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LEIGHTON ALLEN

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Electrical Wiring Plan

Introduction

Electrical wiring plan is compulsory for architectural drawing set as this will help the engineers to understand the wiring and other outlet points for the building. In this plane we have created a wiring plan for the house. In this report calculated the cable size for the house plan including lighting fixtures for appropriate lighting in house. As the advances in the technology wiring and electrical circuits has become more sophisticated creating less electrical breakout and fire.

For this task different tools were used:

- AutoCad 2D
- Microsoft Excel
- Microsoft word

Wiring and Lightning Design

Each room has been given multiple light sources according to the size of room. Single plate switch is provided in each room. Number of single plate switches are allocated according to the room size. Double plate switches are provided as design in plan.

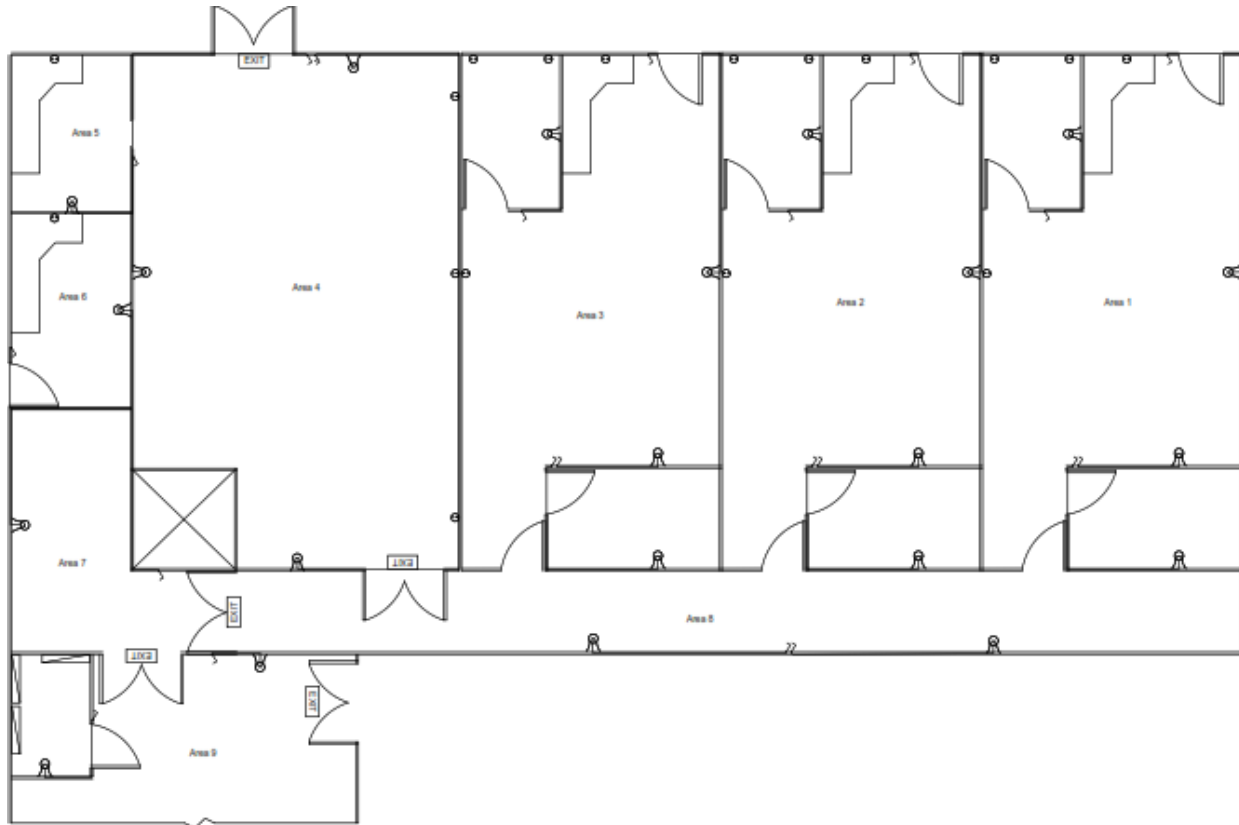


Figure 1 Lightning Fixtures

In the Figure 1 Lightning Fixtures every room is equipped with light fixtures shown on the wall with each room having single plate switches and hallway has double plate switches.

Room1/ Area 1

The Area 1/ Room1 in our house plan has one regularly lightning option and one emergency lightning option, in addition to that room1 has one single plate switch and one double plate switch. Room is equipped with four light switches and 4 light bulbs.

