

**REPUBLIC OF SINGAPORE
MINISTRY OF DEFENCE**

CONTRACT NO. 9021203762

PROJECT D2019-00162

**DEVELOPMENT ALONG SEMBAWANG ROAD
(DIEPPE BARRACKS)**

**OPERATION AND MAINTENANCE MANUAL
FOR
ELECTRICAL WORKS INSTALLATION
AT DIEPPE BARRACKS – BLOCK 2**

CONSULTANT : PDC CONSULTANTS PTE LTD

MAIN CONTRACTOR : DEENN ENGINEERING PTE LTD

SUB-CONTRACTOR : CHIN SENG ENGINEERING (S) PTE LTD

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SECTION 1

INTRODUCTION

PROJECT: D2019-00162
DEVELOPMENT ALONG SEMBAWANG ROAD (DIEPPE BARRACKS) – BLOCK 2

PROJECT DESCRIPTION

The Electrical for Dieppe Barrack Block 2 includes design & installation, testing commissioning and handover the following works;

- Electrical draw pits, pipelines, including lead-in pipe and road crossing pipes for LT reticulation system.
- 1 no 300A 3 Phase 400V Normal main switchboard and 800A 3 phase 400V Emergency Main Switchboard complete with MCCB, digital power meter for metering and protection, kilo-watt-hour meters, lightning surge arrestor, and all necessary accessories.
- Distribution boards and sub-distribution boards complete with kilo-watt-hour meters, relay for metering indication and protection, miniature circuit breaker etc.
- External lighting inclusive of street light & link-way light.
- Luminaires and accessories for all areas.
- Final circuit wiring for lighting & power, isolator for other trades.
- Dedicated electrical earthing systems.
- Dedicated COMMS earthing system.
- Lightning protection system.
- 1 Way EVC System as per CP requirements.
- Security System inclusive of IDS, CCTV, Intercom etc.
- AV System for various rooms.

SECTION 2

SYSTEM DESCRIPTION

PROJECT: D2019-00162
DEVELOPMENT ALONG SEMBAWANG ROAD (DIEPPE BARRACKS) – BLOCK 2

LT POWER DISTRIBUTION

The Supply for Block (2) is taken from Block 11(3) LT Switch room via underground cable.

The Main LT Boards supply power to Sub-board or DB at different locations and/or rooms with specified requirement.

The general distribution segregated is by areas, i.e. Office/Store Area, M&E Plant Room etc. Special usage like MV, Air-con, NCR/Server Room & etc. c/w independent DB to avoid the disturbance from common area DB.

LIGHTING SYSTEM

The light fittings provides the illumination requirement for the functional and circulation areas within the development.

The lighting at each functional spaces and rooms are generally controlled by local light switch(es) located within the space/room. Motion detectors also are used to reduce light usage when it is vacant. It is installed in most of the small store, toilets, & etc.

The lighting at external area is controlled by timer switch / photocell.

EARTHING SYSTEM

The electrical earthing system adopted for the development is TNS system. The main earth electrodes are located in external area next to the Consumer LV Switch Room and provides the low earth impedance of less than 1 ohm for the main earth bar of MSBs. All electrical earth cables are connected back to MSBs main earth bar.

LIGHTNING PROTECTION SYSTEM

The lightning protection system consists of:

Air termination network using horizontal lightning tapes on roof parapets.

Down conductors using dedicated rebar conceal within column at the external wall of building are installed with exthometric welding linking to test link box at 1st storey.

Bi-metallic connector is installed within test link box to connect the dedicated rebar for measurement of earth reading.

SECURITY SYSTEM

IDS, Intercom and CCTV System are provided at strategic location to monitor all the exit doors, Gantry and all the important external area etc. All the signals are monitored and centralized controlled at Pass Office. The duplicated signal is also being monitored at Block 2 OPS Room in future.

ONE WAY EVC SYSTEM

One Way EVC System is provided to the entire building as per SS:546 required to all areas include office, store, toilet, staircase, plant room etc. with its main equipment located inside Block 11 FCC Room and Main paging panel is housed at Blk 2 OPS Room.

AUDIO VISUAL SYSTEM

Audio Visual System is being provided for DC Room, Training Room, Planning Room etc.

AV System is equipped with high resolution projector, motorized screen, sound system and AV receptacle for easy presentation purpose.

SECTION 3

EMERGENCY PROCEDURE AND CONTACT PERSON

EMERGENCY PROCEDURE

If there is electrical power failure, please DO NOT touch the Switchboard. Please call Facilities Management / Guard for assistant.

