Alpha
Engineering Consultant

PROJECT QUALITY PLAN

SEAGATE RMO2 AT WOODLANDS

For

M/S Seagate Technology International

Copy No.	1

Prepared By: Choong Choon Guan

Authorised By: Andrew Loh

Date: 9 March 2004

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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	1371-PQP	9 March 2004
2	Choong Choon Guan	9 March 2004

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	9 March 2004	1 to 10	26	

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Industrial

Statistics of Development	
Site Area, m²	24,271.00
Nett Floor Area, m²	-
Gross Floor Area, m²	52,356.87
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	1 Block / 5 Storey
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LEI	FFAI	PSI	SPFI	CR	DI		
Estimate										
Awarded		7.9		2	1.9	-	21			

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate			
Awarded	-	-	111

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				MEDICAL GAS			
DATA COMM.									
FLUSHFLOOR TRUNKING									

(✓ *where applicable*)

2.3.3 Submission to Relevant Authorities by Others

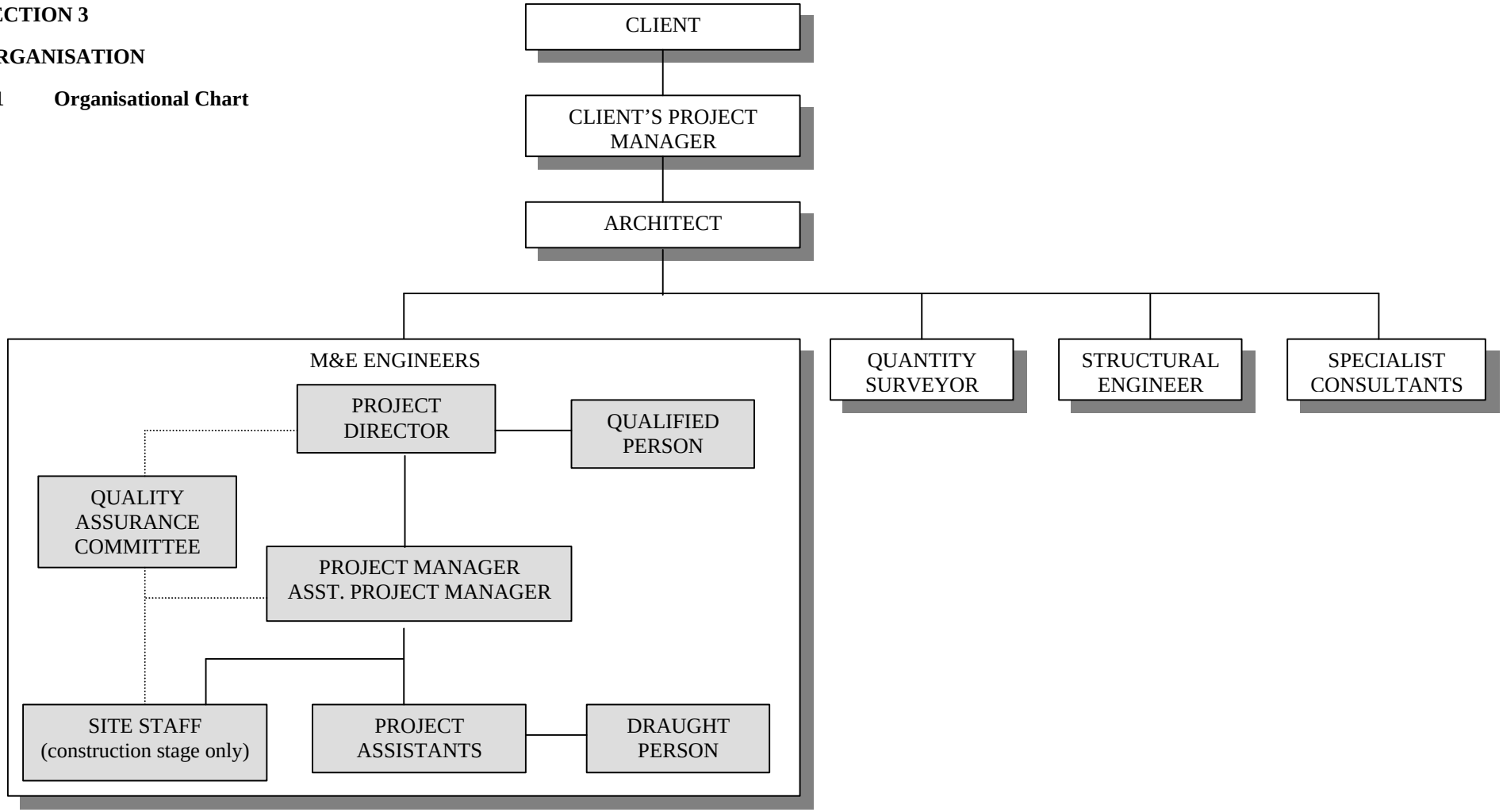
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK	✓	LIFT & ESCALATOR	✓	PRESSURE VESSEL		HOISTS	✓	FOAM	

