Amendment –II

Dated 04.04.2018

Tender Enquiry No: HSCC/SJH / Medical Equipment/2017/40 Dated 28.02.2018

Amendment have been received for Item No. 1 and 2 it is therefore the bid submission date may be extended as per table no. I

Table -I

Sr. No.	Description	Detail of Items	Previous Date & time	Revised Date & time
i.	Sale Date of the tender	Item No.1 , 3 Tesla MRI Unit Item No. 2 Digital Flat Panel Radiography System	04.04.2018, 2.30 PM	16.04.2018, 2.30 PM
ii.	Closing Date & Time for receipt of Bids		04.04.2018, 2.30 PM	16.04.2018, 2.30 PM
iii.	Time and date of Opening of Tender		04.04.2018 ,3.00 PM	16.04.2018 ,3.00 PM

Amended Specification and Layout plan are as follows :

Item No. 1, 3 Tesla MRI UNIT

	Date: 04.04.2018 **Revised Technical Specification of 3.0 Tesla MRI System for New Emergency Block, Safdarjang Hospital, New Delhi after prebid meeting.**
	Quoted Model :
	'State of the art' Whole Body 3.0 Tesla Magnetic Resonance Imaging System optimized for all body applications, including musculoskeletal, vascular, pediatric, hepatobiliary, abdominal, cardiac and neurological applications with super conducting magnet, high performance gradients and digital Radio Frequency System. The manufacturer/ bidder must quote the latest 'state of the art' 3 Tesla MR system as per the specifications below. Latest model to be quoted; If any new model in the same series with better specifications is launched in RSNA, then the same should be quoted. Model should be US-FDA approved.
	Please mention the year of launch of the quoted model/version/release offered. It should be latest RSNA November 2015 launch –or later. The manufacturer will guarantee the latest available version with latest hardware and software at the time of delivery. Future **software update** should be provided free of cost for the next 10 years. The detailed specification that follows shall be understood to be minimum requirement.
	The offered model should be USFDA approved. Authentic and legible certificate for the same should be annexed.
	The scanner supplied should not have any refurbished/recycled parts/accessories.
1	**Magnet**
A	3.0 T active shielded super conductive magnet should be short and non-claustrophobic.

B	It should have at least 70 cm patient bore with flared opening.
C	Magnet length should be less than 200cm.
D	Homogeneity of the magnet should be better than 1.5 ppm at 40 cms (guaranteed homogeneity)
E	The magnet should be well ventilated and with in-bore illumination with built in 2 way intercom for communication with patient.
F	It should have a built in cryo-cooler such that helium consumption is minimized and does not exceed 0.05 litre/hour.
G	Specify hardware and software for acoustic noise reduction.
H	Active shielding/ Fringe field – quote values for 5 Gauss and 1 Gauss line.
I	External shielding – external interference shield (sufficient to house the magnet, anaesthesia and physiologic monitors) should be provided.
2.	**Shim System**
A	High performance, highly stable shim system with global and localized manual and automated shimming including 3D shimming for high homogeneity magnetic field for complete imaging, volume imaging & CSI and spectroscopy.
B	Auto shim should be available to shim the magnet with patient in position
3	**Gradient System**
A	Actively shielded Gradient system in X, Y, Z planes
B	The gradient should be actively shielded with each axis having independently a slew rate of at least 200 T/m/s and a peak amplitude of 44mT/m
C	The system should have efficient and adequate Eddy current compensation.
D	Effective cooling system for gradient coil and power supply
E	Silent MRI" sequence package to be quoted as standard.
4	**RF System**
1.A	A fully digital RF system capable of Multi Transmission with 2 amplifiers of at least 15kW each or one amplifier of 30 kW, to reduce magnetic susceptibility artifacts.
1 B	Inhomogeneity correction should be possible.**vendor should offer multitransmit /multidrive/trueshape as standard supply.**.
2.A	If the vendor has additionally technology like Zoom it/FOCUS or equivalent for selective excitation within a user specified FoV, the same should be quoted. True shape and true form or equivalent technology such as multi drive/multi transit 4D to be quoted.
B	It should also have at least 32 independent RF receiver channels "acquisition" with each having bandwidth of 1 MHz or more along with necessary hardware to support quadrature array / Matrix coils.
C	It should support Parallel acquisition techniques with a factor of 12 or more. Highest available PAT factor to be quoted.
D	Should allow remote selection of coils and or coil elements.

E	The operating frequency should cover 1H spectroscopy and P31 nucleus (for multinuclear spectroscopy 1H and P31)
5	**Patient Table**
A	**Suitable patient table to be quoted which should be fully motorized with computer controlled table movements in vertical and horizontal directions.**
B	A CCTV system with LCD display to observe the patient should be provided
C	Emergency manual traction of the subject from the magnet.
D	Table technology – (1) Bolus chasing with automatic/ continuous moving table should be offered and should be available with fluoro triggered MR angiography for manual and fast switchover in less than 1 second for CE-MRA
6	**Computer System /Image Processor Operator Console.**
A	The main Host computer should have a 19 inches or more high resolution LCD TFT color monitor with 1024 x 1024 matrix display. The system should have image storage capacity of 100 GB for at least 2,00,000 images in 256 x 256 matrix.
B	The Image reconstruction speed should be at least 1300 images/second or more for full FOV 256 matrix.
C	The main console should have facility for music system for patient in the magnet room. The system should have DVD / CD/ Flash drive archiving facility. Supply 1000 DVD along with the system. The system should be provided with auto DVD writer.
D	Patient monitoring devices for ECG, respiratory rate, pulse rate, O2 saturation at console.
7	**Measurement System**
A	Largest Field of View should be at least 45 cm or more higher will be preferred in all three axis. Specify the maximum and minimum FOV.
B	The measurement matrix should be from 128x128 to 1024x1024. Highest matrix available to be quoted.
C	Minimum 2D slice thickness mm should be equal to or less than 0.5
D	Minimum 3D slice thickness mm should be equal to or less than 0.1
8	**Coil System**
	The main body coil integrated to the magnet must be Quadrature/CP of the latest technology. In addition to the in-built body coil, following coils should be quoted. All coils (other than coils for exclusive spectroscopy, like surface coils) should be compatible for parallel acquisitions. The vendor should supply latest coil with the best technology available with them at the time of tender submission.
I	Multichannel Head coil with 32 channels or more for EPI/DTI application.
Ii	Neuro-vascular Coil with 20 or more channels or Head / Neck Coil combined, capable of high resolution neuro-vascular imaging or combination of head & neck coil for similar coverage.
Iii	Spine Array/Matrix Coil for thoracic and lumbar spine imaging with at least 32 channels acquisition per exam

