OPERATION & MAINTENANCE OF THE LEBANESE UNIVERSITY CAMPUS - HADATH

VOLUME 2: TECHNICAL DOCUMENTS

Section 2.3 – Work Package 2 – Electrical Works

Lebanese University Campus - Hadath

Work Parcel 2: Electrical Works

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2.1 - Work Parcel 2 - Technical Description

Fire Alarm System

The building fire alarm control panel (FACP) is connected to the fire alarm detectors/manual stations in a multi-loops like configuration. Control modules are installed on the loops and linked to selected bells or selected door holders regrouped themselves on separate loops for purposes of alarm sound activation and zone isolation in affected zone. The building FACP is locally interfaced with the building BMS by means of appropriate field server/microcontroller system.

Low Voltage Power Distribution
(Excluding Faculty of Science Main Building, Library, & Old Cafeteria)

The building RMU supplies MV power to one or more MV/LV step down transformer(s) whose LV side(s) are feeding one or more MDB(s) linked or not by tie breaker eventually interlocked with the main circuit breaker incomer(s). The building MDB's directly supply power to the MCC's feeding the building mechanical equipment, to the power panels of the lifts, to four level priority distribution boards themselves subdistributing power to preselected priority formatted linked final branch panel board also to the UPS's which in turn supply emergency uninterrupted power to main UPS panel feeding in subdistribution configuration the different final branch UPS panels.

Low Voltage Power Distribution
Faculty of Science Main Building, Library, & Old Cafeteria

The building RMU supplies MV power to one or more MV/LV step down transformer(s) whose LV side(s) are feeding one or more MDB(s) linked or not by tie breaker eventually interlocked with the main circuit breaker incomer(s).

Closed Circuit Television

The campus main matrix switcher in building T is connected to the faculty matrix switchers by means of appropriate star configured RG-6 cabling network to ensure any camera picture of the buildings to be retransmitted to the CSSC.

Other Systems

-Telephone &data: refer to WP-3
-Sound system & video projection: refer to WP-5
-BMS : refer to WP-3

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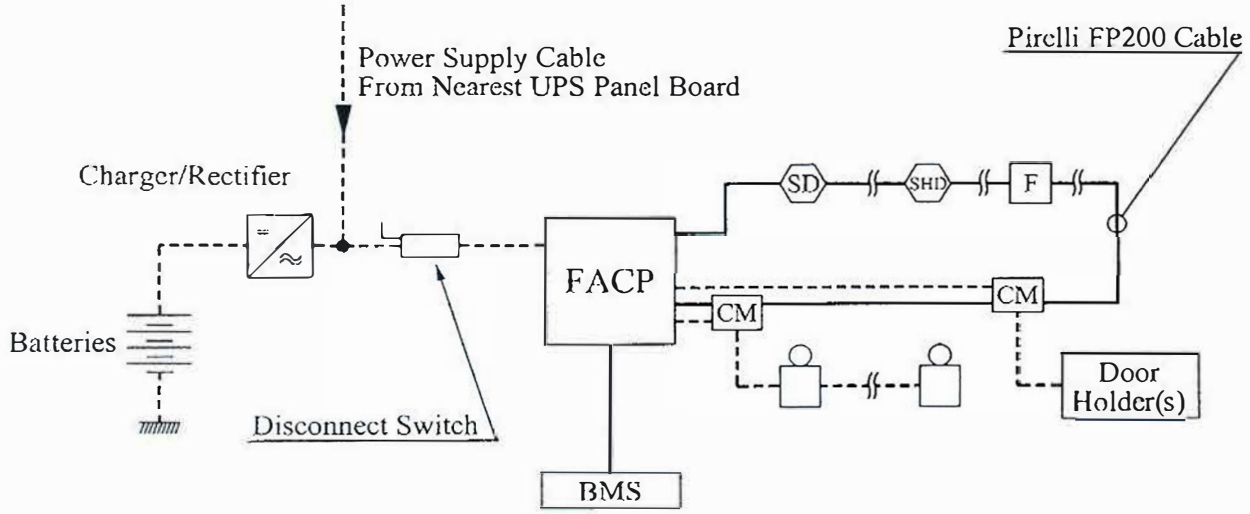
2.2- Work Parcel 2- Schematic Diagrams of Systems

WORK PARCEL 2 : ELECTRICAL WORKS

2.2 : SCHEMATIC DIAGRAM OF SYSTEMS

2.2.1: TYPICAL FIRE ALARM SHEMATIC DIAGRAM

Fire Alarm System Configuration



Equipment Per Building

Bldg X:	AFP 1010 (2 Loops)
Bldg U2:	AFP 200
Bldg R01:	AFP 1010 (2 Loops)
Bldg R02:	AFP 1010 (4 Loops)
Bldg Q:	AFP 1010 (3 Loops) + Repeater Panel
Bldg M1:	AFP 1010 (3 Loops)
Bldg M2:	Repeater Panel
Bldg M3:	AFP 200
Bldg K:	3 × AFP 200
Bldg H:	AFP 1010 (2 Loops)
Bldg F:	AFP 1010 (2 Loops) + Repeater Panel
Bldg D:	AFP 1010 (2 Loops)
Bldg J:	AFP 400 + Repeater Panel
Bldg G:	Simplex 4020
Bldg B:	AFP 1010 (3 Loops) + Repeater Panel
Bldg T:	AFP 400
Bldg V1:	AFP 1010 (2 Loops)
Bldg U3:	AFP 200

LEGEND AND ACCESSORIES

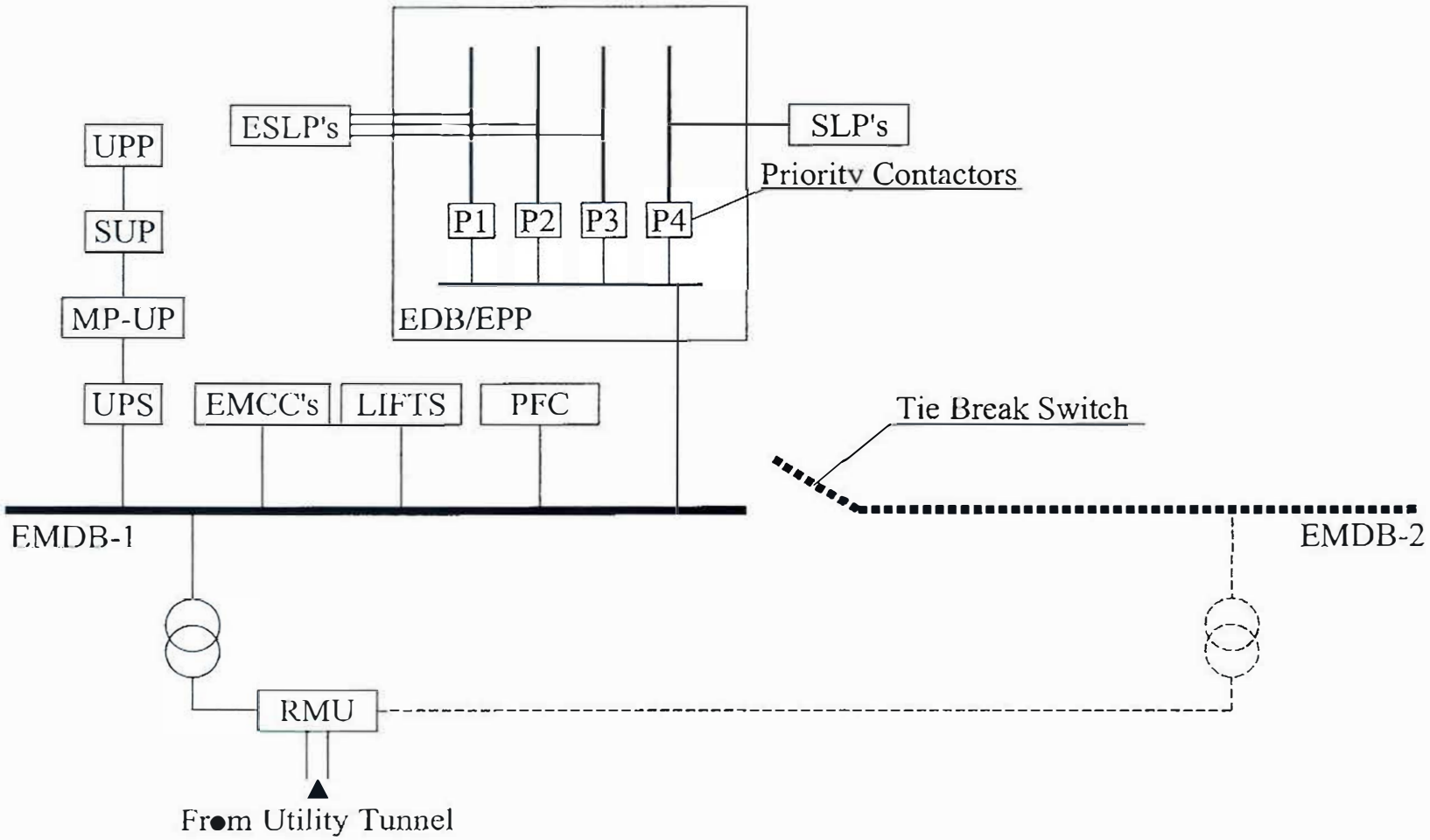
- SD — Smoke Detector
- SHD — Combined Smoke/Heat Detector
- Alarm Bell
- F — Manual Pull Station
- CM — Control Module

GENERAL NOTES

WORK PARCEL 2 : ELECTRICAL WORKS

2.2 : SCHEMATIC DIAGRAM OF SYSTEMS

2.2.2: TYPICAL LOW VOLTAGE SCHEMATIC DIAGRAM



LEGEND AND ACCESSORIES

TYPICAL COMPONENTS IN EVERY BUILDING

TYPICAL COMPONENTS IN SOME BUILDING

GENERAL NOTES

PRIORITY CONTACTORS ARE CONTROLLED VIA THE CSSC DEPENDING ON THE DEMAND AND AVAILABLE LOAD.

