Alpha
Consulting Engineers Pte Ltd

PROJECT QUALITY PLAN

PROPOSED RESIDENTIAL FLAT DEVELOPMENT AT 45 AMBER ROAD

For

UOL DEVELOPMENT (AMBER) PTE LTD

Copy No.	1

Prepared By: Yip Yoke Fun/Thin Thin Tun

Authorised By: Loh Fook Yuen

Date: 18 December 2020

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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	6243	18 December 2019

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	5 July 2017	1 to 11	29	+ 1 page (Section 4.1 – Overall Programme) + 1 page (Section 9.1 – Sustainable Design Features / Criteria)
1	16 October 2017	1 to 11	29	+ 1 page (Section 4.1 – Overall Programme) + 1 page (Section 9.1 – Sustainable Design Features / Criteria)
2	6 May 2019	1 to 11	29	+ 4 pages (Section 4.1 – Overall Programme) + 1 page (Section 9.1 – Sustainable Design Features / Criteria)
3	29 October 2019	1 to 11	29	+ 4 pages (Section 4.1 – Overall Programme) + 1 page (Section 9.1 – Sustainable Design Features / Criteria)
4	18 December 2020	1 to 11	30	+ 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	6,490
Nett Floor Area, m²	-
Gross Floor Area, m²	14,991.90
Covered Carpark, m²	3900
No. of Covered Carpark Lots	140 + 3 Handicap lots
No. of Apartments/Houses	139
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	1 Block/21 Storeys
Green Mark Category	Green Mark Certified
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LEI	FFAI	PSI	SPFI				
Estimate	2.4	2.5	0.56	0.48	2.4	0.2				
Awarded	2.62	2.09	0.72	0.41	1.84	0.27				

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate			45
Awarded			45.58

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

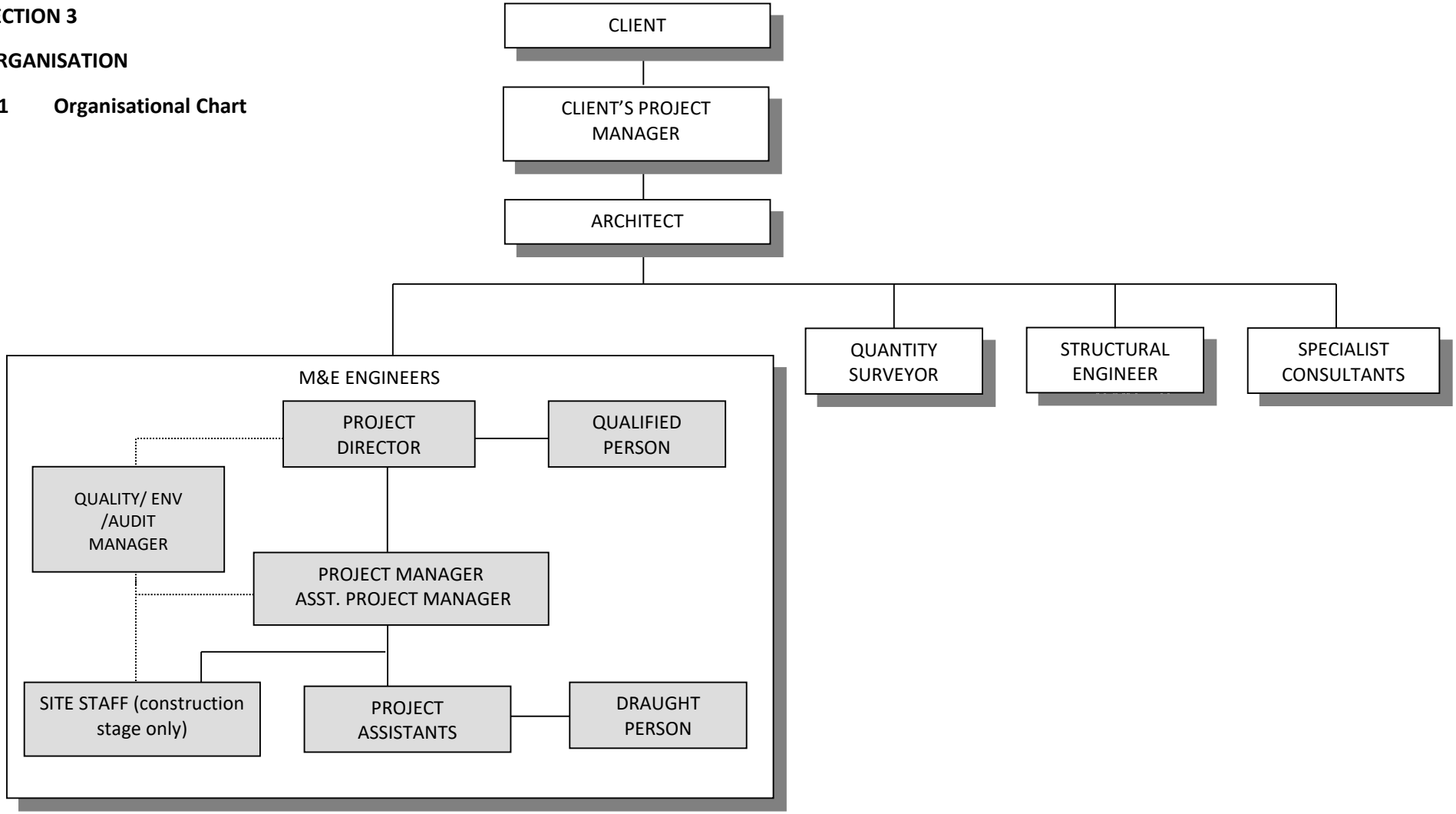
EJECTOR & DIVERTER		SUMP PUMP	✓	FUEL OIL TANK		LIFT & ESCALATOR	✓	PRESSURE VESSEL		HOISTS		FOAM	