Iv	Body Array/Matrix coil with at least 40 cm z axis coverage for imaging of abdomen, with at least 32 channels Acquisition for body part angiograms and heart. In case one coil cannot provide this coverage then multiple coils should be offered. (The best available body coil with the vendor must be supplied)
V	Dedicated peripheral vascular coil for angiography application of at least 32 channels Suitable surface / phased array coil for peripheral angiography application of at least 32 channels with coverage of minimum 80 cm, with single or combination of 2 coils. For Angio application if the coils offered are in combination it will be counted as 1 coil for the purpose of peripheral angiography.
Vi	**Bilateral Breast Coil with at least 16 channels with fully functional spectroscopy.** **Separate 4 channel laterally open breast coil should be provided for biopsy.**
Vii	Dedicated Shoulder Coil- at least 8 Channel or more.
Viii	Dedicated Knee Coil – at least 15 channels or more. If transmit receive coil is available the same should be quoted.
Ix	Dedicated Wrist Coil – 8 channels or more.
X	Flex Coil
	Large (2 quantity) – 4 channel
	Small (2 quantity)- 4 channel
Xi	Flex coil for pediatric and neonatal head and neck applications- 8 channels or more
Xii	Dedicated Ankle Coil with 16 channels or more.
Xiii	**TOTAL COILS – 16 Nos.**
Xiv	For Storage of all coils a caddy to be provided.
Xv	The coil system should permit coverage of 200cm
	The system should continuously monitor the RF coils used during scanning to detect failure modes. (RF coils should not require either set up time or coil tuning; Multi coil connection for up to 2 or more coils simultaneous scanning without patient) repositioning. i.e. like 4GTIM/GEM/D stream coil combination should be quoted as standard.
9	**Application Package**
	Data acquisition:
I	The system should be capable of 2D and 3D acquisitions in conventional, fast and ultrafast spin echo and gradient echo modes so that real-time online images can be observed if needed. All the sequences that are available with the vendor at the time of quote/delivery should be provided as per their manual.
Ii	2D multi-slice imaging should be possible in all planes (axial, sagittal, coronal, oblique and double oblique)
Iii	Up to 1024 x 1024 matrix acquisitions preferred for all applications
Iv	Half Fourier or other techniques to reduce scan acquisition time while maintaining adequate SNR
V	3D volume, multiple contiguous slabs, multiple interleaved and multiple overlapping slabs
Vi	Slice thickness in 2D and partition in 3D to be freely selectable
Vii	Dynamic acquisition (serial imaging) with capability to initiate scan sequences either from the magnet panel or from the console
Viii	Dynamic acquisition: number of repeat scans with delay time either identical time interval or selectable

Ix	Auto slice positioning from the localizer images
X	Maximum-off center positioning both anterior-posterior and lateral direction and should be selectable
Xi	Gating: physiological signals like ECG, pulse, respiratory
Xii	External signal triggering (interface for triggering input pulse from external source). The provision should be available at the console also (for fMRI, EEG, etc.)
Xiii	Simultaneous acquisition, processing and display of image data in 2D multi-slice mode.
Xiv	Selection of voxels from oblique slices should be possible while doing spectroscopy.
Xv	Artifact reduction/ imaging enhancement/ image filtering/ image subtraction/addition/multiplication/ division techniques:
Xvi	Flow: 1st and 2nd order flow artifact compensation
Xvii	Presentation slabs: a number of relocatable saturation bands to be placed either inside or outside the region of interest
Xviii	Graphic prescription
Xix	Fat saturation techniques: frequency selective RF pulses to suppress fat signals in the measured image FOV. ROI selective (regional) fat suppression should also be given.
xx	Magnetization transfer saturation: Off resonance RF pulses to suppress signals from stationary tissue in FOV.
xxi	Phase contrast capability in 2D and 3D mode: Image intensity correction.
Xxii	Breath hold acquisition
xxiii	EPI mode
Xxiv	DTI with MDDW or equivalent with a minimum of 12 and selectable up to 64/256 direction encoding
xxv	Data acquisition in all three standard planes (axial, sagittal and coronal) and oblique and double oblique planes or more oblique planes
xxvi	Higher matrix acquisition capability in single shot EPI. Acquisition time, TR, TE and slice thickness should be clearly mentioned and supported by data sheet reference.
Xxvii	The vendor should offer multi coil acquisition in order to optimize throughput increase and increased effective FOV. Individual acquisition elements of every coil should be mentioned.
10.	**Imaging pulse sequences:**
I	All standard and special pulse sequences available at the time of quote/delivery should be offered and quoted in the bid. Fat suppression for high quality images both inversion recovery and Dixon method/ IDEAL/ 3D Dual Echo/ m-Dixon. The system should acquire motion artifact free images in T2 studies of the brain in restless patients (Propeller, Multivane, Blade, etc.). Dynamic study for pre and post contrast scans and time intensity studies.
Ii	The system should be capable of selecting TR and Tes as per requirement in majority of the pulse sequences.
Iii	Spin echo (SE): multi-slice single echo, multi-slice multi-echo (8 echo or more), SE with symmetrical and asymmetrical echo intervals and fast spin echo. MT-SE imaging sequence.
Iv	Inversion recovery (IR): including short T1 modified IRSE, FLAIR, DIR (Double inversion recovery).

V	Gradient echo (GE): with transverse gradient/ RF spoiling and transverse gradient rephrasing, e.g., GRASE or equivalent etc. 3D gradient echo with shortest TR and TE, free choice of angle selection, while maintaining SNR
Vi	Fast sequences
Vii	Fast spin echo and GE sequences in 2D and 3D mode with T1,T2 and PD contrast capable of acquiring maximum number of slices with a given TR at minimum TE, echo train should be at least 256 or more in fast spin echo mode
Viii	Half Fourier acquisition capabilities should be available with/without diffusion gradients and in combination with fast spin echo
Ix	Fast inversion recovery with spin echo
X	Fast gradient spin echo IR multi-slice multi-echo mode with maximum ETL. Sequences should incorporate RF focusing to acquire ultra-fast gradient spin echo
Xi	Fast gradient echo sequences should incorporate RF spoiling and other technique to acquire images in ultra-fast 2D and 3D modes, gradient echo with ETL of 255 or more.
Xii	Fat and water suppressed imaging sequences
Xiii	EPI optimized sequences (with and without fat suppression) with ETL of 255 or more.
Xiv	For T1, T2, PD imaging, perfusion, regular diffusion values (at least 5b, 3 directions) EPI-FLAIR, EPI-IR, EPI-FLAIR diffusion tensor, EPI-MT-FLAIR, tensor diffusion (at least 16 b values in minimum 32 directions) and diffusion studies. Suitable artifact/ fat suppression techniques to be incorporated in the sequence to have optimum image quality.
Xv	There should be capability of calculating ADC map(isotropic and anisotropy from the regular diffusion and tensor data)
Xvi	Optimized sequence package for special applications.
11	**Special application packages:**
	Please give details of licensees for acquisition post-processing and for special packages quoted for the following applications. **All the software for functional MRI should be from same vendor.**
A.	**Neuro Applications**
1	Functional MRI accessories and post-processing:
i)	Functional Imaging with package for BOLD Imaging and spectroscopic imaging and processing package capable of real-time processing and display of color overlay (in real time) using 32-channel head coil being supplied with the system.
ii)	Complete MRI solution including audio-visual projection system
Iii	The audio-video projection system should have the capability to project movies to the subject, and should be compatible with the 32 channel head coil, and should include all attachments that may be required for complete integration
Iv	The system should be integrated with stimulus presentation/ paradigm generator along with licensed software (like super lab, eprime, presentation, etc.) which is capable of presenting audio-visual, audio, video (multiple formats), etc.
V	The paradigm presentation should be synchronized with the scanner (for starting and ending along with measurements)

