

THE UNITED REPUBLIC OF TANZANIA



**MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT
GENDER ELDERY AND CHILDREN**

CONCEPT NOTE FOR THE ESTABLISHMENT
OF
THE NATIONAL MEDICAL EQUIPMENT CALIBRATION AND
TRAINING CENTER

HEALTH CARE TECHNICAL SERVICES

December, 2021

Dodoma

1.0 Introduction

During the last decade, Tanzania made major progress in the health sector which saw tremendous increase on investment in the health care services. During the same period the number of health facilities nearly doubled with the aim of realization of government vision and target to bring closer to the population the health care services. This expansion of infrastructure goes together with the increase on investment on medical equipment in the facilities both primary and national level referral services whereby government procure, install and put to use medical equipment for diagnostic, curative and rehabilitative services. Investment on medical equipment creates demands for biomedical engineering services to meet demands for services such as planned preventive maintenance and corrective maintenance.

The government of Tanzania through the Health Sector Strategic Plan Five (HSSP V) promised to put in place plans and mechanisms which will institutionalize preventive maintenance to ensure well-maintained and functioning infrastructure and equipment. This target is very crucial for attaining optimal use and benefit of medical equipment. The preventive maintenance includes as well calibration services.

Calibration is the basis of quality control and thus vital in complying to the numerous standards regulating various industries. The processes of calibration provide the means to ensure that instruments maintain their accuracy, by configuring an instrument to provide a specific result.

This generally involves using the instrument to test samples of one or more known values and comparing them to a reference device.

This concept note provide narration on establishment of the national center for calibration of medical equipment and training on calibration standards.

2.0 Rationale for Establishing the Calibration Center

The need for realizing optimal benefit of the government investment on medical equipment and vision of the same government to provide quality services to Tanzanians especially the *Mwananchi or Common Man* create demand for the establishment of the National Calibration and Training Center.

The proposed National Centre for Medical Equipment Maintenance, Calibration and Training shall operate to facilitate high level maintenance intervention, provide equipment calibration

services and conduct training to maintenance personnel and equipment users in order to improve medical equipment management and quality of health services in Tanzania at large.

3.0 Objective of the Center

Calibration of technology will be planned as a part of planned preventive and corrective maintenance. HCTS section in the MOHCDGEC will assist in the development of calibration procedure and training activities.

Biomedical engineers/technicians will be trained before undertaking calibration. In order to strengthen quality performance of medical equipment calibration are deemed to be approved by National Center for Medical Equipment Maintenance, Calibration and Training (NCMECT) or any delegated authority as may deemed so fit to meet the Golden standards. (draft national Policy Guidelines).

4.0 Process of establishment

The center will be established by the MoHCDGEC with support from Swiss Embassy through the SwissTPH/HPSS project. The establishment of calibration center will be stepwise, starting with calibrations and training of basic and selected advanced parameters. In the foreseen future it is expected to be upgraded to more advanced parameters depending on the human, financial and space resources availability.

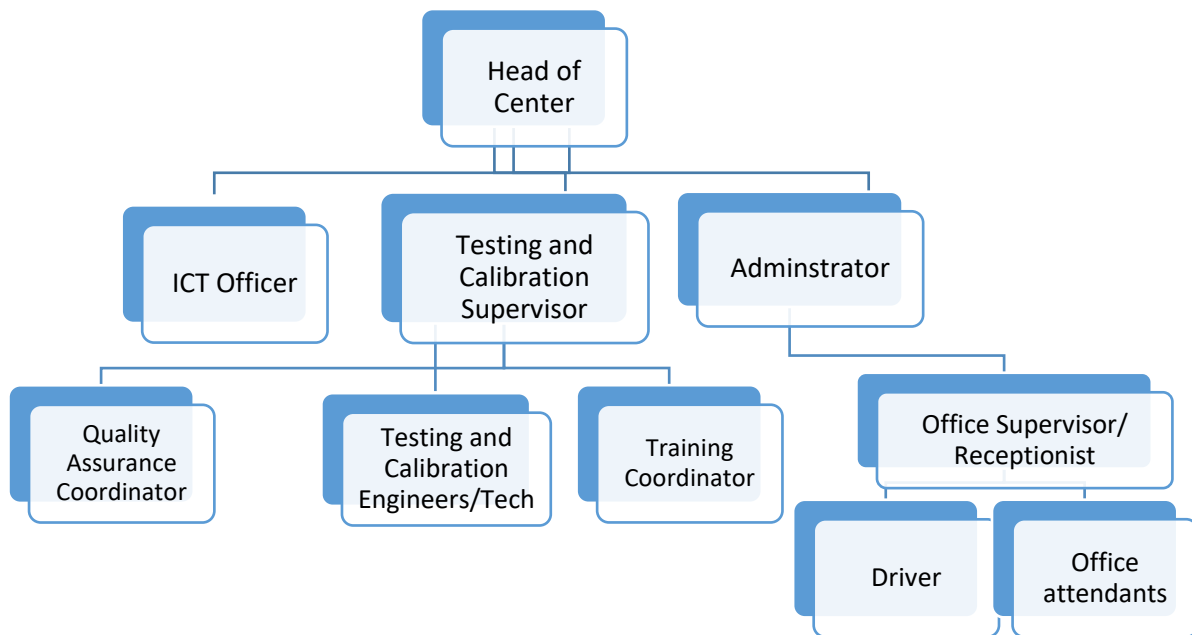
In the future with a purpose of meeting the international standards, MoHCDGEC will facilitate the process to acquire the internationally acceptable standard, such as ISO/IEC17025 issued by International Organization for Standardization (ISO) and/or the International Electro Technical Commission (IEC).

5.0 Location

The center will be establishment in Dodoma City within the Mirembe Mental Health Hospital. The hospital is located at the central of the Tanzania, which make it accessible by all regions easily hence the services for calibration and training to be offered.

6.0 Organogram

The proposed organogram of center suggests that the center will be headed by the Head of the center, who will report to the Head of Health Care Technical Services at the Ministry of Health, Community Development, Gender Elderly and Children. At operational level, there will be sub-head for testing and calibration, sub-head for quality assurance and sub-head for administration as well as Information and Communication Technology.



