Alpha
Consulting Engineers Pte Ltd

PROJECT QUALITY PLAN

HDB AT MOUNTBATTEN ROAD C49

For

HOUSING & DEVELOPMENT BOARD

Copy No.	1

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Authorised By: Loh Fook Yuen

Date: 8 August 2022

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SECTION 1

QUALITY PLAN CONTROL AND DISTRIBUTION

1.1 List of Copy Holders

Copy No.	Copy Holder	Date of Issue
1	6312	8 August 2022

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	8 August 2022	1 to 11	29	+ 1 page (Section 9.1 – Sustainable Design Features / Criteria)

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Residential

Statistics of Development	
Site Area, m²	16,000
Nett Floor Area, m²	-
Gross Floor Area, m²	-
Covered Carpark, m²	-
No. of Covered Carpark Lots	-
No. of Apartments/Houses	560
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	-
Green Mark Category	Gold Plus
No. of Phases	-

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LEI	FFAI	PSI	SPFI				
Estimate						-				
Awarded	-	-	-	-	-	-				

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	-	-	-
Awarded	-	-	-

Site Clearance shall include earth work, soil improvement, service diversion and termination.

2.3 Scope of Works

2.3.1 Scope of Consultancy Services

Conceptual/Schematic Design	✓
Detailed Design	✓
Tender Documentation	-
Tender Evaluation	-
Contract Supervision	✓
M&E Costing	✓
Submissions to Authority	✓

(✓ where applicable)

2.3.2 Scope of M&E Services

ELECTRICAL	✓	AIR CONDITIONING		SPRINKLER	✓	SANITARY	✓	SWIMMING POOL	
LIFT	✓	MECHANICAL VENTILATION	✓	FIRE ALARM	✓	COLD WATER	✓	STEAM BOILER	
ESCALATOR		MECHANICAL SMOKE EXTRACT	✓	HOSEREEL	✓	HOT WATER	✓	FUEL STORAGE	
PABX		COMPUTER A/C		WET RISER	✓	TOWN GAS	✓		
SECURITY		BST CARPARK EXH		DRY RISER	✓	LPG GAS			
TELELIFT		HEATING				MEDICAL GAS			
DATA COMM.									
FLUSHFLOOR TRUNKING									

(✓*where applicable*)