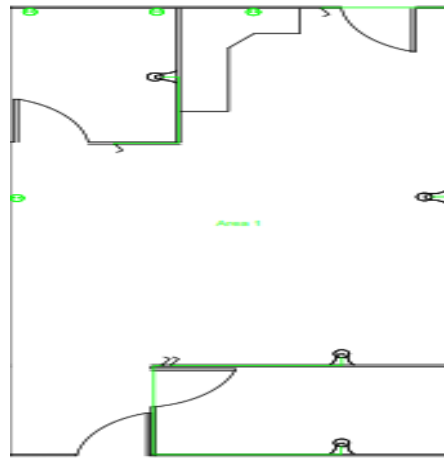


Figure 2 Room1

Room2/Area2

The Area 2/ Room2 in our house plan has one regularly lightning option and one emergency lightning option, in addition to that room2 has one single plate switch and one double plate switch. Room is equipped with four light switches and 4 light bulbs.

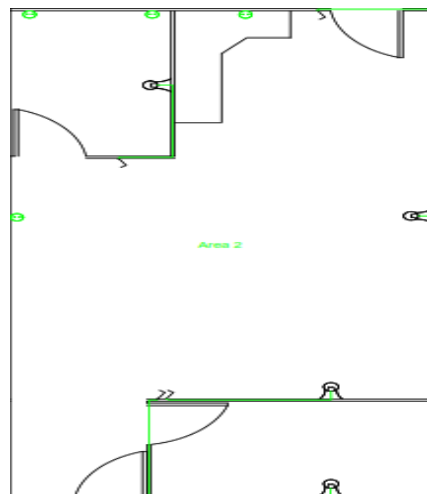


Figure 3 Room2

Room3/Area3

The Area 3/ Room3 in our house plan has one regularly lightning option and one emergency lightning option, in addition to that room3 has one single plate switch and one double plate switch. Room is equipped with four light switches and 4 light bulbs

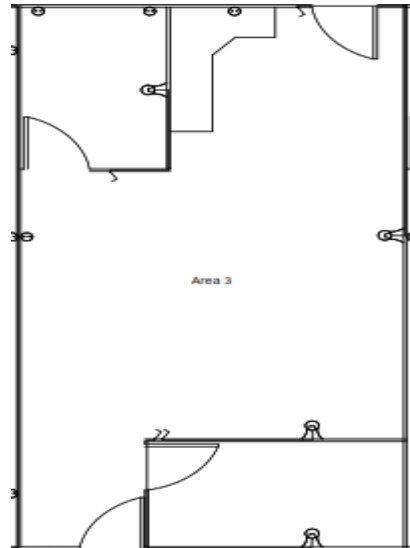


Figure 4 Room3

Kitchen/Area4

Area 4 is designated as kitchen, kitchen is equipped with all the utilities such as kitchen cooker and tumbler dryer , lightning is sufficient , it has three lights and three electrical sockets.

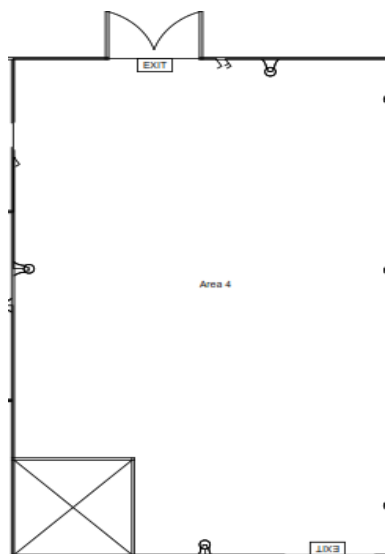


Figure 5 Kitchen

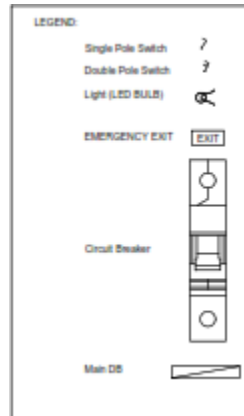


Figure 6 Symbols for Lighting Fixtures

Circuit Breaker and Wiring

Based on the load calculation the total load is distributed to eight circuit breakers as in following diagram. According to NEC requirements each limits the receptacles on each circuit. In our design we have created eight circuit which have different loads on them, by this way each circuit can operate individually and provides safety to its receptacles.