Emergency Situations

Knowing what to do in an emergency situation can save a life. Following are guidelines for electrical emergencies:

i) If the electricity goes out

- ∞ Reset circuit breakers to see if the problem is a short –circuit in the electrical System. If surrounding buildings are dark, the problem is likely a power outage.
- ∞ Turn off all lights and major equipment, this will help to restore power more quickly while protecting your equipment from voltage fluctuations and circuit overloads when power returns. Surge protectors for your computer and electronic equipment provides extra protection.
- ∞ When power returns, wait a few minutes before turning on lights and equipment (one at time).

ii) If someone touches a live electrical wire

If you see a person come into contact with indoor, low-voltage electricity, do not touch the person. Attempt to switch the power off, if possible. If you cannot shut off the power, use a non-conductor (dry wood, rope, board, broom handle) to separate the person from the current.

If the person has come into contact with high voltage, outdoor wires, call 995 and then the power company immediately. Do not attempt to touch the person or to try to free the person from the wires. Stay at least 100 feet away from any downed wires at all times.

After the person has been separated from the electrical source, you should:

Check his breathing and heartbeat. If the person is not breathing, begin mouth-to-mouth resuscitation. If the person's heart has stopped beating, start CPR if you're trained to do so.

- ∞ Treat the victim for shock. Keep him lying down. If the victim is unconscious, lie on his side to allow drainage of fluids. Cover him enough to maintain body heat.
- ∞ Do not move the victim if you suspect neck or spine injury. Treat burn by immersing in cool water.
- ∞ Do not apply grease or oil. For severe burns, cut away loose clothing and cover the burned area with a sterile dressing.

iii) If It is an electrical fire

Never use water on electrical fires, equipment or wires. Unplug equipment or cut power at the control panel if possible. If the fire is small, use baking soda or a multipurpose or dry chemical fire extinguisher. Call 995 as soon as possible.

iv) If your clothing catches fire

Do not run. Stop where you are, drop to the ground, cover your face with your hands, and roll over and over to smother the flames. If someone else's clothes catch fire, push them to the ground and roll them over and over, or smother the flames with a blanket or carpet.

LIST OF CONTACT PERSONNEL

Electrical System

1. Name: Tan Ching Shia
H/p: 9238 8567
2. Name: Bellal
H/p: 8312 0138
3. Name: Sohag Ruslly
H/p: 8587 8655

AV & PA System

1. Name: Jack Tay
H/p: 8133 9290
2. Name: Chito
H/p: 9656 9754

IDS & CCTV System

1. Name: BK Ng
H/p: 9144 1991
2. Name: Lim CK
H/p: 9455 4655

SECTION 4

MATERIAL/EQUIPMENT SCHEDULE

MATERIAL/EQUIPMENT SCHEDULE

OFFICIAL (CLOSED)

S/N	DESCRIPTION	BRAND/ MODEL NO	COMPANY NAME	ADDRESS	PERSON IN CHARGE	TEL NO	FAX NO	REMARKS
1	LT SWITCHBOARD, SUB-BOARDS & DBs	GATHERGATES	GATHERGATES SWITCHGEAR PTE LTD	16 SENOKO DRIVE SINGAPORE 758203	MR. WAYNE TAN	6555 4441	6555 4440	
2	LT POWER & FIRE RESISTANT CABLE	TAI SIN	TAI SIN ELECTRIC CABLE MFG PTE LTD	24 GUL CRESCENT JURONG TOWN SINGAPORE 629531	MR. JOHNSTON TEO	6861 3401	6861 4084	
3	CABLE SUPPORT SYSTEM	CEE	CEE MARKETING (SINGAPORE) PTE LTD	3791 JALAN BUKIT MERAH CENTRE @ REDHILL #04-01 SINGAPORE 159471	MR. SHARON LIM	6352 2838	6352 2858	
4	GI CONDUIT PIPE & ACCESSORIES	VOLTECX	TAKASO INDUSTRIES PTE LTD	7 YISHUN INDUSTRIAL STREET 1, #05-43 NORTH SPRING BIZHUB, SINGAPORE 768162	MR. JOE TEE	6336 8386	6336 1822	
5	uPVC CONDUIT PIPE & ACCESSORIES	LITAFLEX	LITAFLEX PLASTIC MFG PTE LTD	10 SENOKO DRIVE SINGAPORE 758198	MR. ROYSTON	6759 1101	6759 1121	
6	SWITCHES, SOCKET OUTLET & ISOLATOR	HAGER	HAGER ELECTRO SYSTEMS PTE LTD	12 TAI SENG STREET #06-01B LUXASIA BLDG SINGAPORE 534118	MR. JASON LOCK	6383 1030	6383 0230	
7	MOTION SENSOR	HAGER	HAGER ELECTRO SYSTEMS PTE LTD	12 TAI SENG STREET #06-01B LUXASIA BLDG SINGAPORE 534118	MR. JASON LOCK	6383 1030	6383 0230	
8	LIGHT FITTING	PHILIPS	SIGNIFY SINGAPORE PTE LTD	622 LORONG 1 TOA PAYOH SINGAPORE 319763	MR. SAM WEE	6206 8000	---	
9	EMERGENCY & EXIT LIGHT	POWERCRAFT	LITE UNITE PRIVATE LIMITED	47 KALLANG PUDDING ROAD #09-04 CRESCENT @KALLANG SINGAPORE 349318	MR. MARC NGAN	6443 6988	6443 9788	
10	TUBULAR LIGHT PIPE	SOLARSOPT	ARCHITYPE DESIGN SOLUTIONS PTE LTD	36 WOODLANDS IND'L PARK E5 SINGAPORE 757810	MS. LYN NG	9696 1088	6295 5839	
11	WALL FAN, CEILING FAN & DC FAN	KDK	CAPITAL DISTRIBUTION (S) PTE LTD	9 TAGORE LANE #02-31-33, 9@TAGORE SINGAPORE 787472	MR. GILBERT NG	6843 7129	6288 5869	

