Alpha
Consulting Engineers Pte Ltd

PROJECT QUALITY PLAN

RIVER BAY

For

GREEN BAY PTE LTD

Copy No.	1

Prepared By: Tay Chin Meng / Winston Chee

Authorised By: Andrew Loh

Date: 13 January 2011

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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	6058-PQP	13 January 2011

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	21 May 2008	1 to 11	28	+ 2 pgs (Sect 4.1 – Overall Programme)
1	16 June 2009	1 to 11	28	+ 2 pgs (Sect 4.1 – Overall Programme)
2	7 May 2010	1 to 11	28	+ 1 pg (Sect 4.1 – Overall Programme)
3	13 January 2011	1 to 11	28	+ 1 pg (Sect 4.1 – Overall Programme)

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Residential

Statistics of Development	
Site Area, m²	3,837.70
Nett Floor Area, m²	8,400.00
Gross Floor Area, m²	10,745.56
Covered Carpark, m²	8,200.00
No. of Covered Carpark Lots	152
No. of Apartments/Houses	147
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	1 Block of 26-Storey
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LI	FFAI	PSI	SPFI				
Estimate	2.6	2.5	1.2	0.8	2.55	0.2				
Awarded										

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	0.09	3.28	30.63
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

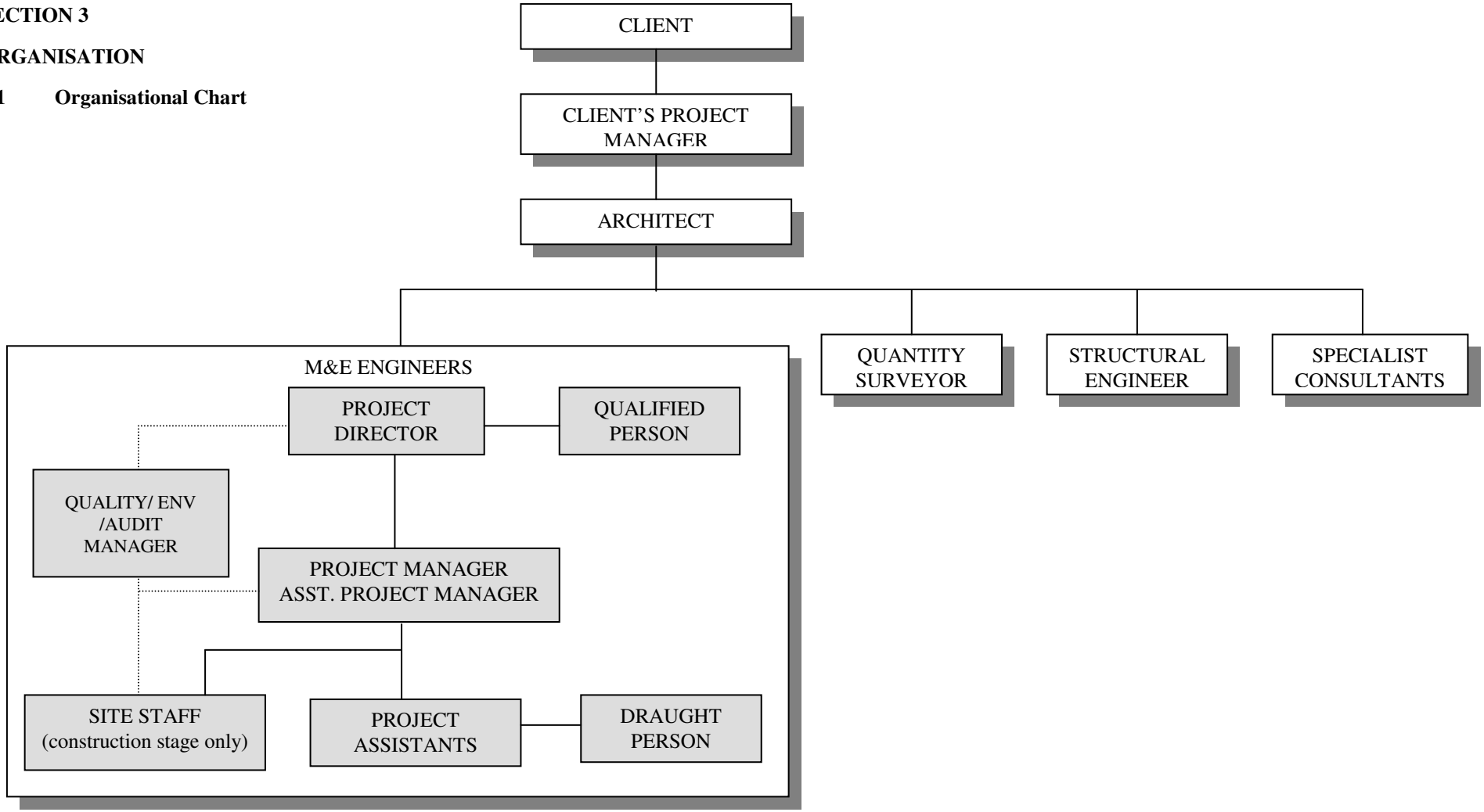
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK		LIFT	✓	PRESSURE VESSEL		HOISTS		FOAM	