Vi	Integration and provision near the console for external trigger (of the sequence) for synchronizing MRI acquisition with paradigm
Vii	Post-processing work station / server with post-processing software and hardware associated, with licences for processing the BOLD data (with required licensed operating platform required like MATLAB, IDL, etc.)
Viii	The entire MRI hardware package should be from a single vendor for complete integrated solution. Please specify the vendor.
2	2D/3D Arterial Spin labeling
3	Perfusion imaging of brain with software for rBV, CBV etc analysis.
4	Susceptibility weighted imaging with phase information (i.e. SW1/SWIp/eSWAN 2.0)/Venous BOLD Imaging
5	Multi Direction DTI with minimum of 32 directions. (Complete package including DTI quantification and tractography software). Prospective motion correction enabled software preferred. Spinal tractography should also be possible.
6	T2 Relaxometry and volumetric analysis for Hippocampus
7	3D-T2 weighted Turbo Spin for volumetric acquisition reconstructed in any plane e.g. for lumbar spine and for nerve root analysis
8	High resolution imaging for inner ear. Please specify sequences eg. CISS or equivalent
9	The system should have facility for flow quantification of CSF aqueduct, spinal canal, vessel flow. Both retrospective and prospective gating should be possible.
10	Whole spine imaging with fusion software.
11	Real time Brain Wave, Pre Acquisition / post processing or Inline BOLD or BOLD Specialist.
12	Sequences such as Double Inversion recovery for “Plaque Imaging’ in Carotids to be provided.
13	MR ventriculography, cisternography, myelography
B.	**Cardiac applications:**
1	Advanced Cardiac Applications: ECG gating, Morphology/wall motion; Cine perfusion imaging; Myocardial viability imaging; Arrhythmia rejection techniques, Advanced Cardiac Ventricular Measurement Analysis; Cine Cardiac Tagging Techniques; Coronary artery techniques; real time interactive imaging, 2D/3D fast field echo/balanced/steady state techniques. Myocardial tagging, STIR for cardiac use, stress perfusion, 3D acquisition of whole heart in one breath hold. Complete cardiac evaluation package to be included on the workstation, besides the main console.
2.	T1, T2, T2* quantification tools for evaluation in real time with automated guidance
C.	**Musculoskeletal:**
1	High resolution imaging for cartilage and musculoskeletal imaging. Parametric MAP be available. dGEMERIC or equivalent, radial imaging for menisci and labrum
2	The system should have software package for evaluation of bone marrow.

3	Whole body screening imaging studies for metastasis.
4	Near metal implant imaging sequence like MAVRIC SL/ Advance WARP/OMAR XD
D.	**Hepatobiliary and abdominal system.**
1	High resolution Abdominal and Liver imaging in breath hold and free breathing modes with respiratory triggered volume acquisitions with navigation, liver iron quantification and liver fat quantification software, and spectroscopy
2	The system should have basic and advanced MRCP packages including free breathing and 3D techniques.
E.	**Vascular Imaging**
1	MR angio Imaging Should have 2D/3D TOF, 2D/3D Phase contrast (with and without gating and magnetization transfer saturation), black blood angiography for cerebral, pulmonary, abdominal and peripheral vessels and TONE, ceMRA, Facilities for high temporal and high resolution 4D angio imaging for time resolved vascular imaging with imaging frame of 40 frames/sec or more.
2	Bolus chasing with automatic and manual triggering from fluoroscopy mode to 3D acquisition mode with moving table facility for whole body application. Specify table movement. Inline subtraction should be available.
3	Non contrast enhanced peripheral angiography for arterial flow with Native/ Trance/inhance sequences.
4	Time resolved angiography with contrast kinetics like 4D TRACKS/ 4D BLISS/Ktblast / TRICKS /TWIST or equivalent
5	Perfusion study in organ systems like kidney, brain, heart etc. with T1 perfusion with permeability maps, and quantification of rCBF/ rCBV, MTT, etc, with color maps.
F	**Breast Imaging:**
i)	Advance package including diffusion, spectroscopy and perfusion with time intensity curve.
G	Diffusion Weighted Imaging.
i)	With at least b value of 7000 or more. Whole body diffusion weighted imaging with background suppression
H	Spectroscopy:

i)	The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, Multislice & Multi-angle 2D, 3D Spectroscopy and Chemical Shift imaging in 2D / 3D.The complete processing / Post processing software including color metabolite maps should be available on main console and the workstation and each of the **Three clients**. Complete prostate, breast, liver spectroscopy hardware and applications should be provided. Spectroscopy phantom for important short echo time neurometabolites, breast and prostate Water and lipid suppression in automated sequences.
I.	Prostate Imaging
i)	With Parametric cards (Ktrans, Kep, Ve, Vp)- quote.
J	Workflow improvement Techniques with capability of automatic planning and scanning, post processing for different body parts.
12	**MR elastography quoted as standard.**
13	TIM whole body suite. Any other hardware, software application packages with the tender to be quoted as standard.
14	Additional workstation:
i)	Client server architecture-server with 3 concurrent clients (Dexus, Intelligence Portal, Syngo.via, etc. or higher) capable of rendering **20000** images at peak performance.Workstation hardware should be industry standards, and should be the latest with the vendors, as per their globally launched product catalogue.
A	A Server workstation with preferably the same user interface as of main console is required with the availability of all necessary software including.
I	Basic post-processing software including MIP, MPR, surface reconstruction and volume rendering technique, Image fusion , 3D evaluation on all **three** concurrent clients.
Ii	Advanced post-processing offered applications including f MRI, perfusion quantification, advanced diffusion and DTI, advanced cardiac evaluation(EF, Calculation, Wall motions, analysis) including perfusion analysis, processing of 2D/3D CSI data, with color metabolite mapping, quantification of CSF flow data, vascular analysis package on at least two clients concurrently.
Iii	The system should support the DICOM print service class as a service class user (SCU)
Iv	Workstations support the DICOM query and Retrieve SCU
V	Workstation should retrieve MR spectroscopy images.
B	Desktops with i7 , 6th generation , Intel Processor , 8 GB DDR3 RAM, 500 GB SSD (Solid state Drives) 1 TB HDD 24" LED Medical Grade Monitor – Total **three** Clients Each of the client should enable printing in laser film camera and color printers. Total **three** client hardware and software to be provided.

