Alpha
Consulting Engineers Pte Ltd

PROJECT QUALITY PLAN

PROPOSED MIXED-USE DEVELOPMENT ON LOT 00147V TS 09 AT RIVER VALLEY ROAD/TAN TYE PLACE/CLARKE QUAY (SINGAPORE RIVER PLANNING AREA) – PROJECT LEGEND

For

LEGEND QUAY PTE LTD

Copy No.	

Prepared By: Chong Lai Meng/Goh Soon Huat

Authorised By: Choong Choon Guan

Date: 19 January 2021

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SECTION 1

QUALITY PLAN CONTROL AND DISTRIBUTION

1.1 List of Copy Holders *(soft copy saved in intranet)*

Copy No.	Copy Holder	Date of Issue
1	6290	19 January 2021

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	19 January 2021	1 to 11	29	

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Mixed-use development

Statistics of Development	
Site Area, m²	12,925.40
Gross Floor Area, m²	100,262.86 permissible GFA 105,143.53 inclusive of bonus GFA
Commercial, m²	12,000
Hotel, m²	27,254.40 Total = 667 rooms Tower B = ART hotel 192 rooms, Tower D = CDL hotel 475 rooms
Residential, m²	65,889.14 Total 716 units Tower A = 460 units, Tower C = 256 units
No. of Blocks / No. of Storeys	4 Blocks, Tower A = 48 storey, Tower B = 20 storey, Tower C = 24 storey, Tower D = 21 storey
Green Mark Category	Gold plus for both Non-Residential and Residential
No. of Phases	One

2.2 Project Cost *(cost not available because it is confidential)*

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

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate	-	-	-
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 (Phase 1)*	√
Detailed Design	
Tender Documentation	
Tender Evaluation	
Contract Supervision	
M&E Costing	
Submissions to Authority	

(✓*where applicable*)

*Alpha is appointed by POC to review the tender documents and provide additional information for costing and prepare materials for presentation and submission to Client.

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

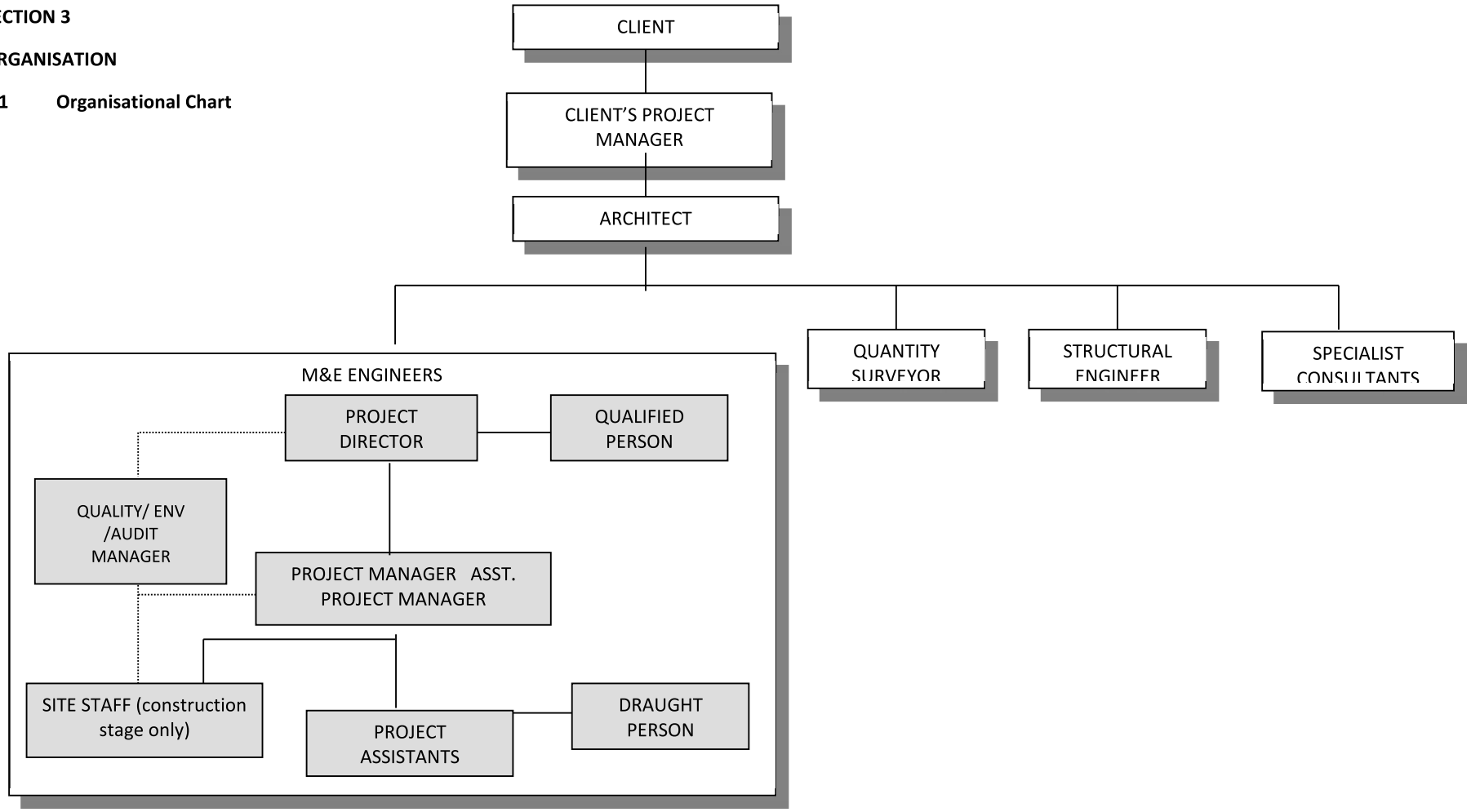
EJECTOR & DIVERTER		SUMP PUMP		FUEL OIL TANK		LIFT & ESCALATOR		PRESSURE VESSEL		HOISTS		FOAM	

