

LAWRENCE SCHOOL, SANAWAR BARNES HALL ELECTRICAL DESIGN BASIS REPORT

Revision	Description	Issued On	Basis for Revision
R0	Electrical Design Basis Report	April 2026	-

LIST OF PROJECT CONSULTANTS:

❖ **CLIENT & OWNER:**

LAWRENCE SCHOOL, SANAWAR

❖ **CONSULTING ARCHITECTS:**

AISHWARIYA TIPNIS ARCHITECTS

❖ **MEP CONSULTANTS:**

M/S. KETAN A. SHAH & ASSOCIATES,
MEP CONSULTANTS.

SYNOPSIS

This report briefs the Engineering principles behind the Conceptual Design Basis of Electrical services in a very systematic order on a section-by-section basis and produced by **M/S. KETAN A. SHAH & ASSOCIATES** for the **Proposed auditorium premises at Lawrence School at Sanawar.**

This report is organized to encompass the following sections,

1: Introduction

In this chapter, the project is briefly described for the usage with short explanation on the owners of the property, the location of the site, building description & the project team.

2: Scope of Services

This chapter explains the scope of **M/S. KETAN A. SHAH & ASSOCIATES** and is covered along with the emphasis on the other consultants' inputs required to complete the detailed design developments so that the Electrical package can be completed fully for the purpose of schematic design and tendering etc.,

3: Codes & Standards

In this section, all major relevant applicable codes and standards are listed.

4: ELECTRICAL Services Overview

This describes a quick explanation on the Electrical services description to get the glimpse of Electrical services distribution and orientation with respect to the project.

Chapter A: Electrical Services

This chapter describes from the very beginning of receiving of power to installation of equipment's to distribution of power for the multiplex.

Chapter B: Fire Alarm & PA Services

This chapter describes Fire Alarm & PA provision for the multiplex.

Chapter B: Security (CCTV) System

Here the Closed-circuit Television (CCTV) monitoring is described along with the basic concept of system design and method of cabling system / video streaming.

1.0 INTRODUCTION

➤ Building Description:

The Proposed Auditorium premises is coming up for **LAWRENCE SCHOOL at SANAWAR**.

The proposed auditorium has proposed 204 seats in the lower level & another 98 seats in the balcony. The proposed auditorium also comprises of the stage, a storage behind the auditorium & a wooden deck area.

2.0 SCOPE OF SERVICE

The Electrical scope of works generally includes the following disciplines of engineering,

Sr.No.	Engineering Discipline
1	Electrical Power system
2	LV switchgear and Panels
3	Distribution Board
4	LV cabling
5	Lighting and Power Wiring
6	Emergency Power system(standby / back-up DG)
7	Earthing
8	CCTV system

Notes:

1. For obtaining all approvals, **M/S. KETAN A. SHAH & ASSOCIATES** shall support with necessary drawings in consultation with respective specialized consultants/architect.
2. For all specialized activities listed above, **M/S. KETAN A. SHAH & ASSOCIATES** shall provide the necessary single point input and collect single point output and further integrate in our design wherever required/applicable.

3.0 CODES AND STANDARDS

Sr. No.	Code Description
1	NBC- National Building Code of India 2016
2	BIS -Bureau of Indian Standards.
3	NEC- National Electric Code of India
4	IEE -Institution of electrical Engineers

Chapter A: ELECTRICAL SERVICES



TABLE OF CONTENT

Chapter A: Electrical Services.

1. Incoming Electrical Power
2. Electrical Power Demand
3. Power Distribution.
4. Lighting
5. Generator Back up
6. Earthing

1.0 Incoming Electrical Power:

The power supply to the proposed auditorium is supposed to be received from the school premises itself and it may be of 415 V supply line. However, this is to be confirmed by the Client, through their electrical team. Being the auditorium single power supply will be received from the school main electrical supply.

2.0 Electrical Demand & Transformers:

Electrical load details for the proposed auditorium are worked out in detailed and the summary for the Total Power Requirement is given below: -

2.1

		Multiplex
1	CONNECTED LOAD IN KW	168.87 kW
2	TOTAL DEMAND LOAD	99.23 kW
3	SUPPLY REQUIRED IN KVA	From school main panel
4	DG SET REQUIRED IN KVA	1 no. 125 KVA, 100% back up for auditorium considered

Refer attached load calculation sheets for details

3.0 Power Distribution:

The main panel of the auditorium are proposed to be at the store room on the auditorium hall floor. The incoming cables/Feeders will be taken from the school main panel.

The auditorium is proposed to be backed by 20 kVA UPS for the sound system, LED screen, lighting dimming system.

