PROJECT QUALITY PLAN

PROPOSED DESIGN AND BUILD OF PUBLIC HOUSING AT BUKIT PANJANG NEIGHBOURHOOD 1 CONTRACT 13 CONSISTS OF ERECTION OF 3 BLOCKS OF 30 STOREY FLATS (BLK 181,184 & 185), 2 BLOCKS OF 29 STOREY FLATS (BLK 182 & 183), 2 BLOCKS OF 6 STOREY CARPARK (MSCP 181A & 185A) AND ANCILLARY BUILDINGS ON LOT 854C PT MK 14 AT BUKIT PANJANG ROAD AND JELEBU ROAD
(PUBLIC HOUSING AT BUKIT PANJANG, N1 C13)

For

HOUSING DEVELOPMENT BOARD

Copy No.	

Prepared By: Tay K L

Authorised By: Richard Teo

Date: 11 January 1999

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	AEC's Project Team Member
3.3	Client/Client's Representative
3.4	Other Consultants
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	Not Used

TABLE OF CONTENTS

SECTION	DESCRIPTION
5	**PROJECT RECORDS**
5.1	List of Internal File
5.2	Filing of Drawings
6	**INTERFACING**
6.1	Method of Interface
6.2	Not Used
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	**CLIENT'S REQUIREMENTS**
9.1	List of Output Required by Client
9.2	Specific Procedures Required by Client
10	**LIST OF SUB-JOB**
10.1	Not Used

SECTION 1

QUALITY PLAN CONTROL AND DISTRIBUTION

1.1 List of Copy Holders

Copy No.	Copy Holder	Date of Issue
1	1153-PQP File	11 January 1999
2	Tay K L	11 January 1999

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
1	2 March 1999	3.5, 4.2 & 7	13	-
2	1 June 1999	2.3, 3.5 & 4.2	3	-
3	28 October 1999	1.2, 3.2, 4.2 - 4.3, 5.1 - 5.2 & 6.1	7	-
4	3 January 2000	1.2 & 3.5	2	-

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Residential

Statistics of Development	
Site Area, m²	27,406.4
Nett Floor Area, m²	Data not available
Gross Floor Area, m²	110,580.82
Covered Carpark, m²	1440
No. of Covered Carpark Lots	935
No. of Apartments/Houses	848
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	3 Blocks/30 Storeys, 2 Blocks/29 Storeys & 2 MSCPs (6 Storeys)
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1000)										
Services	EI	ACVI	LI	FFAI	PSI	SPFI				
Estimate	-	-	-	-	-	-				
Awarded	4530	-	2400	1200	5800	-				

Total Project Construction Cost (S$ x1000)			
	Site Clearance	Piling Works	Main Contract
Estimate	-	Included in MC	-
Awarded	-	-	107411

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							
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	