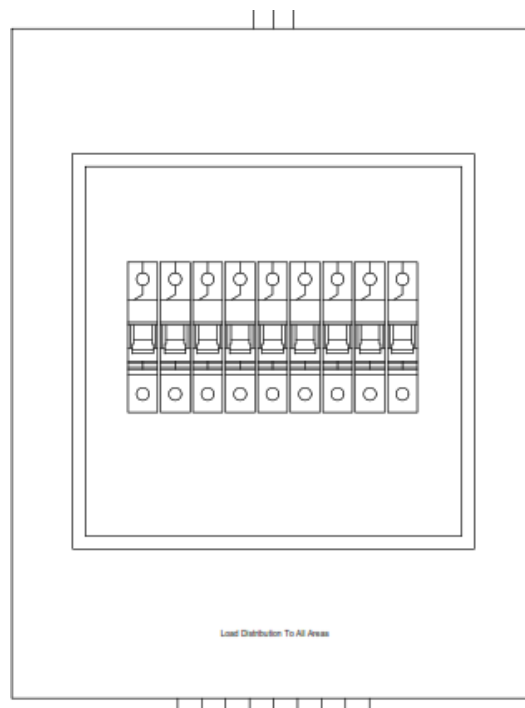


Figure 7 Load Distribution Diagram

Safety Diagram

Safety breakers are sort of protective equipment for wiring it will shut down the electrical circuit if anything inconsistent happens, safety breaker protects the electrical wiring of the house, in our house plan the safety breaker are designed for eight circuits , total of three safety breakers are dedicated for complete house each breaker will perform individually in case any inconsistent voltage tries to pass through it.

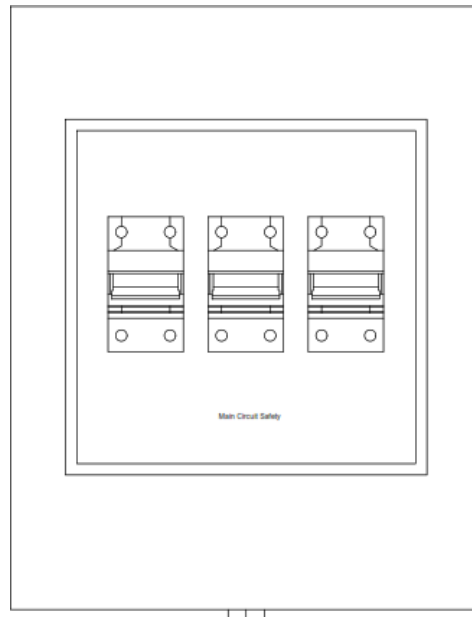


Figure 8 Main Circuit Safety Diagram

Complete Wiring and Circuit breaker Diagram

Total of eight circuits are designed for the house which have their own circuit breaker each wiring is assigned to each breaker which will add extra layer of protect for wiring and electrical equipment.

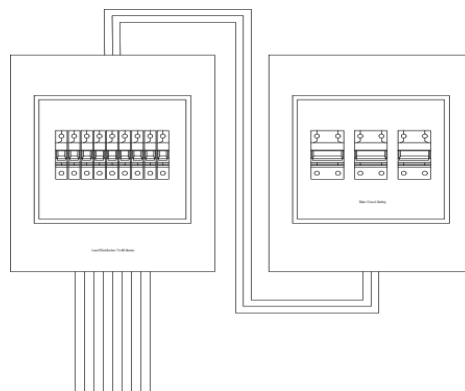


Figure 9 Main Circuit breaker and Circuit safety

Electrical Regulation

BS 7671 is the 18th edition and the current standard used in the UK. It came into effect from 1st January 2019 and is the national standard used for electrical installation and wiring safety across domestic, commercial, and industrial properties.

BS 7671 covers circuits supplied at nominal voltages up to and including 1000V AC or 1500V DC. It also applies to Extra Low Voltage (ELV) ranges and Low Voltage (LV) ranges, across a variety of frequencies.

The 18th edition superseded the previous 17th edition (in effect from 2008 to 2018) and introduced several key additions. These included performance levels relating to energy efficiency, as well as the use of arc fault detection devices and surge protection devices. The 18th edition standard was amended in February 2020 with a change relating to electric vehicle charging installations

Cable calculation and Electrical load

In the following calculation it has shown the load calculations for each area and it has separately assigned DB for it. The calculations shows the individual load for each area and DB also it shows the total load for house plan for overall lightning and other fixtures.

Electrical Load											
DB	Area	Lights	Socket	EXIT LIGHT	Kitchen Cooke	Tumble Drye	Washing Machine				
DB1	Area 1	4	4		1						
		0.08	7.2		7						
DB1	Area 2	4	4								
		0.08	7.2								
DB1	Area 3	4	4								
		0.08	7.2								
DB2	Area 4	3	3	2		1					
		0.06	5.4	0.05							
DB2	Area 5	1	1				1				
		0.02	1.8				3.6				
DB2	Area 6	1	1								
		0.02	1.8								
DB2	Area 7	1	1	1							
		0.02	1.8	0.025							
DB3	Area 8	2	2	1							
		0.04	3.6	0.025							
DB3	Area 9	2	1	1							
		0.04	1.8	0.025							

Figure 10 Electrical Load

According to the calculation shown in the Figure 10 Electrical Load the total load of electrical fixtures and equipment would 55.365 KW.

References

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