(✓*where applicable*)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 ACEPL's Project Team Member

TITLE		NAME
Project Director		Andrew Loh (LCT)
Qualified Person	Mechanical	Andrew Loh (LCT)
	Electrical	Loh Fook Yuen (LFY)
Project Manager		Goh Soon Huat (GSH)
Assistant Project Manager		Andrew Loh (LCT)
Project Assistant (Mech)		Tay Chin Meng (TCM)
Project Assistant (Elect)		Winston Chee (WC)
Draughtsperson		Common Pool
Resident Engineer (M&E)		-
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		-

3.3 Client/Client's Representatives

Client:- Green Bay Pte Ltd

Address:- 1 Kim Seng Promenade
#05-02 Great World City Office Podium
Singapore 237994
Tel:- 6733 2822

Fax:- 6738 3800

Client's Representatives:-

Name of Company	Contact Person	Contact
Green Bay Pte Ltd	Name: Mr Wong Lin Chye Position: Director	Tel: 6733 2822 Fax: 6738 3800 Handphone: - Email: wlc@allgreen.com.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	Name: Mr Christopher Chow Position: Senior Architectural Associate	Tel: 6221 8816 Fax: 6325 4918 Handphone: 9679 3007 Email: chris@addp.com.sg
Quantity Surveyor Northcroft Consultants Pte Ltd	Name: James Loo Position: Managing Director	Tel: 6220 7188 Fax: 6222 0868 Handphone: - Email: nlc@northcroft.com.sg
Structural Engineer Lim Kim Cheong Consultants	Name: Lim Kim Cheong Position: Managing Director	Tel: 6292 6377 Fax: 6293 3602 Handphone: - Email: lkccon@singnet.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 Sitetectonix Pte Ltd	Name: Fumiko Sano Position: Associate	Tel: 6327 4452 Fax: 6327 8042 Handphone: - Email: fumikosano@sitetectonix.com.sg
_____	Name: Position:	Tel: Fax: Handphone: Email:
_____	Name: Position:	Tel: Fax: Handphone: Email:

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

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 USED

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	Yeo Cheng Hee / Francis Chang	6823 8552 / 6823 8555
(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		
FSSD:		
(a) Building Plan		
(b) M&E Plan		
PUB (Water Supply) Network Dept:		
(a) Water Conservation		
(b) Plumbing Plan		
(c) Diversion		
PUB Water Reclamation (Network) Dept:		
(a) Building Plan/CBPU		
(b) M&E Plan		
(c) Diversion		
City Gas Pte Ltd:		
(a) Planning/Submission		
(b) Installation/Inspection		
PowerGas Pte Ltd		
(a) Diversion		
NEA (Pollution Control)		
(a) Planning/Submission		
(b) Inspection		

