Alpha
Engineering Consultant

PROJECT QUALITY PLAN

PROPOSED LANDED HOUSING DEVELOPMENT FOR ERECTION OF 18 UNITS OF 3-STOREY CORNER TERRACE & 63 UNITS OF 3-STOREY INTERMEDIATE TERRACE DWELLING HOUSES AND 2 UNITS OF 3-STOREY SEMI-DETACHED HOUSES (TOTAL 83 UNITS) ON LOT 9108, 10597PT SL & 133SL MK 18 AT ANG MO KIO AVE 1 (GOLDENHILL VILLAS)

For

M/S CITY DEVELOPMENTS LTD

Copy No.	1

Prepared By: Heng Chye Hing

Authorised By: Richard Teo

Date: 14 March 2003

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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	1276- PQP File	2 September 2002
2	Heng Chye Hing	14 March 2003

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	2 September 2002	1 to 10	26	
1	14 March 2003	1 to 10	26	

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Proposed Landed Housing Development for Erection of 18 Units of 3-Storey Corner Terrace & 63 Units of 3-Storey Intermediate Terrace Dwelling Houses and 2 Units of 3-Storey Semi-Detached Houses (Total 83 Units)

Statistics of Development	
Site Area, m²	22,568.90 m2
Nett Floor Area, m²	-
Gross Floor Area, m²	19,008.81 m2
Covered Carpark, m²	-
No. of Covered Carpark Lots	-
No. of Apartments/Houses	83 Houses
No. of Beds (for Hospitals)	-
No. of Guestroom (for Hotels)	-
No. of Blocks / No. of Storeys	9 / 3 Storey
No. of Phases	1

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)										
Services	EI	ACVI	LI	FFAI	PSI					
Estimate	3.227	2.075	Nil	-	3.415					
Awarded	1.700	0.998	-	-	1.800					

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	0.930	-	38.28
Awarded	0.427	(Included in main contract)	31.88

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

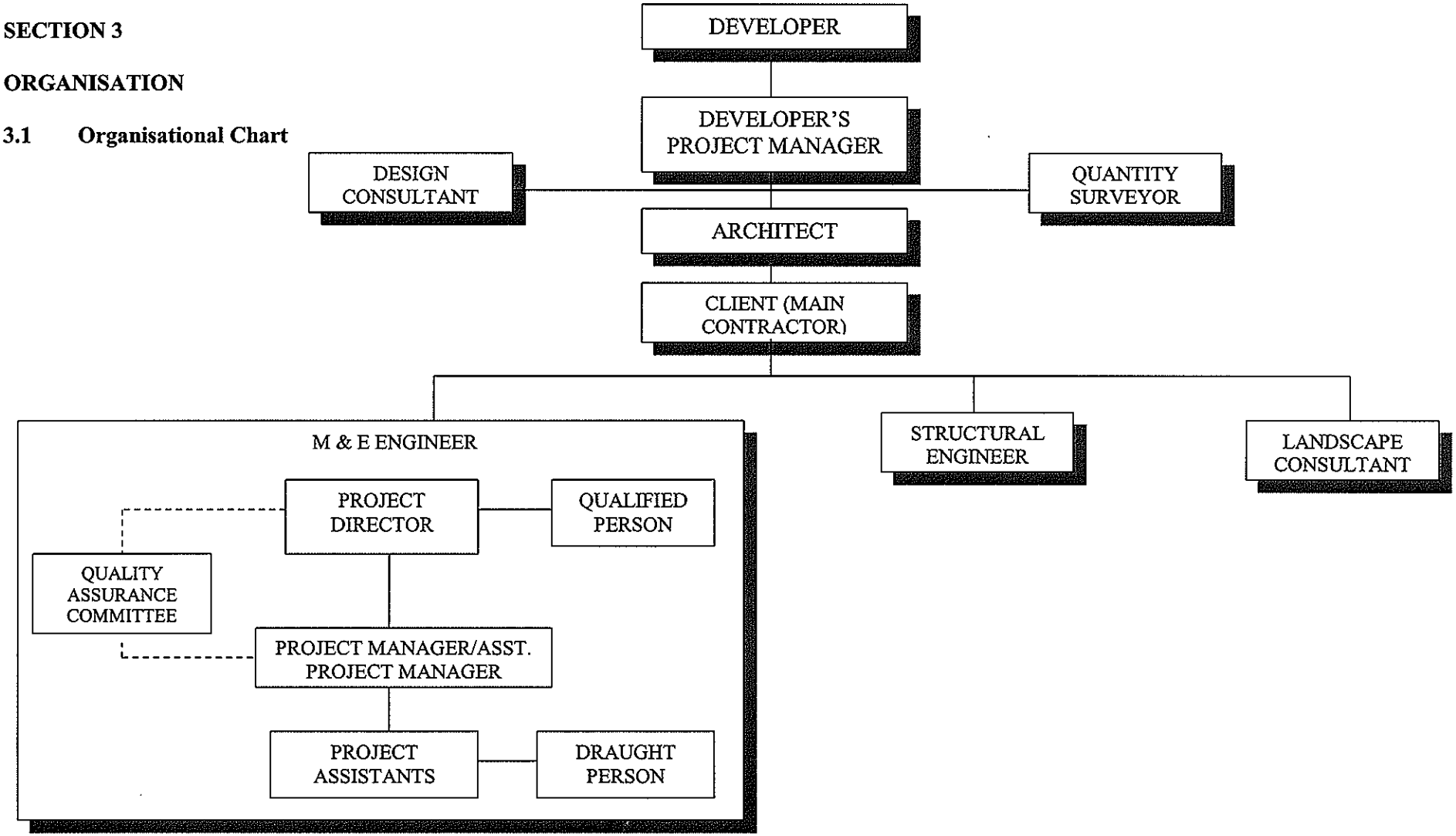
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK		LIFT & ESCALATOR		PRESSURE VESSEL		HOISTS		FOAM	