6.1 Positions, staffing level, Roles & responsibility and Qualification

s/n	Position	QTY	Roles and Responsibilities	Qualification
1	Head of the Center	1	Responsible for customer relationship management through the effective use of technical knowledge to service and maintain the site Supervise and manage day-to-day operations Provide strategic steering of the center. Prepare work plan, activity plan and budget. Support training development Supervise training activities	BSc/MSc Biomedical Engineering, with certified training on calibration.
2	Testing and Calibration Supervisor	1	Manages the calibration workshops. Supervise work flow of the different calibration workshops at the center occasionally perform final inspection of work completed by other technicians. Creates calibration data sheets accurately and efficiently based upon instrument specifications and approved calibration procedures.	BSc/Diploma on Biomedical Engineering with certificated training on calibration

			Resolve calibration/maintenance issues, support non-conformance investigations, improve equipment reliability, review procedures, and minimize equipment downtime.	
3	ICT Officer	1	<p>Advise the Head of the Center on ICT equipment and services</p> <p>Management of ICT equipment and systems</p> <p>Management of daily required updates /upgrades of all Program's ICT systems and networks ie. computer hardware, computer programs, network systems, websites and systems.</p> <p>Provide IT technical support, administration and maintenance to Center staff.</p> <p>Manage the center electronic data bases.</p> <p>Capacity building to center staff and health care workers at all levels on ICT usage.</p>	BSc Information Technology, Computer Science or related field
4	Administrator	1	<p>Serves as the administrator for the national calibration and training center</p> <p>Assists in ensuring center work plan and budget are prepared timely and are approved.</p> <p>Manages all matters related to human resource, assets and finance of the center.</p> <p>Ensure preparation and timely completion and submission of program implementation reports on weekly, quarterly, semi-annual and annual basis.</p> <p>Ensure adequate office supplies, equipment and maintain office equipment's inventory.</p> <p>Provide logistical support to the program and ensure payments of Bills are done on time (water, electricity, telephone, internet etc.)</p> <p>Organizing meetings and workshops.</p> <p>Maintain administrative files for the office, keeping consistent and in an orderly manner.</p>	BA Health System Management
5	Quality Assurance Coordinator	1	<p>Ensured quality assurance using established procedures.</p> <p>Adheres to quality management system policies and procedures in performance of work</p>	BSc/Diploma on Biomedical Engineering and training on calibration

			<p>Make sure that instruments, gauges and testing devices are calibrated correctly and give accurate readings.</p> <p>Conduct routine, period and had hoc quality assurance assessment</p>	
6	Testing and calibration Engineers/Technicians	4	<p>responsible for the inspection, calibration, testing, maintenance and documentation.</p> <p>Performs basic repairs and Preventative maintenance.</p> <p>Performs work at the customer location as well as in the service center.</p> <p>Completes all documentation supporting customer requirements, reporting, ISO and other quality systems</p>	BSc/Diploma on Biomedical Engineering and training on calibration
7	Training Coordinator	1	<p>Coordinate training activities for the maintenance and calibration.</p> <p>Take lead in development of training materials, guidelines, manuals and Information Education and Communication (IEC) materials for calibration services.</p> <p>Assist in setting up the advocacy strategies at all levels to promote calibration services.</p> <p>Liaise with the Regional and District Health Management Teams to establish support mechanisms/network for calibration work at the district, regional and zonal maintenance workshops</p>	BSc/Diploma on Biomedical Engineering and training on calibration or Degree in health-related disciplines.
8	Office Supervisor/Receptionist	1	<p>Front desk management both for visitors and handling telephone communications.</p> <p>Prepare and manage correspondence, reports and documents.</p> <p>Maintain updated address and phone lists of ministry officials, health facilities and stake holders.</p> <p>Organize and coordinate center meetings, meetings for visiting missions/delegations, conference and travel arrangements.</p> <p>Implement and maintain office systems.</p> <p>Filing and safe keeping of center documentations and database to ensure timely and correct flow of information to all relevant stakeholder</p> <p>Maintain a proper record of all</p>	Cert/Diploma Secretarial

			incoming and outgoing documents to and from the center which includes management of file, letter and memo scroll, hardcopy and softcopy storage of all documents etc;	
9	Drivers	1	Transporting center's officials during the execution of the center's activities Carrying out vehicle maintenance checks. Delivering packages to and for center's officials in relation to center official activities in a timely manner. Arranging for vehicle repairs when necessary. Maintains log book showing the details of the movement of the vehicle in order to monitor the efficient and effective utilization of the vehicle. Carry out any other instruction/duties job related as may be assigned from time.	Form four with Certificate of Passenger Service Vehicles (PSV) driver training from recognized training institution.
10	Office Attendant/records Management	2	Moving files, letters and messages from offices; Sending and collecting mails from the post office; Assisting secretaries in photocopying documents and serving soft drinks to visitors and officials in meetings. Keeping office equipment and reporting for any damage to seniors. Performing any other duties related to his/her work as assigned by his/her superior.	Cert office management/registry

PS: Roles and Responsibility listed above are initial draft still to be discussed and approved by the management of respective departments in the MoHCDGEC.

7.0 Functions of the Center

The center will play two main roles which are;

1. Training of Biomedical Engineers and Technicians from hospitals on how to perform calibration of medical equipment.
2. Provide calibration services to medical equipment and to test and maintain calibration and medical equipment.

Apart from offering the services at its premise, the center will provide on-site calibration services for large or Medical fixed equipment or part of an installation which cannot be moved or equipment sensitive to transportation which may cause damage and deterioration.

The center will specifically provide the following calibration services

S/N	Types of Calibration	Parameters
1	Mechanical Calibration	This service will ensure that the mechanical instruments are calibrated to meet the standards which may be caused either by drift as a result of repeated use, mechanical stress, and exposure to fluctuating air conditions etc., This type of calibration is highly to overcome the error induced in the equipment's. Mass, volume, density, force, torque, dimension, angle, flatness, and vibration are the major properties which will be calibrated.
2	Pressure Calibration	Pressure calibration will be offered to bring the equipment to their critical operation performance on monitoring process performance and safety, with gas and hydraulic pressure being the most common measurements.
3	Temperature Calibration	This type of calibration will be carried out to ensure that all temperature dependant/operating and processing instruments are functioning as per their required input and output conditions. Tests to various sensors will be performed, including RTD sensor, Thermocouple and Thermistors.
4	Electrical Calibration	This service will ensure that any instrument that measures or tests electrical properties such as voltage, current, resistance, inductance, capacitance, time, and frequency is operating properly.
5	Radiation Calibration	This calibration part will be done to verify radiation energy power, exposure time and dosage deliveries are obtained and administered properly. Radiation parameters like Peak Kilovolt and Exposure time, Dosimetry, Radiofrequency and EMF will be monitored.

