

ANNEX () DESIGNS AND DRAWINGS.

PREPARED BY:



UNITED NATIONS OFFICE FOR PROJECT SERVICES

FUNDED BY:



WORLD BANK GROUP.

PROJECT.

SUPPLY AND INSTALL OF OFF GRID SOLAR SYSTEM FOR
CHILDREN'S CENTER FOR AUTISM ADEN CITY - YEMEN.

PROJECT REFERENCE NO.

IUS-OPS-ESC-ADN-049.1

OCT. 2019



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- E03- GENEAL LAYOUT
- E04- PV MODULE DISTRIBUTION ROOFTOP PLAN DETAILS
- E05- STRING & COMBINER BOX EARTHING
- E06- BATTERY ROOM AIR CONDITIONING AND FIRE ALARM SYSTEMS
- E07- CONTROL ROOM BATTREY, INVERTER, CC.,AC COPLING DB
- E08- ELECTRICAL SLD
- E09- MDB (MAIN DISTRIBUTION BOARD)
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- E12- EARTHING SYSTEM
- E13- SOLAR SYSTEM SCHEMATIC DIAGRAM

REMARKS: -

1. THE LAYOUT DRAWINGS DO NOT SHOW ALL THE SYSTEMS, OR ACCESSORIES COVERED UNDER THE SCOPE OF ELECTRICAL WORKS TO BE EXECUTED THE LAYOUT DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT OR SPECIALIST DRAWINGS AND SPECIFICATIONS .
2. DO NOT SCALE FROM THE LAYOUT DRAWINGS WORK ACCORDING TO ARCHITECTURAL OR ELECTRICAL DETAILS UNLESS OTHERWISE AUTHORIZED .
3. ALL EQUIPMENT LAYOUTS ARE PROVISIONAL . FINAL LAYOUT SHALL BE DETERMINED BY THE CONTRACTOR FROM THE CONSTRUCTION /SHOP DRAWINGS AND AFTER COORDINATION WITH OTHER TRADES .
4. THE SIZE OF CONDUITS AND /OR CABLE TRAYS IS IN GENERAL NOT SHOWN ON DRAWINGS . THE SIZE OF ALL CONDUITS AND/OR CABLE TRAYS SHALL BE SELECTED BY THE CONTRACTOR IN ACCORDANCE WITH BOQ ,REGULATIONS AND /OR STANDARDS AND WILL BE FUNCTION OF THE NUMBER AND SIZE OF THE RESPECTIVE CONDUCTORS.
5. PERFORATED CABLE TRAY SHALL BE FIXED AND COVER PROPERLY AND SHALL NOT FIXED DIRECT TO ROOF SLAB .
6. EARTH CONTINUITY CONDUCTORS ARE NOT INDICATED ON THE DRAWINGS , BUT SHALL BE RUN WITH ALL CIRCUITS IN ACCORDANCE WITH SPECIFICATIONS , REGULATIONS AND/OR STANDARDS.
7. THE COLOR CODE FOR A FOUR WIRE CIRCUIT IS - ONE BLACK, - ONE RED , ONE BLUE AND ONE YELLOW ANY CONDUCTOR INTENDED FOR GROUNDING PURPOSE SHALL BE GREEN WITH YELLOW STRIPE .
8. CONTRACTOR RESPONSIBLE TO DISCONNECT ALL WIRING IN EXISTING DISTRIBUTION BOARD AND RECONNECTED IN NEW DISTRIBUTION BOARD AS PER SINGLE LINE DIAGRAM .
9. THE CONTROL AND /OR SWITCHBOARDS FOR THE DIFFERENT SYSTEMS SUCH AS THE AIR ONDITIONING EQUIPMENT MACHINES ,E TC . WILL BE IN THE SCOPE OF SUPPLY OF THE SYSTEM SUPPLIER . THE ELECTRICAL CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING AND INSTALLING THE CABLE FEEDERS TO THESE BOARDS, HOOKING UP OF

- EQUIPMENT WILL BE THE SYSTEM SUPPLIER RESPONSIBILITY.
10. CONDUCTORS FOR SINGLE PHASE SOCKETS OUTLETS CIRCUITS SHALL BE 4MM COPPER CONDUCTORS AND PROTECTED BY 16A CIRCUIT BREAKERS UNLESS OTHERWISE INDICATED.
 11. IN THE ABSENCE OF ANY INDICATION ON THE DRAWINGS OR THE SPECIFICATIONS, THE INSTALLATIONS SHALL BE DONE TO THE SATISFACTION OF THE ENGINEER.
 12. THE CONTRACTOR SHALL PROVIDE ALL IRON ANGLES, AND FIXING ACCESSORIES REQUIRED FOR COMPLETE INSTALLATION OF LIGHTING FIXTURES, OUTLETS & ROUTES.
 13. FOR EXACT QUANTITY, TYPE & LOCATION OF ELECTRICAL OUTLETS REFER TO INTERIOR DESIGN DOCUMENT.
 14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFYING THE NO. OF CIRCUIT BREAKERS, RATING, AND WIRING ACCORDING TO MANUFACTURER DATA WITHOUT ANY EXTRA COST.
 15. ALL DISCONNECT SWITCHES FOR A/C SHALL BE ADJACENT TO THE UNIT..
 16. UNLESS OTHERWISE INDICATED MINIMUM SIZE CONDUIT;
 - FOR EXTERIOR INSTALLATION IS 25MM DIAMETER OR AS SHOWN IN PANEL SCHEDULE.
 - FOR INTERIOR INSTALLATION IS 25MM DIAMETER OR AS SHOWN IN PANEL SCHEDULE.
 17. CONTRACTOR SHALL PROVIDE MATCHING PLUG IN FOR ALL SPECIAL OUTLETS.
 18. CONTRACTOR RESPONSIBLE FOR CHANGE ALL EXISTING FLORESCENT TUBE (T) 8LIGHT BY LED TUBE (T) 8INCLUDE ALL OPERATION ACCESSORIES FOR ALL LIGHTING FIXTURES AS PER BOQ.
 19. LED LAMPS SHALL BE FURNISHED AND INSTALLED IN ALL LIGHTING FIXTURES.
 20. ALL OUTDOOR WIRING ACCESSORIES SHALL BE WEATHER PROOF TYPE.
 21. FOR GROUND-FAULT CIRCUIT INTERRUPT (GFCI) REFER TO PLANS AND PANEL SCHEDULES.
 22. THE MINIMUM SEPARATE DISTANCE BETWEEN LOW CURRENT SYSTEMS & LOW VOLTAGE POWER CABLES IS 300MM.
 23. THE MAXIMUM FILLING RATIO FOR POWER & COMMUNICATION CONDUITS IN SITE WORK ARE:
 - MIN50. MMD FOR POWER CABLE WITH MAX 40%. OF CONDUIT CAPACITY.
 - MIN50. MMD FOR LOW CURRENT SYSTEMS WITH MAX