(✓*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 (RT)
Qualified Person	Mechanical	Andrew Loh (LCT)
	Electrical	Richard Teo (RT)
Project Manager		Heng Chye Hing (HCH)
Assistant Project Manager		Goh Soon Huat (GSH)
Project Assistant (Mech)		Terence Tan (TT)
Project Assistant (Elect)		Felix Choo (FC)
Draughtsperson		Common Pool
Construction Manager cum Resident Engineer		-
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		-

3.3 Client/Client's Representatives

Client:- City Developments Ltd

Address:- 36 Robinson Road
#05-00 City House
Singapore 068877

Tel:- 6877 8228

Fax:- 6222 2993

Client's Representatives:-

Name of Firm	Contact Person	Contact
City Developments Ltd 36 Robinson Road #05-00 City House, Singapore 068877	Name: Mr Nelson Hah Position: Asst Manager	Tel: 6877 8228 Fax: 6222 2993 Pager: - Handphone: - Email: nelshah@cdl.com.sg
	Name: - Position: -	Tel: - Fax: - Pager: - Handphone: - Email: -

3.4 Other Consultants (Local)

Function / Name of Firm	Contact Person	Contact
Architect S.H.Lim Architects Pte Ltd No. 73 Bukit Timah Road #06-01 Singapore 229823	Name: Mr Ong Eng Liang Position: Director	Tel: 6339 3922 Fax: 6339 3936 Pager: - Handphone: 9857 9606 Email: shlarch@pacific.net.sg
Quantity Surveyor KPK Quantity Surveyors (1995) Singapore Pte Ltd No 1, Magazine Road, #03-01/06 Central Mall Office Tower, Singapore 059567	Name: Ms Anna Luu Position: Quantity Surveyor	Tel: 6536 3303 Fax: 6536 2633 Pager: - Handphone: - Email: annaluu@kpkqs.com.sg
	Name: Mr Low Kwi Liang Position: Director	Tel: 6536 3303 Fax: 6536 2633 Pager: - Handphone: - Email: ong.ph@kpkqs.com.sg
Structural Engineer Richard K.C. Lim & Partners 10, Jalan Besar #08-10, Sim Lim Tower Singapore 208787	Name: Mr Dennis Loh Position: -	Tel: 6292 9771 Fax: 6293 2349 Pager: - Handphone: - Email: rkclim@asia1.com
Landscape Consultant ACLA Pte Ltd 40B Hong Kong Street Singapore 059679	Name: Mr Ramani Position: Landscape Architect	Tel: 6533 6381 Fax: 6535 5839 Pager: - Handphone: - Email: ramani@acla.com.sg
Design Consultant Resource Planning Design Consultants 73 Cardiff Grove Singapore 558939	Name: Mr. Juan Peck Foon Position: -	Tel: 6382 4518 Fax: 6382 4865 Pager: - Handphone: 9787 3961 Email: peckfoon@singnet.com.sg

