ELECTRICAL SAFETY AUDIT REPORT

AHMEDNAGAR DISTRICT MARATHA SAMAJ SEVA PRASARAK'S

NEW ARTS, COMMERCE AND SCIENCE COLLEGE, PARNER

TALUKA-PARNER, DISTRICT-AHMEDNAGAR

Maharashtra 414302

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Conducted and Submitted by

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ENERFUTURE

CERTIFICATE

ENERFUTURE TECHNOLOGY PRIVATE LIMITED

Verified and Certified that

NEW ARTS, COMMERCE AND SCIENCE COLLEGE,

TALUKA-PARNER, DISTRICT-AHMEDNAGAR Maharashtra 414302

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has carried out

Electrical Safety Audit

as per guidelines laid down in the
IE rules and NBC Codes
in 2021-22.

ENERFUTURE TECHNOLOGY PRIVATE LIMITED ★ PUNE ★

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ACKNOWLEDGEMENT

Enerfuture thanks the management of New Arts, Commerce and Science College, Parner for assigning this important work of Electrical Safety Audit at New Arts, Commerce and Science College, Parner.

Our special thanks to

Name	Designation
Prof. Dr. R. K. Aher	Principal
Prof. Dr. D. R. Thube	Vice-Principal

For giving us necessary inputs to carry out this very vital exercise safety audit.

STUDY TEAM

Sr No	Name	Qualification
1	Mr. Chetan Nemade	M.Tech (Energy Studies), Advance Diploma in Industrial Safety (ADIS), LLB(pursuing), BEE Certified Energy Manager
2	Mr Vinay Mulay	M.Tech (Energy Studies), ISO 50001 Lead Auditor, BEE Accredited Energy Auditor
3	Mr YogeshKuwar	M.Tech (Energy Studies), IGBC IGBC Accredited Professional, Post Graduate Diploma in Environmental law and Policy (PGDELP), BEE Certified Energy Manager
4	Mr Prasad Kalal	B.E Electrical, BE (Electrical), Electrical Supervisor(51242), Electrical Contractor(37364)
5	Mr Prashant Shinde	B.E Mechanical, IGBC Accredited Professional, Certified Energy Auditor
6	Mr Anil Yeole	ISO Lead Auditor, M.Com, P.G.D.B.M., G.D.C&A.

ABBREVATIONS

AC DB: Air Conditioning Distribution Board

DB: - Distribution Board

DG: Diesel Generator

ICTP: Iron Clad Triple Pole Switch

IR: Insulation Resistance

LDB: Lighting Distribution Board

MCB: - Miniature Circuit Breaker

MCCB: - Moulded Case Circuit Breaker

SFU: - Switch Fuse Unit

CONTENTS

COLLEGE INTRODUCTION

INTRODUCTION

New Arts, Commerce and Science College, Parner established in July 1977 is one of the leading colleges in the SPPU region. It is affiliated to Savitribai Phule Pune University, Pune and recognised under 2(f) and 12(B) of the UGC.

The college has figured in rank band of 101-150 in the NIRF rankings 2017 released on 3rd April 2017 by National Institutional Ranking Framework, Ministry of Human Resource Development and GoI.

The college is recipient of Best College Award 2014 given by SPPU. The College is recipient of fifteen state and university level awards during last five years for its excellence in academic, social activities, performance of NSS, NCC, and Students Welfare Board and for its college magazine Chetana.

More than 24 SPPU academic rankers in the last four years indicate the quality of teaching, learning imparted in the college. During the last four decades, the college has made a great contribution to the educational and social development of the Parner tahasil. Fortunately, Parner is blessed with the philosophy of social workers like Padmabhushan Anna Hazare and Popatrao Pawar.

The college has a clean and beautiful campus of 11.4 acres with adequate plantation despite meagre rainfall.

There has been continuous extension and up gradation of infrastructure in terms of classrooms, laboratories, library, gymnasium, hostels, seminar halls, auditorium, guesthouse, equipment, instruments, language laboratory, etc.
The college library is one of the best centres for reference and information in the region. It has more than 41843 books, 61 journals and 452 CD/DVDs.
The present student enrolment is 2416. The total number of programmes offered at present is 42 which include 15 UG, 11 PG, 02 research centres and 14 certificate courses.
The college has continuously upgraded its academic profile with new academic programmes as per the need of the time and to make available the new avenues of career options to students.
Most of the UG academic programmes have been subsequently extended to PG and further to research programmes to ensure progression to higher levels.
During the last five years 02 UG programmes, 07 PG programmes and 02 research centres and 12 certificate courses have been newly introduced.
The college has invested enormous amount to create required infrastructure to run them efficiently.
Over the years, the college has maintained its distinct position in introducing new academic programmes with immediate effect as and when designed and approved by the university.
A wide range of programmes has provided greater need based choices to the students.

VISSION

To make social development through quality education to poor and socioeconomically deprived masses and rural youth.

MISSION

To make all round personality development of students through disciplined teaching-learning process.

OBJECTIVES

- To encourage students in general and girls in particular for quality teaching-learning processes.
- To inculcate scientific temper and humanitarian approach among society in general and students in particular.
- To encourage students to learn modern techniques and methodologies.
- To inculcate values and social responsibilities among students.
- To address to the global and local needs to.

LOCATION


State Bank of India
Parner College Rd
New English Schoo
& Junior College
Cafe Creme
Takeout
Bank Of Baroda
New Arts, Commerce and
Science College, Parner
Science Building
Church Rd
Vishnaharta Hospital
Hotel Gaurav
Layers
Google

ESSENTIAL MAESURES TO BE TAKEN / RECOMMENDATIONS

Sr No	Observations	Recommendations	Remarks
1	Electrical panels are very old and getting rusted	Replaced all electrical panels with new panels as per standards	
2	Outside area electrical panels	Change the height of electrical panels outside area above minimum 2 meters from ground Panels should be waterproof as placed outside.	Height very near to ground.
3	Electrical Single Line Diagram (SLD) not available	Make proper Electrical Single Line Diagram (SLD) of the lectrical system	Should be pasted on each electrical panels
4	No display name sign board on each electrical panel	Paste sign name board on each electrical panel with SLD, authorised person photo, name and contact number	Do not get idea of electrical supply of cable to feeders for any new member
5	Personal Protective Equipment's (PPE) are not used	Use proper PPE while working during electrical works	Personal risk hazards of electric shock, fire burns etc
6	No sign board of use of PPE sign boards on each electrical panel	Paste use of PPE sign boards on each electrical panel	
7	No work permit for internal as well as third party works in the premises	Make work permit for internal as well as third party works in the premises	
8	No lock-out system for electrical maintenance works in the station	Make proper tags of lock-out while during electrical maintenance work	
9	No lighting arrester for Solar PV system	Installed lighting arrester for Solar PV system as per Indian standards	
10	Thermography study of electrical panels not done before	Do the Thermography study of electrical panels and cable connections	Recommended to do once in 6 month

CHECK LIST

Sr No	Description	Observations	Remarks
1	Is there electrical single line diagram available in electrical room?	No	Prepare the Single Line Diagram(SLD) and make available in electrical room/office reception
2	Is their good adequacy of illumination in electrical rooms/around panels, DBs?	Partially	Increase the lux level near and in electrical rooms/ panel area
3	Is there proper naming on feeders?	No. Not observed on single panel	Name boards showing feeder names should be pasted on each panel
4	Is there proper colour coding of cables?	Yes	-
5	Size of cables for R, Y, B & neutral and actual current	Variable sizes at different energy meters incomers.	-
6	Rating of switchgears (Fuse, MCB, MCCB) with respect to actual load	Variable sizes at different energy meters incomers	-
7	Are insulated mats are provided for LT room, UPS batteries & any electrical installations?	No	Please refer section – "Systems & Procedures – Observations & Recommendations"
8	List of contact person in case of any emergency?	No	List of contact persons near main electrical panel as well as at the reception as well as in each office should be provided. It should include Police, Fire, Ambulance, Electrician member contact details
9	Is system and body earthing provided to electrical panels?	Yes	-
10	Are proper sizes of lugs provided for cables?	Partially	Whenever small electrical work to be done in electrical panel lugs should be used.
11	Are glands provided for cable entries?	Partially	Some panels do not have glands for cable entry.
12	Was there any blast or cable burning in any electrical panels?	Yes.	Short circuit happened in the past at girl's hostel