(✓*where applicable*)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 ACEPL's Project Team Member

TITLE		NAME
Project Director		Loh Fook Yuen (LFY)
Qualified Person	Mechanical	Tay Wen Chung (TWC)
	Electrical	Loh Fook Yuen (LFY)
Project Manager		Yip Yoke Fun (YYF)
Assistant Project Manager		-
Project Assistant (Mech)		-
Project Assistant (Elect)		Thin Thin Tun (TTT)
Draughtsperson		Common Pool
Resident Engineer (M&E)		
Assistant Resident Engineer (M&E)		
Clerk-of-Work (M&E)		

3.3 Client/Client's Representatives

Client:- UOL Development (Amber) Pte Ltd

Address:- 101 Thomson Road #33-00
United Square
Singapore 307951

Tel:- 6255 0233

Fax:- 6252 9822

Client:- Unison Construction Pte Ltd

Address:- 180 Paya Lebar Road
#03-05 Yi Guang Building
Singapore 409032

Tel:- 6846 3584

Fax:- 6842 3787

Client's Representatives:-

Name of Company	Contact Person	Contact
UOL Development (Amber) Pte Ltd	Name: Ms See Wai Ming Position: Senior Project Manager	DID: 6358 1720 Fax: 6252 9822 Handphone: 9003 9695 Email: see.waiming@uol.com.sg
Unison Construction Pte Ltd	Name: Mr David Foong Position: Senior Project Manager	Tel: 6846 3584 Fax: 6842 3787 Handphone: 9783 1909 Email: DavidFoong@unisoncon.sg
	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 ADDP Architects LLP	Name: Mr Markus Cheng Thiam Hann Position: Associate Partner	Tel: 6270 2153 Fax: 6325 4918 Handphone: 9742 2550 Email: 45amberroad@addp-doprojects.com
Quantity Surveyor Davis Langdon KPK (S) Pte Ltd	Name: Ms Phan Lay Eng Position: Executive Director	Tel: 6632 3168 Fax: 6299 0297 Handphone: 9366 8715 Email: 60541287AMBERRDDLKPK@davislangdon.com
Structural Engineer KCL Consultants Pte Ltd	Name: Mr Cui Zhe Position: Director	Tel: 6348 2501 Fax: 6348 6873 Handphone: 81638295 Email: kcl17007@kcl.com.sg
Interior Designer Index Design PTE LTD	Name: Ms Sylvian Cheng Position: ID Architect	Tel: 6220 1002/6416 9158 Fax: 6334 7262 Handphone: 9320 2955 Email: pm-amber@index.com.sg
Lighting Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Acoustic Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Landscape Architect Ecoplan Asia Pte Ltd	Name: Mr Thanapong (Gong) Position: Managing Director	Tel: 6235 3825 Fax: 6235 0825 Handphone: 9021 4341 Email: gong@ecoplanasia.com
_____	Name: Position:	Tel: Fax: Handphone: Email:

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

Function / Name of Company	Contract *	Contact Person	Contact
Main Contractor Unison Construction Pte Ltd		Name: Mr David Foong Position: Senior Project Manager	Tel: 6846 3584 Fax: 6842 3787 Handphone: 9783 1909 Email: DavidFoong@unisoncon.sg
Air Conditioning & Ventilation Installation Sub-Contractor SAS M&E Pte Ltd	DSC	Name: Mr Teh Wei Sin Position: General Manager	Tel: 6336 0066 Fax: 6338 0518 Handphone: 9788 3556 Email: project@sasme.com.sg
Plumbing & Sanitary Installation Sub-Contractor Markpoint Engineering Pte Ltd	DSC	Name: Mr Galvin Ang Position: Managing Director	Tel: 6456 8012 Fax: 6454 8012 Handphone: 9455 8012 Email: markpoint@markpoint.com.sg
Electrical Installation Sub-Contractor Hong Shan M&E Services Pte Ltd	DSC	Name: Mr Raymond Goh Position: Managing Director	Tel: 6286 1693 Fax: 6639 6185 Handphone: 9661 5805 Email: hongshanengrg@hotmail.com
Lift & Escalator Installation Sub-Contractor Kone Pte Ltd	DSC	Name: Ms Wiria Position: Senior Sales Engineer	Tel: 6424 8996 Fax: 6424 6346 Handphone: 8500 9502 Email: wiria@kone.com
Fire Fighting & Alarm Installation Sub-Contractor Sprinkler Engineering Pte Ltd	DSC	Name: Mr Tan Tiong Hin Position: General Manager	Tel: 6453 1488 Fax: 6453 7655 Handphone: 9780 0452 Email: sprinkler@singnet.com.sg
Swimming Pool Filtration Plant Installation Sub-Contractor Aquatech Products & Services Pte Ltd	DSC	Name:Mr Joanthan Ang Position: General Manager	Tel: 68421188 Fax: 68420168 Handphone: 97899482 Email: aquatech@singnet.com.sg
Carpark System Installation Sub-Contractor		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	Mr Abbas	6916 8557
(b) Diversion		
SP Services: (a) Customer Supply		
(b) Installation		
(c) Meter Section		
(d) Road Lighting		
TFCC: (a) SCV		
(b) SingTel		
(c) IDA		
BCA: (a) Building Plan		
(b) Green Mark		
FSSD: (a) Building Plan	Mr Ng Chee Heng Bryan	6848 1443
(b) M&E Plan	Ms Ang Ai Hua Nacy	6848 1729
PUB (Water Supply) Network Dept: (a) Water Conservation		
(b) Plumbing Plan	Ms Norain Binte Dalall	6731 3762/8826 4896
(c) Diversion		
(d) NEWater		
PUB Water Reclamation (Network) Dept: (a) Building Plan/CBPU	Mr Ler Seng Chye	6731 3264
(b) M&E Plan	Nur Sakinah	65714080
(c) Diversion		
City Gas Pte Ltd: (a) Planning/Submission	Mr Liew Khee Boon	6578 7603
(b) Installation/Inspection	Mr Lim Teck Seng/Mr Sun Guang	9007 5727/9187 0185
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	13 Jun 2017	13 Jun 2017							20 Jun 2017
Power Supply Substation	SP PowerGrid Ltd	28 Feb 2018	19 Apr 2018	7 May 2018	12 Sept 2018	24 Sept 2018	31 Oct 2018	12 Nov 2018	16 Nov 2018	19 Nov 2018
Metering Layout	SP Services Ltd									
Sanitary Installation	PUB Water Reclamation (Network) Dept	30 Jun 2019	15 Jul 2019							30 Jul 2019
Domestic Water Supply	PUB (Water Supply) Network Dept	28 Feb 2019	1 Mar 2019	24 May 2019	28 May 2019	28 May 2019	30 May 2019			25 Jun 2019
Gas Supply Installation	City Gas Pte Ltd	30 Apr 2019	18 Mar 2019	20 Mar 2019	25 Mar 2019	5 Apr 2019	24 Apr 2019	30 Apr 2019	6 May 2019	16 May 2019
Air Conditioning & Ventilation Inst.	FSSD	31 May 2019	18 Apr 2019							25 Apr 2019
Fire Fighting & Alarm Installation	FSSD	28 Jun 2019	9 Sept 2019							17 Sept 2019
Telephone Installation	TFCC	31 Jul 2018	13 Aug 2018							31 Aug 2018
Broadband Co-axial Cable System (BCS)	Starhub Cable Vision									
Fuel Storage	FSSD									
	NEA (Pollution Control)									

