Alpha
Consulting Engineers Pte Ltd

PROJECT QUALITY PLAN

THE DEVELOPMENT OF RIVER VALLEY HIGH SCHOOL FOR IP AND HOSTEL AT JALAN BOON LAY

For

MINISTRY OF EDUCATION

Copy No.	1

Prepared By: Lim Chai Hoon

Authorised By: Loh Fook Yuen

Date: 2 July 2009

TABLE OF CONTENTS

SECTION	DESCRIPTION
-	**TITLE PAGE**
-	**TABLE OF CONTENTS**
1	**QUALITY PLAN CONTROL AND DISTRIBUTION**
1.1	List of Copy Holders
1.2	Revision Record
2	**PROJECT INFORMATION**
2.1	Project Description
2.2	Project Cost
2.3	Scope of Works
3	**ORGANISATION**
3.1	Organisation Chart
3.2	ACEPL's Project Team Member
3.3	Client/Client's Representative
3.4	Other Consultants - Local - Overseas – Not Used
3.5	Contractor/Sub-Contractors
3.6	Authorities
4	**PROGRAMME**
4.1	Overall Programme
4.2	Authority Submission Status for M&E Services – 1st Submission
4.3	Authority Submission Status for M&E Services (Amendment) – Not Used
5	**PROJECT RECORDS**
5.1	List of Internal Files
5.2	Filing of Drawings

TABLE OF CONTENTS

SECTION	DESCRIPTION
6	**INTERFACING**
6.1	Method of Interface
6.2	Internal Design Interface
6.3	Circulation of Documents to External Parties
7	**WORK AUTHORISATION**
8	**DESIGN INPUT AND METHODOLOGY**
8.1	List of Client's Standards, Reference Documents or Brief
8.2	List of Applicable Code of Practice and Regulations
8.3	List of Design Guide or Handbook Used
8.4	List of Applicable Quality System Procedures
8.5	List of Software Used for Design/Analysis
9	**ENVIRONMENTAL CONSIDERATIONS**
9.1	Sustainable Design Features / Criteria
9.2	Site PPE Requirement
9.3	Site Emergency Preparedness
9.4	Reporting of Environmental Non-conformances
9.5	List of Applicable Environmental Management System Procedures
10	**CLIENT'S REQUIREMENTS**
10.1	List of Output Required by Client
10.2	Specific Procedures Required by Client – Not Used
11	**LIST OF SUB-JOB**
11.1	List of Sub-Job Numbers – Not Used

SECTION 1

QUALITY PLAN CONTROL AND DISTRIBUTION

1.1 List of Copy Holders

Copy No.	Copy Holder	Date of Issue
1	1442-PQP File	28 May 2008

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	28 May 2008	1 to 11	28	+ 2 pgs (Sect 4.1 – Overall Programme + 1 pg (Sect 9.1 - Sustainable Design Features / Criteria)
1	2 July 2009	1 to 11	28	+ 1 pg (Sect 4.1 Overall Progress + 1 pg (Sect 9.1 - Sustainable Design Features / Criteria)

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	IP & Hostel

Statistics of Development	
Site Area, m²	76,427.50
Nett Floor Area, m²	-
Gross Floor Area, m²	59,115.54
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	6 Blocks/4 Storeys & 1 Block/3 Storey Classroom Blocks 2 Blocks/12 Storeys & 1 Block/15 Storeys Hostel Blocks and 1 Block/3 Storeys Multipurpose/Indoor Sports Halls
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)							
Services	EI	ACVI	LEI	FFAI	PSI	SPFI	
Estimate	6.58	3.422	0.55	1.6165	2.8165	-	
Awarded	6.29641	2.457065	0.600	1.748880	2.603665	-	

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	-	-	-
Awarded	-	6.1757	78.9

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

* Exclude supply of air-con equipment.