WORK PARCEL 2 : ELECTRICAL WORKS

2.2 : SCHEMATIC DIAGRAM OF SYSTEMS

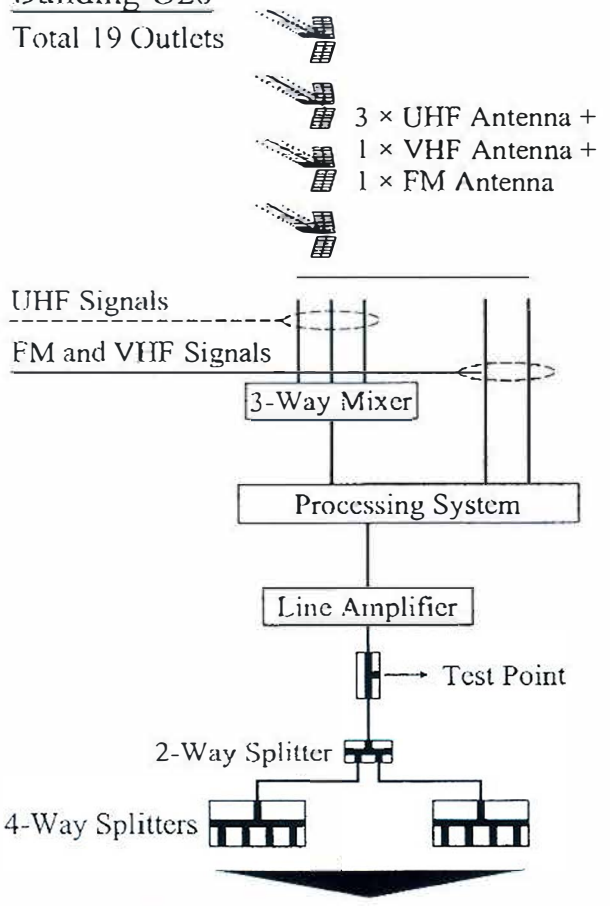
2.2.3: MASTER ANTENNA SHEMATIC DIAGRAM

LEGEND AND ACCESSORIES

GENERAL NOTES

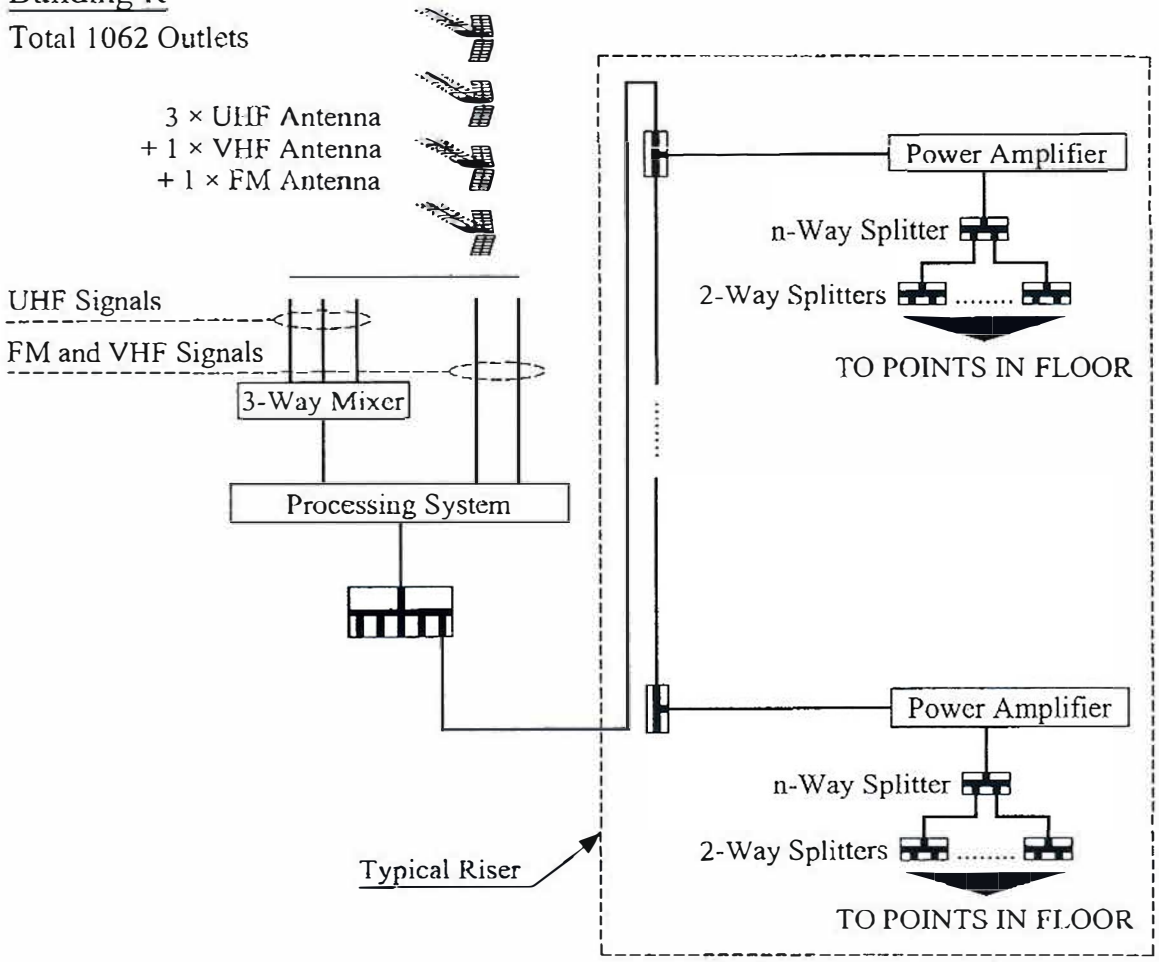
Building U20

Total 19 Outlets



Building R

Total 1062 Outlets



WORK PARCEL 2 : ELECTRICAL WORKS

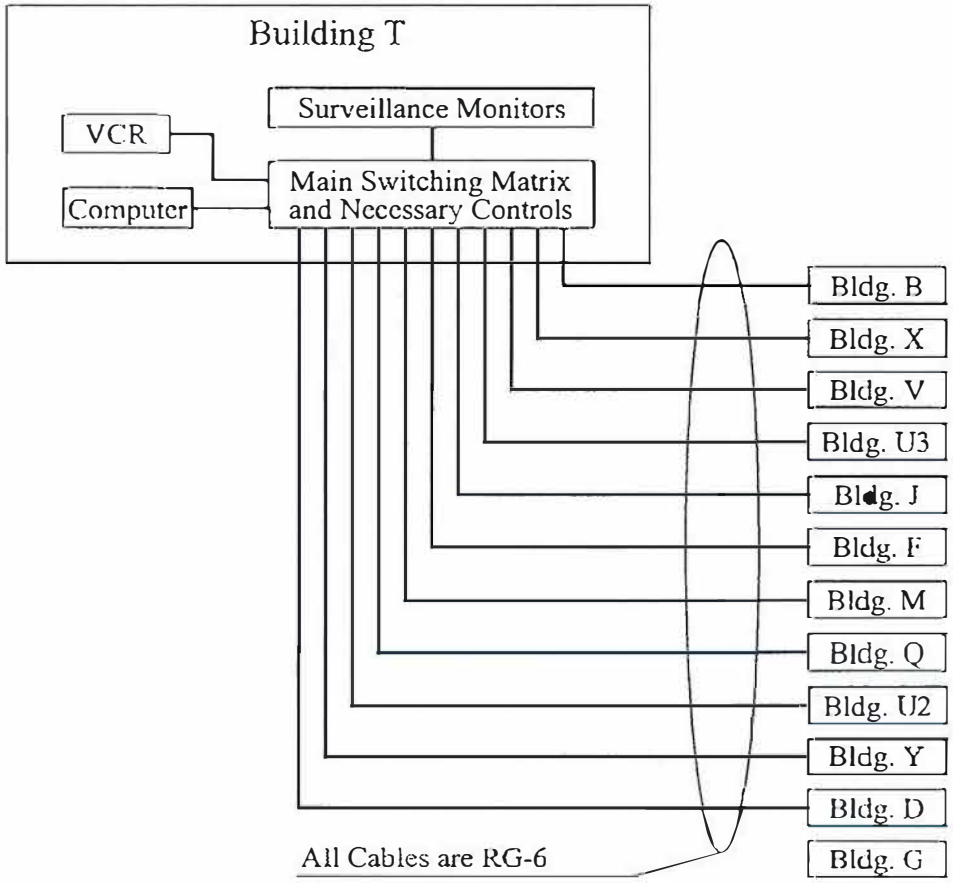
2.2 : SCHEMATIC DIAGRAM OF SYSTEMS

2.2.4: CLOSED CIRCUIT TELEVISION SHEMATIC DIAGRAM

LEGEND AND ACCESSORIES

GENERAL NOTES

Closed Circuit Television System Configuration



Equipment Per Building

Building B:	2 CCTV Cameras
Building X:	2 CCTV Cameras
Building V:	2 CCTV Cameras
Building U3:	2 CCTV Cameras
Building J:	1 CCTV Camera
Building F:	1 CCTV Camera
Building M:	1 CCTV Camera
Building Q:	1 CCTV Camera
Building U2:	1 CCTV Camera
Building Y:	1 CCTV Camera
Building D:	2 CCTV Cameras
Building G:	2 CCTV Camers

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2.3.1.1-Work Parcel 2- List of Equipment

Faculty of Fine Arts (Bldg.B) - O&M Ref : Set 1 - Div 13, Set 2 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	2×1000kVA	2	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell each one incoming cell each one transformer cell each	2	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	2398	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		68		
	Discharge Fixtures		160		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		1074	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		3904	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		99	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMDB-B10-B-1 EMDB-B20-B-2	C.L=1330kVA C.L=1236kVA	1 1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EPP's	Total C.L=1200kVA	10	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.1-Work Parcel 2- List of Equipment

Faculty of Fine Arts (Bldg.B) - O&M Ref : Set 2 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP's	Total C.L=750kVA	4	Main UPS panel with MCCB circuit breakers	✓
	EMCC's	Total C.L=506kVA	9	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		127	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		71	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	2×250kVAR	2	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×125kVA 2×125kVA 2×125kVA 2×125kVA	8	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×34 Batteries 2×34 Batteries 2×34 Batteries 2×34 Batteries	272	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		4		
	Control Panel		4		
	Battery Panel		4		

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2.3.1.1-Work Parcel 2- List of Equipment

Faculty of Fine Arts (Bldg.B) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 2 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Repeater Panel		1		
	Manual Station		58		
	Detectors(all types)		241		
	Bell		64		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		2	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		2	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		8	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.2-Work Parcel 2- List of Equipment

Faculty of Law & Political Sciences (Bldg.D)- O&M Ref : Set 1 - Div 13, Set 3 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1000 kVA 630 kVA	1 1	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell two transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	4325	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		42		
	Discharge Fixtures		117		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		1618	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		948	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		172	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	MDB-1 MDB-2	C.L=718kVA C.L=1296kVA	1 1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EDB's EPP's		3 2	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.2-Work Parcel 2- List of Equipment

Faculty of Law & Political Sciences (Bldg.D)- O&M Ref : Set 3 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP's		2	Main UPS panel with MCCB circuit breakers	✓
	EMCC's		12	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		56	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		19	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	1×125kVAR 1×250kVAR	2	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×100kVA 2×60kVA	4	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×33 Batteriers 2×33 Batteries	132	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		2		
	Control Panel		2		
	Battery Panel		2		

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2.3.1.2-Work Parcel 2- List of Equipment

Faculty of Law & Political Sciences (Bldg.D)- O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 3 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Repeater Panel		1		
	Manual Station		61		
	Detectors(all types)		334		
	Bell		43		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		2	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		1	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		23	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.3-Work Parcel 2- List of Equipment

Faculty of Engineering (Bldg.G) - O&M Ref : Set 1 - Div 13, Set 18 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	2×1000 kVA	2	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell two transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	2134	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		142		
	Discharge Fixtures		40		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		2100	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		843	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		198	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	MDB-EN-B-23-1 MDB-EN-B-23-2	C.L=1048kVA C.L=1037kVA	1 1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	DB's PP's		4 7	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.3-Work Parcel 2- List of Equipment

Faculty of Engineering (Bldg.G) - O&M Ref : Set 18 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP-EN-G1-B13 MPUP-EN-G1-B18		1 1	Main UPS panel with MCCB circuit breakers	✓
	EMCC's		17	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		84	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		17	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	2×250kVAR	2	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×120kVA 2×80kVA	4	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×34 Batteriers 2×32 Batteriers	132	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		2		
	Control Panel		2		
	Battery Panel		2		

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2.3.1.3-Work Parcel 2- List of Equipment

Faculty of Engineering (Bldg.G) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 18 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP	4 Loop Detector 4 Loop Presignal 4 Loop Bell	1	Fire Alarm Control Panel (Simplex)	✓
	Repeater Panel		1		
	Manual Station		65		
	Detectors(all types)		229		
	Bell		36		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		1	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		2	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		12	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.4-Work Parcel 2- List of Equipment

