Alpha
Consulting Engineers Pte Ltd

PROJECT QUALITY PLAN

PROPOSED RE-CONSTRUCTION OF 3-STOREY PODIUM BLOCK CUM ADDITIONS & ALTERATIONS TO MULTI-STOREY CARPARK BLOCK OF PSA BUILDING ON LOT 03024W MK01 AT 460 ALEXANDRA ROAD

For

HELICONIA REALTY PTE LTD

Copy No.	1

Prepared By: Kwek Boon Teck

Authorised By: Choong Choon Guan

Date: 26 April 2010

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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	6106-PQP	26 April 2010

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	26 April 2010	1 to 11	28 pages	+ 1 pg (4.1 – Overall Programme) + 4 pgs (9.1 – Sustainable Design Features / Criteria)

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Shopping Centre

Statistics of Development	
Site Area, m²	27,452
Nett Floor Area, m²	-
Gross Floor Area, m²	17,899
Covered Carpark, m²	-
No. of Covered Carpark Lots	-
No. of Apartments/Houses	-
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	1 Block 3-Storey Podium
No. of Phases	2

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LEI	FFAI	PSI	SPFI			Total	
Estimate	9.7	11.7	2.9	1.75	2.0	-			28.05	
Awarded	8.88	10.4	1.66	1.5	1.98				24.42	

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate			66.717
Awarded			69.12

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

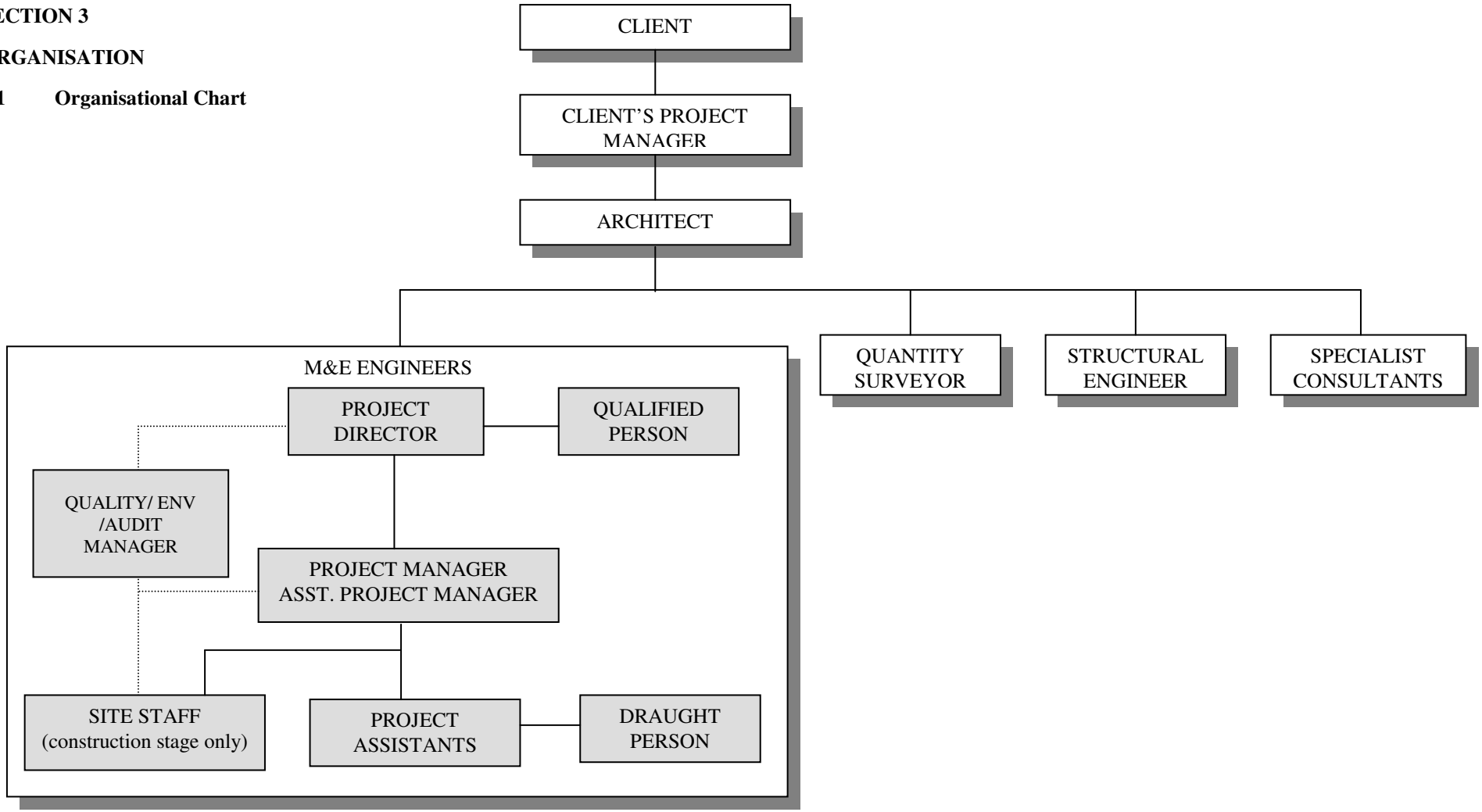
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK	✓	LIFT & ESCALATOR	✓	PRESSURE VESSEL		HOISTS		FOAM	

