PROJECT QUALITY PLAN

PROPOSED 6-STOREY CANCER CENTRE WITH 2 BASEMENTS IN SINGAPORE GENERAL HOSPITAL ON LOT 338 SL TS NO. 22 AT 3RD HOSPITAL AVENUE/HOSPITAL DRIVE/2ND HOSPITAL AVENUE (NATIONAL CANCER CENTRE)

For

M/S MINSTRY OF HEALTH

Copy No.	

Prepared By: Chong T T

Authorised By: Andrew Loh

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	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	File Copy	11 June 1998
2	Chong T T	11 June 1998

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
1/0	11 June 1998	Section 1 to 9	27	-
2	30 December 1998	Section 1 to Section 10	26	-

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Medical Institution

Statistics of Development	
Site Area, m²	5,100
Nett Floor Area, m² *	-
Gross Floor Area, m²	16,020
Covered Carpark, m²	4,500
No. of Covered Carpark Lots	75
No. of Apartments/Houses	-
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	6 + 2 Basement
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LEI	FFAI	PSI	MG	PT	BMS		
Estimate	-	-	-	-	-	-	-	-		
Awarded	3618	3326	840	748	512	580	126	785		

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	Design & Build		
Awarded	42.69		

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	✓	ENGINEERING SMOKE EXTRACT	✓	HOSEREEL	✓	HOT WATER	✓	FUEL STORAGE	✓
PABX	✓	COMPUTER A/C	✓	WET RISER		TOWN GAS	✓	QUEUE MX SYSTEM	✓
SECURITY	✓	BST CARPARK EXH	✓	DRY RISER		LPG GAS		AVA SYSTEM	✓
TELELIFT	✓	CLEANROOM	✓			MEDICAL GAS	✓	VOICE COMM.	✓
DATA COMM.	✓	COLD ROOM	✓					PNEUMATIC TUBE	✓
FLUSHFLOOR TRUNKING	✓	BUILDING MANAGEMENT SERVICES	✓						

(✓ *where applicable*)