SECTION 4

PROGRAMME

4.1 Overall Programme – (Refer to attached Preliminary Master Programme - Launching)

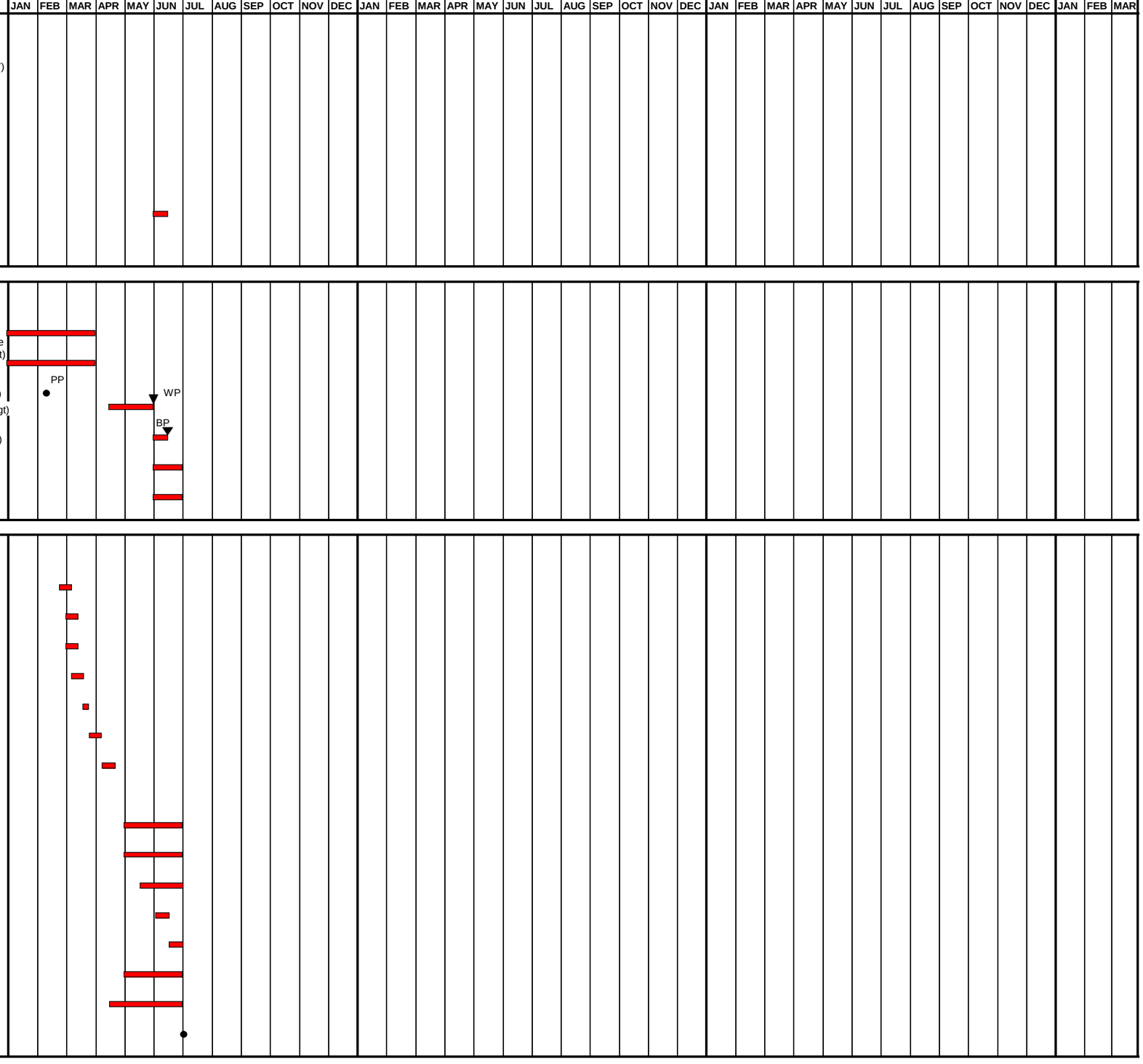
ID	TASK NAME	MONTHS	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1.	Preliminary Planning																									
2.	Planning Submission																									
3.	Detail Design																									
4.	BP Submission																									
5.	BP Submission (Amendments)																									
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																									