Faculty Of Pharmacy (Bldg.H) - O&M Ref : Set 1 - Div 13, Set 5 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1000 kVA	1	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell one transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	1330	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		37		
	Discharge Fixtures		28		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		1041	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		471	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		129	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMDB-PHA	C.L=610kVA	1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EDB-PHA EPP-PHA-G EPP-PHA-F EPP-PHA-S		1 1 1 1	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.4-Work Parcel 2- List of Equipment

Faculty Of Pharmacy (Bldg.H) - O&M Ref : Set 5 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP-PHA	D.L= 100 kVA	1	Main UPS panel with MCCB circuit breakers	✓
	EMCC-PHA-B EMCC-PHA-B1 EMCC-PHA-B2	Total D.L= 220 kVA	1 1 1	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		40 42	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		6	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank		1	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×100kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×33 Batteries	66	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.1.4-Work Parcel 2- List of Equipment

Faculty Of Pharmacy (Bldg.H) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 5 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		18		
	Detectors(all types)		156		
	Bell		22		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		1	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		1	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		7	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.5-Work Parcel 2- List of Equipment

Extension of the Faculty of Sciences (Bldg.J) - O&M Ref : Set 1 - Div 13, Set 6 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1000 kVA	1	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell one transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lighting	Fluorescent Fixtures	As indicated on drawings	1103	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		15		
	Discharge Fixtures		60		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		1006	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		326	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		105	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMDB-EX-B2	C.L=675kVA	1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EDB EPP's	C.L=217kVA Total C.L=132kVA	1 2	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.5-Work Parcel 2- List of Equipment

Extension of the Faculty of Sciences (Bldg.J) - O&M Ref : Set 6 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP's	Total C.L=373kVA	2	Main UPS panel with MCCB circuit breakers	✓
	EMCC's	Total C.L=140kVA	4	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		25	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		18	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	1×250kVAR	1	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×100kVA 2×50kVA	4	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×33 Batteries 2×33 Batteries	132	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		2		
	Control Panel		2		
	Battery Panel		2		

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2.3.1.5-Work Parcel 2- List of Equipment

Extension of the Faculty of Sciences (Bldg.J) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 6 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Repeater Panel		1		
	Manual Station		15		
	Detectors(all types)		96		
	Bell		14		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		1	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		1	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		6	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.6-Work Parcel 2- List of Equipment

Faculty of Medicine (Bldg.M1.1,M1.2) - O&M Ref : Set 1 - Div 13, Set 8 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	2×1000 kVA	2	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell each one outgoing cell each two transformer cell each	2	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	1491	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		2		
	Discharge Fixtures		16		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		831	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		674	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		130	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMDB-M-1 EMDB-M-2	C.L=1280kVA C.L=1592kVA	1 1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EPP's		3	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.6-Work Parcel 2- List of Equipment

Faculty of Medicine (Bldg.M1.1,M1.2) - O&M Ref : Set 8 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP-1	C.L=118kVA	1	Main UPS panel with MCCB circuit breakers	✓
	EMCC's		4	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		37	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP's,UPP's		7	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	2×250kVAR	2	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×100kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries		128	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.1.6-Work Parcel 2- List of Equipment

Faculty of Medicine (Bldg.M1.1,M1.2) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 8 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		12		
	Detectors(all types)		96		
	Bell		25		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		1	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		1	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		4	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.7-Work Parcel 2- List of Equipment

Faculty of Dentistry-Bldg(M1.3,M1.4) - O&M Ref : Set 8 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Lighting	Fluorescent Fixtures	As indicated on drawings	1695	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Discharge Fixtures		24		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		687	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		1300	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		142	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EPP's		4	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓
	MPUP-2	C.L=120kVA	1	Main UPS panel with MCCB circuit breakers	✓
	EMCC's		4	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		42	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		10	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
UPS System	UPS	2×100kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries		128	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.1.7-Work Parcel 2- List of Equipment

Faculty of Dentistry-Bldg(M1.3,M1.4) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 8 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		18		
	Detectors(all types)		164		
	Bell		33		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		1	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		5 30	B/W Camera fixed type	✓
	Control System & Monitor		4	Switching Matrix + B/W Monitors + VCR etc…	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.8-Work Parcel 2- List of Equipment

Faculty of Public Health (Bldg.Q) - O&M Ref : Set 1 - Div 13, Set 10 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1000 kVA 630 kVA	1 1	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell two transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	2296	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		42		
	Discharge Fixtures		54		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		1564	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		769	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		150	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	MDB-PH-B2-1 MDB-PH-B2-2		1 1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EPP's	Total C.L=697kVA	6	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.8-Work Parcel 2- List of Equipment

Faculty of Public Health (Bldg.Q) - O&M Ref : Set 10 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MP-UP-1 MP-UP-2	129kVA 144kVA	1 1	Main UPS panel with MCCB circuit breakers	✓
	EMCC's		5	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		74	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		18	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	1×125kVAR 1×250kVAR	2	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×100kVA 2×100kVA	4	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×33 Batteries 2×33 Batteries	132	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		2		
	Control Panel		2		
	Battery Panel		2		

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2.3.1.8-Work Parcel 2- List of Equipment

Faculty of Public Health (Bldg.Q) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 10 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Repeater Panel		1		
	Manual Station		34		
	Detectors(all types)		264		
	Bell		31		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		1	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		15	B/W Camera fixed type	✓
	Control System & Monitor		2	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		23	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.1.9-Work Parcel 2- List of Equipment

Faculty of Science Main Building, Library, & Old Cafeteria

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			2	Lightning Capturing Head (Radius R = 80/110),Down Conductors 25x3 bare copper earth rod flashing and terminal network, , bonding to prevent side flashing and Copper earth rod 1.5mX16mm	✘
Lighting	Fluorescent Fixtures		7164	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		1850		
	Discharge Fixtures		250		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		1675	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		1288	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		250	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	MDB-(TP1) MDB-(TP2) MDB-(TPR) MDB-(TP3) MDB-(TP4)	C.L= 658 kVA	5	Main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EDB's (TBs ,TMG)	3x175 Amp. 3x200Amp.	13	Distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.1.9-Work Parcel 2- List of Equipment

Faculty of Science Main Building, Library, & Old Cafeteria

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP's		3	Main UPS panel with MCCB circuit breakers	✓
	EMCC's		4	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary	✓
	SLP's & ESLP's TES , TE, TEP, TM, SPP	3x30Amp 3x32Amp 3x40Amp 3x50Amp 3x60 Amp	450	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	ATS Panel	ATS-1 ATS-2 ATS-3 ATS-4	4	ATS power switching Panel" EDL - Generator "	✓
UPS System	UPS	1.5 KVA 2.5 KVA 5 KVA with built in battery system	3	Is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✘
	Batteries	2×2 Batteriers 2×1 Batteries	6	Acidtype, 150AH & 150AH, 12V Each	
	Control Panel		2		
	Battery Panel		2		

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2.3.1.9-Work Parcel 2- List of Equipment

Faculty of Science Main Building, Library, & Old Cafeteria

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		2	Zeta Fire Alarm Control panel	✓
	Repeater Panel		*		
	Manual Station		200		
	Detectors(all types)		385		
	Bell		200		
Clock System					
Time Attendance System	Time attendance Unit	Hand Punch 3000	1	Hund Punch unit Used for Time And attendance management	✘
Access Control System					
Closed circuit television	Camera	Tayama	49	B/W Camera fixed type	✘
	Control System & Monitor		3	Switching Matrix+Monitors+VCR	
	Outlets for dedicated cameras		3		
BMS					

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2.3.2.1-Work Parcel 2- List of Equipment

Conference Center (Bldg.F) - O&M Ref : Set 1 - Div 13, Set 4 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1×1000kVA 1×630kVA	2	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell two transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	1696	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		245		
	Discharge Fixtures		46		
	Projector type A	2 kW	6	Stage lighting projector (ADB DS205 europe range 13 to 36 degree condenser profile)	
	Projector type B	1 kW	8	Stage lighting projector (ADB DS205 europe range medium angle 15 to 31 degree 1.2kW condenser profile)	
	Projector type C	1kW	10	Stage lighting projector (ADB F101 europe range medium angle 13 to 59 degree 1/1.2kW fresnel spotlight)	
	Projector type D	1kW	8	Stage lighting projector (ADB C103 europe range medium angle 7 to 61 degree 1/1.2kW prism convex spotlight)	
	Projector type E	1kW	8	Stage lighting projector (vision PAR 64 CAN)	
	Projector type F	500W	8	Stage lighting projector (cell 500W symmetrical floodlight)	
	Projector type G	500W	8	Stage lighting projector (cell 500W asymmetrical floodlight)	

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2.3.2.1-Work Parcel 2- List of Equipment

Conference Center (Bldg.F) - O&M Ref : Set 1 - Div 13, Set 4 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Lighting	Stage lighting control desk	48 separate channel DMX outputs with patch to 96 dimmers	1	Console with manual and memory operation	✓
	Digital dimmer	24 channel	3	ADB digital dimmer for the stage lighting wih 24 channel × 2.3kW	
		8 channel	3	Polaron digital dimmer for the auditorium lighting	
		12 channel	1	Polaron digital dimmer for the auditorium lighting	
	Lighting control panel	10 buttons	2	Polaron lighting controllers	
	Auditorium remote lighting control		2	Polaron lighting controller-Infra red transmitter	
	RS 232 Programming point		1	Polaron lighting controller-wall mounted outlet box to allow PC to be connected to system for programming	
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		448	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		322	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		35	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMDB's	Total C.L=820kVA	2	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,...	✗✓
	EDB-CC		1	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓
	EPP's		2		

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2.3.2.1-Work Parcel 2- List of Equipment

Conference Center (Bldg.F) - O&M Ref : Set 1 - Div 13, Set 4 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MPUP-CC-UPS	C.L=23kVA	1	Main UPS panel with MCCB circuit breakers	✓
	EMCC's	Total C.L=217 kVA	2	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		19	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
UPS System	SUP,UPP		5	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	1×250kVA 1×125kVA	2	To bring up power factor of LV system to better than 0.9	✓
	UPS	2×30kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×24 Batteries	48	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.2.1-Work Parcel 2- List of Equipment

Conference Center (Bldg.F) - O&M Ref : Set 1 - Div 13, Set 4 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Repeater Panel		1		
	Manual Station		28		
	Detectors(all types)		160		
	Bell		27		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		1	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		1	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		7	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.2-Work Parcel 2- List of Equipment

Sport Complex (Bldg.K) - O&M Ref : Set 1 - Div 13, Set 7 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1×1000 kVA 1×630kVA	2	20KV/0.4kV , D/Y connection, 50HZ, oil type	✔
	Ring Main Unit	one incoming cell one outgoing cell two transformer cell	1	To connect the building to the medium voltage loop	✔
	MV System		1	to provide protection earthing and	
Earthing	LV System		1	equipotential bonding based on the TN-S system arrangement	✔
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✔
Lighting	Fluorescent Fixtures	As indicated on drawings	545	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	
	Incandescent Fixtures		28		
	Projectors	2kW	96	Lighting Projectors installed on the 38m poles (Stadium)	
	Projectors	2kW	24	Lighting Projectors installed on the 25m poles (Multipurpose)	✔
	Floodlights	1000W	12	Lighting Projectors type SON-T installed on the 10m poles (tennis courts)	
	Floodlights	400W	72	Lighting Projectors type SON-T installed on the 10m poles (Basketball courts)	
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		143	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		196	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	✔
	Disconnecting Switch		40	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	

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2.3.2.2-Work Parcel 2- List of Equipment