8.0 Requirement for Establishment of the Center

Establishment of the National Medical Equipment Calibration and Training Center will require investment for building infrastructure, human resources and medical equipment. The requirement is further elaborated hereunder;

8.1 Investment on equipment is very crucial, a list of equipment needed for calibration and training have been prepared. The current list comprises of 113 types of equipment

which some will be needed in a set of 1, other in set of 2 and 3, therefore a total 194 equipment are required. Annex 1 detailed the list of equipment required for performing different test and calibration parameters at the Calibration center.

8.2 Building infrastructure has been realised, buildings have been constructed to meet the defined business processes for the center. Structure design for the calibration center is annexed, see annex 2.

8.3 On the side of human resource, structure with staffing level has been established and minimum staffing has been provided for its operations.

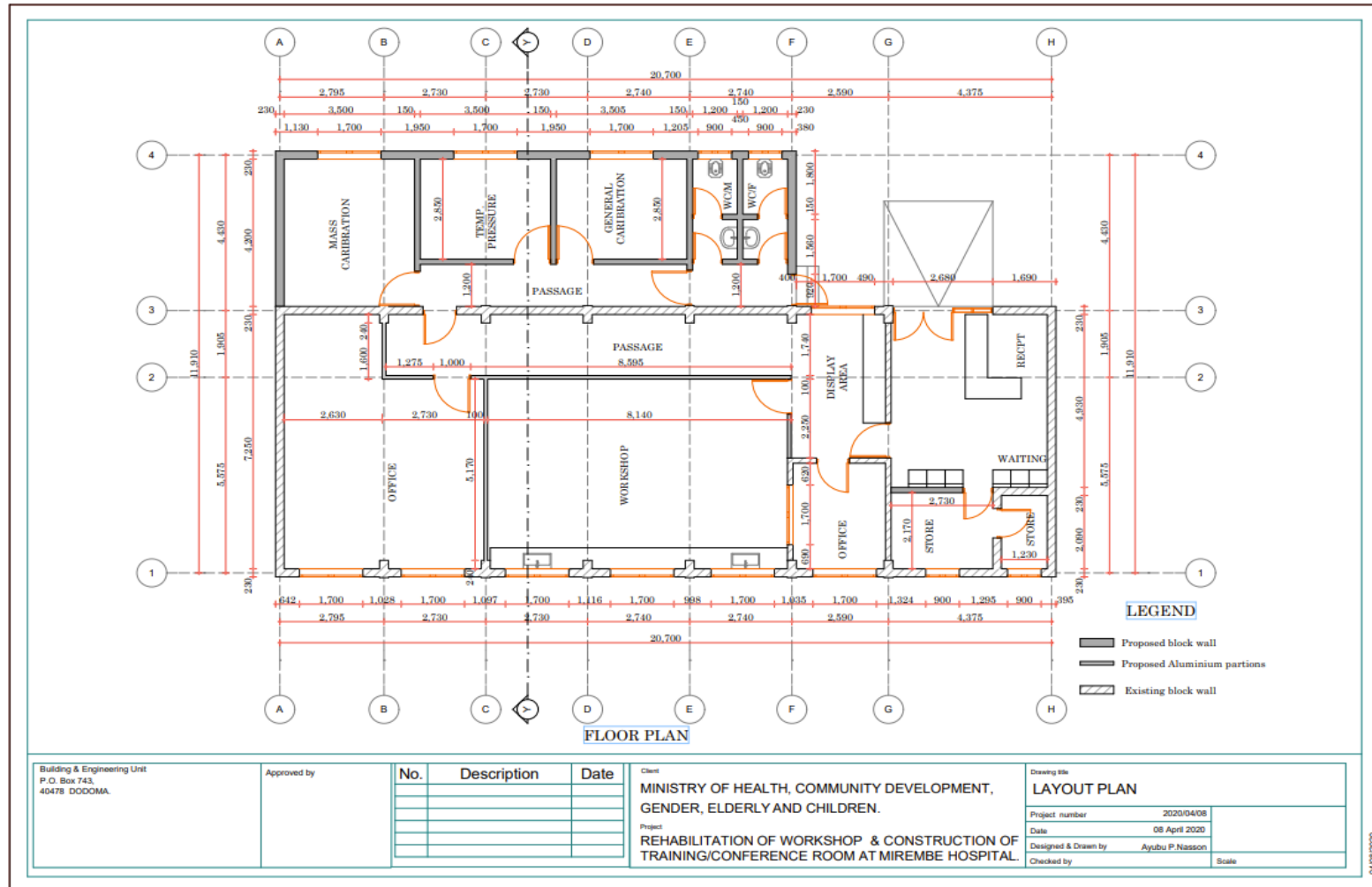
Annex 1: List of Equipment for the Calibration Center