2.3.3 Submission to Relevant Authorities by Others

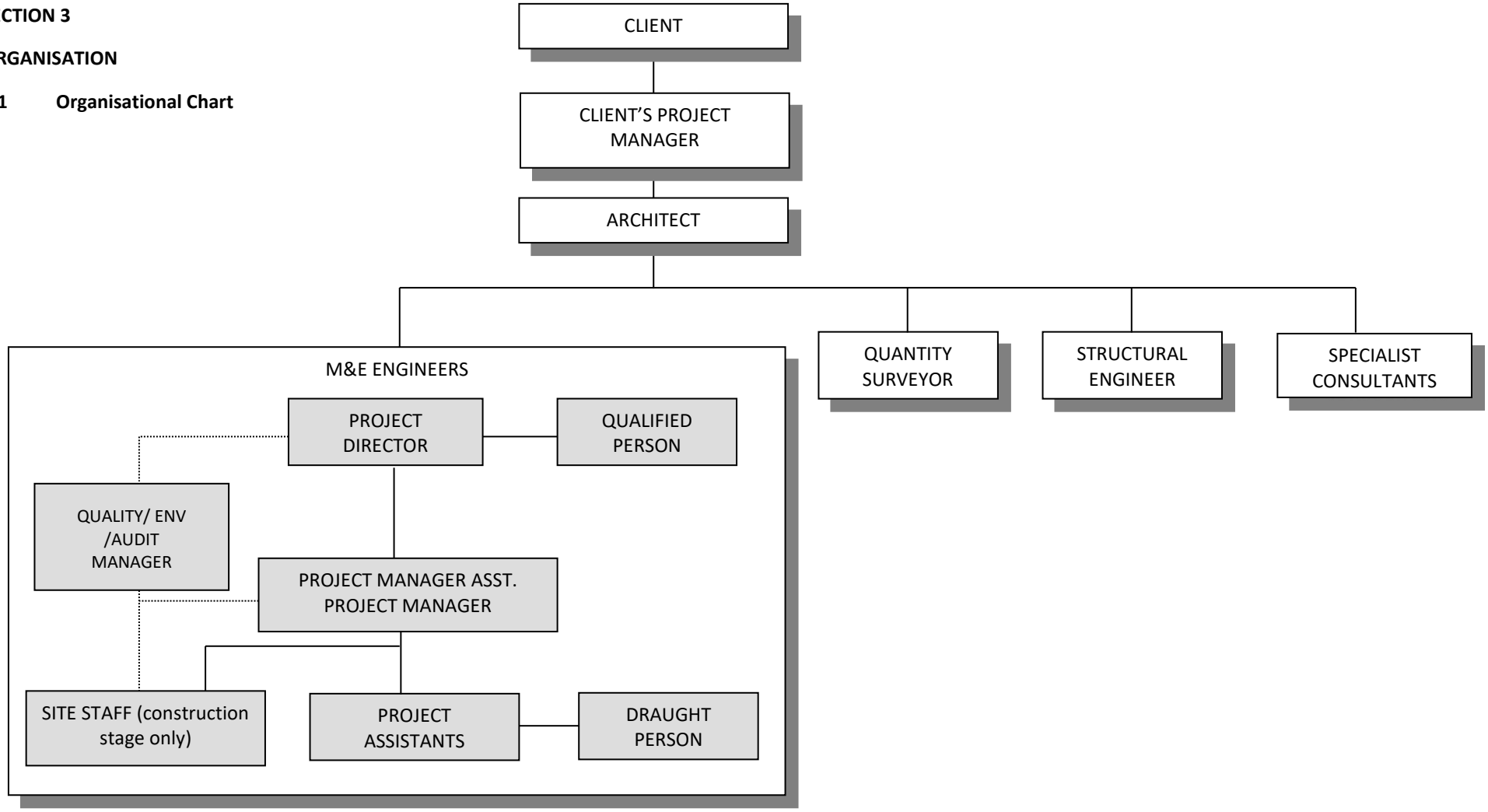
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK		LIFT & ESCALATOR		PRESSURE VESSEL		HOISTS		FOAM	

(✓ where applicable)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 ACEPL's Project Team Member

TITLE		NAME
Project Director		
Qualified Person	Mechanical	Choong Choon Guan (CCG)
	Electrical	Loh Fook Yuen (LFY)
Project Manager		Yip Yoke Fun (YYF)
Assistant Project Manager		–
Project Assistant (Mech)		–
Project Assistant (Elect)		Lim Sheng, Benedict
Draughtsperson		Common Pool
Resident Engineer (M&E)		–
Assistant Resident Engineer (M&E)		–
Clerk-of-Work (M&E)		–

3.3 Client/Client's Representatives

Client:- Housing & Development Board

Address: HDB Hub
480 Lorong 6, Toa Payoh
Singapore 310480

Tel: 6490 2108

Fax: 6397 2457

Client's Representatives:-

Name of Company	Contact Person	Contact
Housing & Development Board	Name: Mr Lester Goh Position: Senior Architect	Tel: 64902108 Fax: 63972457 Handphone: 96556827 Email: Lester_CH_GOH@hdb.gov.sg
	Name: Position:	Tel: Fax: Handphone: Email:
	Name: Position:	Tel: Fax: Handphone: Email:
	Name: Position:	Tel: Fax: Handphone: Email:
	Name: Position:	Tel: Fax: Handphone: Email:

3.4 **Other Consultants** (Local)

Function / Name of Company	Contact Person	Contact
Architect DP Architects Pte Ltd	Name: Mr Chin Thoe Chong Position: Director	Tel: 6829 5998 Fax: 6337 9989 Handphone: 9670 0376 Email: HDB-ProjectM@dpa.com.sg
Quantity Surveyor Northcroft Lim Consultants Pte Ltd	Name: Mr Sunny Tan Position: Director	Tel: 6220 7188 Fax: 6220 0868 Handphone: 9674 1858 Email: 2230pm@northcroft.sg
Structural Engineer E2000 Pte Ltd	Name: Mr Wang Yee Khai Position: Director	Tel: 6221 0388 ext 11 Fax: 6221 2600 Handphone: 9017 0508 Email: e2000@e2000.com.sg
Interior Designer	Name: Position:	Tel: Fax: Handphone: Email:
Lighting Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Acoustic Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Landscape Consultant DP Green Pte Ltd	Name: Ms Yvonne Tan Position: Director	Tel: 6829 3420 Fax: 6337 9989 Handphone: 9012 3246 Email: yvonnetan@dpg.com.sg
Project Consultant Arcadis Project Management Pte Ltd	Name: Mr Vibhor Agarwal Position: Senior Director	Tel: 6239 8585 Fax: 6224 7089 Handphone: 9852 8607 Email: SGPM1390@arcadis.com