(✓*where applicable*)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 ACEPL's Project Team Member

TITLE		NAME
Project Director		Choong Choon Guan (CCG)
Qualified Person	Mechanical	Choong Choon Guan (CCG)
	Electrical	Loh Fook Yuen (LFY)
Project Manager		Kwek Boon Teck (KBT)
Assistant Project Manager		Derek Ong (DO)
Project Assistant (Mech)		Tay Heng Chuan (THC)
Project Assistant (Elect)		Charles Wong (CW)
Draughtsperson		Common Pool
Resident Engineer (M&E)		
Assistant Resident Engineer (M&E)		
Clerk-of-Work (M&E)		

3.3 Client/Client's Representatives

Client:- Heliconia Realty Pte Ltd

Address:- 460 Alexandra Road #05-02/03
PSA Building (Annexe Block)
Singapore 119963

Tel:- 6377 6111

Fax:- 6273 2740

Client's Representatives:-

Name of Company	Contact Person	Contact
Mapletree Investments Pte Ltd	Name: Mrs Lee Pheck Yan Position: Senior Vice President	Tel: 6377 6110 Fax: 6273 2740 Handphone: Email: pylee@mapletree.com.sg
Mapletree Investments Pte Ltd	Name: Mr Wong Sik Hong Position: Vice President	Tel: 6377 6290 Fax: 6273 2740 Handphone: Email: wong.sikhong@mapletree.com.sg
Mapletree Investments Pte Ltd	Name: Mr Ng Sze Kiat Position: Project Manager	Tel: 6377 6106 Fax: 6273 2740 Handphone: Email: skng@mapletree.com.sg
	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 P&T Consultants Pte Ltd (PTA)	Name: Tan Sok Miang Position: Associate Director	Tel: 6309 0331 Fax: 6535 1283 Handphone: Email: smtan@ptcon.com.sg
Quantity Surveyor WT Partnership (S) Pte Ltd	Name: Lim Siew Cheng Position: Senior Quantity Surveyor	Tel: 6533 0822 Fax: 6533 2833 Handphone: Email: lim.siewcheng@wtpartnership.com.sg
Structural Engineer HCE Engineers Partnership	Name: Dennis Ong Position: Director	Tel: 6337 5555 Fax: 6337 2649 Handphone: Email: dennis_ong@hce.com.sg
Interior Designer	Name: Position:	Tel: Fax: Handphone: Email:
Lighting Consultant The Lightbox Pte Ltd	Name: Warinya Pintongkam (Jui) Position: Managing Director	Tel: 6294 6803 Fax: 6324 0868 Handphone: 9741 1599 Email: jui@lightboxlighting.com
Acoustic Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Landscape Consultant Peridian Asia Pte Ltd	Name: Nakagawa Take Position: Landscape Architect	Tel: 6227 7998 Fax: 6227 0509 Handphone: Email: take@peridianasia.com
Greenwork Consultant BSD Pte Ltd	Name: Yang Ping Quen Position: Associate Director	Tel: 6560 0702 Fax: 6795 0020 Handphone: 9829 7399 Email: yongpq@bsd.com.sg

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		
(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	Liew Khee Boon	6578 7603
(b) Installation/Inspection		
PowerGas Pte Ltd		
(a) Diversion		
NEA (Pollution Control)		
(a) Planning/Submission		
(b) Inspection		

SECTION 4

PROGRAMME

4.1 Overall Programme – See Attachment

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																									

Attachment 8.1

PRELIMINARY PROGRAMME CHART

Project: PROPOSED ADDITIONS & ALTERATIONS TO PSA BUILDING (S0905)