14	Is electrician license copy available?	No	-
16	Is there any combustible material in LT room, UPS room, DG room?	Yes	LT room should be clean and free from any material
18	Is there lightning arrester for the building?	No	Install lighting arrester for building as per IS-2309, IS-3070-3
19	Is there any electrical safety training conducted before or not?	No	-
20	Thermography Study of electrical panels and cable connection before	No	Recommended Can do once in 6 month

IMPLEMENTATION PRIORITY RANKING

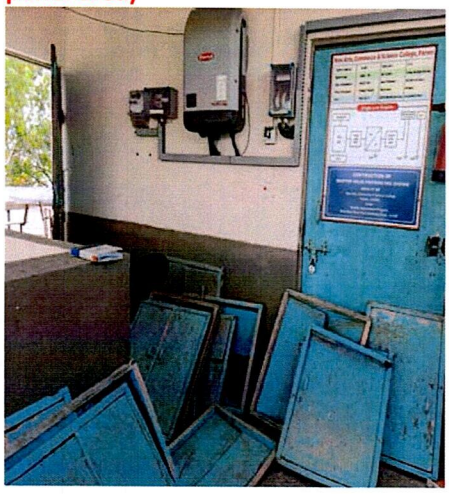
The implementation priorities and recommendations are ranked based on the risk levels. The approach followed is a Semi-Quantitative Risk Ranking (SQRR) technique, which is based on the audit team's expertise.

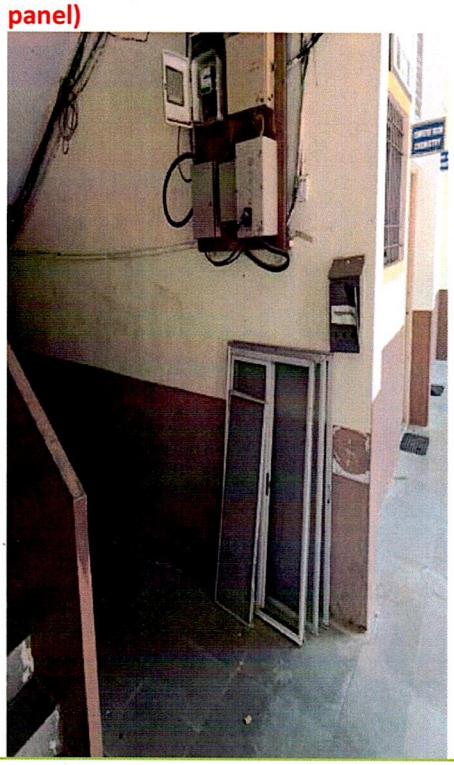
In this report, the implementation priority is ranked based on the experience of the auditor and with a priority towards human safety for the Electrical Risk Assessment and hence is indicative only. This section of the report contains the implementation ranking for individual recommendations.

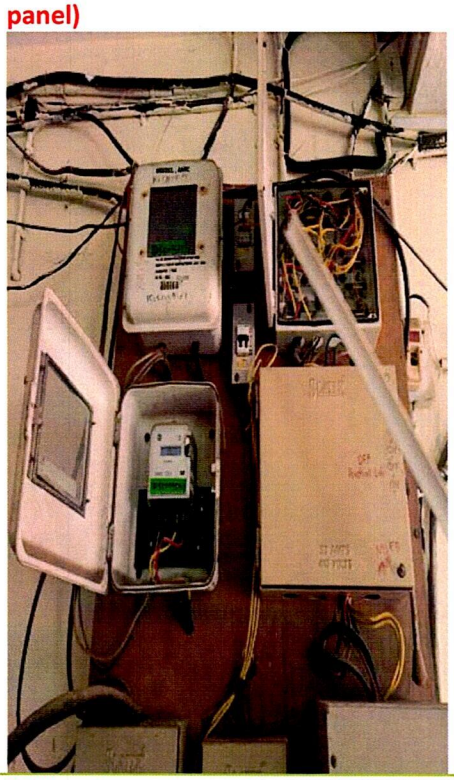
Recommendation priority	Criterion
Very High	Recommendations that require immediate implementation
High	Recommendations that require implementation within two months
Medium	Recommendations that may be implemented within next six months
Low	Recommendations that may be implemented during the next available opportunity

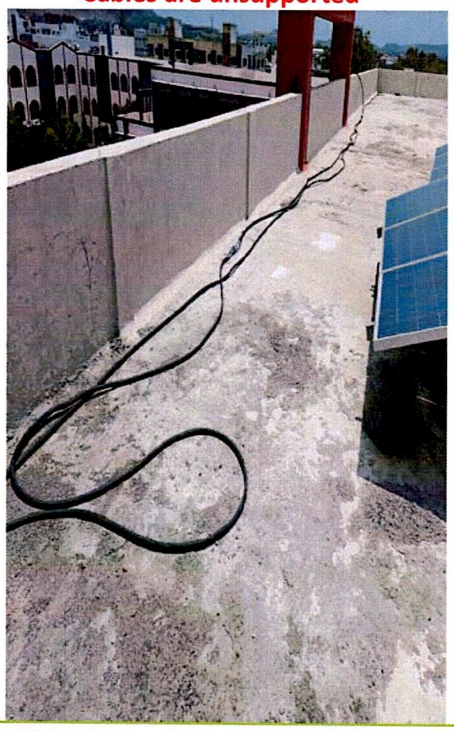
SYSTEM AND PROCETURES- OBSERVATIONS AND RECOMMENDATIONS

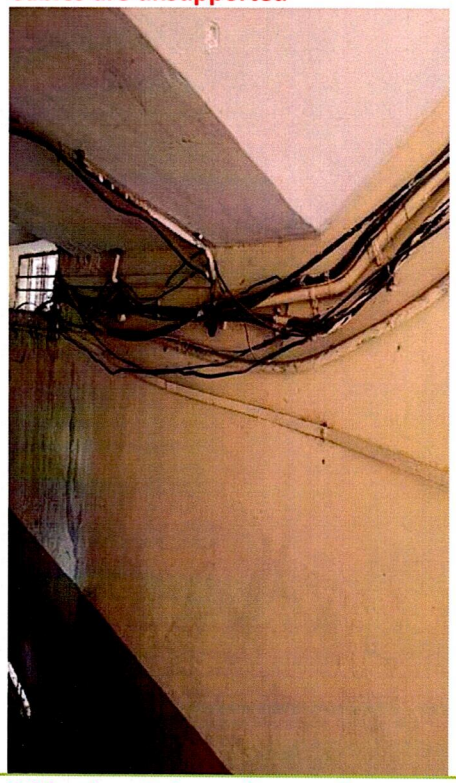
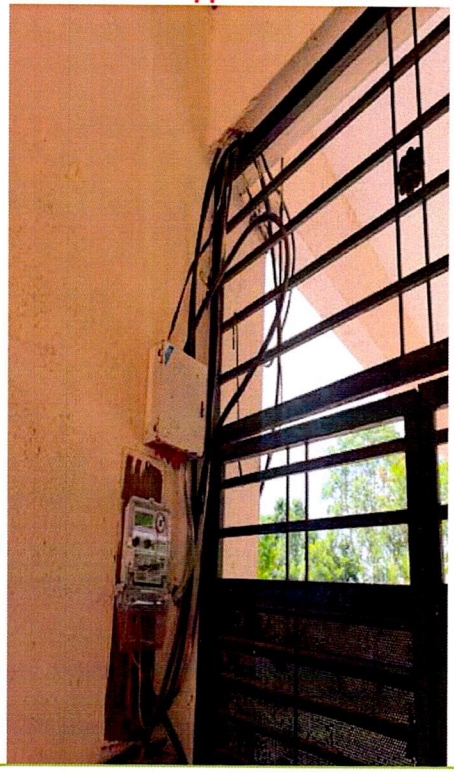
ELECTRICAL SAFETY