Sport Complex (Bldg.K) - O&M Ref : Set 1 - Div 13, Set 7 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	EMDB-SC-26 (TR1) EMDB-SC-26 (TR2) EMDB-ST-21	C.L=599kVA C.L=589kVA	1 1 1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EPP's		12	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓
	EMCCP's	Total C.L=242 kVA	3	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		9	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP's		3	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
UPS System	Capacitor bank	1×125kVA 1×250kVA	2	To bring up power factor of LV system to better than 0.9	✓
	UPS	2×5kVA 2×5kVA 2×5kVA	6	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×15 Batteries 2×15 Batteries 2×15 Batteries	90	Dry type, 80AH, 12V Each	
	Sinewave (active filter) Control Panel Battery Panel		3 3 3		

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2.3.2.2-Work Parcel 2- List of Equipment

Sport Complex (Bldg.K) - O&M Ref : Set 1 - Div 13, Set 7 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		3	Fire Alarm Control Panel	✓
	Manual Station		10		
	Detectors(all types)		58		
	Bell		11		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Time Attendance System	Time attendance Unit		2	Hand punch unit used for time and attendance management	✓
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.3-Work Parcel 2- List of Equipment

Library of Medical Sciences-Bldg(M2) - O&M Ref : Set 9 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Lighting	Fluorescent Fixtures	As indicated on drawings	430	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Discharge Fixtures		5		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		134	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		103	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		35	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EPP		1	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓
	EMCC's		1	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		6	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP		1	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓

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2.3.2.3-Work Parcel 2- List of Equipment

Library of Medical Sciences-Bldg(M2) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 9 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	Repeater Panel		1		✓
	Manual Station		8		
	Detectors(all types)		47		
	Bell		6		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Outlets		3	Camera and Power Outlets	✓
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.4-Work Parcel 2- List of Equipment

Male Dormitories (Bldg.R01) - O&M Ref : Set 1 - Div 13, Set 11 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	3×1000kVA 1×630kVA	4	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell four transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	2615	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		1910		
	Discharge Fixtures		336		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		2810	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		3150	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		750	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMDB-R4-1A EMDB-R4-1B EMDB-R4-2A EMDB-R4-2B		1 1 1 1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EPP's		4	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.2.4-Work Parcel 2- List of Equipment

Male Dormitories (Bldg.R01) - O&M Ref : Set 11 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	EMCC's		10	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		70	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP		1	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	3×250kVAR 1×125kVAR	4	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×10kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×20 Batteries	40	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.2.4-Work Parcel 2- List of Equipment

Male Dormitories (Bldg.R01) - O&M Ref : Set 1 - Div 14, 17 and 18, Set 11 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		50		
	Detectors(all types)		340		
	Door Holder		3		
	Bell		70		
Master Antenna TV System	Main TV Cabinet		1		✓
	Splitter		28		
	Power Amplifier		18		
	Antenna	3 UHF Antenna 1 VHF Antenna 1 FM Antenna	5		
	Outlets		670		
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television (Health Clinic)	Camera		1	B/W Camera fixed type	✓
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.5-Work Parcel 2- List of Equipment

Female Dormitories (Bldg.R02) - O&M Ref : Set 12 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	1980	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		713		
	Discharge Fixtures		86		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		1410	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		1500	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	✓
	Disconnecting Switch		355	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	✓
Panel Boards	EMCC's		3	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		28	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
UPS System	UPS	2×10kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×20 Batteries	40	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.2.5-Work Parcel 2- List of Equipment

Female Dormitories (Bldg.R02) - O&M Ref : Set 1 - Div 14, 17 and 18, Set 12 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		18		
	Detectors(all types)		125		
	Bell		18		
Master Antenna TV System	Splitter		19		✓
	Power Amplifier		8		
	Outlets		392		
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.6-Work Parcel 2- List of Equipment

Technical Area-Bldg(T1,T2&T3) - O&M Ref : Set 1 - Div 13, Set 13 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1000 kVA	1	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell one transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	680	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		6		
	Discharge Fixtures		86		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		234	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		260	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch			500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMDB	C.L=730 kVA	1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EDB PP's	C.L=471kVA Total C.L=280kVA	1 7	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.2.6-Work Parcel 2- List of Equipment

Technical Area-Bldg(T1,T2&T3) - O&M Ref : Set 13 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	MP-UP-TA	21kVA	1	Main UPS panel with MCCB circuit breakers	✓
	EMCC's	Total C.L=125kVA	2	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		12	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP,UPP		3	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank	1×250kVAR	1	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×20kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×24 Batteries	48	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.2.6-Work Parcel 2- List of Equipment

Technical Area-Bldg(T1,T2&T3) - O&M Ref : Set 1 - Div 14, 15, 17 and 18, Set 13 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		20		
	Detectors(all types)		118		
	Bell		16		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		6	B/W Camera fixed type	✓
	Control System & Monitor		2	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		1	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.7-Work Parcel 2- List of Equipment

Restaurant & Functional Housing (Bldg.U2) - O&M Ref : Set 15 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	943	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		52		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		445	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		295	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		59	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	MDB-FH-B2		1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EDB-FH-2 EPP's		1 3	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.2.7-Work Parcel 2- List of Equipment

Restaurant & Functional Housing (Bldg.U2) - O&M Ref : Set 15 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	EMCCP's	Total C.L=118 kVA	2	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		29	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	SUP	C.L=11kVA	1	UPS power distribution panel with MCCB main circuit breaker and outgoing circuit breakers	✓
	Capacitor bank		1	To bring up power factor of LV system to better than 0.9	✓
UPS System	UPS	2×10kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries		24	Dry type, 2×12 Batteries, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.2.7-Work Parcel 2- List of Equipment

Restaurant & Functional Housing (Bldg.U2) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 15 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		28		
	Detectors(all types)		76		
	Bell		16		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Master Antenna TV System	Main TV Cabinet		1		✓
	Splitter		2		
	Power Amplifier		1		
	Antenna	3 UHF Antenna 1 VHF Antenna 1 FM Antenna	5		
	Outlets		19		
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		1	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
	Outlets		9	Camera and Power Outlets	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.8-Work Parcel 2- List of Equipment

Central Parking (Bldg.U3) - O&M Ref : Set 19 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Earthing	LC System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	378	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		5		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		43	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		69	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		26	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	EMCC-PAR	Total C.L=89kVA	1	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP ESLP		1 1	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓

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2.3.2.8-Work Parcel 2- List of Equipment

Central Parking (Bldg.U3) - O&M Ref : Set 1 - Div 14,15, 16, 17 and 18, Set 19 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Repeater Panel		1		
	Manual Station		13		
	Detectors(all types)		10		
	Door Holder		2		
	Bell		17		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Closed circuit television	Camera		2	B/W Camera fixed type	✓
	Control System & Monitor		1	Switching Matrix + B/W Monitors + VCR etc…	
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.9-Work Parcel 2- List of Equipment

Eastern Parking (Bldg.V1) - O&M Ref : Set 20 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Earthing	LC System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	319	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		26	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		53	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		14	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Board	EMCC-V1-V5	C.L=124kVA	1	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP-EP-1B1 ESLP-EP-1B1		1 1	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓

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2.3.2.9-Work Parcel 2- List of Equipment

Eastern Parking (Bldg.V1) - O&M Ref : Set 1 - Div 14, 17 and 18, Set 20 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		12		
	Detectors(all types)		110		
	Door Holder		4		
	Bell		8		
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.10-Work Parcel 2- List of Equipment

Water Tower (V2) - O&M Ref : Set 23 - Div 3

Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	4	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		1		
	Discharge Fixtures		57		
	Obstraction Light		6		
Wiring Devices	Single phase Sockets, normal and emergency types as shown on drawings		2	simplex power socket single phase 16A, 250V	✓
	Switches: one way, one gang		1	general lighting switch 10A 240V ac. For indoor installation in general .	
Panel Boards	ESLP-V2 CP-V2-0B		1 1	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓

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2.3.2.11-Work Parcel 2- List of Equipment

Main Pumping Station (Bldg.V3) - O&M Ref : Set 21 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Earthing	LV System		1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	86	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Discharge Fixtures		12		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		18	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		20	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		23	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	DP EDP CL RO MCF SLP ESLP	Total C.L=615kVA	1 1 1 1 1 1 1	Normal Distribution Board Emergency Distribution Board Panel for chlorine pumps Panel for container board Panel for exhaust fans lighting and power DP Emergency lighting and power DP	✓
Starters			15	Starters for Submersibles Motors ,Booster Motors ,Drain and Sump Pump Sets and liquid Tank Pumps	✓
UPS System	UPS	2×3kVA	2	is to be interposed between normal ac. Power supply and critical load ,to secure a minimum period of continuity of non- break battery back-up for 15 minutes in case of failure of normal ac. Supply and maintain output voltage ,frequency and phase deviation	✓
	Batteries	2×15 Batteries	30	Dry type, 80AH, 12V Each	
	Sinewave (active filter)		1		
	Control Panel		1		
	Battery Panel		1		

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2.3.2.11-Work Parcel 2- List of Equipment

Main Pumping Station (Bldg.V3) - O&M Ref : Set 1 - Div 14 & 18, Set 21 - Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		2		
	Detectors(all types)		8		
	Bell		2		
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.12-Work Parcel 2- List of Equipment

Utility Tunnel (Bldg.V4) - O&M Ref : Set 22 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Lighting	Fluorescent Fixtures	As indicated on drawings	270	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		60	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		65	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	✓
Panel Boards	ESLP's		10	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓

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2.3.2.12-Work Parcel 2- List of Equipment

Utility Tunnel (Bldg.V4) - O&M Ref: Set 1 Div 14, 18

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.13-Work Parcel 2- List of Equipment

Underground Wester Parking and Central Catering (Bldg.X) - O&M Ref : Set 1 - Div 13, Set 16 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	1000 kVA	1	20KV/0.4kV , D/Y connection, 50HZ, oil type	✓
	Ring Main Unit	one incoming cell one outgoing cell one transformer cell	1	To connect the building to the medium voltage loop	✓
Earthing	MV System		1	to provide protection earthing and equipotential bonding based on the TN-S system arrangement	✓
	LV System		1		
	LC System		1		
Lightning			1	Faraday cage type with air terminal network, down conductors, earth termination network, bonding to prevent side flashing and accessories	✓
Lighting	Fluorescent Fixtures	As indicated on drawings	875	Complete indoor and outdoor lighting installations including fixtures, control gear (where applicable) , accessories and connection to circuit wiring .	✓
	Incandescent Fixtures		10		
Wiring Devices	Single and three phase Sockets, normal and emergency types as shown on drawings		69	simplex and duplex power socket single phase 16A, 250V and power socket 3P+E ,32A,380/415V and UPS outlets	✓
	Switches: one way, one gang one way ,two gang two way ,one gang two way, two gang push button		148	general lighting switch 10A 240V ac. For indoor installation in general and push buttons(push to make, push to break)	
	Disconnecting Switch		42	500V, 2,3 or 4pole, load break, used for disconnecting power for mechanical equipment	
Panel Boards	MDB-WP	C.L=648kVA	1	main distribution board:floor mounted 600V class of service switchboards,multi-cubicle with relays, Measuring instruments , MCCB Outgoing Circuit breakers, ACB main circuit breaker ,CTs,VTs,…	✓
	EDB-WP EPP's PP's	C.L=115kVA Total C.L=107kVA Total C.L=223kVA	1 3 6	Priority distribution panels with four main busbars, MCCB circuit breakers, priority contactors, and control accessories	✓

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2.3.2.13-Work Parcel 2- List of Equipment