(✓ *where applicable*)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 AEC's Project Team Member

TITLE		NAME
Project Director		Andrew Loh
Qualified Person	Mechanical	Choong Choon Guan
	Electrical	Tan Lai Siong
Project Manager		Choong Choon Guan
Assistant Project Manager		Goh Soon Huat
Project Assistant (Mech)		Chuan Kian Heng
Project Assistant (Elect)		Teh Yong Hui
Draughtsperson		Common Pool
Resident Engineer (M&E)		Chee Wee Meng
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		

3.3 Client/Client's Representatives

Client: Shimizu Corporation

Address: 78 Shenton Way #11-01
MCL Land Building
Singapore 079120

Tel: 6220 0406

Fax: 6224 9890

Client's Representatives:-

Name of Firm	Contact Person	Contact
Shimizu Corporation	Name: H Ishitsu Position: Project Director	Tel: 6536 1755 Fax: 6536 1300 Handphone: 9654 8434 Email: ishitsu@seg.shimz.com.sg
	Name: S. Yamamoto Position: Project Manager	Tel: 6536 1755 Fax: 6536 1300 Handphone: 9186 8434 Email: yamamoto@seg.shimz.com.sg
	Name: Wong S F Position: Sr. M&E Manager	Tel: 6536 1755 Fax: 6536 1300 Handphone: 9818 7940 Email: sfwong@seg.shimz.com.sg
	Name: K Kuroda Position: Manager/Architect	Tel: 6536 1755 Fax: 6536 1300 Handphone: 9186 1472 Email: kuroda@seg.shimz.com.sg
	Name: K Isozaki Position: M&E Sr. Engineer	Tel: 6536 1755 Fax: 6536 1300 Handphone: 9186 1476 Email: isozaki@hq.shimz.com.sg

3.4 Other Consultants (Local)

Function / Name of Firm	Contact Person	Contact
Architect CPG Consultants Pte Ltd (Airport Development Division)	Name: Keith Ooi Position: VP (Special Projects)	Tel: 6543 7379 Fax: 6542 0406 Pager: - Handphone: 9634 9056 Email: keith.ooi@cpgcorp.com.sg
Quantity Surveyor	Name: Position:	Tel: Fax: Pager: Handphone: Email:
Structural Engineer T Y Lin South East Asia Pte Ltd	Name: Lim T C Position: Principal	Tel: 6278 3383 Fax: 6278 2622 Pager: - Handphone: - Email: tclim@tylin.com.sg
Interior Designer	Name: Position:	Tel: Fax: Pager: Handphone: Email:
Lighting Consultant	Name: Position:	Tel: Fax: Pager: Handphone: Email:
Acoustic Consultant National University of Singapore	Name: Professor Lim Position:	Tel: 6778 9080 Fax: 6778 0522 Pager: Handphone: Email:
_____	Name: Position:	Tel: Fax: Pager: Handphone: Email:
_____	Name: Position:	Tel: Fax: Pager: Handphone: Email:

3.4 **Other Consultants** (Owner's)