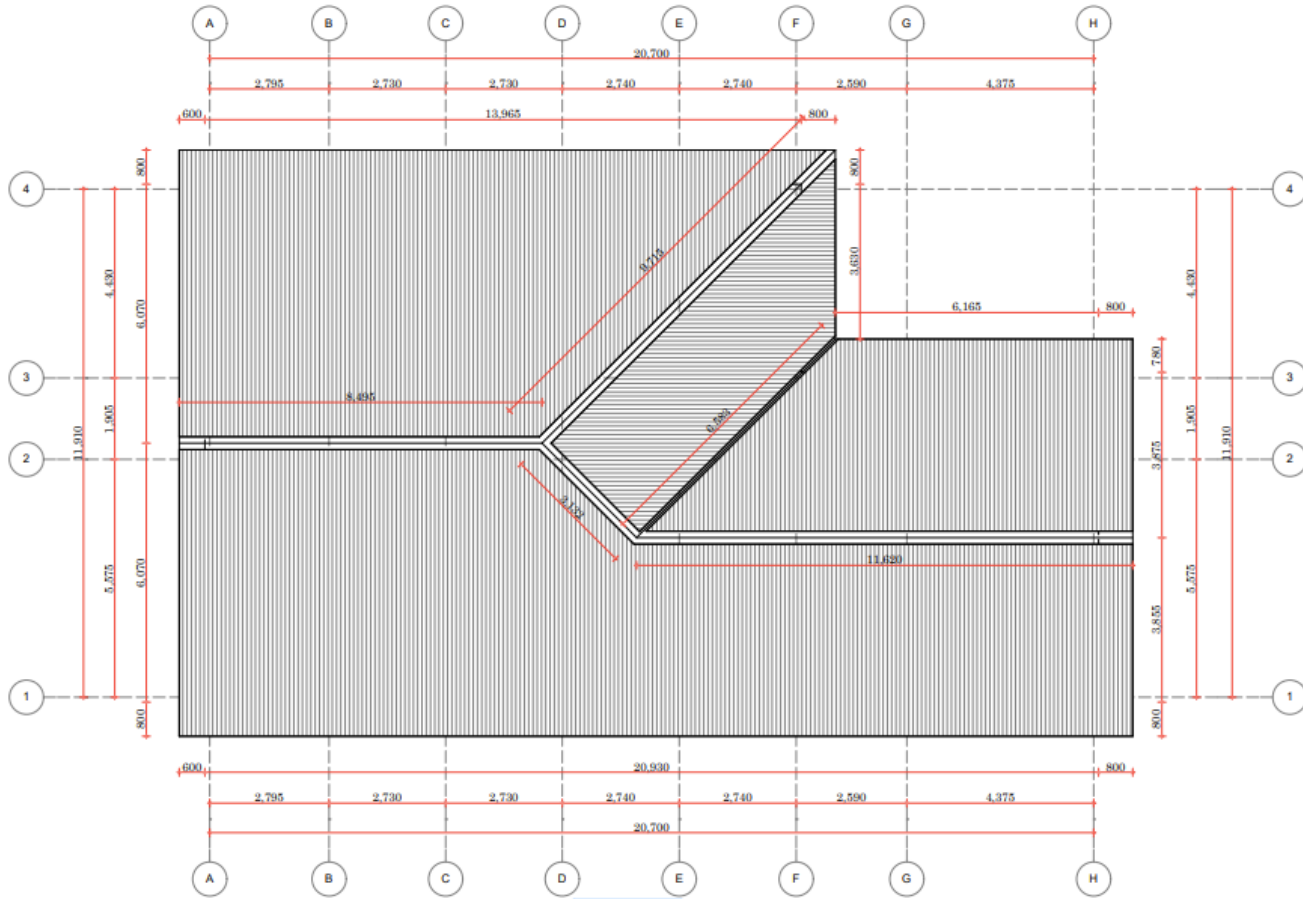
S/N	ITEM	QTY
1	DIGITAL TACHOMETER WITH CONTACT & NON CONTACT MEASURING CAPABILITY	1
2	DIGITAL MULTIMETER WITH TEMPERATURE PROBE RANGE (-100°C ~ 300°C)	1
3	DIGITAL PRESSURE MANOMETE R UPTO 10 BAR MEASURING CAPABILITY	1
4	DIGITAL HEAVY DUTY LIGHT METER	1
5	MULT GAS ANALYSER	1
6	DIGITAL TIMER	1
7	DGITAL X-RAY DOSE METER	1
8	kVp Meter and Exposure Time Meter	1
9	HAND BLOWER ATLEAST 400W	3
10	Set of insulated screw drivers	3
11	Spirit Level	3
12	Adjustable Spanner/Wrench, 6", 1" Jaw	3
13	Adjustable Spanner/Wrench, 12", 2" Jaw	3
14	DIP/IC EXTRACTION TOOL 8-24 PIN JONARD	3
15	16CM EQUAL CUT 2/HANDLE GROBET	3
16	Feeler gauge with 11 blades	3
17	Smooth Blade Electrician's Scissors 5-1/4" Long	3
18	M-130/SX 8" Push-Pull Spring Tool	3
19	Chain/Long Nose Pliers with Cutter	3
20	Combination plier	3
21	Miniature Diagonal Cutters 4-3/8" Long	3
22	Miniature Chain/Long Nose Pliers 4-7/8" Long	3
23	set of Ullman A2 J, Pocket Inspection Mirror 7/8", 7-1/2	3
24	SLOT BLADE 3/16"	3
25	PHILLIPS BLADE#1	3
26	PHILLIPS BLADE #2	3
27	HANDLE 4 1/8"	3
28	Cable cutter and striper	3
29	STEEL RULER 6"	3
30	Constant Temperature Soldering Iron 30W	3
31	Non Conductive Alignment Tool	3
32	ALIGNMENT TRIMPOT TOOL	3
33	OB-1/3 BURNISHER FILES PKG/3 JONARD OB1	3
34	4-Piece Phillips Screwdriver Set precision screw drivers With Steel Handles	3
35	Vice Grip 6LN 6" Long Nose Locking Pliers with Cutter	3
36	BOX Socket Set, 1/4" Drive. 14 PC, Inch	3

37	Combined fixed spanner sets 6mm-22mm	3
38	Fluke Digital Multimeter	3
39	Refrigeration Charging Station inclusive of a vacuum pump& system analyzer	2
40	Electronic refrigerant Leak detector	2
41	Tube Cutter 1/8"-1.1/8"	2
42	Reamer outer/Inner	2
43	Oxyacetylene portable set complete	2
44	Quick Coupler set straight flare connections 1/4", 5/6"	2
45	Deburring tool	2
46	Hydraulic tube bender	2
47	Hydraulic tube Expansion set	2
48	Torgue wrench set	2
49	Hand Held thermometers	2
50	Tube piercing pliers	2
51	Lazer pointed infrared thermometers	2
52	Digital thermocouple thermometer with calibration certificates	2
53	Precision Weights (Class-E2 and below)	2
54	Digital Analytical Balances	1
55	Analog Weighing Scales	1
56	Mechanical Weighing Scales	1
57	Spring Balances	1
58	Force Gauges	1
59	Tensiometer	1
60	Digital Multimeter	1
61	Analogue Multimeter	1
62	Frequency Standards	1
63	Microwave Synthesized Signal Generators	1
64	Synthesized Signal Generators	1
65	Decade Capacitance Boxes	1
66	AC/DC Calibrators	1
67	LCR Bridges	1
68	Wheatstone Bridges	1
69	Communication Test Set	1
70	DC Power Supplies	1
71	RF Power Generator	1
72	Audio Analyzers	1
73	Audio Meter	1
74	Oscilloscopes and Calibrators	1
75	Calibrators	1
76	RF Power Meters	1
77	Power Sensors	1
78	Universal Frequency Counters	1
79	Insulation Testers	1
80	High Power Wattmeters	1
81	Pulse Generator	1