Underground Wester Parking and Central Catering (Bldg.X) - O&M Ref : Set 16 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Panel Boards	EMCC-WP-B1 EMCC-WP-B2	Total C.L= 222 kVA	1 1	Motor Control centers for control and feeding of mechanical equipments with MCCB circuit breakers and necessary control circuits and accessories	✓
	SLP's & ESLP's		10	Secondary lighting and power distribution panels with MCCB main circuit breaker and MCB outgoing circuit breakers and all necessary control circuits and accessories	✓
	Capacitor bank	1×250kVAR	1	To bring up power factor of LV system to better than 0.9	✓

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2.3.2.13-Work Parcel 2- List of Equipment

Underground Wester Parking and Central Catering (Bldg.X) -

O&M Ref : Set 1 - Div 14, 15, 17 and 18, Set 16 Div 3

Low Current

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
Telephone & Data	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Fire Alarm	FACP		1	Fire Alarm Control Panel	✓
	Manual Station		20		
	Detectors(all types)		160		
	Bell		15		
Clock System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
Access Control System	**Refer to Work Parcel 3 - Chapter 3.3.2**				
BMS	**Refer to Work Parcel 3 - Chapter 3.3.2**				

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2.3.2.14-Work Parcel 2- List of Equipment

Army Cabinets (Bldg.Z) - O&M Ref : Set 1 - Div 13, Set 16 - Div 3

Medium and Low Voltage

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in Section 2.4 & Operation and Maintenance Manuals Listed in Appendix No: 2.5.1
MV	Transformer	100 kVA	1	400V/400V	✓
Lighting	Lighting Fixture	2 x 56 W	68	Lambda	✓
	Lighting Fixture	1 x 36 W	3	Lambda	✓
	Lighting Fixture	1 x 75 W	17	Type H.H	✓
	Lighting Fixture	1 x 75 W	30	Type K	✓
	Lighting Fixture	2 x 36 W	16	Type F	✓
Wiring Devices	**Switches**:		75	General Lighting Switches 10A - 240 V	✓
	One Way, One Gang				
	One Way, Two Gang				
	2 Poles + Earth Sockets		96		✓
Panel Boards	SLP's and ESLP's		11	Secondary Lighting and Power Distribution Panels	✓

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2.4 - Work Parcel 2-Scope of Work

2.4.1 - GENERAL DESCRIPTION OF SCOPE

Technical Scope Of Work: Operation

1- Contractor shall comply with the requirements of the Contract documents.

2- Contractor shall be responsible for the coordination with the Lebanese University buildings managements in order to operate the systems as per the academic time schedules planned for each buildings.

3- Contractor shall be responsible for keeping systems installed satisfactory to perform their designed functions such as:
   a- Control of priority contactors in case of emergency to provide maximum services to buildings using the available power resources.
   b- Control of electro-mechanical equipment (refer to attached appendix 2.3) via the building management system by keeping the key parameters (energy management , load shedding, monitoring,etc…) effective.

4- Contractor shall be responsible to provide regular reports (quarterly) showing the consumption of main consumables (such as lamps, ballasts, fuses etc….).

5- Contractor shall be responsible to operate the systems taking into account the energy saving measures as for and non-restricted to the following:
   a- Planning and updating the schedules for operation of systems according to the results of the reports mentioned in paragraph 3 above.
   b- Other energy saving measures as for power consumption should be taken into consideration for efficient operation.

Technical Scope Of Work: Maintenance

1- Contractor is responsible to perform all the preventive (routine) and corrective maintenance (emergency), as defined in the O&M manuals,cleaning and restoration (painting, welding, minor repairs, corrosion protection) of Electro-mechanical equipment which are defined in the Cotntract documents.

2- All works should be performed in accordance with the manufacturer's recommendations and /or as stipulated in the appendices.

3- Reporting:
The contractor shall be responsible to provide regular (quarterly) reports showing the maintenance works executed, along with suggestions for furture maintenance tasks, status of equipment, frequency and analysis of troubleshooting.

The contractor shall be responsible to provide emergency reports for problems that may occur. These reports shall contain description of the problem, corrective studies, all necessary corrective actions,and budgeting.

4- Refer to attached document overleaf for detailed description:

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2.4 – Work Parcel 2 – Scope of Work

2.4.2 SPECIFIC TASKS RELATED TO SPECIFIC EQUIPMENT

List of sample tasks scheduling for maintenance

2.4.2.1. MV Switchgear 2

2.4.2.2 Main Distribution Board (MDB) 4

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2.4.2.5. Final Lighting Circuits and Small Power Circuits 13

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2.4.2.7. Multipurpose Lighting System 19

2.4.2.8. Emergency/Exit Lighting Fixtures (EE1/EE) 23

2.4.2.1 MV Switchgear

Weekly

- Check switch room and switchboard for cleanliness and clean as necessary.
- Check that all instruments (i.e. meters) are functioning correctly. Note readings and compare with those taken previously.
- Check that batteries and charger are functioning correctly.

Monthly

- Carry out tasks as described for Weekly.
- Check indicator lamps and replace any faulty ones as necessary.
- Check spring charge condition indicators. If showing discharged arrange for immediate rectification.
- Check overheating, vibration and undue noise etc. and report to the Management for correction or repair, immediately. Carry out repair as necessary.
- Check all doors can be securely closed by retaining devices. Repair or replace devices as necessary.
- Check warning and indication labels ace securely in position.

Annually

N.B. Refer to Manufacturer's Instruction Book.

Equipment in cubicles/compartments under must be switched off and earthed. A “Permit of Work” must be issued. All work to conform to switchgear standards and manufacturers manual.

- Carry out monthly tasks.
- Inspect cables wiring for tight connections, ample support and signs of wear and damage. Replace wires if necessary.
- Remove covers of panel devices where practicable and check wiring and clean contacts on relays and switches.
- Inspect all bolted connections, nuts and screws for tightness.

- Clean all insulation thoroughly with oil free solvent on a clean cloth.
- Clean the stationary portion of the switchgear by wiping with a clean cloth or with compressed air hose and vacuum clean.
- Test earthling system, inspect all connections and record earth resistance measurements between earth bar and electrode (should be less than 1 ohm).
- Replace or clean dirty filters from dust (by flushing with a stream of water). After draining, recoat with super coat adhesive or equivalent and refix.
- Check enclosure and any other parts for corrosion. Repair if required and repaint.
- Examine resistors and other devices prone to overheating.
- Check heaters operating when switched ON.

Three-Yearly

N.B. Refer to Manufacturer's Instruction Book.

Equipment in cubicles/compartments under maintenance must be switched off and earthed. A “Permit of Work” must be issued. All work to conform to switchgear standards and manufacturers manuals.

- Carry out all annual tasks.
- Measures insulation resistance on voltage and current transformers with a 500V megger and record results (min. 0.5 mega ohms).
- Perform ratio tests on voltage and current transformers and record results.
- Clean out chambers and check all connections.

2.4.2.2 Main Distribution Board (MDB)

Weekly

- Check that all metering instruments are functioning. Note and compare with those taken previously.
- Check that operating tools/handles, keys etc. are readily available in switchboard.
- Inspect switchboard or circuit Breakers enclosure for undue heating.

Monthly

- Carry out tasks as detailed for Weekly.
- Check for undue noise, overheating or vibration, loose parts, tightness of screws/bolts and warping, and report to the Management for correction or repair.
- Visually check PACB's, MCCB's fuse switches or isolators, for signs of arcing/burning (Checking of the PACB's may only be done if the circuit breaker is permitted to be opened for servicing and only under the instruction of the engineer in charge).
- Examine resistors and devices prone to overheating, where and when possible, without shutting down the essential loads (Check with the supervising engineer).
- Inspect earthing connections, power terminations and control circuits without shutting down the MDB and as per Engineer's instruction.
- Remove all dust and debris inside cubicles or enclosures where possible with the aid of a vacuum cleaner.
- Check that PACB's stored energy mechanical are charged correct any defects.

Bi-Annually

- Carry out tasks as for Monthly.
- Check operation of MCCB's, PACB`s using their switching arrangements to ensure mechanisms are in sound good order.
- Check operation of all fuse switches and isolators and ensure mechanisms are in sound working order. Correct any defects. Remove all dust and debris with the aid of a vacuum cleaner.

- Check fuse links, carries, bridges, for signs of arcing. Ensure correct grade of fuse is fitted. Correct any defects.

Annually

- Carry out tasks as for Bi-Annually

N.B: Substation must be shut down and dead before further tasks are carried out

- Substation must be shut down and dead before further tasks are carried out.
- Inspect electrical primary and secondary connections, cables and supports, insulation for discoloration, excessive corrosion, secure connections, clean contacts, insulation chafing and embroiled and discoloured cable or insulator. Correct any defects.
- Clean the stationary part of the switchgear with a clean cloth; use compressed dry air for inaccessible areas. Clean out debris or dust with the aid of a vacuum cleaner.
- Examine all air filters for dust content, flush with water & recoat with super coat adhesive as recommended by Manufacturer.
- Check that all conduit and cable gland terminations associated with the switchboard are secure.

All Circuit Breakers

- Check anti-pump relay operation.
- Check and clean insulated parts using a mild detergent, a lint free cloth, rinsing with clear water and dry.
- Inspect arc chutes and contacts of circuit breakers, fuse-switches, isolators, and repair or replace as per Manufacturer's procedures.
- Check security of all electrical terminations and connections and tighten as necessary.
- Check that all barriers and guards are in place and secure.
- Check that phase discs and labels giving circuit references are securely fixed. Replace any missing items and update information as necessary.
- Ensure that 380 volt and other warning labels are in position where applicable.
- Check door interlocks and that doors can be securely closed. If a lock is provided, check that it functions correctly.

- Check enclosure for paintwork condition and signs of corrosion. Correct any defects.
- Visually inspect under voltage relay, clean and carry out simulation test. Z
- After energizing the substation, check the loading of all outgoing circuits on the LV circuit breakers and record readings.
- Check that the rating of the circuit breakers and settings of the over-current and ground fault relays are correct with regard to loading, cabling, type of load, etc., with reference to design data. Report any overloading and/or loads that are up to the set rating of the breaker.
- Make any possible adjustment with regard to circ data. Report need for adjustment to the Management.
    - Dates and type of any malfunction of the unit either overloading or other.
    - Dates and period unit was operational through power failure or other.

Two-Yearly

- Carry out tasks as for Annually.

LV Switchgear

- Measure insulation resistance of bus-ducts, busbars and circuit breakers with a 1000V Megger, and compare with previous record, using a 1000V megohmmeter. Repair as necessary.
- Measure the insulation resistance of the secondary wiring (by using a 500V megohmmeter) and record results (IR must not be less than 0.5 mega ohm).
- Check continuity of all control circuits.
- Measure circuit breaker contact resistance.
- Carry out injection testing of all relays.
- Carry out insulation resistance measurement of instrument transformers.

Five Yearly

- Carry out tasks .as for Annually
- Carry out testing of relays on LV circuit’s breakers.

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2.4 – Work Parcel 2 – Scope of Work

- Carry out ratio test on instrument and protective current and voltage transformers.

2.4.2.3. Motor Control Center (MCC)

Monthly

- General check for overhead surfaces, missing or broken instruments, controls, devices and pilot lights. Replace defective ones. Use infra red heat detectors where further investigation is required.
- Visually check all switching devices and contactors for signs of arcing/burning where possible to do so without interrupting the supply to essential plant.
- Check contactors for noisy operation and correct any noisy ones where possible, without interruption of the supply to essential plant.
- Remove all dust debris with the aid of a vacuum cleaner for all outdoor MCC`s.