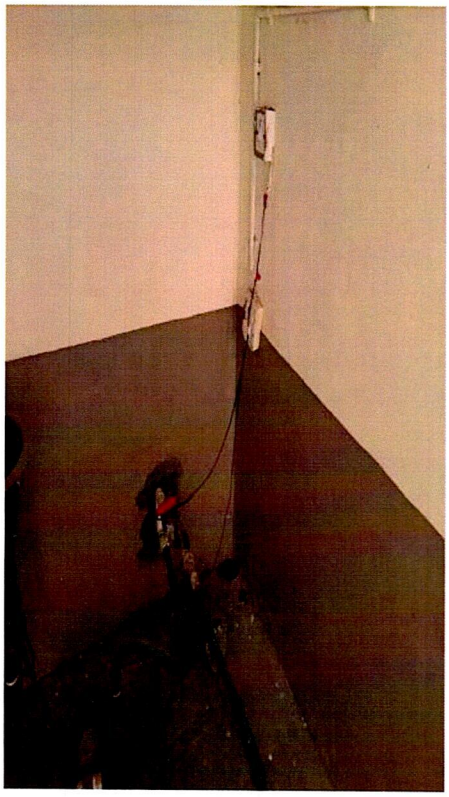
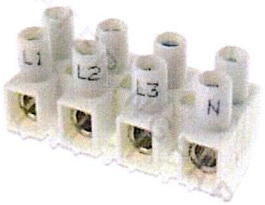
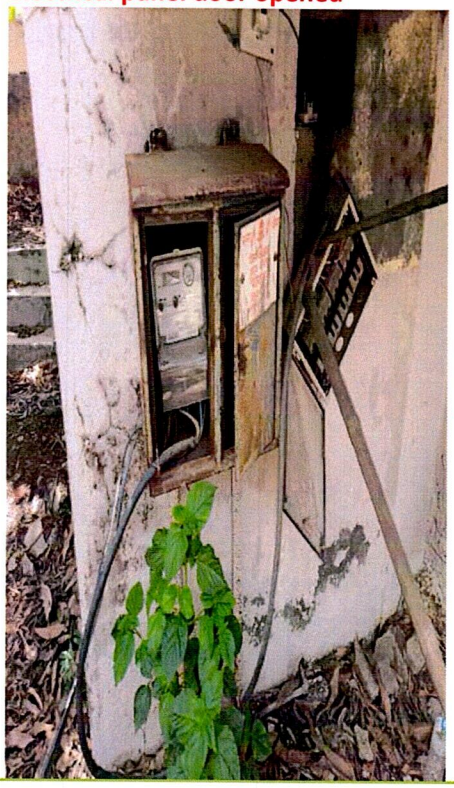
Sr No	Observations	Recommendations	Reference Standard Rule	Risk Category
1	**Unwanted material** **(Common point for all electrical panel area)** 	It is extremely dangerous to keep such unwanted materials in electrical room. It is recommended to clear up the unwanted material immediately.	IE Rules 1956 Rule 68 (a)	**High**
2	**Unwanted material** **(Common point for all electrical panel area)** 	It is extremely dangerous to keep such unwanted materials in electrical room. It is recommended to clear up the unwanted material immediately.	IE Rules 1956 Rule 68 (a)	**High**

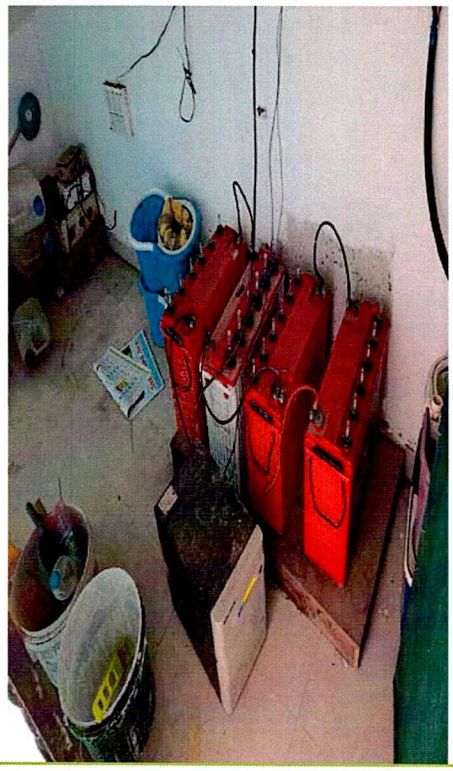
3	**Glands are not used for cable entries in feeder.** **Also unwanted openings observed** **(Applicable to all electrical panels)** 	**-Use glands for cable entrance. Gland helps to protect cable insulation from sharp edge cutting.** **-Close unwanted opening properly.** 	**IS 1646 Section 6.5**	**Very High**
4	**Rubber mat is not provided near all electrical panels.** **(Common point for all electrical panel)** 	Provide rubber mat for panel. The rubber mat shall confirm to IS 15652 	IE Rules 1956 Rule 36 IS 5424 : 1969	**High**

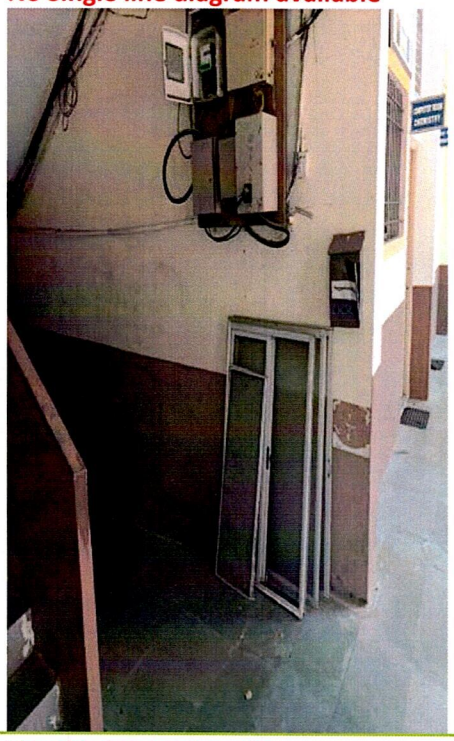
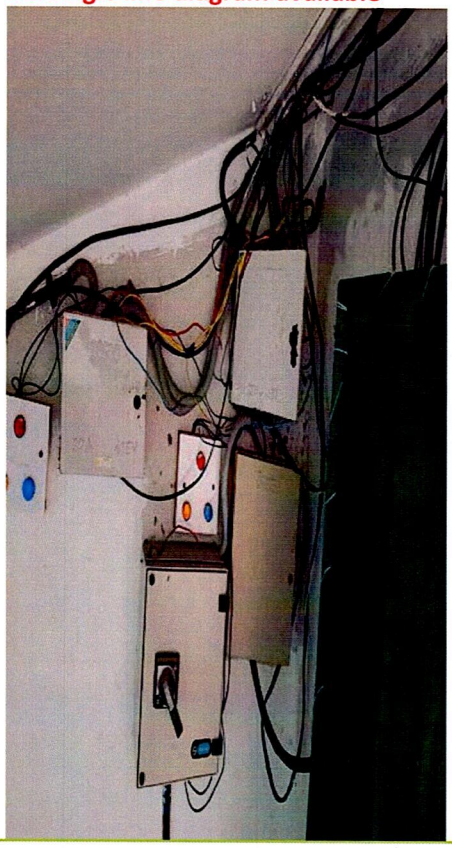
5	**Lugs are not used for electrical connections.** **Open connections** **(Common point for all electrical panel)** 	**A connection without lugs becomes loose over a period of time. Lugs should be used for good electrical connections.** 	**IE Rule 1956 Rule 117 (4) IS 2412 : 1975**	**Very High**
6	**Wiring is not dressed properly. Cables are unsupported** 	Wiring should be properly dressed. It should be properly supported and should not be hanged unsupported.	IE 1956 Rule 36 (1) IS 732:1989 IS:9537(Part-1)-1980	**High**