RIVERBAY @ MAR THOMA ROAD

PRELIMINARY MASTER PROGRAMME (LAUNCHING)

REV: 1
UPDATED: 16.04.10

S/NO	ACTIVITY	ESTIMATED DURATION (IN WEEKS)	TARGET DATE
1	**PRELIMINARY WORKS**		
1.1	Site survey - Tographical	-	Completed (9/6/07)
1.2	Site Alienation/Lifting of title Restriction	-	(owner to advise)
1.3	Services Detection	4	
1.4	Soil Investigation/bore pile test	-	Completed
1.5	Site Possession(based on last resident shifting out date)	-	Completed
1.6	Strata Title Board Approval - (End Sales Blk)	2	Mid Jun (Tgt)
1.7	SLA Approval of Alienation	-	Completed
2	**ARCHITECTURE DESIGN & RELATED AUTHORITIES SUBMISSION**		
2.1	Design Development		Main design freeze by end Mar (Target)
2.2	Client Confirmation & Approval		
2.3	DC drawings (Prep/Subm/Compliance/Approval)	- 7 - 9 (Pending LTA reply)	PP-AM3 - 10/2/10 AWP - End May (Tgt)
2.4	BP Submission (Prep/Subm/Compliance/Approval)	2	BP - Mid Jun (Tgt)
2.5	Application for Unit No. / House No. & Development Name	4	End Jun (Tgt)
2.6	Application for strata title / share value	4	End Jun (Tgt)
3	**SHOW FLAT**		
3.1	Design of Riverbay showflat units/ sales office/ pantry/ WC (ADDP)	2	
3.2	Client's clearance/ confirmation on showflat design	2	
3.3	Client/ marketing clearance for the showhouse design	2	
3.4	Prep for submission/ approval for showflat (to liase with P&T)	2	
3.5	Preparation for showflat tender drwg (by ADDP)	1	
3.6	Tender period	2	
3.7	Tender Clarification/Interview/Evaluation/Negotiation	2	
3.8	Award of Contractor for showflat A & A		End Apr '10
3.9	A & A to Showhouse (include ID furnishing/fittings etc)	8	
3.10	ID Calling for Quotation/Evaluation/Award (ID to advise)	8	
3.11	ID / Soft Furnishing & Accessories	4	
3.12	Appointment of Arch RI (Showhouse)		
3.13	RI inspection/Appln for TOP showhouse	2	
3.14	Model-making / Perspective (for Sales purposes)	8	
3.15	Logo /Slogan / Sales brochure / Advertisemt / Media	12	
3.16	Launch Sales		End Jun '10



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	Sep 2008	8/8/08							
Power Supply Substation	SP PowerGrid Ltd	Dec 2008	14/4/09	27/4/09						
Metering Layout	SP Services Ltd	Oct 2011								
Sanitary Installation	PUB Water Reclamation (Network) Dept	Oct 2011								
Domestic Water Supply	PUB (Water Supply) Network Dept	Oct 2011								
Gas Supply Installation	City Gas Pte Ltd	Oct 2011								
Air Conditioning & Ventilation Inst.	FSSD	Oct 2011								
Fire Fighting & Alarm Installation	FSSD	Oct 2011								
Telephone Installation	TFCC	June 2011								
Broadband Co-axial Cable System (BCS)	Starhub Cable Vision	June 2011								
Fuel Storage	FSSD	N.A								
	NEA (Pollution Control)	N.A								

SECTION 4

PROGRAMME

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

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)	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/Other Consultants/ Contractors	✓	- 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:	
- PP / VO	✓				