Quarterly

- Carry out tasks as detailed for Monthly.
- Check fuse clips and bridges for signs of arcing, overheating, inadequate spring pressure looseness. Replace if necessary.
- Inspect for moisture and causes of accumulation, and seal-off any cracks, openings or conduit that allows moisture to enter the enclosure.
- Test manually all relays and auxiliary control equipment for proper functioning. Carry out repairs as necessary.
- Check and correct operation of all lock stops.
- Remove all dust and debris with the aid of s vacuum cleaner for all indoor MCC's.

Bi-Annually

N.B. Motor control centre must be shut down and dead before Bi-annual tasks can be carried out.

- Carry out tasks as detailed for Quarterly.
- Check security of all terminals, connections and conductors for tightness of screws or bolts, and inspect for discoloured conductors/terminals, corrosion, melted, chared or burnt insulation. Correct as necessary.

- Check voltage on bus-way with independent instruments upon restoration of supply.
- Check contractors for correct operation via local and remote controls, or automatic controls, and check that all interlocks and sequence of operations are as prescribed and required.
- Check and correct, if necessary, circuit diagrams/charts.

Annually

N.B. Motor Control Centre must be shut down and dead before annual tasks can be carried out.

- Carry out tasks as detailed for Bi-annually.
- Inspect switching devices on the current carrying faces, outside the area of the arc boxes. If such arcing is evident, replace the contacts.
- Clean and lubricate the carriage slides.
- Check all exposed cable insulation up to driven equipment for signs of ' damage. Correct any defects.
- Check for signs of any overheating and/or arcing within cabinets. Correct defects.
- Operate each switching device several times to ensure all mechanisms are free and in proper working order. (Never attempt to operate a switching device with excessive force).
- Check the operation of the mechanical disconnecting devices and all safety interlocks.
- Check instrument calibration using portable test equipment. For each relay perform primary current injection test. Compare tripping point with set characteristic curve.
- Perform insulation resistance tests on busbars, using 1000V megger. If results are not satisfactory carry out high-pot test. Report to Management for necessary corrective maintenance.
- Cheek-test earthing of MCC.
- Remove dust and foreign materials from all equipment. Replace dirty or wet parts which cannot be cleaned. Clean equipment by clean cloth and vacuum cleaner. Clean inside bottom of the MCC.
- Check control fuse links and fuses for correct rating in relation to design data and replace as necessary.

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2.4 – Work Parcel 2 – Scope of Work

- Replace all cover bolts which may be worn or missing.
- Check that all conduit and cable gland terminations associated with the panel are secure, adjust as necessary.
- Check cabinets for paint condition and signs and Correct any defects.
- Check that phase discs and labels giving distribution board and switchgear references are securely fixed. Replace any missing items.
- Ensure that 380-volt warning labels are in position where applicable.
- After restoration of power is reinstated, check current drawn for each item of equipment and compare with previous readings. Report on any overloading and/or loads close-up to the set ratings of the equipment.
- In case cables are disconnected and reconnected or replaced, verify the proper phase sequence.

2.4.2.4. Distribution, Sub-Distribution, and Final Branch Panel Boards (EPP, EDB, SLP, ESLP, EOLP)

Quarterly

N.B. Advise/program with Management, before carrying out tests, operation repairs on any MCCB's or panel boards.

- Visually check all MCCB's and/or isolators for signs of arcing/burning or overheating. Carry out repairs as necessary.
- Test any Residual Current Devices (RCD's) where available and, on any incoming and outgoing MCCB's by use of their integral test mechanism.
- Check contactors for undue noise and overheating. Check indicator lights & push buttons.
- Clean out dust and debris from individual items of equipment with the aid of a vacuum cleaner.
- Check the loading of all outgoing circuits and record readings.

Bi-annually

- Carry out tasks as detailed for Quarterly.
- Check the operation of all breakers, isolators, R.C.D.'s etc. and ensure mechanisms are in sound working order. Correct any defects.
- Check that the rating of the MCCB is correct with agreed to loading, cabling, type of load etc., with particular reference to design data. Report any overloading and/or loads that are up to the set rating of the breaker. Report need for adjustment.
- Check for proper fixation of all circuit breakers, security of all electrical termination and connections and tighten as necessary.
- Check that all barriers and guards are in place and secure.
- Check that all truncking, conduit or cable gland associated with the panel are secure. Adjust as necessary.
- Check that doors can be securely closed. If a lock is provided, check that it functions correctly.
- Ensure that 380 volt and other warning labels are in position where applicable.

- Check that phase discs and labels giving the panel circuit reference are securely fixed to the enclosure door. Replace any missing items and update information as necessary.
- Inspect respective contactor units with enclosure, for proper fixation, loose springs, breaks or cracks, signs of overheating, burnt contacts, discoloured cables and termination. Close the door and operate contactor on / off several time to ensure proper operation. Correct any defaults. Check operation by the BMS.

Annually

- Carry out tasks as for Bi-annual.
- Test earth continuity of incoming supplies circuit and measure loop resistance of each panel board and contactor enclosure.
- Check all exposed cable insulation for signs of damage inside each panel board and contactor enclosure. Correct any defects.
- Check enclosures for paintwork condition and sign of corrosion. Correct any defects.
- With a 500V megger, test insulation resistance between busbars and busbars to earth. (Note: All circuit breakers must be in `OPEN' position and power supply `OFF').
- Select at random two circuit breakers out of each panel board and test its time current curve using appropriate current injection tests instrument. Report any discrepancies. (Tests are to be in accordance with NFPA 70B, Section 18-10, 2.4, 300% overload).

2.4.2.5. Final Lighting Circuits and Small Power Circuits

General Description

N.B Obtain a permit before proceeding with the work in each of the respective areas involved

- Prepare Log Book, complete with all necessary forms to record the works carried and any special notes.
- Ensure that details of the lighting installation, details of the luminaries (make, type, date of installation, type and size of lamps) and any other relevant data are listed in a log Book.
- Defects noted during inspection checks and tests should be recorded in a logbook.
- Dangerous defects are to be reported immediately to the user affected luminaries are to be disconnected from the electrical supply.
- Remedy minor defects using tools and materials readily available.
- Defects which cannot be remedied immediately or which necessitate disconnection of the luminaries from the electrical supply should be reported to the Management immediately
- Refer to suggested lamp life at the end of this schedule.
- Harsh abrasive and organic solvents should not be used for cleaning lighting units.
- Staining of aluminium reflectors and yellowing of plastic reflectors can be removed by pre-cleaning with metal polish or a mild abrasive paste. Painted/stove enamelled surfaces must not be abraded to remove stains or to restore colour.

Weekly

- Correct any defective luminaries or circuit immediately.
- Check all lighting units and luminaries and replace any failed lamps.
- Visually inspect all luminaries to ensure that they remain clean.

Monthly

- Carry out tasks as detailed for Weekly.

- Simulate mains failure condition on non-maintained emergency lighting units (packages) by putting off the supply from respective panel board for a short period, to ensure correct functioning. Correct or replace any defective unit immediately.
- Ensure correct operation of remote/local control where applicable.
- Inspect all lighting units and luminaries and replace any failed lamps, broken/corroded baffles, louvers, diffusers or covers. Replacement of lamp should be with same type, size and rating.
- Check incandescent lighting fixtures and re-lamp at 1000 or 2000 hrs running time as applicable to type of lamp and dispose of replaced lamps in a professional manner.

Outdoor Lighting

- Clean externally only all outdoor surface mounted luminaries, using damp cloth or sponge. An anti static solution can be used.
- Wash column mounted luminaries by using water jet ground level.

N.B. Ladders or mobile platform lifers may be required for close inspection, cleaning and/or maintenance.

Bi-annually

- Carry out tasks as detailed for Monthly.
- Replace broken/corroded baffles, reflectors, diffusers, glass covers burnt, lamps etc. Replacement of lamp should be of the same type, size and rating.
- Check local switches (where provided) for correct operation and check security of switches and plates. Correct any defects.
- Visually inspect socket outlets for broken or damaged plates, fixing, tightness, and signs of carbonisation and availability of power. Correct as necessary or replace devices.
- Inspect disconnect switches for proper fixation, loose springs, broken or cracked insulation signs of flash over, clamps and straps, loose connections, blades and contacts, locking and interlocking mechanism, cable insulation etc. for signs of overheating and corrosion. Correct as necessary.

Outdoors Lighting & Other Equipment

- Check corrosion on outdoor lighting units, poles/columns, brackets and supports. Repair as necessary and check security of mounting and fixing.

- Check security of all outdoor cable terminations, grounding and bonding, and covers to all outlet/junction boxes. Correct as necessary.
- Check gaskets or seals for all weatherproof fittings luminaries. Correct or replace as necessary.

Annually

- Carry out tasks as detailed for Bi-annually.
- Check security of all indoor fixings, suspensions and support etc. and correct any defects.
- Remove diffusers, lamps etc., clean down using compatible agent. Treat all plastic surfaces with an anti-static solution. Wipe down reflective surfaces, frames etc., with damp clothe.
- Examine lamp holders, sockets, fuses and fuse holders (if any), control gear, cable terminations and internal wiring for signs of overheating or corrosion. Replace any defective component.
- Relamp all fluorescent lighting fittings/luminaries, using same size, type and ratings of lamps
- Relamp all lighting fixtures with high-pressure mercury vapour and with high-pressure sodium lamps (below 150W only) using same type, size and rating of lamps, where applicable
- Dispose of all lamps in a clean in a clean, safe, professional manner (discharge lamps contain toxic substances for this task).
- Check insulation resistance of socket outlet circuits (taking a minimum of two socket outlets of which one is electrically most remote from the distribution boards), using 500V megger (insulation resistance) shall not be less than 0.5 megohms). Check continuity of earth conductor also.
- Check insulation painting of outdoor steel supports, brackets, columns/poles, and any other material that requires a protective finish as installed.

2-Yearly

- Carry out tasks as for Annually.

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2.4 – Work Parcel 2 – Scope of Work

- Relamp all high pressure sodium fixtures and luminaries 150W and over using same type, size and rating of lamp. Clean down using compatible cleaning agent, wipe all surfaces with a damp cloth, change any corroded reflectors, gaskets etc. Check lamp holders, sockets, control gear, cable terminations and internal wiring for any signs of overheating or corrosion. Replace any defective components.
- Test insulation of all final circuits (shall not be less than 0.5 megohms with a 500V megger), earthing, continuity, and check condition of insulation, conduits, flexible, and connection at junction boxes and at luminaries.

Lamp Life Guide

The table below indicates average economic lamp life and may be used to determine lamp replacement intervals for particular installations when the annual hours of use are known.

Lamp Types	**Life (Hours)**
Tungsten filament (ordinary)	1000
Tungsten halogen	2000
*Tubular fluorescent (26mm and 38mm dia.)	7500 (economic service period)
Tubular SL and PLC compact lamps other fluorescent	5000 (economic service period)
Metal Halide (up to 250W)	5000 (economic service period)
Metal Halide (400W and higher)	10000 (economic service period)
Mercury discharge	7500 (economic service period)
High pressure sodium	
Below 150 Watt	*6000 (economic service period)*
150 Watt and over	*10000-12000 (economic service period)*

These lamps exhibit a significant reduction in efficiency long before actual lamp failure. The continued use of such lamps beyond their economic service period may result in unacceptably low lighting levels and client complaints.

2.4.2.6. Earthing System

Bi-annually

Earthing

- Check security of connections to main earth and tighten as necessary.
- Check the integrity of all bonding connections and ensure they remain secure and tight.
- Check the integrity of the main neutral earthing connection as per design requirements i.e. at the LV switchgear neutral or at the transformer neutral. Ensure that false earth leakage tripping will not occur, and that the protection is not inadvertently cancelled where provided and that all connections remain tight.

N.B. Log Book is to be prepared for all inspection and testing procedures in which records will be kept.