P&T CONSULTANTS PTE LTD
24 RAFFLES PLACE
#23-00 CLIFFORD CENTRE
SINGAPORE 048621
TEL : 6535 2011
FAX : 6535 1283

DATE : 09-11-09

Revision : 6

	ACTIVITIES \ MONTHS	2009 MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	2010 JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	2011 JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	2012 JAN
1	ARCHITECTURAL																																	
1.1	• Issue Revise Drawings To All Consultants				●																													
1.2	• Confirmation of Design				●																													
1.3	• Design Development & Tech. Consulations							08/11/09																										
1.4	• Preparation of URA Submission							20/11/09 2 Weeks																										
1.5	• URA - PP								URA PP 6 Weeks	4/12/09																								
1.6	• URA - Preparation of Resubmission									3 Weeks 22/01/10																								
1.7	• URA - WP										6 Weeks	WP 5/3/10																						
1.8	• DC Clearance / Consultation - Technical Depts																																	
1.9	• BP Clearance - Technical Depts																																	
1.10	• Preparation of BCA Submission											3 Weeks 24/03/10																						
1.11	• BCA - BP Approval												2 Weeks 02/04/10 BP Approval																					
2	STRUCTURAL																																	
2.1	• Soil Investigation		11 Weeks		10/08/09																													
2.2	• Existing Structure Appraisal	6 Weeks	15/06/09																															
2.3	• Framing Plan		2.25 Months					30/11/09																										
2.4	• Foundation / Piling Design							2 Months		30/12/09																								
2.5	• Piling - BSL Submission / Permit																																	
	a) Accredited Checker Review									3 Weeks 22/01/10																								
	b) BCA Review & Approval										5 Weeks	26/02/10																						
2.6	• Sub-structure & Super-structure Design								2 Months																									
2.7	• Sub/Super-structure - BSL Submission / Permit																																	
	a) Accredited Checker Review										4 Weeks	9/02/10																						
	b) BCA Review & Approval											4 Weeks	19/03/10																					
3	MECHANICAL & ELECTRICAL																																	
3.1	• Collecting Information on Existing Building	2 Weeks	31/05/09																															
3.2	• Investigation of Existing M&E Services		3.5 Months		31/08/09																													
3.3	• Preliminary Design & Co-ordination			4.5 Months				20/11/09																										
3.4	• Detail Design									2.5 Months	08/02/10																							
3.5	• Submission to Authorities											4 Weeks	08/03/10																					
	a) TFCC																																	
	b) Sewerage																																	
	c) PUB (Water & Gas)																																	
	d) FSB (ACMV / Fire Protection)																																	
	e) SCV																																	
4	Main Contract																																	
4.1	• Design Approved																																	
4.2	• Design Development									18/12/10																								
4.3	• Tender Drawings & Documentation									15/1/10																								
4.4	• Calling for Tender									1/1/10	29/1/10																							
4.5	• Evaluation and Award											2/4/10																						
4.6	• Mobellisation												16/4/10																					
4.6	• Construction												2.5 Months TOWER LOBBY		3 Months DEMOLITION OF PODIUM			2.5 Months PILING / FOOTING				Total 20 Months											READY FOR TOP 21/11/2011 1 Month	P2 COMPLETION TOP ACHIEVEMENT 19/12/2011
5	NSC PACKAGES																																	
5.1	• Glass Curtain Wall / Sky Light							DD		TDD		T	E & A																					
5.2	Landscape & Water Feature							DD		TDD		T	E & A																					
5.3	Signage							D		DD		T	E & A																					
5.4	Ironmongeries									TDD	T	E & A																						
5.5	External Lighting / Specialist Lighting							DESIGN		DD		TDD	T	E & A																					
5.6	LED																																	

▼ Concept Approval DD = Design Development TDD = Tender Drawing & Documentation T = Tender E & A = Evaluation & Award

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									
Power Supply Substation	SP PowerGrid Ltd									
Metering Layout	SP Services Ltd									
Sanitary Installation	PUB Water Reclamation (Network) Dept	4 May 2010								
Domestic Water Supply	PUB (Water Supply) Network Dept	11 Jun 2010								
Gas Supply Installation	City Gas Pte Ltd	16 Apr 2010								
Air Conditioning & Ventilation Inst.	FSSD	18 May 2010								
Fire Fighting & Alarm Installation	FSSD	18 May 2010								
Telephone Installation	TFCC	6 Dec 2010								
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 – 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	✓
- Authorities	✓	- Other Consultants	
- Contractors	✓	- CC	
- CC/CF	✓	- PQP/QSP	✓