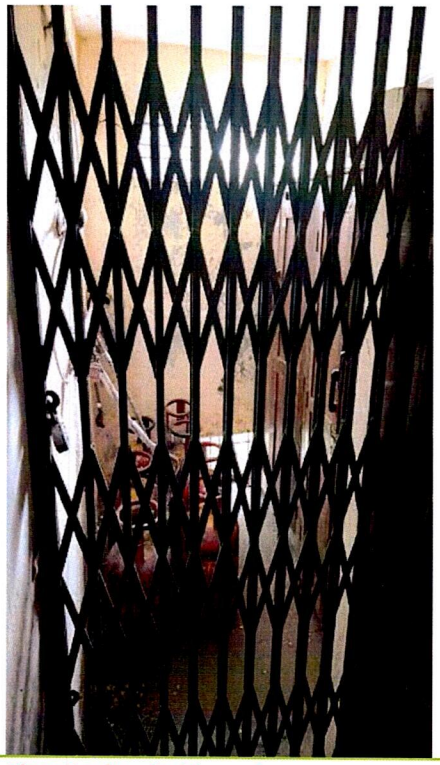
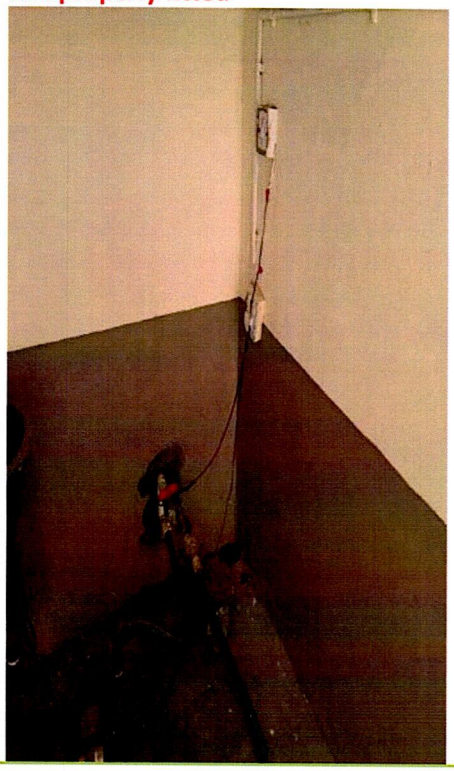
7	**Wiring is not dressed properly. Cables are unsupported** 	Wiring should be properly dressed. It should be properly supported and should not be hanged unsupported.	IE 1956 Rule 36 (1) IS 732:1989 IS:9537(Part-1)-1980	**High**
8	**Wiring is not dressed properly. Cables are unsupported** 	Wiring should be properly dressed. It should be properly supported and should not be hanged unsupported.	IE 1956 Rule 36 (1) IS 732:1989 IS:9537(Part-1)-1980	**High**

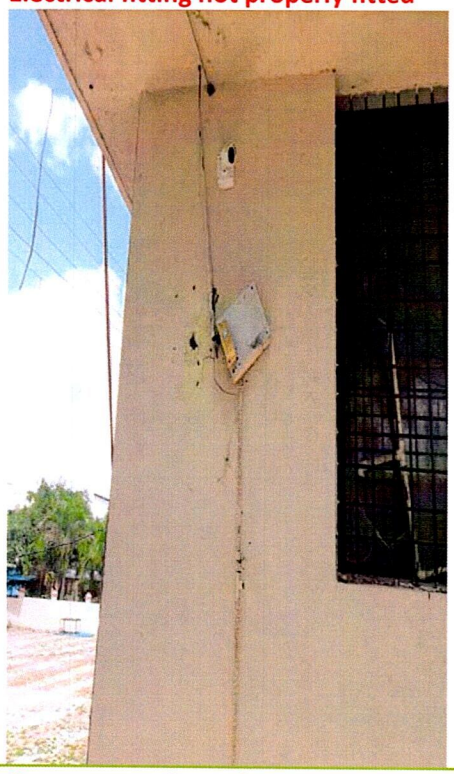
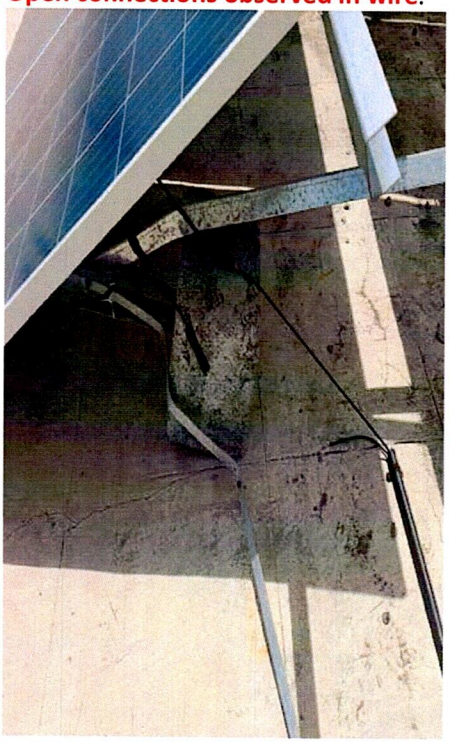
9	**Wiring is not dressed properly.** **Cables are unsupported** 	Wiring should be properly dressed. It should be properly supported and should not be hanged unsupported.	IE 1956 Rule 36 (1) IS 732:1989 IS:9537(Part-1)-1980	**High**
10	**Wiring is not dressed properly.** **Cables are unsupported** 	Wiring should be properly dressed. It should be properly supported and should not be hanged unsupported.	IE 1956 Rule 36 (1) IS 732:1989 IS:9537(Part-1)-1980	**High**

11	**Insulation tape joints observed in wire.** 	Avoid insulation tape joints use proper size of connector for joint. 	IE 1956 Rule 36 (1) IS 732:1989	**High**
12	**Electrical panel door opened** 	**Closed the door when not in use or any electrical work**	**IS 1646 Section 6.5** **IE 1956 Rule 36 (1)** **IS 732:1989**	**High**

13	Unwanted material placed near batteries 	-Remove unwanted material from batteries. - Also placed the batteries at safe place or with as per standards of protection.	NFPA	High
14	Fire extinguisher due date expires but it is still not renewed. 	There should be regular inspection and maintenance of fire extinguisher from authorised person. Testing of the fire extinguisher should be done. Practice of regular AMC of fire extinguisher should be followed.	IS 2190-2010 Section 11,12,13,14, 15	Very High

15	**No panel name boards** **No Single line diagram available** 	-It is highly recommended that there should be name boards for each electrical panels -Single line diagram of each panel should be pasted on each panel.	**IS 732:1989**	**High**
16	**No panel name boards** **No Single line diagram available** 	-It is highly recommended that there should be name boards for each electrical panels -Single line diagram of each panel should be pasted on each panel.	**IS 732:1989**	**High**

17	Wooden cupboards are observed in LPG gas cylinder room 	-Strictly prohibited any active fire catching material in LPG cylinder room which prone to high risk of fire hazards		Very High
18	Electrical switchboard Not properly fitted 	It is highly recommended that properly fixed the electrical fittings or switchboards. It should not be hanging.	IE 1956 Rule 36 (1) IS 732:1989 IS:9537(Part-1)-1980	Very High

19	Electrical fitting not properly fitted 	It is highly recommended that properly fixed the electrical fittings. It should not be hanging.	IE 1956 Rule 36 (1) IS 732:1989 IS:9537(Part-1)-1980	Very High
20	Open connections observed in wire. 	It is highly recommended that to fix the open joints of solar panel connections as it is DC cable having DC voltage more than 100 V	IE 1956 Rule 36 (1) IS 732:1989	High

THERMOGRAPHY AUDIT

INTRODUCTION

This THERMOGRAPHIC INSPECTION is designed to assess the performance of all switchgears, cable terminations, bus bar joints on site and to highlight areas which require attention.

Thermography is a term used to describe a type of photography that uses infrared radiated wavelengths to make pictures as opposed to visible lights as in normal photographs it can be also referred to as "THERMAL IMAGING" or "INFRARED".
Objects that have a temperature above absolute zero emit infrared wavelengths. Thermography is the production of thermal (heat) pictures from these wavelengths, whereby temperature measurements or comparative analysis can be made.

SCOPE

Infrared thermal scanning of all electrical switchgear and associated areas is taken to identify equipment operating near or above desirable/ safe temperatures.
Depending on the basis of recorded temperature, 'priority' for remedial action has been given.