- Test electrode resistance between main earth bar or terminal and the electrode at each substation (once during the wet season and once during the dry season).

N.B. Advise owner and take permit in case power supply is to be interrupted and also before restoration. Electrode resistance is not to exceed 5 ohm. Above test is to be carried out with the substation shut down.

- Inspect all the earthing installation for damage, deterioration and corrosion, check the conductor fixings for security, the connections for tightness and test the continuity of the earthing conductors which cannot be visually inspected. Check to verify "Warning" labels are filled at the point of connection to earth electrodes.
- Clean out all inspection pits and ensure lids fit correctly, and are appropriately marked as initially installed.

Annually

Lightning Protection System

N.B. The testing of a lightning protection installation shall not be undertaken when thunderstorms in the vicinity are possible.

Under no circumstances must more than one rod be disconnected at one time whilst carrying out these tasks.

- Check the fixings of conductors and components for security and check the installation for damage, deterioration and corrosion.

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2.4 – Work Parcel 2 – Scope of Work

- Ensure bonding of the lightning protection system to the main earth bars.
- Check to verify that metallic sheath/armouring of the supply cable(s), metallic pipes, metallic structures etc. are bonded to the lightning protection installation at the point of entry and are earthed outside the structure of the building by supplementary earth electrodes.
- Test the electrical continuity of the conductors, bonds and joints etc. that cannot be visually inspected.
- Measure the resistance to earth of each earth rod or multiple earth rod group and any supplementary earth electrodes when disconnected from the installation (for multiple earth rod groups, a single measurement for the group is adequate).
- With all earth electrodes and any bonding to other services connected to the installation measure the resistance of the installation to earth from random points on the installation.
- Record the condition of the installation, the measured earth electrode resistance, the individual earth rods or multiple earth rod groups and the highest resistance measured at random points on the installation.
- Treat dissimilar metal joints at test clamps with oxide jelly or Paste where necessary.
- Clean out all inspection pits and ensure concrete lids fit correctly.
- Inspect vertical down conductors and earth termination. Ensure that conductors are securely fixed to the structure and that all joints including those to structural and services steel work are mechanically and electrically sound.
- Check any air terminals, connections at air terminal or structures behaving as air terminals.

2.4.2.7. Multipurpose Lighting System

General Instructions

N.B. Obtain a permit before proceeding with the work in each of the respective areas involved.

Prepare Log Book, complete with all necessary forms to record the work carried out and any special notes.

Ensure that details of the lighting installation, details of the luminaries (make, type, date of installation, type and size of lamps) and any other relevant data are listed in a log Book.

Defects noted during inspection, checks and tests should be recorded in a Logbook.

Dangerous defects are to be reported immediately to the user. Affected luminaries are to be disconnected from the electrical supply.

Remedy minor defects using tools and materials readily available.

Defects which cannot be remedied immediately or which necessitate disconnection of the luminaries from the electrical supply should be reported to the Management immediately.

Refer to suggested lamp life at the end of this schedule

Harsh abrasive and organic solvent should not be used for cleaning lighting units.

Weekly

Lighting Fixtures:

- Clean all luminaries/floodlights with a damp cloth or sponge. An anti static solution can be used. harsh abrasive and organic solvents should not be used for cleaning lighting units. Staining of aluminium reflectors and yellowing of plastic reflectors can be removed by pre-cleaning with metal polish or a mild abrasive paste. Painted/stove enameled surfaces must not be abraded to remove stains or to restore color.

Monthly

N.B. All work is to be carried out by specialists and/or trained technicians.

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2.4 – Work Parcel 2 – Scope of Work

Lighting Fixtures:

- Carry out tasks as detailed for-weekly.
- Check lighting fixtures consumption power. Record results and compare with the previous readings. Report any overloading and relamp if necessary.
- Check wiring and labelling by selecting at random a group of luminaries. Selection shall be in such a way that all floodlights/floodlights will be checked once a year.
- Simulate mains failure condition on emergency CTV projectors by putting off the supply from respective board for a short period, to ensure correct functioning. Correct or replace any defective part immediately.
- Inspect all lighting units and luminaries and replace any failed lamps, broken/corroded baffles, louvers, diffusers or covers. Replacement of lamp should be with same type, size and rating.
- Check halogen lighting fixtures and relamp at economic running time as applicable to type of lamp and dispose of replaced lamps in a professional manner.
- NB. Ladders or mobile platform lifers may be required for close inspection, cleaning and/or maintenance.

BMS Network

- Test good functioning of all input/output ports, interfaces and connectors.
- Test performance of system by measuring time sending and time receiving of data.
- Check protocol system, integrity of signals and data transferring. Report any abnormal transmission or missed information.

Lighting Bars

- Check weights carried: Report any overloading and reinforce as necessary.
- Check lighting bars for leveling and alignment. Adjust fixtures to original default position if displaced.
- Check fixing supports for spacing and tightness.
- Check cabling for exact routing and installation. Report any damaged cable and replace where necessary. Junctions on cables are forbidden.
- Check cable termination on bars including fixing accessories, labels and/or references.

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2.4 – Work Parcel 2 – Scope of Work

Control Console and PCs

- Check good functioning of control touches/push buttons on control console.
- Check operation of PC programs by selecting at random a group of luminaries and in such a way that all communication of luminaries signals and lamp responds will be checked at least once a year.

Bi-annually

- Carry out tasks as detailed for Monthly.
- Replace broken/corroded baffles, reflectors, diffusers, glass covers burnt, lamps etc. Replacement of lamp should be of the same type, size and rating.
- Check corrosion on lighting units, brackets and supports. Repair as necessary and check security of mounting and fixing.
- Check security of all cable terminations, grounding and bonding, and covers to all outlet/junction boxes. Correct as necessary.
- Check gaskets or seals for luminaries. Correct or replace as necessary.

Annually

- Carry out tasks as detailed for Bi-annually.
- Check security of all indoor fixings, suspensions and support etc. and correct any defects.
- Examine lamp holders, sockets, and fuses and fuse holders (if any), control gear, cable terminations and internal wiring for signs of overheating or corrosion. Replace any defective component.
- Relamp all lighting fittings/luminaries, using same size, type and ratings of lamps
- Dispose of all lamps in a clean in a clean, safe, professional manner (discharge lamps contain toxic substances for this task).
- Check insulation painting of steel supports, brackets and any other material that requires a protective finish as installed.

2-Yearly

- Carry out tasks as for Annually.

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2.4 – Work Parcel 2 – Scope of Work

- Relamp all fixtures and luminaries using same type, size and rating of lamp. Clean down using compatible cleaning agent, wipe all surfaces with a damp cloth, change any corroded reflectors, gaskets etc. Check lamp holders, sockets, control gear, cable terminations and internal wiring for any signs of overheating or corrosion. Replace any defective components.
- Test insulation of all final circuits (shall not be less than 0.5 megohms with a 500V megger), earthing, continuity, and check condition of insulation, conduits, flexible, and connection at junction boxes and at luminaries.

Lamp Life Guide

The table below indicates average economic lamp life and may be used to determine lamp replacement intervals for particular installations when the annual hours of use are known.

Lamp Types	**Life (Hours)**
Tungsten filament (ordinary)	1000
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*Tubular fluorescent (26mm and 8-mm dia.)	7500 (economic service period)
Tubular SL and PLC compact lamps other fluorescent	5000 (economic service period)
Metal Halide (up to 250W)	5000 (economic service period)
Metal Halide (400W and higher)	10000 (economic service period)
Mercury discharge	7500 (economic service period)
High pressure sodium	
Below 150 Watt	*6000 (economic service period)*
150 Watt and over	*10000-12000 (economic service period)*

These lamps exhibit a significant reduction in efficiency long before actual lamp failure. The continued use of such lamps beyond their economic service period may result in unacceptably low lighting levels and client complaints.

2.4.2.8. Emergency/Exit Lighting Fixtures (EE1/EE)

Weekly

- Switch off normal power supply to circuit.
- Inspect all Fixtures and record all units to be repaired.
- Restore normal power supply.
- Replace all burnt out lamps.
- Repair all defective units.
- Repeat normal failure simulation and assure proper operation of all units.

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2.5.1-Work Parcel 2- List of Operation & Maintenance Manuals

DIVISION	DESCRIPTION	VOLUME No.
	SET NO.1 – CENTRAL SERVICES	
0	FIRST AID INSTRUCTIONS STRUCTURE OF O&M MANUALS	1 of 1
1	CHILLED WATER SYSTEM	1 of 2 2 of 2
2	COOLING WATER SYSTEM	1 of 1
2A	CHEMICAL WATER TREATMENT	1 of 1
2B	NALCO Stress Management for Cooling System (3D TRASAR)	1 of 1
3	HOT WATER SYSTEM AND STEAM SYSTEM	1 of 2 2 of 2
4	GENERATOR SET	1 of 2 2 of 2
4A	FUEL OIL SYSTEM	1 of 1
5	LPG GAS SYSTEM	1 of 1
6	MAIN PUMPING STATION • WATER WELLS • DOMESTIC SYSTEM • POTABLE SYSTEM • RO SYSTEM • CHLORINATION SYSTEM	1 of 5
7	IRRIGATION SYSTEM	1 of 2 2 of 2
8	FIRE FIGHTING SYSTEM	1 of 1
9	DRAINAGE SYSTEM	1 of 1
10	POOLS AND FOUNTAINS	1 of 2 2 of 2
11	KITCHEN EQUIPMENT	1 of 2 2 of 2
12	LAUNDRY EQUIPMENT	1 of 1
13	MV SYSTEM	1 of 5 TO 5 of 5
14	TELEPHONE SYSTEM	1 of 1
15	SOUND SYSTEM	1 of 1
16	CLOCK SYSTEM	1 of 1
17	CCTV SYSTEM	1 of 1
18	BUILDING MANAGEMENT SYSTEM, SECURITY SYSTEM AND INTERFACE WITH FAS	1 of 13 TO 13 of 13
19	LIFTS	1 of 12 TO 12 of 12
20	THEATER LIGHTING AND DIMMING	1 of 1

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2.5.1-Work Parcel 2- List of Operation & Maintenance Manuals

DIVISION	DESCRIPTION	VOLUME No.
	SET NO. 2 –NATIONAL SCHOOL OF FINE ARTS BUILDING B	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 3 –FACULTY OF LAW AND POLITICAL SCIENCES BUILDING D	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2
2	HVAC SYSTEM	2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 4 –CONFERENCE CENTER – BUILDING F	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 5 –SCHOOL OF PHARMACY – BUILDING H	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 6- EXTENSION OF EXISTING FACULTY OF SCIENCES	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 2 2 of 2
	SET NO. 7- SPORTS COMPLEX BUILDINGS K1, K2,K3	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 1
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 8- FACULTY OF MEDICINE, BUILDING M1 **SET NO.9- FACULTY OF DENTISTRY, BUILDING M2**	
1	PLUMBING/MECHANICAL SYSTEM	1 of 2 2 of 2
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 10- FACULTY OF PUBLIC HEALTH – BUILDING Q	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3

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2.5.1-Work Parcel 2- List of Operation & Maintenance Manuals

DIVISION	DESCRIPTION	VOLUME No.
	SET NO. 11- MALE DORMITORIES, BUILDING R1 **SET NO.12- FEMALE DORMITORIES, BUILDING R2**	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 13- TECHNICAL BUILDINGS T1, T2&T3	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 14-UNDERGROUND PARKING, BUILDING U3 **EASTERN PARKING, BUILDING V1**	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 1
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 15- RESTAURANT & FUNCTIONAL HOUSING BUILDING U2	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 2 2 of 2
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 16- CENTRAL CATERING AND WESTERN PARKING, BUILDING X	
1	PLUMBING/MECHANICAL SYSTEM	1 of 1
2	HVAC SYSTEM	1 of 1
3	ELECTRICAL SYSTEMS	1 of 3 TO 3 of 3
	SET NO. 17- FACULTY OF SCIENCES (FOS, LIBRARY & CAFETERIA)	
1	HVAC SYSTEM	1 of 1
2	ELECTRICAL SYSTEMS	1 of 1

