Building and Construction Authority

This form may take you 5-8 minutes to complete.

THE BUILDING CONTROL ACT (CAP 29)

CERTIFICATE OF DESIGN & SUPERVISION OF LIGHTNING PROTECTION SYSTEM

Commissioner of Building Control Building & Construction Authority 52 Jurong Gateway Road #11-01 Singapore 608550 Website: *http://www.bca.gov.sg/*	INSTRUCTIONS: (1) One copy is to be submitted (2) Please tick in the appropriate box. (3) This form is to be filled in BLACK INK only.

This Certificate relates to the lightning protection system installed in the building(s) approved under: -

Project Ref. No.: [**A2105-00599-2022-BP01**]

Address: [**SEMBAWANG ROAD**]

Building Name (if any): [ ]

TS/MK & Lot/Plot: [**05019M MK13**]

Remarks: [**PROPOSED ADDITIONS OF 1 BLOCK OF 3-STOREY OFFICE BUILDING (BLK 2), 1 BLOCK OF 6-STOREY ACCOMMODATION BUILDING (BLK 3), 1 BLOCK OF 4-STOREY ACCOMMODATION BUILDING (BLK 4), 1 BLOCK OF 2-STOREY TRAINING MULTIPLEX (BLK 9), 1 BLOCK OF MSVS (BLK 10), AND ANCILLARY FACILITIES (BLK 5, 6 & 8), PARTIAL DEMOLITION OF BLKS 1 & 22 AND DEMOLITION OF BLKS 1A, 1B, 2, 3, 3A, 4, 4A, 5, 5A, 6, 6A, 6B, 7, 7A, 8, 9, 10, 14, 18, 18A, 19, 20, 23, 23B, 23C, 24, 25, 25A, 25B, 26, 26A, 26B, 26C, 26D, 27A, 31, 31B, 32, 33B, 33C, 33D, 33E, 33F, 33G, 33H, 37, 37A, 37B, 41, 44, 44A & 131 TO EXISTING DIEPPE BARRACK ON LOT 05019M MK13 AT SEMBAWANG ROAD (MANDAI PLANNING AREA) – PHASE 1: PARTIAL TFP INVOLVING BLK 2, 3, 4, 5 & 6]

Part 1 : Lightning Protection System Design Certification

I certify that the design of the above-mentioned lightning protection system complies with the requirements of the Building Control Regulations 2003, SS:555 and the relevant Singapore Standard Code of Practice.

(a) The design of the lightning protection system is in accordance with -

- ☐ the Code of Practice for Protection Against Lightning - SS 555:2010; or
- ☑ the Code of Practice for Protection Against Lightning - SS 555:2018.

(b) ☐ The design and installation of the lightning protection system are based on alternative solution

Remarks and Alternative Solution provided:

Address of Professional Engineer PDC Consultants Pte Ltd Paya Lebar Square #10-17/18 (Office Lobby 1) 60 Paya Lebar Road Singapore 409051	Name, PE Registration Number & Signature of Professional Engineer PROFESSIONAL ENGINEER (SINGAPORE) ELECTRICAL TEE LEONG HOU 4106

Tel No. : 64447748	Date: 9/10/2024

Part 2: Lightning Protection System Supervision Certification

I have supervised the above-mentioned lightning protection installation and hereby certify the installation works complies with the requirements of the Building Control Regulations 2003, SS:555 and the relevant Singapore Standard Code of Practice. I further certify that the installation works has been inspected and tested by me in accordance to relevant Singapore Standard Code of Practice.

Remarks :

Address of Professional Engineer	Name, PE Registration Number & Signature of Professional Engineer
T YEO ENGINEERS PTE LTD 80 GENTING LANE, #05-09G RUBY IND COMPLEX SINGAPORE 349565	PROFESSIONAL ENGINEER ELECTRICAL YEO TIONG LAI 3467 SINGAPORE EMA LICENSED ELECTRICAL ENGINEER LICENCE NO: 9/20140
Tel No. : 9818 8372	Date: 09/10/2024

Building and Construction Authority

THE BUILDING CONTROL ACT (CAP 29)

CERTIFICATE OF SUPERVISION OF LIGHTNING PROTECTION SYSTEM
(Earth Resistance & Electrical Continuity Test Form)

Commissioner of Building Control Building & Construction Authority 52 Jurong Gateway Road #11-01 Singapore 608550 Website: *http://www.bca.gov.sg/*	INSTRUCTIONS: (1) One copy is to be submitted (2) This form is to be filled in BLACK INK only.

