public works
& infrastructure

Department:
Public Works and Infrastructure
REPUBLIC OF SOUTHAFRICA

BID DOCUMENT

PROJECT DESCRIPTION: EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

BID NO:	**GQET-25/26-034**
Closing Date:	**Tuesday, 02 December 2025**
Closing Time:	**11H00**
Bid Briefing Meeting Date:	**Friday, 21 November 2025**
Bid Briefing Meeting time:	**11H00**

***Tenderers CSD No*:** ……

Name of the Tenderer: ……

Bid Box Address
Department of Public Works & Infrastructure
Eben Donges Building
Corner Robert & Hancock Street
Gqeberha
6001

SCM SPECIFIC ENQUIRIES:	**TECHNICAL / PROJECT SPECIFIC ENQUIRIES**
Enquires: BONGIWE NDABA	Enquires: PORTIA MVANA
Tel No: 041 408 2015 during office hours	Tel No: 041 408 2181 during office hours
Cell No: NONE	Cell No: 082 327 4062
Email Address: Bongiwe.ndaba@dpw.gov.za	Email Address: Portia.Mvana@dpw.gov.za

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SUMMARY OF BID INFORMATION

Bid Number	GQET-25/26-034	
Bid/ Project Description	EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS	
Bid Closing date & Time	Tuesday, 02 December 2025	**11H00**
Bid Briefing Date & Time (If applicable)	Friday, 21 November 2025	**11H00**
Venue	BISHO ALL SAINTS COLLEGE	
SCM SPECIFIC ENQUIRIES:	BONGIWE NDABA	Bongiwe.ndaba@dpw.gov.za
	041 408 2015	NONE
TECHNICAL / PROJECT SPECIFIC ENQUIRIES	PORTIA MVANA	Portia.Mvana@dpw.gov.za
	041 408 2181	082 327 4062
Bid Document Price	R 500.00	
Procurement Plan Reference Number	1286	
Points to be allocated for an area for work to be done or services to be done in that area	EASTERN CAPE	

PA-04 (EC): NOTICE AND INVITATION TO TENDER

THE DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE INVITES TENDERS FOR:

Project title:	**EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**		
Bid no:	**GQET-25/26-034**	**Procurement Plan Reference no:**	**1286**
Advertising date:	**Friday, 07 November 2025**	**Closing date:**	**Tuesday, 02 December 2025**
Closing time:	**11H00**	**Validity period:**	**84 calendar days**

1. REQUIRED CIDB GRADING

It is estimated that tenderers should have a CIDB contractor grading designation of ***4ME*** *or* ***4ME **** or higher.
** Delete "or select tender value range select class of construction works" where only one class of construction works is applicable*

It is estimated that potentially emerging enterprises should have a CIDB contractor grading designation of ***select tender value range select class of construction works*** **PE** *or* ***select tender value range select class of construction works*** **PE*** or higher.
** Delete "or select tender value range select class of construction works PE" where only one class of construction works is applicable*

2. FUNCTIONALITY CRITERIA APPLICABLE

2.1 The Bid will be evaluated on Functionality and the following Functionality evaluation criteria will apply and failure to meet minimum functionality score will result in the tenderer being disqualified. From further evaluation:

EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

Functionality Criteria No	Criteria	**Evaluation Indicators**	**Applicable Value**
1	**BIDDERS RELEVANT EXPERIENCE IN MAINTENANCE OR REPAIR OR NEW INSTALLATION IN COMPLETED AND/OR CURRENT CONTRACTS OF A SIMILAR NATURE, SCOPE AND/ OR COMPLEXITY**		**25**
	Conditions 1. Provide a reference letter(s) of a **completed** project of a similar nature, scope and/ or complexity. 2. The contract/ project **reference** must comply with the following minimum reuirements: i. The project must be for a relevant servicing or maintenance or repairs or new installation of air conditioning equipment and ii. The project must be in the last **Five (5)** years and iii. Has a value of atleast **R 900 000.00** and 1. The reference letters submitted must comply with the following minimum reuirements: 1. The reference letter(s) must be dated and signed.	**One (1)** x reference letter of a **completed and or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	**5 (1)** Minimum points for Functionality Criteria No. 1
		Two (2)) x reference letters of **completed and or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	10 **(2)**
		Three (3)) x reference letters of **completed and or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	15 **(3)**
		Four (4)) x reference letters of a **completed and or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	20 **(4)**
		Atleast **Five (5)** x reference letters of **completed and or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	25 **(5)**

	2. The project must be within the period specified in the bid. 3. The reference letter(s) contract period and R-value must be for a single contract and not the sum of various contracts. 4. The reference letter(s) must clearly indicate the contract start date and contract end date/ or at least practical completion date. 5. The reference letter(s) must indicate the client's name, contact particulars and Email address. 6. The reference letter(s) must be stamped by the client or on the letterhead of the client. i. In the case of a rates based contract, the actual expenditure or work certified will be deemed the contract value. 7. If the bidder's performance is not indicated in the reference letter(s), the Department will deemed that the bidder's performance was unsatisfactory and will not verify the contrary. 8. An appointment letter/ award letter and or signed contract are not accepted as a reference letter. <u>Conditions</u> 1.1 This conditions refers to a reference letter of a current project of a similar nature, scope and or complexity (i.e. a project/ contract started, but not yet completed). i. All the minmimum requirements for a reference letters, contracts or projects as per paragraphs 1(a) and 1(b) above, are applicable ii. In respect of a **construction project:** a. Progress on site must have reached a minimum of 50% completion or b. An R-value of atleast **R450 000.00** at the closing date of the bid iii. In respect of a **term contract**: a. It must have reached a minimum of **50%** of the contract duration or b. An R-value of atleast **R450 000.00** at the closing date of the bid.		

Please note: Experience of the bidder will be based on the reference letters submitted. If a project is listed in the table below, but a supporting reference letter is not submitted, the project or the experience of the bidder will not be considered valid. If a reference letter is not listed in the table below, but the reference letter is submitted with the bid and it is valid, it will be considered. The submitted reference letter(s) will be used in Functionality Criteria No. 1 to validate the experience of the bidder only. Bidders may

also submit a single reference letter(s)/ testimonial(s) that covers both the requirements (experience and satisfactory performance) as required for Functionality Criteria No. 1 and Functionality Criteria No. 2

	Short Description of project	Client	Project Start date	Project End Date	Value of Project (Final account)
1.					
2.					
3.					
4.					
5.					

Functionality Criteria No	Criteria	Evaluation Indicators	Applicable Value
2.	**REFERENCES FROM PROJECT MANAGERS/CLIENTS/CONSULTANTS FOR PROJECTS OF SIMILAR IN NATURE, SCOPE AND VALUE WHICH INDICATES THE BIDDERS PERFORMANCE.**		**25**
	a. Please provide: 1. Signed reference letters from Consultant / Clients confirming your company's performance. 2. All the requirements for contracts or projects or reference letters as precribed in Functionality Criteria 1 applies. 3. Additionally, for a reference letter to be considered for this functionality criteria, the bidders' performance **must** be rated in the letter as at least "satisfactory".	One (1) x reference letter which indicates atleast a **satisfactory performance** in a **completed or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	5 **(1)** Minimum points for Functionality Criteria No. 2
		Two (2) x reference letters which indicates atleast a **satisfactory performance** in a **completed or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	10 **(2)**
		Three (3) x reference letters which indicates atleast a **satisfactory performance** in a **completed or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	15 **(3)**
		Four (4) x reference letters which indicates atleast a **satisfactory performance** in a **completed or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher.	20 **(4)**
		Atleast five (5) x reference letters which indicates atleast a **satisfactory performance** in a **completed or current** servicing or maintenance or repairs or new installation of air conditioning equipment project with a contract value of R900 000.00 or higher..	25 **(5)**

If a project is listed in the table below or the table above, but the reference letter is not submitted, the project will not be considered. If a project is not listed, but the reference letter is submitted with the bid and it is valid, it will be considered. For a reference letter to be considered valid for Functionality Criteria No. 2, the performance of the bidder **must** be indicated in the reference letter and the performance of the bidder **must be rated at least satisfactory**. Bidders may also submit a single reference letter(s)/ testimonial(s) that covers both the requirements (experience and satisfactory performance) as required for Functionality Criteria No. 1 and Criteria No. 2

	Name of Company	Value of Project as measured for final account	Letter attached	
			YES	NO
1				
2				
3				
4				
5				

Functionality	Criteria	Evaluation Indicators	Applicable Value

Criteria No				
3.	**FINANCIAL CAPACITY**			**20**
	3.1 a) Provide a valid Bank rating letter or certificate from your Banking Institution stating at least a bank rating code of **A or B or C or D** and b) The Bank rating letter or certificate must not be older than **3** months and c) The bank rating code must be for an amount of at least **R2 million** **3.2** In the case that a bidder submit a bank rating letter with more than one bank rating code: **1.** The Department will consider the lowest bank rating code, which is on the bank rating letter, provided it complies with the acceptable bank rating codes as specified in the bid **and** 2. If one of the bank rating codes on the submitted bank rating letter is less than the acceptable bank rating code(s) as specified in the bid document, it will be deemed non-compliant and will not be accepted.	Bank rating code of D		8 (2) Minimum points for Functionality Criteria No. 3
		Bank rating code of C		12 (3)
		Bank rating code of B		16 (4)
		Bank rating code of A		20 (5)

No	Name of Bank	Contact Person	Contact Number	Date of letter
1				
2				

Functionality Criteria No	Criteria	Evaluation Indicators	Applicable Value
4.	**COMPETENCE OF KEY PERSON(S), PROFESSIONAL AND TECHNICAL PERSONNEL**		**30**
	CONDITONS APPLICABLE TO KEY STAFF AND QUALIFICATIONS **4.1 MINIMUM REQUIRED KEY STAFF** 1. The minimum key staff/ technical personnel required on this project is: a) 2 x Refrigeration/Air-conditioning Technicians who passed their trade test. b) At least one (1) x Electrician with trade test and wireman's license **4.2 QUALIFICATIONS** 2. The submission of copies of qualifications/ accreditations of the following key staff/	**Minimum Key Staff x three (3) made up as follows:** a) 2 x Refrigeration/Air-conditioning Technicians (who passed their trade test) and 1 x Electrician with trade test and wireman's license.	6 **(1)** Minimum points for Functionality Criteria No. 4
		Key Staff x four (4) made up as follows: a) 3 x Refrigeration/Air-conditioning Technicians (who passed their trade test) and 1 x Electrician with trade test and wireman's license	12 **(2)**
		Key Staff x five (5) made up as follows: a) 4 x Refrigeration/Air-conditioning Technicians (who passed their trade test) and 1 x Electrician with trade test and wireman's license.	18 **(3)**
		Key Staff x six (6) made up as follows: c) 5 x Refrigeration/Air-conditioning Technicians (who passed their trade test) and 1 x Electrician with trade test and wireman's license	24 **(4)**
		Atleast x seven (7) key staff made up as follows: a) 6 x Refrigeration/Air-conditioning Technicians (who passed their trade test) and 1 x Electrician with trade test and wireman's license.	30 **(5)**

	technical personnel is mandatory: a) Trade test Certificate (for the Aircon/Refrigeration technicians) b) A Wireman's license (Electrician(s)) **4.3 CV's** 3. The submission of the CV's of the following key staff/ technical personnel is mandatory: a) CV of Artisans b) CV Electrician 4. Failure to submit copies of the qualifications/ accreditations (where required) will result in the qualification/ accreditation not been considered valid. 5. Failure to submit a CV (where required) will result in the key staff/ technical personnel member not been considered.			

No	**Name of the Key Person**	**Name of the Qualification(s)**	**Portfolio/Position**	**CVs and Qualifications attached**	
				YES	**NO**
1					
2					
3					
4					
5					
Minimum Qualifying Score for Functionality				**50**	

TOTAL SCORE **100**

NB:

a) If a bid fails to achieve the minimum qualifying score for functionality of Fifty percent (50%), it will automatically be regarded as non-compliant, and shall be not considered any further in the evaluation process.

b) In addition to the above minimum points for overall functionality (50%), bidders` must score the minimum points for each Functionality Criteria, (i.e. Functionality Criteria No 1, Functionality Criteria No 2, Functionality Criteria No 3 and Functionality Criteria No 4.) If a bidder fails to score the minimum points for each Functionality criteria, the bidder's offer will be regarded as "failed functionality", even if the bidder scored the required minimum overall functionality score of 50%.

2. EVALUATION METHOD FOR RESPONSIVE BIDS

3.1. **The following Evaluation Method for responsive bids will be applicable:**

☐ Method 1 (Financial offer)	☒ Method 2 (Financial and Preference offer)

3.2. **The 80/20 Preference points scoring system will be applicable for this bid**

3. RESPONSIVENESS CRITERIA

Indicate SUBSTANTIVE RESPONSIVENESS criteria applicable for this tender. Failure to comply with the criteria stated hereunder shall result in the tender offer being disqualified from further consideration:

1.	☒	Only those tenderers who satisfy the eligibility criteria stated in the Tender Data may submit tenders.
2.	☒	Tender offer must be properly received on the tender closing date and time specified on the invitation, completed either electronically (if issued in electronic format), or by writing legibly in non-erasable ink. (All as per Standard Conditions of Tender).
3.	☒	Use of correction fluid is prohibited. Corrections to be crossed out and initialled.
4.	☒	Submission of a bid offer.
5.	☒	Bidders must comply with DPW-21 (EC): Record of Addenda to tender documents, if any.
6.	☒	The tenderer shall submit his fully priced Bills of Quantities / Lump Sum Document (complete document inclusive of all parts) together with his tender.
7.	☒	There will be a compulsory bid briefing/ clarification meeting and all potential bidders must attend.
8.	☒	Any addendums or erratums to the bid will be published in the original advertising media, at least 10 working days before the bid closing date. Bids will be evaluated in accordance with the published addendums or erratums.
9.	☒	The tenderer shall submit his fully priced and completed sectional summary- and final summary pages with the tender.
10.	☒	Bidders will be disqualified in the following circumstances: b) If they submit for the same bid, more than one bid or an alternative bid offer. c) If they submitted a bid, but is also in agreement to an additional bidding entity who submitted an offer for the same bid (e.g in an agreement with a joint venture or consortium or partnership, etc.). d) If there are factual evidence of communication with any other bidder, which are competing for the same bid, (example a signature of the bidder is found in a competing bidder or the bidder is a director of in a competing bid offer.
11.	☒	Offer's from the following bidders' will be eligible to have their submissions evaluated: a) Only bidders' who are registered with the Construction Industry Development Board (CIDB), or who are capable of being so registered with the CIDB within twenty-one (21) working days from the closing date for submission of tenders, in the specified contractor designation (class of works) and or specified contractor grading (or higher) or b) Bidders who submitted proof with their bids that they already applied to CIDB, on or before the closing date: i. For the correction of their overall CIDB non-compliance status or ii. For an upgrade of their specified contractor CIDB grading or iii. For a registration in a specified contractor designation.
12.	☒	Bidders must submit a Letter of Good standing with COIDA relevant to the scope of works.

ADMINISTRATIVE CRITERIA

4. Indicate administrative requirements applicable for this tender. Tenderers may be required to submit the below documents where applicable.

The Employer reserves the right to request further information regarding the undermentioned criteria. Failing to submit further clarification and/or documentation within seven (7) calendar days from request or as specifically indicated, will disqualify the tender offer from further consideration.

1.	☒	Any correction to be initialled by the person authorised to sign the tender documentation as per PA 15.1 or PA 15.2 resolution of board/s of directors / or PA15.3 Special Resolution of Consortia or JV's.
2.	☒	Submission of applicable (PA-15.1, PA-15.2, PA-15.3): Resolution by the legal entity, or consortium / joint venture, authorising a dedicated person(s) to sign documents on behalf of the firm / consortium / joint venture.
3.	☒	Submission of (PA-11): Bidder's disclosure
4.	☒	Submission of proof of Registration on National Treasury's Central Supplier Database (CSD). Insert the Supplier Registration Number on the form of offer, including proposed sub-contractors if any.
5.	☒	All parts of tender documents submitted must be fully completed in ink and signed where required.
6.	☒	Upon request, submission of fingerprints obtainable from local SAPS including any other additional documentation and information required for vetting purposes.
7.	☐	Upon request, submission of a fully completed security clearance application form with supporting documentation and information as required. The security clearance form will be provided by the Employer for projects requiring a security clearance.
8.	☒	Submission of (PA 40): Declaration of Designated Groups for Preferential Procurement
9.	☒	Bidders will be evaluated as per the Special Conditions of Bid (SCB-01)
10.	☒	Submission of DPW-09 (EC): Particulars of Tenderer's Projects: Bidders may use 'own form' – the details of all the tenderer's current and previous projects must however be the same as the details of the DPW-09 (EC) form. Bidders are required to sign and date the DPW-09 / 'own form' and cross-reference the documents if 'own form' is used.
11.	☒	Submision of DPW-21 (EC): Record of addenda to tender documents: Bidder maybe requested to confirm receipt and or compliance with the "Record of Addenda" if the record of Addenda" was not submitted with the bid at the closing date.
12.	☒	**CIDB non-compliance at the time of tender** If a bidder submitted with their bid proof that they had already applied to CIDB for an upgrade or for correction of their non-compliance with CIDB, such a contractor will be deemed to be capable of being so registered in that particular grading and will be evaluated as such, within the 21 workings days period after the closing date. **Note:** A CIDB non-compliance status is defined as a CIDB status which is inactive and or expired, and or suspended, and or deregistered and or not registered in the specified contractor designation (class of works) and or not registered on the CIDB in the specified (or higher) contractor grading.
13.	☒	PA 10: FM GENERAL CONDITIONS OF CONTRACT
14.	☒	**CIDB non-compliance after tender closing date** Upon request, a bidder will be given twenty one (21) working days to correct its CIDB compliance status, if the bidder becomes CIDB non-compliant, after the bid closing date
15.	☒	A bidder may nominate the same key resources for more than one bid in the Department. During evaluation, the bidder's offer will be "deemed responsive" (if it complies with the substantive criteria). Should **a bidder**, subsequently be awarded more than one bid, but the key staff is already allocated to another awarded bid or another recommended bid, the Department may request a bidder to provide new key staff, which are accompanied by the minimum required qualifications and CV's (if applicable).
16.	☒	Submission of a fully completed Form of Offer and Acceptance. (DPW-07)

5. Indicate administrative requirements applicable for specific goals, Tenderers will not be required to submit the below document if not provided in the original tender proposals, Failure to comply with the criteria stated hereunder shall result in the tenderer not allocated points for specific goals.

1	☒	Submission of (PA-16): Preference Points Claim Form in terms of the Preferential Procurement Regulations 2022
2	☒	A trust, consortium or joint venture (including unincorporated consortia and joint ventures) must submit a consolidated B-BBEE Certificate issued by a SANAS accredited service provider

6. METHOD TO BE USED TO CALCULATE POINTS FOR SPECIFIC GOALS

a. For procurement transaction with rand value greater than R1 Million and up to R50 Million (Inclusive of all applicable taxes) the specific goals listed below are applicable.

Serial No	Specific Goals	Preference Points allocated out of 20	Documentation to be submitted by bidders to validate their claim for points
1.	An EME or QSE or any entity which is at least 51% owned by black people	10	• SANAS Accredited BBBEE Certificate or sworn affidavit where applicable.
2.	Located in EASTERN CAPE for work to be done or services to be rendered in the EASTERN CAPE area	2	• Official Municipal Rates Statement which is in the name of the bidder. Or • Any Account or statement which is in the name of the Bidder. Or • Permission To Occupy from local chief in case of rural areas (PTO) which is in the name of the bidder. Or • Lease Agreement which is in the name of the bidder.
3.	An EME or QSE or any entity which is at least 51% owned by black women	4	• SANAS Accredited BBBEE Certificate or sworn affidavit where applicable.
4.	An EME or QSE or any entity which is at least 51% owned by black people with disability	2	• SANAS Accredited BBBEE Certificate or sworn affidavit where applicable. and • Medical Certificate indicating that the disability is permanent or • South African Social Security Agency (SASSA) registration indicating that the disability is permanent Or • National Council for Persons with Physical Disability in South Africa registration (NCPPDSA)
5.	An EME or QSE or any entity which is at least 51% owned by black youth	2	• ID Copy and SANAS Accredited BBBEE Certificate or sworn affidavit where applicable.

7. OBJECTIVE CRITERIA APPLICABLE: YES

8. OBJECTIVE CRITERIA

9.1 The Department may pass over the highest point scoring bidder based on the objective criteria (conditions) as listed below and

9.2 The condition for passing over the highest point scorer is only applicable to the bids listed below :

a) ***GQET-25/26-034:*** *EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS.*

b) ***GQET-25/26-035:*** *PE AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS*

9.3 The two bids above are for two different and wide spread geographical areas. Appointing a single service provider for more than one of these projects, post a risk of failure or under performance to the Department. The Department intents with this Objective Criteria to appoint multiple service providers to spread this risk of failure or under performance.

9.4 In the event that a bidder scores the highest PPPFA Points in more than one of these bids, the Department will afford the highest point scoring bidder the opportunity to select its preferred bid.

9.5 After the highest point scorer bidder select its preferred bid, the Department reserves the right to negotiate with the other remaining bidders (from the 2nd highest point scorer downwards).

9.6 During the Negotiation process, the following condition will apply:

a. The Department will only enter into negotiations with another bidder, if they have not been awarded already any of the remaining bids.
b. If the 2nd highest scoring bidder`s price is acceptable, and their tendered price in R-value is less than the highest point scorer`s price, the Department will award it to the 2nd highest point scoring bidder at its tendered price **or**
c. If the price in R-value is not less than the highest point scorer`s price, the 2nd highest point scoring bidder will be given a counter offer. The counter offer which will be given to the 2nd highest point scorer, will be the offer of the highest point scoring bidder, provided that the highest point scorer`s price is reasonable and market related **or**
d. If the highest point scorer`s price is not market related, the 2nd highest point scorer will be given a market related counter offer, if the 2nd highest point scorer`s offer is not market related.
e. If the 2nd highest point scorer decline the counter offer (if any), the Department reserves the right to negotiate with the 3rd bidder up to the last bidder and the same methodology will be followed.

9.7 The Department may only award more than one of these bids to a bidder, once all the other bidders declined.

9.8 The Department may award the same Service Provider more than one bid, if there is (are) no other responsive(s) bidders for the particular bid/geographical area.

9.9 Should the Department withdraw or cancel any bid(s) which are part of the Objective Criteria, the following conditions will apply:

a. The bidding process will proceed as the need for the remaining goods or services still exist.
b. The objective criteria will be applicable on the remaining bids.
c. The withdrawn or cancelled bids will be omitted from the Objective Criteria.
d. The remaining bids will be evaluated and finalized in accordance with the remaining bid rules and Objective Criteria.

10 ELIGIBILITY IN RESPECT OF RISK TO THE EMPLOYER:

10.1 Standard risk management assessment criteria in respect of tenders received for routine projects in the engineering and construction works environments:

Tender offers will be evaluated by an Evaluation Committee based on the technical and commercial risk criteria listed hereunder. Each criterion carries the same weight / importance and will be evaluated individually based on reports presented to the Bid Evaluation Committee by the Professional Team appointed on the project. A tender offer will be declared non-responsive and removed from any further evaluation if any one criterion is found to present an unacceptable risk to the Employer.

In order for the evaluation reports to be prepared by the Professional Team, the Tenderer is obliged to provide comprehensive information on form DPW-09 (EC). Failure to complete the said form will cause the tender to be declared non-responsive and removed from any further consideration. The Employer reserves the right to request additional information over and above that which is provided by the Tenderer on said form. The information must be provided by the Tenderer within the stipulated time as determined by the Bid Evaluation Committee, failing which the tender offer will *mutatis mutandis* be declared non-responsive.

10.2 Technical risks:

Criterion 1: Experience on comparable projects during the past 5 years.
The tendering Service Provider's experience on comparable projects during the past 5 years. The number of current and previous comparable projects performed by the Tenderer as per the evaluation report prepared by the Consultant Team, based on its research and inspection of a representative sample of the Tenderer's current and previous work as reflected on form DPW-09 (EC), as well as, if necessary, of any additional work executed by the Tenderer, not reflected on form DPW-09 (EC) or any alternative accepted format. Failing to provide contactable references will result in the tender offer will be *mutatis mutandis* declared non-responsive. A bidder will not be afforded to provide alternative references, if the bidder's initial reference is contactable, or don't respond to the Department. If a reference letter is not listed in on form DPW-09 (EC) or any alternative accepted format, but the reference letter is submitted with the bid and it is valid, it will be considered

Aspects to be regarded as "comparable" includes (but may be extended according to circumstances): size of projects (measured against monetary value or other project quantifying parameters), nature of projects (building, engineering, high/low rise, etc.), locality/area of execution (site-specific influences, knowledge of local conditions, etc.), complexity of project, projects for similar client department irrespective of end purpose of buildings/facilities created or in progress of being created and time scales of projects (normal, fast track, etc.) and stage of its/their development.

Criterion 2: Contractual commitment and quality of performance on comparable projects during the past 5 years.

Adherence to contractual commitments and quality of performance of comparable current and previous projects performed by the Tenderer during the past 5 years as per the evaluation report prepared by the Consultant Team, based on its research and inspection of a representative sample of the Tenderer's current and previous work as reflected on form DPW-09 (EC) or any alternative accepted format, as well as, if necessary, of any additional work executed by the Tenderer, not reflected on form DPW-09 (EC). Failing to provide contactable references will result in the tender offer be *mutatis mutandis* declared non-responsive.

Aspects to be considered include, but are not limited to the following:

1. The level of progress on current projects in relation to the project programme or, if such is not available/applicable, to the contractual construction period in general;
2. The degree to which previous projects have been completed within the contractual completion periods and/or extensions thereto, and the extend of penalties imposed;
3. Project performance: time management & programming of works, timeous ordering of materials and appointment of subcontractors;
4. Financial management: payment to suppliers and cash flow problems;
5. Quality of workmanship: extent of reworks and timeous attention to remedial works;
6. Personnel resources: suitably qualified and experienced, turnover in site staff and labour force, specifically site manager and foreman;
7. Personnel management: extent of labour disputes and ability to resolving labour disputes amicably;

8. Sub-contractors: extent of turnover in subcontractors, general liaison and payment problems experienced;
9. Contract administration: contractual aspects such as complying to laws and regulations, insurances, security, submission of required documentation timeously, reaction to written contract instructions, appointments of subcontractors, etc. as can generally be expected in standard/normal conditions of contract.
10. Health & Safety: adherence to regulations and compliance, and number of transgressions & serious incidents.
11. Plant & equipment: sufficient resources on site and in time.
12. Delays: extent of causing delays, submission of claims timeously, and abuse of or exaggerated delay claims.
13. Final account: extent to which the contractor assisted in finalising the final account.

Criterion 3: Suitably qualified and appropriately experienced human resources

Allocation of suitably qualified and appropriately experienced human resources, both in respect of principals and/or other staff (contract manager, site agent, site foreman including other professional, technical and/or administrative) of the tendering Service Provider to the project, as proof that the tendering Service Provider will be able to react/respond appropriately to the Services required herein. The Company Organogram with CV's and certified ID's of all principals and employed workforce as well as proof of Professional Registration will be verified. Current and future workload of the tenderer in relation to capacity and capability will also be considered. The tenderer should demonstrate that he or she possesses the necessary professional and technical qualifications and -competence in relation to the scope of work and work to be undertaken.

Criterion 4: Attendance of compulsory bid clarification meeting, if applicable

When a bid briefing/ clarification meeting is compulsory, the bidder (an authorised representative of the bidder) must attend a compulsory bid briefing meeting, if applicable.

10.3 Commercial risks:

The financial viability assessment evaluates the risk over the life of the construction period, as to whether the tenderer will be able to deliver the goods and services which are specified in the contract and / or be able to fulfil guarantees or warranties provided for in the contract in order to complete the project successfully for the amount tendered.

11 CONTRACT PARTICIPATION GOAL TARGETS AND CIDB B.U.I.L.D. PROGRAMME

The contractor shall achieve in the performance of the contract the following Contract Participation Goals (CPGs) as described in PG-01.2 (EC): Scope of Work and PG-02.2 (EC): Pricing Assumptions and in accordance with the feasibility study, which forms part of the specifications in the CPG Section of the Specification of this contract.

(a)	Minimum Targeted Local Manufacturers of Material Contract Participation Goal, in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(b)	Minimum Targeted Local Building Material Suppliers Contract Participation Goal in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(c)	Minimum Targeted Local Labour Skills Development Contract Participation Goal in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(d)	**CIDB BUILD Programme**: Minimum Targeted Enterprise Development Contract Participation Goal in accordance with the cidb Standard for Indirect Targeting for Enterprise Development through Construction Works Contracts, No 36190 Government Gazette, 25 February 2013, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**

(e)	**cidb BUILD Programme:** Minimum Targeted Contract Skills Development Goal in accordance with the cidb Standard for Developing Skills through Infrastructure Contracts as published in the Government Gazette Notice No. 43495 of 3 July 2020, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(f)	DPWI National Youth Service training and development programme (NYS) – Condition of Contract.	**Not applicable**
(g)	Labour Intensive Works – Condition of Contract.	**Not applicable**

12 COLLECTION OF TENDER DOCUMENTS

☒ Bid documents are available for free download on e-Tender portal www.etenders.gov.za
☒ Alternatively; Bid documents may be collected during working hours at the following address NDPWI, Eben Donges Building, Cnr Robert and Hancock street, Gqeberha, 6056.
A non-refundable bid deposit of R 500.00 is payable (cash only) on collection of the bid documents.

13 COMPULSORY BID BRIEFING/ CLARIFICATION/ SITE INSPECTION MEETING

Details of Compulsory Bid Briefing/ Clarification / Site Inspection Meeting (if any):

Venue:	BISHO ALL SAINTS COLLEGE		
Virtual meeting link:	(Type link here or indicate "N/A")		
Date:	Friday, 21 November 2025	**Starting time:**	11H00

14 ENQUIRIES

14.1 Technical enquiries may be addressed to:

DPWI Project Manager	PORTIA MVANA	**Telephone no:**	041 408 2181
Cellular phone no	082 327 4062	**Fax no:**	**Indicate**
E-mail	Portia.Mvana@dpw.gov.za		

14.2 SCM enquiries may be addressed to:

SCM Official	BONGIWE NDABA	**Telephone no:**	041 408 2015
Cellular phone no	NONE	**Fax no:**	**None**
E-mail	Bongiwe.ndaba@dpw.gov.za		

15 DEPOSIT / RETURN OF TENDER DOCUMENTS

Telegraphic, telephonic, telex, facsimile, electronic and / or late tenders will not be accepted.
Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the Tender Data.
All tenders must be completed in non-erasable ink and submitted on the official forms – (forms not to be re-typed).

Closing Date: **Tuesday, 02 December 2025**
Closing Time: **11H00**

Tender documents may be posted to: The Director-General Department of Public Works and Infrastructure Private Bag X 3193 Gqeberha 6001 Documents must be deposited in The Bid Box before the closing date of the bid	**OR**	**Deposited in the tender box at:** The Bid Box Department of Public Works & Infrastructure Eben Donges Building Corner Robert & Hancock Street

DPW-07: FORM OF OFFER AND ACCEPTANCE

The Employer, identified in the acceptance signature block, has solicited offers to enter into a contract for the procurement of:

Bid no: GQET-25/26-034

Bid/ Project Description: EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

The Tenderer, identified in the offer signature block, has examined the documents listed in the tender data and addenda thereto as listed in the returnable schedules, and by submitting this offer has accepted the conditions of tender.

By the representative of the Tenderer, deemed to be duly authorized, signing this part of this form of offer and acceptance, the Tenderer offers to perform all of the obligations and responsibilities of the Service Provider under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the contract data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX (All applicable taxes" includes value- added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies) IS:

Rand (in words):	
Rand in figures:	**R**

The award of the tender may be subjected to price negotiation with the preferred tender(s). The negotiated and agreed price will be considered for acceptance as ***a firm and final offer***.

This offer may be accepted by the Employer by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the tender data, whereupon the Tenderer becomes the party named as the Service Provider in the conditions of contract identified in the contract data.

THIS OFFER IS MADE BY THE FOLLOWING LEGAL ENTITY: (cross out block which is not applicable)

Company or Close Corporation: …… …… And: Whose Registration Number is: …… And: Whose Income Tax Reference Number is: …….. CSD supplier number: ……	**OR**	Natural Person or Partnership: …… …….. Whose Identity Number(s) is/are: …….. Whose Income Tax Reference Number is/are: …… CSD supplier number: ……

AND WHO IS (if applicable)**:**

Trading under the name and style of: ……

AND WHO IS:

Represented herein, and who is duly authorised to do so, by: Mr/Mrs/Ms: …… In his/her capacity as: ……	**Note:** **A Resolution / Power of Attorney, signed by all the Directors / Member / Partners of the Legal Entity must accompany this Offer, authorising the Representative to make this offer.**

Bid No: GQET-25/26-034

Bid/ Project Description: EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

SIGNED FOR THE TENDERER:

Name of representative	Signature	Date

WITNESSED BY:

Name of witness	Signature	Date

This Offer is in respect of: (Please indicate with an "X" in the appropriate block) ☐
The official documents …… ☐
The official alternative …….…….. ☐
Own alternative (only if documentation makes provision therefore)

SECURITY OFFERED: (Not required for this quotation/ bid)

The Service Provider will provide one of the following forms of security:

(1) Cash deposit of 2.5% of the Contract Sum (excl. VAT)	Yes ☐	No ☒
(2) Variable guarantee of 2.5% of the Contract Sum (excl. VAT) (DPW-10.5: FM)	Yes ☐	No ☒
(3) Retention of 2.5% of the Contract Sum (excl. VAT)	Yes ☐	No ☒
(4) 1.25% cash deposit and 1.25% retention of the Contract Sum (excl. VAT)	Yes ☐	No ☒

NB. Guarantees submitted must be issued by either an insurance company duly registered in terms of the Short-Term Insurance Act, 1998 (Act 35 of 1998) or by a bank duly registered in terms of the Banks Act, 1990 (Act 94 of 1990) on the pro-forma referred to above. No alterations or amendments of the wording of the pro-forma will be accepted.

The Tenderer elects as its *domicilium citandi et executandi* in the Republic of South Africa, where any and all legal notices may be served, as (physical address):

……

Other Contact Details of the Tenderer are:

Telephone No…….. Cellular Phone No. ……

Fax No. ……..

Postal address……

Banker …… Branch……..

Bank Account No. …… Branch Code ……..