Separate DB is proposed for stage lighting system which will feed power to the stage lights & respective equipments. The wiring of the same is to be done by the stage lighting vendor.

The Acs are fed from the AC panel connected to the main auditorium Panel for feeding power to all AC equipment's indoor and outdoor units. AC panel will have a control cable from Fire alarm panel which will be powered off in case of Fire. Separate single phase AC DB is also proposed for the single phase Acs in the auditorium.

A separate exhaust panel is proposed for the auditorium which will only be running in case of an emergency.

APFCR panel of 40KVAR capacity is proposed for the premises as per the demand load. Single dielectric capacitors proposed. The APFCR panel is to be provided with the switching off system

during the event of the change over from mains to DG & switching on system during the event of the change over from DG to mains.

4.0 Lighting:

Lighting Switching Concept

Area	Switching Strategy
Auditorium ceiling & side wall lights	DB Operated with Dimmable channel
Stage Lights	DB operated by dedicated DB for stage lights

The following are illumination levels are proposed.

Area	NBC Code (lux)	Proposed for this project
Auditorium	50-100-150	100

ELECTRICAL WIRING & CABLING:-

The wiring & cabling to be done would be as per the IS standards. FRLS PVC insulated Copper wires in MMS FRLS PVC conduit pipes to be used for all the circuit wiring & point wiring since the wiring is to be surfaced clamped in conduits. The main cables, the cables required for the Cinema Main Panel, common areas distribution boards & panels and all DB's would be done using LT XLPE armoured cables. For all cables up to 16 sq.mm. size, copper cables to be used. For the cables beyond 16 sq.mm. size aluminum cables to be used.

The distribution boards to be used for the various electrical power distribution would be as per the standard available distribution boards.

5.0 Generator Back-up:



One no 125 kVA Separate Diesel Generator (D.G.) sets is proposed in case of Power Failures for auditorium total Electrical load requirements. Hence there will be provision of 100% D.G. back-up. 'Electrical Load Estimate Sheet' is attached for the detailed calculations for arriving at generator capacity requirement.

6.0 Earthing:

Earthing will be of maintenance free type. Maintenance free Safe Earthing Electrode, Dia 80 mm, 3 mtr long with necessary Bags of corrosion resistant, hygroscopic, highly conductive Back Fill Compound including boring & Providing masonry enclosure with 10 mm thick C.I. cover plate having locking arrangement with test link arrangement The resistance to the earth will be maintained to about 1 ohm. Adequate number of earth pits shall be provided and connected in the closed network.

All the Electrical Equipment's, Panels, Distribution Boards etc., shall be earthed as per the requirement.

Number of Earth Pits requirement:

4 nos. for the UPS & UPS equipments including sound rack & LED screen (totally 4 nos.).

2 nos. for Main Panel.

The earthing pits installation scope is to be confirmed by the end clients & the mall authorities.

For mains earthing wiring for the UPS systems, copper cables to be used.

For the mains earthing wiring of the main panel, GI earthing strips welded at ends to be used.

Chapter B: FIRE ALARM AND PA SYSTEM)



For the auditorium, fire alarm system, public address system is to be installed. The same would be done as per the norms of the CFO(Chief Fire Officer) & NBC(National Building Codes). Addressable fire alarm system is proposed for the auditorium. The detectors, manual call points, hooters etc. to be connected to the main fire alarm panel of the school.

The following fire alarm devices are proposed:-

- Beam detector is proposed for the auditorium hall as the height inside the hall is more than acceptable limit of smoke detector.
- Manual call point along with Hooter is proposed at the exit location.

- Optical type Smoke detectors proposed in those areas where the height inside the hall is permissible for the operation of the smoke detectors.
- The Speaker system of the auditorium are to be integrated with the general public address system of the school for emergency announcement.
- FRLS copper armored cabling is proposed for the fire alarm system. The cabling to be used for the fire alarm system would be exposed on the ceiling and in Red colour as per the norms.
- Glow sign boards/battery operated sign boards comprising of signages for fire exit would be installed in the multiplex as per the safety norms.

The fire alarm system & the CCTV system to be installed in the auditorium. Cat 6 cables in FRLS conduit pipes to be used for the CCTV camera wiring.

Chapter C: SECURITY SYSTEM (IP BASED TYPE 'CCTV' SYSTEM)



CCTV cameras proposed to be installed in the auditorium. Dome type CCTV cameras with night vision to be installed here. The CCTV system make will be as per the client approved make list & specifications. The CCTV cameras to be connected to the main CCTV mux of the school. The cat 6 cabling in FRLS conduit pipes to be laid from the CCTV mux of the school till each CCTV cameras.