24. ALL C.BS WITH FRAME RATING LARGER THAN 100A SHOULD HAVE ADJUSTABLE THERMAL OVERLOAD SETTING.
25. CONTRACTOR SHALL PROVIDE CONTROL CONDUIT & WIRING AS PER OPERATIONAL REQUIREMENTS SHOWN ON HVAC AND PLUMBING DRAWING.
26. EXACT METHOD OF JOINING CABLE TRAYS,AND CABLE TRUNKING SHALL BE IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURERS RECOMMENDATION USING PROPER COMPONENT.
27. GROUNDING TO LOW CURRENT SYSTEMS SHALL BE SEPARATE GROUNDING PIT AND CONNECTED TO BUILDING GROUNDING NETWORK.
28. THE DISTANCE BETWEEN EARTH PIT SHALL BE DOUBLE OR MORE THAN LENGTH OF EARTHING ROD.
29. THE CONTRACTOR SHOULD PROVIDE COMPLETE CENTRAL INTERFACE BETWEEN THE SOLAR GENERATION SYSTEM & GENERATOR SET.
30. THE DIMENSION OF ELECTRICAL PANELS AND EQUIPMENT'S SHALL BE AS PER APPROVED FABRICATOR / SUPPLIER SHOP DRAWING.
31. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALL SUITABLE VENTILATION SYSTEM IN BATTERY ROOM TO ASSURING REFRESHING AIR FLOW INSIDE ROOM . CONTRACTOR RESPONSIBLE TO DISTRIBUTE ALL DISTANCE BETWEEN ALL SYSTEM COMPONENTS INSIDE BATTERY ROOM AS PER MANUFACTURE INSTALLATION INSTRUCTION.

PREPARED BY:

UNOPS
 OPERATIONAL EXCELLENCE
 FOR RESULTS THAT MATTER.
 SANAA - YEMEN.

FUNED BY:

WORLD BANK GROUP
 WORLD BANK GROUP.

PROJECT TITLE:
 CHILDREN CENTER FOR AUTISM

PROJECT LOCATION:
 ADEN - YEMEN

DRAWING TITLE:
 MAIN NOTES

DRAWING TYPE:
 ELECTRICAL PLAN

DESIGN-BY:

CHECKED-BY:

APPROVED-BY:

STATUS:
 STATUS

PROJECT NO:
 IUS-OPS-ESC-ADN-049.1

DATE:
 OCT.,30TH,2019

PAPER SIZE:
 A3

SCALE:
 SCALE



DRAWING NO:
E-01



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 WORLD BANK GROUP.

PROJECT TITLE:
 CHILDREN CENTER FOR AUTISM

PROJECT LOCATION:
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DRAWING TITLE:
 GOOGLE EARTH IMAGE

DRAWING TYPE:
 ELECTRICAL PLAN

DESIGN-BY:
 CHECKED-BY:
 APPROVED-BY:

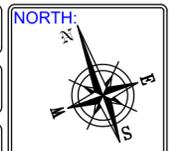
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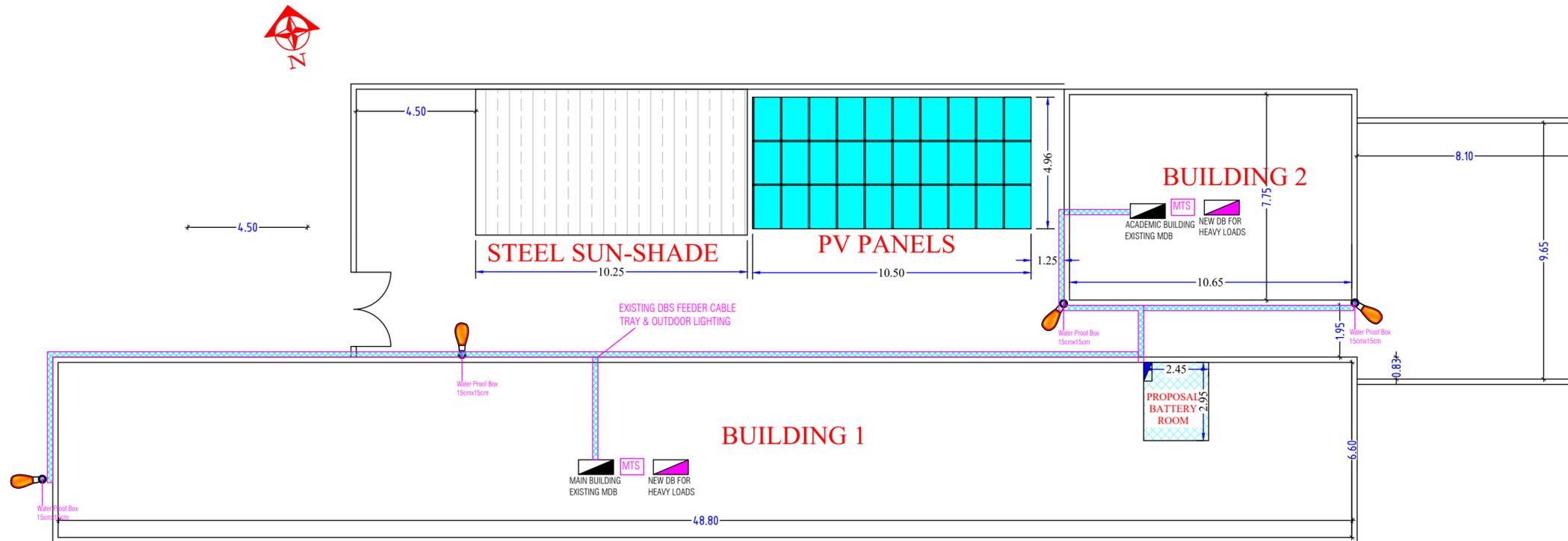
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E-02



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PROJECT TITLE:
 CHILDREN CENTER FOR AUTISM
 PROJECT LOCATION:
 ADEN - YEMEN

DRAWING TITLE:
 GENERAL LAYOUT
 DRAWING TYPE:
 ELECTRICAL PLAN

DESIGN-BY:
 CHECKED-BY:
 APPROVED-BY:

