF BRAND-NEW LINEAR
ACCELERATOR SYSTEM WITH RELATED CIVIL
WORKS FOR THE PHILIPPINE GENERAL
HOSPITAL CANCER INSTITUTE**

Opening of Bids: **December 27, 2022**
ABC: **PHP279,500,000.00**

Contract: **SINGLE BID**

1. Brochures/Technical data Sheet for the following:
 - a. Linear Accelerator Machine
 - b. Fully integrated MV CT Imaging System
 - c. Immobilization Devices
 - d. Oncology Information System with Networking, Record and Verify System
 - e. Treatment Planning System
2. SEC registration to prove that the supplier is in the business of importing and supplying medical equipment for the past 10 years
3. Certification that the manufacturer has been in the business of manufacturing Linear Accelerator Machines for at least 20 years.
4. Certified true copy of the Certificate of Distributorship for the last 5 years. The principal and the local distributor must have been in business partnership for the past 5 years.
5. Guarantee letter from the manufacturer and local distributor to ensure availability of supplies, parts and accessories for at least ten (10) years after expiration of the warranty period.
6. Certification by the principal that service engineers are factory trained on service and repair.
7. Certification by the supplier that at least one service engineer is available locally to provide quick on-site support.
8. Manufacturer's Office in the USA, Canada, Western Europe, or Japan
9. Must submit a certification indicating 95% uptime for the past 5 years from any Tertiary government or private hospital in the Philippines.
10. Must submit at least three (3) certificates of Performance Evaluation with a rating of at least Very Satisfactory within the past ten (10) years from any Tertiary government or private hospital in the Philippines.
11. Required Licenses of Certification: License from the Department of Health - Food and Drug Administration – Center for Device Regulation, Radiation Health and Research (DOH-FDA-CDRRHR)
12. Certification or Declaration of Conformity issued by the equipment manufacturer that the medical LINAC in its present condition is compliant with the performance and safety requirements of the International Atomic Energy Agency or the International Atomic Energy Agency or the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC)
13. Notarized affidavit of Site Inspection

Approved by:

Dean CHARLOTTE M. CHIONG, MD, PhD
Chairperson

(Signature over Printed Name of President / Gen. Manager)

(Name & Address of Company)

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Contract: **SINGLE BID**

14. Philippine Contractors Accreditation Board (PCAB) license of winning bidder or its subcontractor

Approved by:

Dean CHARLOTTE M. CHIONG, MD, PhD
Chairperson

(Signature over Printed Name of President / Gen. Manager)

(Name & Address of Company)