C	The offered System is to be networked with the then existing "Department Network" including PACS. Appropriate anti-virus protection to be provided by the Vendor. The vendor should provide picture storage and archival system, to store and retrieve MR images
D	The system should have DICOM 3.0 compliant interface and enabled for networking connectivity to Linux/ Windows based servers/ clients with patient ID labeling and integration to generic hospital information system/ PACS
15	**Safety Features**
	The System should have following safety features
A	The magnet system should include an Emergency Ramp Down unit (ERDU) for fast reduction of the magnetic field with Ramp Down time below 3 minutes.
B	The magnet should have quench bands that contain the fringe fields to a specified value in the event of a magnet quench
C	Real time SAR calculation should be performed by software to ensure that RF power levels comply with regulatory guidelines and are displayed on each image
D	The system shall have manual override of the motor drive for quick removal of the patients from the magnet bore
E	Temperature sensor (built in) for magnet refrigeration efficiency must be provided
16	**Optional items** **Price not to be included for calculation of L1 of optional items 16 A(i) & (ii) & 16 (B) given below.**
	A. Multi Nuclear Spectroscopy: Facility of P31 Imaging & spectroscopy to be provided with i) Double tuned head coil for brain and ii) suitable surface coil for body imaging. B. Dedicated coil for pediatric and neonatal head and neck applications- 8 channels or more
17	**Accessories**
A	DICOM compatible Dry Chemistry laser camera (2 No.s) with integrated processor for filming from main console & workstation. The camera should be capable of printing on films of 14" x 17", 11" x 14" and 10" x 8" sizes in a resolution of 600 or more dpi. It should be possible to connect other imaging modalities to the printer. 2000 compatible films to be provided. Films to be provided after installation as and when required by the user. Main equipment (MRI) in the emergency block to be networked with cameras of CT and DRF camera in the emergency block
B	A color laser printer for printing high-resolution color-coded 3D images and protocols on plain paper in 1200 dpi resolution or more than 20 ppm or alternatively a dedicated color printer for medical images
C	The UPS system should be provided for complete MRI unit with Chiller and emergency lights with at least 30 minute back up, preferably **150 kVA or more** (specify kVA). An emergency door or hatch should be provided in RF cabin.

D	RF Cabin: The system should be supplied with the imported RF cabin with RF room shielding, RF Door screen, and interiors for the same should be carried out suitably.
E	Dual Head MRI-Compatible Pressure Injector, FDA approved (minimum 2000 Gauss line) with 1000 sets of syringes (Two syringes & connecting tubing per set). It should be compatible with 50 ml syringes for both saline and contrast.
F	Non-magnetic I/V stand
G	Water Chiller for Cold Head and Gradients
H	Two Non-ferromagnetic MR compatible patient transfer trolleys should be globally reputed make
I	Fire Fighting System, Detectors and 6 Fire Extinguishers (MR Compatible)
J	Hand held metal detectors - 2 Nos
K	Closed circuit CCD camera for patient observation.
L	Phantoms for image quality audits
M	Defibrillator Biphasic with ECG recording with Adult and Paediatric paddles
N	MR Compatible Infusion Pump (2000 Gauss Line)
O	Patient positioning accessories with hand held alarm & look-out mirror.
P	MR Compatible Transport Ventilator. (1000 Gauss Line)
Q	Three desktops with i7 , 6th generation Intel Processor , 8 GB DDR3 RAM, 500 GB SSD (Solid state Drives) 1 TB HDD 24” LED Medical Grade Monitor with three laser Printers of 600 dpi, UPS & Dictaphone
R	SPECIFICATION FOR MRI COMPATIBLE ANAESTHESIA MACHINE (1000 Gauss Line) & MRI COMPATIBLE MONITOR or (1000 Gauss Line)
	MRI COMPATIBLE ANAESTHESIA MACHINE SPECIFICATIONS: (Minimum 1000 Gauss Line)
A	Should be MRI compatible at 3T, antistatic, heavy frame & base with good quality castors with front brakes, with following features
I	Three gas model viz Oxygen, Nitrous oxide and Air.
Ii	Should be compact, ergonomic, easy to use and easy to maintain.
Iii	. Should have separate fresh gas outlet for use in open circuit.
Iv	. Machine should have flow meters for Oxygen, Nitrous oxide and air. Emergency Oxygen flush should be available. There should be facility to select oxygen-air or oxygen-nitrous oxide with the help of a separate switch or knob.

V	Dual flow sensing capability at inhalation and exhalation ports.
Vi	Should have paramagnetic/ galvanic cell oxygen sensors. In case of galvanic cell sensors, the firm should supply free sensors for the entire warranty period of 5 years. In case of Paramagnetic sensors, the firm shall ensure that there is no down time during repair of these sensors (if necessary) and provide a standby alternative.
Vii	Shall have back-up Oxygen Control which provides an independent fresh gas source and flow meter control in case of failure.
Viii	Pressure regulators shall be of modular design.
Ix	Should have oxygen fail safe device & an auxiliary built in oxygen flow meter.
X	Electronic or Mechanical Hypoxic Guard to ensure minimum 25% Oxygen across all O2–N2O mixtures and Oxygen Failure Warning.
	Vaporizers:
Xi	Facility of mounting minimum two Vaporizers, latest technology , key filler, selectatec type, tool free installation ,meaning any vaporizer of our choice can be mounted at will with interlocking facility.It should be preferably of the same make as that of machine.
Xii	Temperature ,pressure and flow compensated with high accuracy of delivered concentration of volatile anesthetic agent. Should be maintenance free.
Xiii	Two Vaporizers should be supplied (Desflurane ,Sevoflurane).
	Ventilators:
Xiv	The Machine should have an Integrated Anesthesia Ventilator System, facility to vary respiratory parameters and should be able to ventilate adult and Pediatric patients including infants.
Xv	Ventilator should have Controlled ,Manual, Spontaneous modes and provision for PEEP.
Xvi	Tidal volume (inspired and expired) respiratory rate ,1 :E ratio, minute volume Airway pressure & FiO2 should be continuously displayed.
Xvii	Should have Tidal volume and fresh gas compensation mechanism.
Xviii	Audio-visual alarms for high and low settings of Pressure, volume and disconnection should be present.
Xix	Tidal Volume (VT) 20-1500ml (Volume Control) ,Rate atleast 4-80 BPM.
Xx	Inspiratory / Expiratory ratio (I :E) 2:1 to 1:6 &Peak Flow -100 to 120
Xxi	Ventilator should have at least 30min rechargeable battery backup for ventilator.

Xxii	Machine should have an integrated breathing circuit with circle absorber of good quality, easy to clean, autoclavable , fewer parts to reduce leaks.
Xxiii	Machine should have mounting capability of One O2 and one N2O pin-indexed cylinder
Xxiv	Adult autoclavable (2 sets) breathing circuits & one paediatric circuit to be provided.
Xxv	The Machine should be equipped with AGSS.
B)	MRI COMPATIBLE MONITOR (Minimum 2000 Gauss Line)
	Specifications for MRI compatibility:
I	Monitor should be quipped with MRI shielding and set to Remote Communication Mode.
Ii	Should be MRI compatible (Safe will not be acceptable) at 1000 Gauss, 3.0 Tesla and 4W/Kg SAR.
Iii	System should include fiber–optic SPO2 finger sensor, MRI compatible ECG Patient Leads and Electrodes, NIBP cuffs, hoses and etCO2 sampling kit and temperature probe.
	General Specifications for Monitor:
I	The Monitor should have adult and neonatal application and should be user friendly.
Ii	It should be capable of monitoring ECG, non-invasive blood pressure ,oxygen saturation (SpO2) ,ETCO2 and temperature.
Iii	. It should have an internal battery which should last for 30-40 min.
Iv	It should be operational at wide temperature (10 degree Celsius – 40 degree Celsius) and humidity (20% to 90%).
V	It should have a facility of 24hours data storage of trended parameters and trend graph of 1,2,3,6,12 or 24 hours display format.
Vi	Should have a facility to deactivate all the alarms if necessary.
	ECG Monitoring: Essential Specification:
I	Available leads : I,II,III,V,AVR,AVL,AVF with facility for recording 12 lead ECG.
Ii	Should display one or all the selected leads at a time.
Iii	Accuracy of +- 5% of the rate.
Iv	Monitor Mode : Digital Signal Processing (DSP).