(✓*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	TCM
Incoming Architectural Sketches/Details	TCM
Incoming Structural Drawings	TCM
M&E Drawings - Electrical Installation	WC
- Lift Installation	WC
- Air Conditioning & Ventilation Installation	TCM
- Fire Fighting & Alarm Installation	TCM
- Plumbing & Sanitary Installation	TCM
- Swimming Pool & Filtration Installation	TCM
Other Drawings - Landscape Drawings	TCM

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 USED

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	A	C	C	-	
b.	Project Administration	-	-	-	-	-	
c.	Project Cost Estimate/Contract Cost	A	A	-	-	C	
2.	**Drawings**						
a.	Outline Design Drgs.	A	A	C	C	-	
b.	Sketch Design Drgs.	A	A	C	C	-	
c.	Final Design Drgs.	A	A	C	C	-	
d.	Shop Drawings	-	-	A/C	C	-	
e.	As Built Drgs.	I	I	I	I	I	
3.	**Other Document**						
a.	Specification	A	A	C	C	C	
b.	Tender Document	A	A	C	-	C	
c.	Tender Evaluation Report	A	A	C	-	C	
d.	Design Report	A	A	C	C	C	
e.	Progress Report	-	-	-	-	-	
f.	Financial Report	-	-	-	-	-	
g.	Minutes of Meeting	I	I	I	I	-	
h.	Inspection Report	I	I	I	-	-	
i.	Testing & Comm. Report	I	I	I	-	-	
j.	O & M Manual	I	I	I	-	-	

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 USED

ITEM	KEPT BY

8.2 List of Applicable Code of Practice and Regulations

Electrical Wiring	~~BS~~	SS	~~IEE~~	~~NFPA~~	
Lightning Protection System	~~BS~~	SS			
Emergency Voice Communication System	~~BS~~	SS	~~NFPA~~		
Air Conditioning & Ventilation Installation	~~BS~~	~~AS~~	~~NFPA~~	SS	~~MS~~
Lift ~~& Escalator~~ Installation	~~BS~~	SS			
Sprinkler System (N.A)	~~BS~~	~~SS~~	~~NFPA~~	~~AS~~	~~LPC~~
~~Dry Riser~~ / Wet Riser System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Automatic Fire Alarm System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Sanitary System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Plumbing System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Town Gas/LPG Supply System	~~BS~~	SS	~~NFPA~~	~~AS~~	
Boiler and Steam Supply System (N.A)	~~ASME~~	~~BS~~	~~AS~~		
Mechanical Smoke Control System (N.A)	~~BS~~	~~NFPA~~	~~AS~~		

(Delete where necessary)

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 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	
QE1	Quality & Environmental System Audit	✓
QE2	Feedback Reporting	✓
QE3	Clients Feedback	✓
QE4	Management Review	

8.5 List of Software Used For Design/Analysis

DESCRIPTION/ PACKAGE NAME	VERSION	SUPPLIER/ SOURCE	PURPOSE	
Calculux	2.30	Philips	Lighting design	
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	
Lift Traffic	-	Alpha Consulting Engineers Pte Ltd	Lift traffic calculation	✓
Econdial	2.5	Merlin Gerlin	Design for low voltage network	
Hyena	4.00.1	ACADS-BSG	Fire Sprinkler & Hydrant Analysis	
Fault Level Calculation	-	Alpha Consulting Engineers Pte Ltd	Calculation of voltage drop and fault level	✓

(✓*where applicable*)

SECTION 9

ENVIRONMENTAL CONSIDERATIONS

9.1 Sustainable Design Features / Criteria

Item	Remarks
Green Mark criteria	Certified
Green Design Features	TBA

9.2 Site PPE Requirement

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

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	✓

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	A
M&E Cost Estimate Report	-
Pre-Qualification of Tenderers	-
Tender Documents	A
Tender Report	A
Payment Valuation for QS	-
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 USED**

SECTION 11

LIST OF SUB-JOB

11.1 List of Sub-Job Numbers -– NOT USED

Sub Job No	Description	Allocation Details