Function / Name of Firm	Contact Person	Contact
Architect 3HPArchitects Pte Ltd	Name: Michael Wong Position: -	Tel: 6235 8333 Fax: 6733 0809 Pager: Handphone: Email: sgp3hpa@pacific.net.sg
M&E Consultant Bescon Consulting Engineers Pte	Name: Yong C T Position: Director	Tel: 6293 2611 Fax: 6749 3234 Pager: Handphone: Email: ctyong@bescon.com.sg
Quantity Surveyor KPK Quantity Surveyors	Name: Peter Jerome Position: Associate Director	Tel: 6536 3303 Fax: 6536 2633 Pager: Handphone: Email: peterjerome@kpkqs.com.sg
Structural Engineer Chong & Lee Consultants Pte Ltd	Name: Lee Foh Sang Position: -	Tel: 6222 0669 Fax: 6222 0979 Pager: Handphone: Email: chonglee@pacific.net.sg
Interior Designer	Name: Position:	Tel: Fax: Pager: Handphone: Email:
Lighting Consultant	Name: Position:	Tel: Fax: Pager: Handphone: Email:
Acoustic Consultant CCW Associates Pte Ltd	Name: - Position -:	Tel: 6278 4918 Fax: 6275 7206 Pager: Handphone: Email:
_____	Name: Position:	Tel: Fax: Pager: Handphone: Email:

3.5 Contractors/Sub-Contractors

Function / Name of Firm	Contract *	Contact Person	Contact
Main Contractor Shimizu Corporation		Name: S. Yamamoto Position: Project Manager	Tel: 6536 1755 Fax: 6536 1300 Pager: - Handphone: 9186 8434 Email: yamamoto@seg.shimz.com.sg
Air Conditioning & Ventilation Installation Sub-Contractor Techniques Air Conditioning & Engineering Pte Ltd		Name: Koh Jit Chua Position: Project Manager	Tel: 6744 6667 Fax: 6747 8342 Pager: - Handphone: 9630 5443 Email: jckoh@techniques83.com
Plumbing & Sanitary Installation Sub-Contractor Fatt Heng Construction Pte Ltd		Name: Sim Chin Hock Position: Project Manager	Tel: 6749 3116 Fax: 6742 2709 Pager: Handphone: 9730 5858 Email: fattheng@singnet.com.sg
Electrical Installation Sub-Contractor SANYO Airconditioners Manufacturing (S) Pte Ltd		Name: Chris Neo Position: Project Manager	Tel: 6265 7777 Fax: 6265 6856 Pager: Handphone: Email: info@samsin.com.sg
Lift & Escalator Installation Sub-Contractor Fujitec Singapore Corporation Ltd		Name: Position:	Tel: 6241 6222 Fax: 6444 7626 Pager: Handphone: Email: fujitec@fujicsg.com
Fire Fighting & Alarm Installation Sub-Contractor Fire Protection Company Pte Ltd		Name: Dominic Ang Position: Project Manager	Tel: 6258 5191 Fax: 6258 7086 Pager: Handphone: 9661 6364 Email: fpcnfm@pacific.net.sg
Clean Room Taikisha Ltd		Name: Position:	Tel: 6223 9928 Fax: 6223 9328 Pager: Handphone: Email:
RO/DI Ionics Asia-Pacific Pte Ltd		Name: Position:	Tel: 6841 4388 Fax: 6841 4355 Pager: Handphone: Email:
_____		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		
(b) Sub-Station		
(c) Installation		
(d) Meter Section		
(e) Road Lighting		
(f) Diversion		
Telecom:		
(a) Planning/Line Plant		
(b) Installation		
(c) Diversion		
BCD:	Yeo Boon Hua	6885 5163
(a) Building Plan		
FSSD:		
(a) Building Plan		
(b) M&E Section	Han Fook Kuang	6848 1467
PUB (Water)		
(a) Water Conservation	Lee Kee Seng	6731 3558
(b) Plumbing Plan	M/s Ang Liew Kwee	6731 3598
(c) Diversion		
PowerGas:		
(a) Planning/Submission	Liew Khee Boon	6586 8846
(b) Installation/Inspection	Thomas Lee	6586 8875
(c) Diversion		
ENV (Sewerage):		
(a) Building Plan	Jimmy Tan	6885 5150
(b) M&E Section	Norhayati Bte Rahmat	6885 5161
(c) Diversion		
ENV (Pollution Control)		
(a) Planning/Submission	A Rahman Bin Ngarsi	6731 9649
(b) Inspection		