2.3.3 Submission to Relevant Authorities by Others

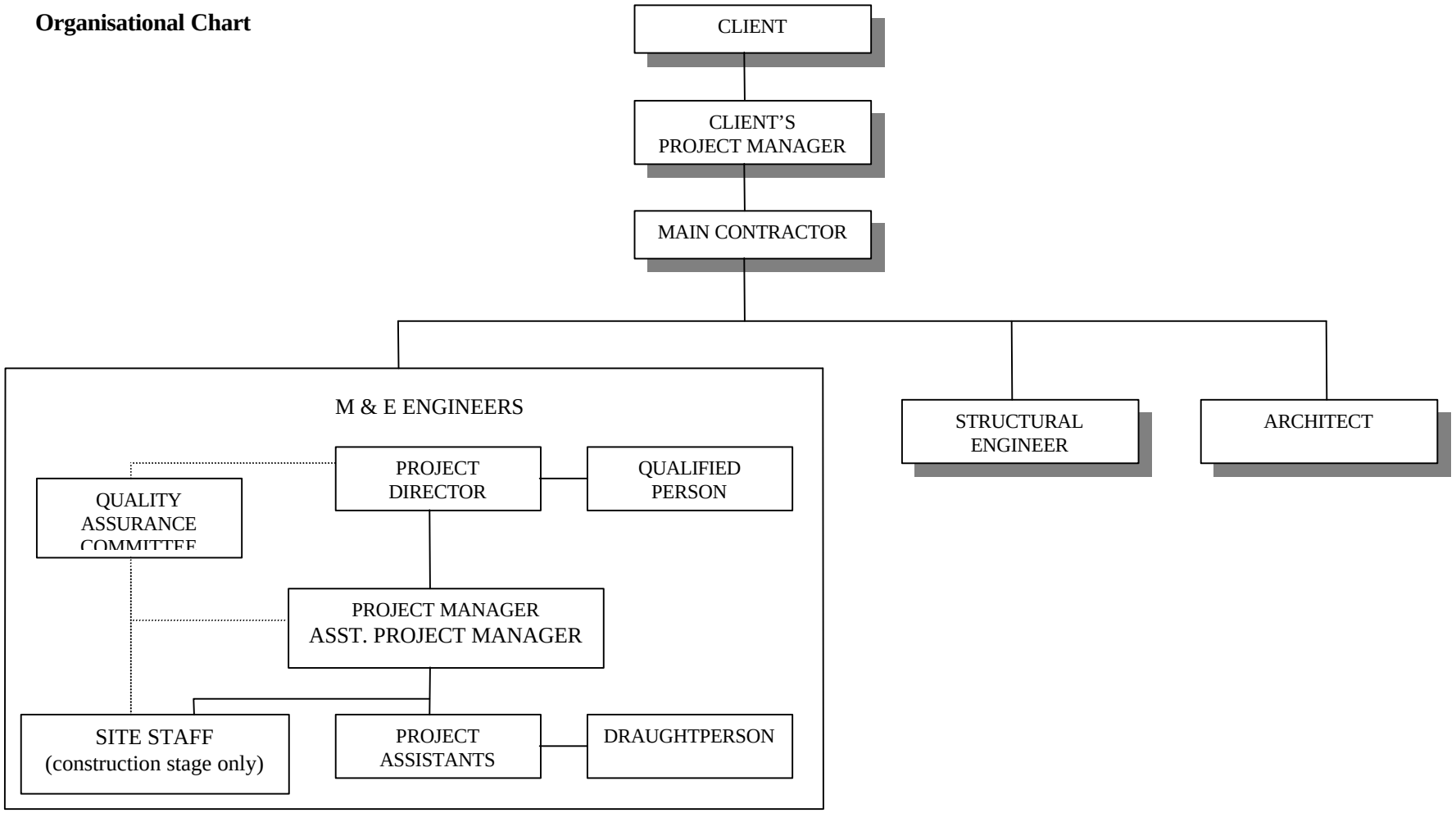
EJECTOR & DIVERTER	✓	SUMP PUMP	✓	FUEL OIL TANK	✓	LIFT & ESCALATOR	✓	PRESSURE VESSEL		HOISTS		FOAM	

(✓ *where applicable*)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 AEC's Project Team Member

TITLE		NAME
Project Director		Andrew Loh
Qualified Person	Mechanical	Andrew Loh
	Electrical	Richard Teo
Project Manager		Chong T T
Assistant Project Manager		Goh S H
Project Assistant (Mech)		-
Project Assistant (Elect)		Wong T C
Draughtsperson		Common Pool
Resident Engineer (M&E)		-
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		-

3.3 Client/Client's Representatives

Client:- Ministry of Health

Address:- College of Medicine Building
16 College Road
Singapore 169854

Tel:- 223 7777

Fax:- 224 1677

Client's Representatives:-

Name of Firm	Contact Person	Contact
Public Works Department	Name: Ms Ruby Lai Position: Superintendant Officer	Tel: 222 1211 Fax: 325 8454 Pager: - Handphone: - Email: -
	Name: Ms Choy Cheng Teng Position: Assistant Superintendant Officer	Tel: 325 8458 Fax: 325 8454 Pager: - Handphone: - Email: -
Public Works Department	Name: Mr Sandy Mok Position: Mechanical Engineer	Tel: 325 7351 Fax: 334 2246 Pager: 9540 8054 Handphone: - Email: -
Public Works Department	Name: Mr Thomas Cheng Position: Electrical Engineer	Tel: 325 7330 Fax: 334 2246 Pager: 9704 5072 Handphone: - Email: -
National Cancer Centre	Name: Ms Chia Puay Choo Position: Administrator	Tel: 326 6036 Fax: 225 6283 Pager: - Handphone: - Email: -
National Cancer Centre	Name: Prof. Hui Kam Han Position: Director (Research)	Tel: 326 6092 Fax: 225 6283 Pager: - Handphone: - Email: -