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

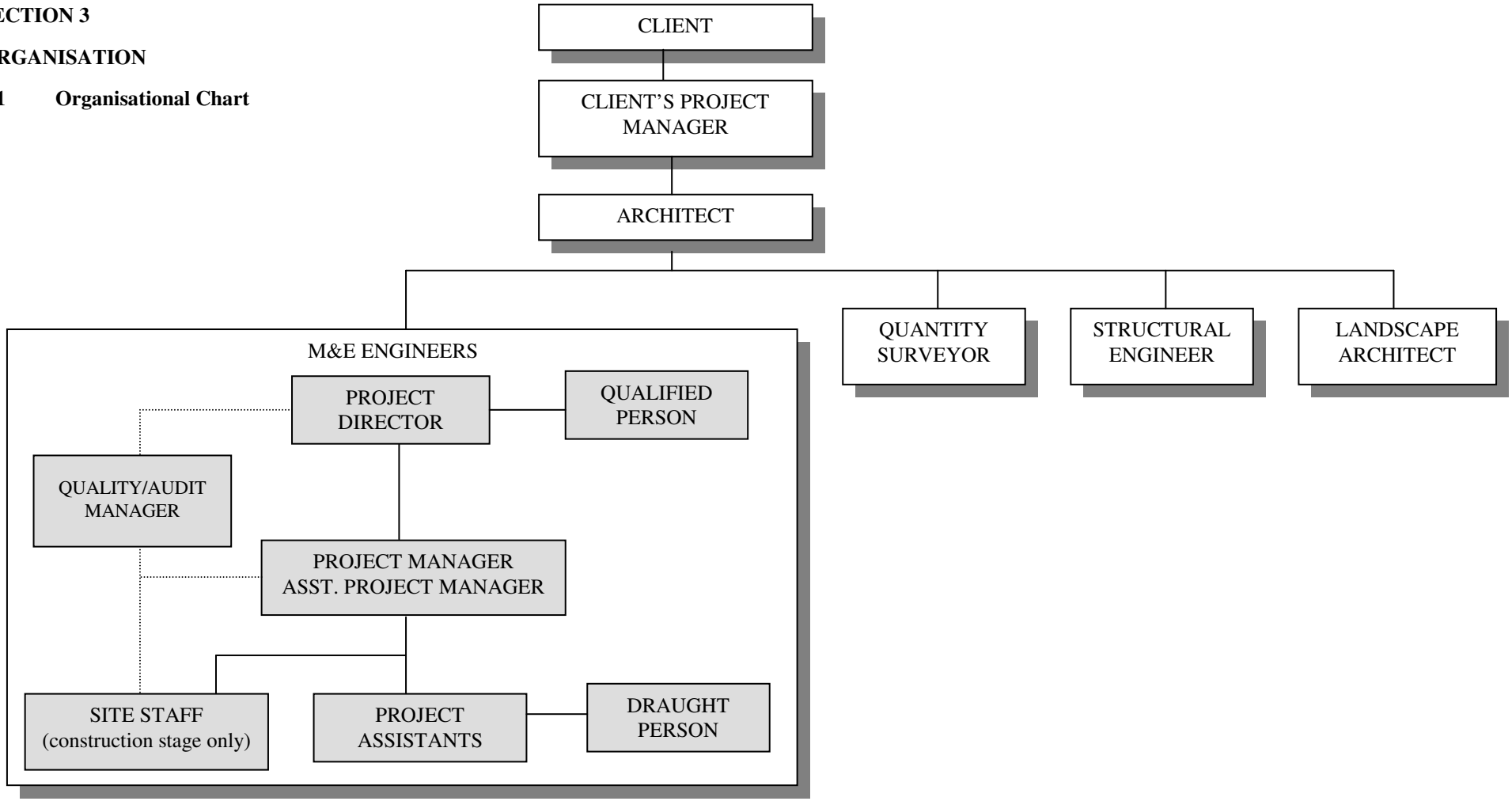
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK		LIFT & ESCALATOR	✓	PRESSURE VESSEL		HOISTS		FOAM	

(✓*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	Loh Chew Thong (LCT)
	Electrical	Loh Fook Yuen (LFY)
Project Manager		Lim Chai Hoon (LCY)
Assistant Project Manager		Ang Wee Loong (AWL)
Project Assistant (Mech)		-
Project Assistant (Elect)		-
Draughtsperson		Common Pool
Resident Engineer (M&E)		-
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		Chow Seng Lock (CSL)
Clerk-of-Work (M&E)		Phuah Ching Thong (PCT)