Registration No of Tenderer at Department of Labour……

ACCEPTANCE

By signing this part of this form of offer and acceptance, the Employer identified below accepts the Tenderer's offer. In consideration thereof, the Employer shall pay the Service Provider the amount due in accordance with the conditions of contract identified in the contract data. Acceptance of the Tenderer's offer shall form an agreement between the Employer and the Tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

Bid No: GQET-25/26-034

Bid/ Project Description: EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

The terms of the contract, are contained in:

Part 1 Agreements and contract data, (which includes this agreement)
Part 2 Pricing data
Part 3 Scope of work.
Part 4 Site information

and drawings (where applicable) and documents or parts thereof, which may be incorporated by reference into Parts 1 to 4 above.

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as listed in the tender schedules as well as any changes to the terms of the offer agreed by the Tenderer and the Employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this agreement. No amendments to or deviations from said documents are valid unless contained in this schedule.

The Tenderer shall within two weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the Employer's agent (whose details are given in the contract data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the contract data. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect, if delivered by hand on the day of delivery, or if delivered by courier within two working days after submission by the Employer to the courier services for a door-to door delivery to the tenderer, provided that the Employer notifies the tenderer of the tracking number within 24 hours of such submission. Unless the tenderer (now Service Provider) within seven working days of the date of such submission notifies the Employer in writing of any reason why he cannot accept the contents of the schedule of deviation to this agreement if applicable), this agreement shall constitute a binding contract between the parties.

For the Employer:

Name of signatory	Signature	Date

Name of Organisation:	Department of Public Works
Address of Organisation:	

WITNESSED BY:

Name of witness	Signature	Date

SCHEDULE OF DEVIATIONS

Bid no: GQET-25/26-034

Bid/ Project Description: EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

1.1.1. Subject:
Detail:

1.1.2. Subject:
Detail:

1.1.3. Subject:
Detail:

1.1.4. Subject:
Detail:

1.1.5. Subject:
Detail:

1.1.6. Subject:
Detail:

By the duly authorised representatives signing this agreement, the Employer and the Tenderer agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the tender data and addenda thereto as listed in the tender schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the Tenderer and the Employer during this process of offer and acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the Tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

PA-11: BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. BIDDER'S DECLARATION

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest[3] in the enterprise, employed by the state?

☐ YES ☐ NO

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

([3]) the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

Any reference to words "Bid" or Bidder" herein and/or in any other documentation shall be construed to have the same meaning as the words "Tender" or "Tenderer".
For External Use

2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution?

☐ YES ☐ NO

2.2.1 If so, furnish particulars:

……....

……

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract?

☐ YES ☐ NO

2.3.1 If so, furnish particulars:

……..

……..

3. DECLARATION

I, the undersigned, (name)…… in submitting the accompanying bid, do hereby make the following statements that I declare to be true and complete in every respect:

3.1 I have read and I understand the contents of this disclosure;

3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;

3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium[4] will not be construed as collusive bidding.

3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

3.5 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

3.6 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

[4] Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

Any reference to words “Bid” or Bidder” herein and/or in any other documentation shall be construed to have the same meaning as the words “Tender” or “Tenderer”.
For External Use

3.7 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59

of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I DECLARE THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT. I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

Name of Bidder	Signature	Date	Position

This form is aligned to SBD 4.

PA-15.1: RESOLUTION OF BOARD OF DIRECTORS

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

_____

_____
(*legally correct full name and registration number, if applicable, of the Enterprise)*

Held at _____ (*place)*

on _____ *(date)*

RESOLVED that:

1 The Enterprise submits a Tender to the Department of Public Works in respect of the following project:
_____

_____
(*project description as per Tender Document)*

Tender Number: _____*(Tender Number as per Tender Document)*

2 *Mr/Mrs/Ms: _____

in *his/her Capacity as: _____(*Position in the Enterprise)*

and who will sign as follows:

_____

be, and is hereby, authorised to sign the Tender, and any and all other documents and/or correspondence in connection with and relating to the Tender, as well as to sign any Contract, and any and all documentation, resulting from the award of the Tender to the Enterprise mentioned above.

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Note:

1. ** Delete which is not applicable.*
2. ***NB:** This resolution must, where possible, be signed by <u>all</u> the Directors / Members / Partners of the Tendering Enterprise.*
3. *In the event that paragraph 2 cannot be complied with, the resolution must be signed by Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (attach proof of shareholding / ownership hereto).*
4. *Directors / Members / Partners of the Tendering Enterprise may alternatively appoint a person to sign this document on behalf of the Tendering Enterprise, which person must be so authorized by way of a duly completed power of attorney, signed by the Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (proof of shareholding / ownership and power of attorney are to be attached hereto).*
5. *Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.*

ENTERPRISE STAMP

PA-15.2: RESOLUTION OF BOARD OF DIRECTORS TO ENTER INTO CONSORTIA OR JOINT VENTURES

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

_____

_____
(*legally correct full name and registration number, if applicable, of the Enterprise)*

Held at _____ (*place)*

on _____ *(date)*

RESOLVED that:

1. The Enterprise submits a Tender, in consortium/joint venture with the following Enterprises:

   _____

   _____
   (list all the legally correct full names and registration numbers, if applicable, of the Enterprises forming the consortium/joint venture)

   to the Department of Public Works in respect of the following project:

   _____

   _____
   (*project description as per Tender Document)*

   Tender Number: _____(*Tender Number as per Tender Document)*

1 *Mr/Mrs/Ms: _____

   in *his/her Capacity as: _____*(Position in the Enterprise)*

   and who will sign as follows:

   _____

   be, and is hereby, authorised to sign a consortium/joint venture agreement with the parties listed under item 1 above, and any and all other documents and/or correspondence in connection with and relating to the consortium/joint venture, in respect of the project described under item 1 above.

2 The Enterprise accept joint and several liability with the parties listed under item 1 above for the due fulfilment of the obligations of the joint venture deriving from, and in any way connected with, the Contract to be entered into with the Department in respect of the project described under item 1 above.

3 The Enterprise chooses as its *domicilium citandi et executandi* for all purposes arising from this joint venture agreement and the Contract with the Department in respect of the project under item 1 above:

   Physical address: _____

   _____Postal Code _____

   Postal Address: _____

_____Postal Code_____

Telephone number: _____ Fax number: _____

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

The tendering enterprise hereby absolves the Department of Public Works from any liability whatsoever that may arise as a result of this document being signed.

Note:

*1. * Delete which is not applicable.*
*2. **NB:** This resolution must, where possible, be signed by all the Directors / Members / Partners of the Tendering Enterprise.*
3. In the event that paragraph 2 cannot be complied with, the resolution must be signed by Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (attach proof of shareholding / ownership hereto).
4. Directors / Members / Partners of the Tendering Enterprise may alternatively appoint a person to sign this document on behalf of the Tendering Enterprise, which person must be so authorized by way of a duly completed power of attorney, signed by the Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (proof of shareholding / ownership and power of attorney are to be attached hereto).
5. Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

ENTERPRISE STAMP

PA-15.3: SPECIAL RESOLUTION OF CONSORTIA OR JOINT VENTURES

RESOLUTION of a meeting of the duly authorised representatives of the following legal entities who have entered into a consortium/joint venture to jointly tender for the project mentioned below: *(legally correct full names and registration numbers, if applicable, of the Enterprises forming a consortium/joint venture)*

1 _____

_____

2 _____

_____

3 _____

_____

4 _____

_____

5 _____

_____

6 _____

_____

7 _____

_____

8 _____

_____

Held at _____ (*place)*

on _____*(date)*

RESOLVED that:

A. The above-mentioned Enterprises submit a tender in consortium/joint venture to the Department of Public Works & Infrastructure in respect of the following project:

_____

_____
(project description as per Tender Document)

Tender Number: _____ *(tender number as per Tender Document)*

B. Mr/Mrs/Ms:_____

in *his/her Capacity as: _____ *(position in theEnterprise)*

and who will sign as follows: _____

be, and is hereby, authorised to sign the tender, and any and all other documents and/or correspondence in connection with and relating to the tender, as well as to sign any Contract, and any and all documentation, resulting from the award of the tender to the Enterprises in consortium/joint venture mentioned above.

C. The Enterprises constituting the consortium/joint venture, notwithstanding its composition, shall conduct all business under the name and style of:

_____

D. The Enterprises to the consortium/joint venture accept joint and several liability for the due fulfilment of the obligations of the consortium/joint venture deriving from, and in any way connected with, the Contract entered into with the Department in respect of the project described under item A above.

E. Any of the Enterprises to the consortium/joint venture intending to terminate the consortium/joint venture agreement, for whatever reason, shall give the Department 30 days' written notice of such intention. Notwithstanding such decision to terminate, the Enterprises shall remain jointly and severally liable to the Department for the due fulfilment of the obligations of the consortium/joint venture as mentioned under item D above.

F. No Enterprise to the consortium/joint venture shall, without the prior written consent of the other Enterprises to the consortium/joint venture and of the Department, cede any of its rights or assign any of its obligations under the consortium/joint venture agreement in relation to the Contract with the Department referred to herein.

G. The Enterprises choose as the *domicilium citandi et executandi* of the consortium/joint venture for all purposes arising from the consortium/joint venture agreement and the Contract with the Department in respect of the project under item A above:

Physical address: _____

_____

_____Postal Code _____

Postal Address: _____

_____

_____Postal Code _____

Telephone number _____ Fax number: _____

E-mail address: _____

	Name	Capacity	Signature
1			
2			

	Name	Capacity	Signature
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

The tendering enterprise hereby absolves the Department of Public Works & Infrastructure from any liability whatsoever that may arise as a result of this document being signed.

Note:

*1. * Delete which is not applicable.*
*2. **NB:** This resolution must be signed by all the Duly Authorised Representatives of the Legal Entities to the consortium/joint venture submitting this tender, as named in item 2 of Resolution PA-15.2.*
3. Should the number of the Duly Authorised Representatives of the Legal Entities joining forces in this tender exceed the space available above, additional names, capacity and signatures must be supplied on a separate page.
4. Resolution PA-15.2, duly completed and signed, from the separate Enterprises who participate in this consortium/joint venture, must be attached to this Special Resolution (PA-15.3).

DPW-16. TENDER BRIEFING MEETING CERTIFICATE

Project title:	**EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**		
Tender / Quotation no:	**GQET-25/26-034**	**Reference no:**	1286

Date Bid Briefing Meeting: Friday, 21 November 2025

Time of Bid Briefing Meeting: 11H00

Venue: BISHO ALL SAINTS COLLEGE

This is to certify that I,_____

representing _____

attended the tender clarification meeting on: _____

I further certify that I am satisfied with the description of the work and explanations given at the tender clarification meeting and that I understand the work to be done, as specified and implied, in the execution of this contract.

Name of Tenderer	Signature	Date

Name of DPW Representative	Signature	Date

DPW-21: RECORD OF ADDENDA TO TENDER DOCUMENTS

Project title:	**EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**		
Tender / Quotation no:	**GQET-25/26-034**	**Reference no:**	1286

1. I / We confirm that the following communications received from the Department of Public Works before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer: *(Attach additional pages if more space is required)*

	Date	Title or Details
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Name of Tenderer	Signature	Date

2. I / We confirm that no communications were received from the Department of Public Works before the submission of this tender offer, amending the tender documents.

Name of Tenderer	Signature	Date

PA- 40: DECLARATION OF DESIGNATED GROUPS FOR PREFERENTIAL PROCUREMENT

Tender Number: GQET-25/26-034
Name of Tenderer …… ☐ **EME**[1] ☐ **QSE**[2] ☐ **Non EME/QSE (tick applicable box)**

1. **LIST ALL PROPRIETORS, MEMBERS OR SHAREHOLDERS BY NAME, IDENTITY NUMBER, CITIZENSHIP AND DESIGNATED GROUPS.**

Name and Surname #	Identity/ Passport number and Citizenship##	Percentage owned	Black	Indicate if youth	Indicate if woman	Indicate if person with disability	Indicate if living in rural / under developed area/township	Indicate if military veteran
1.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
2.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
3.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
4.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
5.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
6.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
7.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
8.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
9.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
10.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Where Owners are themselves a Company, Close Corporation, Partnership etc., identify the ownership of the Holding Company, together with Registration number
State date of South African citizenship obtained (not applicable to persons born in South Africa)

[1] EME: Exempted Micro Enterprise
[2] QSE: Qualifying Small Business Enterprise

1. DECLARATION:

The undersigned, who warrants that he/she is duly authorized to do so on behalf of the Tenderer, hereby confirms that:

1 The information and particulars contained in this Affidavit are true and correct in all respects;

2 The Broad-based Black Economic Empowerment Act, 2003 (Act 53 of 2003), Preferential Procurement Policy Framework Act, 2000 (Act 5 of 2000), the Preferential Procurement Regulations, 2022, National Small Business Act 102 of 1996 as amended and all documents pertaining to this Tender were studied and understood and that the above form was completed according to the definitions and information contained in said documents;

3 The Tenderer understands that any intentional misrepresentation or fraudulent information provided herein shall disqualify the Tenderer's offer herein, as well as any other tender offer(s) of the Tenderer simultaneously being evaluated, or will entitle the Employer to cancel any Contract resulting from the Tenderer's offer herein;

4 The Tenderer accepts that the Employer may exercise any other remedy it may have in law and in the Contract, including a claim for damages for having to accept a less favourable tender as a result of any such disqualification due to misrepresentation or fraudulent information provided herein;

5 Any further documentary proof required by the Employer regarding the information provided herein, will be submitted to the Employer within the time period as may be set by the latter;

Signed by the Tenderer

Name of representative	**Signature**	**Date**

DPW-09 PARTICULARS OF TENDERER'S PROJECTS

Project title:	**EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**		
Tender / Quotation no:	**GQET-25/26-034**	**Closing date: Tuesday, 02 December 2025**	**Time: 11H00**

Note: The Tenderer is required to furnish the following particulars and to attach additional pages if more space is required.

1. PARTICULARS OF THE TENDERER'S CURRENT AND PREVIOUS COMMITMENTS

1.1. Current projects

	Projects currently engaged in	**Name of Employer or Representative of Employer**	**Contact tel. no.**	**Contract sum of Project**	**Scope of Services (Work stages appointed for – eg 1 to 6)**	**Work stages completed**	**Work stages in progress**
1.							
2.							
3.							
4.							
5.							
6.							
7.							

1.2. Completed projects

Projects completed in the last 5 (five) years		Name of Employer or Representative of Employer	Contact tel. no.	Contract sum of Project	Scope of Services (Work stages appointed for – eg 1 to 6)	Date of appointment	Date of completion
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							

Name of Tenderer	Signature	Date

PA-16: PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL PROCUREMENT REGULATIONS, 2022

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1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to invitations to tender:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and

1.2 Preference Points System to be applied

☒ The applicable preference point system for this tender is the **80/20** preference point system.

1.3 Points for this tender shall be awarded for:

1.3.1 Price: Maximum 80 points

1.3.2 Specific Goals: Maximum 20 points

1.4 The maximum points for this tender are allocated as follows:

Preference Points System to be applied	**80/20**
PRICE	**80**
SPECIFIC GOALS	**20**
Total points for Price and Specific Goals	**100**

1.5 Breakdown Allocation of Specific Goals Points

1.5.1 **For procurement transactions with rand value greater than R1 Million and up to R50 Million (Inclusive of all applicable taxes) the specific goals as listed in the table below are applicable:**

Serial No	Specific Goals	Preference Points allocated out of 20	Documentation to be submitted by bidders to validate their claim for points
1.	An EME or QSE or any entity which is at least 51% owned by black people	10	• SANAS Accredited BBBEE Certificate or sworn affidavit where applicable.
2.	Located in EASTERN CAPE for work to be done or services to be rendered in the EASTERN CAPE area	2	• Official Municipal Rates Statement which is in the name of the bidder. Or • Any Account or statement which is in the name of the Bidder. Or • Permission To Occupy from local chief in case of rural areas (PTO) which is in the name of the bidder. Or • Lease Agreement which is in the name of the bidder.

Serial No	Specific Goals	Preference Points allocated out of 20	Documentation to be submitted by bidders to validate their claim for points
3.	An EME or QSE or any entity which is at least 51% owned by black women	4	• SANAS Accredited BBBEE Certificate or sworn affidavit where applicable.
4.	An EME or QSE or any entity which is at least 51% owned by black people with disability	2	• SANAS Accredited BBBEE Certificate or sworn affidavit where applicable. and • Medical Certificate indicating that the disability is permanent or • South African Social Security Agency (SASSA) registration indicating that the disability is permanent Or • National Council for Persons with Physical Disability in South Africa registration (NCPPDSA)
5.	An EME or QSE or any entity which is at least 51% owned by black youth	2	• ID Copy and SANAS Accredited BBBEE Certificate or sworn affidavit where applicable.

1.6 Failure on the part of the tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals, if the service provider/ tenderer did not submit proof or documentation required to claim for specific goals will be interpreted to mean that preference points for specific goals are not claimed.

1.7 The organ of state reserves the right to require of a service provider/tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

(a) **"tender"** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;

(b) **"price"** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;

(c) **"rand value"** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;

(d) **"tender for income-generating contracts"** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and

(e) **"the Act"** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1. THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right) \quad \text{or} \quad Ps = 90\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where

Ps = Points scored for price of tender under consideration
Pt = Price of tender under consideration
Pmin = Price of lowest acceptable tender

3.2. FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT

3.2.1. POINTS AWARDED FOR PRICE

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 + \frac{Pt - P\,max}{P\,max}\right) \quad \text{or} \quad Ps = 90\left(1 + \frac{Pt - P\,max}{Pmax}\right)$$

Where

Ps = Points scored for price of tender under consideration
Pt = Price of tender under consideration
Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1,2 and 3 above as may be supported by proof/ documentation stated in the conditions of this tender:

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

(a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or

(b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20

preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.

Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (80/20 system) (To be completed by the tenderer)
1. An EME or QSE or any entity which is at least 51% owned by black people	10	
1. Located in EASTERN CAPE for work to be done or services to be rendered in the EASTERN CAPE area	2	
2. An EME or QSE or any entity which is at least 51% owned by black women	4	
3. An EME or QSE or any entity which is at least 51% owned by black people with disability	2	
4. An EME or QSE or any entity which is at least 51% owned by black youth	2	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm…….

4.4. Company registration number: ……...

4.5. TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One-person business/sole propriety
- ☐ Close corporation
- ☐ Public Company
- ☐ Personal Liability Company
- ☐ (Pty) Limited
- ☐ Non-Profit Company
- ☐ State Owned Company

[TICK APPLICABLE BOX]

4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs

1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –

(a) disqualify the person from the tendering process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution, if deemed necessary.

……**SIGNATURE(S) OF TENDERER(S)**
SURNAME AND NAME: ……
DATE: ……
ADDRESS: ……
……
……
……

B-BBEE EXEMPTED AFFIDAVIT FOR EXEMPTED MICRO ENTERPRISES

(ISSUED IN TERMS OF THE AMENDED CONSTRUCTION SECTOR CODE)

(Gazette Vol. 630 No. 41287)
Issued in terms of paragraph 3.6.2.4.1 (B)

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1) The contents of this statement are to the best of my knowledge a true reflection of the facts.
2) I am a Member☐ / Director ☐ / Owner ☐ **(Select one)** of the following enterprise and am duly authorised to act on its behalf:

Enterprise Name:			
Trading Name (If Applicable):			
Registration Number:			
Enterprise Physical Address:			
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):			
Nature of Construction Business:	**BEP** (Built Environment Professional)	**Contractor**	**Supplier**
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – who are citizens of the Republic of South Africa by birth or descent; or who became citizens of the Republic of South Africa by naturalization before 27 April 1994; or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"		
Definition of "Black Designated Groups"	"Black Designated Groups" means: (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;"		

3) I hereby declare under Oath that as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

- The Enterprise is _____% Black Owned
- The Enterprise is _____% Black Female Owned
- The Enterprise is _____% Owned by Black Designated Group (provide Black Designated Group Breakdown below as per the definition in the table above)

o Black Youth % _____%

o Black Disabled % _____%

o Black Unemployed % _____%

o Black People living in Rural areas % _____%

o Black Military Veterans % _____%

Select applicable

4) Based on the Financial Statements ☐ /Management Accounts and other information available ☐ on the latest financial year-end of _____/_____/_____, (format: day/month/year) the annual Total Revenue was less than the applicable amount confirmed by ticking the applicable box below.

day/ month /year

BEP	R1.8 million	
Contractor	R3.0 million	
Supplier	R3.0 million	

If the turnover exceeds the applicable amount in the table above then this affidavit is no longer applicable and an EME certificate must be obtained from a rating agency accredited by SANAS or when applicable a B-BBEE Verification Professional Regulator appointed by the Minister of Trade and Industry.

- Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box below.**

100% Black Owned	**Level One** (135% B-BBEE procurement recognition level)	
At least 51% Black Owned	**Level Two** (125% B-BBEE procurement recognition level)	
At least 30% Black Owned	**Level Four** (100% B-BBEE procurement recognition level)	
Less than 30% Black Owned	**Level Five** (80% B-BBEE procurement recognition level)	

5) I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the Owners of the Enterprise which I represent in this matter.

6) The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature_____

Date: _____

_____
Commissioner of Oaths
Signature & stamp

Stamp Commissioner of Oath

SPECIAL CONDITIONS OF BID (SCB-1)

1 INTERPRETATION

1.1 The word “Bidder” in these conditions shall mean and include any firm of Contractors, Services Providers or any company or body incorporated or unincorporated or any other legal entities.
1.2 The word “Department” in these conditions shall mean the DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE
1.3 Any reference to words “Bid” or “bidder” herein and or any other documentation shall be construed to have the meaning as the words “Tender” or Tenderer”.

2 PRECEDENCE

2.1. If any other condition (bid rule) in the bid document is in contradiction with the “Special Conditions of Bid” the “Special Conditions of Bid” will take preference.
2.2. The “Special Conditions of Bid” can only be amended by an official addendum before the closing date of the bid.

3 GENERAL BID RULES

3.1. “Written” or “in writing” means hand-written in non-erasable ink or any form of electronic or digital writing and or a combination thereof.
3.2. The digital and or electronic completion and signing of documents is permitted.
3.3. A bidder participates in this bid process entirely at its own risk and cost.
3.4. The Department may accept or reject any bid offer or may cancel the bid process (or reject all bid offers at any time) prior to award, due to the following:
  3.4.1. due to changed circumstances, there is no longer a need for the goods or services specified in the invitation;
  3.4.2. funds are no longer available to cover the total envisaged expenditure;
  3.4.3. no acceptable tender is received;
  3.4.4. there is a material irregularity in the tender process; or
  3.4.5. there is material change in the scope of works.
3.5. The Department shall not accept or incur any liability for such cancellation or rejection or acceptance, but will give written reasons for such action upon receiving a written request to do so.
3.6. Completed bid documents in a sealed envelope, endorsed with the relevant bid number, bid description and the closing, must be deposited in the bid box as indicated in the bid document.
3.7. Bidders must ensure that bids submitted via courier services are deposited by the courier service in the Departmental Bid box, prior to the closing date and time. The Department will not accept responsibility for any bids, which are not timeously deposited in the Bid Box.
3.8. A Bid will be treated as a late bid, if it is not received in the bid box. The Department will not accept responsibility for any late depositing of bids or for the non-depositing of bids in the bid box, which are as a result from an act committed or omitted by an official. This is not limited to the following cases:
  3.8.1. A Bidder handed over its bid to a departmental official or to the security services personnel timeously, but they omits to deposit the bid in the bid box on or before the closing date and time.
  3.8.2. If a courier service delivers the bid to a departmental official or to the security services personnel timeously and it is not deposited in the bid box timeously.
  3.8.3. The bid documents were send through mail / Post Office and it is not timely collected and or timely deposited in the Departmental Bid Box.
3.9. Bids received after the closing date and time will not be accepted for consideration and where practical, be returned unopened to the Bidder(s).
3.10. Bidders who are not registered on the CSD, must register on the CSD within 7 working days, if requested to do so. No award letters or purchase orders or contracts will be signed, with a bidder not registered on the CSD.
3.11. The Department will download the following documents, to verify the information submitted by bidders:
  3.11.1. CSD registration certificate (if the bidder is registered in the CSD)
  3.11.2. CIPC registration
  3.11.3. CIDB registration

3.12. Bidders are not allowed to recruit or shall not attempt to recruit an employee of the Department for purposes of preparation of the bid or for the duration of the execution of this contract or any part thereof.

4 AMBIGUITIES/ CONTRADICTIONS / OMISSIONS

4.1. If a bidder becomes aware of any ambiguities or contradictions or omissions in the bid document or the specifications, drawings or descriptions or functionality or quality, or any part of the bid document, this should be clarified with the Department, at least five (5) working days before the closing time stated in the tender data.

4.2. If the Department found, after the closing date of the bid, that there is an ambiguity/ contradiction or omission in the bid document , the Department reserves the right to:

4.2.1. If the ambiguity or contradiction or omission in the bid document is of an administrative nature, request bidders to correct any non-compliances caused by the ambiguity or contradiction or omission or

4.2.2. If the ambiguity or contradiction or omission is immaterial, proceed to finalise the procurement process and notify the delegated authority in the submission of the ambiguity or contradiction or omission for the consideration of the approving authority or

4.2.3. Cancel the bid and process

5 PERIOD OF VALIDITY FOR BIDS AFTER CLOSING DATE

5.1 All Bids must remain valid from the closing date for a period as stipulated in the bid document.

5.2 The Department reserves the right to request for the validity extensions of bids, should it deemed necessary. The following conditions will apply when the Department request for a validity extension of a bid:

5.2.1 The request for a validity extension will be done while the validity period of the bids are still valid.

5.2.2 Bidders have the right to refuse the extension of the validity period of their bids.

5.2.3 If a request for validity extensions are send to bidders while the validity period of the bids are still valid, non-replying to the request for validity extension before the expiry date will be deemed a tacit agreement to the extension of the validity period. The Department will communicate with the affected bidders to confirm such tacit agreement.

5.2.4 Should the bidder not agree with the tacit agreement, the bidder shall be deemed to be non-responsive and not considered for further evaluation.

5.2.5 If a bidder(s) refused a validity extension, it will be deemed that the bidder(s) had withdrawn their bids from the bidding process. The Department reserves the right to continue with its bid evaluation and adjudication of the remaining bids and finalise the process.

6 BRAND NAMES

6.1 Wherever a brand name is specified in this bid document (i.e. in the specifications, pricing schedule or bill of quantities or anywhere in this document), the department's requirement is not limited to the specified brand name, but requires an item similar/equivalent or better than specified.

7 CONTRACTUAL PRICE ADJUSTMENTS

7.1 The Bid will not be subjected to any price escalation, unless specified otherwise in the bid documents.

8 AUTHORITY TO SIGN BID DOCUMENTS

8.1 No authority to sign (PA 15.1: Resolution of Board of Directors) is required from an enterprise which has only one director or is a sole ownership.

8.2 In the case of a bid being submitted on behalf of a company, close corporation or partnership, evidence should be submitted with the bid at the closing time, that the Bid has been signed by a person properly authorised by resolution of the directors or under the articles of the entity. For that purpose, forms PA-15.1-15.3 (Resolution of Board of Directors) are included in the bid document for completion by the relevant Board(s) of Directors

8.3 The department further accepts that, in the absence of a PA 15.1: Resolution of Board of Directors, any director or any member of the enterprise may have the authority to bind the enterprise. Therefore the following will apply when only one director or one member of the enterprise signed the bid documents:

8.3.1 The signature of any one of the directors or any one of the members of the enterprise will bind the enterprise and all the directors/ members of the enterprise. This condition will therefore render the bid valid; and

8.3.2 The Department will verify the authority to sign (if deemed necessary) and where possible, may request proof of such authority of the relevant director or relevant member to act on behalf of the enterprise in the form of a " Resolution of the Board of Directors", if such ", (PA 15.1: Resolution of Board of Directors)," was not submitted with the bid or was not completed or was incorrectly completed,

8.4 In the case of a sub-contractor agreement, a joint venture or consortia, the signing of the sub-contractor agreement, or Joint Venture or Consortia agreement by any director or member of each of the parties to the agreement, will render the sub-contractor agreement or Joint Venture or Consortia agreement valid. Therefore:

8.4.1 The Department reserves the right to request from each party to the sub-contractor agreement or Joint Venture or Consortia" agreement, proof of such authority of the relevant director or relevant member to act on behalf of the enterprise(s), in the form of a " Resolution of the Board of Directors", if it was not submitted with the bid or was not completed or was incorrectly completed,

8.5 In the event that a non-member or non-director to the enterprise(s) sign the bid documents and or sign a joint venture or consortia agreement, an "Authority to sign" issued by a director of the enterprise(s) or by the Board of Directors of the enterprise(s) must be submitted with the bid at the closing date. Failure to comply with this requirement at the closing date of the bid, will invalidate the bid submitted.

9 CONTRACT PERIOD

9.1 The contract period is stipulated in the Contract Data or the specifications.

9.2 The construction period for Infrastructure works, will commence from the date of site handover.

10 NEGOTIATION WITH THE IDENTIFIED PREFERRED BIDDER

10.1 The Bid will be awarded to the bidder who scores the highest PPPFA number of points:

10.1.1 However, should an offer not be market related, the Department reserves the right to negotiate with bidders a reasonable market price /offer?

11 AWARD OF CONTRACTS TO TENDERERS NOT SCORING HIGHEST POINTS

11.1 The Department reserves the right to award the bid to a tenderer not scoring the highest points, after having applied an objective criteria or a risk assessment criteria, if such (i.e. the objective criteria/ risk assessment) is specified in the bid document.

12 TAX COMPLIANCE

12.1 No tender shall be awarded to a bidder who is non tax -compliant.

12.2 All bidders' tax matters must be in order prior to award.

12.3 Bidders' tax matters will be verified through CSD.

12.4 If the recommended bidder's tax status is non-compliant, the recommended bidder must submit written proof from SARS of their tax compliant status or submit written proof that they have made an arrangement with SARS to meet their outstanding tax obligations.

12.5 The recommended bidder will be given a maximum of seven (7) working days to correct their tax compliance status.

12.6 Failure to comply within seven (7) working days, from the date of the request, the Department will reject the bid submitted by the bidder.

13 REGISTRATION AS A VAT-VENDOR

13.1 Non-VAT vendors do not have to include VAT in their bid prices.

13.2 Non-VAT vendors who submit bids for contracts that would, if successful, take their annual turnover above the threshold of R1 million, must include VAT in the prices quoted and must therefore immediately upon award of the contract, register with the South African Revenue Service (SARS) as VAT vendors.

13.3 The award of contract would be conditional (for Non-VAT vendors who included VAT in their prices) conditional pending the successful bidder submitting proof of registration as VAT vendor with SARS within 21 days of award.

13.4 Failure to comply within 21 days after being notified to do so will lead to the automatic withdrawal of the "provisional letter of award" and elimination of the bidder's offer.

13.5 VAT vendors must include VAT in their bid prices and failure to comply will lead to an automatic elimination of the bidder's offer.

13.6 In all other instances, where bidders have excluded VAT from the prices quoted, if the bidder is successful, the letter of award will clearly state that the price at which the contract is awarded is exclusive of VAT and that VAT will not be added on at any stage after the contract has been signed.

13.7 If a Non-VAT vendor/ bidder is contracted with the Department with a price which is Excluded Vat, and it becomes a VAT vendor after award or alternatively becomes a VAT vendor due to a cumulative number of awards, the bidder will have to absorb the adverse financial implications of not including VAT in their price quoted. VAT cannot be claimed from the Department for any payments already made or from any future payments.

14 CERTIFICATION OF DOCUMENTS

14.1 Where so required in the bid documents, bidders are required to submit copies, which are certified as a "true copy of the original".

14.2 If a bidder submitted an uncertified copy of an original document, or an original copy which is not correctly certified, the bidder will be afforded an opportunity to correct such non-compliance within a minimum period of 48 hour.

14.3 All bidders' whose copies complies with the minimum requirements above, will be "deemed in order" and will be subjected for consideration in further evaluation processes, even if the Department did not request any corrections.

14.4 No submissions of new or alternative documents or certified copies of new or alternative documents will be allowed after the bid closing date.

14.5 The Department will not accept a copy of a previously certified document and will not provide any bidder an opportunity to correct such a non-compliance.

15 REQUIREMENTS FOR A VALID BBBEE CERTIFICATES AND SWORN AFFIDAVITS

15.1 A valid B-BBEE Certificate is a B-BBEE Certificate which has not expired at the closing date of the bid.

15.2 A "Sworn Affidavit" must comply with the following minimum requirements at the closing date, to be considered valid. If the submitted "Sworn Affidavit" does not comply with the minimum requirements below, the bidder will not be given an opportunity to correct it:

15.2.1 The "Sworn Affidavit" must not be expired at the closing date.

15.2.2 The BBBEE Level Contributor must be indicated (ticked)

15.2.3 The "Sworn Affidavit" must be signed and dated by the bidder (Deponent).

15.2.4 The "Sworn Affidavit" submitted must be signed and stamped by the "Commissioner of Oath".

15.2.5 The "latest financial year-end" field must not be left blank.

15.2.5.1 The latest "financial year-end date" cannot be a future date.

15.2.5.2 If only the year is indicated (it is not in the format: day/month/year), the Department will validate the financial year-end (day/month) from CIPC or deal with any clarity seeking matter/ confirmation as an administrative matter.

15.3 In respect of "Sworn Affidavits" of the Construction sector, Property Sector, the field (block) where the bidder must confirm its financial information (i.e. Net Assets or Annual Turnover) must be completed (ticked) and must not be left blank or not ticked.

15.4 The Commissioner of Oath cannot be an employee or ex officio of the enterprise because, a person cannot by law, commission a sworn affidavit in which they have an interest.

15.5 The Department will seek the following clarity matters in respect of the Sworn Affidavits (should it be deemed necessary) and upon request, the bidder will be given a minimum of five (5) working days to respond to the Department:

15.5.1 If the bidder did not select/circle/ticked "Member/ Director/ Owner" where so required. The Department will communicate with such affected the bidder in writing.

15.5.2 If a bidder did not select/ circle/ ticked the required field "Financial Statements/ Management Accounts/ Audited Financial Statements" where so required. The Department will communicate with such affected the bidder in writing.

15.5.3 If only the year is indicated (it is not in the format: day/month/year), the Department will validate the financial year-end (day/month) on CIPC or against

any other submitted document or will seek clarity / confirmation from the bidder and deal with it as an administrative matter.

15.5.4 If the financial year-end indicated in the sworn affidavit is not at the end of the month or it is not the correct month when validated on CIPC or against any other submitted documents, the Department will enquire from the affected bidder to indicate its correct latest financial year end in the format (day/month/year) and:

15.5.4.1 If the "day" indicated on the submitted affidavit is wrong, but the month and year is correct, the bidder's affidavit will be "deemed valid" and it will be evaluated.

15.5.4.2 If the "month" indicated on the submitted affidavit is wrong, the bidder's affidavit will be will be considered invalid.