(✓*where applicable*)

SECTION 3

ORGANISATION

3.1 Organisational Chart



SECTION 3

ORGANISATION

3.2 ACEPL's Project Team Member

TITLE		NAME
Project Director		Choong Choon Guan
Qualified Person	Mechanical	Choong Choon Guan
	Electrical	Loh Fook Yuen
Project Manager		Chong Lai Meng
Assistant Project Manager		Goh Soon Huat
Project Assistant (Mech)		Khor Bee Khoon
Project Assistant (Elect)		Steven Cao Yang
Draughtsperson		Common Pool
Resident Engineer (M&E)		
Assistant Resident Engineer (M&E)		
Clerk-of-Work (M&E)		

3.3 Client/Client's Representatives

Client:-	Penta-Ocean Construction Co., Ltd	Client:-	Kim Seng Heng Engineering Construction (Pte) Ltd
Address:-	1 HarbourFront Place #13-01 HarbourFront Tower One Singapore 098633	Address:-	36 Senoko Road Singapore 758108
Tel:-	63388966	Tel:-	67582266
Fax:-	63370987	Fax:-	67582532

Client's Representatives:-

Name of Company	Contact Person	Contact
Penta-Ocean Construction Co., Ltd	Name: Raymond Poh Position: M&E Manager	Tel: - Fax: - Handphone: 93259195 Email: raymondpoh@mail.penta-ocean.co.jp
Kim Seng Heng Engineering Construction (Pte) Ltd	Name: Amy Ng Mei Mei Position: Quantity Surveyor	Tel: - Fax: - Handphone: 92246270 Email: meimeing@kimsengheng.com.sg
	Name: Position:	Tel: Fax: Handphone: Email:
	Name: Position:	Tel: Fax: Handphone: Email:
	Name: Position:	Tel: Fax: Handphone: Email:

3.4 Other Consultants *(see attached Client's Consultant Team)*

Function / Name of Company	Contact Person	Contact
Architect	Name: Position:	Tel: Fax: Handphone: Email:
Quantity Surveyor	Name: Position:	Tel: Fax: Handphone: Email:
Structural Engineer	Name: Position:	Tel: Fax: Handphone: Email:
Interior Designer	Name: Position:	Tel: Fax: Handphone: Email:
Lighting Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Acoustic Consultant	Name: Position:	Tel: Fax: Handphone: Email:
_____	Name: Position:	Tel: Fax: Handphone: Email:
_____	Name: Position:	Tel: Fax: Handphone: Email:

3.4 Other Consultants (Overseas)

Function / Name of Company	Contact Person	Contact
Architect	Name: Position:	Tel: Fax: Handphone: Email:
M&E Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Quantity Surveyor	Name: Position:	Tel: Fax: Handphone: Email:
Structural Engineer	Name: Position:	Tel: Fax: Handphone: Email:
Interior Designer	Name: Position:	Tel: Fax: Handphone: Email:
Lighting Consultant	Name: Position:	Tel: Fax: Handphone: Email:
Acoustic Consultant	Name: Position:	Tel: Fax: Handphone: Email:
_____	Name: Position:	Tel: Fax: Handphone: Email:

3.5 Contractors/Sub-Contractors – NOT APPLICABLE (*as it is under D&B tender stage)*

Function / Name of Company	Contract *	Contact Person	Contact
Main Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Air Conditioning & Ventilation Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Plumbing & Sanitary Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Electrical Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Lift & Escalator Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Fire Fighting & Alarm Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Swimming Pool Filtration Plant Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
Carpark System Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
_____		Name: Position:	Tel: Fax: Handphone: Email:

** Type of Contract*
- *NSC (Nominated Sub-Contract)*
- *DSC (Domesticated Sub-Contract)*
- *DC (Direct Contract)*
- *NS (Nominated Supplier)*

3.6 Authorities – NOT APPLICABLE *(as it is under D&B tender stage)*

Authorities/Department	Contact Person	Tel/Fax Nos./E-mail
SP PowerGrid:		
(a) Sub-Station		
(b) Diversion		
SP Services:		
(a) Customer Supply		
(b) Installation		
(c) Meter Section		
(d) Road Lighting		
TFCC:		
(a) SCV		
(b) SingTel		
(c) IDA		
BCA:		
(a) Building Plan		
(b) Green Mark		
FSSD:		
(a) Building Plan		
(b) M&E Plan		
PUB (Water Supply) Network Dept:		
(a) Water Conservation		
(b) Plumbing Plan		
(c) Diversion		
(d) NEWater		
PUB Water Reclamation (Network) Dept:		
(a) Building Plan/CBPU		
(b) M&E Plan		
(c) Diversion		
City Gas Pte Ltd:		
(a) Planning/Submission		
(b) Installation/Inspection		
PowerGas Pte Ltd		
(a) Diversion		
NEA (Pollution Control)		
(a) Planning/Submission		
(b) Inspection		

SECTION 4

PROGRAMME

4.1 Overall Programme – NOT APPLICABLE *(as it is under D&B tender stage)*

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 - NOT APPLICABLE *(as it is under D&B tender stage)*

Service	Authority	Original Submission		Comments/Resubmission						Approval/
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	Clearance
Application for Electricity Supply	SP Services Ltd									
Power Supply Substation	SP PowerGrid Ltd									
Metering Layout	SP Services Ltd									
Sanitary Installation	PUB Water Reclamation (Network) Dept									
Domestic Water Supply	PUB (Water Supply) Network Dept									
Gas Supply Installation	City Gas Pte Ltd									
Air Conditioning & Ventilation Inst.	FSSD									
Fire Fighting & Alarm Installation	FSSD									
Telephone Installation	TFCC									
Broadband Co-axial Cable System (BCS)	Starhub Cable Vision									
Fuel Storage	FSSD									
	NEA (Pollution Control)									

SECTION 4

PROGRAMME

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

Service	Authority	Original Submission		Comments/Resubmission						Approval/
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	Clearance
Application for Electricity Supply	SP Services Ltd									
Power Supply Substation	SP PowerGrid Ltd									
Metering Layout	SP Services Ltd									
Sanitary Installation	PUB Water Reclamation (Network) Dept									
Domestic Water Supply	PUB (Water Supply) Network Dept									
Gas Supply Installation	City Gas Pte Ltd									
Air Conditioning & Ventilation Inst.	FSSD									
Fire Fighting & Alarm Installation	FSSD									
Telephone Installation	TFCC									
Broadband Co-axial Cable System (BCS)	Starhub Cable Vision									
Fuel Storage	FSSD									
	NEA (Pollution Control)									

SECTION 5

PROJECT RECORDS

5.1 List of Internal Files

Standard Files - *All correspondences saved in email and Teams*

File Ref:		File Ref:	
- Owner		- Architect	
- Authorities		- Other Consultants	
- Contractors		- CC	
- CF		- PQP/QSP	

Project Files to be initiated by PM as and when required

File Ref:		File Ref:		File Ref:	

(✓*where applicable*)

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	Not applicable
Incoming Architectural Sketches/Details	Not applicable
Incoming Structural Drawings	Not applicable
M&E Drawings	Not applicable
- Electrical Installation	
- Lift & Escalator Installation	
- Air Conditioning & Ventilation Installation	
- Fire Fighting & Alarm Installation	
- Plumbing & Sanitary Installation	
- Swimming Pool & Filtration Installation	
Other Drawings Incoming tender drawings	Chong Lai Meng

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 APPLICABLE

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

** Information required by INTERNAL DESIGN TEAM MEMBERS*

SECTION 6

INTERFACING – NOT APPLICABLE

6.3 Circulation of Documents to External Parties *(Not applicable)*

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

*Note: Applicable only, if the client engaged a Project Manager.