3.3 Client/Client's Representatives

Client:-	Ministry of Education	Client's Project Manager :	PM Link Pte Ltd
Address:-	School Development Office 1 North Buona Vista Drive #09-00 MOE Building Singapore 138675	Address:-	70 Bendemeer Road #03-01 Luzerne Singapore 339940
Tel:-	6872 1110	Tel:-	6391 7088
Fax:-	6776 3850	Fax:-	6391 7033

Client's Representatives:-

Name of Firm	Contact Person	Contact
Ministry of Education	Name: Ms Chew Sor Hoon Position: Development Executive	Tel: 6879 6980 Fax: 6776 3850 Handphone: - Email: CHEW_Sor_Hoon@moe.gov.sg
PM Link Pte Ltd	Name: Mr Shaun Yeo Siang Fong Position: Project Manager	Tel: 6391 7047 Fax: 6391 7033 Handphone: 9875 0420 Email: yeo.siang.fong@pmlink.com.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 Firm	Contact Person	Contact
Architect Architects 61 Pte Ltd	Name: Ms Ooi Wen Chuen Position: Architect	Tel: 6393 6879 Fax: 6732 5439 Handphone: - Email: wenchuen@a61.com.sg
Quantity Surveyor CPG Consultants Pte Ltd	Name: Ms Chng Poh Suang Position: Quantity Surveyor	Tel: 6357 4533 Fax: 6357 4188 Handphone: - Email: chng.poh.suang@cpgcorp.com.sg
Structural Engineer Fong Consult	Name: Ms Lim Wan Sin Position: Engineer	Tel: 6748 4668 Fax: 6748 3319 Handphone: - Email: ws.lim@fongintl.com
Landscape Architect	Name: Position:	Tel: - Fax: - Handphone: - Email: -
Lighting Consultant	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** (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

Function / Name of Firm	Contract *	Contact Person	Contact
Main Contractor Koh Brothers Building & Civil Engineering Contractor Pte Ltd	Main Contractor	Name: Mr Ng Kim Teong Position: Project Manager	Tel: 6289 8889 Fax: 6841 5200 Handphone: 9719 6033 Email: ngkt@kohbrothers.com
Air Conditioning & Ventilation Installation Sub-Contractor Carrier Singapore (Pte Ltd)		Name: Mr Goh Chee Heong Position: Project Manager	Tel: 6567 5522 Fax: 6567 6818 Handphone: 9277 0660 Email: cheeheong.goh@carrier.utc.com
Plumbing & Sanitary Installation Sub-Contractor Patience Construction Pte Ltd	DSC	Name: Mr Gan Tee Hiyang Position: Managing Director	Tel: 6382 3393 Fax: 6382 1488 Handphone: - Email: patience_cons@yahoo.com.sg
Electrical Installation Sub-Contractor Perita Electrical Engineering Pte Ltd	DSC	Name: Mr Low Peng Hong Position:Project Engineer	Tel: 6282 0717 Fax:6280 6581 Handphone: 9620 9665 Email: peritaee@singnet.com.sg
Lift & Escalator Installation Sub-Contractor Otis Elevator Co (S) Pte Ltd		Name: Joachim Goh Position: Project Engineer	Tel: 6298 7733 Fax: 6797 2646 Handphone: - Email: -
Fire Fighting & Alarm Installation Sub-Contractor Maxx Engineering Pte Ltd		Name: Mr Henry Yong Position: Project Manager	Tel: 6487 5044 Fax: 6487 5833 Handphone: 9080 0643 Email: henry@maxx.com.sg
Swimming Pool Filtration Plant Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
		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	Mr Chin Yoke Fah	6823 8556
(b) Diversion	Mr Tan Boon Heng	6314 6196
SP Services:		
(a) Customer Supply	Mr Rick Lim	6823 8661
(b) Installation		
(c) Meter Section		
(d) Road Lighting		
TFCC:		
(a) SCV	Mr Patrick Chai	9658 4977
(b) SingTel	Mr Lee Chong Beng	6342 5937
(c) IDA	Mr Tan Huay San	6211 1870
BCA:		
(a) Building Plan		
FSSD:		
(a) Building Plan		
(b) M&E Plan		
PUB (Water Supply) Network Dept:		
(a) Water Conservation		
(b) Plumbing Plan	Ms Norain Binte Dalail	6731 3762
(c) Diversion		
PUB Water Reclamation (Network) Dept:		
(a) Building Plan/CBPU		
(b) M&E Plan	Mr Philip Tan	6731 9384
(c) Diversion		
City Gas Pte Ltd:		
(a) Planning/Submission	Mr Tan Kah Hock	6578 7889
(b) Installation/Inspection	Mr Misnal B Pagi	6578 7816
PowerGas Pte Ltd		
(a) Diversion		
NEA (Pollution Control)		
(a) Planning/Submission		
(b) Inspection		