V	T-Wave suppression for high field MRI.
Vi	Heart rate measuring ranges 15-300 beats/min. Should have arrhythmia monitoring facility.
Vii	Should have user selectable alarms.
Viii	**Pulse Oximeter (SPO2):**
I	Should provide a digital value of the arterial oxygen saturation as well as diagnostic plethysmographic pulse waveform.
Ii	Measurement range : 0% to100%.
Iii	User Selectable upper and lower alarm limits.
Iv	Probes with finger and ear sensors for adult, paediatric and neonatal use.
V	Should be sensitive and function accurately even at low perfusion states of low blood pressure or hypothermic conditions.
	ETCO2 Monitoring:
I	Should have side stream Carbon di-oxide module and display both graphically and numerically.
Ii	Single beam ,non-dispersive infrared (NDIR) absorption, radiometric measurement, no moving parts.
Iii	. Initialization time less than 10 seconds, full specifications within 1-2minutes.
Iv	Carbon di-oxide range should be 0 to152 mm Hg barometric pressure supplied by module itself.
V	Should be able to detect breath rate in the range of 2-150 BPM.
Vi	Respiratory rate accuracy should be + 1 breath.
Vii	Barometric Pressure auto compensated from 400mm Hg to 850mm Hg.Operator selectable O2, N2O,He and Agent Compensation.
Viii	. No routine user calibration required. An offset calibration should run automatically when the ambient temperature is not stable.
Ix	Sampling line should have both nasal sampling line and extension sampling line.
X	Warm up time 10seconds.
	Temperature Monitoring:
I	Measuring range: 5 to 50 degree Celsius.
Ii	Accuracy + 0.1 degree Celsius.
Iii	User Selectable upper and lower limit of alarm.
Iv	Core and skin probes.
	Non-Invasive Blood Pressure (NIBP) monitoring:
I	Should automatically sense infant / adult cuffs and set appropriate inflation pressure and safety limits.
Ii	Operating Modes : Automatic ,Manual ,Stat.

Iii	Accessories ,NIBP cuff :
	1 Adult for thigh and arm.
	2 Paediatric
	3 Neonatal
18	**New Point Added : Ferromagnetic Detection System:** Latest Advance Ferromagnetic Detection for MRI Safety for Zone IV Protection like FERR ALERT HALO II Plus. The accessory should be USFDA approved.
19.	**Guarantee**
	Principals and Indian counterpart. The Principals should be responsible for any lacuna or deficit in service or supply.
I	All items in the supply order should be supplied during the time of installation, No exceptions will be allowed .Items under Research .Agreement should be finalized well in advance (after receipt of supply order). So that there is no delay in delivery of software or coil or any other accessories.
II	Software updates (where hardware upgrades are not required)like new pulse sequence, new application package etc. should be provided within one month after release worldwide (any country,viz. north America/ Europe/Germany etc).In case, the same is not provided in time, the parent company should undertake the responsibility to implement the same. This is to make sure that the machine stays updated with similar products for at least 10 years.
20	**WARRANTY PERIOD**
I	The entire equipment should have 60 months warranty from the date of handing over the fully functional unit. **This should include all coils, ALL the accessories and consumables and all third party items and turnkey projects provided to the hospital. The Helium Supply and cold head repairs (including replacement) should also be included in the warranty period.**
Ii	Even during the warranty period, the desired uptime of 98% of 365 days (24 hrs basis) will be ensured. In case the down time exceed the 2% limit, extension of the warranty period will be twice the excess downtime period
Iii	Any Liquid Helium due to quenching or due to any other causes during the warranty period shall be borne by the firm.
Iv	If any particular coil is not working resulting in non functioning of a particular clinical application for more than 3 days it will be considered as downtime .
21	**POST WARRANTY ANNUAL COMPREHENSIVE MAINTENANCE CONTRACT (CMC)**
I	The post –warranty (after 5 years) CMC rate quoted for next 5 years **should include maintenance of entire equipment, all coils, ALL the accessories and consumables and all third party items and turnkey projects provided to the hospital. The Helium Supply and cold head repairs including replacement should also be included in CMC.** This CMC should be quoted in Indian Rupees.
	The price of post warranty 5 years CMC shall be taken for price comparison.

Ii	The desired up-time during post-warranty CMC is 98% of 365 days (24 hr basis) along with the penalty clause that in case exceeds the 2 % limit, extension of the post warranty CMC period by the twice the excess down-time period.
Iii	The rate of post-warranty comprehensive CMC should be offered for at least five years by the bidder and be offered in Indian Rupees only.
Iv	Note any liquid helium due to quenching or due to any other causes during the CMC period shall be borne by the firm.
V	If a particular coil is not working resulting in non working of a particular clinical application for more than 3 days will be considered as downtime
Vi	All local items should be quoted in Indian Rupees. Other items should be quoted in US Dollars only, to have uniformity. The technical and financial bids should be separate. The model with 'the best and latest technical features' available with the vendor should be quoted in tender response with original printed vendor data sheets. The system should incorporate all the features as per the November 2015 RSNA standards/declaration.
Vii	All product catalogues in original.
Viii	When the vendor data sheet disagrees with the bid response, clarification should accompany in the form of letter/certificates from the principals in original.
Ix	System should be DICOM - 3MPPS & should be ready to integrate with any existing PACS/HIS System
X	List of all installations of the system in the country
Xi	The compliance statement must be filled strictly under headings given in the tender.
Xii	Each specification corroborated in the compliance statement must give the page number where it is listed in the original technical data sheet along with soft copy. The technical bid should clearly mention model number and make, detailed technical specifications, quantity of each component offered. the technical bid should be duly supported by original brochure/catalogue of the manufacturer and relevant parts proposed to be supplied highlighted. In compliance statement units of measurement used should be same as in the required technical specifications.
Xiii	There should be no discrepancy between specifications given in technical bid, brochure and compliance statement. In case of any such discrepancy, the technical bid will be disqualified.
Xiv	The quotation should clearly mention the accessories (including quantity) which are part of the main equipment and the price of which is included in the main equipment.
Xv	The equipment should be fully functional with the standard accessories
22	**Training :**
1	On-site training of all faculty members & radiographers.
2	On-site training for radiographers and other staff by an application expert for a period of at least 3 months