OFFICIAL (CLOSED)

MATERIAL/EQUIPMENT SCHEDULE

OFFICIAL (CLOSED)

S/N	DESCRIPTION	BRAND/ MODEL NO	COMPANY NAME	ADDRESS	PERSON IN CHARGE	TEL NO	FAX NO	REMARKS
12	HVLS FAN	SPACEFANS	SPECTRA INSTRUMENT PTE LTD	8 LORONG BAKAR BATU #06-05/06 KOLAM AYER IND.PARK SINGAPORE 348743	MR. LIONEL LOO	6747 5895	---	
13	UNDERFLOOR SERVICE OUTLET BOX	MK	USS SOLUTION PTE LTD	8 KAKI BUKIT AVENUE 4 #02-17 PREMIER @KAKI BUKIT SINGAPORE 415875	MR .WILSON CHAN	6385 7506	6385 7507	
14	LIGHTNING PROTECTION SYSTEM	EMTECH	TAN TECK SENG ELECTRIC CO (PTE) LTD	137 KAKI BUKIT AVENUE 1, SHUN LI INDUSTRIAL PARK, SINGAPORE 416003	MS. ANNIE TAN	6747 8833	6747 0370	
15	FIRE STOP SYSTEM	SURESEAL	ACEMECH SERVICES PTE LTD	1 BUKIT BATOK CRESCENT #06-06 WCEGA PLAZA SINGAPORE 658064	MR. KELVIN NG	6795 8588	6795 3168	
16	SECURITY SYSTEM	SCHEMPP	SCHEMPP SECURITY SYSTEMS PTE LTD	52 UBI AVE 3 #04-39 FRONTIER SINGAPORE 408867	MR. BK NG	6241 2441	6241 2003	
17	1 WAY EVC / PUBLIC ADDRESS SYSTEM	TEC REVOX	TEC REVOX ENGINEERING PTE LTD	18 KAKI BUKIT ROAD 3 #03-12 ENTREPRENEUR BUSINESS CTR SINGAPORE 415978	MS. LYNN HANG	6481 6288	6481 6280	
18	AUDIO VISUAL SYSTEM	TEC REVOX	TEC REVOX ENGINEERING PTE LTD	18 KAKI BUKIT ROAD 3 #03-12 ENTREPRENEUR BUSINESS CTR SINGAPORE 415978	MS. LYNN HANG	6481 6288	6481 6280	

OFFICIAL (CLOSED)

SECTION 5

MAINTENANCE SCHEDULE AND CHECKLIST

DIEPPE BARRACK @ SEMBAWANG ROAD - Phase 1A & 1B Maintenance Service Schedule

S/N	Trade	Phase 1A & 1B (Block 2, 11(3), 10(4), 5, 4(6) & 7												
		Jan' 2024	Feb' 2024	Mar' 2024	Apr' 2024	May' 2024	Jun' 2024	Jul' 2024	Aug' 2024	Sep' 2024	Oct' 2024	Nov' 2024	Dec' 2024	Remarks
1	Electrical Works													
a	HT Switchgear												10/12/2025	Yearly
b	Transformer												10/12/2025	Yearly
c	Gen-set	08/01/2025	06/02/2025	06/03/2025	09/04/2025	07/05/2025	11/06/2025	09/07/2025	07/08/2025	10/09/2025	08/10/2025	06/11/2025	10/12/2025	Monthly
d	HVLS Fan			06/03/2025			11/06/2025			10/09/2025			10/12/2025	Half yearly
e	Electrical installation	08/01/2025	06/02/2025	06/03/2025	09/04/2025	07/05/2025	11/06/2025	09/07/2025	07/08/2025	10/09/2025	08/10/2025	06/11/2025	10/12/2025	Monthly
2	AV System			06/03/2025			11/06/2025			10/09/2025			10/12/2025	Quarterly
3	PA System			06/03/2025			11/06/2025			10/09/2025			10/12/2025	Quarterly
4	Security System						11/06/2025						10/12/2025	Half yearly