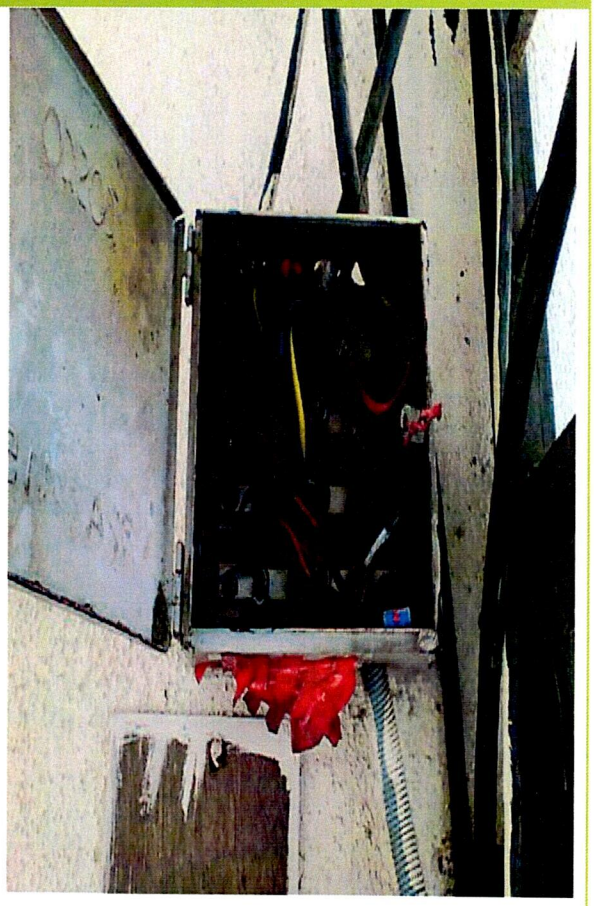
IMAGE AND OBJECT PARAMETERS	
Thermal Imaging camera	FLIR_E6
IR Resolution	160 X 120
Emissivity	0.95
Reflected Temperature	20 Deg C
Ambient temperature	30 Deg C
Object distance	1mtr from object

PRIORITY CODES AND ACTIONS			
Priority Code	**Temperature Level**	**Abnormalities Descriptions**	**Color Code**
0	**Up to 50 ?C**	**NO ABNORMALITY ? No Action**	
1	**51?C to 70?C**	**ALERT ? Schedule work during next maintenance**	
2	**71?C to 90?C**	**SERVICE ? Take corrective action as earliest**	
3	**91?C to 100?C**	**CRITICAL ? Repair Immediately**	
4	**Above 100?C**	**IMMEDIATE ? Take shut down and repair immediately**	

EXECUTIVE SUMMARY

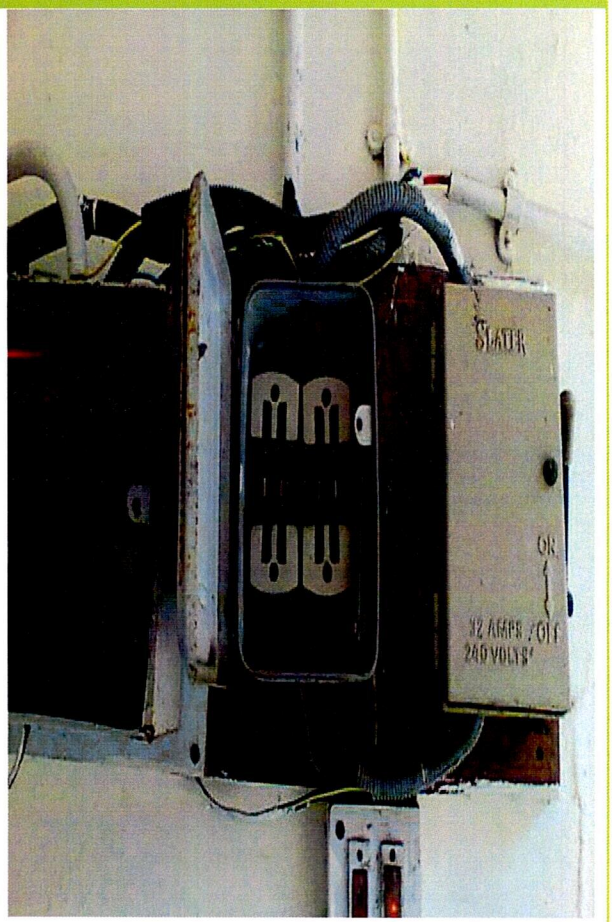
SR. NO.	LOCATION	MAXIMUM TEMPERATURE RECORDED (Deg.C)	RECOMMENDATIONS	PRIORITY
1	Girl's hostel- Bus bar panel	>254	Immediate take action for loose connections and proper wiring.	4
2	Girl's hostel- Fuse panel	30.9	No action required	0
3	Girl's hostel- Electrical panel	30.7	No action required	0
4	Science building- Electrical panel	64.7	Immediate take action for loose connections and proper wiring.	1
5	Science building Batteries in lab	33.1	No action required	0
6	Admin building- MCB panel	31.1	No action required	0
7	Admin building- Bus bar panel	28.6	No action required	0
8	Admin building- Bus bar panel	31.4	No action required	
9	Admin building- Fuse panel	28.9	No action required	0
10	Library- Electrical panel	42.8	Check for loose connections.	1
11	Arts, Commerce building- Bus bar panel- Solar	47.9	Check for loose connections.	1
12	Arts, Commerce building- Bus bar panel- Solar	8227	No action required	0

8199- Girl's hostel- Bus bar panel



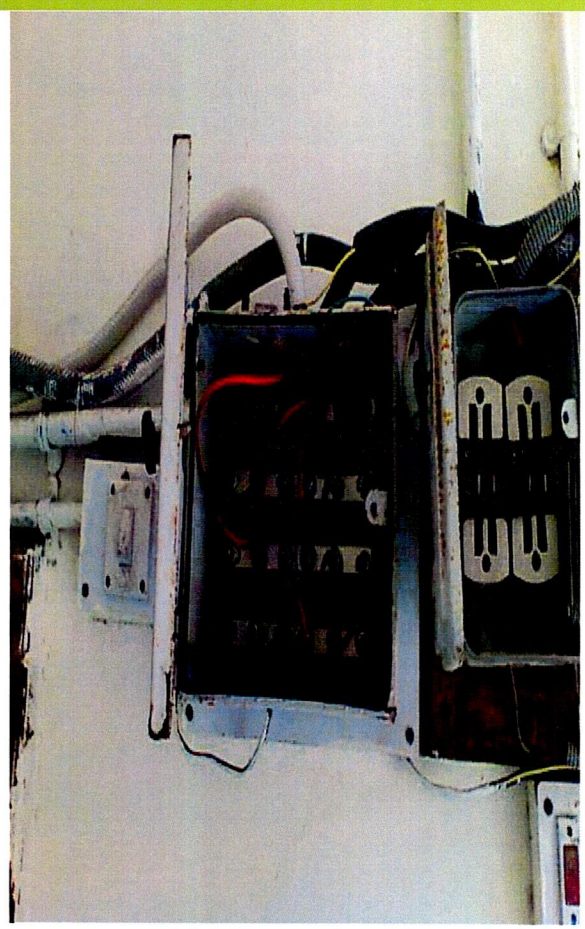
Maximum Temperature Recorded	>254Deg.C
Observation	Hot spot at bus bar and cable connections.
Recommendation	Immediate take action for loose connections and proper wiring.
Priority Code	4