3	One on site service engineer and one on site application specialist to be available for a uninterrupted continuously break period of two months with the team of both engineers will maintain log book of training provided to technical staff & doctors
23	**Turnkey Works For 3 Tesla MRI Unit**
I	The layout plans (with dimensions) allocated uploaded. Air-conditioning of appropriate strength/capacity (tonnage) in the area as required shall be done. Additional standby split air conditioner(s) of appropriate strength/capacity (tonnage) to be fixed in the main equipment rooms.
Ii	Civil work: In the civil works Modifications/Renovations in the existing rooms by the supplier/vendor as shown in the layout plan after approval by Purchaser/HSCC shall be executed as per approved makes specified.
Iii	The walls of MRI Complex should be finished acrylic/plastic emulsion (approved makes) and should be finished with vitrified tiles (approved makes) up to five feet height from the floor. Colour as approved by Purchaser/HSCC shall be provided.
Iv	The flooring in the MRI complex should be as per regulations. Flooring in all rooms shall be of vitrified tiles of 80 x 80cm size or other close appropriate size of reputed makes (approved makes). Colour as approved by Purchaser/HSCC shall be provided.
V	Whole area of MRI Complex as in the layout plan shall be finished with fire resistant false ceiling material (approved makes). MRI Room PVC roll flooring with mineral fiber panel false ceiling and Aluminium suspension.
Vi	All the doors should be provided with necessary fittings with hydraulic type door closures (approved makes) and with Mortised locks (approved makes).
Vii	Electrical work: The firm is required to specify load requirement i.e. required for the unit, the air conditioning, room lighting and accessories, if any. The electrical works should be as per approved makes mentioned. The electrical works should have minimum two separate Earthing with copper plate is to be provided for the each equipment and air-conditioning equipment as per equipment requirements. The use of earth leakage circuit breaker will be as required.
Viii	A distribution panel of appropriate capacity is to be provided by hospital. The load shall also be provided by the hospital. From the substation of the hospital to the distribution panel, cable of appropriate size shall be provided & fixed by the hospital. Vendor shall do cabling from distribution panel up to the equipment.
Ix	The switch gears (MCBs / ACBs/ MCCBs), L.T. distribution board for MCBs etc. (approved makes).

X	Electrical wires should be of copper of different capacity as per the load (approved makes).
Xi	For Telephone wiring cables (approved makes). Telephones to be provided in all rooms with EPABX system having control in office.
Xii	Modular range Switches / Sockets of approved makes should be provided and fixed as per requirement.
Xiii	LED lights of suitable illumination should be provided of Phillips/GE/ Crompton/Syska make.
Xiv	Light dimmers (down lighters) should also be fixed in the equipment room.
24	**Air conditioning:**
I	**Existing as** :Split Air conditioners of reputed make (approved makes) to be provided by the vendor in whole complex as per requirements (to maintain appropriate temperature in the main equipment room & other rooms) and as per regulations of AERB. **Amended as** : Ductable Air Conditioners in Main equipment room and Split Air/Ductable Air conditioners of reputed make (approved makes) to be provided by the vendor in whole complex as per requirements (to maintain appropriate temperature in the main equipment room & other rooms) and as per regulations of AERB.
Ii	**Existing As :** Standby additional split air conditioners of appropriate strength/capacity (tonnage) to be fixed in the main equipment room. **Amended as** : Standby additional ductable /split air conditioners of appropriate strength/capacity (tonnage) to be fixed in the main equipment room.
Iii	Hygrometer Nos.1 to be provided.
Iv	In-built or External De Humidifier in Equipment, Console and Examination rooms to be provided as per room layout.
25	**Fire Protection**
I	Non water based fire protection is to be integrated as per requirement. Fire extinguishers of appropriate types (approved makes) should be fixed in different rooms as per requirement. Heat detectors/hooters/photoelectric/smoke detectors (approved makes) shall be provided in all the rooms and corridors as per requirements. In case the expiry date of fire extinguishers is before the completion of 5 years comprehensive warranty period, extra set(s) of fire extinguishers will be supplied by the vendor till the completion of the 5 years comprehensive warranty period. Besides, any works required as per statutory/Delhi Fire Services norms shall be executed by the vendor.
Ii	The vendor to also install the following:
Iii	Audio visual Music systems for patient waiting areas.
Iv	Adequate Pest, insect and rodent control system to be provided and installed to ensure that area remains insect, pest and rodent free.
V	Music and Public Address system for calling/ informing the patients in the waiting areas.

Vi	Furniture:-
a	Following furniture (Godrej/Debono/Delite) will be provided:
B	Chairs with castors and armrests 2 nos.
C	Coil Rack for MRI 1 No.
D	Medicine Trolley 1 No.
E	Ultrasonic pest repellent equipment 1 no.
F	Insect killer equipment 1no.
G	Steel Storage Almirah 2 nos.
H	Overhead Storage(1.2x0.4x.6m) for CD storage 1 no.
In case any item missed out inadvertently, vendor shall provide the same. The price quoted by the bidders shall include all costs required for supply, installation, testing and commissioning of the equipment on turnkey basis and as per bid document.	

Item No. 2 FLAT PANEL RADIOGRAPHY SYSTEM (1 No.)

Date: 03.04.2018

REVISED SPECIFICATIONS AFTER PRE BID MEETING FOR DIGITAL FLAT PANEL RADIOGRAPHY SYSTEM (1 No.) FOR NEW EMERGENCY BLOCK.

A. General Specifications

1. Latest state of the art Fully digital radiography system. Mention the year of introduction of the quoted model in the International market.

2 (a).The quoted model (and not the individual components) should be US FDA and CE approved.

2(b). In the system 2 out of 3 major components (Tube, detector, and generator) should be manufactured by the quoting vendor themselves.

3 (a). Mention the manufacturer of the third component and provide the MoU with the other party for the same.

3(b). Vendor should have experience of supplying and maintaining similar DR equipment in the last 5 years in major government hospitals/reputed NABH accredited hospitals. (Certificates of supply and satisfactory performance to be enclosed Other certificates are not acceptable).

4. <u>The quoted model should have AERB type approval certificate. In case the model is being imported for the first time NOC from AERB must be available & AERB type approval certificate must be obtained within 8 weeks of installation by the vendor who receives the order.(Vendor must give undertaking for obtaining AERB type approval certificates with tender quotation.</u>

5 (a). Fully digital radiography system with two Flat panel detectors with Cesium Iodide Scintillator and with Automatic Exposure control (AEC) capable of performing exposure in vertical, horizontal and oblique positions to perform all skeletal body (Upright and Lying down) radiographs.

5(b). The unit should be completely integrated along with auto features in quality control & performance, AEC, APR, fully automated positioning system with autotracking for horizontal table and for vertical stand studies.