STATUS:
 STATUS
 PROJECT NO:
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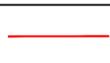
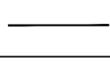
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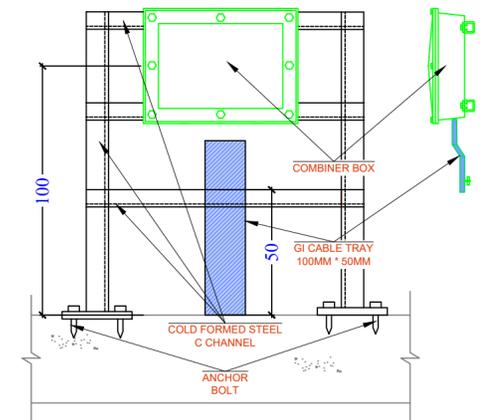
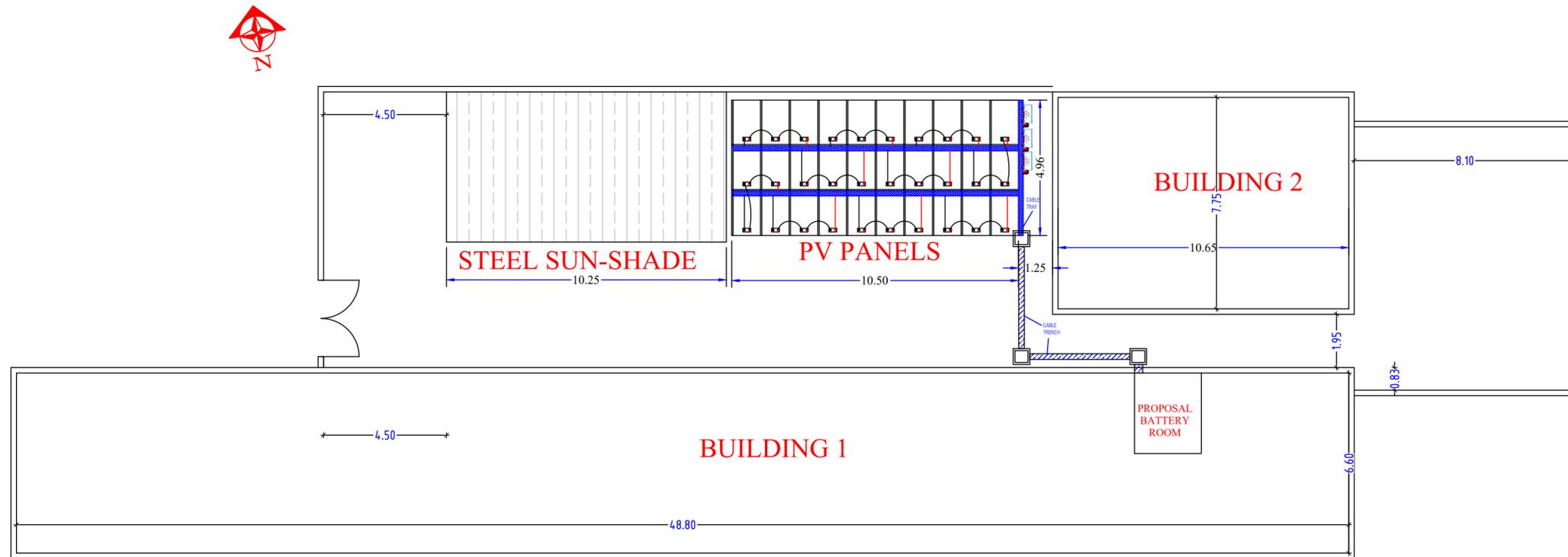
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 SCALE:
 SCALE

REMARKS:

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2. ALL DIMENSIONS TO BE CHECKED AND CONFIRMED ON SITE BEFORE COMMENCEMENT OF ANY WORK.
3. ANY DISCREPANCY TO BE REPORTED TO THE UNOPS SITE ENGINEER/ PROJECT MANAGER PROMPTLY BEFORE PROCEEDING.
4. ALL OUTDOOR OUTLETS, SOCKET OR WIRING ACCESSORIES SHALL BE WEATHER PROOF TYPE.
5. ALL DISTANCE BETWEEN SYSTEM COMPONENTS INSIDE BATTERY ROOM TO BE DISTRIBUTE AS PER MANUFACTURE INSTALLATION INSTRUCTION.

LEGEND:

	PHOTOVOLTAIC MODULE
	COMBINER BOX
	SOLAR SINGLE CORE CABLE 1C X 6 SQ.MM (RED COLOR)
	SOLAR SINGLE CORE CABLE 1C X 6 SQ.MM (BLACK COLOR)
	SOLAR SINGLE CORE CABLE 1C X 35SQ.MM (RED COLOR)
	SOLAR SINGLE CORE CABLE 1C X 35SQ.MM (BLACK COLOR)
	GALVANIZED CABLE TRAY
	SOLAR WATER HEATER



COMBINER BOX DETAILS
NOT TO SCALE.

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PROJECT TITLE:
 CHILDREN CENTER FOR AUTISM
 PROJECT LOCATION:
 ADEN - YEMEN

DRAWING TITLE:
 PV MODULE DISTRIBUTION ROOFTOP
 PLAN DETAILS
 DRAWING TYPE:
 ELECTRICAL PLAN

DESIGN-BY:
 CHECKED-BY:
 APPROVED-BY:

STATUS:
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 SCALE:
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NORTH:

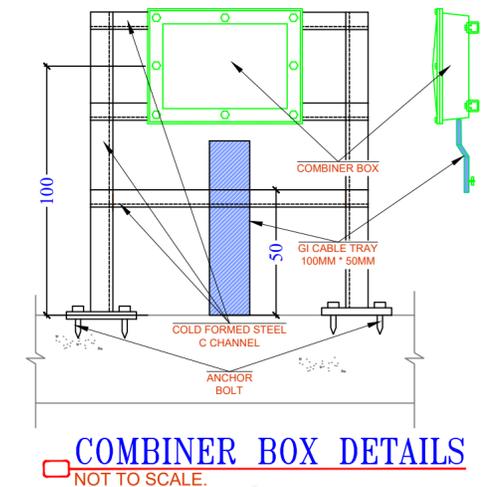
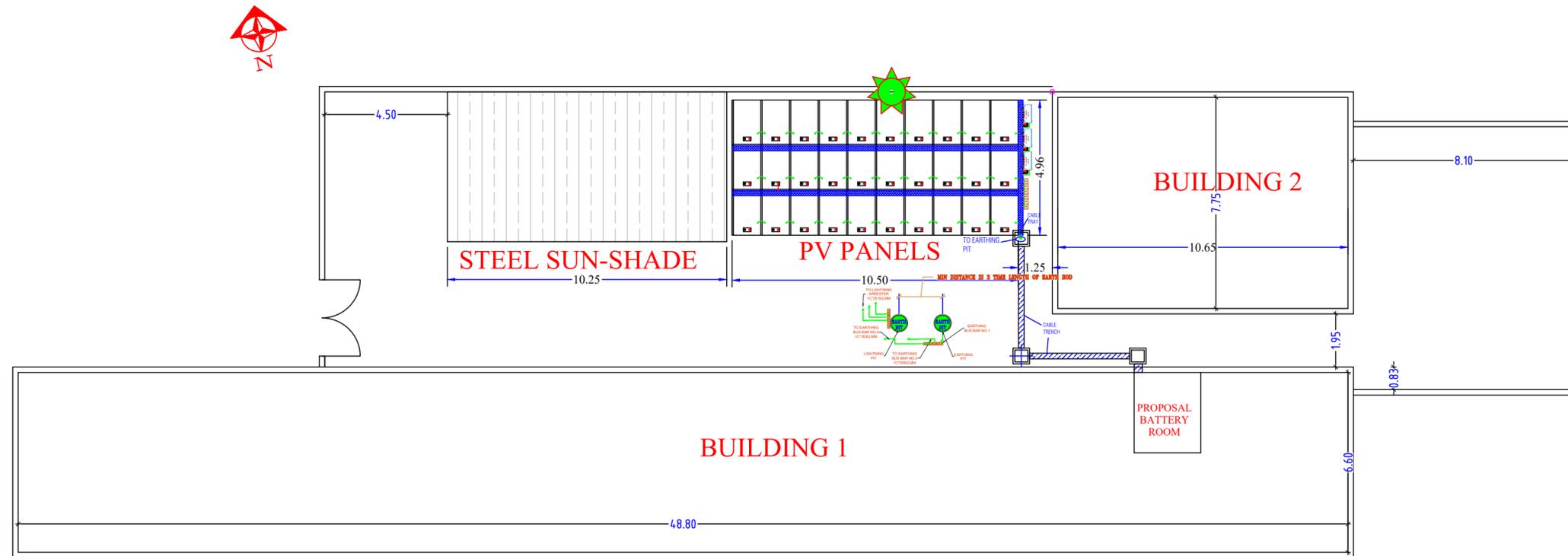