8201- Girl's hostel- Fuse panel



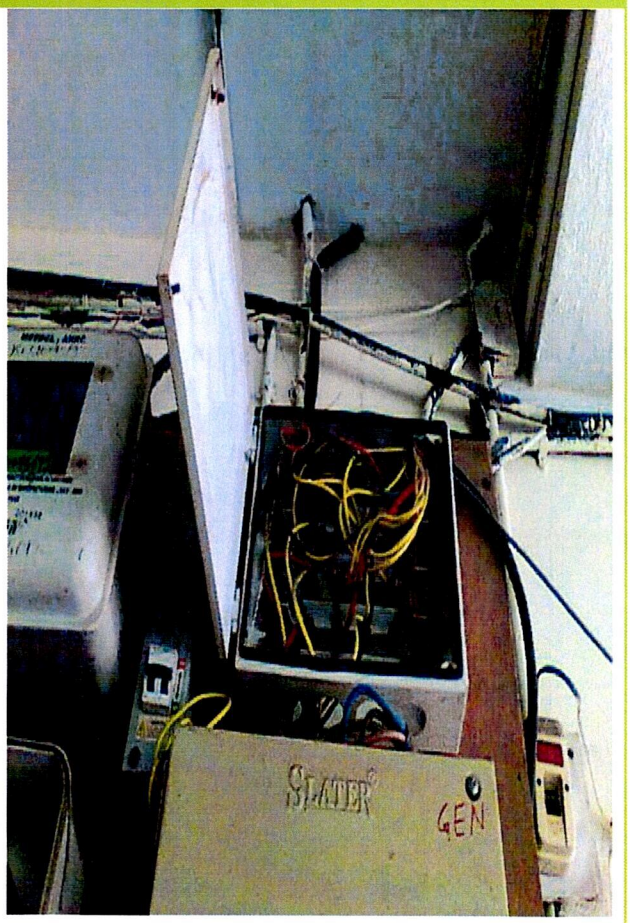
Maximum Temperature Recorded	30.9Deg.C
Observation	No abnormality found.
Recommendation	No action required
Priority Code	0

8203- Girl's hostel- Electrical panel



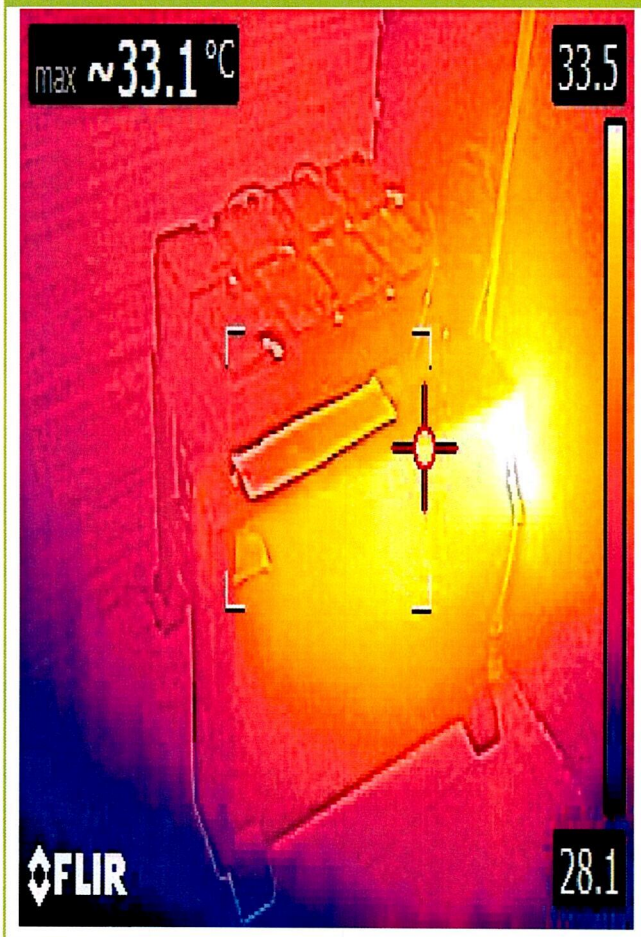
Maximum Temperature Recorded	30.7Deg.C
Observation	No abnormality found.
Recommendation	No action required
Priority Code	0

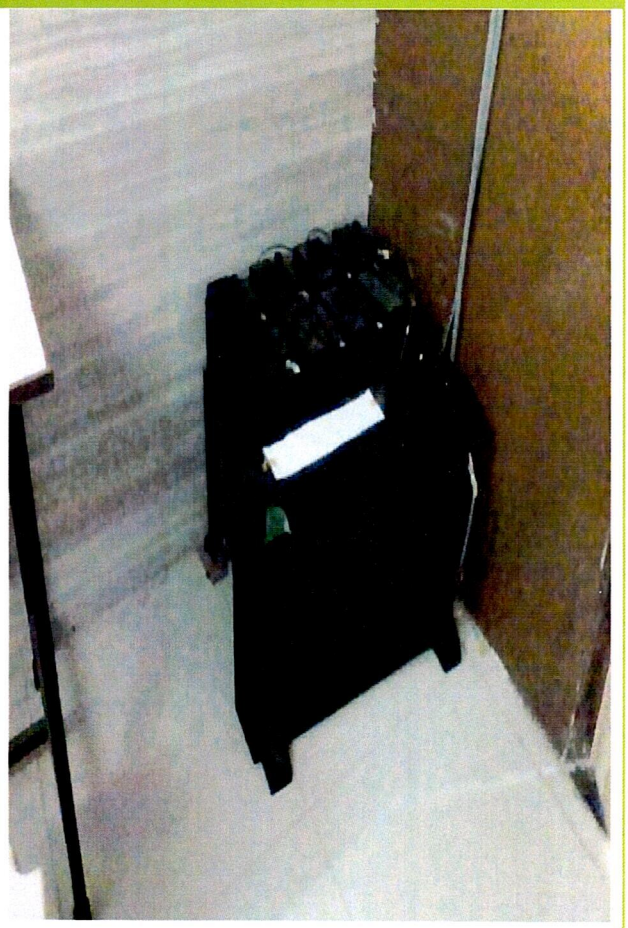
8209- Science building- Electrical panel



Maximum Temperature Recorded	64.7Deg.C
Observation	Hot spot at bus bar and cable connections.
Recommendation	Immediate take action for loose connections and proper wiring.
Priority Code	1