SECTION 4

PROGRAMME

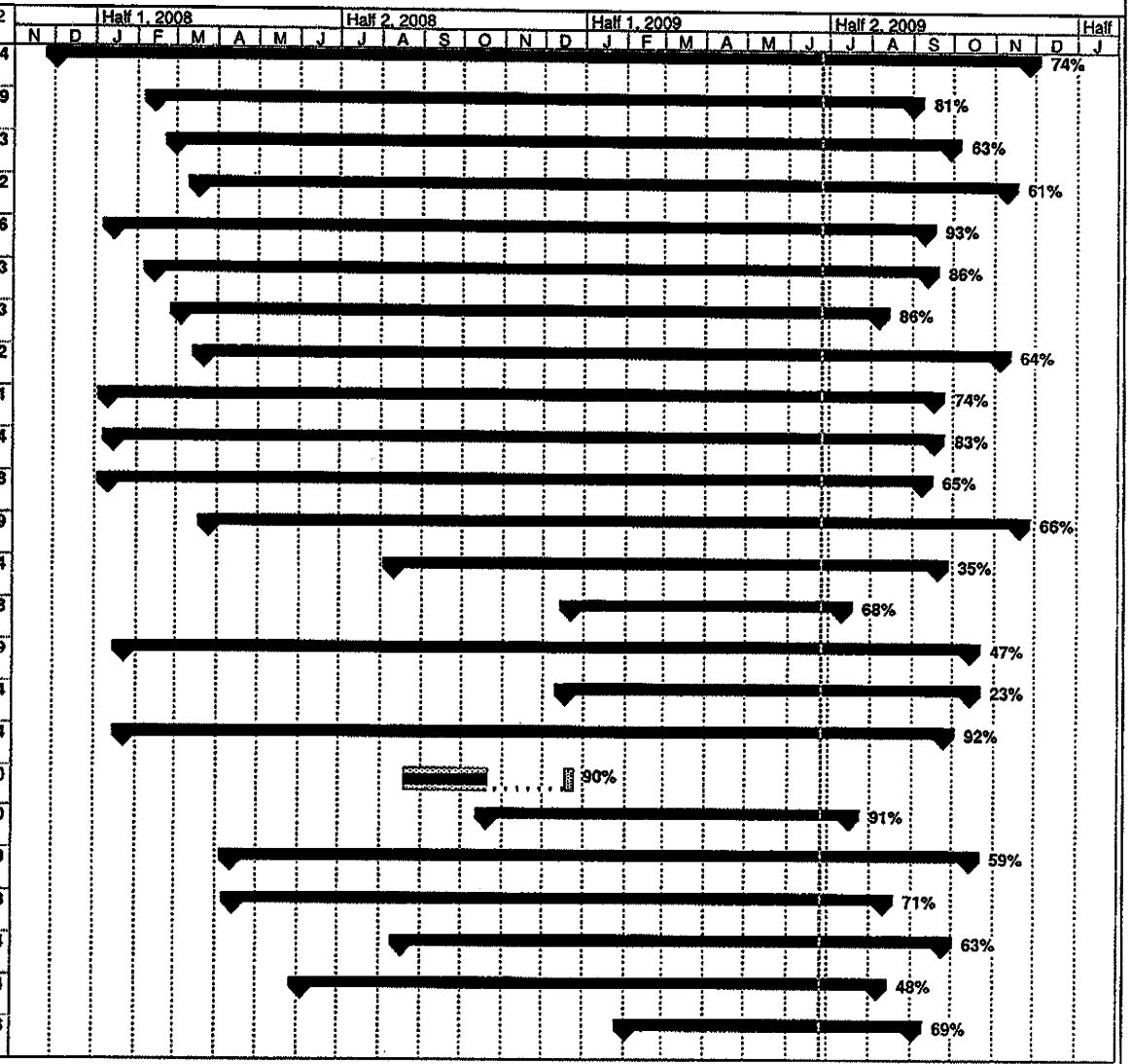
4.1 Overall Programme – See attached

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																									

PROPOSED RIVER VALLEY HIGH SCHOOL & HOSTEL DEVELOPMENT AT BOON LAY AVENUE

Overall Progress Summary as at 25 Jun 2009

ID	Task Name	Duration R02	Start R02	Finish R02	% Plan R02
1	OVERALL PROJECT	556 days	Fri 30/11/07	Mon 28/09/09	84
31	CONSTRUCTION OF BLOCK A (AUDITORIUM BLOCK)	469 days	Thu 14/02/08	Wed 26/08/09	79
222	CONSTRUCTION OF BLOCK B (ADMINISTRATION BLOCK)	366 days	Thu 12/06/08	Mon 24/08/09	73
367	CONSTRUCTION OF BLOCK C (LIBRARY/CLASSROOM BLOCK)	379 days	Tue 27/05/08	Sat 22/08/09	82
513	CONSTRUCTION OF BLOCK D (SPECIAL TEACHING/CLASSROOM	464 days	Mon 14/01/08	Fri 24/07/09	96
664	CONSTRUCTION OF BLOCK E (LABORATORY/CLASSROOM	462 days	Sat 02/02/08	Tue 11/08/09	93
816	CONSTRUCTION OF BLOCK F (DESIGN	437 days	Mon 03/03/08	Thu 06/08/09	93
959	CONSTRUCTION OF BLOCK G (CCA / CANTEEN BLOCK)	348 days	Thu 03/07/08	Mon 24/08/09	72
1084	CONSTRUCTION OF BLOCK H (HOSTEL BLOCK)	489 days	Fri 11/01/08	Thu 20/08/09	91
