PROJECT QUALITY PLAN

DESIGN & BUILD OF PUBLIC HOUSING AT SENGKANG NEIGHBOURHOOD 3 CONTRACT 8 CONSISTING OF 12 BLOCKS OF 18-STOREY FLATS, 2 BLOCKS OF 6-STOREY CARPARK AND ANCILLARY BUILDINGS ON LOT 539 PT (SL) & 634 PT (SL) MK 21AT ANCHORVALE ROAD/ANCHORVALE LANE/SENGKANG EAST AVENUE

For

HOUSING DEVELOPMENT BOARD

Copy No.	

Prepared By: Philip Tey/Belinda Yee

Authorised By: Richard Teo

Date: 30 December 1998

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	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	**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	List of Sub-Job Numbers

SECTION 1

QUALITY PLAN CONTROL AND DISTRIBUTION

1.1 List of Copy Holders

Copy No.	Copy Holder	Date of Issue
1	1151-PQP File	26 June 1998
2	Philip Tey	26 June 1998

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
1/1	26 June 1998	Sections 1 & 8	2	Pages 3 & 26
1/2	23 October 1998	Sections 1, 3 & 4	3	Pages 3, 9 & 16
3	30 December 1998	Sections 1 to 10	26	-

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Residential

Statistics of Development	
Site Area, m²	47,761.50
Nett Floor Area, m²	114,960.31
Gross Floor Area, m²	162,721.81
Covered Carpark, m²	38,000.00
No. of Covered Carpark Lots	1288
No. of Apartments/Houses	1248
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	12/18
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LEI	FFAI	PSI	SPFI				
Estimate	8.4	-	4.0	-	9.6	-				
Awarded	-	-	-	-	-	-				

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	-	Included in MC	154.9
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							
DATA COMM.									
FLUSHFLOOR TRUNKING									

(✓ *where applicable*)

2.3.3 Submission to Relevant Authorities by Others

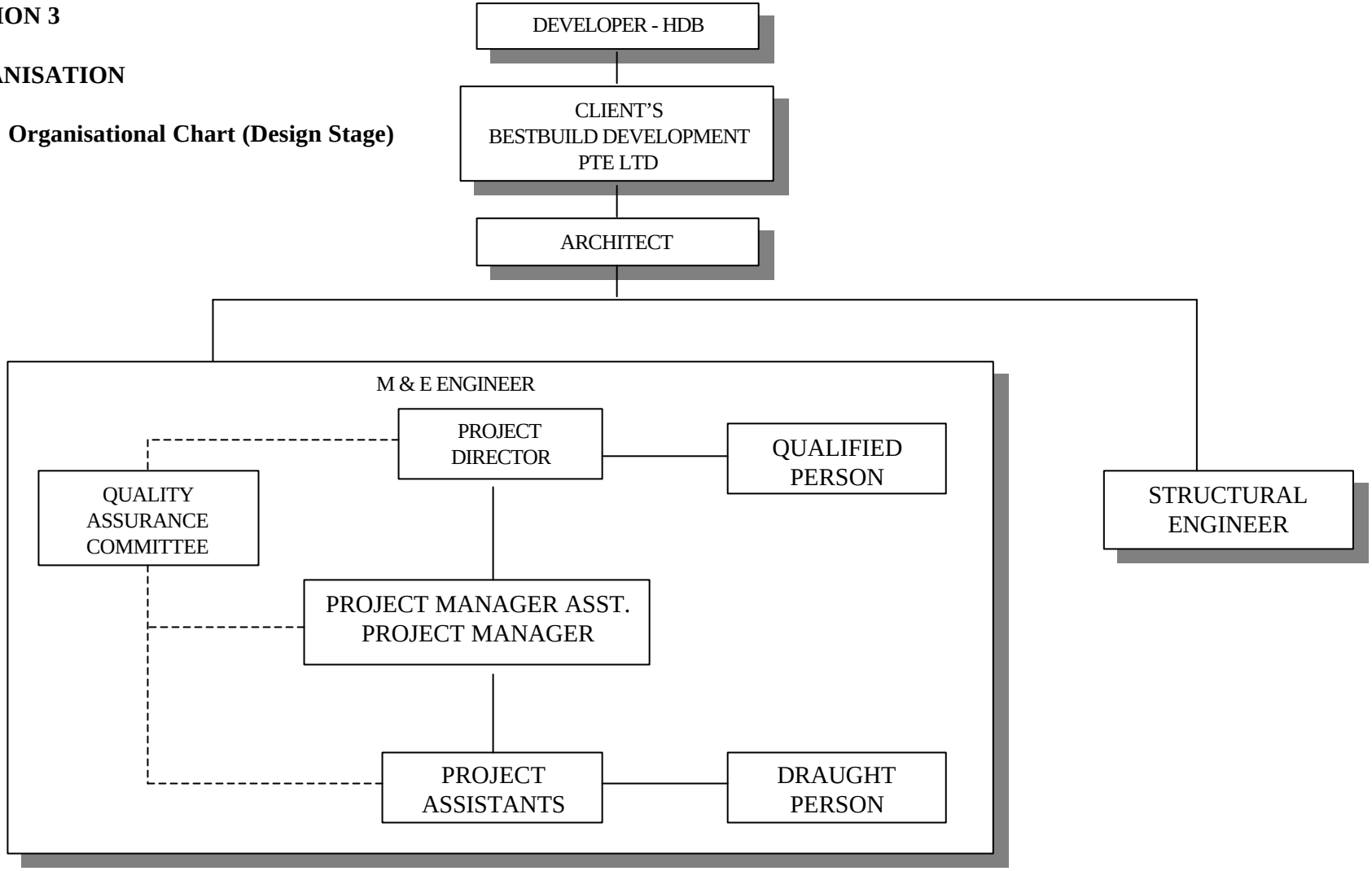
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK		LIFT	✓	PRESSURE VESSEL		HOISTS		FOAM	

