PROJECT QUALITY PLAN

RESEARCH BUILDING
AT SCIENCE PARK 3 – PHASE 1 PLOT 3

For

M/S ASCENDAS LAND (S) PTE LTD

Copy No.	

Prepared By: Choo Cheong Nian

Authorised By: Richard Teo

Date: 1 December 2000

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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	1290- PQP File	1 December 2000
2	Choo Cheong Nian	1 December 2000

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	1 December 2000	1 to 10	26	

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Life Science Research Building

Statistics of Development	
Site Area, m²	15,045
Nett Floor Area, m²	22,567
Gross Floor Area, m²	30,090
Covered Carpark, m²	-
No. of Covered Carpark Lots	307
No. of Apartments/Houses	-
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	2 / 6
No. of Phases	2

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LI	FFAI	PSI					
Estimate	5.300	6.200	1.000	1.300	2.200					
Awarded	3.0	2.78	0.67	0.65	1.3003					

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	3.195	3.5	50.7
Awarded	0.535	1.53	38.5

Site Clearance shall include earthwork, 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		GENERATOR	✓
SECURITY	✓	BST CARPARK EXH	✓	DRY RISER	✓	LPG GAS		UPS	
TELELIFT		HEATING				MEDICAL GAS		AUTO PAGING	
DATA COMM.						DE-IONISED WATER		SECURITY	✓
FLUSHFLOOR TRUNKING								PUBLIC ADDRESS	✓

(✓ *where applicable*)

2.3.3 Submission to Relevant Authorities by Others

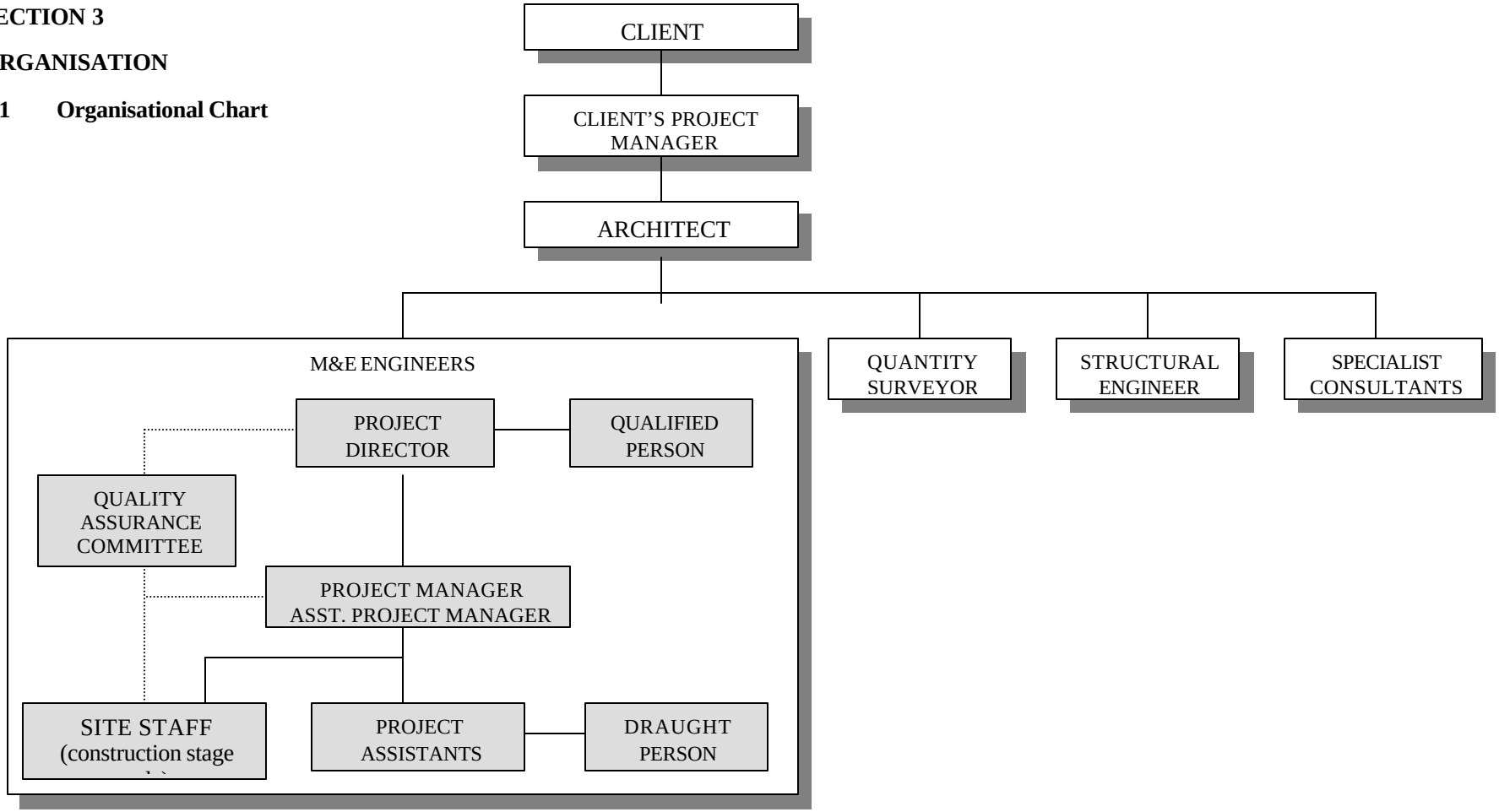
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK	✓	LIFT & ESCALATOR	✓	PRESSURE VESSEL		HOISTS		FOAM	