3.4 Other Consultants (Overseas)

NOT USED

3.5 Contractors/Sub-Contractors

Function / Name of Firm	Contract *	Contact Person	Contact
Earthwork Contractor Chuan Seng Kim Trading & Construction Pte Ltd	DC	Name: Ang Chun Giap Position: Chief Executive Director	Tel: 6862 5688 Fax: 6861 6686 Pager: - Handphone: - Email: -
Main Contractor Tiong Seng Contractors Pte Ltd 510 Thomson Road #19-00 SLF Building Singapore 298135	MC	Name: Winston Goh Position: Construction Manager Name: Lim Meng Heck Position: Project Manager	Tel: 6282 4278 (Site) Fax: 6282 8457 (Site) Pager: - Handphone: 9759 3140 Email: winston.goh@tiongseng.com.sg lim.meng.heck@tiongseng.com.sg
Main Contractor Tiong Seng Contractors Pte Ltd 510 Thomson Road #19-00 SLF Building Singapore 298135	MC	Name: Jeffrey Low Position: M & E Co-Ordinator / M & E Clerk-of-Work	Tel: 6282 4278 (Site) Fax: 6282 8457 (Site) Pager: - Handphone: 9622 3394 Email: jeffery.low@tiongseng.com.sg
Air Conditioning & Ventilation Installation Sub-Contractor O.Y.L Sales & Service (Singapore) Pte Ltd	DSC	Name: Ong Thiam Son Position: Marketing Manager	Tel: 6844 0166 Fax: 6844 0133 Pager: 9403 5373 Handphone: 9661 9362 Email: oylsss@singnet.com.sg
Air Conditioning & Ventilation Installation Sub-Contractor O.Y.L Sales & Service (Singapore) Pte Ltd	DSC	Name: Chua C.S. Position: -	Tel: 6844 0166 Fax: 6844 0133 Pager: - Handphone: Email: -
Plumbing & Sanitary Installation Sub-Contractor Leong Electrical & Plumbing Engineering Pte Ltd	DSC	Name: Michael Tok Position: -	Tel: 6265 0800 Fax: 6268 0880 Pager: - Handphone: 9457 8996 Email: -
Electrical Installation Sub-Contractor Beng Beng Electrical Pte Ltd 22 Woodlands Link #03-30 Singapore 738734	DSC	Name: Jeffrey Ng Kim Lean Position: Director	Tel: 6759 6188 Fax: 6759 2188 Pager: - Handphone: 9662 6288 Email: bengbeng@magix.com.sg

** 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:	1200002051 DPL:92431/A/106	
(a) Customer Supply	-	
(b) Sub-Station	Mr Francis Chang	6823 8555
(c) Distribution Planning	Mr Tony Yeo	6823 8552
(d) Installation	-	
(e) Meter Section	-	
(f) Diversion	-	
Telecom:	TFCC/1919	
(a) Planning/Line Plant	Singapore Telecom – Mr Barry Tan	6848 5798
(b) Installation	-	
(c) Diversion	-	
Land Transport Authority		
(a) Road Lighting		
(b) Diversion	Mr Daniel Foo	6396 1760 / 6396 1488
BCD:		
(a) Building Plan	-	-
FSB:		
(a) Building Plan	-	-
(b) M&E Section	-	-
PUB (Water)		
(a) Water Conservation	Mr Basheer	6731 3575 / 6731 3023
(b) Plumbing Plan	Mr Ang Wui Seng (Water Mains) Mr Ng Guan Chai (Reticulation Plans)	6731 3548 / 6731 3015 6731 3598 / 6731 3023
(c) Diversion		
PowerGas:		
(a) Planning/Submission	Mr Liew Khee Boon	6586 8846
(b) Installation/Inspection	Mr Mohd Zulkiflee B Kamis	6586 8873 (Pg: 92654895)
(c) Diversion	-	
PUB (Sewerage):		
(a) Building Plan	Mr David Lim BH	6731 9725 / 6731 9629
(b) M&E Section	-	-
(c) Diversion	-	-