3.4 Other Consultants (Overseas) – **NOT APPLICABLE**

Function / Name of Company	Contact Person	Contact
Architect	Name: Position:	Tel: Fax: Handphone: Email:
M&E Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Quantity Surveyor	Name: Position:	Tel: Fax: Handphone: Email:
Structural Engineer	Name: Position:	Tel: Fax: Handphone: Email:
Interior Designer	Name: Position:	Tel: Fax: Handphone: Email:
Lighting Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Acoustic Consultant	Name: Position:	Tel: Fax: Handphone: Email:
_____	Name: Position:	Tel: Fax: Handphone: Email:

3.5 Contractors/Sub-Contractors – NOT APPLICABLE

Function / Name of Company	Contract *	Contact Person	Contact
Main Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Air Conditioning & Ventilation Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Plumbing & Sanitary Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Electrical Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Lift & Escalator Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Fire Fighting & Alarm Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Swimming Pool Filtration Plant Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Carpark System Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
_____		Name: Position:	Tel: Fax: Handphone: Email:

** Type of Contract*
- *NSC (Nominated Sub-Contract)*
- *DSC (Domesticated Sub-Contract)*
- *DC (Direct Contract)*
- *NS (Nominated Supplier)*

3.6 Authorities

Authorities/Department	Contact Person	Tel/Fax Nos./E-mail
SP PowerGrid:		
(a) Sub-Station		
(b) Diversion		
SP Services:		
(a) Customer Supply	-	6916 7200 / install@spgroup.com.sg
(b) Installation	-	6916 7200 / install@spgroup.com.sg
(c) Meter Section		6916 8555
(d) Road Lighting		
TFCC:		
(a) SCV		
(b) SingTel		
(c) IDA	Mr Seah Koon Chye	6989 5635 / Seah_Koon_chye@imda.gov.sg
BCA:		
(a) Building Plan		
(b) Green Mark		
FSSD:		
(a) Building Plan		
(b) M&E Plan		
PUB (Water Supply) Network Dept:		
(a) Water Conservation		
(b) Plumbing Plan	Mr Ng Kok Peng/Mr Chee Beng Huat	6380 9843 / 6380 9825
(c) Diversion		
(d) NEWater		
PUB Water Reclamation (Network) Dept:		
(a) Building Plan/CBPU		
(b) M&E Plan		
(c) Diversion		
City Gas Pte Ltd:		
(a) Planning/Submission	Mr Jackson Houng	6595 5925
(b) Installation/Inspection		
PowerGas Pte Ltd		
(a) Diversion		
NEA (Pollution Control)		
(a) Planning/Submission		
(b) Inspection		

SECTION 4

PROGRAMME

4.1 Overall Programme (Not Applicable)

ID	TASK NAME	MONTHS	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1.	Preliminary Planning																									
2.	Planning Submission																									
3.	Detail Design																									
4.	BP Submission																									
5.	BP Submission (Amendments)																									
6.	Tender Period for Piling																									
7.	Tender Period for Sub-Structure																									
8.	Tender Period for Super-Structure																									
9.	Piling Period																									
10.	Sub-Structure Construction Period																									
11.	Super-Structure Construction Period																									
12.	TOP																									
13.	CSC																									