DRAWING NO:
E-04

REMARKS:

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LEGEND:

SYMBOL	DESCRIPTION
	PHOTOVOLTAIC MODULE
	COMBINER BOX
	EARTHING BUS BAR
	EARTHING CABLE
	LIGHTNING ARRESTOR



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CHILDREN CENTER FOR AUTISM

PROJECT LOCATION:
ADEN - YEMEN

DRAWING TITLE:
STRING & COMBINER BOX EARTHING

DRAWING TYPE:
ELECTRICAL PLAN

DESIGN-BY:

CHECKED-BY:

APPROVED-BY:

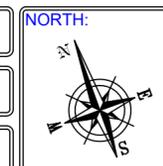
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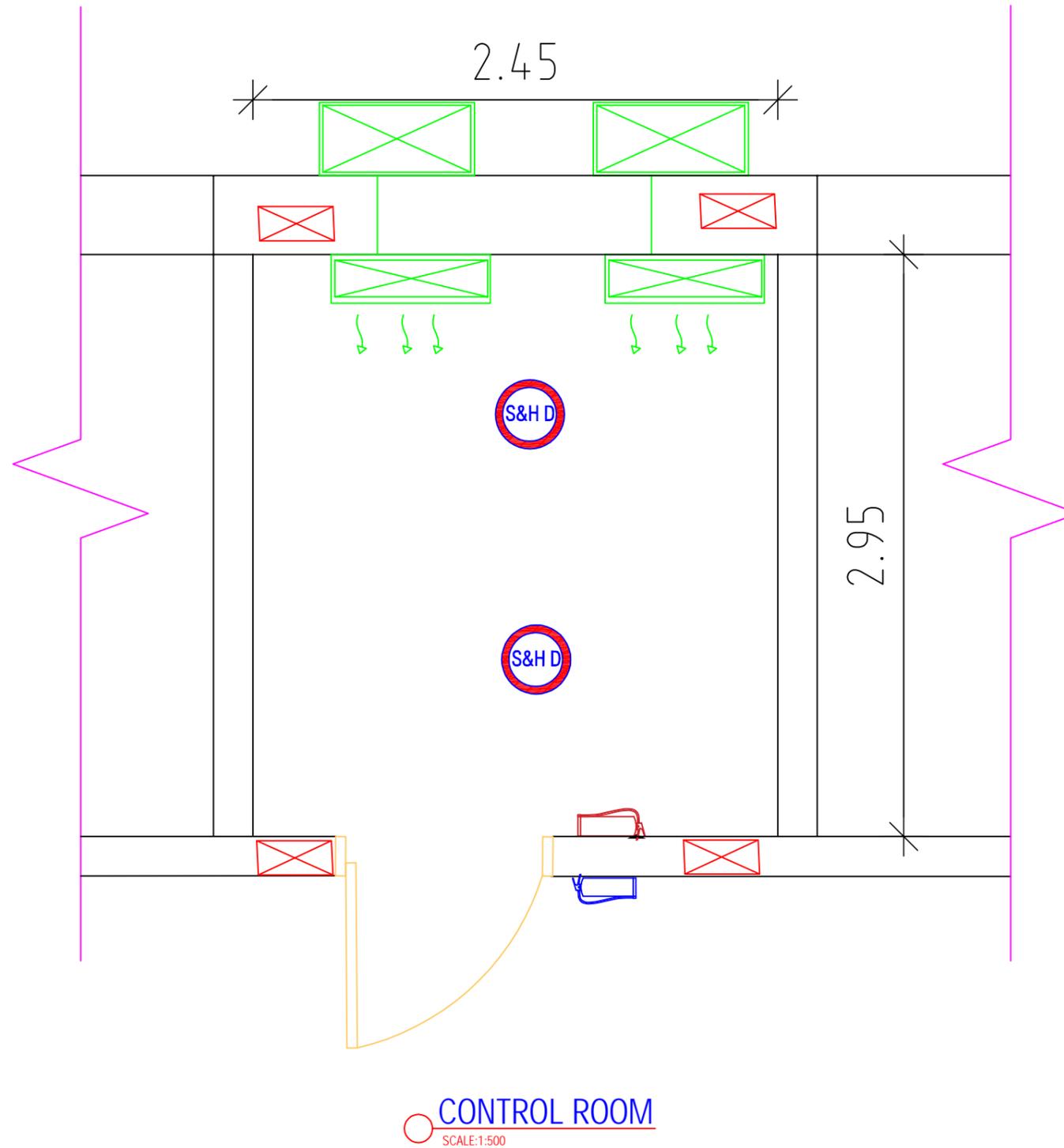
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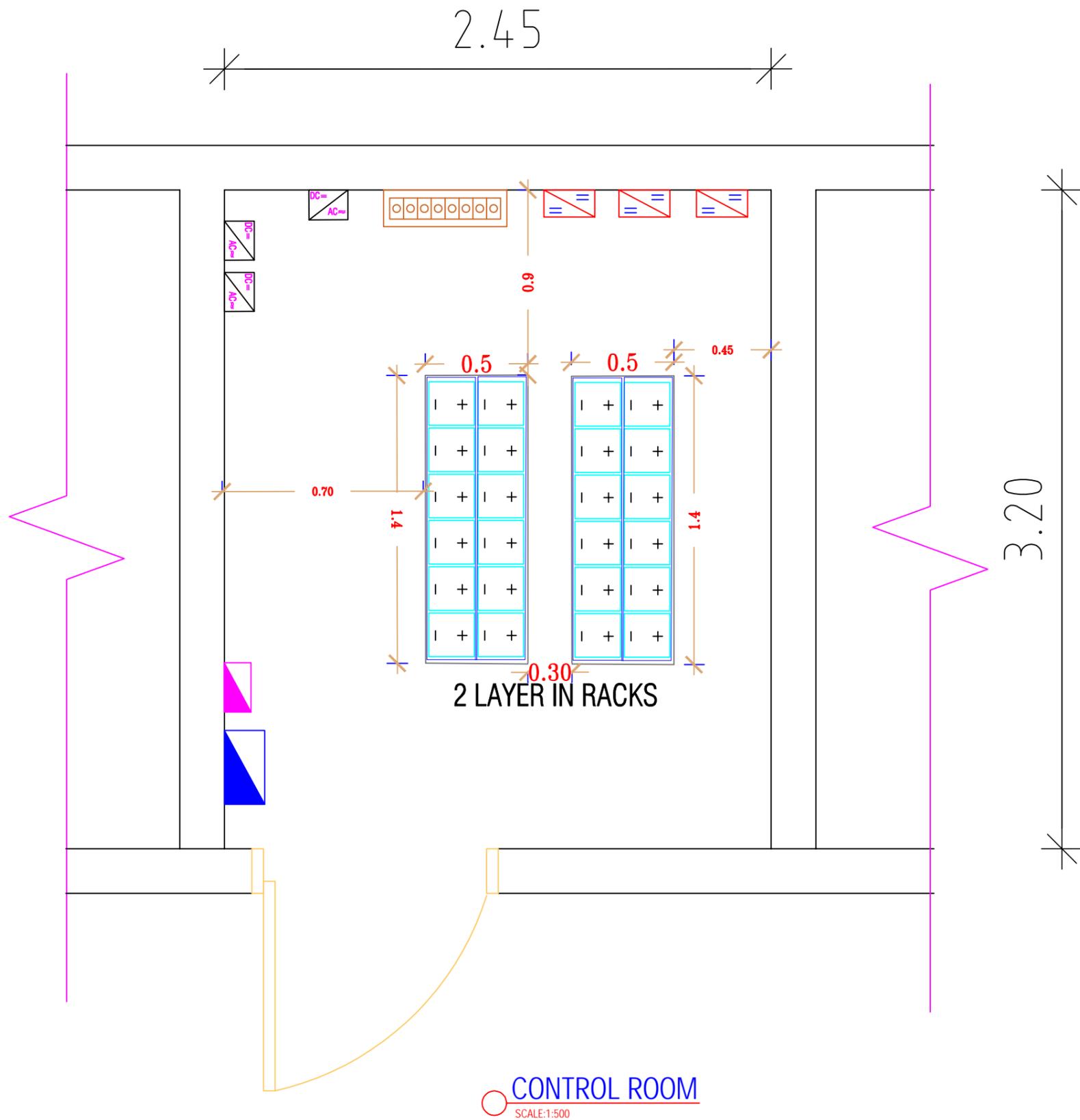
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3. ANY DISCREPANCY TO BE REPORTED TO THE UNOPS SITE ENGINEER/ PROJECT MANAGER PROMPTLY BEFORE PROCEEDING.
4. EARTHING PIT SHALL BE CARRY OUT AS BE SITE ENGINEER INSTRUCTION.