Project Files to be initiated by PM as and when required

File Ref:		File Ref:		File Ref:	
- 6106-EC/MC	✓				

(✓*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	KBT/CW/THC
Incoming Architectural Sketches/Details	
Incoming Structural Drawings	
M&E Drawings - Electrical Installation	CW
- Lift & Escalator Installation	CW
- Air Conditioning & Ventilation Installation	KBT
- Fire Fighting & Alarm Installation	THC
- Plumbing & Sanitary Installation	THC
- 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

Item No.	Description*	Required From	Required By	Date Required	Remarks
1.	Electrical load of mechanical equipment	KBT	CW	End Nov. 2009	Completed
2.	Location of SCP	KBT	CW	Early Dec. 2009	Completed
3.	BMS Point Schedule	CW	KBT	Early Dec. 2009	Completed

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

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 Questionaires			✓		
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	~~BS~~	SS	~~NFPA~~	~~AS~~	~~LPC~~	
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~~	~~ASME~~	~~BS~~	~~AS~~			
Mechanical Smoke Control System	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	Gold
Green Design Features	See Attached List

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 – NOT USED

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	

Ref No.	Title	Objective of Criteria	Description of Action or Features	BSD Preliminary Score & Remarks - GOLD award		
				Prelim Pts	Max Pts	Design Target / Current Provision
Part 1 : Energy Efficiency						
1-1	Building Envelope - ETTV (By Meinhardt Façade)	Building envelope design that reduces cooling load	2 Pts for every reduction in 1 W/m2 in ETTV below 50 W/m2.	10.00	15	ETTV of 45 W/m2 (Alpha feedback no change in ETTV)
1-2	Air-conditioning system (By Alpha Consultant)	To recognize and encourage energy efficient features and fixtures. 1. AC plant 2. Air Distribution 3. CO2 demand control	Option (a) central chilled water plant: (i) 1.45 points for every % improvement in a/c plant efficiency above the baseline (ii) 0.5 pts for every % improvement in air distribution system efficiency above baseline Note: Pro-rate score based on a(ii) for district cooling system. Option (b) Unitary System: 1.5 points for every % improvement in unitary system efficiency above the baseline.	25.00	25	Assume: Chiller & pump - 5% improvement from baseline Cooling Tower - 10% improvement from baseline Air Distribution Sys- 10% improvement from baseline. District Cooling: pro-rate based on air distribution. Email reply by Dr Gao Chun Ping to use District cooling approach.
			Sensor or similar automatic control device to regulate outdoor air flow rate to maintain the conc. of CO2 below 1000 ppm.	2	2	Provision for CO2 sensor for Fresh Air control for all AHU (Email dtd 15/12/09 by Sik Hong)
	SUB-TOTAL (A) ITEM 1-1 TO 1-2			**37.00**	**42**	
1-5	Artificial Lighting (By The Lightbox)	To reduce electricity consumption through efficient lighting design and control	Improve lighting power budget. Pts = 0.5 x %improvement below baseline (SS530). Max. 12 pts. Max. pts awarded only if tenant lighting provision is included in the design. If tenants lightings are not provided, points awarded capped at 5 pts.	0	12	Lighting budget assuming no improvement from SS530
1-6	Ventilation in Carparks (By Alpha Consultant)	To encourage natural ventilation	Full NV- 5pts Fume extract- 4pts MV- 3pts Additional pts with CO sensors to regulate demand for MV at carparks.	5	5	NV carpark (Confirmed by Boon Teck on 17/12/09)
1-7	Ventilation in Common Areas (By Alpha Consultant)	To encourage efficient design and control of ventilation system. Toilets, staircases, corridors, lift lobbies and atrium.	NV-1.5pt for each area MV-0.5pt for each area	1	5	Design to achieve MV for common area: Staircase MV - 0.5pt Toilet MV - 0.5pt
1-8	Lifts and Escalators (By Alpha Consultant)	Encourage energy efficient lifts	VVVF with sleep mode lifts. Motion sensor escalators with slow down function	3	3	Provision for VVVF lifts with sleep mode. Provision for escalator with Motion sensor (Email dtd 15/12/09 by Boon Teck)
1-9	Energy Efficient Practices & Features	Encourage energy efficient features and practices	Compute EEI through energy modeling- 1pt Use energy efficient features such as heat recovery, sun pipes, ductless fans, motion sensors- 11pt	1	12	To calculate EEI-1 pt. Assume @ 200 kwh/m2 per year
	SuB-TOTAL (C) ITEM 1-5 TO 1-9			**10**	**37**	
Category Score for Part 1- Energy Efficiency (Exclude Bonus points) Prorate Subtotal (A) + Prorate Subtotal (B) + Subtotal [C]			**Max 50**	**47.00**	**79**	
1-10	Renewable Energy	Encourage renewable energy		0	20	Current design is NIL