82	Angle Position Indicators	1
83	Decade Resistance Boxes	1
84	Clamp meters	1
85	Hydraulic Deadweight Testers	1
86	Digital Pressure Calibrators	1
87	Pressure / Vacuum Gauges	1
88	Pressure Switches	1
89	Altimeter	1
90	Air-Speed Indicator	1
91	Rate-of-Climb Indicator	1
92	Pitot-Static Leak Tester	1
93	Gauge Blocks Sets	1
94	External/Internal Micrometers	1
95	Vernier Calipers	1
96	Depth Micrometers	1
97	Digital / Dial Test Indicators	1
98	Height Gages	1
99	Cylindrical Rings / Plugs	1
100	Precision Angle Indicators	1
101	Coating Thickness Gauge	1
102	Talyvel system	1
103	Profile Projector	1
104	Tachometer Calibrator	1
105	Digital RTD Thermometer Indicators	1
106	Temperature Bath, -80°C to 125°C	1
107	Temperature Bath, 30°C to 300°C	1
108	Humidity Generator, 0% to 100%RH	1
109	Humidity Indicator	1
110	Temperature / Humidity Chart Recorder	1
111	Torque Wrenches/Screw Drivers	1
112	Power-Dyne Torque Tools	1
113	Digital/Analog Torque Testers	

Annex 2: Technical Drawing for the National Calibration and Training Center





ROOF PLAN

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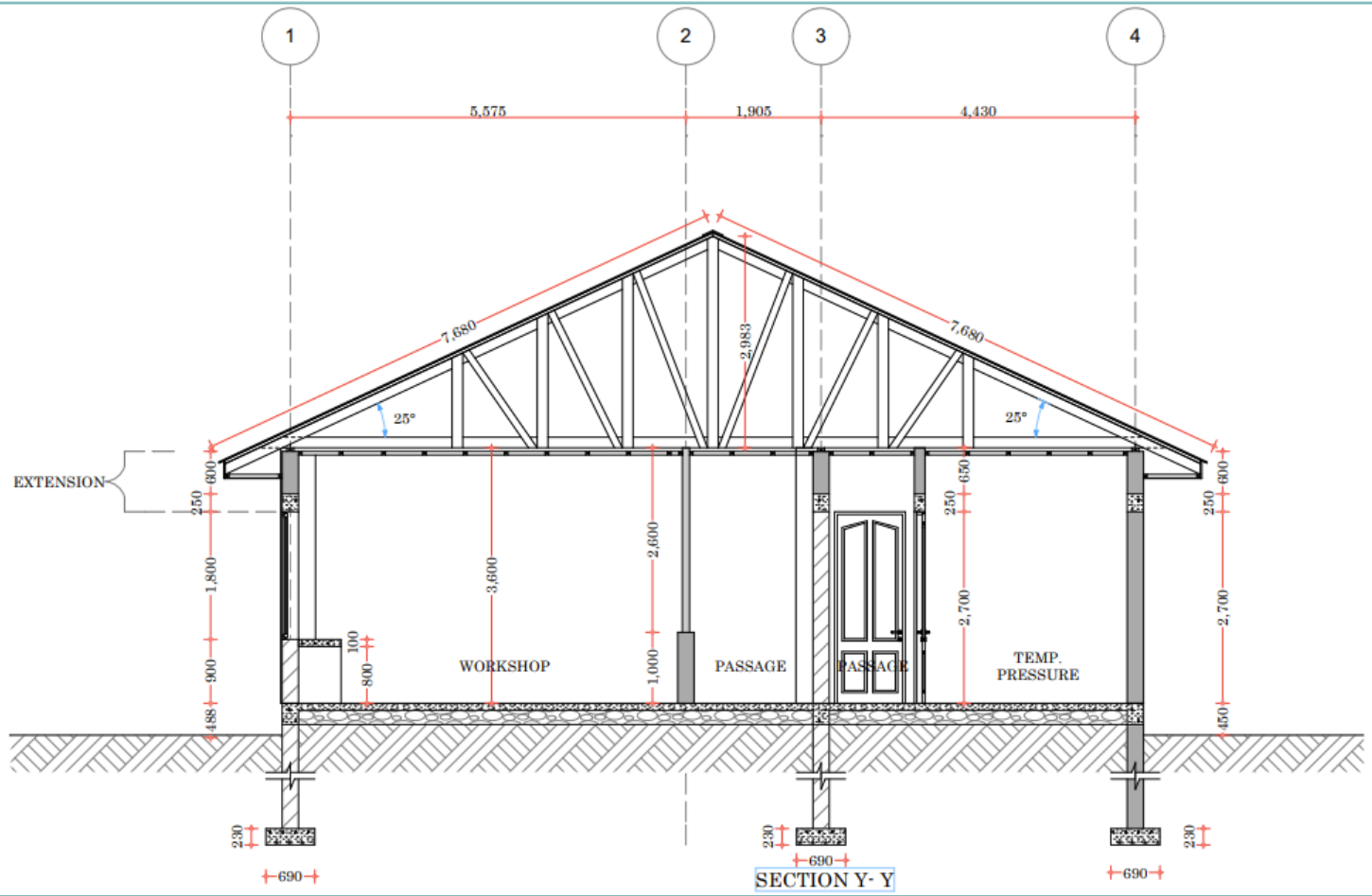
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Project
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 TRAINING/CONFERENCE ROOM AT MIREMBE HOSPITAL.**