SECTION 4

PROGRAMME

4.3 Authority Submission Status for M&E Services (Amendments) – 2nd Submission

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	1/12/20	1/12/20							9/12/20
Fire Fighting & Alarm Installation	FSSD	3/12/20	3/12/20							9/12/20
Telephone Installation	TFCC									
Broadband Co-axial Cable System (BCS)	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:	
MC/EC	✓				

(✓*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 - Landscape Drawings - FSSD Approval Building Plan	

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 – NOT APPLICABLE

ITEM	KEPT BY

8.2 List of Applicable Code of Practice and Regulations

Services	Title of Code of Practice/Standard
Electrical Wiring	SS CP 5 : 1998
Lightning Protection System	SS 555 : 2010
Emergency Voice Communication System	NA
Air Conditioning & Ventilation Installation	SS 553 : 2016, SS 554 : 2016
Lift & Escalator Installation	SS 550 : 2009
Sprinkler System	SS CP 52 : 2004
Dry/Wet Riser System	SS 575 : 2012
Automatic Fire Alarm System	SS CP 10 : 2005
Sanitary System	Code of Practice on Sewerage & Sanitary Works
Plumbing System	SS CP 48 : 2005
Town Gas/LPG Supply System	SS 608 : 2015
Mechanical Smoke Control System	NA

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

8.4 List of Pre-Consultation and Waiver

S/N	Description	Date of Application	Date of Approval	Remarks
1	*Clause 2.3.3(c)(ii) n Fire Code which require clarification or waiver. Consultation Ref No.- Waiver Ref. No. WVR/01650/17	21 Jun 2017	29 Jun 2017	
2	*Clause 1.4.4.1(a) & (b) in Code of Practice for Installation & Servicing of Electrical Fire Alarm System which require clarification or waiver. Consultation Ref No. CON/C05269/18 Waiver Ref. No.WVR/R03082/18	30 Nov 2018	18 Dec 2018	
3	*Clause number in Code of Practice for Fire Code 2013, clause 2.2.13(b)(iv) which require clarification or waiver. Consultation Ref No.- Waiver Ref. No. WVR/02847/19	22 Oct 2019	1 Nov 2019	

8.4 List of Pre-Consultation and Waiver (Cont'd)

S/N	Description	Date of Application	Date of Approval	Remarks
4	*Clause number in Code of Practice for 1st sty Fire Code 2013, clause 2.3.3(22 Oct 201c)(i) which require clarification or waiver. Consultation Ref No.- Waiver Ref. No. WVR/03157/19	9 Nov 2019	20 Jan 2020	
5	*Clause number in Code of Practice for SS575, clause 2.2.3.4 which require clarification or waiver. Consultation Ref No. - Consultation Ref No. - Waiver Ref. No. WVR/02622/20	1 Oct 2020	8 Oct 2020	

*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 & Corrective Action Procedures	√
S14	Quality & Environmental Management System Audit	√
S15	Feedback Reporting	√
S16	Client's 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	Green Mark Certified
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 DESIGN FEATURE

1. Energy label with five ticks rating (excellent) for air-cooled multi-split units and two ticks rating (excellent) or with the following COP range as registered with NEA are used in all apartment units and common areas (such as lift lobbies in the basement & 1st storey, gym room, function room, management office, karaoke room, guardhouse & MDF room):

    - COP100% 3.34

    - Weighted COP 3.76

2. Variable frequency variable voltage (VVVF) drive & gearless lifts with lights and fans in the lift cars switched off when there is no hall call after a predetermined time delay.

3. T5 lamps are used at car park areas and M&E plantrooms. T5 with integrated motion sensor are used at staircase. Energy efficient LED are used in gym room, function room, management office, guardhouse, landscape, swimming pools and water features.

4. Basement car-parks are provided with 2.5% openings for natural intake and CO sensors to control ductless exhaust system.

5. Automatic flushing cistern for the handicapped toilet. Dual flush cistern for WC and all basin, sink & shower mixer taps in apartment unit toilets and clubhouse changing rooms/toilets are either very good or excellent MWELS certified.

6. Eco-plug is provided to each apartment units.

7. Use of Pneumatic Waste Collection

SECTION 9

ENVIRONMENTAL CONSIDERATIONS

9.4 Reporting of Environmental Non-conformances - NOT APPLICABLE

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	A
M&E Cost Estimate Report	A
Pre-Qualification of Tenderers	NA
Tender Documents	A
Tender Report	A
Payment Valuation for QS	A
Certificates of Supervision for TOP/CSC	I

* *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