(✓ *where applicable*)

SECTION 3

ORGANISATION

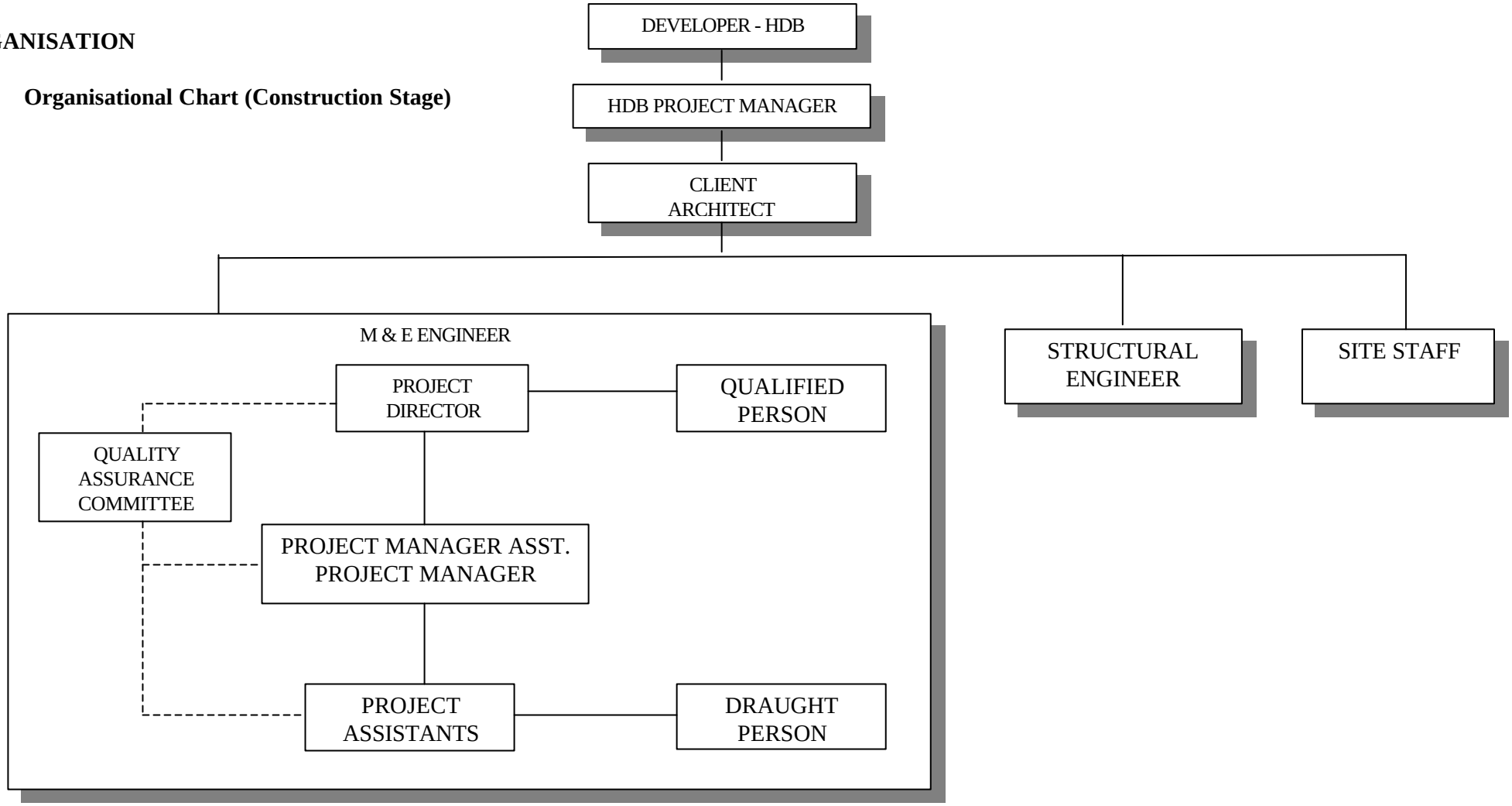
3.1 Organisational Chart (Design Stage)