3.4 Other Consultants (Local)

Function / Name of Firm	Contact Person	Contact
Architect ADDP Architects	Name: Mr Alfred Koh/ Mr Lim Hseng Iu Position: Architect	Tel: 224 0280 Fax: 224 0280 Pager: - Handphone: - Email: -
Quantity Surveyor NA	Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -
Structural Engineer SCE Consultants Pte Ltd	Name: Mr Henry Gunawan Position: Structure	Tel: 337 2828 Fax: 339 9313 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 Public Works Departments	Name: Ms Choy Cheng Teng Position: Project Manager	Tel: 325 8458 Fax: 325 8454 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 Fujita - Koh Brothers Joint Venture	DB	Name: Mr Ken Seward Position: Project Manager	Tel : 223 5135 Fax : 220 3340 Tel: 222 6637 (Site) Fax: 222 6658 (Site) Pager: - Handphone: - Email: -
Air Conditioning & Ventilation Installation Sub-Contractor Shin Nippon Air Technologies Co Ltd	DSC	Name: Mr T Y Lim Position: Project Manager	Tel : 223 5135 Fax : 220 3340 Tel: 222 6637 (Site) Fax: 222 6658 (Site) Pager: - Handphone: - Email: -
Plumbing & Sanitary Installation Sub-Contractor Shin Nippon Air Technologies Co Ltd	DSC	Name: Mr T Y Lim Position: Project Manager	Tel : 223 5135 Fax : 220 3340 Tel: 222 6637 (Site) Fax: 222 6658 (Site) Pager: - Handphone: - Email: -
Electrical Installation Sub-Contractor Shin Nippon Air Technologies Co Ltd	DSC	Name: Mr T Y Lim Position: Project Manager	Tel : 223 5135 Fax : 220 3340 Tel: 222 6637 (Site) Fax: 222 6658 (Site) Pager: - Handphone: - Email: -
Lift & Escalator Installation Sub-Contractor Fujitec Singapore Corporation Ltd	DSC	Name: Mr Sugumaran N Pillai/Mr Sim S L Position: Project Engineer	Tel : 241 6222 Fax : 444 7626 Pager: - Handphone: - Email: -
Fire Fighting & Alarm Installation Sub-Contractor Shin Nippon Air Technologies Co Ltd	DSC	Name: Mr T Y Lim Position: Project Manager	Tel : 223 5135 Fax : 220 3340 Tel: 222 6637 (Site) Fax: 222 6658 (Site) Pager: - Handphone: - Email: -

3.5 Contractors/Sub-Contractors (Cont'd)

Function / Name of Firm	Contract *	Contact Person	Contact
Medical Gas Sub-Contractor Singapore Oxygen Air Liquide Pte Ltd	DSC	Name: Mr Philip Chia Position: Project Manager	Tel: 265 3788 Fax: 268 8403 Pager: - Handphone: - Email: -
Pneumatic Tube Sub-Contractor Mecomb Singapore Ltd	DSC	Name: Mr Mark Phua Position: Project Engineer	Tel : 469 8833 Fax : 467 1905 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	-	-
(b) Sub-Station	-	-
(c) Installation	-	-
(d) Meter Section	-	-
(e) Road Lighting	-	-
(f) Diversion	-	-
Telecom:		
(a) Planning/Line Plant	Mr Thong Yam Ser	Tel: 838 2874
(b) Installation	-	-
(c) Diversion	-	-
BCD:		
(a) Building Plan	-	-
FSB:		
(a) Building Plan	-	-
(b) M&E Section	Mr Chan Hong Meng/Mr Ng Ah Hiap	Tel: 838 6390
PUB (Water)		
(a) Water Conservation	Mr Ahmad	Tel: 731 3976
(b) Plumbing Plan	Mr Toh Tse Teck/Mr K K Lam	Tel: 731 3552
(c) Diversion	-	-
PowerGas:		
(a) Planning/Submission	Mr Lim Hock Ann	Tel: 831 8681
(b) Installation/Inspection	Mr Tay	-
(c) Diversion	Mr Wong Yew Yin	Tel: 831 8681
ENV (Sewerage):		
(a) Building Plan	Mr Tan Eng Seng	Tel: 731 9629
(b) M&E Section	Ms Tan/Mr Chow Yew Meng	Tel: 731 9643 Fax: 731 9630
(c) Diversion	-	-
ENV (Pollution Control)		
(a) Planning/Submission	Mr Lui Kean Hoong	Tel: 731 9629
(b) Inspection	-	-