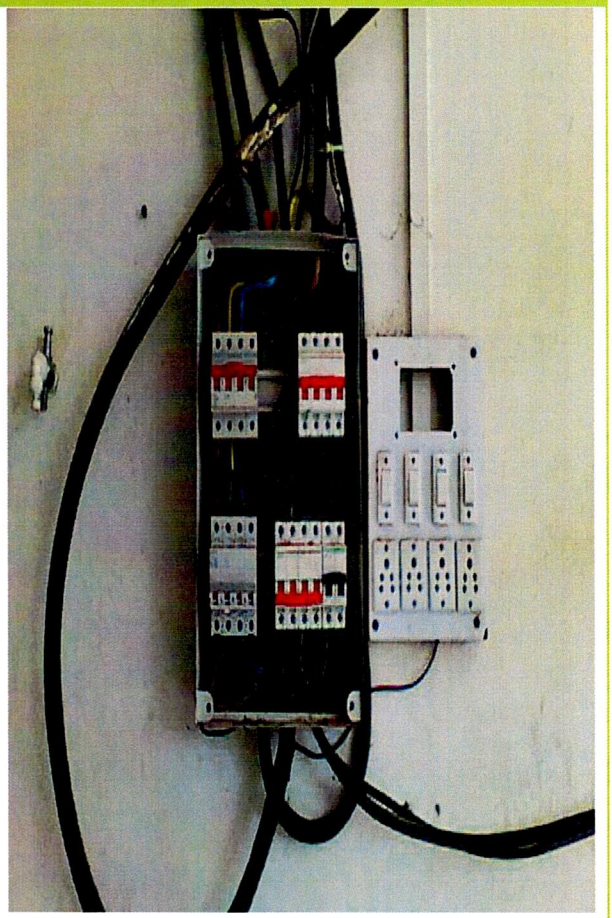
8211- Science building Batteries in lab





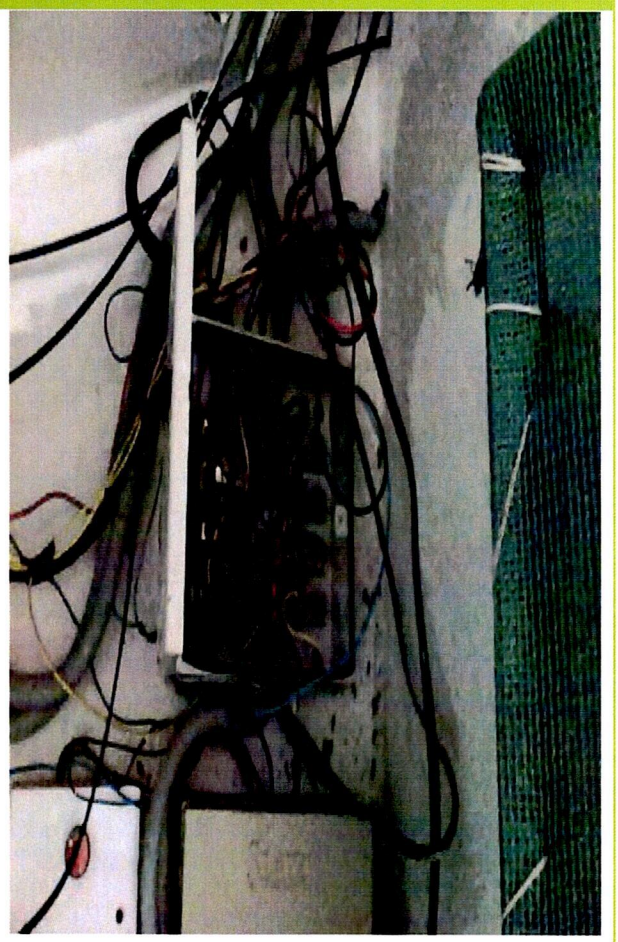
Maximum Temperature Recorded	33.1Deg.C
Observation	No abnormality found.
Recommendation	No action required
Priority Code	0

8213- Admin building- MCB panel



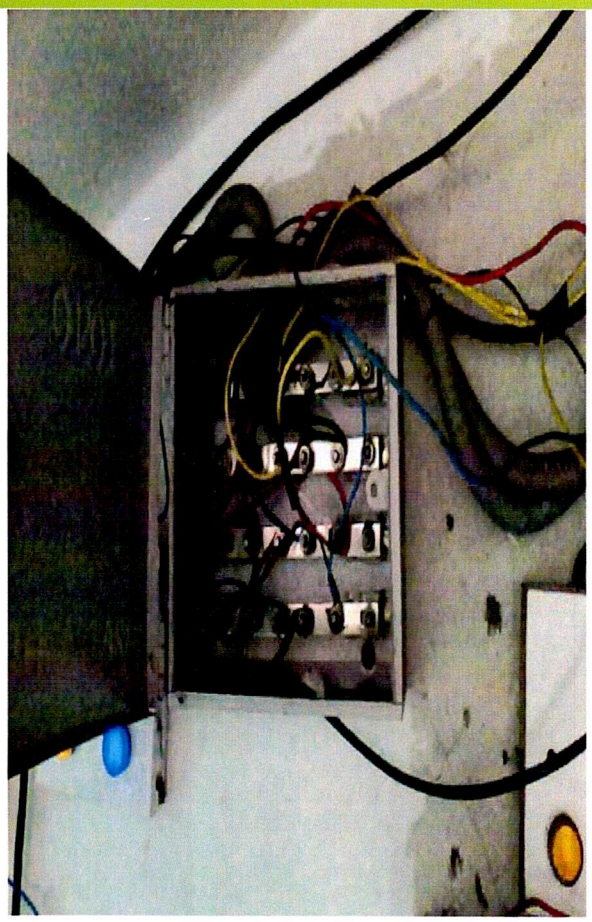
Maximum Temperature Recorded	31.1Deg.C
Observation	No abnormality found.
Recommendation	No action required
Priority Code	0

8215- Admin building- Bus bar panel



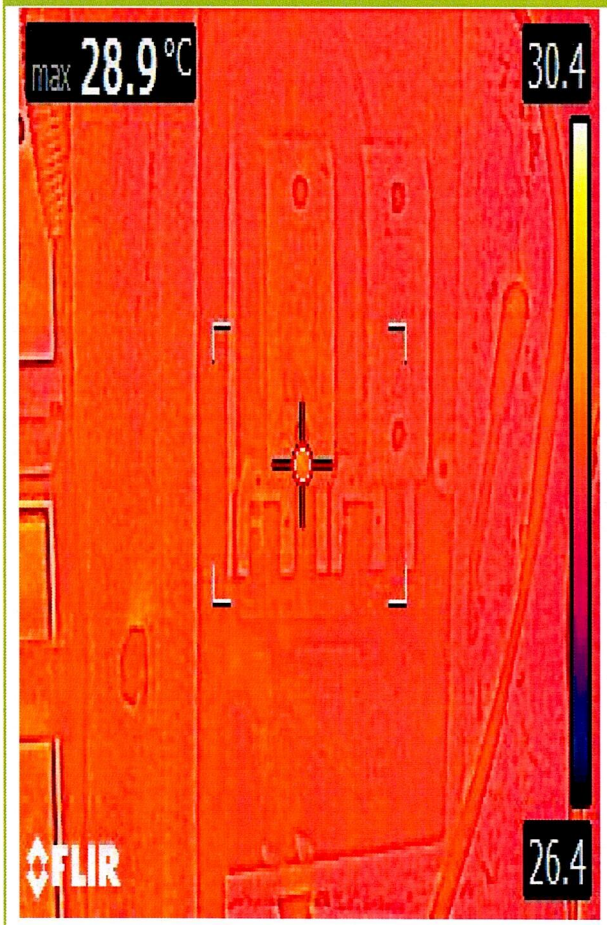
Maximum Temperature Recorded	28.6Deg.C
Observation	No abnormality found.
Recommendation	No action required
Priority Code	0

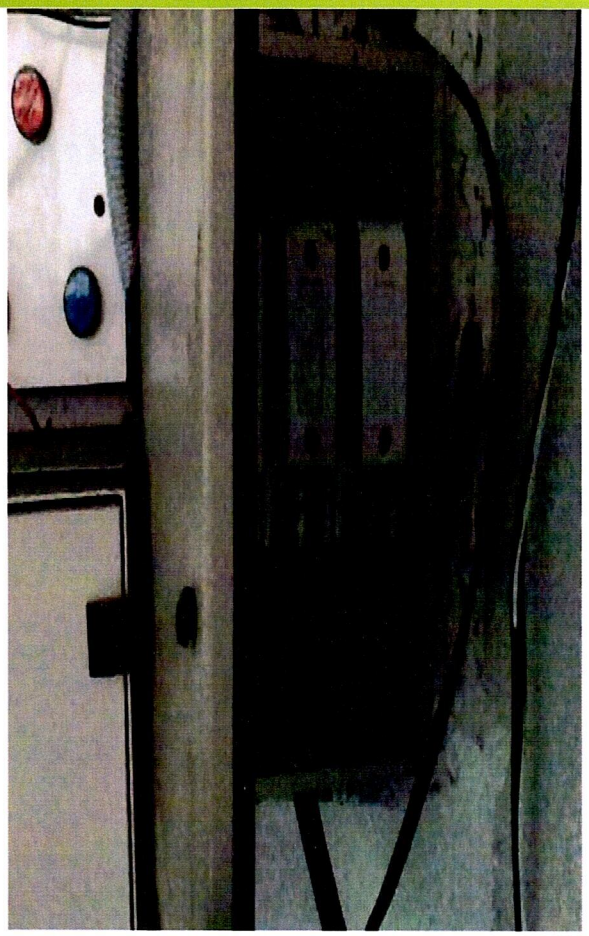
8217- Admin building- Bus bar panel



Maximum Temperature Recorded	31.4Deg.C
Observation	No abnormality found.
Recommendation	No action required
Priority Code	0