SECTION 4

PROGRAMME

4.1 Overall Programme – NOT USED

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																									

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		11/7/03							30/7/03
Main Single Line Diagram	Power Supply Pte Ltd		11/7/03							30/7/03
Consumer Switchroom Layout	PowerGrid Pte Ltd		11/7/03							30/7/03
Metering Layout	PowerGrid Pte Ltd		11/8/03							27/8/03
Sanitary Installation	ENV (Sewerage)		1/8/03							7/8/03
Domestic Water Supply	PUB (Water)		25/8/03							31/12/03
Gas Supply Installation	PowerGas Pte Ltd		2/10/03							8/12/03
Air Conditioning & Ventilation Inst.	Fire Safety Bureau		26/12/03							29/12/03
Fire Fighting & Alarm Installation	Fire Safety Bureau		18/12/03							19/12/03
Telephone Installation	Telecom (Broadband)		24/7/03							13/8/03
	Telecom (TDCS)		24/7/03							13/8/03
	Telecom (Domestic Operation)		24/7/03							13/8/03
Fuel Storage	Fire Safety Bureau									
	Pollution Control Department		16/10/03							1/3/04

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									
Consumer Switchroom Layout	PowerGrid Pte Ltd									
Metering Layout	PowerGrid Pte Ltd									
Sanitary Installation	ENV (Sewerage)		23/2/04							24/2/04
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		-EC		-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	IB	GEN	CR	DI	
-G	✓	✓	✓	✓	✓		✓		✓	✓	
-Q											
-VO								✓			
-PP											
-AI											
-AD											
-CF											

SECTION 5

PROJECT RECORDS

5.2 Filing of Drawings – NOT USED

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	
- Lift & Escalator Installation	
- Air Conditioning & Ventilation Installation	
- Fire Fighting & Alarm Installation	
- Plumbing & Sanitary Installation	
- 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 – NOT USED

Item No.	Description*	Required From	Required By	Date Required	Remarks

** Information required by INTERNAL DESIGN TEAM MEMBERS*

SECTION 6

INTERFACING

6.3 Circulation of Documents to External Parties – NOT USED

	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						
c.	Project Cost Estimate/Contract Cost						
2.	**Drawings**						
a.	Outline Design Drgs.						
b.	Sketch Design Drgs.						
c.	Final Design Drgs.						
d.	Shop Drawings						
e.	As Built Drgs.						
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						
j.	O & M Manual						

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
Seagate Tender Document	Choong Choon Guan

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 Management System Procedures

Section	Title
M1	Preparation of Consultancy Offer
M2	Project Commissioning and Service Agreement
M6	Authority Submission
M7	Construction Process Control
M8	Testing and Commissioning
S1	Document Control
S2	Documentation of Quality Management System Procedure
S3	Documentation of Project Quality Plan
S5	Library Control
S6	Archive Control
S7	Filing Control
S9	Administration Control
S10	Purchasing Control
S11	Training Control
S12	Computer Control
Q1	Quality System Audit
Q2	Feedback Reporting
Q3	Clients Feedback
Q4	Management Review

8.5 List of Software Used For Design/Analysis – NOT USED

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
30% Design Review	A, C
60% Design Review	A, C
95% Design Review	A, C
100% Design Review	A, C
Shop Drawing Review	A, C
Technical Submission Review	A, C
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)*

NOT USED

SECTION 10

LIST OF SUB-JOB

10.1 List of Sub-Job Numbers – NOT USED

Sub Job No	Description	Allocation Details