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		Philip Tey
Assistant Project Manager		Chim Heng Leong
Project Assistant (Mech)		Karen Wong
Project Assistant (Elect)		Belinda Yee
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

Client:- Pan-Indo Architects International (Construction Stage)

Address: 61-A Tanjong Pagar Road
Singapore 088482

Tel:- 225 1533

Fax: 222 4645

Developer's/Client's Representatives:-

Name of Firm	Contact Person	Contact
Housing & Development Board	Name: Alan Tang Liang Yan Position: Executive Project Manager	Tel: 279 7285 Fax: 484 2512 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Lim Chin Hok Position: Executive Mechanical Engineer	Tel: 279 7894 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Lim Chai Yong Position: Electrical Engineer	Tel: 279 7817 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Tan Check Sim Position: Electrical Engineer	Tel: 279 7844 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Lee Sang Tong Position: Electrical Engineer	Tel: 279 7802 Fax: 279 7914 Pager: - Handphone: - Email: -

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

Name of Firm	Contact Person	Contact
Housing & Development Board	Name: Jimmy Tan Position: Electrical Engineer	Tel: 279 8410 Fax: 279 7914 Pager: - Handphone: - Email: -
Housing & Development Board	Name: Suari Manon Position: Senior Technical Officer	Tel: 484 2010 Fax: 484 2512 Pager: 9239 7897 Handphone: - Email: -
Pan-Indo Architect	Name: Ow Wah Foong Position: Principal	Tel: 225 1533 Fax: 222 4645 Pager: - Handphone: - Email: -
Pan-Indo Architect	Name: Wong Soon Tuan Position: Project Architect	Tel: 225 1533 Fax: 222 4645 Pager: 9520 6620 Handphone: - Email: -
Pan-Indo Architect	Name: Tan Thean Ho Position: Resident Engineer	Tel: 484 2010 Fax: 482 0913 Pager: - Handphone: - Email: -
Pan-Indo Architect	Name: Kor Aik Leng Benji Position: Clerk-of-Works	Tel: - Fax: 484 2512 Pager: 9520 6620 Handphone: - Email: -
Bestbuild Development Pte Ltd	Name: Mr Tey C C Position: Project Manager	Tel: 377 1222 Fax: 339 5401 Pager: - Handphone: - Email: -
Bestbuild Development Pte Ltd	Name: Mr Anthony Chew 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: Ow Wah Foong 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: Lucas Liew 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: -
Client's Project Manager Housing & Development Board	Name: Alan Tang Liang Yah Position: Executive Project Manager	Tel: 279 7285 Fax: 279 7914 Pager: 9239 7861 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 C C Tey Position: Project Manager	Tel: 337 1222 Fax: 339 544401 Pager: 9525 3928 Handphone: - Email: -
Air Conditioning & Ventilation Installation Sub-Contractor NA		Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -
Plumbing & Sanitary Installation Sub-Contractor Kenly Plumbing Pte Ltd	DSC	Name: Mr Peh Chuan Hoe Position: Project Manager	Tel: 269 9882 Fax: 269 9662 Pager: 9400 0543 Handphone: - Email: -
Electrical Installation Sub-Contractor Strike Engineering Pte Ltd	DSC	Name: Mr Richard Low Position: Contract Manager	Tel: 455 3922 Fax: 455 7322 Pager: 9304 3367 Handphone: - Email: -
Lift & Escalator Installation Sub-Contractor LG Industrial Systems Co. Ltd	DSC	Name: Mr Duke H Suh Position: Project Manager	Tel: 323 7361 Fax: 323 7362 Pager: 9665 6401 Handphone: - Email: -
Fire Fighting & Alarm Installation Sub-Contractor Strike Engineering Pte Ltd	DSC	Name: Mr Richard Low Position: Contract Manager	Tel: 455 3922 Fax: 455 7322 Pager: 9304 3367 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	-	-
(b) Sub-Station	Mr Francis Chan	831 8555
(c) Installation	Mr Wang Hee Wong	277 7043
(d) Meter Section	Mr Kong Kum Ming	277 7056
(e) Road Lighting	-	-
(f) Diversion	-	-
Telecom:		
(a) Planning/Line Plant	Mr Ng Kok Yong	838 2838/733 9895
(b) Installation	Mr Ng Kok Yong	838 2838/733 9895
(c) Diversion	-	-
HDB(BCU):		
(a) Architectural	Mr Seetoh KumYuen	279 7503
(b) Civil Engineering	Mr Chua Chim Huee	279 7715
Structural Engineering	Mdm Chan/Mr Loo Fook Lim	279 7553
PUB (Water)		
(a) Water Conservation	Mr David Loh/Mr Chow Yue Kit	731 3518/731 3976/731 3023
(b) Plumbing Plan	-	-
(c) Diversion	-	-
PowerGas:		
(a) Planning/Submission	Mr Dion Tay Meng Teck/Mr Ivan Lim	831 8636
(b) Installation/Inspection	-	-
(c) Diversion	-	-
ENV (Sewerage):		
(a) Building Plan	Mr Benedict Aw	731 9653 (DID)
(b) M&E Section	-	-
(c) Diversion	-	-
ENV (Pollution Control)		
(a) Planning/Submission	-	-
(b) Inspection	-	-