15.6 The Department will deal with all other matters, which is not listed under the minimum requirements as reflected above, as administrative matters, should it be deemed necessary.

15.7 For all sectors (example the construction sector, the property Sector and or any sector), a "Sworn Affidavit" issued in terms of the relevant sector must be used. All the minimum requirements applicable to "valid sworn affidavits" as per this "Special Conditions of Bid" will apply.

16 AWARDING OF POINTS FOR SPECIFIC GOALS (PA-16)

16.1 In accordance with the PPPFA regulations 2022, bidders will not be eliminated if they do not submit a BBBEE – certificate or a "valid sworn affidavits". The bidder will not be scored for points, but will be evaluated further.

16.2 For a bidder to be awarded points for specific goals as per the bid, the bidder must submit proof as specified in the bid document with the bid at the closing date and time.

16.3 The requirements of a valid BBBEE-Certificate and or "Sworn Affidavit" as specified in the Special Conditions of Tender applies.

16.4 Parties in an unincorporated joint venture must submit its own consolidated B-BBEE certificate, which has not expired at the closing date of the bid.

16.5 If a bidder submit with the bid at the closing date the required proof for specific goals, as specified in the bid document, but the proof is not certified or is certified incorrectly, the bidder will be given a minimum of 48 hours to submit a copy which is correctly certified. The copy maybe certified after the closing date of the bid. The copies maybe certified after the closing date of the bid.

16.6 Non-submission of the PA-16 form or non-completion the PA-16 form or an incomplete PA-16 form, is not an elimination criteria.

16.7 If a bidder submit at the closing date of the bid a valid proof as specified in the bid document, but the bidder's PA 16 is not signed or dated or witnessed or it is not properly completed, or its not completed or submitted or did not claim points, the bidder will be given a minimum of 48 hours to submit or correctly complete its PA 16.

16.8 All bidders' whose submitted proof as specified in the bid document and it complies with the minimum requirements above, will be "deemed in order" and will be subjected for consideration in further evaluation, even if the Department did not request any corrections/ certifications.

16.9 No submissions of alternative proof for specific goals as specified in the bid document will be allowed after the bid closing date.

16.10 Bidders who failed to submit the required proof for points for specific goals, will not be scored for the relevant specific goal(s), but there offers will still be evaluated further.

17 BIDDER'S DISCLOSURE/ BIDDER'S DECLARATION (PA - 11)

17.1 The Department will afford a bidder an opportunity to correct its PA-11 form, if the bidder omitted to sign or to complete or to properly complete this form.

17.2 A bidder's offer maybe eliminated if the bidder's declaration is proven false during the bid evaluation process.

18 CORRECTION OF ERRORS

18.1 Only the authorised signatory to the tender should initial corrections in the tender document.

18.2 All corrections must be in non-erasable ink and the use of correcting fluid (tippex) is prohibited.

18.3 In the event that a correction is not initialled or the correction is initialled by a person not having the prescribed authority, the Department will:

18.3.1 Seek the necessary clarification from the tenderer and;

18.3.2 If accepting the response from the tenderer, evaluate the bid further and or;

18.3.3 Allow the tenderer to correct/ ratify any noncompliance, where necessary.

19 CONDITIONS WITHDRAWN FROM THE GENERAL CONDITIONS OF CONTRACT

19.1 N/A

20 INCOMPLETE SECTIONS OR SCHEDULES IN BID DOCUMENTS

20.1 Bidders' who omitted or incorrectly completed a section(s) or a schedule(s) in the bid document, but have submitted with the bid the required/ specified proof or supportive documents for that particular sections of the document, maybe allowed to correct such non-compliance.

21 POINTS FOR SPECIFIC GOALS

21.1 To qualify for points for Specific goals, as specified in the "Invitation to Bid" and the "PA-16", bidders must comply with the requirements at the closing date of the bid.

21.2 It is the bidder's responsibility to ensure that it submit the correct evidence at the closing date of the bid, for the validation of the points the bidder is claiming.

21.3 Bidder's will not be given an opportunity to submit evidence after closing date, if the evidence is not submitted or if incorrect evidence was submitted.

22 THE OTHER ADDITIONAL INFORMATION WHICH MAY BE REQUIRED FOR EVALUATION

CRITERIA	SPECIAL CONDITIONS OF BID
a) **A close corporation, incorporated prior to 1 May 2011 under the Close Corporations Act, 1984 (Act 69 of 1984, as amended)**	**Copies of the Founding Statement - CK1**
b) **A profit company duly registered as a private company. [including a profit company that meets the criteria for a private company, whose Memorandum of Incorporation states that the company is a personal liability company in terms of Section 8(2)(c) of the Companies Act, 2008 (Act 71 of 2008, as amended)].**	**Copies of:** i. **Certificate of Incorporation - CM1;** ii. **Shareholding Certificates of all Shareholders of the company, plus a signed statement of the company's Auditor, certifying each Shareholder's ownership / shareholding percentage relative to the total; and/or** iii. **Memorandum of Incorporation in the case of a personal liability company.**
c) **A profit company duly registered as a private company in which any, or all, shares are held by one or more other close corporation(s) or company(ies) duly registered as profit or non-profit company(ies).**	**Copies of documents referred to in a. and/or b. above in respect of all such close corporation(s) and/or company(ies).**
d) **A profit company duly registered as a public company.**	**Copy of Certificate of Incorporation - CM1, and a signed statement of the company's Secretary or Auditor confirming that the company is a public company.**
e) **A non-profit company, incorporated in terms of Section 10 and Schedule 1 of the Companies Act, 2008 (Act 71 of 2008, as amended).**	**Copies of:** i. **The Founding Statement - CK1; and** ii. **The Memorandum of Incorporation setting out the object of the company, indicating the public benefit, cultural or social activity, or communal or group interest.**
f) **A natural person, sole proprietor or a Partnership**	**Copy(ies) of the Identity Document(s) of:** i. **such natural person/ sole proprietor, or each of the Partners to the Partnership.**
g) **A Trust**	**Deed of Trust duly indicating names of the Trustee(s) and Beneficiary (ies) as well as the purpose of the Trust and the mandate of the Trustees.**

23 DISCLAIMER

23.1 It is impractical and cumbersome for the Department to communicate with all qualifying bidders to correct/ ratify all eligible matters as articulated in this “Special Conditions of Bid”. The Department therefore reserves the right and discretion, during its evaluation and other administrative processes to:

23.1.1 Limit its correspondences for corrections/ ratifications/ clarities to potential higher point scoring bidders only and to

23.1.2 Further evaluate any potential qualifying lower scoring bidder(s) as “deemed responsive” or giving points, etc., without requesting the corrections/ ratifications of a matter which is eligible as per the “Special Conditions of Bid”.

– End Special Conditions of Bid –
(Version: Approved 18 July 2025)

FACILITIES MANAGEMENT CONDITIONS OF CONTRACT (DPW)

SEPT. 2005 VERSION 1

PA-10 (FM): CONDITIONS OF CONTRACT

1. *DEFINITIONS*

1.1. *The following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:*

1.1.1. *"Additional Services" are increases in the quantity of the routine Services detailed in the Scope of Works.*

1.1.2. *"Bill of Quantities" means the document so designated in the Pricing Data that describes the Services and indicates the quantities and rates associated with each item which the Employer agrees to pay the Service Provider for the Services completed;*

1.1.3. *"Certificate of Completion" means the certificate issued by the Service Manager signifying that the Contract has expired;*

1.1.4. *"Commencement Date" means the date on when the Service Provider is notified of the Employer's acceptance of its offer;*

1.1.5. *"Contract" means the Contract signed by the Parties and of which these Conditions of Contract form part of, and such amendments and additions to the Contract as may be agreed in writing between the Parties;*

1.1.6. *"Contract Data" means the specific data, which together with these Conditions of Contract, Scope of Works and Pricing Data collectively describe the risks, liabilities and obligations of the contracting Parties and the procedures for the administration of the Contract;*

1.1.7. *"Contract Period" is from Commencement Date for the period stated in the Contract Data;*

1.1.8. *"Contract Price" means the price to be paid for the Services in accordance with the Pricing Data, subject to such additions thereto or deductions there from as may be made from time to time under the provisions of the Contract;*

1.1.9. *"Contract Sum" refers to the amount stated by the Service Provider in the Form of Offer and Acceptance;*

1.1.10. *"CPAP" means contract price adjustment provisions used for the adjustment of fluctuations in the cost of labour, plant and materials and goods as stated in the Contract Data;*

1.1.11. *"Day" means a calendar day;*

1.1.12. *"Drawings" means all drawings, calculations and technical information which are made available to the Service Provider for inspection at a venue and time to be announced by the Service Manager and any modifications thereof or additions thereto from time to time approved in writing by the Employer or delivered to the Service Provider by the Employer;*

1.1.13. *"Employer" means the contracting Party named in the Contract Data who appoints the Service Provider;*

1.1.14. *"Equipment" includes all appliances, tools implements, machinery, articles and things of whatsoever nature required in or for the rendering, completion or defects correction of the Services but does not include materials;*

1.1.15. *"Facilities" means the land and buildings, detailed in the Scope of Works, and any additions, or omission thereto, made available by the Employer for the purposes of the Contract, on, under, over, in or through which the Services are to be rendered or carried out;*

1.1.16. *"Form of Offer and Acceptance" means the written communication by the Employer to the Service Provider recording the acceptance of the Service Provider's offer;*

1.1.17. *"Identified Projects" means any projects, other than routine Services, identified and agreed to by the Parties during the Contract period or any extensions thereto, to be completed in terms of the Contract.*

1.1.18. *"Materials" includes all materials, commodities, articles and things required to be furnished under the Contract for the execution of the Services;*

1.1.19. *"Month" refers to the period commencing on a certain day of a month to the day preceding the corresponding day of the next month;*

1.1.20. *"Parties" means the Employer and the Service Provider;*

1.1.21. *"Pricing Data" means the document that contains the Bill of Quantities and provides the criteria and assumptions, which it will be assumed in the Contract were taken into account by the Service Provider when developing his prices;*

1.1.22. *"Services" means all the work to be performed by the Service Provider during the Contract Period in accordance with the Contract, as more fully set out in the Scope of Works, as amended from time to time by written agreement between the Parties;*

1.1.23. *"Service Provider" means the Tenderer, as named in the Contract Data, whose offer has been accepted by or on behalf of the Employer and, where applicable, includes the Service Provider's heirs, executors, administrators, trustees, judicial managers or liquidators, as the case may be, but not, except with the written consent of the Employer, any assignee of the Service Provider;*

1.1.24. *"Service Manager" means the representative of the Employer named as the Service Manager in the Contract Data. The Employer reserves the right to replace the said Service Manager, by written notice to the Service Provider, without the need to furnish reasons therefor;*

1.1.25. *"Scope of Work" refers to the document which defines the Employer's objectives and requirements and specifications and any other requirements and constraints relating to the manner in which the Services must, or may, be provided or performed;*

1.1.26. *"Service Period" refers to the period indicated in the Contract Data during which the Service Provider shall render the Services required in terms of the Contract;*

1.1.27. *"Transitional Stage" refers to the period indicated in the Contract Data, which commences immediately on the expiry of the Service Period, and during which the Services to be provided by the Service Provider shall include, inter alia, the provision and transfer to the incoming service provider of managerial support and information, as detailed in the Scope of Works.*

2. *INTERPRETATION*

2.1. *In this Contract, except where the context otherwise requires:*

2.1.1 *The masculine includes the feminine and the neuter, vice versa;*

2.1.2 *The singular includes the plural; and vice versa*

2.1.3 *Any reference to a natural person includes a body corporate, firm, association or consortium/joint venture/partnership, vice versa.*

2.2. *The headings to the clauses of this Contract are included for reference purposes only and shall not affect the interpretation of the provisions to which they relate.*

2.3. *Words and phrases defined in any clause shall bear the meanings assigned thereto.*

2.4. *The various parts of the Contract are severable and may be interpreted as such.*

2.5. *The expressions listed in clause 1 bear the meanings as assigned thereto and cognate expressions bear corresponding meanings.*

2.6. *If any provision in a definition clause is a substantive provision conferring rights or imposing obligations on any Party, effect shall be given to it as if it were a substantive clause in the body of the Contract, notwithstanding that it is only contained in the interpretation clause.*

3. *DURATION*

3.1. *The rights and obligations of the Parties to this Contract shall commence on the Commencement Date.*

3.2. *Subject to the terms of clauses 33 and 34 relating to breach and termination respectively, the Contract will commence on the Commencement Date and terminate on the expiry of the Contract Period, unless it is extended in terms of clause 3.3.*

3.3. *The terms or duration of the Contract may be extended as a result of bona fide negotiations between the Parties. No extension of term or duration of the Contract shall however be valid unless the terms and conditions of such extension has been reduced to writing and signed by the authorised representatives of both Parties.*

4. *RIGHTS AND OBLIGATIONS OF THE EMPLOYER*

4.1. *The Employer shall give access to or supply the Service Provider with:*

4.1.1 *All relevant, available data and information required and requested by the Service Provider for the proper execution of the Services; and*

4.1.2 *Such assistance as shall reasonably be required by the Service Provider for the execution of its duties under the Contract.*

5. *RIGHTS AND OBLIGATIONS OF THE SERVICE PROVIDER*

5.1. *The Service Provider shall, in executing his obligations, comply with the Service Manager's written instructions on any matter relating to the Services.*

5.2. *The Service Provider shall take instructions only from the Service Manager or other persons authorised by the Service Manager in terms of Clause 6.*

5.3. *The Service Provider shall not have the power of attorney or authority to enter into any contract or to otherwise bind or incur liability on behalf of the Employer, save where prior written authorisation has been obtained.*

5.4. *The Service Provider shall ensure that it, its employees, agents and representatives have the relevant experience and capacity necessary for rendering of the Services with the reasonable degree of skill, care and diligence that may be expected of professionals providing services similar to the Services.*

5.5. *Should any member of the Service Provider's team, in the opinion of the Service Manager or occupants of the Facilities, misconduct himself or is incompetent or negligent in the delivery of the Services, or whose presence on the Facilities is otherwise considered by the Service Manager, or occupants of the Facilities, on reasonable grounds, to be undesirable, the Employer may, in writing and together with reasons therefor, request that such person be removed. Such person shall not again be employed on the Services without the prior written consent of the Employer.*

5.6. *The Service Provider undertakes to effect such removal, as referred to in 5.5 above, within a day of receipt of the Employer's written request.*

5.7. *The Service Provider shall ensure that reasonable levels of care and responsibility are exercised when using items belonging to the Employer in the delivery of the Services.*

5.8. *During the ongoing provision of the Services the Service Provider shall at all times keep the Facilities clean and in a safe condition.*

5.9. *Notwithstanding anything herein contained to the contrary, it is specifically agreed that the appointment of the Service Provider shall not create an employment contract or relationship between the Parties and the Service Provider or his employees shall therefore not be entitled to any benefits to which the employees of the Employer may be entitled.*

6. *SERVICE MANAGER*

6.1. *The Service Manager shall administer the Contract on behalf of the Employer in accordance with the provisions of the Contract.*

6.2. *The Service Manager may delegate any of his powers and authority and may cancel such delegation, on the prior written notification thereof to the Service Provider.*

6.3. *Such delegation shall continue in force until the Service Manager notifies the Service Provider in writing that the delegation is terminated.*

6.4. *The Service Provider may at any time, prior to giving effect thereto, refer any written order or instruction of the Service Manager's delegatee to the Service Manager who shall confirm, reverse or vary such order or instruction.*

7. *SECURITY*

7.1. *The Service Provider shall provide to the Employer security in the amount and in the form set out in the Contract Data and any expenditure incurred in doing so shall be borne by the Service Provider.*

7.2. *Should the Service Provider fail to select the security to be provided or should the Service Provider fail to provide the Employer with the selected security within 21 days from Commencement Date, it shall be deemed that the Service Provider has selected a security in the form of a retention of 2.5 % of the Contract Sum (excl. VAT).*

8. *SECURITY CLEARANCE*

8.1. *In the event of security clearance becoming necessary, the Service Provider, any subcontractors and all human resources utilized by the Service Provider undertake to undergo security clearance, for which purpose the necessary forms will be made available to the Service Provider at the relevant time by the Employer. The Service Provider accepts that if he or any of his human resources refuses to undergo the required security clearance, they will not be allowed on the Facilities to render the Services.*

8.2. *It is required that all persons engaged in the rendering of the Services shall be easily identifiable and where required, security cleared.*

9. *CONFIDENTIALITY*

9.1. *The Service Provider undertakes to keep any and all information, of whatever nature, relating to the Contract or which he becomes privy to due to his presence at the Facilities, strictly confidential and such shall not be sold, traded, published or otherwise disclosed to anyone in any manner whatsoever, including by means of photocopy or other reproduction, without the Employer's prior written consent. As disclosure or improper use of the confidential information, without the Employer's prior written consent, will cause the Employer harm:*

9.1.1 *the Service Provider shall be liable for any loss or damages suffered by the Employer and shall indemnify the Employer against any claims by third parties as a result of such unauthorised disclosure or use thereof , either in whole or in part; and/or*

9.2.1 *the Employer shall be entitled to cancel the Contract*

9.2. *The Service Provider shall be entitled to disclose such confidential information to the following persons, who have a clear need to know interest, in order to assist with the rendering of the Services on the Contract:*

9.2.1 *employees, officers and directors of the Service Provider; and*

9.2.2 *any professional consultant or agent retained by the Service Provider for the purpose of rendering the Services, provided that the identity of such consultant or agent is made known to the Employer in writing and the Employer acknowledges in writing that the confidential information may be disclosed to such person.*

9.3. *The Service Provider shall be responsible for ensuring that all persons to whom the confidential information is disclosed under this Contract shall keep such information confidential and shall not disclose or divulge the same to any unauthorised person.*

9.4. *The confidential information shall remain the property of the Employer and the Employer may demand the return or destruction thereof, at the cost of the Service Provider, at any time upon giving written notice to the Service Provider. Within ten (10) days of receipt of such notice, the Service Provider shall return all of the original confidential information and shall destroy all copies and reproductions (both written and electronic) in its possession or in the possession of persons to whom it was disclosed and furnish a certificate to the Employer stating as much.*

10. *AMBIGUITY IN DOCUMENTS*

10.1. *The several documents forming the Contract are to be taken as mutually explanatory of one another and any ambiguity in or discrepancy between them shall be explained and, if necessary, rectified by the Service Manager who shall thereupon issue to the Service Provider a written explanation giving details of the adjustments, if any, and a written instruction directing what Service, if any, is to be delivered.*

11. *INSURANCES*

11.1. *It is the responsibility of the Service Provider to assess his risks on this project and to ensure that he obtains and maintains the adequate insurances to cover such risks.*

12. *ACCESS TO THE FACILITIES AND COMMENCEMENT OF THE SERVICES*

12.1. *The Service Provider shall provide the Employer, within 21 days of the Commencement Date, with an acceptable health and safety plan and such other information required in terms of the Occupational Health and Safety Act (85 of 1993).*

12.2. *The Service Period shall commence 30 days from Commencement date, or on such other date as maybe specified in the Contract Data*

12.3. *Notwithstanding the provision of 12.2, the Service Provider shall be given access to the Facilities or portions thereof, only after the provision by the Service Provider of an acceptable health and safety plan and of security clearance being obtained in terms of Clauses 12.1 and 8.1 respectively.*

12.4. *The Service Provider shall be given access to the Facilities or portions thereof and shall render the Services in accordance with its programme, referred to in clause 13 or after the receipt by him of a written instruction to this effect.*

12.5. *If the Employer fails to give the Service Provider access to the facility or any portion thereof for any reason other than default by the Service Provider and the Service Provider suffers additional costs as a result thereof, the Service Provider shall be entitled to make a claim therefor provided that the Service Provider is able to prove his claim and that he has taken all reasonable steps to mitigate the additional costs.*

13. *PROGRAMME*

13.1. *The Service Provider shall deliver to the Service Manager within 14 days from Commencement Date, a realistic programme and a cash flow for the delivery of the Services. The programme shall describe and detail the order in which the Services are to be rendered and shall be subject to the approval of the Service Manager, which written approval shall not be unreasonably withheld.*

13.2. *The Service Provider shall, on receipt of a written request from the Service Manager, furnish the Employer with any documents or information, of whatever nature, in support of the programme and/or in relation to the manner in which the Services are to be rendered and/or the resources to be supplied and used in the rendering of the Services and/or progress of the various parts of the Contract; and/or a detailed cash flow forecast.*

13.3. *A programme and the cash flow forecast will be submitted in terms of 13.1 and reviewed quarterly or as circumstances may require.*

13.4. *Agreement to the programme by the Service Manager or any adjustment thereto will not alter the responsibilities of the Service Provider in terms of this Contract.*

14. *SUBCONTRACTING*

14.1. *The Service Provider may subcontract any part of the Services at its discretion. The subcontracts shall incorporate the applicable terms, conditions and requirements of this Contract.*

14.2. *Subcontracting by the Service Provider shall not be construed as relieving the Service Provider from any obligations under the Contract or imposing any liability on the Employer.*

15. *INTELLECTUAL PROPERTY RIGHTS INDEMNITY*

15.1. *The Service Provider undertakes to obtain the necessary consent from the proprietors or their licensees should the Service Provider make use of the intellectual property of any other person.*

15.2. *The Service Provider further indemnifies the Employer against any claim or action (including costs on an attorney and client scale) caused by or arising from the failure to obtain such consent.*

16. *COMPLIANCE WITH LEGISLATION*

16.1. *This clause applies to legislation emanating from national and provincial government as well as that of any local authorities in whose area of jurisdiction the Facilities fall and which have a bearing on the delivery of the Services and Facilities under this Contract.*

16.2. *All the applicable legislation, which does not specifically allow discretion in respect of compliance by the Employer, shall be followed exactly as intended by such legislation regardless of any instructions, verbal or in writing, to the contrary.*

16.3. *Should any applicable legislation allow discretion in respect of compliance by the Employer it shall be followed exactly as intended by the relevant legislation as if no discretion is allowed until such time as specific instructions in writing are issued to the Service Provider by the Service Manager.*

16.4. *The Service Provider shall in the provision of the Services comply with the provisions of, and give all notices and pay all fees, taxes, levies and other charges required to be given or paid in terms of any legislation or imposed by any other body or person. The Service Provider hereby indemnifies the Employer against any liability for any breach of the provision of this clause.*

16.5. *It is the responsibility of the Service Provider to obtain the consents, permissions and/or permits, referred to in Clause 16.4, in the provision of the Services.*

16.6. *The Service Provider shall not have a claim against the Employer, and the Employer shall not be liable to refund the Service Provider for any of the fees, taxes, levies and other charges referred to Clause 16.4.*

17. *REPORTING OF INCIDENTS*

17.1. *In addition to the above, the Service Provider shall, as soon as possible, notify the Employer in writing of any incidents at the Facilities, which resulted or could have resulted in damage to property or injury or death to persons.*

17.2. *The Service Provider shall verbally notify the Service Manager of any of the incidents referred to in 17.1 immediately after the occurrence thereof.*

17.3. *The Service Provider shall follow up the verbal notification referred to in 17.2 with a detailed written report on such incidents to the Service Manager within the time frame indicated by the Service Manager, but in any event within 48 hours of the incident.*

17.4. *The written report referred to in 17.3 shall provide for all incidents, which resulted in injury, death or damage to property.*

17.5. *The Service Provider shall notify the Employer immediately, on becoming aware of the Contract requiring him to undertake anything that is illegal or impossible*

18. *NUISANCE*

18.1. *The Service Provider shall deliver the Services in a manner that shall not cause unnecessary noise, nuisance, or hinder the normal activities in the Facilities.*

18.2. *The Service Provider hereby indemnifies the Employer against any liability arising out of the Service Provider's non-compliance with his obligations in terms of Clause 18.1.*

19. *MATERIALS, WORKMANSHIP AND EQUIPMENT*

19.1. *All Services delivered, and materials and workmanship shall comply with the requirements of this Contract, the manufacturer's specification; good industry practice and the Service Manager's written instructions and shall be suitable for the purpose intended.*

19.2. *The Service Provider shall, in accordance with the Scope of Works or if instructed by the Service Manager, carry out tests demonstrating the acceptability of the relevant Services provided, or the suitability of materials or equipment to be used.*

19.3. *The Service Provider shall provide all necessary assistance, labour, materials, testing equipment and instruments for the purpose of such tests to be performed by himself or, if so instructed by the Service Manager, for the purposes of tests to be performed by any other person.*

19.4. *All costs for tests carried out shall be deemed to be included in the Service Provider's prices*

19.5. *Copies of the reports on the tests referred to in Clause 19.2 shall be forwarded by the Service Provider to the Employer within 10 days of the tests being completed.*

20. *URGENT WORK*

20.1. *The Employer may, by itself or through another service provider, effect any remedial or other repair work which becomes necessary due to no act or omission on the part of the Service Provider.*

20.2. *If the remedial or repair work became necessary due to an act or omission on the part of the Service Provider, its employees, agents or representatives, the Service Provider shall effect such remedial or repair work at its own cost.*

20.3. *If the remedial or repair work is urgently necessary due to an act or omission on the part of the Service Provider, its employees, agents or representatives and the Service Provider*

refuses to or is not available or able to effect such remedial or repair work, the Employer may effect such remedial or repair work either by itself or through another service provider.

20.4. *If the Employer effects the remedial or repair work in terms of 20.3, then the Employer may recover such costs, losses or damages from the Service Provider or by deducting the same from any amount still due under this Contract or under any other contract presently or hereafter existing between the Employer and the Service Provider and for this purpose all these contracts shall be considered one indivisible whole.*

21. *INDEMNIFICATIONS*

21.1. *The Service Provider shall be liable for and hereby indemnifies the Employer against any liability, claim, demand, loss, cost, damage, action, suits or legal proceedings whether arising in common law or by statute consequent upon:*

21.1.1 *personal injuries to or the death of any person arising out of, related to, occasioned by, attributed to, or in the cause of or caused by the rendering of the Services;*

21.1.2 *loss of or damage to any movable or immovable or personal property or property contiguous to the Facilities whether belonging to or under the control of the Employer or any other body or person arising out of, related to, occasioned by, attributed to, or in the cause of or caused by reason of the rendering of the Services;*

21.1.3 *any liens, attachments, charges or other encumbrances or claims upon or in respect of any materials parts, work-in-process or finished work furnished to, or in respect of which any payment has been made by the Employer.*

21.2. *The Employer accepts liability for all acts or omissions of its employees, agents or representatives.*

22. *VARIATIONS*

22.1. *The Employer may at any time during the Contract Period, vary the Services by way of additions, omissions, or substitutions.*

22.2. *No variation by the Employer of whatever nature shall vitiate the Contract.*

22.3. *Any Services required by the Employer outside of the Services as referred to in the Scope of Works will be regarded as being Identified Projects and shall be dealt with under clause 23 and shall be executed as a variation order.*

22.4. *The Service Provider shall inform the Employer of any instructions that are deemed to be Additional Services prior to such instructions being executed.*

22.5. *Additional Services will only be executed by the Service Provider after receipt by him of a written instruction from the Service Manager.*

22.6. *If no prior written authorisation, as required in 22.5 above, has been obtained, the Employer shall not reimburse the Service Provider for the Additional Services so executed, and the Service Provider agrees that it shall not have a claim for payment for such Additional Services.*

22.7. *The Additional Services will be valued at the rates in the Pricing Data.*

23. *IDENTIFIED PROJECTS*

23.1. *The Service Provider shall inform the Employer of any instructions that are deemed to be Identified Projects prior to such instructions being executed.*

23.2. *The Employer is not obliged to engage the services of the Service Provider on Identified Projects. The Employer may, by itself, through another service provider or through the Service Provider effect the services/works under Identified Projects.*

23.3. *Identified Projects will only be executed by the Service Provider after receipt by him of a written instruction from the Service Manager.*

23.4. *If no prior written authorisation, as required in 23.3 above, has been obtained, the Employer shall not reimburse the Service Provider for the Identified Projects so executed, and the Service Provider agrees that it shall not have a claim for payment for such Identified Projects.*

23.5 In respect of the Identified Projects, the written instruction referred to in 23.3 shall:

(a) describe the services/works required to be executed by the Service Provider under the Identified Project;

(b) state the due commencement and completion dates of the relevant Identified Project;

(c) state the total cost of the relevant Identified Project as agreed to between the Parties; and

(d) any additional requirements, conditions of contract and/or restrictions, other than those already stated in the Contract, that will be applicable.

23.6 Within 14 days of receipt of the written instruction referred to in 23.5, the Service Provider shall furnish the Employer with a realistic programme and a cash flow for the relevant Identified Project as required in 13.

23.7 Where an Identified Project comprises services/works that are of the same or similar character executed under the same or similar conditions as those to which the rates in the Pricing Data apply, it shall be valued at such rates.

23.8 Where an Identified Project comprises services/works that are not of the same or similar character executed under the same or similar conditions as those to which the rates in the Pricing Data apply, it shall be valued at market related rates to be agreed to in writing between the Employer and the Service Provider and in advance of executing the Identified Project. Failing agreement, the rates applicable shall be as determined by the Employer.

23.9 If the Service Provider fails to complete the Identified Project by the completion date specified in the written instruction referred to in 23.3, then the Service Provider will be liable for a penalty, at the rate stated in the Contract Data, for every day that lapses from the due completion date of the relevant Identified Project to the date of the actual completion of such Identified Project.

23.10 If the Identified Projects are delayed by variations, omissions, additions, substitutions or organised work stoppages by any workman not due to any action on the part of the Service Provider, exceptionally inclement weather, any substantial increase in provisional quantities or any other cause beyond the Service Provider's control, including delays caused by the Employer, then the Service Provider shall be entitled to apply in writing within 21 days of the cause of delay arising to the Service Manager for extension of the due completion date of the relevant Identified Project stating the cause of delay and period of extension applied for.

23.11 If during the period for completion of the Identified Project or any extension thereof abnormal rainfall or wet conditions occur, the formula below shall be used to calculate separately the delay for each calendar month or part thereof. It shall be calculated each month during the period referred to herein above, or until the issue date of the certificate of completion for the relevant Identified Project, whichever is the shorter period. The delay calculated for a given month shall be used to determine the interim extension of time granted for the month. At the end of the applicable period referred to above, the aggregate of the monthly delays will be taken into account for the final determination of the total extension of time for the Contract:

$$V = \frac{(Nw - Nn) + (Rw - Rn)}{X}$$

V = Delays due to rain in calendar days in respect of the calendar month under consideration.

Nw = Actual number of days during the calendar month on which a rainfall of Y mm or more per day has been recorded

Rw = Actual rainfall in mm for the calendar month under consideration.

Nn = Average number of days in the relevant calendar month (as derived from existing rainfall records provided in the project specifications) on which a rainfall of Y mm or more per day has been recorded.

Rn = Average rainfall in mm for the calendar month, as derived from the rainfall records supplied in the project specifications.

X = 20, unless otherwise provided in the project specifications.

Y = 10, unless otherwise provided in the project specifications.

The total delay that will be taken into account for the determination of the total extension of time for the Contract shall be the algebraic sum of the monthly totals for the period under consideration. But if the grand total is negative, the time for completion shall not be reduced on account of abnormal rainfall. The total extension of time for any calendar month shall not exceed (Nc – Nn) calendar days, where Nc = number of days calendar days in the month under consideration

The factor (Nw – Nn) shall be considered to represent a fair allowance for variations from the average number of days during which rainfall equals or exceeds Y mm per day.

The factor (Rw – Rn) ÷ X shall be considered to represent a fair allowance for variations from the average for the number of days during which rainfall does not equal or exceed Y mm per day, but when wet conditions prevent or disrupt work.

This formula does not take into account any flood damage, which could cause further or concurrent delays and which should be treated separately in so far as extension of time is concerned.

Accurate rain gaugings shall be taken at a suitable point on the site daily at 08:00 unless otherwise agreed to by the Service Manager, and the Contractor shall, at his own expense, take all necessary precautions to ensure that the rain gauges cannot be interfered with by unauthorized persons.

Information regarding existing rainfall records, if available from a suitable rainfall station near the site, will be supplied in the project specifications, together with calculations of rain delays for previous years in accordance with the above formula. The average of these delays will be regarded as normal rain delays which the Contractor shall accommodate in his programme, and for which no extension of time will be considered.

23.12 Upon receipt of such written application, referred to in 23.10, the Employer may in writing extend the due completion date of the relevant Identified Project by a period to be determined by the Employer or may refuse to extend the due completion date of the relevant Identified Project. The due completion date of an Identified Project may not be extended beyond the end of the Contract Period stated in the Contract Data.

23.13 Any decision given by the Employer, in terms of 23.12, shall be final and binding on the Parties.

23.14 Should the Service Provider fail to apply in writing for an extension of the due completion date of the relevant Identified Projects within the 21 days referred to in 23.10, or should the Employer not grant an extension of the due completion date then the due completion date stipulated in the relevant written instruction referred to in 23.5 shall not be extended nor the

Service Provider exonerated from liability to pay the penalty stipulated in 23.9 or from specific performance of the service/works within the period in the relevant written instruction.

24. *SUSPENSION OF THE SERVICES*

24.1 *The Service Provider shall, on the written order of the Service Manager, suspend the provision of the Services or any part thereof for such time or times and in such manner as the Service Manager shall order and shall, during such suspension, properly protect the Services so far as is necessary.*

24.2 *If the Service Provider is instructed in writing by the Service Manager to suspend any or all of the Services, the Service Provider shall re-schedule the relevant Services. For the duration of such suspension all penalties applicable to that Service will be waived. Should the Service Provider suffer any additional costs resulting from such suspension, the Service Provider shall be entitled to make a claim therefor provided that the Service Provider shall prove his claim and that he has taken all reasonable steps to mitigate the additional costs.*

24.3 *If the Service Provider is unable to render any of the Services for any reason other than an instruction by the Employer to suspend the Services in terms of clause 24.1, the Employer shall not be liable for any claim of whatever nature, including a claim for costs, by the Service Provider.*

25. *PENALTY FOR NON-PERFORMANCE*

25.1 *The Service Provider shall be liable for a performance deduction, if the Service Provider in rendering any of the Services required under the Scope of Works, as amended from time to time,*

25.1.1 *delays in performing any of the Services;*

25.1.2 *fails to perform any of the Services;*

25.1.3 *fails to perform any of the Services to the standard required in the Scope of Works, as amended from time to time.*

25.2 *The performance deduction shall be calculated in accordance with the formula detailed in the Scope of Works.*

25.3 *The Service Provider shall not be liable for a performance deduction, if the Service Provider is unable to perform due to no fault of his own, his employees, agents or representatives.*

26. *PAYMENTS*

26.1 *The Service Manager will evaluate the Service Provider's performance on a monthly basis.*

26.2 *The Service Provider shall submit a monthly certificate taking into account the following:*

26.2.1 *the assessment of the Services rendered during the assessment month, including routine services, management fees, and services using call down rates;*
26.2.2 *adjustments in terms of the pricing data;*

26.2.3 *additional work rendered by the Service Provider;*

26.2.4 *CPAP adjustment where stated in the Contract Data; and*

26.2.5 *VAT. Vat will be indicated separately in all documents.*

26.3 *If the Service Provider elects a security of 2,5% retention, or a 1,25% cash and 1,25% retention, then 5% of all moneys (excl. VAT) in the monthly certificate assessed by the Service Manager as being due to the Service Provider will be retained until such time as the*

amount retained equals 2.5% or 1,25%, whichever is applicable, of the Contract Sum (excl. VAT)

26.4 *The monthly certificate shall be supported by a detailed report substantiating the Services rendered at each Facility during the month under assessment.*

26.5 *The monthly certificate shall be assessed by the Service Manager. If the Service Manager agrees with the certificate, he will issue a statement within 14 days of the receipt of the certificate, taking into account inter alia the following:*

i. Deductions for penalties;
ii. Deductions for overpayments;
iii. Deductions for retention
iv. Deductions for damages.