SECTION 7

WORK AUTHORISATION – NOT APPLICABLE

Activity \ Authorised Signatories	PD	QP	PM	AE	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
AE : Assistant Engineer
SS : ACEPL Site Staff

SECTION 8

DESIGN INPUT & METHODOLOGY

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

ITEM	KEPT BY
Tender documents issued by Client	Save in Teams

8.2 List of Applicable Code of Practice and Regulations

Services	Title of Code of Practice/Standard
Electrical Wiring	
Lightning Protection System	
Emergency Voice Communication System	
Air Conditioning & Ventilation Installation	
Lift & Escalator Installation	
Sprinkler System	
Wet Riser System	
Automatic Fire Alarm System	
Sanitary System	
Plumbing System	
Town Gas/LPG Supply System	
Boiler and Steam Supply System	
Mechanical Smoke Control System	

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 Pre-Consultation and Waiver

S/N	Description	Date of Application	Date of Approval	Remarks
1	*Clause number in Code of Practice for (Services) which require clarification or waiver. Consultation Ref No. Waiver Ref. No.			
2	*Clause number in Code of Practice for (Services) which require clarification or waiver. Consultation Ref No. Waiver Ref. No.			
3	*Clause number in Code of Practice for (Services) which require clarification or waiver. Consultation Ref No. Waiver Ref. No.			

*To fill in actual information

8.5 List of Applicable Quality System Procedures

Alpha Consulting Engineers Pte Ltd's Quality Management System Procedures

Section	Title	✓ where applicable
M1	Preparation of Consultancy Offer	✓
M2	Project Commissioning and Service Agreement	✓
M3	Design Control	
M4	Design Change Control	
M5	Tender Process and Evaluation	
M6	Authority Submission	
M7	Construction Process Control	
M8	Testing and Commissioning	
S1	Document Control	
S2	Documentation of Quality & Environmental Management System Procedure	
S3	Documentation of Project Quality Plan	
S4	Specification Control	
S5	Library Control	
S6	Archive Control	
S7	Filing Control	
S8	Drawing Control	
S9	Administration Control	
S10	Purchasing Control	
S11	Training Control	
S12	Computer Control	
QE1	Quality & Environmental System Audit	
QE2	Feedback Reporting	
QE3	Clients Feedback	
QE4	Management Review	

8.6 List of Software Used for Design/Analysis

DESCRIPTION/ PACKAGE NAME	VERSION	SUPPLIER/ SOURCE	PURPOSE	
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	
Hyena	4.00.1	ACADS-BSG	Fire Sprinkler & Hydrant Analysis	
Dialux	4.11	Freeware	Lighting design	
Lift Traffic	7.18	Elevate	Lift traffic calculation	✓
Fault Level Calculation	11.11	ETAP	Calculation of fault level and voltage drop	

(✓*where applicable*)

SECTION 9

ENVIRONMENTAL CONSIDERATIONS – NOT APPLICABLE

9.1 Sustainable Design Features / Criteria

Item	Remarks
Green Mark criteria	
Green Design Features	

9.2 Site PPE Requirement

The necessary Personal Protective Equipment (detailed below) shall be provided by the main contractor / Company in accordance to the site EHS requirements prior to the site monitoring.

PPE	✓ where applicable
Safety Helmet	
Safety Shoes	
Eye Protection	
Ear Protection	
Safety Harness / Belt	
Others:	

9.3 Site Emergency Preparedness

Site staff shall comply with the site emergency preparedness and response procedure, established by the main contractor / owner, which shall include the following details.

Items	✓ where applicable
Evacuation Route	
Emergency Exit	
Assembly Point	
Emergency Contact List / Person	
Alarm system / methods	

SECTION 9

ENVIRONMENTAL CONSIDERATIONS

9.4 Reporting of Environmental Non-conformances

When encountering environmental non-conformances, Site Staff shall be responsible to feedback to the main contractor.

9.5 List of Applicable Environmental management system Procedures

Alpha Consulting Engineers Pte Ltd's Environmental Management System Procedures

Section	Title	✓ where applicable
E1	Aspect / Impact Identification, Risk Assessment & Risk Control	
E2	Identifying Legal & Other Requirements	
E3	Objectives, Targets & Programmes	
E4	Communication	
E5	Emergency Preparedness & Response	
E6	Monitoring & Measurement	
E7	Control of Air & Noise Pollution	
E8	Management of Wastes	

SECTION 10

CLIENT'S REQUIREMENTS

10.1 List of Output Required by Client:-

Item	* Remarks
M&E Design Report	
M&E Cost Estimate Report	
Pre-Qualification of Tenderers	
Tender Documents	Issued by Client for the D&B tender
Tender Report	
Payment Valuation for QS	
Certificates of Supervision for TOP/CSC	

* *Remarks*

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

Other purposes and for action: please specify.

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

SECTION 11

LIST OF SUB-JOB

11.1 List of Sub-Job Numbers – NOT APPLICABLE

Sub Job No	Description	Allocation Details