1085	Block H1 / H2	483 days	Mon 14/01/08	Sat 15/08/09	94
1404	Block H3	489 days	Fri 11/01/08	Thu 20/08/09	88
1793	CONSTRUCTION OF BLOCK J (ISH / MPH BLOCK)	375 days	Sat 31/05/08	Sat 22/08/09	79
1986	CENTRAL SERVER ROOM & LAN ROOMS	150 days	Thu 29/01/09	Fri 24/07/09	94
2073	M & E Services Room - CDR, MDF, Pump Room, Genset Room	116 days	Fri 13/02/09	Tue 30/06/09	98
2086	EXTERNAL WORKS	501 days	Fri 18/01/08	Thu 10/09/09	59
2087	Minor Works	208 days	Mon 05/01/09	Thu 10/09/09	44
2107	Minor Building Works	470 days	Fri 18/01/08	Wed 05/08/09	94
2108	Bin Centre	60 days	Mon 05/01/09	Thu 19/03/09	100
2147	Spectator Gallery (Block N)	203 days	Mon 20/10/08	Sat 20/06/09	100
2156	ELECTRICAL INSTALLATIONS	372 days	Tue 24/06/08	Fri 11/09/09	80
2187	SANITARY & PLUMBING SERVICES	358 days	Sat 17/05/08	Mon 20/07/09	98
2210	AIR-CONDITION & MECHANICAL VENTILATION SYSTEM	268 days	Thu 23/10/08	Wed 09/09/09	74
2221	FIRE PROTECTION SERVICES	164 days	Thu 12/02/09	Mon 24/08/09	54
2234	Lift Installation	177 days	Thu 22/01/09	Sat 22/08/09	76