SYMBOL	DESCRIPTION
	Air Condition outdoor unit
	Air Condition indoor unit
	Battery Smoke&Heat Detector
	Powder Fire Extinguisher
	CO ₂ Fire Extinguisher
	Exhaust fan



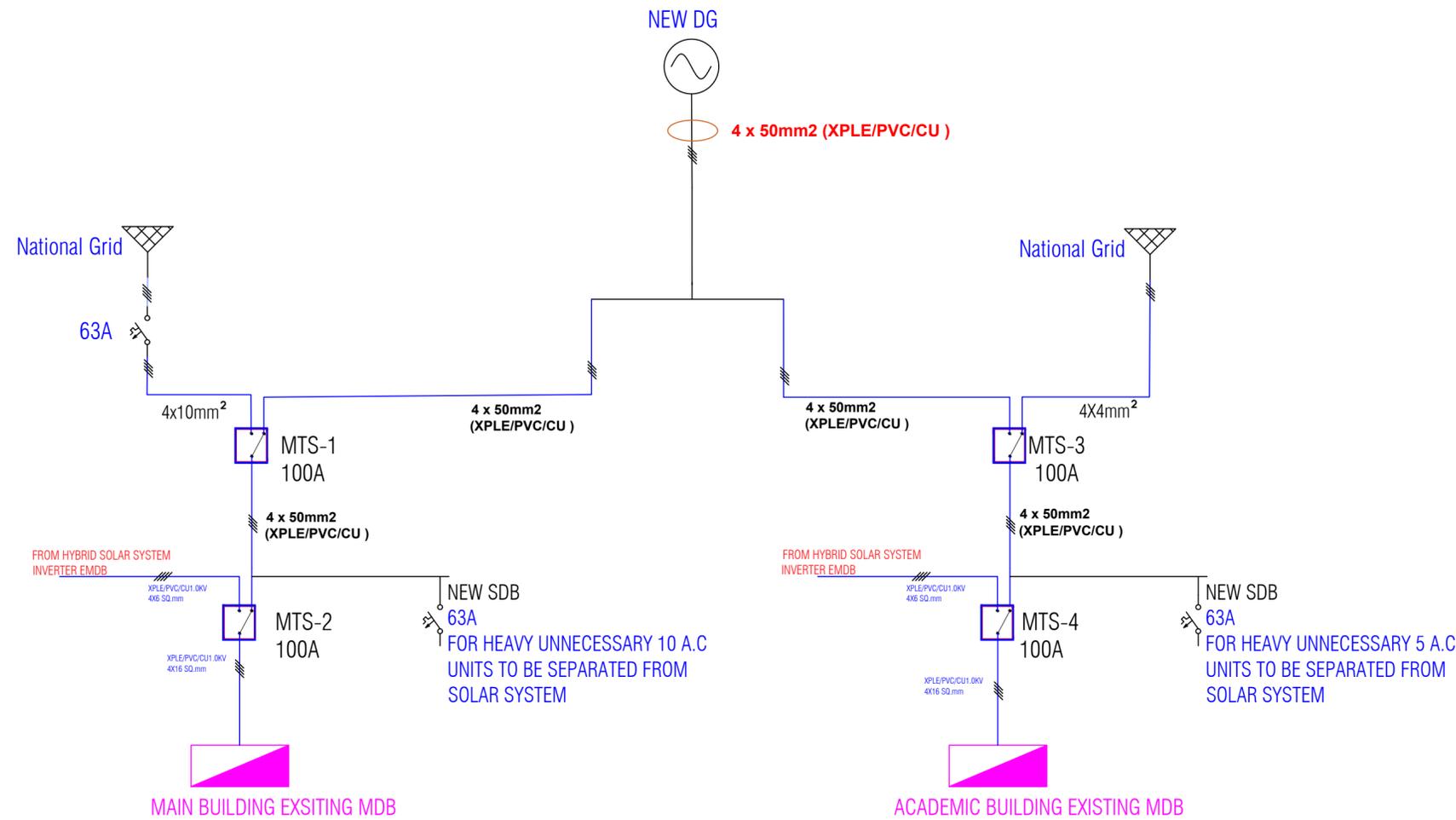
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SYMBOL	DESCRIPTION
	INVERTER
	MPPT BATTERY CHARGE CONTROLLER
	Busbar
	AC COUPLING PANEL
	BATTERY RACK
	EMDB

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SYMBOL	DESCRIPTION
	DG DIESEL GENERATOR
	PUBLIC GRID SYSTEM
	MANUAL TRANSFER SWITCH
	DISTRIBUTION BOARD
	MCCB

ELECTRICAL SLD
SCALE:1:500

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PROJECT TITLE:
CHILDREN CENTER FOR AUTISM

PROJECT LOCATION:
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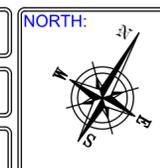
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ELECTRICAL SLD