SECTION 4

PROGRAMME

4.2 Authority Submission Status for M&E Services – 1st Submission

Service	Authority	Original Submission		Comments/Resubmission						Approval/
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	Clearance
Application for Electricity Supply	SP Services Ltd	Jan 25								
Power Supply Substation	SP PowerGrid Ltd	Jan 24								
Metering Layout	SP Services Ltd									
Sanitary Installation	PUB Water Reclamation (Network) Dept									
Overall Plumbing Installation	PUB (Water Supply) Network Dept	Feb 24								
Domestic Water Supply		Jan 25								
Overall Gas Supply Installation	City Gas Pte Ltd	Mar 24								
Gas Supply Installation		Feb 25								
Fire Fighting & Alarm Installation	FSSD	Mar 25								
Car Park Mechanical Ventilation Installation	FSSD									
Telephone Installation	TFCC	Feb 24								
Broadband Co-axial Cable System (BCS) – NA (Discontinued)	Starhub Cable Vision	-	-	-	-	-	-	-	-	-

SECTION 4

PROGRAMME

4.3 Authority Submission Status for M&E Services (Amendments) - 2nd Submission – NOT APPLICABLE

Service	Authority	Original Submission		Comments/Resubmission						Approval/
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	Clearance
Application for Electricity Supply	SP Services Ltd									
Power Supply Substation	SP PowerGrid Ltd									
Metering Layout	SP Services Ltd									
Sanitary Installation	PUB Water Reclamation (Network) Dept									
Domestic Water Supply	PUB (Water Supply) Network Dept									
Gas Supply Installation	City Gas Pte Ltd									
Air Conditioning & Ventilation Inst.	FSSD									
Fire Fighting & Alarm Installation	FSSD									
Telephone Installation	TFCC									
Broadband Co-axial Cable System (BCS)- NA (Discontinued)	Starhub Cable Vision	-	-	-	-	-	-	-	-	-
Fuel Storage	FSSD									
	NEA (Pollution Control)									

SECTION 5

PROJECT RECORDS

5.1 List of Internal Files

Standard Files

File Ref:		File Ref:	
- Owner		- Architect	
- Authorities		- Other Consultants	
- Contractors		- CC	✓
- CF	✓	- PQP/QSP	✓

Project Files to be initiated by PM as and when required

File Ref:		File Ref:		File Ref:	

(✓ *where applicable*)

SECTION 5

PROJECT RECORDS

5.2 Filing of Drawings

The following team members shall take charge of filing of drawings, stamping "SUPERSEDED" drawings, etc.

Description	Team Member
Incoming Architectural Floor Plans	Softcopy saved in the server
Incoming Architectural Sketches/Details	
Incoming Structural Drawings	
M&E Drawings - Electrical Installation - Lift & Escalator Installation - Air Conditioning & Ventilation Installation - Fire Fighting & Alarm Installation - Plumbing & Sanitary Installation - Swimming Pool & Filtration Installation	
Other Drawings	

SECTION 6

INTERFACING

6.1 Method of Interface

Description	Method of Interface	
Client's Review & Approval	M&E Design Report	✓
	Pre-planned meeting at fixed intervals	✓
	Telefax, letter and telephone	✓
	Email	✓
Interface With External Design Teams	M&E Design Report	✓
	Pre-planned meeting at fixed intervals	✓
	Telefax, letter and telephone	✓
	Email	✓
Interface Between Internal Design Teams	Telephone	✓
	Email	✓
	Internal Project Team Meeting	✓
	Circulation of Information	✓

(✓ *where applicable*)

SECTION 6

INTERFACING

6.2 Internal Design Interface – NOT APPLICABLE

Item No.	Description*	Required From	Required By	Date Required	Remarks

** Information required by INTERNAL DESIGN TEAM MEMBERS*

SECTION 6

INTERFACING

6.3 Circulation of Documents to External Parties

	Code: A - Approval Required C - For Comments I - For Information Only	Client/ Client Rep.	* Client's Project Manager	Architect	Structural Engineer	Quantity Surveyor	
1.	**Letters/Fax:**						
a.	Project Design	A	I	I	-	-	
b.	Project Administration						
c.	Project Cost Estimate/Contract Cost	A	I	I	-	I	
2.	**Drawings**						
a.	Outline Design Drgs.	A	I	C	I	I	
b.	Sketch Design Drgs.	A	I	C	I	I	
c.	Final Design Drgs.	A	I	C	I	I	
d.	Shop Drawings	I	I	A	-	-	
e.	As Built Drgs.	I	I	I	-	-	
3.	**Other Document**						
a.	Specification	A	I	I	I	I	
b.	Tender Document	A	I	I	I	I	
c.	Tender Evaluation Report	A	I	I	I	I	
d.	Design Report	A	I	I	-	-	
e.	Progress Report	-	-	-	-	-	
f.	Financial Report	-	-	-	-	-	
g.	Minutes of Meeting	A	I	I	-	-	
h.	Inspection Report	I	I	I	-	-	
i.	Testing & Comm. Report	I	I	I	-	-	
j.	O & M Manual	I	I	I	-	-	

*Note: Applicable only, if the client engaged a Project Manager.