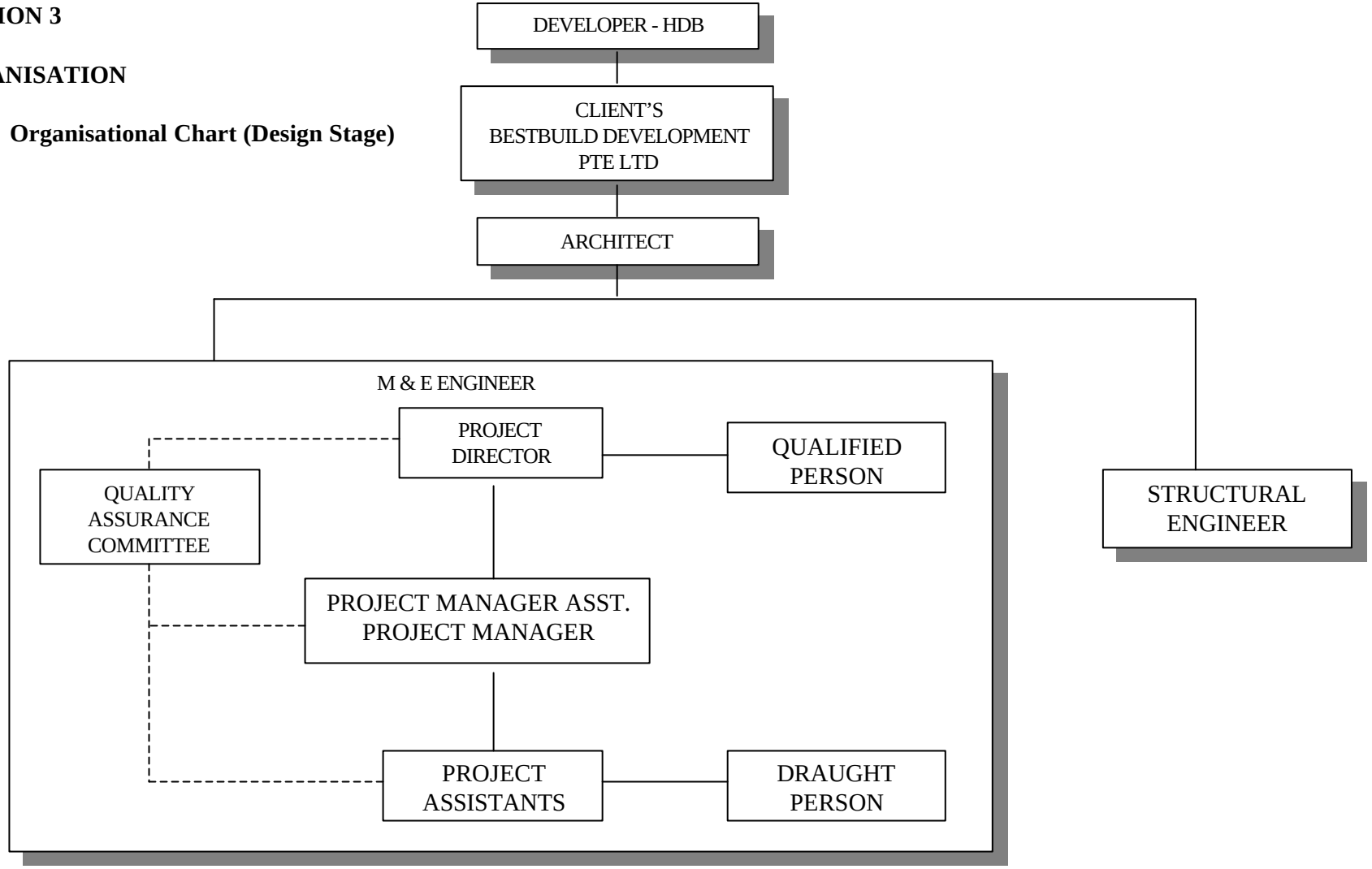
(✓ *where applicable*)

* Pipes only (exclude water heaters)

SECTION 3

ORGANISATION

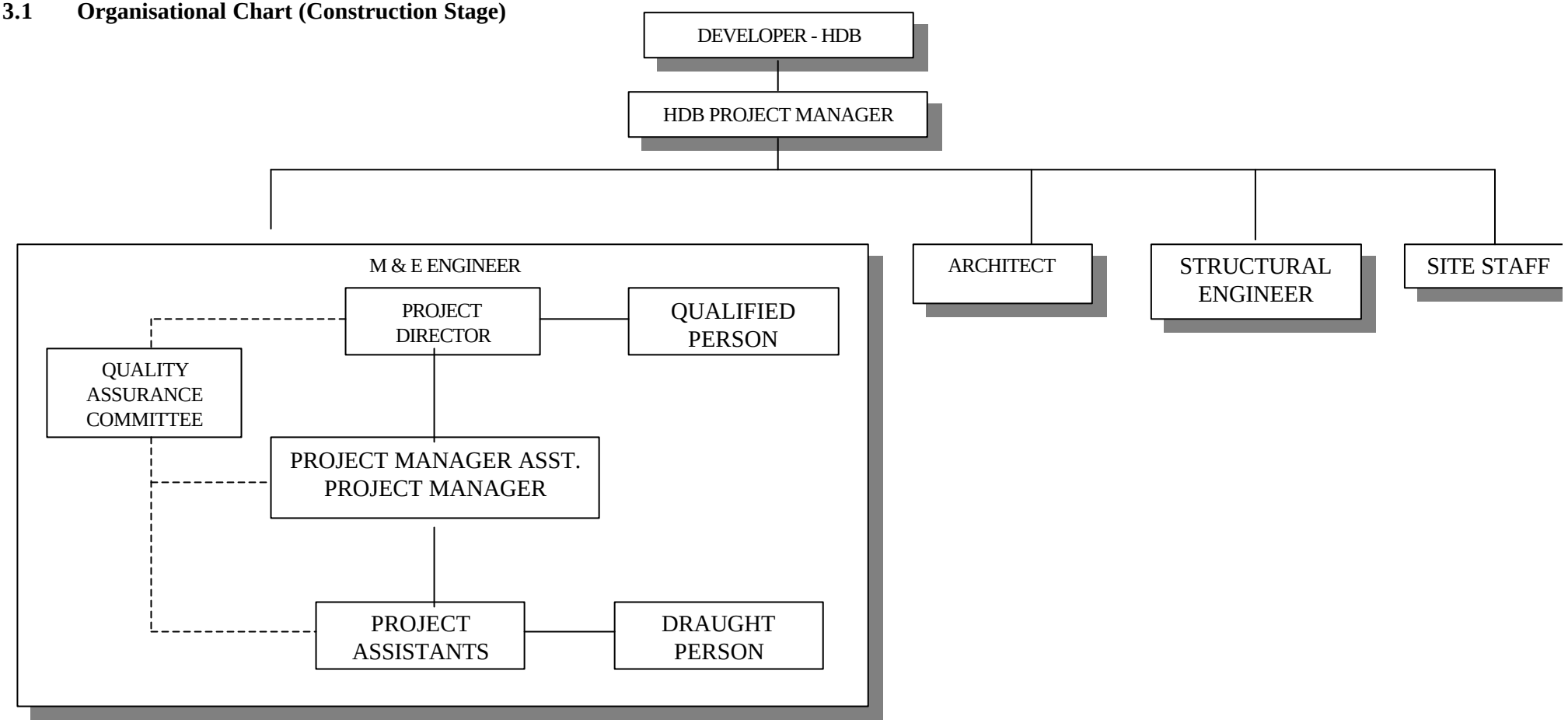
3.1 Organisational Chart (Design Stage)