SECTION 4

PROGRAMME

4.1 Overall Programme

ID	TASK NAME	MONTHS	1997												1998												1999	
			J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
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																											

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	-								*
Power Supply Substation	PowerGrid Pte Ltd	-								*
Main Single Line Diagram	Power Supply Pte Ltd	-								*
Consumer Switchroom Layout	PowerGrid Pte Ltd									*
Metering Layout	PowerGrid Pte Ltd	-								*
Sanitary Installation	ENV (Sewerage)	-	070397	250397	020497					240497
Domestic Water Supply	PUB (Water)	151097	311097	041297	190598	010798	040998			280998
Gas Supply Installation	PowerGas Pte Ltd	230597	230597		0697	200697	260697			140797
Air Conditioning & Ventilation Inst.	Building Control Division	-								
	Fire Safety Bureau	310198	010498							120598
Fire Fighting & Alarm Installation	Fire Safety Bureau	151297	120198	160298	290498					150598
	Telecom (Broadband)									
Telephone Installation	Telecom (TDCS)	151097	121197							
	Telecom (Domestic Operation)									
Fuel Storage	Fire Safety Bureau									
	Pollution Control Department									
Engineering Smoke Control	Fire Safety Bureau	311197	190198	160298	080498	160498	060598			160598

*No submission required

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: 1064		File Ref: 1064	
-CM	✓	-QSP	-
-PC	✓	-BD	✓
-AE	✓	-CC	✓
-AM	✓	-CF	✓
-AA	✓	-GC	✓
-PQP	✓		

Project Files to be initiated by PM as and when required

File Ref: 1064		File Ref: 1064		File Ref: 1064	
-SM	✓	-SR	-	-ET	-
-SC	-	-QM	-	-MT	-
-AI	✓	-EC/MC	✓	-DF	-
-SQ	✓	-MC	-	-EOT	✓
-CO	✓	-PP	-	-VO	✓
-SF	✓				

Service Files to be initiated by PM as and when required

	Service										
File Ref:	ACVI	FFAI	PSI	EI	LI	IB1					
-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	Chong T T
Incoming Architectural Sketches/Details	Chong T T
Incoming Structural Drawings	Chong T T
M&E Drawings	
- Electrical Installation	Wong T C
- Lift & Escalator Installation	Wong T C
- Air Conditioning & Ventilation Installation	Chong T T
- Fire Fighting & Alarm Installation	Chong T T
- Plumbing & Sanitary Installation	Chong T T
- Swimming Pool & Filtration Installation	-
Other Drawings	
- Pneumatic Tube Installation	Chong T T
- Building Management Services	Chong T T
- Medical Gas	Chong T T
- Clean Room	Chong T T

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

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 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
B3	Design Control
B4	Design Change Control
B5	Drawing Control
B6	Specification 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	Re
M&E Cost Estimate Report	-
Pre-Qualification of Tenderers	-
Tender Documents	-
Tender Report	-
Payment Valuation for QS	-
Certificates of Supervision for TOP/CSC	Re

** Remarks*

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

Other purposes and for action: please specify.

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

SECTION 10

LIST OF SUB-JOB

10.1 List of Sub-Job Numbers

NOT USED