(✓ *where applicable*)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 AEC's Project Team Member

TITLE		NAME
Project Director		Richard Teo
Qualified Person	Mechanical	Andrew Loh
	Electrical	Richard Teo
Project Manager		Choo Cheong Nian
Assistant Project Manager		Heng Chye Hing
Project Assistant (Mech)		Ang Wee Loong
Project Assistant (Elect)		Soh Kai Yea
Draughtsperson		Common Pool
Construction Manager cum Resident Engineer		Wong Chee Choon
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		Tang Weng Huat

3.3 Client/Client's Representatives

Client:- Ascendas Land (S) Pte Ltd

Address:- 75 Science Park Drive
#01-03/04 CINTECH II
Singapore Science Park 1
Singapore 118255

Tel:- 774 9098

Fax:- 777 8962

Client's Representatives:-

Name of Firm	Contact Person	Contact
Ascendas Land (S) Pte Ltd	Name: Mr Thomas Teo Position: General Manager	Tel: 774 9098 Fax: 777 8962 Pager: - Handphone: - Email: ttla@arcasia.com
Ascendas Land (S) Pte Ltd	Name: Mr Yew Kok Chee Position: Manager	Tel: 774 9198 (DID) Fax: 777 8962 Pager: - Handphone: - Email: kokchee@arcasia.com
Ascendas Land (S) Pte Ltd	Name: Mr Wong Chee Choon Position: Resident Engineer	Tel: 8721431 Fax: - Pager: - Handphone: 94319295 Email: -
Ascendas Land (S) Pte Ltd	Name: Mr Tang Weng Huat Position: M & E Clerk-of-Works	Tel: 8721431 Fax: 774 5213 Pager: - Handphone: - Email: -

3.4 Other Consultants (Local)

Function / Name of Firm	Contact Person	Contact
Architect P & T Consultants Pte Ltd 24 Raffles Place #23-00 Clifford Centre Singapore 048621	Name: Mr Leong Chee Wai Position: Project Architect	Tel: 535 2011 Fax: 535 1283 Pager: - Handphone: - Email: cwleong@ptcon.com.sg
Quantity Surveyor FSinn & Andrews Pte Ltd 511 Keppel Distripark #03-06 Kampong Bahru Road Singapore 99447	Name: Mr David Johnson Position: Director	Tel: 272 1110 Fax: 272 0749 Pager: - Handphone: - Email: fsasia@cyberway.com.sg
Structural Engineer Maunsell Consultants (Singapore) Pte Ltd 300 Beach Road #03-00 The Concourse Singapore 199555	Name: Mr Saw Wee Hong Position: Associate	Tel: 299 2466 / 394 0231 (DID) Fax: 299 0297 Pager: - Handphone: - Email: swh@maunsell.com.sg
Landscape Consultant ACL Asia Pte Ltd 40B Hong Kong Street Singapore 059679	Name: Mr. Desmond Kok Position: Associate Director	Tel: 5336381 Fax: 5355839 Pager: - Handphone: - Email: desmond.kok@acla.com.sg
Specialist Consultant Prolab Solutions c/o JTC Consultant No.8, Jurong Town hall, #16-00 JTC Summit Singapore 609434	Name: Mr. Leong Wei Weng Position: Lab Planning Specialist Consultant	Tel: - Fax: 877 0677 Pager: - Handphone: 90277325 Email: prolab@lycosasia.com