Koh Brothers Building & Civil Eng Contractor (Pte) Ltd
Date of commencement: 10/12/2007

Task | Summary | Rolled Up Progress | Project Summary
Progress | Rolled Up Task | Split | Group By Summary
Milestone | Rolled Up Milestone | External Tasks | Deadline

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		4/4/07							27/4/07
Power Supply Substation	SP PowerGrid Ltd	29/2/08	13/2/08		1/4/08					18/4/08
Sanitary Installation	PUB Water Reclamation (Network) Dept	12/9/08	15/9/08							19/9/08
Domestic Water Supply	PUB (Water Supply) Network Dept	30/5/08	4/6/08	17/9/08	1/12/08	23/3/09	27/4/09	15/6/09		
Gas Supply Installation	City Gas Pte Ltd	14/3/08	17/3/08	4/6/08	13/6/08	27/6/08	1/7/08	29/7/08		11/8/08
Air Conditioning & Ventilation Inst.	FSSD	3/7/09								
Fire Fighting & Alarm Installation	FSSD	17/7/09								
Telephone Installation	TFCC	7/3/08	24/3/08	9/5/08	3/6/08					16/7/08
Broadband Co-axial Cable System (BCS)	TFCC	7/3/08	24/3/08	9/5/08	36//08					16/7/08
Fuel Storage	FSSD	N.A.								
	NEA (Pollution Control)	N.A.								

SECTION 4

PROGRAMME

4.3 Authority Submission Status for M&E Services (Amendments) - 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 (1st Amendment)	SP PowerGrid Ltd									
Power Supply Substation (2nd Amendment)	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/CF	✓
- CF	-	- PQP/QSP	✓

Project Files to be initiated by PM as and when required

File Ref:		File Ref:		File Ref:	
- EC/MC	✓	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	AWL/LCY/LFY (All project drawings in soft copy to be saved in 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	
- Interior Design	-
- Landscape/Waterscape	-

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 loading for the following items a. ACMV System	AWL	LFY/LCY	-	Completed
	b. Hosereel Pumps				
	c. Domestic Water Transfer & Booster Pumps				
	d. Sprinkler Pumps				

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

Progress Payment agreed date of assessment/issuance

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
MOE Handbook	Intranet

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~~
Dry 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	5.0b	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	-
Green Design Features	See attached

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.

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

Green Mark for RVHS

Electrical sub-metering

Sub-meters will be installed at the following areas to monitor the energy consumption:
a) Auditoriums
b) Lecture theatres
c) Dental clinic
d) Canteen stalls
e) Hostel kitchen

Energy efficient systems and features

The M&E services will include the following items:
a) Energy saving PLC lamps will be used at common areas such as the lift lobbies, staircases, corridors and hostel block.
b) T8 fluorescent lamp with high frequency ballast will be used at all the teaching areas and common facilities rooms such as the classrooms, laboratories, libraries, canteen, administrative office and lecture theaters.
c) Energy efficient lifts with variable frequency variable voltage drive at the hostel block.
d) Energy efficient air conditioning system will be provided.

Efficient lighting control

The lighting controls for the various areas are as follows:
a) Individual lighting switches will be provided for all the enclosed spaces.
b) Timer control for lightings at the 1st storey common areas and on/off switches for lightings at upper storey.
c) Motion detectors to be installed for all the toilets.
d) Alternate circuiting for the lightings at the common areas.

Water usage

Water sub-meter will be installed for the following areas:
a) Canteen stalls
b) Hostel kitchen
c) Taps located at landscape areas

Water efficient fittings

Flow regulator will be provided for all tap points.

CO2 & CO Monitoring and Control **(OPTIONAL ITEM TO BE CONFIRM BY MOE)**

Carbon dioxide monitoring system for controlling the fresh supply to the Air Handling Units serving the Auditorium and Lecture Theatres.

Noise Level

Low noise equipment will be provided.

Refrigerant

CFC free or 0 ozone depletion potential (OPD) refrigerant will be provided.

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	I, A
Pre-Qualification of Tenderers	-
Tender Documents	A
Tender Report	A
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