Project Ref. No.: **A2105-00599-2022-BP01**

Lightning Protection System Earthing & Electrical Continuity Test

Address: **LOT 05019M MK13 AT SEMBAWANG ROAD**	Test Date: **12/09/2024**

Test Instrument Details

Brand & Model 1: **LUTRON MO2014**	Serial No.: **I565964**	Calibrated: **07/03/2024**
Brand & Model 2: **KYORITSU & KEW 4105A**	Serial No.: **E8252667**	Calibrated: **27/11/2023**

Table 1 : Earth Resistance System Test

Type of Test	Resistance of Earth Termination System [Ohm]												Remarks
Earth Electrode Point	1	2	3	4	5	6	7	8	9	10	11	12	**Block 2**
Point Resistance [R< N x 10Ω]	**12.7**	**15.6**	**13.6**	**14.1**	**9.07**	**13.4**	**10.7**	**15.7**	**16.4**	**14.1**	**10.3**	**12.6**	
Electrical Continuity Test Between N & N+1	**0.03**	**0.04**	**0.03**	**0.04**	**0.02**	**0.03**	**0.02**	**0.04**	**0.04**	**0.03**	**0.02**	**0.03**	
Earth Electrode Point	13	14											
Point Resistance [R< N x 10Ω]	**17.6**	**11.2**											
Electrical Continuity Test Between N & N+1	**0.04**	**0.02**											
Earth Electrode Point	1	2	3	4	5	6	7	8	9	10	11	12	**Block 3 (11)**
Point Resistance [R< N x 10Ω]	**16.6**	**15.9**	**15.3**	**14.2**	**16.4**	**17.3**	**16.9**	**13.7**	**14.8**	**13.8**	**16.2**	**15.7**	
Electrical Continuity Test Between N & N+1	**0.04**	**0.04**	**0.04**	**0.03**	**0.04**	**0.04**	**0.04**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	
Earth Electrode Point	13	14	15	16	17	18	19	20	21	22	23	24	
Point Resistance [R< N x 10Ω]	**15.2**	**17.8**	**13.9**	**14.6**	**15.1**	**15.5**	**13.2**	**11.7**	**12.6**	**13.3**	**14.8**	**14.1**	
Electrical Continuity Test Between N & N+1	**0.03**	**0.04**	**0.03**	**0.03**	**0.03**	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	

Earth Electrode Point	25	26	27	28	29	30	31	32					
Point Resistance [R< N x 10Ω]	**13.1**	**12.3**	**11.5**	**12.5**	**13.9**	**11.2**	**12.5**	**13.2**					
Electrical Continuity Test Between N & N+1	**0.04**	**0.03**	**0.02**	**0.04**	**0.02**	**0.03**	**0.02**	**0.03**					
Earth Electrode Point	1	2	3	4	5	6	7	8	9	10	11	12	**Block 4 (10)**
Point Resistance [R< N x 10Ω]	**9.03**	**11.2**	**9.08**	**8.04**	**12.3**	**10.5**	**11.4**	**10.7**	**9.08**	**13.6**	**11.9**	**10.2**	
Electrical Continuity Test Between N & N+1	**0.02**	**0.03**	**0.02**	**0.02**	**0.04**	**0.02**	**0.03**	**0.02**	**0.02**	**0.04**	**0.03**	**0.03**	
Earth Electrode Point	13	14	15	16									
Point Resistance [R< N x 10Ω]	**10.3**	**10.8**	**13.4**	**9.01**									
Electrical Continuity Test Between N & N+1	**0.02**	**0.02**	**0.04**	**0.02**									
Earth Electrode Point	1	2	3	4	5	6	7	8	9	10	11	12	**Block 5**
Point Resistance [R< N x 10Ω]	**13.7**	**14.4**	**15.2**	**10.1**	**11.9**	**15.3**	**16.4**	**10.3**	**13.7**	**14.0**	**14.5**	**14.3**	
Electrical Continuity Test Between N & N+1	**0.03**	**0.03**	**0.04**	**0.02**	**0.02**	**0.04**	**0.04**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	
Earth Electrode Point	13	14	15	16	17	18	19	20					
Point Resistance [R< N x 10Ω]	**17.4**	**15.6**	**12.6**	**9.09**	**11.4**	**10.7**	**14.8**	**14.2**					
Electrical Continuity Test Between N & N+1	**0.04**	**0.04**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.04**					
Earth Electrode Point	1	2	3	4	5	6	7	8					**Block 6 (4)**
Point Resistance [R< N x 10Ω]	**7.09**	**8.04**	**7.06**	**9.02**	**9.07**	**8.03**	**8.04**	**7.06**					
Electrical Continuity Test Between N & N+1	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.02**	**0.02**	**0.02**					
Earth Electrode Point	1	2	3	4									**Covered Linkway Block 3(11) -Block4(10)**
Point Resistance [R< N x 10Ω]	**5.7**	**5.1**	**7.6**	**7.2**									
Electrical Continuity Test Between N & N+1	**0.02**	**0.02**	**0.03**	**0.03**									