26.6 *The Service Provider shall, on receipt of the statement referred to in 26.5, issue to the Employer a tax invoice in the amount reflected in the statement. The Employer shall effect payment to the Service Provider within 16 days of receipt of the tax invoice.*

26.7 *If the Service Manager does not agree with the certificate issued by the Service Provider in terms of Clause 26.2, the Service Manager shall within 14 days of receipt of the certificate, issue a statement in the amount to which the Service Manager agrees and shall give reasons for rejecting the balance of the claim indicated in the statement.*

26.8 *The Service Provider shall furnish the Employer with a tax invoice in the amount indicated in the statement referred to in Clause 26.7.*

26.9 *With regards to the claim in dispute, the Service Provider may, within 14 days of the Service Manager issuing the statement referred to in 26.7, submit a revised certificate or a justification for his claim or declare a dispute in terms of 34.*

26.10 *If it is later resolved that the amount in dispute or any part thereof is owing to the Service Provider, the Employer shall be liable for interest thereon from 30 days after the issue of the relevant monthly certificate referred to in 26.2 until the date of payment at the interest rate determined from time to time, by the Minister of Finance in terms of section 80 (1)(b) of the Public Finance Management Act, 1999 (Act 1 of 1999), as amended.*

26.11 *All the work shall be evaluated in accordance with the provisions of the Pricing Data.*

26.12 *In assessing the quality of the work presented by the Service Provider, the Employer may enlist the assistance of third persons. In assessing the work the third person shall act reasonably. The selection of such third persons shall be in the absolute discretion of the Employer and the Service Provider shall abide by such selection.*

26.13 *Any and all extra costs incurred by the Service Provider, resulting from the Service Provider having to address and/or rectify queries arising from a claim submitted in respect of work done, shall be for the account of the Service Provider.*

27. *RELEASE OF SECURITY*

27.1 *If the Service Provider has furnished a security by way of a variable guarantee of 2.5% of the Contract Sum (excl. VAT), the security will be reduced and be released in accordance with the provisions of such variable guarantee.*

27.2 *If the Service Provider elects to furnish a security by way of a cash deposit of 2.5% of the Contract Sum (excl. VAT), then the security will be released as follows:*

27.2.1 *annually in equal portions, subject to 27.2.2 and 27.2.3;*

27.2.2 *95% of the last annual portion of retention shall be released within 30 days of the expiry of the Service Period;*

27.2.3 the remaining retention shall be released within 30 days of the issue of the Certificate of Completion.

27.3 If the form of security selected is:

(a) a retention of 2.5% of the Contract Sum (excl. VAT); or
(b) a 1,25% cash deposit and a 1,25% retention of the Contract Sum (excl. VAT),

then security will only be released after the 2,5% or 1,25% retention respectively has been accumulated, as follows:

27.3.1 annually in equal portions, subject to 27.3.2 and 27.3.3;

27.3.2 95% of the last annual portion of retention shall be released within 30 days of the expiry of the Service Period;

27.3.3 the remaining retention shall be released within 30 days of the issue of the Certificate of Completion.

28. *OVERPAYMENTS*

28.1 If any overpayment of whatever nature is made to the Service Provider, the Service Provider shall be obliged to repay such amount to the Employer and the Employer shall be entitled to deduct such over payment from any amount due to the Service Provider, in respect of this Contract or any other contract, which the Employer may have with the Service Provider. The Employer shall be entitled to claim interest on any and all overpayments made to the Service Provider at the rate prescribed, from time to time, by the Minister of Finance in terms of section 80 (1)(b) of the Public Finance Management Act, 1999 (Act 1 of 1999), as amended.

29. *COMPLETION*

28.1 At the expiry of the Service Period the Service Manager shall furnish the Service Provider with a written list of Employer's Assets and Data handed over at commencement of the Contract and accumulated during the Contract Period.

29.2 At the expiry of the Contract Period, the Service Manager shall issue to the Service Provider a Certificate of Completion.

29.3 Upon the issue of a Certificate of Completion, unless otherwise provided in the Contract:

29.3.1 The Guarantee shall be returned, if applicable.

29.3.2 The final cash deposit or retention, whichever is applicable, shall be reduced to zero.

30. *ASSIGNMENT*

30.1 The rights and obligations of the Parties in terms of this Contract shall not be ceded, assigned, delegated, or otherwise transferred, by either Party to any person outside of the Service Provider and the Employer, save with the prior written consent of the other Party.

30.2 Each Party warrants that he is acting as a principal and not as an agent of an undisclosed principal.

31. *INDULGENCES*

31.2 No extension of time, latitude or other indulgences which may be given or allowed by either Party to the other shall constitute a waiver or alteration of this Contract, or affect such Party's rights, or prevent such Party from strictly enforcing due compliance with each and every provision of this Contract.

32. *OWNERSHIP AND PUBLICATION OF DOCUMENTS*

32.1 The Employer will become the owner of the information, documents, advice, recommendations and reports collected, furnished and/or compiled by the Service Provider during the course of, and for the purposes of executing this Contract, all of which will be handed over to the Employer, unless otherwise stipulated in the Contract, within ten (10) days of request therefor, but in any event on the termination and/or cancellation of this Contract for whatever reason. The Service Provider relinquishes its retention or any other rights to which it may be entitled.

32.2 The copyright of all documents, recommendations and reports compiled by the Service Provider during the course of and for the purposes of finalising Services, and the Contract as a whole, will vest in the Employer, and may not be reproduced or distributed or made available to any person outside the Employer's service, or to any institution in any way, without the prior written consent of the Employer. The Employer shall have the right to use such material for any other purpose without the approval of, notification to or payment to the Service Provider.

32.3 The copyright of all electronic aids, software programmes etc. prepared or developed in terms of this Contract shall be vested in the Employer, who shall have the right to use such material for any other purpose without the approval of, information or payment to the Service Provider.

32.4 In case of the Service Provider providing documents or material to the Employer, the development of which has not been at the expense of the Employer, copyright shall not be vested in the Employer. The Service Provider shall be required to indicate to which documents and/or materials this provision applies.

32.5 The Service Provider hereby indemnifies the Employer against any action or claim that may be instituted against the Employer and for any damages suffered or legal costs (including costs on an attorney and client scale) incurred on the grounds of an alleged infringement of any copyright or any other intellectual property right in connection with the work outlined in this Contract.

32.6 All information, documents, recommendations, programmes and reports collected or compiled must be regarded as confidential and may not be communicated or made available to any person outside the Employer's service and may not be published either during the currency of this Contract or after termination thereof without the prior written consent of the Employer.

33. *BREACH OF CONTRACT*

33.1 In the event of a breach by the Service Provider of any of the terms and conditions of this Contract, the Employer shall issue a notice of non- compliance requiring compliance within 10 (ten) days. In the event that the Service Provider fails to remedy such breach on expiry of the notice period, then the Employer shall without prejudice to any other rights that it may have, be entitled to exercise any or all of the following rights:

33.1.1 Enforce strict compliance with the terms and conditions of the Contract;

33.1.2 To terminate this Contract without prejudice to any other rights it may have;

33.1.3 To suspend further payments to the Service Provider;

33.1.4 To appoint other service providers to complete the execution of the Services, in which event the Service Provider shall be held liable for costs incurred in connection with and arising from the appointment of such a service provider as well as damages suffered.

33.2 The Service Provider agrees to, within ten (10) days of written request from the Employer, give access to and to make available all information, documents, programmes, advice,

recommendations and reports collected, furnished and/or compiled by them to enable the Employer to assume responsibility for and the benefit of the project as a whole.

33.3 In the event of breach by the Employer of the terms and conditions of this Contract, and in the event of the Employer remaining in breach after ten (10) days' written notice calling for rectification of the breach, the Service Provider shall be entitled to:

33.3.1 enforce strict compliance with the terms and conditions of the Contract; or

33.3.2 terminate the Contract by delivering written notice to the Employer to that effect to the extent that such breach is of a material term of this Contract.

34. *STOPPAGE AND/OR TERMINATION OF CONTRACT*

34.1 The Employer reserves the right to terminate this Contract or temporarily stop the Services, or any part thereof, at any stage of completion.

34.2 The Employer shall have the right to terminate this Contract without prejudice to any of its rights upon the occurrence of any of the following acts:

34.2.1 on breach of this Contract by the Service Provider as stipulated in Clause 33;

34.2.2 on commencement of any action for the dissolution and/or liquidation of the Service Provider, except for purposes of an amalgamation or restructuring approved in advance by the Employer in writing;

34.2.3 if the Service Provider receives a court order to be placed under judicial management or to commence liquidation proceedings that is not withdrawn or struck out within five (5) days;

34.2.4 if the Service Provider informs the Employer that it intends to cease performing its obligations in terms of this Contract;

34.2.5 if the Service Provider informs the Employer that it is incapable of completing the Services as described; or

34.2.6 if in the opinion of the Employer the Service Provider acted dishonestly;

34.3 The Employer reserves the right to, even in the absence of breach or the events referred to in 34, terminate this Contract at any time, by giving one (1) calendar month written notice to the Service Provider.

34.4 Further, the Contract shall be considered as having been terminated:

34.4.1 where the Employer stops the Contract and/or the Project and instructions to resume or reinstate the Services are not issued within twelve (12) months of the instruction; or

34.4.2 if instructions, necessary for the Service Provider to continue with the Services after a stoppage instruction, are not received from the Employer within three (3) months after such instructions were requested by the Service Provider.

34.5 Should the Contract between the Employer and the Service Provider, or any part thereof, be terminated by either of the Parties due to reasons not attributed to the Service Provider:

34.5.1 The Service Provider will be remunerated for the appropriate portion of the Services satisfactorily completed, calculated in accordance with the agreed rates.

34.5.2 Invoices for work done shall be submitted to the Employer within three (3) months after the termination of the Contract, failing which the Employer will not be obliged to pay same.

34.5.3 The Service Provider shall not be entitled to advance a right of retention or any similar right if this Contract is terminated and specifically agrees to, within ten (10) days of written request from the Employer, give access to and to make available all information, documents, programmes, advice, recommendations and reports collected, furnished and/or compiled by them to enable the Employer to assume responsibility for and the benefit of the Contract as a whole.

35. *DISPUTE RESOLUTION*

35.1 In the event of a dispute, the Parties shall endeavour to resolve such dispute through negotiation, in good faith.

35.2 If the Parties fail to resolve a dispute through negotiation as mentioned in 35.1, within 14 days of a dispute being declared, the Parties may by written agreement refer the matter to mediation.

35.3 The mediator shall be a person agreed to by the Parties, failing agreement, the President: South African Facilities Management Institute shall nominate the mediator.

35.4 Whether or not mediation resolves the dispute and irrespective of the outcome of thereof, the Parties shall bear their own costs arising from the mediation and shall equally share the costs of the mediator and related costs. The mediator and the Parties shall, before the commencement of the mediation, agree on a scale of fees on which the mediator's fees will be based.

35.5 The Parties shall appoint the mediator within 21 days of agreeing to mediate.

35.6 On appointment of the mediator, the Parties shall jointly with the mediator decide on the procedure to be followed, representation, dates and venue for the mediation.

35.7 If the dispute or any part thereof is settled, the agreement shall be recorded by the mediator and signed by both Parties. The agreement shall be binding on the Parties to the extent that it correctly records the issues agreed upon between the Parties.

35.8 If the dispute or any part thereof remains unresolved, it may be resolved by litigation proceedings.

35.9 If the mediator or any Party, at any time during the mediation process, is of the opinion that the mediation will not resolve the dispute, then he may in writing stop the mediation process. The dispute may then be dealt with in terms of 35.8.

35.10 Notwithstanding anything else herein contained to the contrary, it is agreed that irrespective of the fact that the dispute is referred to negotiation, mediation or litigation in court, the decision of the Employer on the dispute involved will immediately be given effect to by the Service Provider and the Service Provider shall proceed with the Services with all diligence unless the Parties agree otherwise in writing.

36. *GENERAL*

36.1 This is the entire Contract between the Parties and may only be amended if reduced to writing and signed by the duly authorised representatives of both Parties, whereafter such amendments will take effect.

36.2 The Contract shall be governed by, construed and interpreted according to the law of the Republic of South Africa.

37. *DOMICILIUM CITANDI ET EXECUTANDI*

37.1 The domicilium citandi et executandi of the Parties for all purposes arising from this Contract for the service of notices and legal process shall be as specified by the Parities in the Contract Data.

37.2 Each of the Parties shall be entitled at any time by way of written notice to the other Party, to change its domicilium citandi et executandi to another physical address.

37.3 Any notice in terms of the conditions of the Agreement must either be:

37.3.1 delivered by hand during normal business hours of the recipient; or

37.3.2 sent by prepaid registered post to the address chosen by the addressee.

37.4 A notice in terms of the provisions of this Agreement shall be considered to be duly received:

37.4.1 if hand-delivered on the date of delivery;

37.4.2 if sent by registered post as indicated in clause 37.3.2 above, ten (10) days after the date it was posted, unless the contrary is proved.

37.5 Notwithstanding anything to the contrary contained or implied in this Agreement, the written notice or communication actually received by one of the Parties from the other, including by way of facsimile transmission, shall be adequate written notice or communication to such Party.

37.6 Any notice, request, consent, or other communication made between the Parties pursuant to the Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or one day after being sent by facsimile to such Party at the number specified in the Contract Data or one week after being sent by registered post to the addressee specified in the Contract Data.

TERMS OF REFERENCE/ SPECIFICATIONS

Bid no: GQET-25/26-034

Bid/ Project Description: EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

TECHNICAL SPECIFICATIONS: SERVICING OF AIR CONDITIONING AND REFRIGERATION EQUIPMENT

2.3.1 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall deemed to form part thereof

SABS and other specifications and codes

SABS 0400	-	The applications of the building regulations
SABS 0142	-	Code of practice for the wiring of premises
SABS 0140	-	Identification colour marking
CKS 332	-	Specifications for industrial V-belts
SABS 044 Parts I to IV	-	Welding
SABS 0103	-	The measurement and rating of environmental noise with respect to annoyance and speech communications
SABS 0139, 1981	-	The prevention, automatic detection and extinguishing of fire in buildings
SABS 0147, 1992	-	Refrigerating systems including plants associated with air-conditioning systems
SABS 1530 Part 1, 1991	-	Panels with two impervious facing sheets

SABS Specifications listed on page 3 of the DPW specification OWG 371

2.3.2 DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS

2.1 OWG 371 - Specification of materials and methods to be used
Standard Specification for electrical installations and equipment pertaining to mechanical installations

2.3.3 OCCUPATIONAL HEALTH AND SAFETY ACT OF 1993

All regulations and statutory requirements as laid down in the latest edition of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) shall be adhered to.

2.3.4 MANUFACTURERS' SPECIFICATIONS, CODES OF PRACTICE AND INSTALLATION INSTRUCTIONS

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

2.3.5 MUNICIPAL REGULATIONS, LAWS AND BY-LAWS

All municipal regulations, laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

2.3.6 VARIATIONS AND ADDITIONS TO STANDARD SPECIFICATIONS

The following additional general specifications and requirements shall be read in conjunction with this specification and shall be adhered to unless otherwise specified in the Particular Specification.

2.3.7 GENERAL REPAIR AND INSTALLATION REQUIREMENTS

- All materials and equipment supplied and installed, shall be of new high quality, design and manufactured to the relevant specifications, suitable for providing efficient, reliable and trouble-free service.
- All work shall be executed in a first-class workman-like manner by qualified tradesmen.
- (All equipment, component parts, fittings and materials supplied and/or installed, shall conform in respect of quality, manufacture, test and performance to the requirements of the applicable current SABS specifications and codes, except where otherwise specified or approved by the Engineer in writing.
- All materials and workmanship which, in the opinion of the Engineer, is inferior to that specified for the work will be condemned. All condemned material and workmanship shall be replaced or rectified as directed and approved by the Engineer.
- The Contractor shall submit a detailed list of the equipment and material to be used to the Engineer for approval before placing orders or commencing installation.
- All new equipment, materials and systems shall be installed and positioned such as not to impede on access routes, entrances and other services. The Contractor shall coordinate these items taking other services and equipment into account.
- All control equipment and serviceable items shall be installed and positioned such that they will be accessible and maintainable.
- The Contractor shall make sure that all safety regulations and measures are applied and enforced during the repair and construction periods to ensure the safety of the public and the User Client.
- Repair work shall be programmed in accordance with Additional Specification SC: General
- Decommissioning, Testing and Commissioning Procedures, to ensure the shortest possible down-time of any service, and the least inconvenience to the User Client and the public. The Contractor shall make sure that the necessary notifications and notices are timeously put into place for these activities.

2.3.8 TESTS AND INSPECTIONS ON COMPLETION OF REPAIR WORK

Except where otherwise provided in the Contract, the Contractor shall provide all labour, materials, power, fuel, accessories and properly calibrated and certified instruments necessary for carrying out such tests. The Contractor shall make arrangements for such tests and he shall give at least 72 hours written notice to the Engineer before commencing the test.

In the event of the equipment not passing the test, the Employer shall be at liberty to deduct from the Contract amount all reasonable expenses incurred by the Employer or the Engineer attending the repeated test.

Whenever any equipment is operated for testing or adjusting as provided for above, the Contractor shall operate the entire system for as long a period as may be required to prove satisfactory performance at all times in the occupied space served by that system for up to twenty-four hours a day continuously until the system is handed over.

The Contractor shall provide all labour and supervision required for such operation and the Department may assign operating personnel as observers, but such observation time shall not be counted as instruction time.

After completing the installation or system, all equipment shall be tested, adjusted and readjusted until it operates to the satisfaction and approval of the Engineer.

The Contractor shall submit certificates of tests carried out to prove the efficiency of all equipment, as well as certificates to be obtained from all relevant authorities and statutory bodies, etc.

The Contractor shall only utilise Departmental approved inspection authorities for all inspections and tests to be conducted. This will be done and approved in writing between the relevant parties.

2.3.9 SERVICING OF AIR CONDITIONING & REFRIGERATION EQUIPMENT SPECIFICATIONS

2.3.9.1 Servicing of Small Air Conditioning Units in the East London and Queenstown Area:

The contractor shall undertake the required servicing and repairs to all the Small Air Conditioning units as detailed below, and in accordance with all the relevant specifications.

The maintenance work shall be executed in accordance with all the relevant codes of practices, statutory regulations, standards, regulations, municipal laws and by-laws and the manufacturer's specifications and codes of practice.

The maintenance work and items are to be categorized by the Contractor for each maintenance activity under the following heading:

2.3.9.2 Air Conditioning Units & Plant:

GENERAL

- Check casings for corrosion and clean, treat and paint if necessary.
- Re-fix loose insulation.
- Check filter dryers.
- Check superheat and functioning of expansion devices.
- Check operation of HP and LP switches.
- Check operation of controls.
- Clean all grilles and diffusers.
- Check all painted surfaces and repair if required.
- Check all mountings and anti-vibration mountings.
- Clean condenser coils.
- Clean all condensate drain pans and pipes.
- Clean all filter frames and seals.
- Clean fan blades.
- Grease all bearings.
- Check motor speed and rotational direction.
- Check motor and compressor voltages and currents.
- Check overload settings.
- Check fan blades.
- Check all electrical connections.

MECHANICAL COMPONENTS

- Refrigerant piping and components forming part of the refrigerant circulation system shall be checked as a system.

Carry out a visual inspection on the condensing unit for blockages on the condenser, loose components and correct operation of the condenser fan.

Carry out a visual inspection on the evaporator for blockages, loose components and correct operation of the evaporator fan.

- Do a thorough leak test on all the piping and all components. For this test all evaporators and blower units shall be defrosted and dry on the outside.
- Check alignment and condition of bearings.
- Check alignment and condition of valves.
- Check tension and condition of V-belts.
- Check sight glass with condensing unit running for moisture/bubbles.
- Any damaged panel, foot piece, fan shroud, etc, shall be repaired.

- All service valves shall be checked for full operation, seals checked, shaft ends checked and caps provided where caps are missing.
- Mechanical operation of fans and pumps shall be checked and repaired.

- The superheat setting of thermostatic expansion valves unit shall be checked and readjusted.
- The condition of the filter driers shall be checked.
- All seals on the compressors must be checked.
- (Check the condition of all pipe hangers, fixing of pipes and condition of pipe lagging.

CONTROL SYSTEMS

- Check and reset all pressure switches.
- Check and reset all pressure safety switches.
- Check and reset thermostats.
- Check and readjust timer controller on freezer systems.

ELECTRICAL SYSTEMS

- Check all connections on terminal strips, circuit breakers, contactors, relays.
- Check running currents of all electrical switches and compressors.
- Check settings of over voltage and under voltage protection system.
- Check the condition of all cables.

REFRIGERATED ROOM AND CABINETS

- Replace faulty door seals.
- Replace door threshold, if damaged.
- Replace faulty door and condensate heater tapes in freezer rooms.
- Check operation of door latch, hinges and locking mechanism.
- Check operation of the safety release on the door lock.
- Check and repair cord/freezer room light and remote indicator.
- Check racks and rails for rigidity, repair and replace if necessary.
- Check air passages for blockages and unblock.
- Clear all drip trays and condensate drains.

2.3.9.3 Servicing of Refrigeration Units in the East London and Queenstown Area:

The contractor shall undertake the required servicing and repairs to all the Refrigeration plant as detailed below, and in accordance with all the relevant specifications.

The maintenance work shall be executed in accordance with all the relevant codes of practices, statutory regulations, standards, regulations, municipal laws and by-laws and the manufacturer's specifications and codes of practice.

2.3.10 GUARANTEE OF INSTALLATION AND EQUIPMENT

The Contractor shall provide guarantees obtained from the manufacturer(s) and/or supplier(s) to the effect that each piece of new equipment, supplied and installed under the repair contract, complies with the required performance and will function as part of the complete system.

All new equipment including the complete new installations and the systems as a whole shall be guaranteed for a period of 12 (twelve) months commencing on the day of issue of a certificate of completion for repair work of the installation.

2.3.11 REPAIR WORK TO INSTALLATIONS, SYSTEMS AND EQUIPMENT

2.3.11.1 GENERAL

During the repair and maintenance contract all the systems, installations and equipment shall be repaired as specified in this Specification.

All repair work shall be executed with approved materials and equipment suitable to the systems and/or installations they serve. The said repair work shall be executed in accordance with the relevant codes of practice, standards, regulations, municipal laws and by-laws, manufacturer's specifications and codes of practice and all additional and particular specifications included in this document.

All repair work shall be executed within the specified durations as listed in the Tender. All new equipment, materials and systems shall be furnished with a written guarantee of a defects liability period of 12 months from date of issue of a certificate of completion for the repair work. These guarantees shall be furnished in favour of the Department of Public Works. On completion of the required and specified repair work the systems, installations and equipment shall be commissioned and handed over to the satisfaction of the Engineer.

2.3.12 DESCRIPTION OF SITE AND ACCESS

The East London & Queenstown area consists of all the client departments of the National Department of Public Works in the following areas and towns:

- East London Area
- Queenstown Area

The Contractor shall be responsible for making arrangements with the Officer in charge of each site or building regarding the availability of the installation to the Contractor for inspection for the purpose of preparing his Bid

Should the work fall within a security area, the contractor must obtain access cards for his personnel and employees who work within such an area.

The contractor must comply with any regulations or instructions issued from time to time, concerning the safety of persons and property, by the various client departments

The Department may require the Contractor to have his personnel or a certain number of them security classified.

In the event of either the Department, or the S.A. Police Services requesting the removal of a person or persons from the site for security reasons, the Contractor shall do so forthwith and the Contractor shall thereafter ensure that such person or persons are denied access to the site and/or to any documents or information relating to the work.

2.3.13 DETAILS OF CONTRACT

The contractor shall inform the Department at least 7 days prior to servicing as to which equipment will be serviced, so as to enable the Department to arrange for inspections if it is considered necessary.

The appointed Contractor shall be responsible for making arrangements for the purpose of Maintenance, Servicing and Repairs. In the event of the Contractor failing to make such arrangements, admission to the site may be refused by the Officer in charge and the Department will not be responsible for any additional costs which the Contractor may incur by such a refusal.

The Contractor shall report in writing to the Department any contravention's of the Act and Code as far as the installation is concerned.

The Department reserves the right to inspect the Contractor and his Suppliers' works to assess calibration, testing, storage and handling facilities to assure itself of the capabilities of the Contractor to perform in

accordance with the Specifications and delivery requirements of the Bid

In the event of failure of the Contractor to maintain and/or repair any installation to the satisfaction of the Department, the latter reserves the right to make any arrangements necessary or expedient in regard to said maintenance and/or repairs to any installation appearing in the document attached hereto, and the

Contractor shall be liable to the State for payment of any additional expenditure thereby incurred, as well as for payment of damages which the State may have suffered as a result of the Contractor's default or negligence.

In the event of it becoming evident that there is any deterioration or defects, in part or as a whole of the system or systems to be maintained under this contract, especially towards the end of the maintenance contract period, such a deterioration or defect shall be rectified and made good by the Contractor. Failure to do so, either the incoming Contractor or others will do such rectification and the cost thereof shall then be for the account of the outgoing Contractor.

All quantities in this tender are provisional and inserted in order to obtain competitive tenders. The Department reserves the right to increase or decrease quantities during the progress of the contract and such increases or decreases shall not alter the rates for any item. Payment will be as set out in clauses 13. to 19. of this document

The Contractor shall be a certified company and employed technicians shall have a valid operating certificate for the full duration of the Bid.

2.3.14 REPLACEMENT PARTS

Replacement parts, spares and materials used must be of equal specification to the component that is being replaced and must where possible carry the SANS mark of approval, but can be of a different size if specifically required by the Department. If such equivalent component is not available, then the alternative component must be approved by the Department prior to installation.

A representative of the client department must sign for spares that have been used in the execution of services and details entered on the Job Cards.

The serial numbers of original and new components shall be entered on job cards and invoices presented for payment. The guarantee cards for items must also be attached to job cards.

2.3.15 CONSTRUCTION AND MANAGEMENT REQUIREMENTS

The Contractor undertakes to:

- Arrange with the occupants of buildings regarding access to the
- premises in order to execute the required services.
- Take adequate precautions to prevent damage to buildings, fittings and
- furnishing inside the premises and elsewhere on the site.
- Accept liability and to indemnify the Department against any claims
- whatsoever arising from his conduct and/or the conduct of his employees.
- Safeguard all his employees in accordance with the regulations of the Unemployment Insurance Act 1966, (Act no. 30 of 1966) and any amendments thereof.
- Comply with all By-laws and requirements of the local authority.
- Comply with the local Fire Officer's regulations.

Should the contractor be uncertain about the scope of any work to be executed under this contract, the Department must be immediately requested to clarify its instructions.

An official order number for this contract will be issued to the contractor.

The contractor shall only service items in the quantity as listed in the activity schedule. Should the contractor upon servicing of the items find that there are more items on the premises to be serviced in addition to those listed in the activity schedule, he shall not service those items prior to receipt of written authorization received from the Employer's representative.

No payments will be made for services executed without the necessary written authority.

Non scheduled transport costs will be calculated according to the distance traveled from the main Post Office in East London to the site/building where the work is to be executed and back.

The Contractor must provide at his own cost a supply of Job Cards in accordance with the example included herein. The Job Card must be completed legibly in ink after completion of each service. In addition to the original completed Job Card submitted with the account, the contractor shall submit a copy of the Job Card to the client Department for audit purposes.

Accounts for services rendered, must be accompanied by a Job Card and the fully completed checklist (Schedule A) signed and dated.

The unit rates for items on the Job Card must be cross-referenced to the applicable rates for similar items in the Activity Schedule.

Any errors in the compilation of the Job Cards or accounts discovered at a later stage, shall be rectified and the overpayment recovered by the Department.

Unit prices for items of work executed but not specified in this contract, must be verified by means of invoices of Suppliers.

The amount of such invoices, after deduction of any discount, will be taken into account for payments to the Contractor. If such invoices are not submitted, accounts will not be paid.

Payment of accounts complying with all the requirements of this contract will be made within 21 days after certification thereof. All relevant invoice documentation and the completed checklist and floor plan, signed, dated and stamped, must be attached to each individual account.

Any normal discounts allowed to the contractor shall be passed on to the Department. When determining the profit on non-scheduled material the contractor shall FIRST DEDUCT ANY VALUE ADDED TAX from the cost price of the material AND THEN ADD BACK VAT on the full amount including the contractor's profit.

The rate shall be inclusive of all labour and transport costs.

Overtime rates will only be applicable to emergency services Unauthorized overtime due to the contractor's failure to complete a service in normal working hours will not be applicable unless authorized by the representative of the Department.

All rubbish and waste arising from the work must be removed and the site and buildings left in a clean and tidy condition.

2.3.16 CONSTRUCTION PROGRAM

This Term Contract is for a twelve (12) month period with an option to renew this agreement for further two (2) periods of twelve (12) months. Either party may terminate this agreement, either at the end of the first twelve (12) month period, or at the end of any subsequent twelve (12) month period by giving the other party written: notice thirty (30) days before the end of the twelve month period. (See clause C3.2 8 for CPAP conditions)

Contractors attention is drawn to any claims for late delivery, all such claims shall be received in writing within 21 days of the problem arising, this item is non-negotiable and strict time penalties will be enforced.

The positions of all institutions will be pointed out to the contractor by the Department. The contractor must within 21 days of the date of the letter of acceptance of his Bid, submit to the Department a detailed program for the execution of the service at all institutions for the whole of the contract period, listing each institution,

its location and fixed dates of maintenance. The contractor will be required to keep to the program at all times.

The Contractor shall under this Repair and Maintenance Contract institute a logging and recording system as part of his Maintenance Control Plan. This shall consist of a log and record book, which shall be utilized to log and record all service records, system checks, breakdowns, maintenance visits, inspections, etc.

The logbook shall be stored in a safe place as agreed with the Client and representative of the Department and shall only be utilized by the Contractor and Regional Representative

Copies of the entries and recordings into the logbook shall be submitted by the Contractor together with his report to the representative of the Department at the end of the contract for safe keeping.

The logbook shall be structured to at least include the following:

- Service Records
- Inspection and maintenance actions
- Breakdown reports
- Fire Safety Officer Comments
- Inspection and test comments and reports

The Contractor shall also institute an attendance register, which shall be kept in a safe place as agreed with the User Client and representative of the Department. This register shall be completed by all persons visiting the installation, including

the following:

- Fire safety officer
- Contractor
- Inspectors from Department Labour
- The Department

This register shall state the date, time-in, time-out, name, company and reason for visit.

The items to be serviced shall be listed in tabular form with all relevant details such as capacity, description, condition and if discharged.

Should any equipment be found to be damaged or vandalized, the contractor shall immediately report the matter to the Department. The contractor shall furnish a completed and signed report containing full details of the findings to the Department. Provision shall be made on report for the name and signature of person in charge of institution and service technician.

All equipment that is to be tested at required intervals, shall be executed by a certified company, certificates must accompany invoices. Aluminium test pressure discs shall be pop riveted to the skirt of the extinguisher. Note: Pressure test certificates shall indicate all applicable expansion figures.

The maintenance work shall be executed in accordance with the relevant codes of practices, statutory regulations, standards, regulations, municipal laws and bylaws and the manufacturer's specifications and codes of practice.

The contractor shall be responsible for the supply of a basic floor plan of all sites that are serviced.

The floor plan shall include the following:

- Name of institution
- Position of all air conditioning and refrigeration equipment on site.
- Amount of all air conditioning and refrigeration equipment on site.
- Indicated all types of safety signs installed on site where applicable.

Completed floor plan with signatures, shall accompany invoice. Floor plans shall be included in tender price.

Copies of available departmental floor plans will be issued to the contractor on request.

DEPARTMENT OF PUBLIC WORKS

STANDARD SPECIFICATION FOR AIR CONDITIONING AND VENTILATION INSTALLATIONS

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FOR
AIR CONDITIONING AND VENTILATION INSTALLATIONS
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STANDARD SPECIFICATION
FOR
AIR CONDITIONING AND VENTILATION INSTALLATIONS

SECTION 1

1.0 GENERAL REQUIREMENTS

1.1.0 NOTICE

1.1.1 This standard specification forms part of, and is to be read in conjunction with the Department's supplementary technical specifications for air conditioning and ventilation installations.

1.1.2 In so far as the conditions herein contained are at variance with anything contained in the supplementary specifications, the contract shall be in terms of the supplementary specification for each particular service.

1.1.3 Where reference is made to "Contractor" or "Sub-Contractor", it shall be read to mean the successful Tenderer appointed to execute the contract specified in the supplementary specification.

1.2.0 STANDARD MEASURES

1.2.1 The dimensions, weights, etc., shown on the drawings and mentioned in the specifications shall be taken as the Republic of South Africa's legal standard weights and measures.

1.3.0 MATERIALS AND WORKMANSHIP

1.3.1 All work is to be executed with materials of the best quality and in the most substantial manner under the inspection and to the entire satisfaction of the Department.

1.3.2 The entire installation shall be in accordance with the following:

a) The National Building Regulations and Building Standards Act No. 103 of 1977 as amended in 1984 and all amendments thereafter.
b) The latest revision of SABS 0400: The Applications of the National Building Regulations, as amended.
c) SABS Code of Practice for the Wiring of Premises No. 0142 of 1981, as amended.
d) The Machinery and Occupational Health and Safety Act No. 85 of 1993.
e) Any other relevant by-laws of local or other authorities.