Drawing title	
LAYOUT PLAN	
Project number	2020/04/08
Date	08 April 2020
Designed & Drawn by	Ayubu P.Nasson
Checked by	Scale

04/08/2020



SECTION Y- Y

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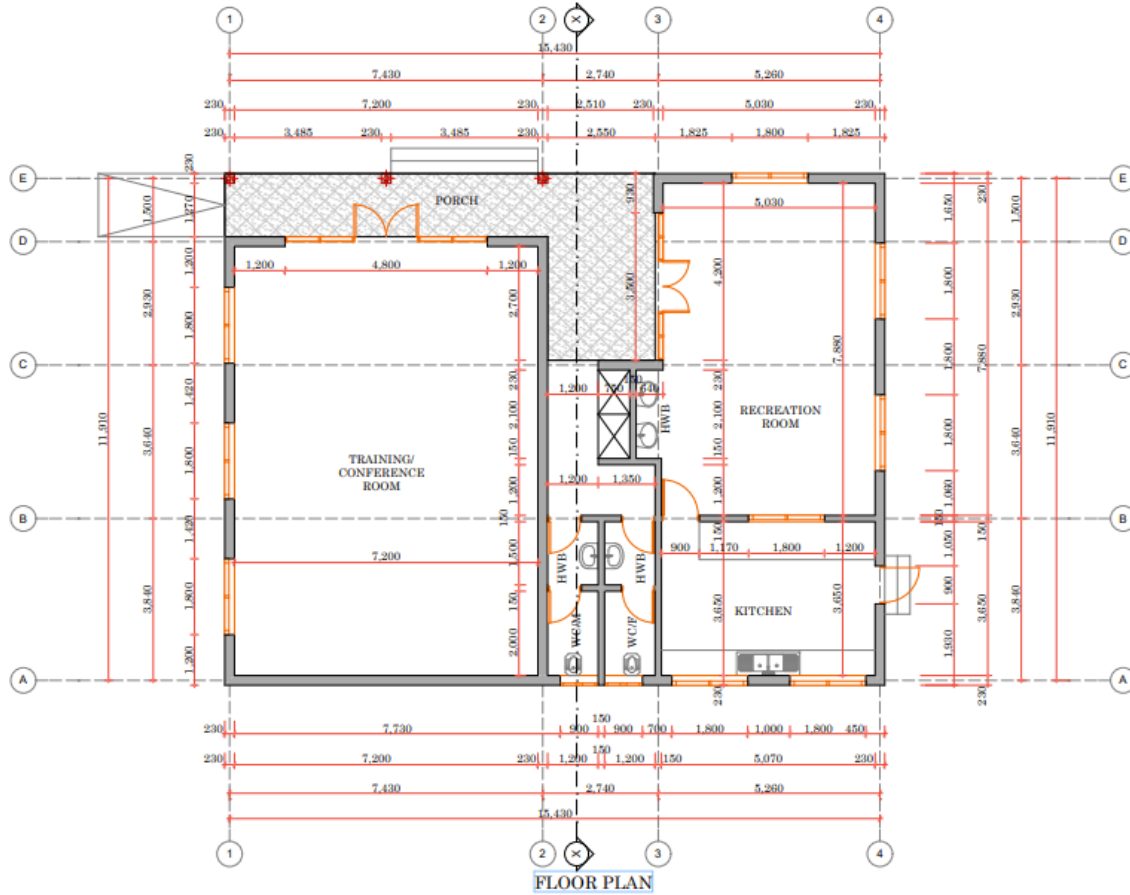