B) Detailed Specification of X-Ray Flat Panel Detectors (Quote the latest model of flat panel detectors)

Note: **<u>The Technical Specifications should be supported by compliance statement with page number of original Technical Data Sheet and any additional information from the manufacturer.</u>**

1 Use of matrix flat panel imager (Radiography).
2 Name of the Detector model and manufacturer to be provided.
3 Assembling should be Monolithic panel/tiles.
4 Active Matrix Flat Panel detectors should be based on Indirect Conversion process
5 Scintillate material used for flat panel detector should be Thallium doped Cesium iodide (Csi:TI).
6. Semi Conductor material (Photodiode) should be Amorphous Silicon.
7. Charge Read Out should be Thin Film Transistor Array (TFT Array).
8. Detector Size should be 40 cm x 40 cm or more (more will be preferred).
9. Array Size be 2000x2000 pixel or more.
10. Pixel Pitch should be 0.2 mm or less.
11 Image depth should be 14 Bits or more.
12. Detector Quantum Efficiency (DQE) should be at least 65%
13. Tube assembly movements to be automatically synchronized with both the horizontal and vertical detectors movement.
14. **Two Digital flat panel detector systems with detector <u>fixed & integrated</u> into the Bucky table as well as wall stand.**
Due to extensive workload a sturdy system is necessary, therefore wireless <u>or tethered detector is not acceptable</u>. Wireless detector is also not acceptable due to risk of theft and damage.
15. **Deleted**
16. System warm up time should be mentioned.

C) Specification of Acquisition Work station:

17. Monochrome LCD monitor with protect panel from dust and scratches.
18. Manufacturers name and model to be provided.
19. Viewing angles **(Horizontal & Vertical)**: 170 Deg. or more.
20. Size of Monitor (diagonal) 19" or more.
21. **Mouse control or touch screen display.**
22. Mention all the standard accessories to be supplied with the monitor.
23. **Hard disc storage: 4000 or more images**.
24. Post Acquisition, Image processing and Display: Mention the time.
25. The system should have auto protocol select.

D) X-Ray Table Specification :

26. **Four way motor driven floating horizontal table top of carbon fibre or its equivalent, compact bucky table with digital flat panel detector should be provided.**
27. Mention the range of vertical, horizontal and longitudinal movements of the table.
28. Removable grid for SID of 100 cms for horizontal table applications.
29. Maximum patient weight - 200 kgs or more.
30. Table Top length: 200 cm or more.
31. **Foot switches for – adjusting height, longitudinal movement side to side movements and for locking.**
32. Automatic detector alignment should be possible on the table.

E) Vertical Stand

33. Vertical movement should be motorized..
34. The vertical movement to be servo coupled to the movement of the X-Ray tube (simultaneous movements).
35. **Provide two removable grids with Grid Ratio of 12:1 or more.**
36. **Motorized Tilting vertical detector facility should be available from (-20) to (+90) degrees)**.
37. Maximum height from the floor to the centre of detector should be 172 cm or more.

F) Ceiling Mounted X-Ray Tube

38. X-Ray tube suspended on a telescopic column.
39. The movement of X-Ray tube should be motorized and should be possible in all directions: Specify the travel range and angulations in degrees.
40. It should have capability of manual override.
41. **Provision for control panel on patient side.**
    It should have autopositioning and autotracking function.

G. **X-Ray Generator**

42 a)Invertors Type Constant Potential high Voltage Generator (High Frequency X-Ray Generator) ,Microprocessor controlled with constant output and low ripple frequency.

b) Power: 80 KW or more.

c) 1000mA at 80kv or more according to IEC standard.

d) Automatic exposure control with 3 or 4 chambers.

e) overloading protection should be available.

f)minimum exposure time should be 1 milli sec or less.

H) X-Ray Tube

43) **Mention the make of the X-Ray tube.**

44) **A dual focus Rotating anode with high speed of 8000 rpm or more, compatible with the provided generator.**

Focal spots of following sizes-

Large-1.2mm or less.

Small 0.6 mm or less.

45. Anode Heat storage capacity 300 KHU or more. Tube protection against overload should be available. Please specify tube rotation at vertical and horizontal axes.

46. **Filter and collimator**

a) It should have Inherent filtration.

b) Mention details of added filtration.

c) Square collimation –automatic type

d) Display of collimation.

e) Rotation of +/_ 45 degrees or more.

47.Advanced Clinical Application Facility : Auto Image stitching / image pasting soft ware and necessary hardware on vertical and horizontal bucky, for complete spinal column, extra long leg image **& other long body parts, should be a standard feature in the machine.**

48. Two additional Workstations for Image viewing, **Post Processing, reporting and documentation : Qty (2 Nos.)**

- High Speed processor based workstation 2.4 GHz or higher processing speed with post processing capability. The workstation should have 8 GB RAM or more. It should have its independent memory & hard disk of at least 1 TB. It should

have a high resolution medical grade 2 MP monitor of size 21'' or more capable of simultaneously viewing or performing post processing functions. Both Workstations should be configurable with Digital X- Ray or Digital fluoroscopy System & all other Imaging equipments in New Emergency block of any make. Latest operating system should be available.

49. Image Annotation.and addition of Anatomical markers.
50. Demographic Correction.
51. Window and Level adjustment.
52. Electronic Collimation.
53. Magnification, Image Rotation.
54. Application for comparison with standard (Look up) tables should be available. Should have CD and DVD writing facilities.
It should support storage of images on CD or DVD.
System should be DICOM 3 or higher version. It should have features to connectivity to any network in DICOM format.
Easy integration and networking should be possible with any other existing future networking including other modalities, HIS, RIS and PACS at no extra cost.

Accessories

55. Dry chemistry camera of 500 DPI or more should print at least 3 sizes of films at one time i.e. 10x8, 10x12, 10x14, 14x14, 14x17 inches. 500 films of 14x17 size should be supplied along with camera. **It should be capable of being networked with all modalities of all other Imaging equipments in New Emergency block of any make.**
56. Compression belt (Pediatric and adult) (2 each).
57. Patient hand grip.
58. Patient support bar for vertical stand to be provided.
59. Lead Glass 120 cm x 100 cm to be provided.
60. **Provide Voltage stabilizer for the entire system including both workstation.**
61. UPS of appropriate rating along with batteries (with half hour back up) for the acquisition workstation of reputed brand to be provided.
62. **Radiation protection equipment:**
a. light weight lead aprons -5,
b. gonad shields-4 (2 Adult, 2 Pediatric)
c. lead goggles-4
d. thyroid shield -4.
63. PA system for calling patient.
64. **lead aprons hanging unit –for 5 aprons.**
65.**Necessary furniture like table for operating console ,4 standard and two revolving office chairs, examination stool and foot step.**

Other Terms and Conditions:-

66. Some specification which are not qualified, the buyer reserves the right to evaluate the specification based on the details given by the firm.
67. The equipment should be under comprehensive warranty for 5 years for all items for which order is placed including turnkey works from the date of successful installation and handing over with an uptime warranty of 98% and extension of warranty period by double the down time in excess of 2%.
68. Please quote Comprehensive maintenance Contract (Including X-Ray Tube and detector) and all other items for which order is placed including turnkey works for next 5 years after successful completion of warranty with 98%uptime and extension of CMC period by double the down time in excess of 2%.

69. All software up-gradation will be provided free of cost to the institute as and when available

70. Operating manual & service manual along with schematic diagram to be provided

71. There will be an agreement between the buyer and seller for comprehensive maintenance contract at the time of finalization of purchase of equipment.
72. Only principal or their authorized principal agents should participate in the tender. Principal manufacturer will have to give an undertaking of availability of spares as well maintenance of services for 10 years in case there is any change of local agent.
73. Company should provide adequate application training of at least one month or as long as required to the Radiologists & Technical staff.
74. All the civil, Electrical alternation / fixation pertaining to the installation of the machine will be the responsibility of the firm.