1.3.3 All apparatus, components parts, fittings and materials supplied and/or installed whether especially specified herein or not shall conform in respect of quality, manufacture, tests and performance with the requirements of the appropriate current South African (SABS) or British Standard Specifications (BS) and Addenda thereto, except where otherwise required by this specification or permitted by approval of the Department in writing. All materials and workmanship which may, in the opinion of the Department, be inferior to that specified for the work will be condemned. All condemned material and workmanship must be replaced or rectified as the case may be, to the satisfaction of the Department.

1.3.4 No second hand equipment of any description may be offered for supply or installation.

1.3.5 If so required the Department may call for samples of material and equipment for approval. Such samples shall be submitted within 14 days of the request and if judged necessary by the Department may only be returned after completion of the installation in order to ensure that the quality of the installed product is the same as that of the approved sample.

1.3.6 Any fitting or item of equipment not specifically mentioned but obviously necessary for the successful completion of the installation is to be included so as to form a complete working installation.

1.4.0 DRAWINGS

1.4.1 The tender drawings issued with the supplementary technical specification are schematic and do not necessarily purport to show the exact position, size or details of construction of equipment.

1.4.2 Tenderers must satisfy themselves that the equipment offered by them can be accommodated in

the available space and positioned in such a way that access for maintenance, repairs or removal is not obstructed.

1.4.3 Contractor's drawings
Where indicated in the Supplementary Specification these drawings are to be prepared by the Contractor at his expense in accordance with this document and shall be on a scale of not less than 1:50.

These drawings shall at least consist of:

a) Builder's work drawings
These shall indicate all work to be done by others (bases, foundations, holes in concrete and masonry, etc.) as well as the sizes, capacities and positions of service connections (electrical, water, drainage, etc) to be provided by others, all in accordance with the supplementary specification.

b) General arrangement drawings
These shall indicate all equipment, distribution systems, testing and inspection requirements as well as instrumentation positions and access requirements.
During their preparation, the Contractor shall take cognisance of all relevant architectural, structural, electrical and other services drawings in order to properly co-ordinate his layout.
These drawings can be obtained via the Department. The drawings shall be amended as required during the contract period, and up to date copies kept on site for reference purposes.

1.4.4 Positions and sizes of air grilles, louvred openings through reinforced concrete beams and slabs, etc., as indicated on the tender drawings shall be adhered to as far as possible. Amendments will only be considered if absolutely unavoidable.

c) Shop drawings
These shall be based on the General Arrangement drawings, and shall show in detail the construction of all the parts of the works, method of assembly where applicable, erection and construction, materials and connections, welds, gaskets, sealants, fastenings, reinforcing and all other necessary detail.

d) Electrical drawings

Electrical drawings shall comprise complete control and power wiring diagrams, as well as front and side elevations giving major dimensions of control panels as well as instrumentation and switch position layouts.

e) As-Built drawings and wiring diagrams

These are up-to-date approved drawings at the completion of the contract. Tenderers shall allow in their price for submitting to the Department a sepia of each of the up-to-date general arrangement drawings, shop drawings, as well as electrical drawings together with the O&M manuals specified herein.

1.4.4 Submission of contractor's drawings
Drawings shall be submitted to the Department in orderly fashion commencing within the following time limits or as determined by the main contract programme (where applicable):
Builder's work drawings : within 2 weeks of tender acceptance.

General layout drawings : within 4 weeks of tender acceptance.

Shop drawings : within 6 weeks of tender acceptance.

Electrical drawings : within 6 weeks of tender acceptance.

As-built drawings : at completion before first hand-over.

By submitting drawings, the Contractor represents that he has determined and verified all site measurements, site instruction criteria, materials, catalogue numbers and similar data, or will do so, and that he has checked and co-ordinated each of his drawings with the requirements of the works and the contract documents, taking into account drawings of all other relevant disciplines.
At the time of submission the Contractor shall inform the Department in writing of any deviation in

the Contractor's drawings from the requirements of the supplementary documents.
After scrutiny the Department may at it's discretion and depending on the number of discrepancies, require amendment and resubmission prior to approval. Drawings shall be resubmitted until approved prior to any portion of the works related to the drawings being commenced.
Should the Contractor, during drawing amendment, alter any portion of his drawings not specifically required by the Department, he shall point this out in writing when resubmitting the drawing.
Approval of the Contractor's drawings in no way indemnifies him from being responsible for the correctness of the drawings and satisfactory operation of the installation.

1.4.6 If the Tenderer wishes to submit alternative proposals, differing from the Department's design, drawings indicating such proposals comprehensively shall be submitted with his tender.

1.5.0 SITE CONDITIONS

1.5.1 It is the responsibility of the Tenderer to visit the site during the tender phase and to familiarise himself with conditions related to it. If the location of the site is not indicated in the Supplementary Specification, it can be obtained from the Department. No claim for additional payment related to ignorance of site conditions will be accepted. By submitting a tender it is accepted that the Tenderer is fully aware of all site conditions as well as the access to it, and has allowed for this in his tender price.

1.6.0 DEVIATIONS FROM TENDER DOCUMENTS

1.6.1 No deviations or alterations from that of the specification, schedules or drawings shall be made without first obtaining the written approval of the Department.

1.7.0 PROGRAMMING OF WORK

1.7.1 The contract works shall proceed concurrently with the building construction or in accordance with an approved programme in all respects.
1.7.2 It is essential that the Contractor programmes his construction and all other work in conjunction with the Main Contractor and the main contract programme in order to avoid possible delays or clashes of trades.
1.7.3 For direct contracts the Contractor shall submit a detailed programme in the form of a bar chart based on the contract period and the various activities and components of the installation. This programme shall be submitted to the Department within two weeks of site hand-over.

1.8.0 MANUFACTURER'S RATINGS

1.8.1 All equipment such as fans, compressors, cooling towers, pumps, etc., shall be selected to be operated well within the manufacturer's ratings. Equipment offered for use beyond these limits will not be considered.
1.8.2 Tenderers must submit manufacturer's ratings of all equipment offered. Ratings shall be given in the SI system.

1.9.0 NOTICES

1.9.1 The Contractor shall supply and install all notices and warning signs that are required by the appropriate laws or regulations and by these documents.

1.10.0 GUARANTEE

1.10.1 The 12-month guarantee called for in the Supplementary Specification, shall apply to all items of plant such as chillers, etc., delivered to site and/or erected. It is the responsibility of the Contractor to negotiate with his suppliers in order to secure their equipment guarantee on this basis.
1.10.2 The date of acceptance shall be that appearing in the acceptance certificate issued by the Department and shall define the start of the guarantee period and free maintenance period (where applicable).
1.10.3 No Claims for extended guarantee or otherwise from Suppliers, Principals etc., will be considered even if equipment is required on site long before acceptance date.

1.11.0 LUBRICATION

1.11.1 All bearings must be packed with approved grease or filled with the correct oil, and all gearboxes and sumps must be filled with the lubricant specified by the manufacturer. The Contractor will be

responsible for the supply of all lubricants required for the initial fill. All lubricants must be new and supplied in sealed drums or containers.

1.12.0 COMMISSIONING AND TESTING

1.12.1 Commissioning Engineers
The Tenderer shall allow in his tender price for the services of approved and expert Commissioning

Engineers, as may be appropriate for the individual specialised sections of his contract, as well as a competent Engineer in overall control of the installation. Testing and commissioning shall be carried out by these Engineers.

Should undue problems be encountered at any time, the Contractor may be requested by the Department to obtain the services of a representative of the manufacturer of specified items of equipment, at no cost to the Department.

1.12.2 Notice of Testing and Commissioning
The Department shall receive not less than two weeks advance notice of any tests to be witnessed by the Department.

1.12.3 Failure of Works, Site or Commissioning Tests
Should the Department be notified to attend official tests as laid down, and should the equipment fail the test for any reason whatsoever, such that the Department is required to re-witness the test, the time, transport and disbursement by the Department in so doing will be for the Contractor's account, which amount may be deducted, at the option of the Department, from monies due to the Contractor.

1.12.4 Quality Testing of Equipment
The Department reserves the right to arrange for testing of any piece of equipment at will, to check on compliance with the relevant specifications. Should the particular piece of equipment pass the test, the cost of such testing will be borne by the Department. However, should it fail the test, the cost of the test, rectification of the shortcomings, re-testing and repetition of the same test on the remaining like items will be for the Contractor's account.

1.12.5 Inspection during Manufacture

The Contractor will advise the Department when the items to be supplied are in the course of manufacture. The Department reserves the right to inspect any items during the course of manufacture, and witness any performance tests that may be required thereon. The Contractor shall give the Department at least two weeks advance notice of works tests.

1.12.6 Testing

The Contractor shall be responsible for carrying out all tests laid down in the specific sections elsewhere in this document, in addition to those listed hereafter and in the Supplementary Specification.]

Testing and balancing shall not begin until the system has been completed and is in full working order.

The plant shall be tested and operated to meet the performance figures and duties specified.
All safety features and interlocks will be tested.

The Contractor will be responsible for all costs incurred in the testing, including the supply, calibration and use of all instruments and tools, but not the supply of water or power on site.

All instruments and test equipment used shall be provided by the Contractor, and shall be accurately calibrated and maintained in good working order.

All test instruments used for tests to be
witnessed by the Department's Representative shall be provided with calibration certificates, which must be available to the Department's Representative.

Specific attention is drawn to the fact that calibration certificates will be required for the following:
Watt meters, ammeters, voltmeters, frequency meters, pressure gauges, flow meters, orifices

plates, temperature gauges and dynamometers.

All instruments shall be of above standard grade, and test pressure gauges shall not be less than 150mm in diameter. The maximum scale of the instrument shall not exceed 1,5 times the full test requirement.

It is essential that the Contractor inspects and tests all equipment before requesting the Department to inspect or witness acceptance tests thereon.

All acceptance tests, whether in the manufacturer's works or on site, must be carried out in the presence of the Department's Representative.

Should the Department wish to verify the calibration of any instruments, the Contractor shall make the necessary arrangements for the instrument to be re-calibrated by a recognised authority. Should the instrument prove to be correctly calibrated, the cost of the re-calibration test will be borne by the Department. Should the instrument prove to be in error, the cost of the tests will be borne by the Contractor.

Two copies of the complete test reports shall be submitted to the Department, prior to the first delivery of the project. Reports shall cover all tests carried out on individual sections, including such works tests as may have been conducted. All reports shall be neatly typed.

1.12.7 Commissioning

The Contractor shall carry out all tests and commissioning of the systems installed by him, in a coordinated and properly organised manner.

Air-Conditioning and Ventilation installations shall be commissioned in accordance with the following Codes or such other recognised commissioning procedure or code approved by the Department:

a) Air Distribution Systems:

SABS 0173 : Code of Practice for the Installation, Testing and Balancing of Air Conditioning Ductwork.

b) Refrigeration Systems:

CIBS : Commissioning Code : Series R : Refrigeration Systems.

c) Control Systems:

CIBS : Commissioning Code : Series C : Automatic Controls.

d) Hot Water and Steam Boilers:

CIBS : Commissioning Code : Series B : Boiler Plant.

e) Water Distribution Systems:

CIBS : Commissioning Code : Series W : Water Distribution Systems.
Should the tests be carried out over an area outside the range of normal speech, it is required that the Contractor make available at least four battery powered, two-way radio sets, to facilitate communications.
The testing procedures shall be sufficiently comprehensive to prove the correct functioning of each and every piece of equipment, and its suitability for the application.

After all systems and equipment have been tested and commissioned to the satisfaction of the Department, a detailed demonstration of all functions of the system shall be carried out in the presence of the Department's Representative, so as to allow him to become fully acquainted with the operation of the system.

The commissioning tests shall include the tests laid down under the specific sections hereafter, and a full operational test of all pumps, compressors, fans and control gear in all modes of operation.

The Contractor shall allow for the replacement and cost of any materials and fuel used for testing purposes, as part of the contract.

The demonstration to the users shall include a repeat of the operational tests above.

The planning of this demonstration shall take place in collaboration with the Department.

A certificate of completion will not be issued until all tests have been satisfactorily completed, and the plant has operated successfully, to the complete satisfaction of the Department.

1.13.0 PERFORMANCE TOLERANCE

1.13.1 All performance figures obtained during testing and commissioning must be within -5% and +5% of the specified performance figures given in the supplementary specification. Should the plant fail to comply with these figures after it has been tested and operated for a period of seven days, then the Contractor shall have a further four weeks to meet the requirements of the specification, after which the Department shall have the right to reject the plant and recover all monies paid to the Contractor for the rejected plant.

1.14.0 TEST CERTIFICATES

1.14.1 The Contractor shall ensure that copies of all relevant test certificates, inspection reports, materials analysis certificates and similar data as may be required under various sections of this specification, or by Government Licensing and Inspection Authorities or Local Authorities, shall be provided before handing over the plant. Acceptance of the plant will be delayed if such certificates are not available. In particular, attention is drawn to pressure vessel and boiler construction and materials test certificates.

1.15.0 APPLICATION FOR INSTALLATION

1.15.1 The Contractor shall allow for the submission of the necessary forms, fees and drawings to the Inspector of Machinery or other relevant Authorities to obtain permission to install equipment where this is required. He shall also, in co-operation with the Department make any arrangements that may be required for Government Inspectors or other relevant Inspectors to carry out prescribed tests.

1.16.0 POWER, WATER AND DRAIN CONNECTIONS

1.16.1 Power, water and drain points in the plant room will be provided by and at the expense of the Department.

1.16.2 All plumbing between equipment and water and drain points shall form part of the contract.
1.16.3 The exact details of terminal points will be set out in the Supplementary Specification.

1.17.0 QUALITY OF MATERIALS

1.17.1 Only new materials of high quality shall be used throughout and shall be subject to the approval of the Department.

1.17.2 All materials, where applicable, shall conform in respect of quality, manufacture, tests and performance, with the requirements of the SABS standards or, where no such standards exist, they shall conform with the appropriate current specification of the British Standard Institution. Materials manufactured in South Africa shall be used wherever possible.

1.17.3 Imported materials shall comply with the requirements of the relevant SABS or British Standard Specifications, although these materials need not necessarily bear the SABS mark.

1.17.4 All materials shall be suitable for the particular site conditions. These conditions shall include weather conditions as well as prevailing conditions during installation and subsequent permanent use.
1.17.5 Should the materials or components not be suitable for use under temporary site conditions, where applicable, the Contractor shall provide at his own cost, suitable protection until these unfavourable site conditions cease to exist.

1.18.0 SERVICE ACCESS

1.18.1 Where equipment such as fans, dampers, etc. are installed above ceiling the Contractor shall ensure that access will be possible for maintenance purposes after installation.

1.19.0 STANDARD SPECIFICATIONS

1.19.1 Unless otherwise specified in the supplementary specification, the following standard specifications (including amendments) of the organisations indicated shall form part of this specification.

a) SABS 1125-1977; Room air conditioners
b) SABS 0140-1978; Identification colour marking
c) SABS 0139-1981; The prevention, automatic detection and extinguishing of fire in buildings.
d) SABS 0147-1992; Refrigerating systems including plants associated with air conditioning systems.
e) SABS 0173-1980; The installation, testing and balancing of air-conditioning duct work.
f) SABS 193-1972; Fire dampers.
g) SABS 1238-1979; Air-conditioning ductwork.
h) SABS 1424-1987; Filters for air-conditioning and general ventilation.

1.19.2 Tenderers shall indicate in their tender submission whether their tender and/or equipment as applicable complies with any of the above specifications or carries the SABS mark.

1.20.0 MONTREAL PROTOCOL

Tenders for equipment utilising chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) or hydrofluorocarbons (HFCs), to be supplied and installed shall be within the constraints and schedules of the Montreal Protocol and the Copenhagen Agreement and such amendments thereto as may be made by the international community.
Where tenders are submitted for equipment not complying with this Protocol it shall be clearly indicated, in writing, in the tender submission.

SECTION 2

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SECTION 2

2.0 MAINTENANCE AND SERVICING

2.1.0 GENERAL

2.1.1 Unless otherwise specified in the Supplementary Specification, the Contractor shall be responsible for all maintenance and servicing of the installation for the full 12-month guarantee period. During this period, the Contractor shall make good any defect due to inferior materials or workmanship and maintain all plant and equipment in perfect operating condition.

2.1.2 The Contractor shall be entirely responsible for carrying out regular inspections at intervals not greater than 1 month, unless otherwise specified, and for full servicing of all components of the installation in accordance with the manufacturer's instructions. For this purpose, the Contractor shall prepare a detailed inspection and service report in the form a checklist and log sheet showing all functions to be carried out at each inspection and service. Copies of these service reports shall be regularly submitted to the Department after each service.

The Contractor shall also maintain a plant logbook on site in which he shall record, sign and date all work carried out at each inspection as well as log all temperatures and pressure readings etc.

2.1.3 The Contractor shall allow for all expendable materials necessary for servicing such as lubricating oils, grease, refrigerant and cleaning materials.

Replacement filters, if required, will be provided by and at the expense of the Department.

2.2.0 MAINTENANCE INSTRUCTION OF OWNER'S STAFF

2.2.1 Tenderers shall make proper allowance in their tender price for instruction of the Department's staff in the maintenance, repair and adjustment of all the equipment. Allowance must be made for the proper hands-on tuition of the owner's personnel at the appropriate time to enable them to take over operational duties.

2.3.0 SPARE PARTS AND AGENCIES

2.3.1 Where Tenderers offer plant embodying units of manufacture other than those of their principals and for which they are not accredited South African agents, and for which they do not stock spare parts, they should state in the tender the name of the accredited South African agents from whom spare parts for such units are obtainable.

2.3.2 In all cases, Tenderers should furnish an undertaking from agents to the effect that they are prepared to carry the necessary stock of spare parts for their particular units

2.3.3 Tenderers are also required to furnish the same undertakings as regards the spares for units manufactured by their own principals.

2.3.4 During adjudication of tenders, consideration may be given not only to the cost of the plant offered, but also to the cost of the spares.

2.4.0 TOOLS

2.4.1 All special tool required, i.e. tools specially designed for the particular equipment offered, must be supplied and listed in the tender offer and included in the unit price. In the case of a number of identical items of plant being supplied it will only be necessary to supply two sets of tools covering all units, and not one set for each unit.

2.4.2 It is the responsibility of the Contractor to ensure that all tools are handed over to the Department on completion of the contract, in brand new condition. No damaged tools will be accepted, and the contract will not be considered complete until such tools are satisfactorily received. Tools handed over shall be suitably mounted on a wallboard or supplied in a high quality metal box or other container as may be agreed to by the Department.

2.5.0 OPERATING, MAINTENANCE INSTRUCTIONS, WIRING AND CONTROL DIAGRAMS

2.5.1 The Contractor shall prepare and supply comprehensive manuals for the successful operation and maintenance of the installation. A draft of the manual shall be submitted to the Department after commissioning, for approval. The draft shall then be corrected, if required, and THREE sets of the manual shall be submitted before first acceptance of the plant will be considered.

2.5.2 Manuals shall be prepared in the same language as the contract document unless otherwise required by the Department. These manuals shall be bound in hard file covers with clear titles and indices and shall contain the following information as a minimum, in the sections indicated:

SECTION 1: System Description

A comprehensive description of the system, including schematic diagrams.

SECTION 2: Commissioning Data

The results of all checks and measurements as recorded during the commissioning period, shall be compiled in such a manner that every check and measurement is clearly defined.

SECTION 3: Operating Instructions

1. Plant running checklist and frequency of servicing.
2. Safety precautions to be taken.
3. Manual and automatic operation.
4. Operator's duties.
5. Lubricating oils and service instructions.
6. Pre-start checklist for each system.
7. Starting and stopping procedures.

SECTION 4: Mechanical Equipment

1. Description of all major items of equipment with the make, model number, names, addresses and telephone numbers of the Supplier, Manufacturer or their Agents.

2. Design capacities of all equipment including selection parameters, selection curves, capacity tables, etc.

3. Manufacturer's brochures and pamphlets.

4. Schedule of spares with part numbers recommended to be held in stock by the Department.

SECTION 5: Maintenance Instructions

1. Schedule of maintenance particulars, frequency of service and replacements.
2. Troubleshooting guide.
3. Part number of all replacement items and spares.
4. Capacity curves of pumps, fans and compressors.
5. Serial number of main items of equipment.

SECTION 6: Electrical Equipment

1. Schedule of equipment indicating manufacturer, type, model number, capacity and address and telephone number of supplier.
2. Maintenance instructions.
3. Manufacturer's brochures and pamphlets.
4. Complete "as-built" circuit diagrams and diagrammatic representation of inter-connections of electrical equipment.

SECTION 7: Instrumentation and Control

1. Description of each control system.
2. Schedule of control equipment indicating make, type, model number, rating, capacity and name, address and telephone number of supplier.

3. Maintenance instructions.
4. Manufacturer's brochures and pamphlets.

SECTION 8: Drawings

1. Paper prints (reduced if so desired) of all "as-built" mechanical and electrical Contractor's drawings.
2. Wiring diagrams, framed behind glass shall be mounted adjacent to each relevant control panel.

SECTION 3

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SECTION 3

3.0 TECHNICAL REQUIREMENTS – GENERAL

3.1.0 ERECTION OF EQUIPMENT

3.1.1 Tenderers shall allow for a complete installation, including the provision of mobile cranes, air compressors, lifting tackle, measuring equipment, precision levels, and all other special or regular tools and equipment that may be needed to complete the entire installation in accordance with the specification, and to the satisfaction, of the Department.

3.1.2 The Contractor will be responsible for any damage caused to buildings, equipment, etc. during the course of the erection of his equipment.

3.2.0 EQUIPMENT PLINTHS

3.2.1 Plinths as specified hereunder shall not be confused with any form of inertia or anti-vibration base. Unless otherwise specified in the Supplementary Specification, equipment plinths shall form part of the air conditioning and ventilation contract.

3.2.2 Plinths shall be provided for all mechanical and electrical equipment. Plinths cast on concrete surfaces shall protrude at least 100mm above floor levels and depending on the position of the vibration mountings, shall be at least 300mm wider or longer than the inertia bases mounted on top. (Where applicable)

3.2.3 Plinths for equipment which do not need inertia bases or plinths for inertia bases with recessed vibration mountings, shall be of the same size as the equipment or bases mounted on top. Plinths shall consist of 1,6mm thick channel or angle iron formers with 10mm thick reinforcing bars located

at 150mm pitch in each direction and filled with concrete. The top surface of the concrete shall be floated to an even and smooth finish to allow for not less than 25mm and not more than 50mm of suitable cement or epoxy grout under the equipment base frame. A 25mm 45º chamfer shall finish off all grout corners.

3.2.4 Plinths as specified above shall also be provided for field assembled plenum chambers and other equipment.

3.2.5 Where cooling towers are on the same floor level as condenser water pumps, the towers shall be mounted on concrete or masonry walls high enough to ensure a flooded suction at all times.

3.3.0 HOLDING DOWN BOLTS AND BOLTS FOR EQUIPMENT

3.3.1 The Contractor shall be responsible for the supply of all necessary holding down bolts for the machines supplied by him. He shall also supply all bolts necessary for assembling all the equipment supplied by him.

3.3.2 Holding down bolts shall preferably be cast into concrete bases when the bases are being cast. All bolts shall, in this instance, be provided with galvanised sheet metal sleeves approximately three times the diameter of the bolt, and projecting a minimum of four-bolt diameters below the surface of the concrete. This sleeve must be kept free of concrete until the final grouting takes place.

3.3.3 Under exceptional circumstances, the provision of suitably sized pockets for the holding down bolts will be permitted.

3.3.4 Where galvanised bolts are called for, they shall be fully galvanised all over. No re-cutting of threads will be permitted after galvanising. All nuts must run freely on the threads.

3.4.0 BEDPLATES

3.4.1 All bedplates shall be of fabricated mild steel with surfaces on which the pump, motor, gearbox, fan etc. is mounted.

3.4.2 All bedplates shall be stress relieved after welding but before machining. Each bedplate shall be provided with approximately eight horizontal jacking screws with locknuts for each unit mounted thereon to assist in aligning the pumps and motors, etc.

3.4.3 All bedplates shall be thoroughly cleaned, prepared and painted with one coat of Anodite red oxide primer to finishing coats being applied.

3.4.4 It will not be necessary to dowel equipment in place, provided the jacking screws specified above are fixed and locked.

3.5.0 COUPLING SHAFT AND VEE-BELT GUARDS

3.5.1 All couplings, vee-belts, shafts and moving parts and components shall be fitted with adequate guards which comply in all respects with the Machinery and Occupational Health and Safety Act. They shall be fabricated from sheet and flattened expanded metal, and be so arranged that the couplings or belts are completely visible through the guard.

3.5.2 All guards shall be painted as specified.

3.5.3 Guards for fluid couplings shall be so constructed as to completely enshroud the coupling, and completely contain 110% of the full volume of oil contained in the coupling. In the event of an oil discharge, no oil must be thrown about or leak onto the floor.

3.6.0 COUPLINGS

3.6.1 High speed (Above 750 r/min)

Couplings between motors and driven equipment shall be Fenaflex tyre type couplings or approved, and shall comply with the following requirements:

i) They should be designed and selected for severe duty and 24 hours per day operation. In no case shall a "service factor" of less than 25% above that given in the Fenner Catalogue be

used.
ii) All tyre couplings must be fitted with taper lock bushes.
iii) All couplings shall be of synthetic oil resisting rubber.

3.6.2 Low speed (Below 750 r/min)

These couplings shall in general be of a flexible type, which shall be approved by the Department. Couplings shall in all cases be designed and selected for severe duty and 24 hours per day operation. In no cases shall a "service factor" of less than 25% above that given in the maker's catalogue be used.Where possible, all couplings shall be fitted with taper lock bushes.

3.6.3 Hydraulic Couplings

These shall be of the Crofts, Voith or Vulcan Sinclair manufacture or as approved.
Where possible, couplings shall be fitted with taper lock brushes for both input and output shafts.
All couplings shall be adequately rated for the full power and torque rating of the motor to which they are coupled, plus 15% safety margin.

All fluid couplings must be offered with a temperature safety device, which will safely release the oil in the event of the coupling overheating.

3.7.0 MECHANICAL DRIVES

3.7.1 Vee-belt drives

Where used vee-belts shall be standard sections and lengths conforming to the latest edition of CKS 332 - 1972, "Specifications for industrial vee-belts".

Belt drives shall be designed and selected assuming direct on line starting of a squirrel cage motor and heavy duty operation for 24 hours per day. Design and selection shall be in accordance with the Fenner Power Transmission design manual or equivalent. Design shall be based on at least 2 starts per hour for all air conditioning applications. The power rating of the drive shall be based on full rating of the drive motor.

Pulleys shall be fitted with taper lock bushes. No pulley shall have a diameter smaller than that recommended by the belt manufacturer with minimum diameter being 100mm, and no non-standard pulley will be accepted.

No drive above 1kW rating shall have less than two belts.

Pulley size and centre distance shall be designed to ensure a belt contact arc over the smaller pulley of not less than 120º.

Pulleys shall be manufactured from close-grained cast iron with grooves matching belt sections and properly machined with smooth edges and wear surfaces.

Inward and outward adjustment of the drive motor and pulley combination shall be possible with proper locking mechanisms to enable correct belt tensioning and ease of replacement of belts.
All belt tensions shall be checked within 24 hours of first delivery and again one week later and adjusted as necessary.

Belt speeds exceeding 15 m/s and speed ratios greater than 7:1 are not acceptable.

3.7.2 Chain Drives

To facilitate maintenance, spares inter-changeability and standardisation, chains where selected, shall be standard stock roller type precision drive chains of reputable manufacture.
The axial and angular alignment of wheels and chains shall be carefully checked to very close tolerances to ensure maximum life and trouble free operation.
The amount of adjustment possible to take up chain wear shall be not less than 2 pitches or 2 percent elongation above nominal chain length, whichever is the greater. Chains shall be lubricated in accordance with manufacturer's recommendations.

3.8.0 PACKING OF EQUIPMENT

3.8.1 All base plates and steel work shall be suitably packed with steel packs to ensure that they are true to level, line and grade. The thickness of packing shall be such as to allow for not less than 25mm, and not more than 50mm of grout under all base plates or steel work. Packings shall be of suitable size to support the base plates and one pack must be situated immediately on each side of each holding down bolt as well as in such other positions as may be directed by the Department in order to adequately support the base plates and its superimposed load.

3.8.2 All packs shall be as near as possible to the exact height in one thick piece. Thinner shims may be used for final adjustments, but large piles of thin shims will not be accepted. All packs must be of parallel shims. Taper packs or wedges will not be accepted. Packs must be bedded on a flat and smooth area on the surface of the concrete foundation. Packs resting on rough concrete will be rejected.

3.8.3 After final levelling and lining up, it is essential that all packs are tight. Loose packs will be rejected.
3.8.4 No shims will be permitted between a machine base and plate and the machine's feet except as mentioned hereinafter.

3.9.0 ALIGNMENT OF EQUIPMENT

3.9.1 Bedplates
Where equipment is delivered completely assembled on a bedplate, these items of equipment shall be removed from the bedplate prior to installation. The bedplates shall first be installed, levelled, lined up and packed to ensure that there is no twist or distortion therein. The machines shall then be installed on their bedplates and the final alignment carefully checked and adjusted until it is to the entire satisfaction of the Department.

Minor corrections to the alignment of machines may be carried out using thin shims between the machinery feet and the machined surface of the bedplate. This applies particularly to electric motors. A maximum level error of 20 seconds of arc, or as decided by the Department, will be allowed.

3.9.2 Couplings
The alignment of all couplings must be carefully checked for both the parallelism and eccentricity of their shafts. Alignment must be carried out to the maker's tolerance and to the entire satisfaction of the Department.In any event, a misalignment of more than 0,05mm will not be permitted for either parallel or eccentric misalignment as measured at the periphery of the couplings. It is essential that a dial micrometer is used to set the final alignment, which must be witnessed by the Department.

3.9.3 Vee-belts and chain drives
The alignment of vee-belt drives and chain drives shall be carried out with a precision steel straight edge in the case of short centre drives, or by means of a nylon line in the case of long centre drives. The Contractor must ensure that all belts and chains are correctly tensioned in accordance with the maker's instructions.

3.9.4 Gearboxes
All gearboxes shall be carefully checked for level and twist. No twist in the gearbox casing will be permitted. After final levelling and bolting down, the gear teeth shall be marked with Engineer's blue, and the meshing and bearing of the teeth checked and corrected to the satisfaction of the Department.

3.10.0 ASSEMBLY OF COMPONENTS

3.10.1 It is essential that all mating components such as couplings, taper lock bushes, machined faces, etc., be thoroughly cleaned with a suitable solvent before assembly. All surfaces must be free from burrs or irregularities, which may prevent the correct mating of the surfaces.

3.10.2 A molybdenum-disulphide lubricant similar or equivalent to Mobil-grease Super shall be used on the threads of all bolts and between the mating surfaces of all parts closely fitted together, such as shafts and couplings, keys and base plates. PTFE tape shall be used in all screwed pipe connections.

3.11.0 WELDING

3.11.1 Welding shall be carried out in accordance with the current edition of SABS 044 Parts I to VII where applicable.
3.11.2 All welded filler or butt joints shall be free from porosity, cavities and entrapped slag. Joints shall be ground smooth, if required for aesthetic reasons only, without effecting weld strength.
3.11.3 The joints in the weld run, where welding has been recommended, shall be as smooth as possible and shall show no pronounced hump or crater in the weld surface.
3.11.4 The profile of the weld shall be uniform, of approximately equal leg length and free from overlap at the toe of the weld. Unless otherwise specified the surface shall be either flat or slightly convex in the case of fillet welds and with reinforcement of not more than 3mm in the case of butt welds.
The weld face shall be uniform in appearance throughout its length.
3.11.5 Filler metal electrodes shall be of an approved type for the material being used and shall be kept in a dry condition. All electrodes shall conform to SABS 455.
3.11.6 Only welders in possession of a valid approved competence certificate shall be employed.
3.11.7 All welds must show proper fusion.
3.11.8 Where welding is contemplated in pipework systems, Tenderers shall allow for the removal and testing by an approved body of 5% of the welded joints in the system. These will be removed at random as indicated by the Department and tested. Should faulty welding be discovered, all other joints shall be X-ray tested by the SABS or an approved body, all at the expense of the Contractor.

3.12.0 GALVANISING

3.12.1 Unless otherwise specified in the Supplementary Specification the following items shall always be galvanised:

Fabricated mild steel sections exposed to the weather.
Steel grilles and louvres exposed to the weather.

3.12.2 Where hot dip galvanising is called for, items to be galvanised shall be entirely pre-fabricated and then dismantled in sections for galvanising. No cutting of threads or welding will be accepted after galvanising.

3.12.3 All hot dip galvanising shall be carried out in accordance with SABS 934 and SABS 763 where applicable, including preparation for galvanising.

3.12.4 Mild steel plate and sections shall be of good commercial quality, or higher grades, best suited for galvanising. The materials shall be free from slag or coarse laminations, fine fissures and rolled-in impurities.

3.12.5 Castings shall be sound, dense and clean, and free from distortion, porosity, carbon and slag enclosures, blowholes, and other injurious conditions.

3.12.6 Welding flux shall be chipped away and all welds wire brushed before galvanising.

3.12.7 The surface to be galvanised shall be free from paint, oil, grease and similar impurities.

3.12.8 All exposed surfaces including welds shall be thoroughly sand blasted prior to galvanising.

3.12.9 The Department reserves the right to inspect all steel components before galvanising, and shall have the right to reject or ask for remedial treatment of any material which is considered to be unsuitable. This applies particularly to welds.

3.12.10 The galvanising coating shall be smooth, adherent, continuous and free from black spots or flux stains.

3.12.11 Globular extra-heavy deposits of zinc, which interfere with the intended use of the material, will not be acceptable. Excessively protuberant lumps and nodules shall be removed by hot wiping or by the skilful application of mechanical means, however there shall remain a sufficient minimum thickness of unbroken zinc coating. Flaws on small parts and working surfaces shall be repaired only by stripping and re-dipping.

3.12.12 Repairs to galvanised coatings will not be accepted. Items damaged will need to be re-galvanised.

3.12.13 Coating thickness shall be as per table 1 of SABS 763 unless otherwise specified in the

supplementary specification.

3.12.14 The SABS requirement for uniformity shall apply.
3.12.15 Galvanised surfaces specified with paint finishing shall not be passivated.

3.13.0 PAINTING

3.13.1 The entire installation, other than aluminium or stainless steel pipe cladding, shall be painted, unless otherwise specified in the Supplementary Specification.

3.13.2 Painted items shall include plantroom floors, equipment plinths and bases.

3.13.3 Before any painting is applied, the surfaces shall be prepared according to SABS 064, Code for Preparation of Steel Surfaces for Painting. All surfaces shall be moisture free, clean and properly prepared.

3.13.4 During painting, the Contractor shall ensure that all the necessary fire prevention and fire-fighting precautions have been taken.