ANNEXURES

Annexure-

Annexure-1 Electrical Load Sheet.

	LAWRENCE SCHOOL AUDITORIUM CONNECTED LOAD						29-04-2026
SR. NO.	Description of Load	Connected Load (kW)	Power Factor	Connected Load (Kva)	Demand Factor	Maximum Demand (kW)	Maximum Demand (kVA)
1	Lighting & Power Load	69.12	0.90	76.80	0.60	41.47	46.08
2	UPS Load	21.95	0.90	24.39	0.70	15.37	17.08
3	HVAC Load	24.40	0.90	27.11	0.60	14.64	16.27
4	PLANT ROOM	46.25	0.90	51.39	0.60	27.75	30.83
5	Smoke Exhaust & Make up fans	7.15	0.90	7.94	-	-	-
	TOTAL	168.87		187.63		99.23	110.25
	SUMMARY						
	Connected Load (kW)	168.87	kW				
	Connected Load (kVA)	187.63	kVA				
	Maximum Demand (kW)	99.23	kW				
	Maximum Demand (kVA)	110.25	kVA				
	POWER REQUIRED						
	Max. Demand considering PF as 0.9	110.25	kVA				
	Power Incomer required	110.00	kVA				
	DG RATING(for auditorium)						
	Demand load	110.25	KVA				
	DG rating(considering 85% load on DG set)	129.71	KVA				
	DG set capacity Recommended	125.00	KVA				
	POWER FACTOR CORRECTION(for auditorium)						
	Demand Load (kW)	99.23	kW				
	Load power factor	0.60					
	Considering p.f. improvement from 0.6 to 0.99	0.39					
	Demanded kVAR	38.70	kVAR				
	Proposed size of capacitor bank	40.00	kVAR				

LAWRENCE SCHOOL CONNECTED LOAD**AUDITORIUM LIGHTING & POWER LOAD:-**

Ceiling Spot Light(32W)	50	x	32 Watts	=	1600 Watts
LED Tube -manintenance light	2	x	40 Watts	=	80 Watts
LED Tube lights	2	x	18 Watts	=	36 Watts
16A. Switch socket	10	x	200 Watts	=	2000 Watts
Side wall light	1	x	10000 Watts	=	10000 Watts
Fire alarm system	1	x	200 Watts	=	200 Watts
CCTV mux	1	x	200 Watts	=	200 Watts

14116 Watts**STAGE LIGHTING**

Stage light					40000 Watts
stage craft					15000 Watts

55000 KW**TOTAL CONNECTED LOAD**

AUDITORIUM LIGHTING & POWER LOAD:-					14116 Watts
STAGE LIGHTING					55000 Watts

69116 Watts**69.12 KW**

LAWRENCE SCHOOL AUDITORIUM CONNECTED LOAD**UPS LOAD:-****AUDITORIUM**

Audio Rack	1	x	10000 Watts	=	10000 Watts
LED Screen	1	x	10000 Watts	=	10000 Watts
Step Lights	70	x	14 Watts	=	980 Watts
Exit Lights	2	x	200 Watts	=	400 Watts
LED Spot Lights	8	x	32 Watts	=	256 Watts
Tube lights	1	x	18 Watts	=	18 Watts
Seating chair light	50		2 Watts	=	100 Watts
16A. Switch Socket Combine	1	x	200 Watts	=	200 Watts

21954 Watts**21.95 KW**

LAWRENCE SCHOOL AUDITORIUM CONNECTED LOAD**TOTAL HVAC LOAD**

Stage 5.5 TR. Ceiling suspended AHU	2	x	3000 Watts	=	6000 Watts
Auditorium 13 TR. Ceiling suspended AHU	2	x	7500 Watts	=	15000 Watts
Auditorium lower level 3.0TR. Ceiling suspended AHU	1	x	1199 Watts	=	1199 Watts
A.V.Room 4.0TR. Ceiling suspended AHU	1	x	2200 Watts	=	2200 Watts

24399 Watts**24.40 KW.****SMOKE EXHAUST EMERGENCY SUPPLY**

Auditorium	1	x	7150 Watts	=	7150 Watts
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7150 Watts**7.15 KW.****PLANT ROOM**

Air cool chiller - 40 TR	1	x	44000 Watts	=	44000 Watts
Primary CHW pump	1	x	1500 Watts	=	1500 Watts
Primary CHW pump-standby	1	x	1500 Watts	=	Watts
Pressurisation system		x	1500 Watts	=	750 Watts

46,250 Watts**46.25 KW.**