SECTION 4

PROGRAMME

4.1 Overall Programme

			2000						2001												2002												2003											
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	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 main building work (including Piling)																																										
7.	Construction Period																																										
8.	TOP																																										
9.	CSC																																										

SECTION 4

PROGRAMME

4.2 Authority Submission Status for M&E Services

Service	Authority	Original Submission		Comments/Resubmission						Approval/ Clearance
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	
Application for Electricity Supply	Power Supply Pte Ltd		22.05.00				-	-	-	28.09.00
Power Supply Substation	PowerGrid Pte Ltd		13.11.00	04.12.00	17.05.01	23.05.01	08.08.01	22.08.01	27.08.01	04.09.01
LT Reticulation	PowerGrid Pte Ltd		02.02.01	12.02.01	25.07.01	06.08.01				18.11.02
Sanitary Installation	ENV (Sewerage)		23.05.01							24.05.01
Domestic Water Supply (External Mains)	PUB (Water)		08.12.00	24.02.01	14.05.01	20.08.01	24.09.01			17.10.01
Domestic Water Supply(Reticulation)	PUB (Water)		20.02.01	22.03.01	23.05.01	19.06.01				11.10.01
Gas Supply Installation	CityGas Pte Ltd		08.03.01	26.03.01	23.05.01	11.06.01				19.11.01
Telephone Installation	TFCC		28.05.01							22.06.01
SCV	SCV		02.02.01							14.02.01
Street Lighting	PowerGrid Pte Ltd		19.09.00							04.12.00
	Land Transport Authority		14.12.01							21.01.02

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	✓	-IB6/IG4	✓
-PQP	✓	-VO	✓

Project Files to be initiated by PM as and when required

File Ref:		File Ref:		File Ref:	
-SM	✓	-SR	✓	-ET/MT	✓
-SC	✓	-QM		-MT	
-AI	✓	-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						
-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	TT
Incoming Architectural Sketches/Details	TT
Incoming Structural Drawings	TT
Incoming Landscaping Drawings	FC
M&E Drawings	
- Electrical Installation	FC
- Air Conditioning & Ventilation Installation	TT
- Plumbing & Sanitary Installation	TT
Other Drawings	TT

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	LSO	JL	Oct 00	-
2.	Mechanical equipment control panel & isolator location	LSO	JL	Oct 00	-

** 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 NA – Not applicable	Client/ Client Rep.	Client's Project Manager	Architect	Structural Engineer	Quantity Surveyor	
1.	**Letters/Fax:**						
a.	Project Design	-	A, C	I	I	I	
b.	Project Administration	-	I	I	I	I	
c.	Project Cost Estimate/Contract Cost	-	-	-	-	-	
2.	**Drawings**						
a.	Outline Design Drgs.	-	A	-	-	-	
b.	Sketch Design Drgs.	-	A	-	-	-	
c.	Final Design Drgs.	-	A	-	-	-	
d.	Shop Drawings	-	A	A, C, I	C, I	-	
e.	As Built Drgs.	I	A	-	-	-	
3.	**Other Document**						
a.	Specification	-	A	-	-	-	
b.	Tender Document	-	A	-	-	-	
c.	Tender Evaluation Report	-	-	-	-	-	
d.	Design Report	-	-	-		-	
e.	Progress Report	-	NA	NA	NA	NA	
f.	Financial Report	-	NA	NA	NA	NA	
g.	Minutes of Meeting	-	A	A, I	-	-	
h.	Inspection Report	-	A	-	-	-	
i.	Testing & Comm. Report	-	A	-	-	-	
j.	O & M Manual	C/I	A	-	-	-	

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			
Air Conditioning & Ventilation Installation	~~BS~~	~~AS~~	~~NFPA~~	SS	~~MS~~
Sanitary System	BS	SS	~~NFPA~~	~~AS~~	~~MS~~
Plumbing System	BS	SS	~~NFPA~~	~~AS~~	~~MS~~

(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.	✓
Econdial	2.5	Merlin Gerlin	Design for low voltage network	
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	NA
M&E Cost Estimate Report	NA
Pre-Qualification of Tenderers	NA
Tender Documents	NA
Tender Report	NA
Payment Valuation for QS	NA
Certificates of Supervision for TOP/CSC	Re

* *Remarks*

A: for approval *C: for comment* *I: for Information* *Re: for record*
NA : not applicable
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 – Not Applicable

NOT USED