Ref No.	Title	Objective of Criteria	Description of Action or Features	BSD Preliminary Score & Remarks - GOLD award		
				Prelim Pts	Max Pts	Design Target / Current Provision
Part 2 : Water Efficiency						
2-1	Water Efficient Fittings (By P & T)	To reduce PUB water consumption in building	basin taps and mixers sink/ bib taps and mixers shower taps and mixers showerheads dual flush low capacity flushing cisterns urinals and urinal flush valves	4.28	8	55 - Excellence, 28 - V.Good, 59 - No Tick (Email dtd 17/12/09 by Daniel) Called up Daniel on 18/12/09 & notify on the 2 models that WELS does not register correctly as per provided. This is preliminary score based on first selection.
2-2	Water Usage and Leak Detection (By Alpha Consultant)	To ensure water systems are capable of being monitored and managed	Sub-meters for irrigation, cooling towers, tenants Link all sub-meters to BMS	2	2	Water meters for major branch potable usage. (Confirmed by Alpha)
2-3	Irrigation System (By Peridian Asia)	To reduce the consumption of potable water for landscaping irrigation	1 pt for non-potable water for landscaping irrigation 1pt if 50% of landscape area served by water efficient irrigation sys such as auto subsoil drip irrigation with rain sensor control	0	2	Confirm use of NeWater on all landscaping irrigation.
2-4	Water Consumption of Cooling Tower (By Alpha Consultant)	To reduce the consumption of potable water for ACMV system	1pt for cooling tower water treatment sys with 6 cycles conc. 1pt for use of NEWater or on-site and recycled to for cooling purpose.	1	2	For district cooling appraoch, cooling tower not applicable. Provision for NEWater pipe, to confirm if applicable for points.
Category Score for Part 2- Water Efficiency				**7.28**	**12**	

Ref No.	Title	Objective of Criteria	Description of Action or Features	BSD Preliminary Score & Remarks - GOLD award		
				Prelim Pts	Max Pts	Design Target / Current Provision
Part 3 : Environmental Protection						
3-1	Sustainable Construction	Encourage adoption of design, practices and materials that are env friendly and sustainable. 1. Concrete Usage Index (4pt) 2. Conserve existing Structure (2pt) 3. Environmental friendly materials (8pt)	Reduce Concrete Usage Index. Vol. Of concrete used to construct superstructure (both structural and non-structural). Vol of conc needed to cast a m2 of constructed floor area. 0.1pt for every % improvement below CUI = 0.5 (<15sty building)	0	4	HCE to commit revert on 0 CUI
			Conserved existing building structure. - Max-2pts	0	2	Can not achieve 50% of existing structure.
			Use Environmental Friendly Materials certified under Sgp Green Labelling Scheme - Max 4pts Use of materials with at least 30% recycled content -Max 4pts	4.5	8	Architect would inlcude in tender specs: 1. Use of Greenlabel dry walls - (0.5 pt) 2. Use of Greenlabel ceiling board for level 1-3 - (1 pt) 2. Use of Greenlabel Waterproofing coating for toilet.(0.5 pt) 3. Use of Greenlabel Waterproofing coating for roof.(0.5 pt) 4. Use of GreenLabel low VOC paint for all external wall. (1 pt) 5. Use of Green label drianage cell (0.5 pt) - confirmed by Peridian Asia. 6. Use of pre-cast concrete road kerbs, drain, wheel stopper. (0.5 pt) - confirmed by HCE
3-2	Greenery	Encourage greenery, conservation of trees. 1. Green Plot Ration Calculation. 2. Conserve/ transplanting of trees 3. Use compost from recycled horticultural waste.	GnP calculation. GnP = 0.5 to <1.0 - 1 pt GnP = 1.0 to <1.5 - 2 pt GnP = 1.5 to <3.0 - 3 pt GnP >= 3.0 - 4 pt	1	4	Current preliminary GnP =2.5, (Assumed GnP of 1, to be confirmed by PA)
			Conserve/ transplanting of trees.	1	1	Will conserve some existing trees. (Preliminary comment from Peridian Asia on 21 Dec.)
			Use compost from recycled horticultural waste.	1	1	Will specify the use of compost recycled from horticulture waste. (Preliminary comment from Peridian Asia on 21 Dec.)
3-3	Environmental Management Practice	To recognize and encourage the adoption of an environmental management system during construction.	EMS plan during construction stage. Including noise, water, energy use monitoring. Waste handling.	1	1	To state in detail the program to be implemented e.g. types of monitoring, waste management etc in tender specs.
			CONQUAS score	0	1	No provision.
			ISO 14000 certified team Developer, Main Con, Archi, M&E (0.25 each)	0.75	1	Contractor (0.25), M&E (0.25), Archi(0.25)
			GMM (1 pt) / GMP (2 pt) on team	3	3	BSD - GMM & GMP
			Building user's guide	1	1	To develop building user's guide sample.
			Recycling area for paper, glass, palstics	1	1	To design for recycling areas in building - main collection point & recycling corners.
3-4	Public Transport Accessibility	To reward those development sites that are within close proximity and have good access to public transport networks with frequent service.	Covered linkway to MRT/ bus station/ Bicycle racks.	2	2	Good public access - bus. (1 pt) Provision of at least 10 bicycle lot. (1 pt) (Email dtd 15/12/09 by Archi)
3-5	Refrigerants	Reduce the damage to ozone layer and the increase to global warming.	Zero ODP. GWP less than 100 + leak detection system	1	2	If consider district cooling, this credit not applicable. But R134a which is zero ODP would be selected. (Email dtd 15/12/09 by Boon Teck)
Category Score for Part 3- Environmental Protection				**17.25**	**32**	