SECTION 7

WORK AUTHORISATION

Activity \ Authorised Signatories	PD	QP	PM	AE	SS
General Correspondences with Client			√	√	
General Correspondences with Other Consultants			√	√	
M&E Cost Estimate Report	√	√	√		
M&E Design Report	√	√	√		
Check Prints		√			
Tender Drawing Approval	√	√	√		
Tender Specification Approval	√	√	√		
List of Tenderers	√	√	√		
Tender Questionnaires	√	√	√		
Tender Reports	√	√	√		
Draft Letter of Award	√	√	√		
Review of Contractor's Shop Drawing			√	√	
Review of Contractor's Technical Submittal			√	√	
Review of Contractor's Sample Submittal			√	√	
Contractor's Request for Deviation		√	√		
Progress Payment Valuation Form	√		√		
Final Account Valuation	√		√		
Draft Variation Order	√		√		
Engineer/Architect's Instruction/Direction	√		√		
Site Instruction/Direction			√		
Correspondence/Submission to Authorities	√	√			

(✓*where authorised*)

Key to abbreviations:-

PD : Project Director
QP : Qualified Person
PM : Project Manager/Assistant Project Manager
AE : Assistant Engineer
SS : ACEPL Site Staff

SECTION 8

DESIGN INPUT & METHODOLOGY

8.1 List of Client's Standards, Reference Documents or Brief

ITEM	KEPT BY
HDB Guide Drawings & Specification	Softcopy saved in the server
HDB Design Brief Requirement	Softcopy saved in the server

8.2 List of Applicable Code of Practice and Regulations

Services	Title of Code of Practice/Standard
Electrical Wiring	SS 638
Lightning Protection System	SS 555
Earthing	SS 551
Standby Generator System	SS 535
Emergency Voice Communication System	-
Air Conditioning & Ventilation Installation	-
Lift Installation	SS 550
Sprinkler System	SS CP 52
Dry/Wet Riser System	SS 575
Automatic Fire Alarm System	SS 645
Sanitary System	Code of Practice on Sewerage & Sanitary Works
Plumbing System	SS 636
Town Gas/LPG Supply System	SS 608
Boiler and Steam Supply System	-
Mechanical Smoke Control System	-

SECTION 8

DESIGN INPUT & METHODOLOGY

8.3 List of Design Guide or Handbook Used

Carrier's Handbook of Air Conditioning System Design

ASHRAE Handbooks

Institute of Plumbing's Plumbing Services Design Guide

The Vertical Transportation Handbook Third edition

8.4 List of Pre-Consultation and Waiver - NOT APPLICABLE

S/N	Description	Date of Application	Date of Approval	Remarks
1	*Clause number in Code of Practice for (Services) which require clarification or waiver. Consultation Ref No. Waiver Ref. No.			
2	*Clause number in Code of Practice for (Services) which require clarification or waiver. Consultation Ref No. Waiver Ref. No.			
3	*Clause number in Code of Practice for (Services) which require clarification or waiver. Consultation Ref No. Waiver Ref. No.			