SECTION 4

PROGRAMME

4.1 Overall Programme

			1998												1999											
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	} NA																								
8.	Tender Period for Super-Structure	}																								
9.	Piling Period																									
10.	Sub-Structure Construction Period	NA																								
11.	Super-Structure Construction Period *																									
12.	TOP **																									
13.	CSC																									

* The time for completion of the works – 5 February 1998 to 4 August 2000

** TOP – 29 May 2000 to 6 November 2000

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	-	23/2/98							2/3/98
Power Supply Substation	PowerGrid Pte Ltd	8/4/98	9/4/98	20/4/98	20/5/98	26/5/98				03/07/98
Main Single Line Diagram	Power Supply Pte Ltd	01/07/98	18/08/09							02/09/98
Consumer Switchroom Layout	PowerGrid Pte Ltd	NA								
Metering Layout	PowerGrid Pte Ltd	16/09/98	16/09/98							16/11/98
Sanitary Installation	ENV (Sewerage)	25/05/98	25/5/98	28/5/98	01/07/98					28/08/98
Domestic Water Supply	PUB (Water)	20/6/98	25/09/98							
Gas Supply Installation	PowerGas Pte Ltd	20/6/98	29/07/98	15/08/98	21/08/98					21/08/98
Air Conditioning & Ventilation Inst.	Building Control Division	-								
Fire Fighting & Alarm Installation	Fire Safety Bureau	-								
	Fire Safety Bureau	-								
Telephone Installation	Telecom (Broadband)	20/6/98	03/07/98							16/07/98
	Telecom (TDCS)	-								
	Telecom (Domestic Operation)	20/6/98	06/10/98							28/10/98
Fuel Storage	Fire Safety Bureau	-								
	Pollution Control Department	-								

SECTION 4

PROGRAMME

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

NOT USED

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/MC	✓	-DF	
-SQ		-MC		-EOT	
-CO	✓	-PP	✓		

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	Karen Wong
Incoming Architectural Sketches/Details	Karen Wong
Incoming Structural Drawings	Karen Wong
M&E Drawings	
- Electrical Installation	Belinda Yee
- Lift & Escalator Installation	Belinda Yee
- Air Conditioning & Ventilation Installation	-
- Fire Fighting & Alarm Installation	Karen Wong
- Plumbing & Sanitary Installation	Karen Wong
- 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.	External underground M&E Services Co-ordination	BY	KW	Sept 1998	

** 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	-	-	-	-	-	
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	C	C	-	
d.	Shop Drawings	-	-	C	C	-	
e.	As Built Drgs.	-	A	C	C	-	
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	-	

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				
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
	Karen Wong
** HDB's specification/Architect's detailed plans	Richard Teo
	Karen Wong

8.2 List of Applicable Code of Practice and Regulations

Electrical Wiring	BS	SS	IEE	~~NFPA~~	
Lightning Protection System	BS	SS			
Lift & Escalator 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~~	

(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
A1	Documentation of Quality System Procedure
A2	Documentation of Project Quality Plan
A3	Administration Control
A4	Document Control
A6	Archive Control
A9	Feedback Reporting
A10	Computer Control
B1	Preparation of Consultancy Offer
B2	Project Commission and Service Agreement
B3	Design Control
B4	Design Change Control
B5	Drawing Control
C1	Construction Process Control
C2	Testing and Commissioning
D1	Quality System Audit

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	C
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

Sub Job No	Description	Allocation Details
1151/001	Lightning protection to hardcourts, multi-purposes courts, playgrounds and other extension facilities	HDB's authorisation order ref. 200-21-04-3872 dated 19 September 1998
1151/002	Electrical provision to linkways	