3.4 Other Consultants (Overseas)

NOT USED

3.5 Contractors/Sub-Contractors

Function / Name of Firm	Contract *	Contact Person	Contact
Earthwork Contractor Chye Joo Construction Pte Ltd No. 3 Tuas Avenue 6 Singapore 639294	DC	Name: Ng Teck Lai Position: Managing Director	Tel: 560 7788 Fax: 863 2571 Pager: - Handphone: - Email: chyejoo@cyberway.com.sg
Piling Contractor Zap Piling Pte Ltd 33 Sungei Kadut Loop #04-00 Singapore 729508	DC	Name: Position	Tel: 365 2282 Fax: 365 2262 Pager: - Handphone: - Email:
Main Contractor Eng Lim Construction Co Pte Ltd 211 Holland Avenue #04-03 Singapore 278967	MC	Name: Geoffrey Shutie Position: Project Manager	Tel: 466 8200 Fax: 466 1943 Pager: - Handphone: - Email: englim@pacific.net.sg geoff@cyberway.com.sg
Air Conditioning & Ventilation Installation Sub-Contractor Takasago Thermal Engineering Co., Ltd 111 Somerset Road #09-01 Singapore Power Building Singapore 238164	DSC	Name: Mr Chua Whye Lam Position: Senior Manager Name: Mr Mohamed Nazim B. Jumadi Position: Asst. Project Manager	Tel: 7373312 Fax: 7337442 Pager: - Handphone: - Email: mail@takasago.com.sg
Plumbing & Sanitary Installation Sub-Contractor APP Engineering Pte. Ltd 15 Kian Teck Way Singapore 628738	DSC	Name: Mr Sebastian Tan Position: Project Engineer	Tel: 2686964 Fax: 2659537 Pager: - Handphone: - Email: admin@appengrgcom.sg
Electrical Installation Sub-Contractor Dai-Dan Co Ltd 315 Outram Road #15-09 Tan Boon Liat Building Singapore 169074	DSC	Name: Mr Chong Choon Meow Position: Project Manager	Tel: 275 4111 Tel: 2218488 Fax: 2250544 Pager: 92056033 Handphone: - Email: cmchong@daidansin.com.sg
Lift Installation Sub-Contractor Fujitec Singapore Corporation Ltd 204 Bedok South Avenue 1 Singapore 469333	DSC	Name: Mr Andre S. Noorli Position: Project Executive	Tel: 2416222 Fax: 4447626 Pager: 95129157 Handphone: - Email: fovpc@fujitecsg.com
Fire Fighting & Alarm Installation Sub-Contractor APP Engineering Pte. Ltd	DSC	Name: Mr Sebastian Tan Position: Project Engineer	Tel: 8626364 Fax: 8659537 Pager: - Handphone: - Email:

** Type of Contract*
- *MC (Management Contractor)*
  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 Lim Yew Kiam	823 8553
(b) Sub-Station	Mr Chin Yoke Fah	823 8556
(c) Installation	Mr Wong Nee Chze	277 7041
(d) Meter Section	Mr Tan Hoe Kiang	733 1668
(e) Road Lighting	-	
(f) Diversion	-	
Telecom:		
(a) Planning/Line Plant	Mr Ong Boon Tat	825 6000
(b) Installation	-	
(c) Diversion	-	
BCD:		
(a) Building Plan	-	
FSB:		
(a) Building Plan	-	
(b) M&E Section	Mr Han Fook Kuang	848 1467
PUB (Water)		
(a) Water Conservation	Mr Tham Tuck Kuan / Hashim	731 3557/731 3023
(b) Plumbing Plan	Mr Ang Wui Seng/Ang Boon Beng	731 3548/731 3023
(c) Diversion	Mr Wong Wai Cheing	731 3546/731 3023
PowerGas:		
(a) Planning/Submission	-	
(b) Installation/Inspection	-	
(c) Diversion	-	
ENV (Sewerage):		
(a) Building Plan	Mr Ling Poon Guan	731 9154/731 9725
(b) M&E Section	Mr Chow Yew Meng	731 9630/731 9725
(c) Diversion	-	
ENV (Pollution Control)		
(a) Planning/Submission	-	
(b) Inspection	-	