Accreditation and Quality Certification

75. The quoted model should be AERB type approved and CE & US FDA certified. (as detailed in A of the Technical specification)

76. The Bidder must have been in business of Flat Panel Detector equipment for at least last five years with .supply/installation in major government hospitals. (enclose copies of supply order and satisfactory performance reports)

For Digital Flat Panel Radiography System

77. The new latest,amended layout plans (with dimensions) allocated has already been uploaded earlier. Air-conditioning of appropriate strength/capacity (tonnage) in the area as required shall be done. Additional standby split air conditioner(s) of appropriate strength/capacity (tonnage) to be fixed in the main equipment rooms.

78. Civil work: In the civil works Modifications/Renovations in the existing rooms by the supplier/vendor as shown in the layout plan after approval by the **Atomic Energy Regulatory Board (AERB)** shall be executed as per approved makes specified in Amendment no. XX dated 04.2.2016.

The walls of whole Complex should be finished acrylic/plastic emulsion (for approved makes refer Amendment no. XX dated 04.2.2016) and should be finished with vitrified tiles (for approved makes refer Amendment no. XX dated 04.2.2016) up to five feet height from the floor. Colour as approved by Purchaser/HSCC shall be provided.

The flooring in the Fluoroscopy/DR complex should be as per **AERB regulations**. Flooring in all rooms shall be of vitrified tiles of 80 x 80cm size or other close appropriate size of reputed makes (for approved makes refer Amendment no. XX dated 04.2.2016). Colour as approved by Purchaser/HSCC shall be provided.

Whole area of Complex as in the layout plan approved by the **AERB** shall be finished with fire resistant false ceiling material (for approved makes refer Amendment no. XX dated 04.2.2016).

All the doors should be provided with necessary fittings with hydraulic type door closures (for approved makes refer Amendment no. XX dated 04.2.2016) and with Mortised locks (for approved makes refer Amendment no. XX dated 04.2.2016).

Main door of the complex in the corridor shall be in glazed aluminium powder coated with adequate thickness of glass with etching work wherever required. Colour of aluminium powder coating shall be got approved from Purchaser/HSCC before execution of works.

Lead Glass window of adequate size will be fixed as per **AERB guidelines** in the console room. Proper signage both external and internal to be done.

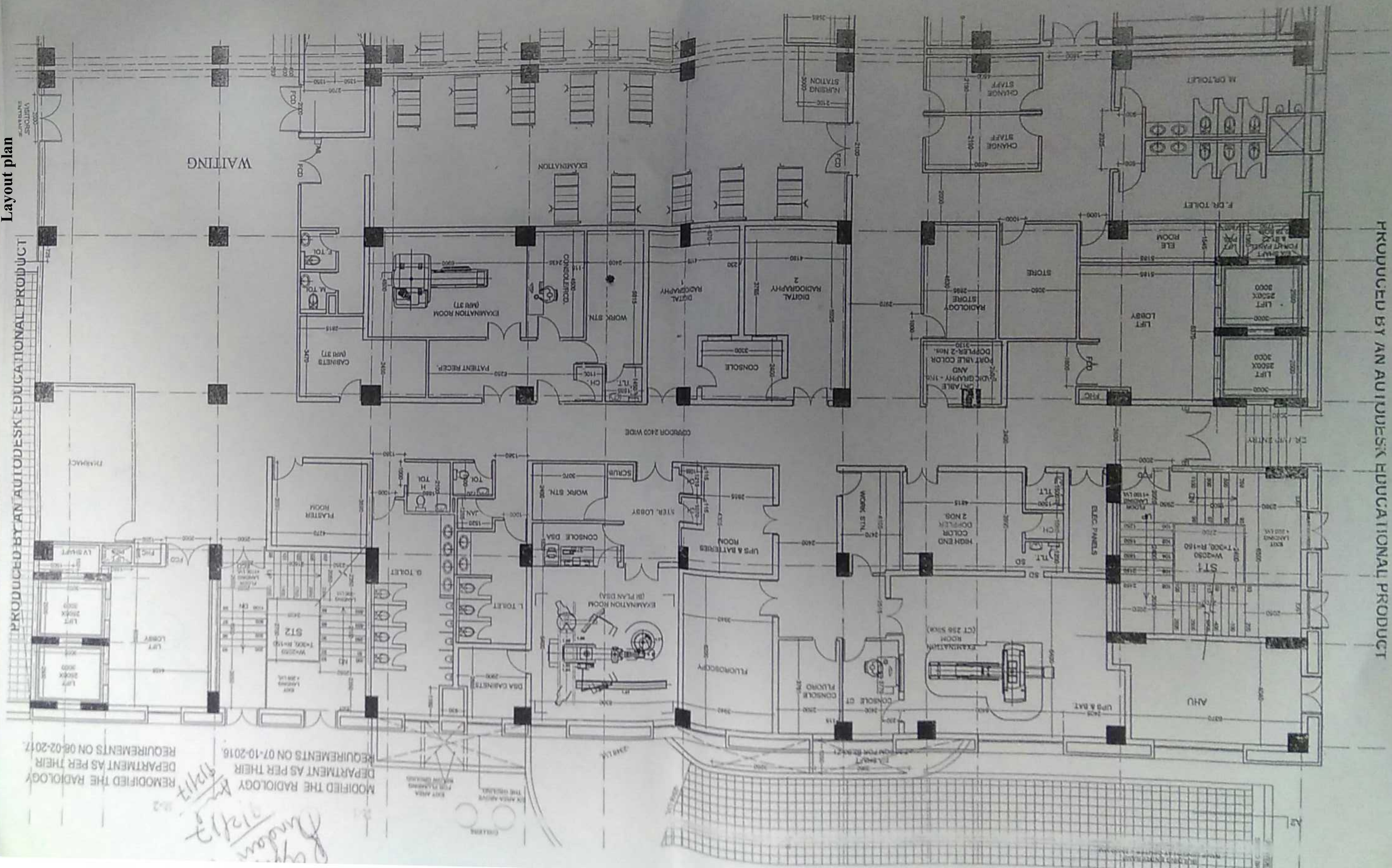
79. Electrical work: The firm is required to specify load requirement i.e. required for the unit, the air conditioning, room lighting and accessories, if any. The electrical works should be as per approved makes mentioned in Amendment no. XX dated 04.2.2016. The electrical works should have minimum two separate earthing with copper plate to be provided for the each equipment and air-conditioning equipment as per equipment requirements. The use of earth leakage circuit breaker will be as required.

All other terms and conditions of the tender enquiry document shall remain unchanged.

Prospective bidders are advised to regularly visit HSCC website /CPP Website for corrigendum/amendments etc. if any, as these will be notified on these portals only. No separate advertisement will published in the news papers in this regards.

Medical Superintendent
VMMC & SAFDARJUNG Hospital

Layout plan



MODIFIED THE RADIOLOGY DEPARTMENT AS PER THEIR REQUIREMENTS ON 07-10-2016.

REMODIFIED THE RADIOLOGY DEPARTMENT AS PER THEIR REQUIREMENTS ON 08-02-2017.