DRAWING TYPE:
ELECTRICAL PLAN

DESIGN-BY:
CHECKED-BY:
APPROVED-BY:
UNOPS TEAM

STATUS:
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SCALE:
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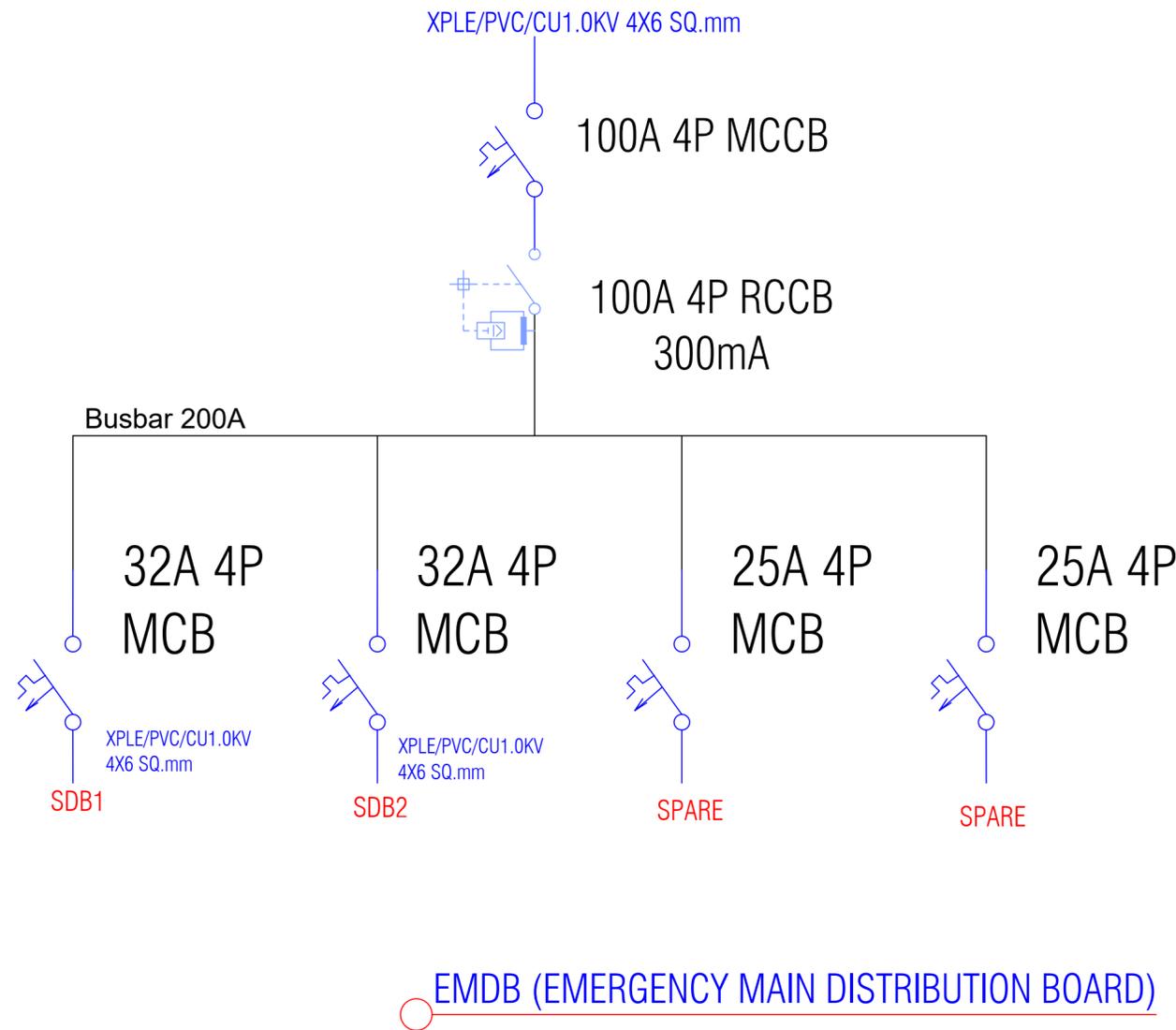
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4. NEW DISTRIBUTION BOARD SHALL BE INSTALLED IN THE SAME LOCATION OF EXISTING ONE.

LEGEND:

SYMBOL	DESCRIPTION
	MANUAL TRANSFER SWITCH
	SURGE ARRESTER
	CIRCUIT BREAKER (MCCB/MCB)
	CIRCUIT BREAKER (RCB)
	AC FUSE



○ EMDB (EMERGENCY MAIN DISTRIBUTION BOARD)

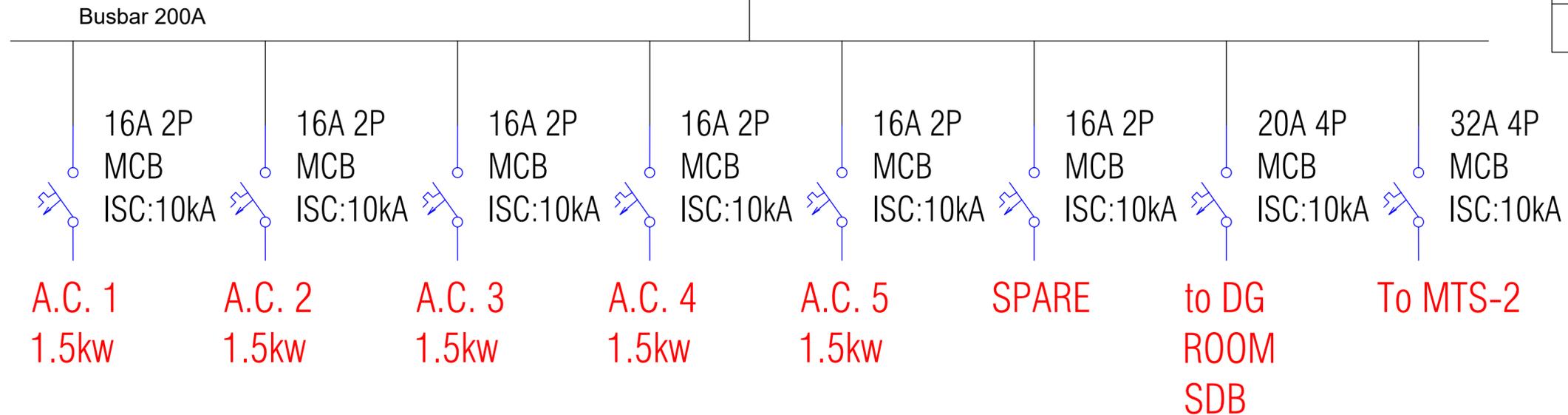
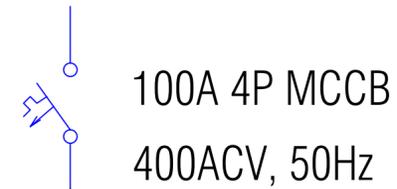
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4. NEW DISTRIBUTION BOARD SHALL BE INSTALL IN THE SAME LOCATION OF EXISTING ONE.