Ref No.	Title	Objective of Criteria	Description of Action or Features	BSD Preliminary Score & Remarks - GOLD award		
				Prelim Pts	Max Pts	Design Target / Current Provision
Part 4 : Indoor Environmental Quality						
4-1	Thermal Comfort	AC designed to allow for cooling load variations in ambient air temperature.	Indoor temp between 22.5 to 25.5 °C Relative Humidity < 70%	2	2	Design specs for consultant. Can comply. (Confirmed by Alpha)
4-2	Noise Level	To ensure noise control at occupied spaces	To comply with CP13	2	2	Design specs for consultant. Can comply. (Confirmed by Alpha)
4-3	Indoor Air Pollutants	To minimize airborne contaminants.	Encourage use of low VOC paints/ adhesives 1pt for low VOC Green Label paint to 90% of internal walls 1pt for Green Label adhesives for all composite wood products	2	2	Low VOC paints & adhesive in tender specs. (Confirmed by P&T)
4-4	High Frequency Ballasts	Improve workplace lighting quality by avoiding low frequency flicker.	Encourage use of high frequency ballasts. HF ballast to 90% of space served by fluorescent luminaries-2pt	2	2	Use to HF ballast for all flourescent light. (Confirmed by Alpha)
Category Score for Part 4- Indoor Enclronmental Quality				**8**	**8**	
Part 5 : Other Green Features						
5-1	Green Features & Innovation	To encourage the adoption of innovative designs, technologies and processes for commercial/residential building applications that impact environmental performance		0.5	7	Provision for non-chemcial terminte treatment system - 0.5pts (Email dtd 16/12/09 by Sok Miang)
Category Score for Part 5- Other Green Features				**0.5**	**7**	

BCA GREEN MARK

Categories	Current Score	Max Score
Part 1 - Energy Efficiency (min 30pts)	47.00	50
Part 2 - Water Efficency	7.28	12
Part 3 - Environment Protection	17.25	32
Part 4 - Indoor Environment Quality	8.00	8
Part 5 - Other Green Features	0.50	7
Total (Part 1 - 5)	80.03	100
Bonus Points	0	20
Grand Total	**80.03**	**120**

BCA Green Mark Award Rating

Green Mark Score	Green Mark Rating
90 and above	Green Mark Platinum
85 to < 90	Green Mark Gold^{Plus}
75 to < 85	Green Mark Gold
50 to < 75	Green Mark Certified

Green Mak GOLD

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 – NOT USED

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	C
M&E Cost Estimate Report	Re
Pre-Qualification of Tenderers	-
Tender Documents	I
Tender Report	I
Payment Valuation for QS	I
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