SECTION 4

PROGRAMME

4.1 Overall Programme

			2000						2001												2002					
ID	TASK NAME	MONTH	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
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	Nov 00	15/11/00	-	-	-	-	-	-	27/11/00
Power Supply Substation	PowerGrid Pte Ltd	Nov 00	06/02/01	15/02/01	09/04/01	-	-	-	-	18/04/01
Main Single Line Diagram	Power Supply Pte Ltd	May 01	06/07/01	11/07/01	08/08/01	-	-	-	-	14/08/01
Consumer Switchroom Layout	PowerGrid Pte Ltd	-	-	-	-	-	-	-	-	-
Metering Layout	PowerGrid Pte Ltd	Dec 01								
Sanitary Installation	ENV (Sewerage)	May 01	31/07/01	-	-	-	-	-	-	-
Domestic Water Supply	PUB (Water)	May 01	26/06/01	06/08/01	22/08/01	29/08/01	06/09/01	-	-	24/09/01
Gas Supply Installation	PowerGas Pte Ltd	-	-	-	-	-	-	-	-	-
Air Conditioning & Ventilation Inst.	Fire Safety Bureau (ACMV)	Oct 01								
Fire Fighting & Alarm Installation	Fire Safety Bureau (FFAI)	Oct 01								
Telephone Installation	Telecom (Broadband)	May 01	22/05/01	15/06/01	07/08/01	-	-	-	-	11/09/01
	Telecom (TDCS)	-	-	-	-	-	-	-	-	-
	Telecom (Domestic Operation)	-	-	-	-	-	-	-	-	-
Fuel Storage	Fire Safety Bureau	-	-	-	-	-	-	-	-	-
	Pollution Control Department	-	-	-	-	-	-	-	-	-
SCV	SCV	May 01	22/05/01	-	-	-	-	-	-	05/07/01

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	✓	-BD	✓
-PC	✓	-CC	✓
-AE	✓	-CF	✓
-AM	✓	-GC	✓
-AA	✓	-BD	✓
-PQP	✓	P1/P4	✓
-VO	✓		

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	✓	-601	✓
-H2	✓	-Q	✓	-QC	✓

Service Files to be initiated by PM as and when required

	Service										
File Ref:	ACVI	FFAI	PSI	EI	LI						
-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	
Incoming Architectural Sketches/Details	
Incoming Structural Drawings	
M&E Drawings	
- Electrical Installation	Soh Kai Yea
- Lift Installation	Soh Kai Yea
- Air Conditioning & Ventilation Installation	Ang Wee Loong
- Fire Fighting & Alarm Installation	Ang Wee Loong
- Plumbing & Sanitary Installation	Ang Wee Loong
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.	Mechanical equipment power requirement	HCH/AWL	CCN		
2.	Mechanical equipment essential load requirement	HCH/AWL	CCN		
3.	Mechanical equipment control panel & isolator location	HCH/AWL	CCN		
4.	Lift motor room heat load	CCN	HCH/AWL		

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

SECTION 8

DESIGN INPUT & METHODOLOGY

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

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 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~~
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
A5	Library Control
A6	Archive Control
A7	Purchasing Control
A8	Training 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
B6	Specification Control
B7	Tender Process and Evaluation
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	A
M&E Cost Estimate Report	A
Pre-Qualification of Tenderers	A
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.

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

9.2.1 Prequalification of M&E Tenderers.

SECTION 10

LIST OF SUB-JOB

10.1 List of Sub-Job Numbers

Sub Job No	Description	Allocation Details
601	Design changes	