LEGEND:

SYMBOL	DESCRIPTION
	MANUAL TRANSFER SWITCH
	SURGE ARRESTER
	CIRCUIT BREAKER (MCCB/MCB)
	CIRCUIT BREAKER (RCB)
	AC FUSE

(XPLE/PVC/CU) 4 x 35mm²



ACADEMIC BUILDING HEAVY LOADS NEW SDB

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SANA'A - YEMEN.

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PROJECT TITLE:
CHILDREN'S CENTER FOR AUTISM

PROJECT LOCATION:
ADEN - YEMEN

DRAWING TITLE:
CENTER TARGETED LOADS DB

DRAWING TYPE:
ELECTRICAL PLAN

DESIGN-BY:

CHECKED-BY:

APPROVED-BY:

STATUS:
STATUS

PROJECT NO:
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SCALE:
SCALE

NORTH:

DRAWING NO:
E-10

REMARKS:

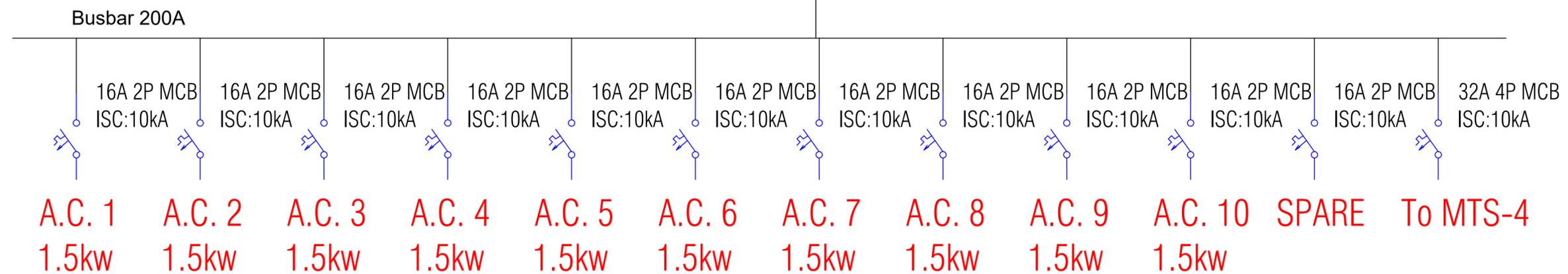
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LEGEND:

SYMBOL	DESCRIPTION
	MANUAL TRANSFER SWITCH
	SURGE ARRESTER
	CIRCUIT BREAKER (MCCB/MCB)
	CIRCUIT BREAKER (RCB)
	AC FUSE

(XPLE/PVC/CU) 4 x 35mm²

100A 4P MCCB
400ACV, 50Hz



CENTER MAIN BUILDING HEAVY LOADS NEW SDB

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CHILDREN'S CENTER FOR AUTISM

PROJECT LOCATION:
ADEN - YEMEN

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CENTER TARGETED LOADS DB

DRAWING TYPE:
ELECTRICAL PLAN

DESIGN-BY:

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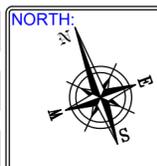
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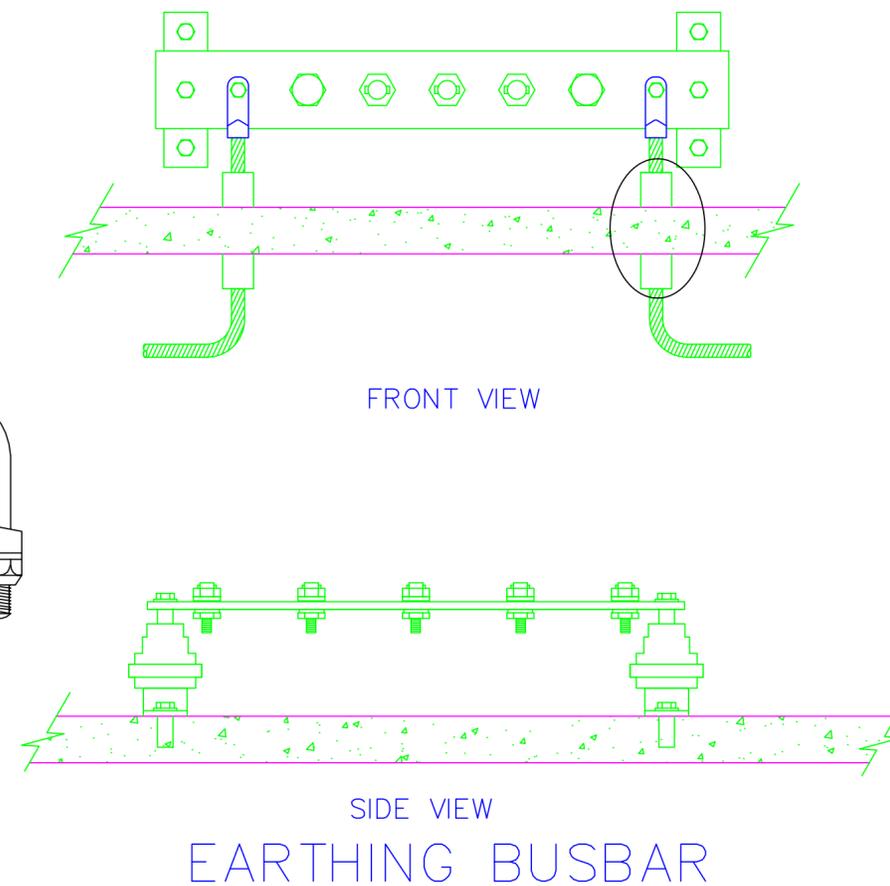
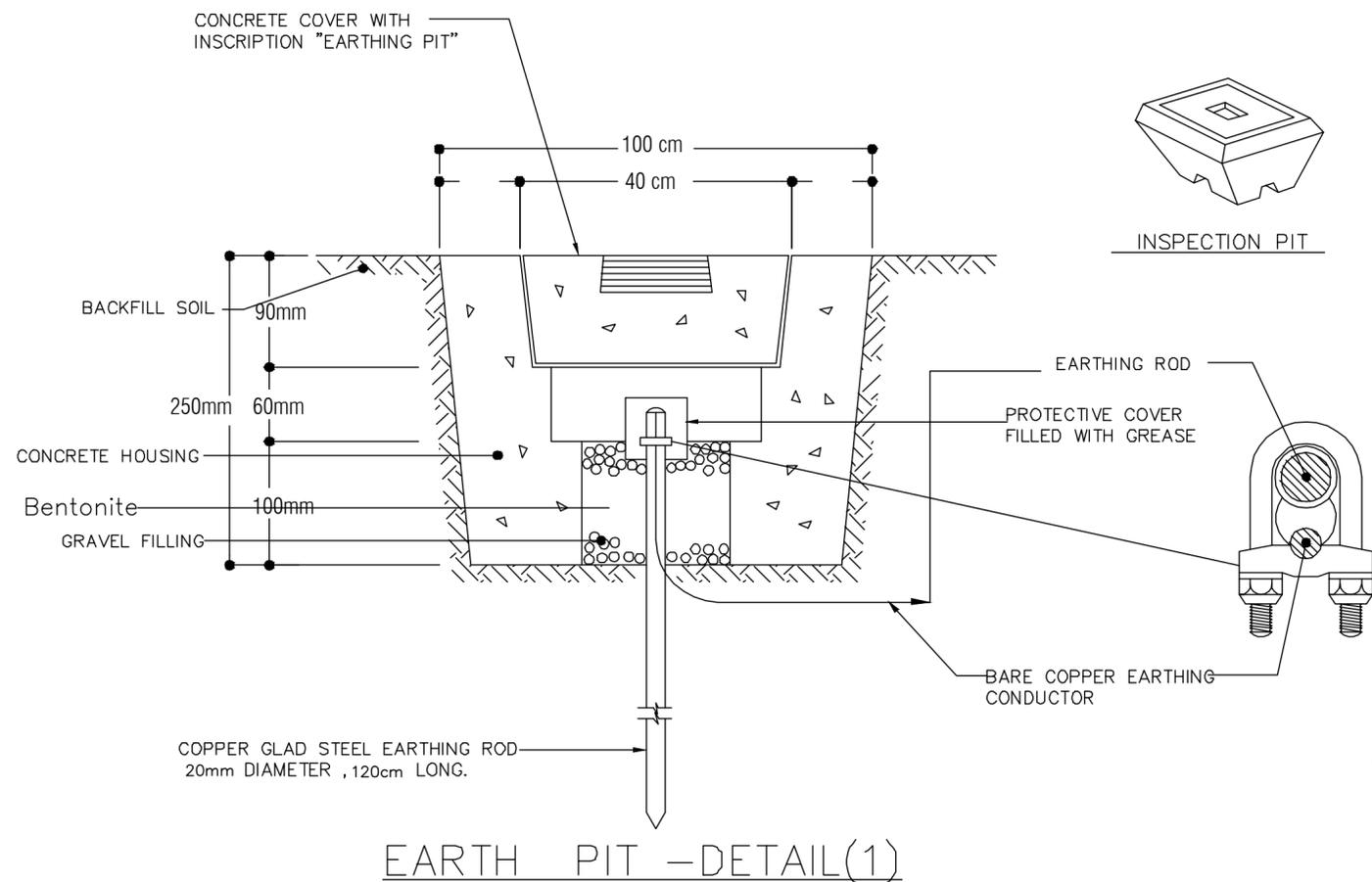
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DRAWING NO:
E-11