Earth Electrode Point	1	2											**Covered Linkway Block 3(11) – Block 5**
Point Resistance [R< N x 10Ω]	**5.1**	**5.1**											
Electrical Continuity Test Between N & N+1	**0.02**	**0.02**											
Earth Electrode Point	1	2	3	4	5								**Covered Linkway Block 3(11) – Block 7**
Point Resistance [R< N x 10Ω]	**6.5**	**9.4**	**7.9**	**7.7**	**6.7**								
Electrical Continuity Test Between N & N+1	**0.02**	**0.03**	**0.03**	**0.03**	**0.02**								

Overall resistance of the Earth Termination System

[$R_{overall} \leq 10\Omega$]: [0.4 Ohm]

Table 2 : Natural Down Conductor Electrical Resistance Test

Type Of Test	Continuity Test for Down Conductor System [Ohm]												Remarks
Electrical Continuity Test	1	2	3	4	5	6	7	8	9	10	11	12	**Block 2**
Overall value in Ohm [R<0.2Ω]	**0.04**	**0.03**	**0.03**	**0.01**	**0.02**	**0.02**	**0.04**	**0.03**	**0.03**	**0.03**	**0.02**	**0.02**	
Electrical Continuity Test	13	14											
Overall value in Ohm [R<0.2Ω]	**0.03**	**0.03**											
Electrical Continuity Test	1	2	3	4	5	6	7	8	9	10	11	12	**Block 3 (11)**
Overall value in Ohm [R<0.2Ω]	**0.03**	**0.03**	**0.03**	**0.02**	**0.03**	**0.04**	**0.04**	**0.04**	**0.03**	**0.03**	**0.03**	**0.03**	
Electrical Continuity Test	13	14	15	16	17	18	19	20	21	22	23	24	
Overall value in Ohm [R<0.2Ω]	**0.02**	**0.04**	**0.03**	**0.03**	**0.02**	**0.03**	**0.03**	**0.02**	**0.02**	**0.01**	**0.02**	**0.02**	
Electrical Continuity Test	25	26	27	28	29	30	31	32					
Overall value in Ohm [R<0.2Ω]	**0.03**	**0.03**	**0.02**	**0.03**	**0.02**	**0.03**	**0.02**	**0.03**					
Electrical Continuity Test	1	2	3	4	5	6	7	8	9	10	11	12	**Block 4 (10)**
Overall value in Ohm [R<0.2Ω]	**0.01**	**0.03**	**0.02**	**0.01**	**0.03**	**0.02**	**0.02**	**0.01**	**0.03**	**0.03**	**0.02**	**0.02**	
Electrical Continuity Test	13	14	15	16									
Overall value in Ohm [R<0.2Ω]	**0.03**	**0.02**	**0.03**	**0.02**									
Electrical Continuity Test	1	2	3	4	5	6	7	8	9	10	11	12	**Block 5**
Overall value in Ohm [R<0.2Ω]	**0.03**	**0.03**	**0.03**	**0.02**	**0.02**	**0.04**	**0.04**	**0.02**	**0.03**	**0.02**	**0.03**	**0.03**	
Electrical Continuity Test	13	14	15	16	17	18	19	20					
Overall value in Ohm [R<0.2Ω]	**0.03**	**0.03**	**0.02**	**0.04**	**0.02**	**0.03**	**0.03**	**0.03**					
Electrical Continuity Test	1	2	3	4	5	6	7	8					**Block 6 (4)**
Overall value in Ohm [R<0.2Ω]	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.02**					
Electrical Continuity Test	**1**	**2**	**3**	**4**									**Covered Linkway Block 3(11) - Block 4(10**
Overall value in Ohm [R<0.2Ω]	**0.02**	**0.02**	**0.03**	**0.03**									

Electrical Continuity Test	**1**	**2**											**Covered Linkway Block 3(11) – Block 5**
Overall value in Ohm [R<0.2Ω]	**0.02**	**0.02**											
Electrical Continuity Test	**1**	**2**	**3**	**4**	**5**								**Covered Linkway Block 3(11) – Block 7**
Overall value in Ohm [R<0.2Ω]	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**								

* Table 2 applicable for down conductor using natural component such as rebar of concrete column.

Remarks:

Notes:

1. Test Report shall be provided for each structure/building.
2. LPS as-built plans should include air-termination system, down conductor system, earth termination system, details of equipotential bonding with metallic fixtures/structural steel works, zones of lightning protection provided by rolling sphere and/or protection angle, photos of concealed equipotential bonding points between metal fixtures, steel rebar of concrete with LPS, etc.
3. Any other details as required by BCA but not mentioned above.

PROFESSIONAL ENGINEER
ELECTRICAL
YEO TIONG LAI
3467
SINGAPORE
EMA LICENSED ELECTRICAL ENGINEER
LICENCE NO: 0/20140

Signature/Name/PE Registration Number of Professional Engineer