3.13.5 Name plates, labels and notices on equipment shall not be painted.

3.13.6 Items which do not require painting such as diffusers and grilles, shall only be installed after the paintwork on the plant, ceiling or walls have been completed.

3.13.7 Painted surfaces on proprietary manufactured items shall be adequately protected. Equipment on which the paintwork has been damaged during installation shall be repainted before first delivery of the plant will be considered.

3.13.8 Unless otherwise specified in the Supplementary Specification the installation shall be painted in accordance with SABS colour coding where applicable. Colour code bands and arrow indicators shall be as per SABS 0140 of 1978, and the basic colour shall cover the full length and circumference of pipes and ducts.

3.13.9 Plastered surfaces inside plenums shall be painted with a suitable alkali resistant primer to SABS 1414-1987 followed by a universal undercoat with a final coat of high gloss enamel paint to SABS 630, Grade I. The colour of the final coat shall be white.

3.13.10 Lagged and plastered ductwork and plastered surfaces outside plenums shall be painted with a suitable alkali resistant primer to SABS 1414 of 1987 followed by one undercoat to SABS 681, type II and one coat high gloss enamel paint to SABS 630, Grade 1 or PVA exterior type emulsion paint to SABS 634 of 1974 as top coat.

3.13.11 Ferrous casings of cooling towers, evaporative condensers and sprayed coils including galvanised iron casings, sumps, fans and ductwork connected to outlets of cooling towers or evaporative condensers, shall be internally painted with two coats of epoxy-tar paint to SABS 801, type II. Angle iron framework shall be similarly painted with epoxy paint before side covers are fitted. All steel surfaces shall be cleaned and painted with a wash primer or zinc chromate primer (ungalvanised iron) before the epoxy paint is supplied.

3.13.12 Exposed and unlagged galvanised piping shall be painted with one coat wash primer (self etch primer) to SABS 723 followed by one undercoat to SABS 681, type II and one coat gloss enamel paint to SABS 630, Grade 1 as top coat.

3.13.13 Unlagged black piping, flat iron, angle iron, rods, etc, for supports, brackets, frames, duct stiffeners, etc, shall be painted on all sides with a zinc chromate primer to SABS 679 type 1, followed by one coat universal undercoat and one finishing coat of enamel paint to SABS 630 Grade 1.

3.13.14 Where specified in the supplementary specification, aluminium shall be painted with a wash primer to SABS 723 followed by a zinc chromate primer to SABS 679, type I and one coat universal undercoat to SABS 681-1972 type II and one final coat of enamel paint to SABS 630, Grade 1.

3.13.15 Where specified in the supplementary specification, steel surfaces shall be cleaned and then treated with the hot phosphate process to a minimum weight of 1,6 g/m? coating followed by two coats of backing enamel to SABS 783 type I.

3.13.16 All galvanised surfaces requiring painting other than those covered in 3.13.17 below shall be thoroughly degreased. In case a detergent is used, the surface shall be well rinsed and dried. It shall then be painted with one coat wash primer (self etch primer) to SABS 723. When dry, the surface shall be painted with one undercoat to SABS 681 type II and one coat universal undercoat and one coat high gloss enamel paint to SABS 630 Grade 1 as top coat.

3.13.17 All galvanised surfaces inside air handling plenums and external within 50km of the coast, or as specified in the supplementary specification, shall be cleaned with a galvanised iron cleaner until a water break free surface is achieved. After drying one primer coat of "Galvo-Grip" or approved paint shall be applied followed by one coat of universal undercoat paint. A final coat of gloss enamel to SABS 630, Grade I shall then be applied.

3.13.18 For air handling units the entire air-conditioning unit casings, including galvanised iron eliminators, sumps, drip pans, fans etc., shall be painted internally with two coats of epoxy-tar paint to SABS 801, type II. The white rust preventative compound on galvanised iron shall be removed as specified above before the paint is applied. Angle iron framework shall be similarly painted with epoxy paint before side covers are fitted.

3.13.19 Exposed piping with canvas covered insulation shall be painted two coats of bitumen aluminium paint to SABS 802 followed by the colour coding basic colour as per table 1.

3.14.0 BEARINGS

3.14.1 Anti-friction
Anti-friction bearings shall include all bearings, which provide rolling contact between one or more sets of hardened steel balls or rollers and hardened steel rings or raceways.
Anti-friction bearings shall be of approved manufacture and available throughout South Africa.
To facilitate maintenance, spares interchangeability and standardisation, anti-friction bearings of standard design and manufacture shall be employed. All anti-friction bearings shall be provided with greasing facilities in accordance with manufacturer's requirements.

3.14.2 Bushed Bearings

Only where specifically stated in the Supplementary Specification and in the case of low velocities and light loads in moisture free conditions will bushed bearings be accepted. All bushed bearings shall be made of an approved bearing metal composition, which has good anti-friction qualities and is capable of withstanding severe usage in the specific application.
All bushed bearings shall be provided with lubrication facilities to ensure adequate lubrication and shall be properly grooved to distribute the lubricant uniformly over the bearing surfaces. Grooves shall not be cut into the journal, but always into the surrounding bush. The edges of all chambers and grooves shall be rounded to avoid sharp corners and to facilitate the introduction of the oil or grease between the journal and the bearing metal.

3.14.3.1 Self-lubricating or oilless bearings

Self-lubricating or oilless bearings shall only be used on application of light and low velocities in moisture free and low humidity conditions and where access to bearings is difficult and likely to be neglected during servicing.
The type of bearing metal composition used shall have frictional and wear resistant properties akin to those of grease lubricated bushed bearings.

3.15.0 NOISE AND VIBRATION CONTROL

3.15.1 General Unless otherwise specified in the Supplementary Specification the design, manufacture and installation of all the mechanical and electrical equipment shall be such as to ensure compliance with the relevant sections of SABS 0103 of 1983 "The Measurement and Rating of Environmental Noise with Respect to Annoyance and Speech Communications", as amended.
Any installation where the measured residual sound level exceeds the maximum desired residual sound level as per SABS 0103 shall be rectified to comply with SABS 0103 at the Contractor's own expense.
In all plantroom applications where airborne noise cannot be limited or comply with the set standards, provision shall be made for acoustical treatment of the equipment involved or, alternatively, total enclosure thereof with acoustical panelling to comply with requirements laid down in this specification.
Such provisions shall be included in the tender price and no claims for payment to comply with this

requirement will be entertained.

3.15.2 Vibration Isolation

Proper provisions shall be made in the foundations and mountings of all equipment capable of transmitting vibration forces to its environment, whether local or remote, (As is the case with pipes) for vibration isolation.

The following table of recommended isolation efficiencies for critical areas applicable to heavy mass concrete floor slabs serves as a guide only:

CRITICAL AREAS TRANSMISSIBILITY
ISOLATION
EFFICIENCY
1. Centrifugal compressors and chillers 0,5% 99,5%
2. a) Centrifugal fans larger than 15kW
b) Reciprocating compressors larger than 40kW
c) Pumps larger than 4kW 1% 99%

3. a) Axial flow fans larger than 20kW
b) Centrifugal fans up to 15k W
c) Reciprocating compressors up to 40kW
d) Pumps up to 4kW
e) Unit air conditioners
f) Fan coil units 3% 97%

4. a) Axial flow fans up to 20kW
b) Air handling units 4% 96%

5. a) Pipes
b) Electrical connections, conduit cabling etc. 8% 92%

6. Boilers, steam and central heating, larger than 20kW 4 to 7 Hz

The following table of recommended isolation efficiencies for general areas applicable to heavy mass concrete floor slabs serves as a guide only:

CRITICAL AREAS TRANSMISSIBILITY
ISOLATION
EFFICIENCY

1. Centrifugal compressors and chillers 5% 95%
2. a) Centrifugal fans larger than 15kW
b) Reciprocating compressors larger than 40kW
c) Pumps larger than 4kW 8% 92%

3. a) Axial flow fans larger than 20kW
b) Centrifugal fans up to 15k W
c) Reciprocating compressors up to 40kW
d) Pumps up to 4kW
e) Unit air conditioners
f) Fan coil units 10% 90%

4. a) Axial flow fans up to 20kW
b) Air handling units 15% 85%

5. a) Pipes
b) Electrical connections, conduit cabling etc. 20% 80%

6. Boilers, steam and central heating, larger than 20kW 8 to 15 Hz

Selection of vibration isolation equipment and in particular, mountings for equipment and machines, shall be done with due regard to the forcing frequency of the driven machinery and the mounted natural resonant frequency of the machine.

In the case of installation of equipment on upper floors, suspended floors, roofs etc. it is of prime importance that floor stiffness, floor, deflection and natural frequency of the floor be taken in to consideration to ensure that resonant conditions cannot occur.

Driven machinery and isolator deflections shall be carefully selected in these applications.
Equipment selection schedules shall be submitted to the Department for approval and shall contain full details regarding the forcing frequency, the natural mounting frequency, the static deflection and all other relevant information to evaluate vibration isolation equipment.

Should added mass inertia blocks be required to comply with these vibration isolation requirements, proper provision shall be made at tender stage for the provision of such.

3.15.3 Damping

Where static deflections in excess of 8mm are indicated, steel springs shall be employed incorporating acoustic sound pads in series with the spring.

The horizontal stiffness of the springs shall not exceed that in the vertical, in particular for systems mounted at vertical frequencies below 5Hz.

Low frequency mounts shall incorporate rubber snubbers to accommodate extreme horizontal or vertical motions such as can occur near resonance during start up.

The snubbers shall however not be relied upon to provide the necessary horizontal stability of the machine in normal operational conditions.

Spring layouts and inertia blocks shall be employed to avoid this situation.
For static deflections below 8mm, rubber in sheer mounts may be used provided the frequency is above 6Hz.

For small static deflections less than 4mm and particularly for high-speed machines and general acoustic isolation, ribbed rubber neoprene composite pads may be employed subject to the specified requirements.

No equipment shall be installed in critical areas without correct and approved vibration isolation.
Sufficient stability and damping shall be incorporated in the mountings to minimise the movement of the machine during start up or changes in the operating conditions.

The selection of mounts shall take proper cognisance of unequal distribution of the mounting weight of equipment and rotational and/or pressure forces acting thereon.

3.15.4 Refrigeration Chillers

3.15.4.1 Indoor Units

Indoor units shall be carefully selected with due regard to vibration transmission to pipework and the surrounding structure and airborne noise transmitted to the plantroom. Where the airborne noise inside the plantroom exceeds the limits laid down, provisions shall be made in the tender for the total enclosure of the chiller with acoustic panelling to ensure acceptable noise levels.
Spring mounting of compressors only on the basic chiller framework as supplied ex factory will not be sufficient. In addition, (unless otherwise specified in the supplementary specification) the complete chiller unit shall be installed on spring mountings of the correct deflection characteristic.
For critical areas, the standard spring mounting of the chillers will not be sufficient. In addition, inertia mass will be required with the chiller unit as a whole mounted on correctly selected spring mounts. Deflection in excess of 40mm can be expected.
Indoor air cooled chillers shall in all cases be fitted with centrifugal fans for the condenser section. The complete unit with fan/s, ducting grilles etc. shall comply with the requirements laid down in this specification.

3.15.4.2 Outdoor Chillers
Where outdoor type air-cooled chillers are specified in critical areas, in addition to the laid down

requirements, condenser-cooling fans shall be of the centrifugal type and provided with attenuation.
Centrifugal fans and attenuation shall be provided where necessary to meet the laid down noise criteria for other areas.
Acoustic panelling to the chiller housing shall similarly be provided for equipment where necessary to comply with the laid down criteria.
SABS 0103 has reference.

3.15.5 Cooling Towers

3.15.5.1 Indoor Applications

Anti-vibration requirements and noise transmission to surrounding areas shall comply with requirements as laid down (unless otherwise specified in the supplementary specification). No cooling tower shall be installed indoors unless it is mounted on anti-vibration spring mountings and should it be necessary, the required inertia mass.

3.15.5.2 Outdoor Applications

Cooling towers installed outdoors shall similarly comply with the laid down noise criteria for this application, particular care being paid to the selection of the fans and where applicable, the pumps for critical areas.

3.15.5.3 Cooling Tower Fans

Centrifugal fans shall generally be required for indoor application of cooling towers and for outdoor applications in critical areas.
In critical areas it will possibly be required that proper attenuation be applied to air inlets and air discharge of cooling towers and, where so specified in the supplementary specification, the total cooling tower shall be installed inside acoustic panelling to prevent noise breakout.
Alternatively ejector type cooling towers may be offered, subject to the requirements of this specification.

3.15.6 Pumps
All pumps with their motors shall be mounted on a baseframe, which shall be installed on concrete plinths.

In addition it is required that pumps installed indoors and in critical areas shall be installed on antivibration mountings with inertia mass bases with mountings selected for correct static deflection.
Bases for pumps in non-critical areas shall be installed on rubber in sheer mounts as a minimum, depending on the pump selection and locality of the pump.

Where required in the supplementary specification, pumps shall be totally enclosed in acoustic panelling to reduce noise breakout to the immediate vicinity and surrounding areas.

3.15.7 Fans

3.15.7.1 Centrifugal Fans

No centrifugal fan shall be selected in a class range other than Class 1 or 2 and the rotating speed of the fan at duty point shall not exceed 1 440 r/min.
Centrifugal fans in critical areas and fans above 7,5kW shall in all cases be mounted together with the drive motor on anti-vibration mountings together with the correct inertia mass.

3.15.7.2 Propeller Fans

Propeller fans shall comply with the criteria already laid down and shall be carefully selected for the highest possible efficiency with due regard for the noise criteria.
Propeller fans in excess of 0,5kW and of rotational speed higher than 800 r/min shall, in addition to the requirements already laid down, be mounted on correctly selected and installed anti-vibration mountings to reduce possible vibration transmission to surrounding structures.

3.15.7.3 Axial Flow Fans

Axial flow fans shall be selected for the highest possible efficiency and comply with the noise criteria specified. In critical areas no fan shall be installed without attenuators on inlet and outlet sides.

In addition it will be required that the fan as a whole be mounted on anti-vibration mountings and where specified in the supplementary specification, it may be required for the fan to be enclosed in acoustic panelling.

No axial flow fan may be installed without anti-vibration mountings to match the fan characteristics and in critical areas it may be required for the axial fan to be provided with inertia mass to match. Fan rotational speeds specified in the supplementary specification shall not be exceeded.

3.15.7.4 General

No fan may be directly connected to ducting either on the inlet or outlet sides, approved flexible connections shall be provided between the fan and the ducting distributing the air.
Where fan noise characteristics cannot meet the requirements of this specification such fans shall be replaced or other approved steps taken by the contractor at his own expense until the installation meets the requirements.

3.15.8 Air Handling Units

3.15.8.1 General Application

Air handling units shall comply with the requirements already laid down for noise vibration and noise criteria.In the case of built-up air handling units, the fan and motor unit shall be mounted on anti-vibration mountings and in the case of critical areas, be provided with additional inertia mass to comply.

In the case of packaged factory-built units, it shall be necessary to mount the fan and motor unit on anti-vibration mountings internally to the unit and in addition, it will be required for the air handling unit as a whole to be mounted on anti-vibration mountings of the correct static deflection characteristic.

In critical areas, it will be necessary to provide additional inertia mass for the fan and motor combination in addition to the above.

Where necessary to comply with the noise criteria laid down, air handling units shall be provided with internal acoustic panelling to match the fan characteristic and to comply with the noise criteria laid down.

3.15.8.2 Hospital Applications

In hospital applications, the noise criteria already laid down for critical areas and as per SABS 0103 shall apply and the general requirements set out above.

However, no internal insulation or acoustic panelling will be permitted and all noise reduction required shall be done external to the air path.

3.15.9 Piping

3.15.9.1 General

Under no circumstances may any piping be directly connected to noise generating equipment such as pumps, chillers, cooling towers etc.Connections to such equipment shall be made with correctly selected flexible rubber type connectors of the spherical type.
In critical areas double spherical rubber type isolators immediately adjacent to the noise generating machine will be required.

3.15.9.2 Pipe Penetrations Through Walls

Under no circumstances will pipe penetrations through walls be permitted where the pipe comes in direct contact with the surrounding wall or structure.
At such penetrations it is required that a sleeve of 25mm thick soft neoprene, or other approved material, be provided around the piping at the penetration and, where plastering is applied, plastering shall be cut back to the outer edge of this sleeve.
Rubber links similar to the LINK-SEAL bolted type are preferred.

3.15.9.3 Pipe Supports

In all critical applications and within the first ten metres of all equipment, it is required that pipe supports shall be of the flexible type, correctly selected for the application and with the correct static deflection.

Depending on the application spring mounting will in all probability be required.
Any other areas and applications at risk of noise or vibration transmission to the surrounding structure similarly require pipe mountings isolated from the structure.
Pipe supports fixed to sensitive building elements will not be permitted.

3.15.9.4 Refrigerant Piping

Refrigerant piping in critical applications shall similarly be supported on anti-vibration mountings and in addition, delivery and suction piping at compressors and air handling units shall be provided with at least two braided flexible connections installed at 90? to each other and in close proximity of each other.

3.15.10 Sound Attenuators

Where required, in order to comply with the noise and vibration criteria already laid down, or where specified in the supplementary specification, sound attenuators shall be provided for ventilation, air conditioning and all other plant (Duct mounted and/or as applicable).
Primary sound attenuators shall be installed near or in the plantroom.
The attenuators selected shall match the specific fan or plant characteristics to ensure the correct insertion loss to meet the sound criteria laid down.
Unless otherwise specified, sound attenuators shall be installed with flexible connections at the inlet and outlet connections.
The sound attenuators shall in addition be selected to produce the minimum pressure loss across the attenuator coupled to the least re-generated noise level produced by the flow through the attenuator.

Unless otherwise specified, air path sound attenuators shall be manufactured from galvanised sheet steel with the sound absorption material moisture repellent and erosion resistant up to 20 m/s air speed, and preferably flange connected.

Wherever possible attenuators shall be proprietary type supplied by the same manufacturer as the plant manufacturer to ensure complete compatibility.

Where not clearly indicated on the drawings, attenuators shall in all cases be provided at points where supply and return air ducting leaves the plantroom and shall be installed to prevent noise breakout from the plantroom via the ductwork.

Where specified in the supplementary specification and indicated on the drawings, additional cross talk attenuators shall be installed in the air conditioning or ventilation ductwork.

The internal free area of sound absorbers shall be not less than the cross sectional area of the connecting duct as indicated on the drawings.

Field fabricated type sound absorbers shall be made as follows:-

All sides of rectangular ducting shall be double walled with the inner walls perforated with 10mm holes at 25mm centres. The space between the two sidewalls shall be divided into 3 unequal sections by means of 25mm thick cement fibre panel strips and filled with glass wool. The lining thickness shall be at least 80mm.

Circular ducts shall be lined as specified above except that the lining thickness shall not be less than 100mm.

3.15.11 Air-Borne Noise

Selection and installation of all items such as grilles, diffusers, dampers, jet outlets, nozzle outlets, transformation pieces, takeoffs, etc. shall be carried out in such a manner to ensure compliance with the noise criteria laid down in this specification. Items shall be carefully selected to reduce

generated noise levels to accepted levels and with minimum air pressure loss. Items such as dampers, volume control items etc, shall be carefully selected with due consideration for noise regeneration in all possible positions of such dampers or items to ensure compliance in all

positions.
All duct penetrations through walls and structures shall be provided with a 25mm thick soft neoprene or similar approved material sleeve surround to ensure that no direct contact between the duct and wall occurs. For plastered walls the plastering shall be cut back to the outer edge of this sleeve.

3.15.12 Room Units

Where room units such as air conditioners, fan coil units, VAV outlets or induction units are used, it is essential that the acoustical characteristics of such units are considered during selection and that they are installed to ensure compliance with the noise criteria laid down.
The sound pressure level from these machines shall be within the set criteria throughout the frequency range.

3.15.13 Noise to the Exterior

Where specified in the supplementary specification, additional measures shall be taken to prevent or reduce noise breakout to the exterior from the plantrooms.
In critical areas it is essential that all possible steps be taken and be allowed for at tender stage to ensure compliance with the requirements laid down.
No allowance shall be made for screening or attenuation with distance in calculating requirements.

3.15.14 Electrical Connections

In critical areas no conduit or armoured cabling may be connected directly to equipment. Flexible connections shall be used in these applications.
In other applications cabling shall be connected to equipment with long radius bends. No sharp corners or bends in cabling may be used.
Electrical connections shall not impede anti-vibration mountings and shall not convey vibrations or sound to the structure or building elements.
In critical areas cabling, trunking etc. shall be supported in a manner to ensure no vibrations are conveyed to the structure. Supporting from sensitive elements of the structure will not be permitted.
Where floating floors, acoustical separating elements etc. are used in a structure, flexible connections, conduit etc. shall be used at all crossover points.

3.15.15 Testing
When called upon to do so by the Department, the Contractor shall provide at his expense, all necessary equipment required to ascertain compliance with noise and vibration elimination in the installation.
The instruments provided shall be calibrated by an approved Authority and shall be capable of measuring sound and vibration levels integrated over a period of time.

The instrument to measure sound pressure levels must be capable of reading sound levels in dBA as well as the sound level at the international octave band centre frequencies of 31,5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz and 8000 Hz as a minimum.

The instrument to measure vibration levels shall be calibrated in nano m/s over the integration period.

In the event of such tests indicating insufficient provision for eliminating airborne noise and vibration transmission, the Contractor shall at his expense rectify the installation as necessary and the tests shall again be executed until satisfactory results are obtained.

Final approval of the noise and vibration levels shall be at the sole discretion of the Department.

3.16.0 ELECTRICAL EQUIPMENT AND INSTALLATION

3.16.1 Unless otherwise stated in the Supplementary Specification tenderers must allow in their price for the complete electrical installation and wiring.
3.16.2 All electrical equipment and wiring shall be in accordance with the current issue of the Department's Standard Specification for Electrical Equipment and Installation for Mechanical Services. Copies can be obtained from the Department, Private Bag X65, PRETORIA, 0001.

3.16.3 Power terminal points will be as specified in the Supplementary Specification.
3.16.4 Ammeters and pilot lights shall be provided for electric heaters, one of each for each step of heating.

3.16.5 All compressor motors over 5kW shall be provided with an approved electronic type motor protection unit in addition to the protection called for in the Standard Specification for Electrical Equipment and Installation for Mechanical Services.

3.16.6 Clause 1.2.1 (a) of the Standard Electrical Specification shall read "The South African Bureau of Standards Code of Practice for the Wiring of Premises as amended".

3.16.7 In conventional field assembled plants lighting wired from the air conditioning control panel shall be provided for the filter chamber, coil chamber and fan chamber and shall comprise of bulkhead fittings permanently fixed to the walls or ceiling and earthed directly to the main earthing bar of the switchboard by means of a 4mm² bare copper earth continuity conductor, in addition to being earthed by means of the continuity of the conduit as specified in the Standard Electrical Specification.

3.16.8 The fault level of the air conditioning distribution board shall be as specified in the Supplementary Specification.

3.16.9 In the case of small wiring direct from busbars, e.g. voltmeter supply, suitable protection fuses shall be mounted directly onto the busbars.

3.16.10 The possibility of inadvertent contact with live terminals shall be avoided at all cost. All apparatus and wiring behind readily accessible hinged doors or panels shall be protected against finger contact by means of insulating panels (Perspex or similar approved material) or other approved method. Busbar mounted voltmeter fuses shall be mounted on insulated back plates to afford complete safety from hand contact with busbars or other conductors in the immediate vicinity.

3.17.0 SELECTION OF EQUIPMENT

3.17.1 All equipment shall be selected with due regard to the installation site conditions, particularly with respect to;
□□altitude
□□ambient temperatures
□□atmospheric conditions

3.17.2 Equipment shall at all times be selected to operate within the limits recommended by the particular manufacturer.

3.17.3 Where equipment will be required to operate at conditions deviating from the manufacturer's standard selection tables, re-rating shall be done strictly in accordance with the manufacturer's methods.

SECTION 4

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CLAUSE DESCRIPTION PAGE

STANDARD SPECIFICATION
FOR
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SECTION 4

4.0 TECHNICAL REQUIREMENTS - EQUIPMENT AND MATERIALS

4.1.0 ROOM TYPE AIR CONDITIONERS - AIR COOLED

4.1.1 General

4.1.1.1 Room type air conditioners shall be completely self-contained units of the direct expansion unitary or split type design, air-cooled.

4.1.1.2 The air conditioners shall generally be in accordance with SABS 1125-1977 with sound levels not exceeding the values specified in the Supplementary Specification and/or this Standard Specification as applicable.

4.1.1.3 Room air side shall be equipped with a suitable and easily accessible filter, two speed fan, adjustable directional air discharge grille, adjustable outside our intake damper, control thermostat, electric heating elements (if not specified as reverse cycle heating) (where applicable), drain pan and drain piping, cooling coil, controls and control panel and complete wiring, including interlocking with outdoor unit.

4.1.1.4 The outdoor unit shall contain the matching compressor unit, air-cooled condenser, condenser fan within a waterproof painted and corrosion protected casing.

4.1.1.5 The indoor/outdoor units shall be interconnected with refrigerant piping (separately insulated suction and delivery piping for reverse cycle units), electric wiring and interlocking control cabling.
Where visible and/or exposed to the weather or possible mechanical damage refrigerant piping and cabling shall be run inside galvanised sheet steel trunking, neatly erected and painted as specified.

4.1.1.6 Where applicable provision shall be made in the unit design to re-evaporate condensate from the Condenser. Provision shall however be made in all cases for the drainage of excessive condensate to the nearest building drain by means of copper or uPVC tubing (refer to Supplementary Specification) not less than 18mm diameter.

For reverse cycle heating units, including split type units, a proper drippan with drainage piping as above shall be provided for the outdoor units where dripping can create unacceptable conditions. Where drainage piping is required to be installed flush mounted, positioning and chasing shall be done in good time to meet construction programmes.Drainage to points other than a proper building drain shall comply with SABS 0400.

4.1.1.7 All panels shall be neat fitting with hardwearing exposed surfaces of baked enamel or equal finish of approved colour.

4.1.1.8 Electrical interlocking shall be provided to ensure that;

a) compressor cannot run without both indoor and outdoor fans running,
b) electric heating elements can only be switched on if the indoor fan is running,
c) it shall not be possible to switch cooling and heating on simultaneously.

4.1.1.9 Unless otherwise specified in the Supplementary Specification room type air conditioners in the cooling mode shall be rated at 35ºC ambient dry bulb air temperature on to the condenser, 27ºC dry bulb and 19ºC wet bulb air entering conditions to evaporator, all at sea level with the cooling capacities specified at these conditions. For reverse cycle heating the rating shall be based on 7ºC ambient dry bulb and 6ºC wet bulb air on to the outdoor coil with 21ºC dry bulb air on to the indoor coil.

4.1.1.10 Unless otherwise detailed on the drawings or in the Supplementary Specification units installed through a wall shall be installed with a subframe built in to the wall (hardwood or steel) and neat finishing architraves inside and outside. The external architrave shall be of aluminium angle and shall be mitred at corners and shall cover the subframe and opening completely. The architrave and

subframe surround shall be sealed with clear silicone sealant.

4.1.2 Coastal Applications
For coastal applications special considerations and requirements are called for namely;

4.1.2.1 All steel parts exposed to the atmosphere or to ambient air (including outdoor unit air path) shall be either hot-dip galvanised or electroplated to SABS 728 of 1970 before painting.

4.1.2.2 Outdoor unit coil shall be constructed of copper to copper tubing and fins.
4.1.2.3 Electric terminals and connections shall be corrosion protected with non-hardening mastic or equal coating.
4.1.2.4 The complete compressor unit shall be sprayed with a continuous skin of PA 10 plastic film, or equal.
4.1.2.5 Fan motors, fan scroll and internal fan wheels shall similarly be sprayed with a PA 10 plastic film or equal.
4.1.3 Window Type Units
4.1.3.1 Window type room air conditioners shall be suitable for mounting in window frames or wall openings and shall be completely self-contained.
4.1.3.2 The units shall be made up in two parts namely the chassis or cabinet and the main body. The cabinet shall be mounted in the window frame or wall. The main body shall slide in/out on selflocating guides and guide strips to facilitate maintenance.
4.1.3.3 Where a unit is installed beyond normal reach the controls shall be installed remote at eye level. Unless otherwise specified in the Supplementary Specification all wiring between the unit and the remote control shall be installed in flush conduit and draw-boxes.

4.1.4 Console Type Units

4.1.4.1 Console units shall be completely self-contained and shall be mounted above skirting height for cleaning purposes.

4.1.4.2 Units with a two-part construction allowing the cabinet to be built in to the wall with the main body to slide in or out is preferred.

4.1.4.3 Matching weather tight air intake and exhaust louvred panels of anodised aluminium with horizontal blades shall be provided and installed with each unit.
Depending on size, detail and wall thickness the louvre shall form part of the cabinet or shall be fixed to the subframe.

4.1.4.4 Units shall be supplied with the manufacturer's standard 2 kW electric heating element thermostatically controlled. Reverse cycle units shall only be supplied if called for in the Supplementary Specification.

4.1.5 Split Type Units

4.1.5.1 Split type units shall consist of a direct expansion indoor fan coil unit and a separate (remote) externally located air-cooled condensing unit.

4.1.5.2 The indoor fan coil unit shall be floor-mounted, wall mounted, under-ceiling mounted, ceiling cassette mounted or above ceiling ducted type as specified.

4.1.5.3 Above ceiling units shall be properly insulated, particularly where exposed to high roof or lighting heat loads.
4.1.5.4 Remote controls shall be wired in conduit and mounted at eye level in the positions indicated on the drawings.

4.1.5.5 All conduit and draw boxes shall be installed flush in the walls or partitions.
Surface mounted wiring in trunking or the like will only be accepted if specified as such.
No joints will be allowed in the control wiring.

4.1.5.6 Suction lines shall be insulated as specified. Suction and delivering lines may not be insulated grouped together as for a single line. Vapour barrier integrity will be critical to prevent dripping.
4.1.5.7 Gas piping (insulated as specified) and wiring shall be installed in galvanised steel trunking

throughout for protection, painted as specified where exposed or visible.
4.1.5.8 Outdoor units shall be installed on raised plinths or where wall mounted on unistrut or approved

galvanised steel brackets, properly braced and fixed.

4.1.5.9 Refrigerant piping shall be sized and fitted with the necessary oil traps strictly in accordance with the manufacturer's requirements.

4.2.0 FANS

4.2.1 General

4.2.1.1 Fan duties are specified in the Supplementary Specification.

Where no pressure requirements are indicated Tenderers shall estimate the fan static pressure requirements for the system layout and equipment as offered by them and tender accordingly.

4.2.1.2 Fans shall be selected to operate at or as near to maximum efficiency as possible.

4.2.1.3 Flexible connections shall be fitted between fan inlet/discharge and ducting or equipment as appropriate. Flanges are required with flexible connections.

4.2.1.4 Fans shall be fitted with manufacturer's nameplates permanently fixed to the casing in a prominent position clearly indicating manufacturer, model number, maximum operating speed, maximum power absorbed, size and serial number for larger fans.

4.2.1.5 Air in/outlets not connected to ducting or equipment shall be properly protected with removable screens as per SABS 0400.

4.2.1.6 Indicating arrows for both direction of rotation and direction of airflow shall be provided on fan casings.

4.2.1.7 Fans for special applications such as corrosive gas, explosive atmospheres etc. shall be specified as such in the Supplementary Specification.

4.2.1.8 Fans for proprietary and package units although not specifically covered in this specification shall however comply with the general requirements of this specification.

4.2.2 Centrifugal Fans

4.2.2.1 Centrifugal fans shall be of the forward or backward curved, multi-vane type with single or double inlet and arrangement as specified in the Supplementary Specification.

4.2.2.2 Fan performance shall be based on tests carried out in accordance with BS 848 : Part 1 or Part 3 (as applicable) and as amended.

4.2.2.3 The fan casing shall be of the volute type manufactured from sheet steel with lock forming or continuously welded seams, suitably reinforced and adequately supported by means of a steel superstructure.

4.2.2.4 Fan wheel and shaft assembly shall be statically and dynamically balanced to ISO 1940 - 1973 within grade G6,3.

4.2.2.5 Fan drives shall be by means of standard V-belt and grooved pulley configuration. Drive motors mounted on the fan casings are not acceptable.

4.2.2.6 Larger fans shall be manufactured with split casings in sections to permit installation through available openings in new and existing buildings.

4.2.2.7 Shaft bearings shall be grease lubricated, self-aligning ball or roller bearings in accordance with the fan manufacturer's standard practice. For bearings located in the air stream, precautions shall be taken to prevent loss of lubricant.

4.2.2.8 Shafts shall be fully machined steel shafting conforming to BS 970 grade 070M20.

4.2.2.9 A drain socket with plug shall be provided at the lowest point in the fan casing (except if discharge is at lowest point).

4.2.2.10 Fans used in variable volume applications shall have stable characteristics throughout the operating range.

4.2.2.11 All fans shall be tested in the factory and checked for vibration to ISO 2372, smooth running, mechanical interference. Bearings shall be checked using a shock impulse meter.

All measurements and observations made during this test run shall be recorded and made available to the Department on request.

4.2.2.12 Fan motors in the air stream in draw-through applications with spray coolers or sprayed coils shall be TEFC and protected to IP44 or better.

4.2.2.13 Shafts for variable inlet vane control shall be supported by pre-lubricated sealed bearings. Both sets of variable inlet vanes on double inlet fans shall be controlled simultaneously and equally. Variable inlet vanes shall automatically be in the closed position during starting-up until the preselected fan speed is reached.

4.2.2.14 Casing access panels shall be fitted to fans 630mm and larger and all fans used in draw-through applications with spray coolers or sprayed coils.

4.2.3 Axial Flow Fans

4.2.3.1 Axial flow fans shall be of the aerofoil type with non-overloading characteristic with peak power requirements occurring in normal operating pressure range and motor rating exceeding this requirement.

4.2.3.2 Axial fans shall be selected for the highest possible efficiency with the lowest possible blade tip speed.
4.2.3.3 Only fans of a make approved by the Department will be acceptable.

4.2.3.4 The complete fan unit shall be statically and dynamically balanced in accordance with ISO 1940 - 1973 within grade G6,3.

4.2.3.5 Fan performance shall be based on tests carried out in accordance with BS 848 : Part 1 as amended.

4.2.3.6 Fan casings shall be manufactured from reinforced mild steel with predrilled flanges at both ends.

4.2.3.7 Casing access panels shall be provided where specified in the Supplementary Specification.

4.2.3.8 Fan motors shall be totally enclosed squirrel cage induction type with protection to IP 55 unless for a special application as set out in the Supplementary Specification.

4.2.3.9 Motor connections shall be in a external weather proof terminal box forming part of the casing. (Except for flameproof and special applications.)