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4. EARTHING PIT SHALL BE CARRY OUT AS BE SITE ENGINEER INSTRUCTION.

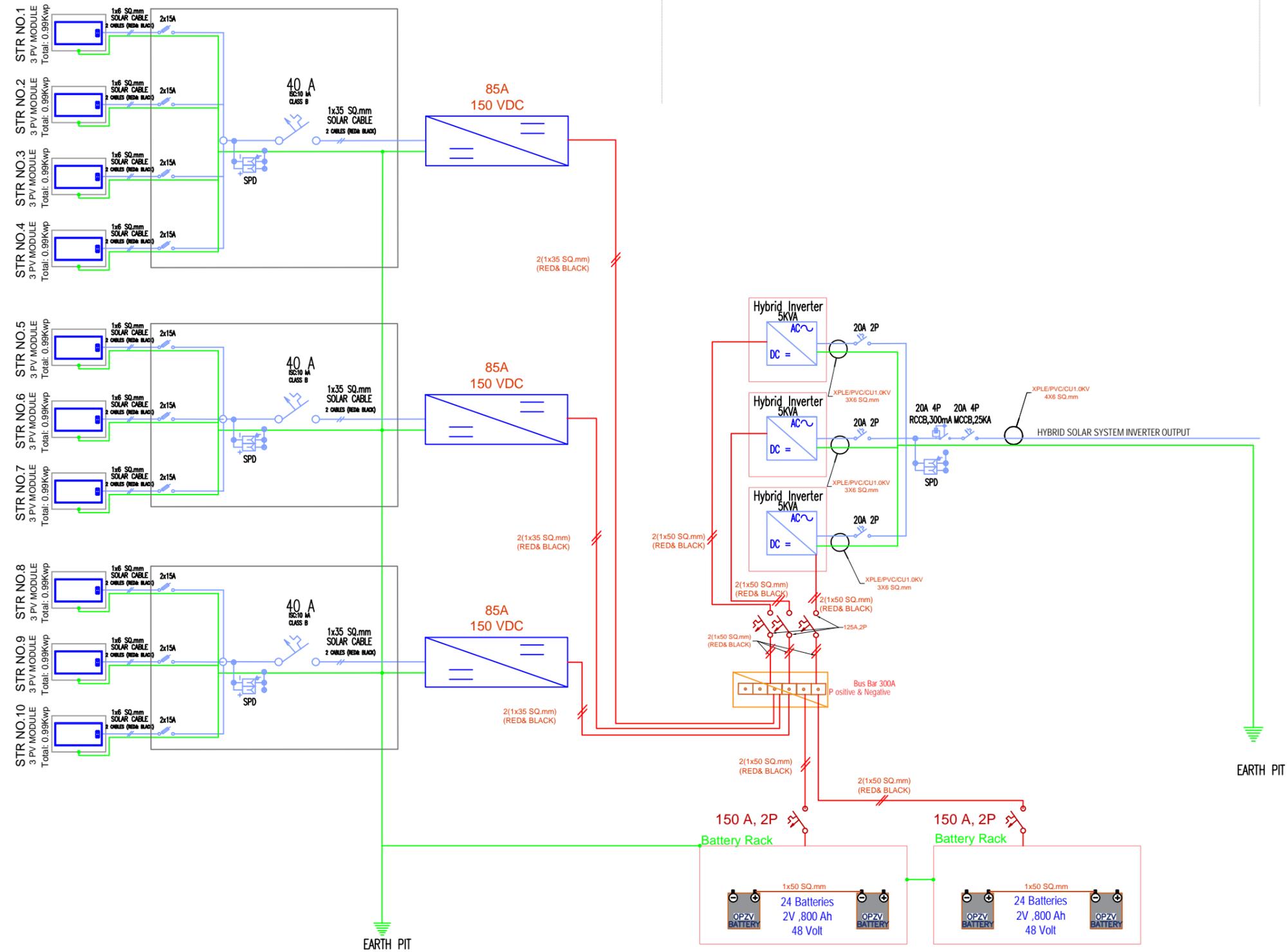


PV Module Connection

Combiner Box

Battery Charger

Hybrid INVERTER



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4. NEW DISTRIBUTION BOARD SHALL BE INSTALLED IN THE SAME LOCATION OF EXISTING ONE.

LEGEND:

SYMBOL	DESCRIPTION
	PHOTOVOLTAIC MODULE
	HYBRID INVERTER
	MANUAL CHANGE OVER
	MPPT BATTERY CHARGER
	SURGE ARRESTER
	CIRCUIT BREAKER (MCB)
	CIRCUIT BREAKER (RCBO)
	DC FUSE
	POSITIVE & NEGATIVE CONNECTION BOX
	DC SWITCH ISOLATOR