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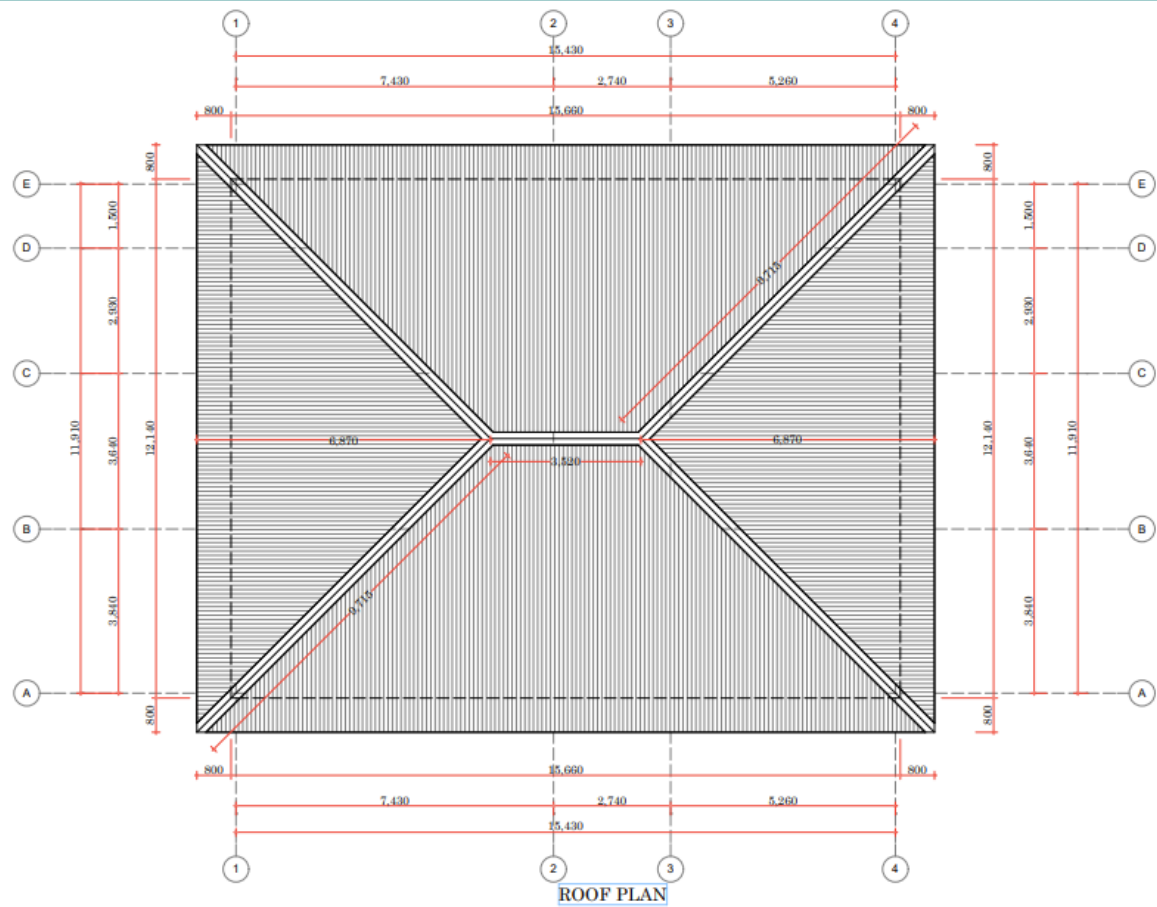
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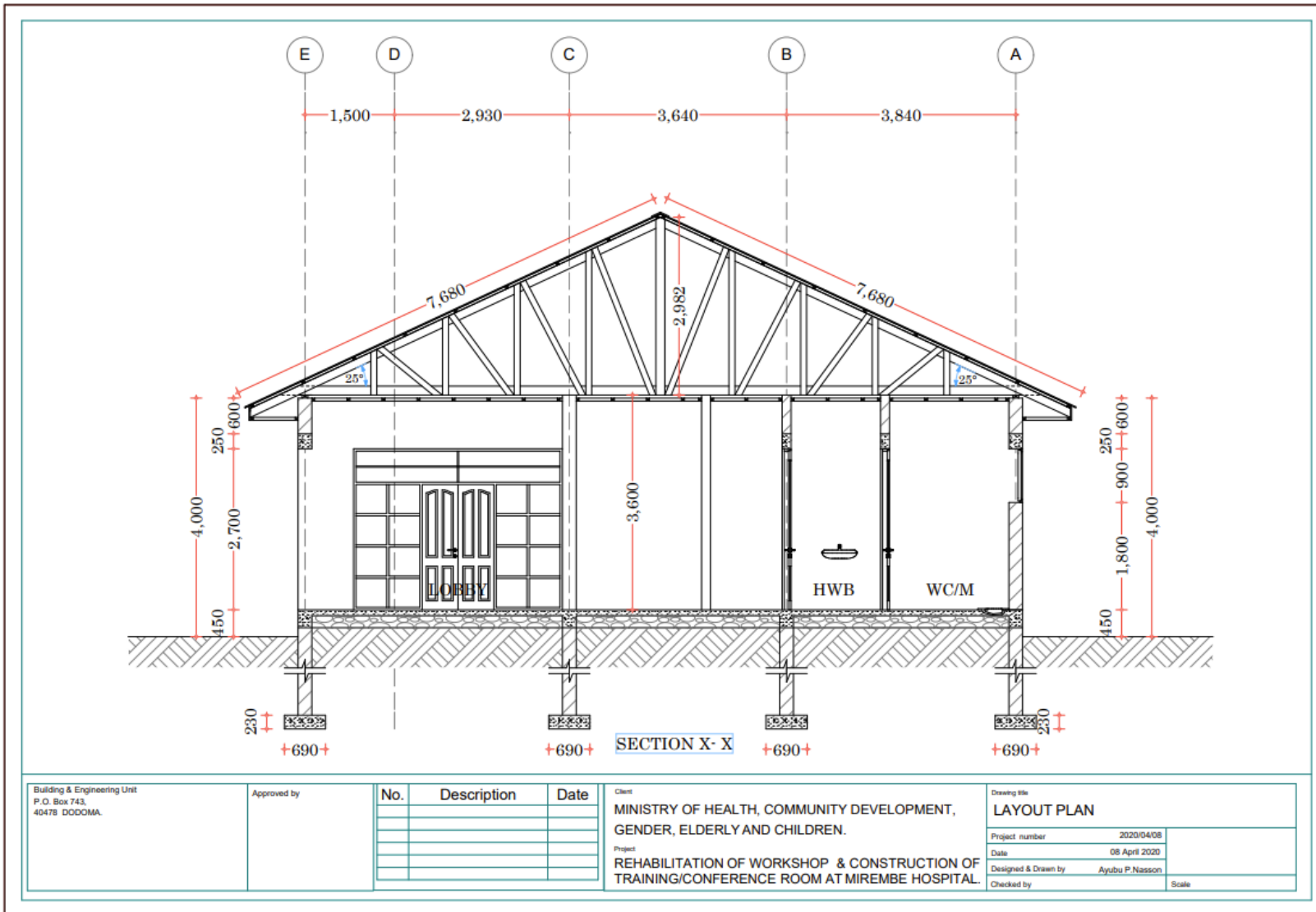