SECTION 3

ORGANISATION

3.1 Organisational Chart (Construction Stage)



SECTION 3

ORGANISATION

3.2 AEC's Project Team Member

TITLE		NAME
Project Director		Richard Teo
Qualified Person	Mechanical	Andrew Loh
	Electrical	Richard Teo
Project Manager		Tay K L
Assistant Project Manager		Loh F Y
Project Assistant (Mech)		Yip Y F
Project Assistant (Elect)		Alex Thum
Draughtsperson		Common Pool
Resident Engineer (M&E)		-
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		-

3.3 Developer's/Client's Representatives

Developer:-		**Housing & Development Board Client:- Bestbuild Development Pte Ltd (Design Stage)**
Address:-	HDB Centre 3451 Jalan Bukit Merah Singapore 159459	149 Rochor Road Fu Lu Shou Complex #04-16 Singapore 188425
Tel:-	273 9090	337 1222
Fax:-	279 7914	339 5401

Developer's/Client's Representatives:-

Name of Firm	Contact Person	Contact
Housing & Development Board	Name: Mr Tong Khoon Heng Position: Executive Project Manager	Tel: 279 7289 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Sin Chee Meng Position: Electrical Engineer (Lift Section)	Tel: 279 8088 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Mr Tan Kok Koon Position: Executive Electrical Engineer (Electrical Section)	Tel: 279 7869 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Mr Mike Wong Siu Kei Position: Executive Electrical Engineer (CATV Section)	Tel: 279 7832 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Mr Alex Chao Tah Jin Position: Executive Mechanical Engineer (Water/Gas Section)	Tel: 279 7903 Fax: 279 7914 Pager: - Handphone: - Email: -

Developer's/Client's Representatives (Cont'd):-

Name of Firm	Contact Person	Contact
Housing & Development Board	Name: Mr Lee Wee Shin Position: Executive Mechanical Engineer (Fire Protection/Ventilation/ Air Con Section)	Tel: 279 7834 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Mr Chong Shin Kian Position: Resident Engineer	Tel: - Fax: - Pager: - Handphone: - Email: -
Bestbuild Development Pte Ltd	Name: Mr Paul Lee Position: Construction Manager	Tel: 377 1222 Fax: 339 5401 Pager: - Handphone: - Email: -
Bestbuild Development Pte Ltd	Name: Mr Choong K S Position: Project Manager	Tel: 377 1222 Fax: 339 5401 Pager: - Handphone: - Email: -

3.4 **Other Consultants (**Local)

Function / Name of Firm	Contact Person	Contact
Architect Pan-Indo Architect	Name: M/s Ow Wah Foong/Jasper Leow Position: Architect	Tel: 225 1533 Fax: 222 4546 Pager: - Handphone: - Email: -
Quantity Surveyor NA	Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -
Structural Engineer KKT Consultant	Name: Mr Lee K C Position: Structural Engineer	Tel: 226 1733 Fax: 223 6671 Pager: - Handphone: - Email: -
Interior Designer NA	Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -
Lighting Consultant NA	Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -
Acoustic Consultant NA	Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -

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

3.5 Contractors/Sub-Contractors

Function / Name of Firm	Contract *	Contact Person	Contact
Main Contractor BestBuild Development Pte Ltd	DC	Name: Mr Choong K S Position: Project Manager	Tel: 763 2558 Fax: 339 5401 Pager: 9502 1476 Handphone: - Email: -
Main Contractor Poh Lian Construction Pte Ltd	DSC	Name: Mr Martin Lee Position: M&E Engineer	Tel: 763 3558 Fax: 763 5819 Pager: 9749 2012 Handphone: - Email: -
Air Conditioning & Ventilation Installation Sub-Contractor NA		Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -
Plumbing & Sanitary Installation Sub-Contractor Landmark Engineering & Water Service Pte Ltd	DSC	Name: Mr Daniel Soh Position: Project Manager	Tel: 284 7977 Fax: 284 5258 Pager: 9494 7070 Handphone: - Email: -
Electrical Installation Sub-Contractor MecBonn Engineering Pte Ltd	DSC	Name: Mr Daniel Loe Position: Project Manager	Tel: 788 2933 Fax: 788 2033 Pager: 9560 9609 Handphone: - Email: -
Lift & Escalator Installation Sub-Contractor LG Industrial Systems Co. Ltd	DSC	Name: Mr Dave Wng Position: Project Engineer	Tel: 323 7361 Fax: 323 7362 Pager: - Handphone: - Email: -
Fire Fighting & Alarm Installation Sub-Contractor NA		Name: - Position: -	Tel: - Fax: - Pager: - 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
PowerGrid/Power Supply:		
(a) Customer Supply	Mr Lee Chi Ming	831 8281
(b) Sub-Station	Mr Chin Yoke Fah	831 8556
(c) Installation	-	-
(d) Meter Section	-	-
(e) Road Lighting	-	-
(f) Diversion	-	-
TAS:		
(a) Planning/Line Plant	Mr Chiam Choong Juke	322 1830
(b) Installation	-	-
(c) Diversion	-	-
HDB(BCU):		
(a) Fire Alarm	-	-
(b) Wet Riser	-	-
Structural Engineering	Mr Loo Fook Lim	
PUB (Water)		
(a) Water Conservation	Mr David Loh	731 3518
(b) Plumbing Plan	Mr Kwang Kim Yaw	-
(c) Diversion	-	-
PowerGas:		
(a) Planning/Submission	Mr Ivan Lim	831 8636
(b) Installation/Inspection	-	-
(c) Diversion	-	-
ENV (Sewerage):		
(a) Building Plan	Mr Lam T C	731 9155
(b) M&E Section	-	-
(c) Diversion	-	-
ENV (Pollution Control)		
(a) Planning/Submission	-	-
(b) Inspection	-	-

SECTION 4

PROGRAMME

4.1 Overall Programme

			1998												1999												2000
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.	HDB Submission																										
5.	BP Submission (Amendments)																										
6.	Tender Period for Piling	}																									
7.	Tender Period for Sub-Structure	} NA																									
8.	Tender Period for Super-Structure	}																									
9.	Piling Period																										
10.	Sub-Structure Construction Period	NA																									
11.	Super-Structure Construction Period																										End Sept
12.	TOP **																										Oct
13.	CSC																										

------▶ HDB's approval period

SECTION 4

PROGRAMME

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

Service	Authority	Original Submission		Comments/Resubmission						Approval/ Clearance
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	
Application for Electricity Supply	Power Supply Pte Ltd	-	17/8/98							24/8/98
Power Supply Substation	PowerGrid Pte Ltd	-	27/10/98	5/11/98	28/12/98					10/2/99
Main Single Line Diagram	Power Supply Pte Ltd	-	12/2/99	22/2/99						27/3/99
Consumer Switchroom Layout	PowerGrid Pte Ltd									
Metering Layout	PowerGrid Pte Ltd									
Sanitary Installation	ENV (Sewerage) *	-	7/7/99							8/7/99
Domestic Water Supply	PUB (Water)	-	23/12/98	9/2/99	16/3/99	26/3/99	1/4/99	26/4/99		4/6/99
Gas Supply Installation	PowerGas Pte Ltd	-	30/9/98	8/10/98	26/10/98					2/11/98
Telephone Installation	TAS	-	3/11/98	5/12/98	8/1/99					21/5/99
	SingTel/StarHub									

* *Acknowledgement of Notice for Commencement of Sanitary Works from Sewerage Department received on 21 May 1999.*