4.2.3.10 Fans fitted at the inlet of a system shall be provided with bell-mouth entries.
4.2.3.11 Axial fans shall be resiliently mounted.

4.2.3.12 Single-phase fan motors shall only be provided where specifically specified in the Supplementary Specification.

4.2.3.13 Impeller hubs and blades shall be die cast aluminium alloy assembled with high tensile steel bolts and nuts except for special applications where material requirements will be as set out in the Supplementary Specification.

4.2.4 Propeller Fans

4.2.4.1 Propeller fans shall be suitable for mounting with or without mounting plate (diaphragm) as specified in the Supplementary Specification.

4.2.4.2 Mounting plates (diaphragm) where required shall be of pressed steel or reinforced laminated fibreglass with integral bell mouth orifice.

4.2.4.3 Impellers shall be of heavy gauge contoured pressed steel blades or reinforced polypropylene or

fibreglass ultra-violet stabilised, mounted on cast aluminium or steel hubs.

4.2.4.4 Fan motors shall be three-phase totally enclosed squirrel cage induction type with protection to IP44 unless otherwise specified.

4.2.4.5 Fans shall be resiliently mounted.

4.2.4.6 Balancing and testing shall be as set out in clauses 4.2.3.4 and 4.2.3.5 above.

4.2.4.7 Motor and impeller protection screens shall be fitted as applicable.

4.2.4.8 Fans on exterior walls shall be fitted with weather tight galvanised louvre shutters and where specified with wall cowls.

4.2.5 Window/Wall Extract Fans

4.2.5.1 Window/wall type fans shall be fitted with automatic shutters.

4.2.5.2 Fans shall be fitted with finger protection guards.

4.2.5.3 Where specified, speed control shall be provided.

4.2.5.4 Where remote control is specified wiring between fan, control point and power supply point shall be flush mounted with conduit and draw boxes.

4.2.6 Roof Extract Fans

4.2.6.1 Roof extract fans shall be the mixed flow or propeller type as specified in the Supplementary Specification with non-overloading characteristic.

4.2.6.2 Where specified, units shall be suitable for upstand or curb mounting complete with weather skirt and flashing as required.

4.2.6.3 Vertical discharge fans shall be fitted with shutters to prevent rain ingress.
4.2.6.4 Roof extract units shall be suitable for mounting on any form of roof with pitch varying from horizontal to 45 degrees.

4.2.6.5 Roof extract units shall be manufactured from corrosion resistant materials and painted as specified.
4.2.6.6 Fans shall be directly driven by totally enclosed airstream rated motors protected to IP44 or as specified.

4.2.6.7 Fan performance shall be based on tests carried out in accordance with BS 848 : Part 1 (as amended).

4.2.6.8 Impeller shall be statically and dynamically balanced.

4.3.0 ELECTRICAL HEATERS
4.3.1 Heaters shall comply with the current issue of the Department's Standard Specification for Electrical Equipment and Installation for Mechanical Services and SABS 0173 as applicable.

4.3.2 Heaters built in to ductwork shall be provided with fibrecement panelling downstream of the heater bank as protection for the insulation in close proximity to the heater bank.

4.3.3 Heaters shall be so constructed and installed that routine maintenance, repair or replacement can be undertaken without disassembly of connected ducting or air handling plants.

4.3.4 The heater element for each step of heating shall be strung across the entire face of the coil or duct opening to prevent stratification and bypassing when operating at reduced capacity.

4.3.5 Ventilation and other openings in the external enclosure shall be so protected that contact with live terminals or parts is rendered impossible without the use of tools.

4.4.0 AIR FILTERS

4.4.1 General

4.4.1.1 Filters of the type, size and quantity as specified in the Supplementary Specification shall be provided.

4.4.1.2 Filter efficiency and arrestance shall be in accordance with ASHRAE Test Standard 52-76.

4.4.1.3 Filters and filter holding frames shall be of approved manufacture with standardised dimensions to enable replacement with equivalent filters of all recognised manufacturers.

4.4.1.4 Construction and manufacture of all components shall be such that under no circumstances any unfiltered air can by-pass filters or filter banks.

4.4.1.5 Sufficient space shall be allowed in front or behind filters, as applicable, to enable inspection and servicing.

4.4.1.6 Proper access doors shall be fitted to filter service areas.

4.4.1.7 Filters installed close to exposed air inlets shall be weather protected with weather louvres and a wire mesh screen.

4.4.1.8 Tubes for the measuring of the pressure drop across each filter bank shall be fitted as standard to enable connecting a manometer or other instrument as specified.

4.4.1.9 All filters and filter banks, including two-stage high efficiency and final filters shall be fitted with inclined pressure differential manometer gauges, clearly marked with filters clean (green) and filters dirty (red) indicators of a permanent type.

A separate manometer shall be fitted for each filter stage.

4.4.1.10 Fan and system selection shall allow for expected final filter resistance to ensure a supply air quantity in excess of 90% of design air quantity immediately prior to filter replacement.

4.4.1.11 Unless otherwise specified in the Supplementary Specification only dry media filters are required.

4.4.1.12 Where specified, pressure monitoring across a filter bank or banks shall be fitted for alarm purposes using differential pressure switches to activate the warning alarm or indicator required.

4.4.1.13 Where air filters of the washable type are specified in the Supplementary Specification a suitable filter wash tank and stand complete with a drying rack shall be provided in each plant room.

The wash tank and stand shall be manufactured from galvanised steel and epoxy powder coated.
The wash tank shall be connected to mains water and a suitable overflow and drain piped to the building drain fitted.The drying rack shall hold at least 20 filters.

4.4.1.14 Where washable filters are specified one complete set of spare filters shall be provided.

4.4.2 Panel Filters

4.4.2.1 Panel filters shall be of the pleated type and not less than 50mm thick.

4.4.2.2 The filter shall be washable or disposable as specified.

4.4.2.3 Synthetic media shall be used bounded together with galvanised wire for reinforcing and bonded in the frame ensuring no air bypass.

4.4.2.4 The frame shall be galvanised steel or a distortion and corrosion free moulding.

4.4.2.5 Initial synthetic dust arrestance shall be not less than 70% with dust holding capacity needed in excess of 300g per square metre nominal face area.

4.4.2.6 Initial dust spot efficiency shall be not less than 20%.

4.4.2.7 Nominal filter face velocity shall not exceed 1,5m/s with initial clean filter resistance 60Pa or less and recommended resistance at specified arrestance not more than 250Pa.

4.4.3 Pad Type Panel Filters

4.4.3.1 Pad type panel filters shall make use of disposable replacement media of thickness as specified, but generally not less than 25mm thick.

4.4.3.2 Disposable media supplied and the filter in general shall comply with 4.4.2 above, unless otherwise specified.

4.4.3.3 The media shall be held in galvanised steel frames with galvanised steel screen supports on both sides. The downstream screen shall be fixed in the frame with the upstream screen removable.

4.4.4 Extended Surface Intermediate Efficiency Filters

4.4.4.1 Filter media shall be self-supporting, leak-free and stable under all airflow conditions.
4.4.4.2 Front frames shall be of aluminium, galvanised steel or reinforced high-density hard polyurethane foam with a continuous foam rubber gasket.

4.4.4.3 "Slide-in" type of arrangements will not be accepted for filters in this class.

4.4.4.4 Filter depths less than 150mm will not be accepted.

4.4.4.5 Galvanised protection screens shall be fitted to match the airflow arrangement.

4.4.4.6 Initial synthetic dust arrestance shall be not less than 85% with dust holding capacity not less than 1 500g per square metre nominal face area.

4.4.4.7 Nominal filter face velocity shall not exceed 2,5m/s with initial clean filter resistance 60Pa or less and recommended resistance at specified arrestance not more than 250Pa.

4.4.5 High Efficiency Particulate Air Filters (HEPA)

4.4.5.1 Filter media shall be self-supporting leak-free and stable under all airflow conditions.

4.4.5.2 The media shall be bonded in to a pressed and sealed particle board housing.

4.4.5.3 Unless otherwise specified in the Supplementary Specification filters shall be provi ded with silicone filled channel seals.

4.4.5.4 "Slide-in" type of arrangements will not be accepted for filters in this class.

4.4.5.5 Filters shall be arranged in two or three stage configuration with the primary filters complying with clauses 4.4.1 to 4.4.4 above as specified in the Supplementary Specification.

4.4.5.6 Filter depths less than 300mm will not be accepted and effective filter media surface area shall exceed 50m? per square metre nominal face area.

4.4.5.7 Each filter shall be individually tested in the factory for leakage with a DOP aerosol and supplied to site in completely sealed protection containers.

4.4.5.8 Corrugated media separators shall be of aluminium or kraft paper.

4.4.5.9 Filter efficiency shall be not less than 99,9% when tested with 0,3 micrometer Dioctylphthalate smoke.

4.4.5.10 Dust holding capacity shall not be less than 2 000g per square metre nominal face area.

4.4.5.11 Nominal filter face velocity shall not exceed 1,5m/s with initial clean filter resistance to be 250Pa or less and final resistance not to exceed 500Pa.

4.4.5.12 Pressure monitoring across the HEPA filters is required with warning light and/or alarm as specified.
4.4.6 Filter Holding Frames

4.4.6.1 Filter holding frames shall be the manufacturer's standard product installed and used in accordance with his recommendations.

4.4.6.2 Holding frames shall be manufactured from at least 16 gauge galvanised or epoxy powder coated steel.
4.4.6.3 Holdi
ng frames may be bolted or riveted together and shall be suitably reinforced in larger arrangements to withstand all possible operating conditions.

4.4.6.4 Fasteners shall be positive sealing type that clip in and a minimum of four fasteners per filter is required.

4.4.6.5 Fasteners shall match the particular filter, filter arrangement and frame.

4.5.0 COOLING AND HEATING COILS

4.5.1 General

4.5.1.1 Cooling coils shall be suitable for direct expansion air to refrigerant heat transfer or air to chilled water heat transfer as specified in the Supplementary Specification.

4.5.1.2 Heating coils shall be of the hot water to air heat transfer type.

4.5.1.3 Coils shall be of the extended surface type, constructed of seamless copper tubes with mechanically bonded aluminium or copper fins.

For coastal installations and all spray coil applications copper to copper construction is required.

4.5.1.4 Coils shall be designed and constructed for a test pressure of 1 400kPa or the system working pressure times 1,5, whichever is the greatest.

4.5.1.4 Coil face velocity shall be low enough to ensure that no water is carried over in the air stream, generally not more than 2,5m/s.
Where moisture carry-over may be a problem proper eliminators shall be fitted downstream of the coil.
4.5.1.6 Coil casings shall be flanged and constructed of 1,6mm or thicker sheet steel hot dip galvanised after manufacture.
4.5.1.7 Water coils shall be provided with air vent and drain connections. Drain connections and coil circuitry shall be such that the coil can be completely drained of water if necessary.

4.5.1.8 Tubes shall be silver soldered to headers.

4.5.1.9 All coils subject to mechanical damage shall be properly protected with galvanised sheetmetal covers over the entire coil face area. Covers shall only be removed when commissioning commences.

4.5.2 Direct Expansion Coils

4.5.2.1 Direct expansion coils shall be circuited for the most economic balance between heat transfer, refrigerant pressure drop and proper oil return.

4.5.2.2 The suction header shall be constructed to ensure complete oil drainage from the coil.

4.5.2.3 Liquid and vapour distributors on multi-circuit coils shall ensure uniform refrigerant distribution between circuits.

4.5.3 Heating Coils

4.5.3.1 Heating coils shall conform to the same requirements as cooling coils.

4.5.3.2 Steam heating coils shall be slightly tilted to ensure proper condensate drainage from the coil.
4.5.3.3 Steam coils shall be fitted with proper vacuum breakers.

4.5.4 Spray Coils

4.5.4.1 Where spray coils are specified a full-face area eliminator section shall be provided downstream of the coil section.

4.5.4.2 Eliminators shall be manufactured from uPVC or moulded fibreglass with a minimum of three directional changes to the air path and eliminator baffle spacing not exceeding 30mm.

4.5.4.3 Water distribution over the coil shall be by means of plastic, bronze or gunmetal nozzles of the centrifugal non-clog type spaced to ensure complete spray coverage over the entire coil face area.

4.5.4.4 A sump manufactured from stainless steel 430 shall be provided to collect spray run-off. The sump shall be provided with a brass float valve connected to the water mains and overflow and drain piped to the nearest building drain point.

4.5.4.5 A removable strainer manufactured from brass or stainless steel shall be fitted to the pump suction connection. The strainer perforations shall be small enough to protect the nozzle and pump impeller clearances.

4.5.4.6 A water bleed line shall be fitted to the pump discharge and piped to the building drain point via an open turndish for visibility. A manual throttling valve shall be fitted to this line.

4.5.4.7 Pump installation shall be such as to ensure a flooded pump suction arrangement.

4.5.5 Drain Pan

4.5.5.1 Drain pans to collect water condensing on the coil shall be provided under all cooling/ dehumidifying coils.
4.5.5.2 The pan shall be constructed from galvanised sheet steel or copper (1,6mm thick or thicker). Fibreglass moulded or uPVC welded drippans are acceptable.

4.5.5.3 The pan bottom shall slope from all sides towards the drain point.

4.5.5.4 The pan shall be fitted with a screwed drain connection 20mm or larger depending on coil size and application.
The drain connection shall be fitted with a manometric trap matching fan pressure but not less than 50mm water depth.

4.5.5.5 Coils shall be arranged so that all condensate water is collected with no air bypassing the coil.

4.5.5.6 Pans at risk of "sweating" on the outside and causing water dripping or collecting outside the pan where it cannot be properly drained away, shall be insulated.

4.5.5.7 The drain from the drippan shall be piped to the nearest building or plantroom drain with 20mm galvanised steelpipe (or copper) or larger.

4.5.5.8 Damming up of water or puddles of water anywhere in the air-handling unit will not be accepted.

4.6.0 HEAT PUMPS

4.6.1 Heat pumps shall be of the air-to-water, water-to-water or air-to-air type or as specified in the Supplementary Specification.

4.6.2 Refrigerant to water heat exchangers shall be corrosion resistant and suitable for use with the local water at high temperature and flow velocities.

4.6.3 Shell and tube condensers are preferred for air to water applications.

4.6.4 Heat pumps shall be completely self-contained units with stainless steel or epoxy powder coated casings and cladding, suitable for permanent outdoor use where required.

4.6.5 Condenser and condenser piping circuits shall be properly insulated.

4.6.6 A condensate drippan of stainless steel 430 shall be fitted and piped to the nearest building drain, allowing for defrost cycles.

4.6.7 Heat pumps shall be selected for a maximum compressor running operation of 20 hours per day.

4.6.8 Reverse cycle automatically controlled defrost shall be provided as standard. Defrost shall be demand controlled and not timer controlled.

4.6.9 The heat pump shall be suitable for operating with ambient wet bulb temperatures as low as -10ºC and as high as 35ºC.
4.6.10 Heat pumps for domestic hot water shall heat the water to 60ºC (or as specified). Condensing and evaporation temperatures shall be selected to ensure correct functioning with water inlet temperature as low as 9ºC and as high as 50ºC. Heat pumps not capable of heating inlet water at 50ºC will not be accepted.

4.6.11 Heat pumps with a coefficient of performance (COP) of less than 3,0 at ambient wet bulb temperature of 15ºC with secondary circuit inlet temperature 20ºC or less will not be acceptable.

4.6.12 Each heat pump shall be fitted with a control and a fault indication panel to provide status indication on fault occurrence and operation mode.

4.6.13 A flow switch shall be fitted to the water or air secondary circuit and the heat pump control interlocked with the flow switch.

4.6.14 Heat pumps for domestic hot water shall be fitted with head pressure control set at ensuring constant 60ºC water supply temperature at all possible water inlet temperatures and flows.

4.6.15 Compressors shall be well known products of an approved manufacturer. Motor windings shall be suitable for the temperatures experienced in heat pump applications, particularly hermetically sealed units. Operating pressures and temperatures shall comply with the manufacturer's recommendations.

4.6.16 Provision shall be made in the refrigerant circuits for liquid collection during periods of not being in use.
4.6.17 The compressor shall be interlocked with the evaporator fan/s and the flow switch to prevent operation unless these elements are functional.

4.6.18 Each refrigerant circuit shall be fitted with a sight glass, replaceable filter drier, manual liquid shut-off valve, high- and low-pressure switches and pressure gauges.

4.6.19 Controls shall be fitted to prevent compressor short cycling on low demand.

4.6.20 Crankcase heaters shall be fitted where application and unit size warrants the use thereof.

4.6.21 Where a standby heater is required with a heat pump application the standby heater shall be switched on automatically on heat pump failure.

4.6.22 Suction- and discharge pressure gauges shall be provided on the instrument panel.

4.6.23 Noise levels shall comply with clause 3.15.0.

4.6.24 Easily detachable/ openable panels of rigid construction giving access to all working parts of the unit shall be provided.

4.7.0 SELF-CONTAINED AIR CONDITIONING UNITS

4.7.1 Each unit shall be complete with fan/s, direct expansion cooling coil, compressor unit, condenser (if not remote), expansion valve, refrigerant tubing and accessories, air filters, return air grille and/or mixing plenum control panel and control thermostat.

4.7.2 Units shall be totally indoor type or totally outdoor type as specified in the Supplementary Specification.

4.7.3 Condensers shall be air or water-cooled.

Air cooled condensers may be remote (split) type with interconnecting refrigerant piping or built in to the unit with ducted air in- and outlets. Water cooled condensers may be remote evaporative cooling type or built in to the unit with water connections for connection to remote closed circuit or open cooling towers, as specified.

4.7.4 Where specified in the Supplementary Specification units shall be reverse cycle heating type.

4.7.5 Indoor units shall be suitable either for the attachment of ductwork or fitted with a discharge air plenum with adjustable directional air louvres (Automatic sweep acceptable) as specified. Return air shall similarly be ducted or through unit mounted return air grille as specified.

4.7.6 Outdoor units shall be suitable for ducted supply and return air with a proper mixing plenum, dampers and filter arrangement as indicated on the drawings.

4.7.7 The cabinet and drippan shall be of rigid galvanised sheet steel and angle iron construction epoxy powder coated. Units installed outdoors shall be totally waterproof. Units installed in visible locations indoors shall have a neat well-finished appearance.

4.7.8 Easily detachable panels giving free access to all components shall be provided.

4.7.9 The total interior of the cabinet shall be insulated with neoprene or sonic liner faced fibreglass at least 25mm thick (or other approved method of insulation).

4.7.10 Compressors shall be of the hermetically sealed or semi-sealed, reciprocating or rotary type.

4.7.11 Remote on/off control and sensing shall be provided where specified, and fitted in the position indicated on the drawings.

4.7.12 Indoor air supply fans shall be of the centrifugal type.

4.7.13 Outdoor fans (condenser fans) shall be of the centrifugal or axial flow type for ducted condenser air applications and propeller fans for free flow applications.

4.7.14 General arrangement and configuration required shall be indicated on the drawings.

4.8.0 FIELD ASSEMBLED AIR HANDLING UNITS AND PLENUMS

4.8.1 Field assembled plants shall consist of plenum chambers built to accommodate equipment such as dampers, filters, cooling- and heating coils, heating elements, fans, drain pan etc., as specified in the Supplementary Specification and/or drawings.

4.8.2 Plenum walls and roof shall consist of prefabricated precision metal clad insulated panels (double skin) with the metal skin permanently bonded to the insulation with heat polymerising adhesive.

4.8.3 Panel sections shall clip together or joined by means of male/female insertions with a nonhardening butyl rubber base sealant. Joints shall be sealed with a clear silicone sealant.

4.8.4 Panel insulation thickness shall be not less than 50mm based on polystyrene or 40mm based on polyurethane.

4.8.5 Panel finish shall generally be galvanised steel on the inside of the plenum and chromadek on the exterior. (Painted exterior panels acceptable.)

4.8.6 Panels for ventilating plants without heating or cooling can be single skin and uninsulated (where not exposed to heat sources) suitably reinforced to ensure a proper installation.

4.8.7 Floors for plenums shall be one of the following:

i) Granolithic screed with steel trowelled finish, or
ii) Panel constructed as for walls (galvanised finish both sides) reinforced on top with 5mm thick aluminium checker plating, or
iii) As specified in the Supplementary Specification. Floors shall be waterproof and laid with a fall to the drain points.

4.8.8 Openings for doors, ducts, dampers etc. shall be pre-cut and neatly framed with angle iron steel and finished to match the exterior wall finish.

4.8.9 The entire plenum section shall be completely airtight and suitably reinforced to withstand all possible pressure differentials across the walls and roof sections.

4.8.10 Access doors shall be provided to all plenum sections. Doors shall be of the hinged double skin insulated type, 1600mm high and 600mm wide. Doors shall close airtight with sufficient cam lever type locking devices and a profiled durable rubber seal.

4.8.11 Detachable sections shall be provided for the removal or replacement of components such as fans, motors etc.

4.8.12 Standard factory fabricated modular central station air handling units may be offered as an alternative to field assembled units where such units match the general requirements set out above and the space requirements.

4.8.13 Doors giving access to electric heater banks shall be provided with safety micro switches to isolate all heater banks when these doors are opened.

The following notice shall be painted on these access doors in clear red lettering at least 50mm high;

"DANGER - ELECTRICAL HEATERS
GEVAAR - ELEKTRIESE VERWARMERS"

4.8.14 Coils, heaters, dampers etc. requirements shall comply with the relevant sections of this Specification.

4.8.15 Other factory made plenum designs will be considered subject to approval by the Department.

4.9.0 AIR HANDLING UNITS

4.9.1 Units and components shall generally comply with the relevant sections of this Specification.

4.9.2 Units shall be of the horizontal or vertical floor mounted type, draw-through or blow-through as specified in the Supplementary Specification.

4.9.3 For Operating theatres, Intensive care units, Burns units, Premature birth nurseries and the like only air handling units with blow through filter arrangements are acceptable.

4.9.4 Unit casings shall be heavy gauge galvanised sheet steel, suitably braced and stiffened to ensure a rigid non-vibrating structure.

4.9.5 Easily removable access panels shall be provided to facilitate servicing and repairs to items like fans, cooling and heating coils etc., and such panels shall be complete with suitable gaskets to ensure air tight fittings.

4.9.6 Solid double skinned access doors of the hinged type sealing air tight with proper hardware and profiled rubber seals shall be provided.

4.9.7 Doors giving access to electric heater banks shall be fitted with safety micro switches isolating the electricity supply to the heaters when such doors are opened. These access doors must be clearly marked in 50mm high red letters.

"DANGER - ELECTRICAL HEATERS
GEVAAR - ELEKTRIESE VERWARMERS"

4.9.8 The unit casing, together with removable panels, shall be internally insulated with 25mm thick polythene/neoprene coated glass fibre.

4.9.9 For Operating theatres, Intensive care units, Burns units, Delivery rooms, Premature birth nurseries and the like, the insulation shall be sheetmetal covered (Double skinned).

4.9.10 Where insulation is not sheet metal covered - i.e. it is not maintained between two sheets of metal, it shall be secured by means of a suitable adhesive as well as metal fasteners, spaced regularly at intervals not exceeding 0,3m.

4.10.0 FAN FILTER UNITS

4.10.1 Fan filter units shall be used to supply filtered air (usually outdoor air) for ventilation purposes as specified.

4.10.2 Filter requirements shall be as set out in the Supplementary Specification and in accordance with the relevant sections of clause 4.4.0.

4.10.3 Units shall be configured as indicated on the drawings.

4.10.4 Centrifugal fans only may be used in the units.

4.10.5 Casings shall be of galvanised sheet steel at least 1,25mm thick suitably reinforced and painted as specified.
4.10.6 Unless otherwise specified wall sleeves and weather louvres matching the fan filter unit shall be provided to form a complete installation.
4.10.7 Unit air supply shall be variable as specified by means of variable motor speed control and not damper control.

4.11.0 ROOM TYPE FAN COIL AIR HANDLING UNITS

4.11.1 Fan coil units shall be of the arrangement as indicated on the drawings i.e. concealed or exposed, floor mounted or ceiling mounted.

4.11.2 Each unit shall be complete with cabinet matching the application, chilled water cooling coil, hot water heating coil or electric element heater (as specified), fan, filter, drain pan, drain piping and controls.

4.11.3 Cabinets for exposed units shall be manufactured from 1,25mm thick sheet steel internally lined with glass fibre at least 12mm thick for insulation and acoustic purposes. A baked enamel finish to exposed surfaces shall be provided. Removable panels shall be provided to allow access for servicing of all components.

4.11.4 Units hidden from sight in bulkheads or ceilings shall be fabricated from 1,25mm galvanised sheet steel, internally lined with glass fibre at least 12mm thick for insulation and acoustic purposes.Motor and fan assembly shall be easily accessible for servicing.Where called for collars for supply and return ducting shall be fitted.Filters shall be accessible for cleaning or replacing.

4.11.5 Supply and return air grille shall be as specified.

4.11.6 Cooling and heating coils, and heating elements shall comply with the relevant sections of this Specification.
4.11.7 Fans shall be centrifugal type, statically and dynamically balance and directly connected to the drive motor.Fan wheels and housings shall be galvanised steel.

4.11.8 Fan motors shall be of the shaded pole or permanent split phase capacitor type with built-in thermal overload protection.
4.11.9 Drain pans shall be removable for cleaning purposes and shall be insulated to prevent condensation on the outer surfaces, and generally as per clause 4.5.5. The drain pan shall project under the entire length and width of the cooling coil including uninsulated portions of chilled water piping and valves.
4.11.10 Fan and unit on/off switch and controls shall be mounted on the unit or remote flush mounted as specified.
4.11.11 Fan control shall be by means of an on/off switch combined with speed selection options. A minimum of three speed selections shall be possible.
4.11.12 Cooling/heating control shall be by means of a thermostat and shall be on/off or proportional as specified.
4.11.13 Filters shall be easily accessible for cleaning and shall be of the cleanable type.
4.11.14 Outside air inlet openings with collars, sleeves, louvres and manual dampers shall be provided where specified.

4.12.0 INDUCTION UNITS

4.12.1 Except where otherwise specified in the Supplementary Specification the cabinets for induction units, with suitable discharge and return air grilles, will form part of the Building Contract.
4.12.2 Each unit shall be complete with air plenum, air balancing damper, ejector nozzles, cooling coil assembly, lint screen, drain pan and the necessary air and water connections.
4.12.3 The air plenum shall be constructed of cold rolled steel suitably rustproofed, or aluminium. All internal areas shall be acoustically and thermally insulated with fibreglass or equal. A primary airbalancing damper arranged for independent manual adjustment of the primary air volume shall be provided.
4.12.4 Ejector nozzles shall be heat resistant (65ºC) and shall be designed for minimum noise generation and good flow characteristics. Nozzle pressure shall be such that the mean sound pressure levels of the units do not exceed the specified level.
4.12.5 Lint screens shall be of fine mesh, properly supported and readily removable for servicing.
4.12.6 Ducting and pipe work within the cabinets shall be properly supported.

4.13.0 EVAPORATIVE COOLING UNITS

4.13.1 Direct Evaporative Cooling Units

4.13.1.1 Evaporative cooling units shall be of the type and configuration indicated on the drawings and in the Supplementary Specification.
4.13.1.2 Unit casing shall be manufactured from galvanised sheet steel panels and galvanised angle iron framework bolted together.
4.13.1.3 Interior wet surfaces shall be epoxy coated against corrosion.

4.13.1.4 Exterior surfaces shall similarly be epoxy coated and then painted as specified.

4.13.1.5 Sufficient access doors and removable panels shall be provided to ensure access to all components.
4.13.1.6 Internal wiring shall be terminated in a weathertight junction box mounted on the outside of the unit.

4.13.1.7 Units shall be complete with fan/s, evaporative media (or nozzles), recirculating spray pumps, pump suction strainer, drain valve and overflow, automatic fill and level control, adjustable bleed valve, internal piping, sump and headers (or nozzles).

4.13.1.8 The unit shall have a saturation efficiency of not less than 80%, excluding pump and fan energy.

4.13.1.9 Evaporative media shall be of cross-fluted, self-cleaning design with a maximum face velocity of 3,8 m/s.
4.13.1.10 The media for rigid-media coolers shall be constructed of cellulose paper impregnated with insoluble anti-rot salts and rigidifying saturants.
4.13.1.11 Wetted pad type coolers may use fibrous fill of resilient material with a maximum nominal face velocity of 1,5 m/s, subject to approval by the Department.
4.13.1.12 Media shall be readily accessible for servicing and replacement.
4.13.1.13 The recirculating pump shall be of the centrifugal submersible type, corrosion proof and fitted with overload protection.

4.13.1.14 The fan shall be a centrifugal fan of corrosion proof materials.

4.13.1.15 Provision shall be made in all cases for the drainage and overflow to be piped to the nearest building drain by means of copper or uPVC tubing (Refer to Supplementary Specification) not less than 18 mm diameter.

4.13.1.16 Controls shall be as specified in the Supplementary Specification.
4.13.2 Two Stage Evaporative Cooling units
4.13.2.1 Two stage evaporative cooling units shall generally comply with 4.13.1 above and shall consist of a primary and secondary air stream, with the primary air dry cooled (sensible cooling) by a first stage cooling coil and second stage evaporative cooling.
4.13.2.2 The first stage coil shall be manufactured from copper tubing with aluminium or copper fins as specified in the Supplementary Specification and generally in accordance with clause 4.5.0.

4.13.2.3 Evaporative media shall be of crossfluted self-cleaning design with maximum face velocity of 3,5m/s.
The media shall be manufactured from special cellulose paper impregnated with insoluble anti-rot salts and rigidifying saturants and not less than 300mm deep.

4.13.2.4 Water distribution piping shall be uPVC of class 4 or higher grade.

4.13.2.5 Fans for secondary air shall be as specified in the Supplementary Specification suitable for ducted or direct flow as required, with sealed bearings and IP54 or better in draw-through configuration.

4.13.2.6 Primary air fan shall be a centrifugal fan of corrosion proof materials.

4.13.2.7 Unless otherwise specified in the Supplementary Specification three step control will be required, i.e. first step no cooling with ventilation only, second step cooling as evaporative cooler only and third step as full two stage cooling unit, all controlled from a room sensor with the necessary controller.

4.14.0 ROOM TYPE AIR CONDITIONERS . WATER-COOLED

4.14.1 Room type water-cooled air conditioners shall generally comply with clause 4.1.0 and shall be of the direct expansion unitary design type with a water-cooled condenser for remote heat rejection.

4.14.1 Electrical interlocking shall be provided to ensure that:

a) compressor cannot run without the indoor fan running and cooling water flowing. A flow switch shall be fitted in the water circuit of each individual unit to this end,
b) electric heating elements can only be switched on if the indoor fan is running,
c) it shall not be possible to switch on cooling and heating simultaneously.

4.14.3 Unit configuration and arrangement required shall be indicated on the drawings.

4.14.4 Units shall be completely self-contained and with isolating valves to connect condenser cooling water.
4.14.5 Units shall be fitted with hot water heating coils or electric heating elements as specified.
4.14.6 The water-cooled condenser shall be of the co-axial tube-in-tube type copper water path.
4.14.7 Water regulating valves for automatic head pressure control shall be fitted where specified.

4.15.0 RECIPROCATING REFRIGERANT COMPRESSORS

4.15.1 Reciprocating compressors shall be either of the open-, semi-hermetic- or hermetic type.

4.15.2 Compressors in the larger cooling capacity ranges shall be equipped with positive pressure lubrication systems.

4.15.3 Compressors shall be operated within the selection and speed ranges recommended by the manufacturer.

4.15.4 Provision shall be made to prevent excessive accumulation of liquid refrigerant in crank- cases during off-cycles.Larger units shall be factory fitted with crankcase heaters as standard.

4.15.5 Compressors having nominal cooling capacities of 35 kW and larger shall be equipped with built-in capacity controlled steps (Depending on number of cylinders) of unloading cylinders.

4.15.6 Compressors with nominal cooling capacity exceeding 7 kW must start unloaded.

4.15.7 Open type compressors shall be directly coupled to the drive motor by means of flexible couplings. Compressor and motor shall be mounted on a single robust bedplate of fabricated steel construction.

4.15.8 Multiple compressors connected to the same refrigerant circuit shall have the piping arranged to return oil equal to all compressors and balance lines shall be installed to equalise pressure differences between compressors.The compressors must all operate at the same suction pressure.

4.15.9 Operating and safety controls shall be provided for each unit in a control panel forming an integral part of the unit or in a separate control panel/switchboard, as specified.

The following controls and instruments shall be provided as a minimum;
a) Suction and discharge pressure gauges with isolating valves,
b) Oil pressure gauge and low oil pressure safety switch on compressors with positive pressure oil feed,
c) High- and low refrigerant pressure safety switches,
d) Positive action timer controlled circuit for pump-down and to prevent short cycling,
e) Sight glass indicating oil level in crankcase.

4.15.10 Units of 7 kW and larger shall be fitted with a suction strainer and an oil filter with replaceable element and safety by-pass.
4.15.11 Initial charge of oil and refrigerant shall be provided.
4.15.12 Internal motor over-temperature protection shall be fitted to hermetically and semi-hermitically sealed units together with external over-current protection.
4.15.13 Serviceable compressors shall be equipped with shut-off valves on the suction and discharge sides.
4.15.14 Compressor and components of 40kg or heavier shall be fitted with lifting lugs.
4.15.15 Tenders for compressors of a manufacture not adequately backed by South African suppliers

carrying sufficient stock of the complete line of spare parts, which are subject to replacement, will not be considered.

4.16.0 RECIPROCATING COMPRESSOR WATER CHILLERS

4.16.1 The compressors shall generally be in accordance with clause 4.15.0.

4.16.2 Each water chiller shall be complete with one or more compressor and motor units, water cooler (evaporator), condenser, expansion valves, refrigerant piping circuits, controls and control panel.

4.16.3 The condenser shall be air-cooled or water cooled as specified.

4.16.4 The water chiller shall be a complete packaged unit with all components mounted on a sturdy steel framework with cladding, panels etc. to match the application.

4.16.5 Air-cooled chillers installed indoors shall be fitted with centrifugal or axial flow condenser fans.

4.16.6 The water cooler (evaporator) shall be of the shell-and-tube design with seamless copper tubing expanded into steel tube plating, each individually replaceable.

Tubes shall be accessible from either side of the shell for tube replacement and cleaning purposes. Corrosion proof internal baffling shall be provided.

4.16.7 Chillers smaller than 30kW cooling capacity may be provided with copper to copper, tube-in-tube evaporators.

4.16.8 Waterside working pressure rating for the water cooler and condenser (where water-cooled) shall be not less than 1000 kPa.