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2.5.2-Work Parcel 2- List of As Built Drawings

IRN	Trades	Block/Zone	Subzone or Scale	Type of Document	Level of Plans	Running Number	Revision
Internal Revision Number		Zone defining the Building Examples: R2: Female Dorm R1: Male Dorm TS: Type Spaces OO: Whole Project	o= (Whole Zone) 1,2,3,4,5,6 (Parts of zone or whole zone) 7= Miscellaneous 8=Typical Spaces	1= Plans 2=Sections 3=Elevations 4=Details on A0 5=General Details on A3 6=Particular Details on A3 7=Schedules 8=Miscellaneous	0=Foundation 1=2nd Basement 3=Ground Floor 4=1st Floor 5=2nd Floor 6=3rd Floor 7=4th Floor 8=5th Floor 9=Roof	To facilitate diff documents of the same type and the same location	A, B, C, D

Trades (As needed for Drawing Numbering)

Trade A		Trade B		Trade C		Trade D		Trade E	
Site Works		Structures & OutBoards		Technical Equipment		Technical Equipment		Finishes	
A05	Main Pumping Station	**B00**	General Structure Drawings	**C00**	General M+E Drawings	**D02**	Swimming Pool Treatment equipment & accessories	**E00**	Architectural Executive Drawings
A06	Water Supply	**B01**	Concrete Works	**C10**	HVAC	**D04**	Decorative Fountains		
A07	Waste Water	**B02**	Frame Works & Canopies	**C20**	Plumbing	**D08**	Scientific Lab Equipment		
A11	External Signs & Boards	**B03**	Waterproofing & Joints	**C30**	High Voltage Installation General				
A13	Electrical Network	**B05**	External Aluminum & Glazing	**C31**	Transformer Substat				
A14	Low Current (Refer to C04)	**B09**	Reinforcement	**C32**	Static UPS System				
A15	Chilled & Heating Water	**B10**	Precast Elements	**C33**	Lighting layout				
		B11	Concrete Drawings with Reinforcement	**C34**	Miscellaneous				
				C35	Earthing System & Lightning Project				
				C40	Low Current Installation General				
				C41	Telephone Systems				
				C42	Computer Network				
				C43	Sound System				
				C44	Fire Alarm System				
				C45	Clock System				

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2.5.3-Work Parcel 2- List of Suppliers & Subcontractors

Trade:MV & Protection
(Excluding Faculty of Science Main Building, Library, & Old Cafeteria)

	Equipment	Subcontractor/ Supplier	Contact (Tel.)	Manufacturer	Concerned Bldgs
1	Transformer	ABB	01/512830	ABB	All other Bldgs
		Matelec	09/620920	Matelec	Faculty of Engineering- Bldg(G)
2	Ring Main Unit	ABB	01/512830	ABB	All Bldgs
		Matelec	09/620920	Matelec	Faculty of Engineering- Bldg(G)
3	MV Cables	Liban Cables	01/350040	Liban Cables	All Bldgs
4	Lightning and Earthing Accessories	Dantziguian Hrayr Automation system	01/683770	Furse	All other Bldgs
		Quazar	03/608283	Wallis	Faculty of Engineering- Bldg(G)

Trade:MV & Protection
Faculty of Science Main Building, Library, & Old Cafeteria

	Equipment	Subcontractor/ Supplier	Contact (Tel.)	Manufacturer	Concerned Bldgs
1	Lightning and Earthing Accessories	Nasrallah Engineering	03/388139	FRANCE-PARATONNERRES	FOS Building

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2.5.3-Work Parcel 2- List of Suppliers & Subcontractors

Trade: LV
(Excluding Faculty of Science Main Building, Library, & Old Cafeteria)

	Equipment	Subcontractor/ Supplier	Contact (Tel.)	Manufacturer	Concerned Bldgs
1	Lighting Fixtures	Light incorporated	01/389546	Philips	All other Bldgs
		Light & Power Lap	01/389546	3Filippi	All other Bldgs
		Light & Power Lap	01/389546	Biffi	All other Bldgs
		Light & Power Lap	01/389546	Civic	All other Bldgs
		Light & Power Lap	01/389546	Disano	All other Bldgs
		Light & Power Lap	01/389546	Allum	All other Bldgs
		Light & Power Lap	01/389546	Boluce	All other Bldgs
		Light & Power Lap	01/389546	Francesconi	All other Bldgs
		Light & Power Lap	01/389546	Signalatori	All other Bldgs
		Light & Power Lap	01/389546	Nordex	All other Bldgs
		Light & Power Lap	01/389546	Ivella	All other Bldgs
		Light & Power Lap	01/389546	Ova	All other Bldgs
		Light & Power Lap	01/389546	Colombo	All other Bldgs
		Light & Power Lap	01/389546	Genex	All other Bldgs
		Technolight	01/423112	Polaron	Conference center(Bldg F) and Faculty of Fine Arts (Bldg.B)
		Technolight	01/423112	ADB	Conference center(Bldg F) and Faculty of Fine Arts (Bldg.B)
		Astra	01/251635	Astra,Ova	Faculty of Engineering- Bldg(G)
2	Single Phase Sockets	Triacom	01/362661	Jung	All other Bldgs
		Sounds & Lights	01/613924	Jung	Faculty of Engineering- Bldg(G)
3	Three Phase Sockets	HARB Electric Triacom	01/821625 01/362661	ABB Jung	All other Bldgs
		Sounds & Lights	01/613924	Jung	Faculty of Engineering- Bldg(G)
4	Switches	Triacom	01/362661	Jung	All other Bldgs
		Sounds & Lights	01/613924	Jung	Faculty of Engineering- Bldg(G)
5	Disconnecting Switches	HARB Electric	01/821625	ABB	All other Blgs
		Rafic Gazzaoui & Co	01/855888	Katco	Faculty of Engineering- Bldg(G)
6	Panel Board:EMDB's,EDB's	Al Bonian International	06/410371	Elsteel	All other Bldgs
		Rafic Gazzaoui & Co	01/855888	Eldon	Faculty of Engineering- Bldg(G)
7	Panel Board:EPP's	Al Bonian International	06/410371	Elsteel	All other Bldgs
		Kemco	07/240851	Kemco	Faculty of Engineering- Bldg(G)
8	Panel Board:MPUP's	Al Bonian International	06/410371	Eldon/Elsteel	All other Bldgs
		Kemco	07/240851	Kemco	Faculty of Engineering- Bldg(G)

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2.5.3-Work Parcel 2- List of Suppliers & Subcontractors

Trade: LV
(Excluding Faculty of Science Main Building, Library, & Old Cafeteria)

	Equipment	Subcontractor/ Supplier	Contact (Tel.)	Manufacturer	Concerned Bldgs
9	Panel Board:EMCC's	Al Bonian International	06/410371	Cubic	All other Bldgs
		Rafic Gazzaoui & Co	01/855888	Eldon	Faculty of Engineering- Bldg(G)
10	Panel Board: SLP's, ESLP's, SUP's, UPP's	Engineering Group Contractors	03/317173	Engineering Group Contractors	All other Bldgs
		Kemco	07/240851	Kemco	Faculty of Engineering- Bldg(G)
11	Circuit Breakers	HARB Electric	01/821625	ABB	All other Bldgs
		Rafic Gazzaoui & Co	01/855888	Bticino	Faculty of Engineering- Bldg(G)
12	Contactors	HARB Electric	01/821625	ABB	All other Bldgs
		Rafic Gazzaoui & Co	01/855888	Allen Bradley	Faculty of Engineering- Bldg(G)
13	Panel Board: Capacitor Bank	AL bonian Group	01/385708	Arcotronics	All other Bldgs
		Matelec	09/620920	Matelec	Faculty of Engineering- Bldg(G)
14	UPS System	Mideast Power Systems	01/682000	MGE UPS Systems	All other Bldgs
		Manalco	01/250633	PCE/DELTA	Faculty of Engineering- Bldg(G)

Trade: LV
Faculty of Science Main Building, Library, & Old Cafeteria

	Equipment	Subcontractor/ Supplier	Contact (Tel.)	Manufacturer	Concerned Bldgs
1	Lighting Fixtures	Philips	01/1683941	Philips	FOS Building
2	Single Phase Sockets	GAZZAOUI	01/855888	bticino	FOS Building
3	Three Phase Sockets	GAZZAOUI	01/855888	bticino	FOS Building
4	Switches	GAZZAOUI	01/1855888	bticino	FOS Building
5	Disconnecting Switches	HARB ELECTRIC	01/1821625	ABB	FOS Building
6	Panel Board:EMDB's,EDB's	HARB \ SIMON ELECTRIC	01/821625 01/560222	General Electric	FOS Building
7	Panel Board:EPP's	HARB \ SIMON ELECTRIC	01/821625 01/560222	General Electric	FOS Building
8	Panel Board:MPUP's	HARB \ SIMON ELECTRIC	01/821625 01/560222	General Electric	FOS Building
9	Panel Board:EMCC's	HARB \ SIMON ELECTRIC	01/821625 01/560222	General Electric	FOS Building
10	Panel Board: SLP's, ESLP's, SUP's, UPP's	HARB \ SIMON ELECTRIC	01/821625 01/560222	General Electric	FOS Building
11	Circuit Breakers	HARB \ SIMON ELECTRIC	01/821625 01/560222	General Electric	FOS Building
		HARB ELECTRIC	01/821625	ABB	FOS Building
12	Contactors	HARB ELECTRIC	01/821625	ABB	FOS Building

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2.5.3-Work Parcel 2- List of Suppliers & Subcontractors

Trade: LC

	Equipment	Subcontractor/ Supplier	Contact (Tel.)	Manufacturer	Concerned Bldgs
2	Fire Alarm and Detection System	Beydoun Fire Equipment	01/644301	Notifier	All other Bldgs
		Automation & Control	04/487726	Simplex	Faculty of Engineering- Bldg(G)
3	Closed Circuit Television System	Comware	09/210974	Baxall/Vista/ Ultrak	All other Bldgs
		Automation & Control	04/487726	Vista	Faculty of Engineering- Bldg(G)
4	Master Antenna Television System	Triacom	01/512830	Katherein	R01,R02 and U2
6	Time Attendance System	Security Engineering	01/864867	RSI	All Bldgs

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2.5.4-Work Parcel 2- List of Consummables

	Consummable	Systems/Location	Form
1	Fluorescent Lamps	Lighting Fixtures	Pcs
2	Incandescent Lamps		
3	HID Lamps		
4	Ballasts		
5	Starters		
6	Glass Covers		
7	Battery/Charger	Emergency Lighting	Pcs
8	Signalling Lamps	Panel Boards	Pcs
9	MCB Circuit Breakers		
10	MCCB Circuit Breakers		
11	Relays		
12	Contactors		
13	Metering and Measuring Devices		
14	Fuses		
15	Switches	Lighting Control	Pcs
16	Push Buttons		
17	Disconnecting Switches	Mechanical Equipment	Pcs
18	Batteries	UPS	Pcs
19	Smoke Detectors	Fire Alarm	Pcs
20	Combined S/H Detectors		
21	Manual Stations		
22	Bells		
23	MV Fuses	MV System	Pcs
24	Oil	Transformers	Liquid