SECTION 4

PROGRAMME

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

Service	Authority	Original Submission		Comments/Resubmission						Approval/ Clearance
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	
Application for Electricity Supply	Power Supply Pte Ltd									
Power Supply Substation	PowerGrid Pte Ltd									
Main Single Line Diagram	Power Supply Pte Ltd									16/10/99
Consumer Switchroom Layout	PowerGrid Pte Ltd									
Metering Layout	PowerGrid Pte Ltd									
Sanitary Installation	ENV (Sewerage)									
Domestic Water Supply	PUB (Water)									
Gas Supply Installation	PowerGas Pte Ltd									
Air Conditioning & Ventilation Inst.	Building Control Division									
	Fire Safety Bureau									
Fire Fighting & Alarm Installation	Fire Safety Bureau									
	Telecom (Broadband)									
Telephone Installation	Telecom (TDCS)									
	Telecom (Domestic Operation)									
Fuel Storage	Fire Safety Bureau									
	Pollution Control Department									

SECTION 5

PROJECT RECORDS

5.1 List of Internal Files

Standard Files

File Ref:		File Ref:	
-CM	✓	-QSP	✓
-PC	✓	-BD	✓
-AE	✓	-CC	✓
-AM	✓	-CF	✓
-AA	✓	-GC	✓
-PQP	✓		

Project Files to be initiated by PM as and when required

File Ref:		File Ref:		File Ref:	
-SM	✓	-SR	✓	-ET	✓
-SC	✓	-QM		-MT	✓
-AI/AD	✓	-EC	✓	-DF	
-SQ	✓	-MC	✓	-EOT	
-CO	✓	-PP	✓	-601	✓

Service Files to be initiated by PM as and when required

	Service										
File Ref:	ACVI	FFAI	PSI	EI	LI	SPFP	-				
-G		✓	✓	✓	✓						
-Q											
-VO							✓				
-PP											
-AI											
-AD											
-CF		✓	✓	✓	✓						

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	Yip Y F
Incoming Architectural Sketches/Details	Yip Y F
Incoming Structural Drawings	Yip Y F
M&E Drawings	
- Electrical Installation	Alex Thum
- Lift Installation	Alex Thum
- Air Conditioning & Ventilation Installation	-
- Fire Fighting & Alarm Installation	Yip Y F
- Plumbing & Sanitary Installation	Yip Y F
- Swimming Pool & Filtration Installation	
Other Drawings	
Landscape drawings	Alex Thum

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

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

* When issue relates to the respective Consultant.

SECTION 7

WORK AUTHORISATION

Activity \ Authorised Signatories	PD	QP	PM	SS
General Correspondences with Client	✓		✓	
General Correspondences with Other Consultants			✓	
M&E Cost Estimate Report				
M&E Design Report				
Check Prints (for construction)			✓	
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
SS : AEC Site Staff

SECTION 8

DESIGN INPUT & METHODOLOGY

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

ITEM	KEPT BY
* HDB's specifications/Architect's schematic plans	Richard Teo
	Yip Y F
** HDB's specification/Architect's detailed plans	Richard Teo
	Yip Y F

8.2 List of Applicable Code of Practice and Regulations

Electrical Wiring	BS	SS	IEE	~~NFPA~~	
Lightning Protection System	BS	SS			
Lift Installation	BS	SS			
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~~	
Automatic Wet Riser System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~

(Delete where necessary)

* Conceptual/schematic stage
** Detailed design stage

SECTION 8

DESIGN INPUT & METHODOLOGY

8.3 List of Design Guide or Handbook Used

Institute of Plumbing's Plumbing Services Design Guide

8.4 List of Applicable Quality System Procedures

Alpha Engineering Consultant's Quality System Procedures

Section	Title
A2	Documentation of Project Quality Plan
A3	Administration Control
A4	Document Control
A6	Archive Control
A9	Feedback Reporting
B4	Design Change Control
B5	Drawing Control
C1	Construction Process Control
C2	Testing and Commissioning

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 Engineering	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 Engineering	Calculation of voltage drop and fault level	✓

(✓ *where applicable*)

SECTION 9

CLIENT'S REQUIREMENTS

9.1 List of Output Required by Client:-

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

** Remarks*

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

Other purposes and for action: please specify.

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

* Base design drawings are to be approved by HDB before commencement of work at the site.

* No technical submission for materials and equipment if selected from the HDB's approved lists.

SECTION 10

LIST OF SUB-JOB

10.1 List of Sub-Job Numbers

NOT USED