8219- Admin building- Fuse panel



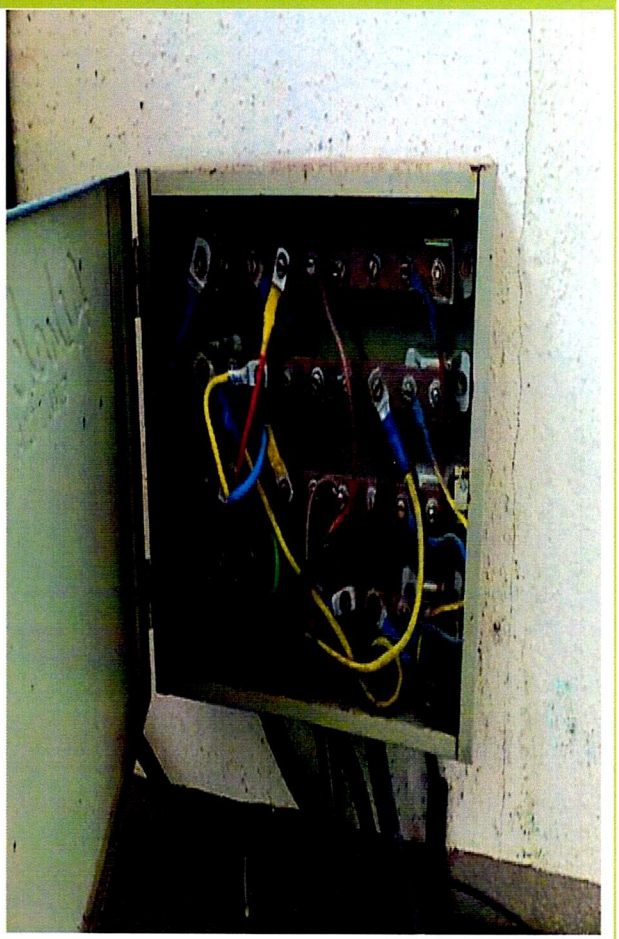


Maximum Temperature Recorded	28.9Deg.C
Observation	Hot spot at bus bar and cable connections.
Recommendation	Check for loose connections of bolts regularly in maintenance.
Priority Code	2

8223- Library- Electrical panel

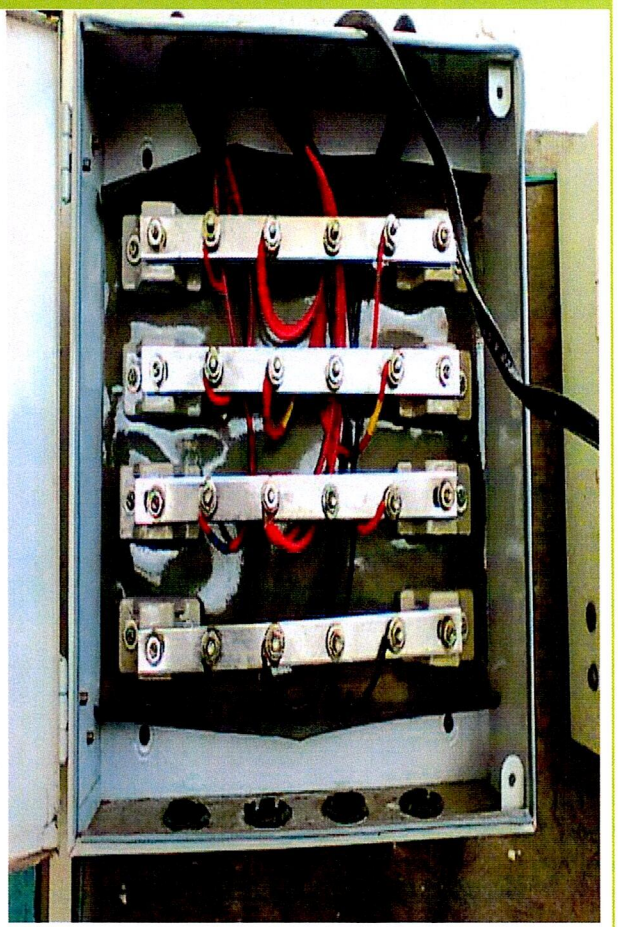
Maximum Temperature Recorded	42.8Deg.C
Observation	Hot spot at cable connections.
Recommendation	Check for loose connections.
Priority Code	1

8225- Arts, Commerce building- Bus bar panel- Solar



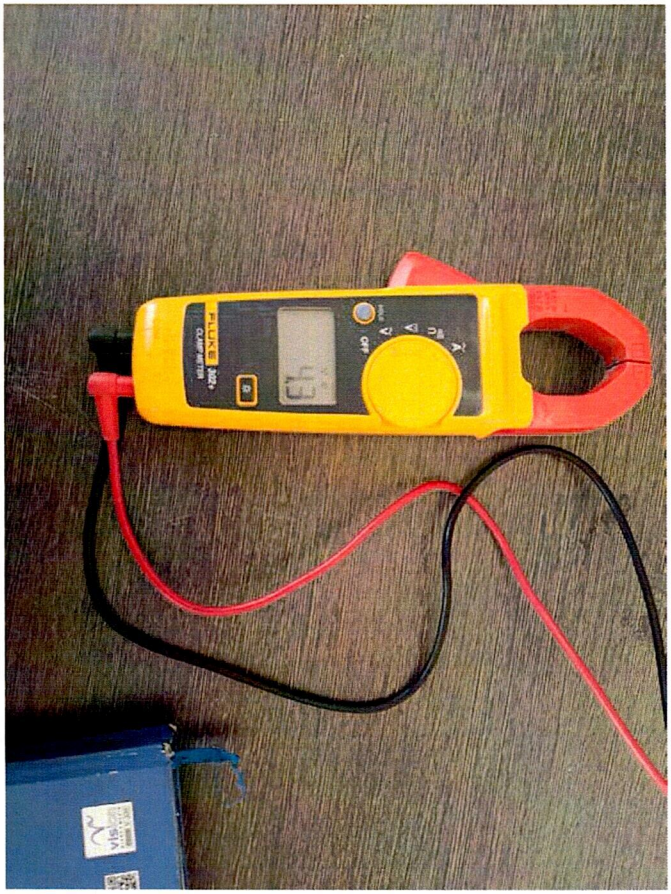
Maximum Temperature Recorded	47.9Deg.C
Observation	Hot spot at bus bar and cable connections.
Recommendation	Check for loose connections.
Priority Code	1

8227- Arts, Commerce building- Bus bar panel



Maximum Temperature Recorded	31.8Deg.C
Observation	No abnormality found.
Recommendation	No action required.
Priority Code	0

EARTHING TO NEUTRAL VOLTAGE TESTING



ACTUAL RESULT, OBSERVATIONS

Sr No	Particular	Resistance	Remark
		Ohm	
1	Earthing to Neutral voltage	4.3	**At higher side**

RECOMMENDATIONS

It is recommended that maintain the eating pits in the college premises as per Indian standards. Regularly pour the water for low resistance of earth pit.

GENERAL ELECTRICAL SAFETY – Do's & Don'ts

Do's

- Pull the plug itself, not the cord attached to it.
- Disconnect any appliance that sparks and have it repaired immediately.
- Always disconnect appliances before cleaning them.
- Turn off appliances when you leave home.
- Keep electrical cords away from hot appliances.
- Keep appliances clean and free of dust, lint and grease.
- Use moisture resistant cords when outside.
- Wear rubber soled shoes when operating power tools.
- Follow manufacturers' instructions when operating electrical devices. All electrical devices should carry an Underwriters Laboratory approval tag.
- Make sure outdoor electrical outlets are covered with weatherproof covers.
- Use extension cords only for temporary applications.
- Use heavy duty cords when using power tools.
- Keep work areas clean and dry. Sparks can ignite wood scraps, sawdust and solvents.
- Make sure your power tools are grounded or certified double insulated.
- When utilizing adapters, make sure to screw in the wire for grounding.
- Certain outlets for outdoor appliances or tools should have a ground fault interrupter (G.F.I). This type of circuit breaker, installed in an outlet, protects the user from shock.

Don'ts

- Never turn on an appliance when standing or sitting in water. Shocks can be fatal.
- Never overload a circuit by plugging in too many appliances.
- Plug three-way grounded plugs into appropriate outlets. Never tamper with the third prong.
- Never install cords under rugs where they will become worn by foot traffic.

DISCLAIMER

The information contained in this Electrical Safety Audit Report is given in good faith, based on the site survey and data provided by your site representatives to ENERFUTURE TECHNOLOGY PRIVATE LIMITED as on 7th June, 2021.

This safety report and its recommendations are based on the status of the site as on 7th June, 2021. ENERFUTURE TECHNOLOGY PRIVATE LIMITED, their auditors and / or their employees are not liable for the accuracy of the information provided to them neither, for any occurrences incurred due to change of site conditions after 7th June, 2021.