*To fill in actual information

8.5 List of Applicable Quality System Procedures

Alpha Consulting Engineers Pte Ltd's Quality Management System Procedures

Section	Title	✓ where applicable
M1	Preparation of Consultancy Offer	√
M2	Project Commissioning and Service Agreement	√
M3	Design Control	√
M4	Design Change Control	√
M5	Tender Process and Evaluation	
M6	Authority Submission	√
M7	Construction Process Control	√
M8	Testing and Commissioning	√
S1	Document Control	√
S2	Documentation of Quality & Environmental Management System Procedure	√
S3	Documentation of Project Quality Plan	√
S4	Specification Control	
S5	Library Control	
S6	Archive Control	√
S7	Filing Control	√
S8	Drawing Control	√
S9	Administration Control	√
S10	Purchasing Control	
S11	Training Control	
S12	Computer Control	
S13	Non-Conformity and Corrective Action Procedures	√
S14	Quality & Environmental System Audit	√
S15	Feedback Reporting	√
S16	Clients Feedback	√
S17	Management Review	√
S18	Risk Identification, Assessment & Control	√

8.6 List of Software Used For Design/Analysis

DESCRIPTION/ PACKAGE NAME	VERSION	SUPPLIER/ SOURCE	PURPOSE	
Cophos	3.31	Zumtobel	Lighting design	
Carrier E20-II	3.21	Carrier	Programme for determination of heat load, duct size and its losses, etc.	
Gensize 2	2.1	Onan	Generator sizing	
Hyena	4.00.1	ACADS-BSG	Fire Sprinkler & Hydrant Analysis	
Dialux	4.11	Freeware	Lighting design	
Lift Traffic	7.18	Elevate	Lift traffic calculation	
Fault Level Calculation	11.11	ETAP	Calculation of fault level and voltage drop	

(✓*where applicable*)

SECTION 9

ENVIRONMENTAL CONSIDERATIONS

9.1 Sustainable Design Features / Criteria

Item	Remarks
Green Mark criteria	Gold Plus
Green Design Features	Refer to attached list

9.2 Site PPE Requirement – NOT APPLICABLE

The necessary Personal Protective Equipment (detailed below) shall be provided by the main contractor / Company in accordance to the site EHS requirements prior to the site monitoring.

PPE	✓ where applicable
Safety Helmet	-
Safety Shoes	-
Eye Protection	-
Ear Protection	-
Safety Harness / Belt	-
Others:	-

9.3 Site Emergency Preparedness – NOT APPLICABLE

Site staff shall comply with the site emergency preparedness and response procedure, established by the main contractor / owner, which shall include the following details.

Items	✓ where applicable
Evacuation Route	
Emergency Exit	
Assembly Point	
Emergency Contact List / Person	
Alarm system / methods	

List of Green Features

- CFD ventilation simulation modelling
- LED light at common areas
- LED light with motion sensor control at staircases
- Regenerative lifts
- Fuel cell system for lifts
- Dual bicycle rack system
- 15% EV lots
- Utilize Pneumatic Waste Collection System (PWCS)
- Smart private meters to monitor water & electricity usage in common areas
- 2 ticks shower mixer tap, basin mixer tap & bib tap
- Eco-pedestals to all Bath/WC of flats
- ABC water features

SECTION 9

ENVIRONMENTAL CONSIDERATIONS

9.4 Reporting of Environmental Non-conformances

When encountering environmental non-conformances, Site Staff shall be responsible to feedback to the main contractor.

9.5 List of Applicable Environmental Management System Procedures

Alpha Consulting Engineers Pte Ltd's Environmental Management System Procedures

Section	Title	✓ where applicable
E1	Aspect / Impact Identification, Risk Assessment & Risk Control	✓
E2	Identifying Legal & Other Requirements	✓
E3	Objectives, Targets & Programmes	✓
E4	Communication	✓
E5	Emergency Preparedness & Response	✓
E6	Monitoring & Measurement	✓
E7	Control of Air & Noise Pollution	✓
E8	Management of Wastes	✓

SECTION 10

CLIENT'S REQUIREMENTS

10.1 List of Output Required by Client:

Item	* Remarks
M&E Design Report	-
M&E Cost Estimate Report	A
Pre-Qualification of Tenderers	-
Tender Documents	-
Tender Report	-
Payment Valuation for QS	A
Certificates of Supervision for TOP/CSC	RE

* *Remarks*

A: for approval *C: for comment* *I: for Information* *Re: for record*

Other purposes and for action: please specify.

10.2 Specific Procedures Required By Client *(If applicable)*

NOT APPLICABLE

SECTION 11

LIST OF SUB-JOB

11.1 List of Sub-Job Numbers – NOT APPLICABLE

Sub Job No	Description	Allocation Details