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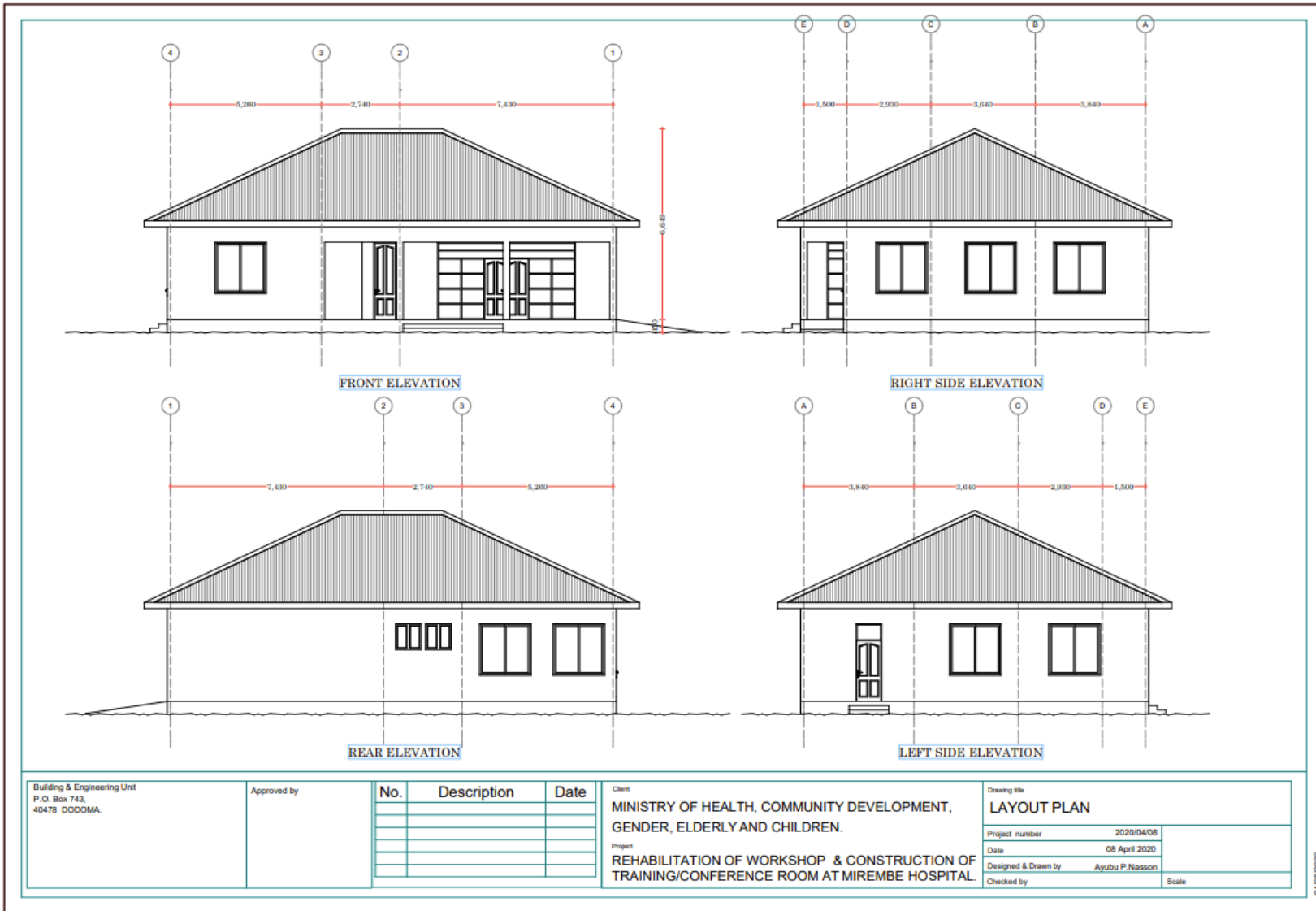
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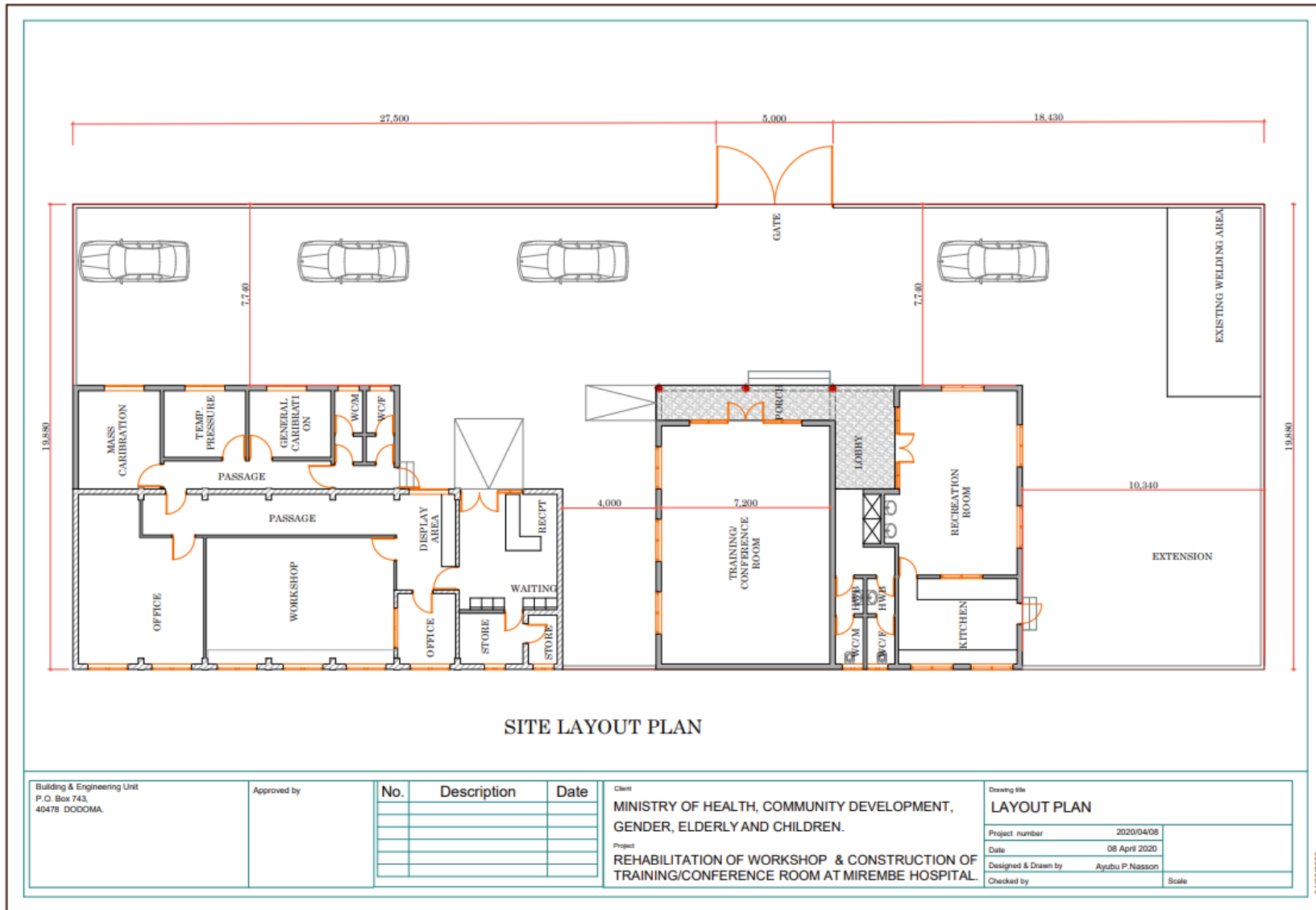


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