**PROJECT: D2019-00016 CONSTRUCTION OF NINE BUILDINGS AND ADDITION & ALTERATIONS TO
TWO BUILDINGS ALONG SEMBAWANG ROAD- ELECTRICAL WORKS**

MAINTENANCE CHECKLIST - ELECTRICAL INSTALLATION

BLOCK: _____
DB: _____

Checked **Condition** **Recommendation**
Good **Bad**

1 LV Main Switchboard

1.1	Check pilot lights are working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
1.2	Check ammeters are working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
1.3	Check voltmeter are working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
1.4	Check protection relay setting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
1.5	Check all power meter are working, reading & record	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

	Voltage	Current	Active Power	Reactive Power	Max. Demand
L1					
L2					
L3					
Power Factor:					

2 Sub-Board / Distribution Boards

2.1	Check Pilot Lights are working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2.2	Check protection relay settings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2.3	Check all PVC shutter are firmly secured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2.4	Check earth cable to cover are firmly secured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2.5	Check all timer are set accurately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2.6	Check all power meter are working, reading & record	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

	Voltage	Current	Active Power	Reactive Power	Max. Demand
L1					
L2					
L3					
Power Factor:					

3 Light Fitting/Fan/Motion Sensor

3.1	Check all light fitting/Fan/Motion are working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3.2	Check all mounting bracket are secured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3.3	Check all cable are secure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

4 Power Circuit

4.1	Check all power point are working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4.2	Check all power point any loose cable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Inspected by: _____

Witness by: _____

Sign by: _____

Sign by: _____

Date: _____

Date: _____



SPECTRA INSTRUMENTS PTE LTD

8 Lorong Bakar Batu, #06-05/06 Kolam Ayer Ind. Park, Singapore 348743.
Tel: 67478857, 67475895 Fax: (65) 67475873 e-mail: info@spacefans.com.sg
UEN: 199906486Z (GST Reg : 19-9906486-Z)

bizSAFE₄

M/s : _____

REPORT NO.

Address : _____

M: 3951

Tel : _____ Hp : _____

Ref / PO : _____

Attn : _____

Date : _____

HVLS Fan Model :

Warranty : Yes / No

Fan Height :

Date of Expiry :

Fan Location :

Quantity :

Type of MEWP : Scaffold / Scissorlift / Boomlift / Ladder

HVLS Preventive maintenance cleaning services

Maintenance Check List

- a) Clean / dry up all airfoils
- b) Inspect lower yoke and safety cables
- c) Inspect upper & lower bolts and nuts
- d) Inspect and tighten motor terminations
- e) Inspect gear reducer for oil leakage
- f) Inspect and tighten guy wires (if installed)
- g) Inspect winglets and hybrid airfoils
- h) Inspect / torque airfoils / retainer bolts and nuts
- i) Inspect and tighten controller terminations
- j) Check and update program parameters
- k) Check custom electrical hardwares (if installed)
- l) Check electrical control panel box-functional testing

Done

Remarks

<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

Remarks : _____

The above work has been carried out to my satisfaction.

Time arrived : _____

Time finished : _____

Attended by : _____

Customer's name / Company's stamp / Date

SECTION 6

TECHNICAL INFORMATION, CATALOGUES
AND OPERATION INSTRUCTION
(Refer to File Attached)

LIST OF CATALOGUE

S/N	DESCRIPTION
1	LT SWITCHBOARD, SUB-BOARDS & DBs
2	LT POWER & FIRE RESISTANT CABLE
3	CABLE SUPPORT SYSTEM
4	GI CONDUIT PIPE & ACCESSORIES
5	uPVC CONDUIT PIPE & ACCESSORIES
6	SWITCHES, SOCKET OUTLET & ISOLATOR
7	MOTION SENSOR
8	LIGHT FITTING
9	EMERGENCY & EXIT LIGHT
10	TUBULAR LIGHT PIPE
11	WALL FAN, CEILING FAN & DC FAN
12	HVLS FAN
13	SOB BOX
14	LIGHTNING PROTECTION SYSTEM
15	FIRE STOP SYSTEM
16	SECURITY SYSTEM
17	1 WAY EVC / PUBLIC ADDRESS SYSTEM
18	AUDIO VISUAL SYSTEM

SECTION 7

TESTING AND COMMISSIONING REPORT (Refer to File Attached)

SECTION 8

AS-BUILT DRAWING
(Refer to File Attached)