4.16.9 Evaporators shall be factory insulated.

4.16.10 Step control shall be provided matching compressor/cylinder configuration.

4.16.11 Each evaporator unit shall be provided with a chilled water low temperature safety switch.

4.16.12 Compressor control shall be interlocked with a flow-switch in the chilled water circuit (with delay timer) to prevent the unit operating with no water flow.

4.16.13 Multiple compressor and refrigerant circuit units shall be provided with automatic controls for lead/lag switching and operating time balancing of compressor running hours.

4.16.14 Units shall be selected with fouling factors as required in the Supplementary Specification.

4.17.0 CENTRIFUGAL COMPRESSOR WATER CHILLERS

4.17.1 Centrifugal compressor chillers shall be of the packaged type complete with built-up water cooler and condenser, centrifugal compressor, capacity control system, lubrication system, purge system, all interconnecting piping, controls and all other auxiliaries required for the proper and safe operation of the unit.

4.17.2 Rotor assemblies shall be statically and dynamically balanced and shall be free from vibration at all operating conditions, also during acceleration from rest and deceleration from operating speed to rest.
Operating speed shall be well below the first critical speed.

4.17.3 Each compressor unit shall be equipped with a forced lubrication system complete with oil pump, reservoir, oil heater, oil cooler, filter, level indicator etc. which shall provide positive lubrication of all moving parts under all operating conditions, including start-up and shut-down operations.

4.17.4 Units operating below atmospheric pressure shall be provided with a motor driven purge pump or compressor complete with the necessary accessories for the automatic separation of noncondensible gasses and the return to the evaporator of reclaimed refrigerant.

4.17.5 Each unit shall be provided with a control panel or cabinet containing the main switch, circuit

breakers, refrigerant pressure gauges, high and low pressure and low temperature cut-out safetyswitches, a differential oil pressure safety switch and all other accessories required for the proper and safe operation of the unit.

4.17.6 Units operating above atmospheric pressure shall be provided with a separate compressor operated transfer unit and storage tank to permit removal and isolation of the full refrigerant charge allowing internal inspection of the evaporator, condenser and compressor.

The transfer unit shall be complete with all necessary controls for manual operation including all piping and valves.

4.17.7 The chiller shall be capable of starting and operating at part load.

4.17.8 Stable capacity control through a range of 10% to 100% of full load by means of variable inlet vanes shall be provided.

4.17.9 Thermometers shall be provided as permanent equipment on all compressor and gearbox bearings to indicate the prevailing bearing or lubricant temperatures.

4.17.10 The water cooler (evaporator) shall generally be of the shell and tube type as specified for the reciprocating compressor water chillers.

4.17.11 Condensers shall be of the water-cooled shell and tube type.

4.17.12 Evaporators shall be provided with charging connections, relief devices and sufficient eliminator area to prevent liquid refrigerant carry-over.

4.17.13 Operating and safety controls shall be provided on the control panel or cabinet supplied with each unit. The following instrumentation shall be provided as a minimum;
a) Microcomputer control system,
b) Suction and discharge refrigerant pressure gauges,
c) Oil pressure gauge, (or LED readout)
d) Oil temperature gauge, (or LED readout)
e) Low chilled water temperature safety switch,
f) Low oil pressure safety switch,
g) Low- and high refrigerant pressure safety switches,
h) Bearing high temperature safety switch (manual reset),
i) Motor winding high-temperature safety switch (manual reset),
j) Necessary relays and time delays, including motor overload protection,
k) Ammeter. (3-phases)

4.17.18 Each compressor shall be driven by a squirrel cage induction type electric motor. The motors of hermetic units shall have insulation suitable for the service. It shall be either refrigerant gas cooled or water-cooled and shall be provided with a moisture indicator.

4.17.19 Waterside working pressure rating for water cooler and condenser shall be not less than 1000 kPa.

4.17.20 Units shall be selected with fouling factors as required in the Supplementary Specification.

4.17.21 Initial charge of oil and refrigerant shall be provided
.
4.17.22 The water chiller shall be a complete packaged unit with all components mounted on a sturdy steel framework with cladding, panels etc. to match the application.

4.17.23 Evaporators shall be factory insulated.

4.17.24 Compressor control shall be interlocked with a flow switch (with delay timer) in the chilled water circuit to prevent the unit operating with no water flow.

4.17.25 Mechanical means shall be provided to prevent loss of efficiency and impeller damage due to liquid carry-over.

4.17.26 Condenser tubes shall be protected against direct impingement of high velocity compressor discharge gas.

4.17.27 Initial charge of oil and refrigerant shall be provided.

4.18.0 SCREW COMPRESSOR WATER CHILLERS

4.18.1 Screw compressor chillers shall be of the serviceable hermetic compressor, direct drive packaged type complete with screw compressor, water cooler, condenser, capacity control, lubrication system, all interconnecting piping, control panel and all other auxiliaries required for the proper and safe operation of the unit.

4.18.2 Motor and rotor assemblies shall be statically and dynamically balanced and shall be free from vibration at all operating conditions.

4.18.3 Capacity control shall be by means of a hydraulic slide valve on a continuous basis or equal.
4.18.4 Bearing elements shall be pressure lubricated.

4.18.5 Low oil circulation rate shall be provided by means of an efficient oil separator forming an integral part of the compressor assembly.

4.18.6 The drive motor shall be refrigerant cooled.

4.18.7 Oil circulation system shall be complete with separator, compressor oil injection, oil filter, solenoid valves, flow switch, oil cooler, etc.
4.18.8 The water cooler (evaporator) shall be of the shell and tube type as specified for the reciprocating compressor water chillers.
4.18.9 The condenser shall be a water-cooled shell and tube condenser.
4.18.10 Water side working pressure rating for water cooler and condenser shall be not less than 1000 kPa.

4.18.11 The water chiller shall be a complete packaged unit with all components mounted on a sturdy steel framework with cladding, panels etc. to match the application.

4.18.12 Evaporators shall be factory insulated.

4.18.13 Each evaporator shall be provided with a low temperature safety switch.

4.18.14 Compressor control shall be interlocked with a flow switch in the chilled water circuit (with delay timer) to prevent the unit operating with no water flow.

4.18.15 Units shall be selected with fouling factors as required in the Supplementary Specification.

4.18.16 Each unit shall be provided with a control panel or cabinet containing the main switch, circuit breakers, refrigerant pressure gauges, high and low pressure and low temperature cut-out safety switches, low oil pressure safety switch and all other accessories required for the proper and safe operation of the unit.

4.18.17 The drive motor shall drive the male rotor assembly directly and shall be of the squirrel cage induction type.

4.18.18 Operating and safety controls shall be provided on the control panel or cabinet supplied with each unit. The following instrumentation shall be provided as a minimum;

a) Microcomputer control system,
b) Suction and discharge refrigerant pressure gauges,
c) Oil pressure gauge (or LED readout),
d) Oil temperature gauge (or LED readout),
e) Low chilled water temperature safety switch,
f) Low oil pressure safety switch,
g) Low- and high refrigerant pressure safety switches,
h) Bearing high temperature safety switch (manual reset),
i) Motor winding high-temperature safety switch (manual reset),
j) Necessary relays and time delays, including motor overload protection,
k) Ammeter (or digital readout), 3 phases.

4.18.19 Initial charge of oil and refrigerant shall be provided

4.19.0 SCROLL COMPRESSOR WATER CHILLERS

4.19.1 Scroll type compressor water chillers and components shall generally comply with the requirements set out for reciprocating compressor chillers.
4.19.2 The chiller shall be air-cooled, air cooled remote condenser or water cooled as specified.
4.19.3 The unit shall be free of liquid refrigerant and oil slugging.

4.19.3 Lubrication shall be by means of mechanical oil pump, complete with oil heater.

4.19.4 Evaporators and water-cooled condensers shall be shell and tube design.

4.19.5 The water chiller shall be a complete packaged unit with all components mounted on a sturdy steel framework with cladding, panels etc. to match the application.

4.19.6 Each chiller shall be complete with one or more compressor and motor units, water cooler (evaporator), condenser, expansion valves, refrigerant piping circuits, controls and control panel.

4.19.7 Evaporators shall be factory insulated.

4.19.8 Each evaporator unit shall be provided with a chilled water low temperature safety switch.

4.19.9 Compressor control shall be interlocked with a flow switch (with delay timer) in the chilled water circuit to prevent the unit operating with no water flow.

4.19.10 Operating control shall include for anti-recycling timing between compressor starts and capacity steps and low pressure starting.

4.19.11 Multiple compressor and refrigerant circuit units shall be provided with automatic controls for lead/lag switching and operating time balancing of compressor running hours.

4.20.0 AIR-COOLED CONDENSERS

4.20.1 Air-cooled condensers shall be complete factory assembled packaged units consisting of refrigerant condensing coils, framework, casing, fan/s and fan motor/s.

4.20.2 For coastal applications condensers shall be manufactured in accordance with clause 4.1.2.

4.20.3 Units shall be arranged for horizontal or vertical airflow as indicated on the drawings.

4.20.4 Units with ducted air discharge shall be fitted with centrifugal or axial flow fans.

4.20.5 Wiring shall be terminated in a weathertight junction box mounted in an accessible position on the unit.
4.20.6 Head pressure control with fan cycling and/or fan speed control shall be fitted as standard equipment.
Idle fans shall not be driven backwards by air short-circuiting.

4.20.7 Condenser casings shall be constructed of galvanised steel, stainless steel or aluminium and painted. All steel parts shall be adequately protected against corrosion. Access panel doors shall be provided for repairs and maintenance.

4.20.8 Condensing coils shall be of seamless copper tubing with copper or aluminium fins depending on the application.

Inlet headers shall be designed for uniform gas distribution through all individual circuits.

Headers shall be arranged to prevent trapping of oil. The coil face velocity shall not exceed 3m/s.

4.20.9 Units for outdoor use must be suitably weather proofed. Fan blades shall be of aluminium or of steel having a corrosion resistant coating, including fan shafts.

4.20.10 Air intake and discharge openings shall be screened to protect coils and fins.

4.20.11 Heat rejection capacity and coil sizing shall be selected to ensure sub cooling of refrigerant.

4.20.12 Interlocks for fans shall be provided between the indoor and outdoor units.

4.21.0 EVAPORATIVE CONDENSERS

4.21.1 Evaporative condensers shall be factory assembled sectional units, complete with fan/s, refrigerant condensing coil/s, spray nozzles and water distribution system, recirculating spray pump, eliminators, pan section and casing.

4.21.2 Heat rejection capacity and condenser section shall be selected for refrigerant subcooling.

4.21.3 Water level control shall be automatic with a quick-fill bypass valve and drain valve fitted to the sump.

4.21.4 Unless otherwise specified in the Supplementary Specification the unit shall be of the counter-flow blow-through arrangement type with centrifugal fan/s.

4.21.5 All steel sections shall be manufactured from galvanised steel with edges protected against corrosion.

4.21.6 Casings shall be rigidly manufactured from galvanised sheet steel, aluminium or re-enforced moulded glass fibre. Glass fibre units used outdoors shall be ultra-violet resistant.
Access to all internal parts shall be provided by means of easily removable panel/s or watertight doors fitted with quick opening catches. Suitable handles or holding bars shall be fitted to removable panels and doors.

4.21.7 Fan wheels and housings shall be of hot dip galvanised steel or corrosion protected to the Department's approval.

4.21.8 All moving parts shall be protected with removable screens and panels, hot dip galvanised after manufacture.

4.21.9 Effective eliminator sections, corrosion proof shall be provided to prevent water carry-over.

4.21.10 Refrigerant inlet and outlet headers shall be arranged to ensure proper refrigerant distribution and complete drainage of any oil present.

4.21.11 The heat transfer coil shall be of heavy class seamless steel tubing to SABS 62, hot dip galvanised after manufacture. (Copper for coastal and high corrosion applications).

4.21.12 The pan section shall be manufactured of heavy gauge hot dip galvanised steel.
Standard pan accessories shall include access doors, easily removable corrosion proof strainer for the pump suction, drain valve, overflow and large bore adjustable make-up ball valve.
The perforations of the strainer shall be smaller than the bore of the spray nozzles.

4.21.13 Automatic water treatment for corrosion protection with bleed control shall be fitted as standard equipment.

4.21.13 Re-circulating spray water shall be uniformly distributed over the condensing coil ensuring complete wetting of the coil at all times.

Spray nozzles shall be of the non-clogging type. Nozzles and branch piping shall be easily removable for cleaning and flushing purposes.

4.21.15 Evaporative condensers with ducted discharge shall be provided with access panels in the ducting, large enough to ensure proper access to nozzles and headers and to enable removal of eliminator sections for repairs or replacement.

4.21.16 The re-circulating pump shall be of the centrifugal type matching the system flow and pressure requirements.

A pressure gauge shall be fitted to the pump discharge.

The pump shall be installed in such a manner that it will drain completely when the sump is drained.
4.21.17 Units for outdoor use shall be completely weatherproof including all electric components.

4.21.18 Units shall be assembled with compatible galvanised or polymer and cadmium coated fasteners.

4.21.19 Where specified in the Supplementary Specification protection against pan freezing shall be built in.

4.21.20 Head pressure control by means of modulating damper control matching heat rejection and system load shall be provided.

4.21.21 The unit shall be painted as set out in clause 3.13.11.

4.21.22 Drain and overflow connections shall be piped to the nearest building drain point or gully.

4.21.23 Interlocks for fans and pumps shall be provided between the indoor and outdoor units linked in the system as specified.

4.21.24 Wiring shall be terminated in a weathertight junction box on the unit.

4.22.0 WATER COOLED CONDENSERS

4.22.1 Water-cooled condensers smaller than 30 kW heat rejection may be copper, tube-in-tube type.

4.22.2 Water cooled condensers larger than 30 kW heat rejection shall be of the shell-and-tube design with seamless copper tubing expanded in to steel tube plating, each individually replaceable.

Tubes shall be accessible form either side of the shell for tube replacement and cleaning purposes.

4.22.3 Water-cooled condensers shall be fitted with the manufacturer's standard head pressure control.

4.22.4 Steel shells shall be welded to the tube plates.

4.22.5 Safety pressure relief valves shall be fitted.

4.22.6 Waterside shall be designed for a working pressure of 1000 kPa, refrigerant side to match the system.
4.22.7 Sub-cooling of refrigerant shall be built in as standard.

4.22.8 Mechanical means shall be provided in each condenser to avoid direct impingement of high velocity compressor discharge gas on the tubes.

4.22.9 The water velocity inside condenser tubes shall not exceed 3m/sec and the tube diameter shall not be less than 13mm I.D. Each condenser shall be provided with a main liquid stop valve.

4.22.10 A plastic resin coating or equal for corrosion protection shall be applied after fabrication to the waterside of all steel tube plates within each condenser.

4.22.11 Tube supports, correctly spaced shall be provided between the end plates.

4.22.12 End covers shall be of cast iron or welded steel with integral baffled circuiting to suit the pass arrangements.
4.22.13 End covers shall be provided with proper gaskets and shall be easily removable for periodic cleaning.
4.22.14 Water and refrigerant pipe connections shall be sized according to the duty and shall be flanged.

4.22.15 The unit shall be painted as set out in clause 3.13.11.

4.23.0 COOLING TOWERS

4.23.1 Cooling towers shall be factory assembled units, rigidly constructed of galvanised sheet steel, stainless steel, aluminium or moulded fibre glass suitably reinforced with galvanised steel angle iron.
Units shall be complete with fan/s, spray nozzles, water distribution system, eliminators, pan section and casing.
4.23.2 Water level control shall be automatic with a quick-fill bypass valve and drain valve fitted to the sump.
4.23.3 Unless otherwise specified in the Supplementary Specification the unit shall be of the counter-flow blow-through arrangement type with centrifugal fans.

4.23.4 All steel sections shall be manufactured from galvanised steel with edges protected against corrosion.

4.23.5 Access to all internal parts shall be provided by means of easily removable panel or watertight doors fitted with quick opening catches. Suitable handles or holding bars shall be fitted to removable panels and doors.

4.23.6 Fan wheels and housings shall be of hot dip galvanised steel or corrosion protected to the Department's approval.
4.23.7 All moving parts shall be protected with removable screens and panels, hot dip galvanised after manufacture.
4.23.8 Effective eliminator sections, corrosion proof shall be provided to prevent water carry-over.

4.23.9 The pan section shall be manufactured of heavy gauge hot dip galvanised steel.

Standard pan accessories shall include access doors, easily removable corrosion proof strainer for the pump suction, drain valve, overflow and large bore adjustable make-up ball valve.
The perforations of the strainer shall be smaller than the bore of the spray nozzles.

4.23.10 Automatic water treatment for corrosion protection with bleed control shall be fitted as standard equipment.
4.23.10 Recirculating spray water shall be uniformly distributed over the heat transfer surfaces ensuring complete wetting of the wet deck areas at all times.
Spray nozzles shall be of the non-clogging type. Nozzles and branch piping shall be easily removable for cleaning and flushing purposes.
4.23.12 Cooling towers with ducted discharge shall be provided with access panels in the ducting, large enough to ensure proper access to nozzles and headers and to enable removal of eliminator sections for repairs or replacement.

4.23.13 A pressure gauge shall be fitted to the nozzle inlet piping from the pump.

4.23.14 Units for outdoor use shall be completely weatherproof including all electric components.

4.23.15 Units shall be assembled with compatible galvanised or polymer and cadmium coated fasteners.

4.23.16 Where specified in the Supplementary Specification protection against pan freezing shall be built in.
4.23.17 Where specified modulating damper control matching heat rejection and system load shall be provided.

4.23.18 All steel surface shall be painted as specified in Clause 3.13.11.

4.23.19 Cooling towers with forced draught propeller or axial flow fans are not acceptable.

4.23.20 Units with multiple fan sections shall be internally baffled to permit independent operation of the individual fan sections.
4.23.21 The wet deck shall consist of heavy hot dip galvanised steel, PVC or other plastic material impervious to rot or biological attack or decay encased in removable hot dip galvanised steel panels or sections.
The wet deck surface shall be properly degreased.

4.23.22 Eliminators shall be manufactured from hot dip galvanised steel, stainless steel or moulded fibre glass UV stabilised where exposed to the sun with a minimum of three directional changes to the air path.
Plate spacing shall not exceed 30mm centre to centre.

4.23.23 Drain and overflow connections shall be piped to the nearest building drain point or gully.

4.23.24 Cooling tower and circulating pump levels shall be arranged to ensure a flooded pump suction with NPSH complying with the manufacturer's requirements.

4.23.25 Piping system and cooling tower shall be arranged to prevent the sump flooding when circulating pumps are stopped.

4.23.26 Interlocks for fans and pumps shall be provided between the indoor and outdoor units linked in the system, as specified.

4.23.27 Wiring shall be terminated in a weather tight junction box on the unit.

4.24.0 CLOSED CIRCUIT COOLING TOWERS

4.24.1 Closed circuit cooling towers shall generally comply with clauses 4.22.0 and 4.23.0 as applicable. The heat exchanger shall however be water/fluid to water and not refrigerant to water.

4.24.2 Each tower shall be served by two circulating pumps, one for the closed circuit to be cooled and one forming an integral part of the cooling tower for the spray circuit.

4.24.3 The closed circuit shall be fitted with the necessary air release valves, expansion tank with makeup, overflow and drain connections and provision for slug-dosing of the closed circuit against corrosion.

4.25.0 DRY COOLERS

4.25.1 Dry coolers shall be factory assembled closed circuit water to air coolers, complete with heat exchanger, fan/s, screens and controls.

4.25.2 Heat rejection shall be based on ambient air to water or ambient air to glycol water solution where specified in the Supplementary Specification.

4.25.3 Drycooler selection shall be based on specified ambient dry bulb temperature and maximum circuit heat rejection.
4.25.4 Drycoolers shall be
factory assembled, tested, commissioned and guaranteed.

4.25.5 Drycooler and circulating pumps shall be interlocked with the chiller/condenser with timer controlled delay starting of approximately 60 seconds (Adjustable 30 - 120 seconds).

4.25.6 The drycoolers shall be of the vertical or horizontal type with slow speed multiple fans of the direct drive type with horizontal or vertical air discharge as indicated on the drawing, suitable for permanent outdoor use.

4.25.7 The drycooler heat exchanger shall be constructed of copper tubing with aluminium fins (copper fins for coastal applications). Design water pressure shall be not less than 1400 kPa.

4.25.8 The casing shall be constructed of corrosion resistant steel, aluminium or stainless steel panels suitable for permanent outdoor application.If not stainless steel the casing shall be epoxy powder coated finish.

4.25.9 All sections of the casing shall be completely self-draining with no water collecting areas.

4.25.10 Support framework shall be hot dip galvanised after manufacture and epoxy powder coated.

4.25.11 The fans shall be direct drive type fitted with rigid protection screens on the discharge side and coils/fins similarly protected.

Fans and fan motor shall have permanently sealed and lubricated ball or roller bearings, designed and manufactured for continuous heavy duty application.

The drycoolers shall operate at minimum noise level with maximum fan speeds not exceeding 1000r/min.

Fan blades shall be of aluminium or corrosion protected steel including shaft.

4.25.12 Tube headers shall be fitted with automatic air vent valves and drain valves as well as suitable in/out water connections.

4.25.13 Solid state fan speed control and fan cycling control on multiple fan units is required to maintain a near constant water temperature.

4.25.14 Off-cycle fans shall be protected against windmilling.

4.25.15 Coil face air velocity shall not exceed 3m/s.

4.25.16 The drycooler shall be mounted on a sturdy base frame and concrete plinth.

4.25.17 Internal wiring shall be terminated in a weather tight junction bore mounted on the unit baseframe.

4.26.0 CLOSED CIRCUIT, SECONDARY CIRCUITS

4.26.1 Proper provision shall be made in closed circuit secondary cooling circuits on the pump suction manifold for sampling and charging the circuit with glycol and corrosion inhibitor as required.

4.26.2 Systems shall be charged initially with a concentration by mass of non-corrosive glycol ethylene suitable for the application, where specified.

4.26.3 Systems shall also be charged with a recognised corrosion inhibitor chemical treatment of a reputable and recognised firm. This inhibitor shall match the corrosion characteristics of the site water, the glycol ethylene (where specified) and the piping system, including heat exchanger materials.It will also be expected of the Contractor during the 12-month maintenance guarantee period to sample the closed circuits, correct the concentration and inhibitor content as necessary and file a report on the state thereof with the maintenance report.

4.27.0 COMPUTER ROOM AIR CONDITIONING UNITS

4.27.1 Computer room type air conditioning units shall be of the remote air cooled, water/glycol cooled or chilled water cooled type as specified in the Supplementary Specification.
4.27.2 Down-flow or up-flow cabinet units shall be provided as indicated in the Supplementary Specification.
4.27.3 The units shall be of the free standing type suitable for mounting on a suspended computer type floor.
All units shall run continuously, capacity to be based on parallel redundancy.
Each unit shall be complete with compressor/s, water/glycol cooled or air cooled condenser and evaporator coils or chilled water coils, fan/s, electric heaters, filters, humidifier, refrigerant circuit and built-in controls with alarms and switchboard.

4.27.4 The units shall operate on 100% recirculating air and shall be near sensible coolers only. Air coil off temperature shall be maintained at set point temperature for normal operation, but the temperature shall be automatically adjusted for dehumidification when required with automatic reheat to maintain room temperature.

4.27.5 All components shall be selected for continuous year round operation with maximum life expectancy.

4.27.6 Each unit shall be installed on a specially manufactured steel structure to the supplier's requirements and not directly on the floor structure. This steel support shall be properly earthed to the unit but shall be insulated from the floor matrix and the special floor earth.
This floor stand shall have adjustable legs for height setting to match the final surrounding floor level and shall be complete with vibration isolation pads.

4.27.7 Cabinets shall consist of a rigid corrosion resistant framework onto which components and exterior panels are fitted. The exterior panels shall be provided with pressure tight, non-perishable rubber seals. All hinges shall be invisible and all panels easily removable for service access. Exterior panels shall be insulated with 25mm thick closed cell foam insulation or equal.

4.27.8 The coil drippan shall be of stainless steel 430 and shall be insulated. Drainage piping shall be provided.

4.27.9 An adjustable air by-pass is required to enable exact air balancing on site where direct driven fans are tendered. Air discharge opening sizes and positions to be arranged with Principal Contractor on site, to be cut into floor panels.

4.27.10 Service access shall be possible to all components and a secondary screening panel is required for live electrical terminals etc.

4.27.11 Cabinet colour shall be approved by the Department prior to ordering but shall generally match the computer equipment.

4.27.12 Refrigerant units larger than 15 kW nominal cooling capacity shall have multiple independent refrigerant circuits with separate compressors, evaporators etc.

4.27.13 Compressors shall be of the hermetic or semi-hermetic serviceable type with suction gas cooled motor and shall be mounted on anti-vibration and noise isolators.

4.27.14 Each compressor unit shall be complete with built-in overloads, oil sight glass, manual reset high pressure switch, pump down low pressure switch, reversible oil pumps for forced feed lubrication, pumpdown control and service valves. Units with compressor crankcase heaters and suction line accumulators in lieu of pump down control will also be considered.

4.27.15 Each compressor unit shall be complete with suction line strainer-dehydrator, hot gas muffler, moisture indicator, sight glass, thermal expansion valve and cooling coil (evaporator). The cooling coil shall be at least four rows deep.

4.27.16 The design shall ensure quiet operation, with fan impellers statically and dynamically balanced, and running on self aligned sealed-for-life bearings. Each fan shall be driven by it's own motor.

4.27.17 Fan motors shall be of the heavy duty, drip proof or totally enclosed type, specially selected for quiet operation and reliability. Overload protection shall be provided.

4.27.18 For belt driven units the motors shall be mounted on adjustable slide bases. A minimum of two belts, each capable of transmitting the full power requirements shall be provided.

4.27.19 Even air distribution over the coil face is essential.

4.27.20 Condenser circuits shall be equipped with head pressure control, factory fitted.

4.27.21 Disposable panel filters with pleated surfaces shall be provided. Filter efficiency shall be not less than 95% arrestance generally as per clause 4.4.0.

4.27.22 Filters shall form an integral part with the fan coil unit and shall fit into self-centring frames with soft rubber seals. An external manometer shall be mounted on each filter bank clearly marked to indicate filter replacement resistance.

4.27.23 The filters shall be serviceable from either side of the unit without a ladder or platform.

4.27.24 A filter resistance switch with adjustable range shall be provided and wired for remote indication/monitoring as part of control and alarm system, with terminals to suit.

4.27.25 Each unit shall be fitted with the manufacturer's standard heater/ reheater (electrical).
The element pack is to be arranged to give an efficient heat transfer to the air, easy accessibility for maintenance and to allow expansion of the elements without distortion.

4.27.26 Each unit shall be provided with a complete microprocessor type environmental control system that may be programmed at the unit for the various parameters with local visual display of operating modes and visual indication of alarm conditions.

4.27.27 Local monitoring and programming as wel
l as L.E.D. numerical displays on a visible monitor panel
on the front of the unit of the following functions are required;
a) Current room temperature, ºC
b) Temperature setpoint, adjustable 18ºC - 30ºC
c) Temperature sensitivity, adjustable 1ºC - 5ºC
d) Humidity setpoint, 40% - 60% relative humidity
e) Humidity sensitivity, adjustable 1% - 10% r.h.

4.27.28 The following normal operating modes shall be indicated as coloured L.E.D. status displays on the monitor panel;
a) Heating
b) Cooling
c) Humidification
d) Dehumidification

4.27.29 The control system shall monitor unit operation and activate an audible and visual L.E.D. display on the unit monitor panel of the following alarms;
a) High room temperature
b) Low room temperature
c) High room humidity
d) Low room humidity
e) High compressor head pressure (for each compressor, where applicable).
f) Filter resistance high
g) Reduced or loss of air flow
h) Humidifier alarm

4.27.30 A silence button shall be provided for the audible alarm but alarm displays shall remain until the alarm condition is corrected.
A manual compressor sequence switch shall be provided to enable changing of the lead/lag sequence for multiple compressor units.

4.27.31 Proportional dehumidification control is required with reheating to maintain room conditions.

4.27.32 A battery back-up system is required to maintain unit set points in the event of a power interruption.

4.27.33 Where specified in the Supplementary Specification the control system shall be suitable for interfacing with a remote monitoring microprocessor. It shall also be possible to set or adjust all operating and alarm parameters for each individual unit from this remote microprocessor.

4.27.34 Stop/start push buttons as well as lamp test buttons shall be provided.

4.27.35 Terminals shall be provided for N.O. or N.C. dry contact interlocking with fire protection systems to enable switching off of the unit in the event of a fire.

4.27.36 Interlocking for stopping/starting and control purposes shall be provided between indoor and outdoor units where applicable.

4.28.0 AIR COOLED CONDENSING UNITS

4.28.1 Air-cooled condensing units shall be factory produced and tested units complete with compressor/s, fan/s, condenser/s and casing.
4.28.2 Compressor, condenser and unit casing shall generally comply with clauses 4.15.0, 4.19.0 and 4.20.0 as applicable.
4.28.3 Outdoor units shall be suitable for permanent outdoor use and fully weatherproof.

4.29.0 REFRIGERANT CIRCUITS

4.29.1 Refrigerant tubing shall generally be in accordance with SABS 1453: 1988: Copper tubes for medical gas and vacuum services with preferred sizes in accordance with SABS: 460 class 2 and shall be de-oxidised and dehydrated.

4.29.2 The tubing shall be seamless cold drawn copper tubing with soldered copper capillary fittings.
4.29.3 Piping/tubes, up to and including 10 mm diameter, may be jointed with the flaring method.

Other pipeline joints, shall be silver soldered or other approved hard solder. All soldered joints, on factory supplied equipment, shall be carefully checked before commissioning and remade if found damaged in transit. Silver solders shall be in accordance with SABS 23: 1973 and revisions.

4.29.4 Pipe sizing shall be as specified in the supplementary specification. Pipe size selections shall however be such as to produce moderately low velocities whilst, nevertheless, ensuring;
a) proper oil return to the compressor and minimising lubricating oil being trapped in the system.
b) practical lines without excessive pressure drops and with proper feed to evaporators.
c) prevent liquid refrigerant from entering the compressor during operation and at shutdown.

4.29.5 All plant room piping shall be thoroughly cleaned and painted with a heat resistant clear lacquer.
4.29.6 Piping shall be supported (unless otherwise indicated on the drawings) as follows:
Pipe Size(mm) Max. distance between
supports in meters
10 (and smaller) 0,6
10 . 18 1,0

22 1,5
28 . 35 2,0
42 2,5
54 2,75
67 3,0

4.29.7 Refrigerant piping shall be arranged so that normal inspection and servicing of the compressor and other equipment is not hindered. Locations where copper tubing will be exposed to mechanical damage shall be avoided.

4.29.8 Flexible metal vibration absorbers shall be fitted at compressor discharge and suction connections. Absorbers shall be installed at right angles to the direction of vibration. Hangers and supports where piping penetrates through walls shall be designed to prevent transmission of vibration to the building.

4.29.9 A hot gas muffler shall be installed as close to the compressor as possible in a position to prevent oil trapping.

4.29.10 Flash gas at the expansion valve shall be prevented. On systems with large pressure drops due to line friction or static head, liquid line subcooling shall be accomplished by the use of either liquidsuction heat exchangers, or subcooling sections in evaporative, air, or water-cooled condensers.

4.29.11 Subcooling coils in evaporative and air-cooled condensers shall be in accordance with clause 4.5.0. Receivers shall be provided in the liquid line between the condensing and subcooling coils.

4.29.12 Liquid-suction heat exchangers shall be of either the shell-and-tube or the tube-in-tube type. Liquidsuction heat exchangers shall not be used in systems using R-22 as refrigerant. A valved liquid bypass shall be provided around the heat exchanger.

4.29.13 Coils with more than one inlet or coils in which the individual circuits are not evenly loaded due to surface or air quantity variations shall be provided with separate expansion valves.

4.29.14 For evaporative or air cooled condensers each compressor circuit shall be equipped with a receiver with safety valve, isolating valves and purge cock, capable of holding the full volume of refrigerant in that circuit. Receivers shall be shaded from the sun.
Receivers with pressure/volume rating qualifying as pressure vessels in terms of the Regulations of the Machinery and Occupational Health and Safety Act shall comply with all requirements of the Act and Regulations and shall be fitted with safety valves, purge cock, isolating valves, manufacturer's plates etc. as required by the Regulations.

4.29.15 For water-cooled condensers where the condensers are not of sufficient capacity to hold the full refrigerant charge, a receiver shall be installed in each circuit to hold the balance of refrigerant.

4.29.16 The liquid piping from the condenser to the receiver shall allow free drainage of the liquid. The condenser to receiver piping shall be as short as possible and shall be pitched towards the receiver with a minimum slope of 20mm per metre.

4.29.17 Oil separators shall be used in systems where it is impossible to prevent substantial absorption of refrigerant in the crankcase oil during normal operation or during shutdown periods. Oil separators shall be insulated to prevent it form acting as a refrigerant condenser. Provision shall be made to prevent drainage of condensed refrigerant into the crankcase.

4.29.18 A quality refrigerant drier shall be provided in the liquid line on all systems. Dryers shall be of the side inlet replaceable element type. Dryers shall be installed with a three-valve bypass for servicing and to allow partial flow on open compressor systems in order to reduce pressure drop. All the refrigerant shall flow through the drier on hermetic compressor systems. A reliable moisture indicator shall be provided for positive indication when the drier cartridge should be replaced.

4.29.19 A quality strainer shall be provided on all systems in the liquid line. A suction strainer shall also be provided unless the compressor is equipped with a built-in suction strainer. Combined filter-dryers are also acceptable. Strainers shall be adequately sized to assure adequate foreign material storage capacity without causing excessive pressure drop.

4.29.20 Sight glasses of double port seal cap type shall be installed in a vertical section of the liquid line after the receiver or condenser (if no receiver is used) to check the refrigerant charge and before the expansion valve to check the state of the refrigerant. Moisture indicators installed directly in the

liquid line serving the dual purpose of liquid line sight glass and moisture indicator are also acceptable.

4.29.21 A refrigerant charging connection shall be provided between the receiver or shell and tube condenser and the refrigerant drier, in the liquid line. Before charging the system with refrigerant the

circuit shall be tested as specified.

4.29.22 Solenoid valves shall have opening stems to continue operation of the system in case of solenoid coil failure.

4.29.23 All pipes, vessels etc. operating below ambient dew point shall be insulated and a vapour barrier provided.

4.30.0 WATER CIRCUITS AND ACCESSORIES

4.30.1 Piping
4.30.1.1 Piping layouts and circuits shall be laid out as shown on the drawings, including schematic drawings issued with the service.

4.30.1.2 Unless otherwise specified open circuit condenser cooling water piping shall be heavy class steel piping to SABS 62: 1971, amended and galvanised to SABS 763 : 1988 for type B articles, heavy duty.
4.30.1.3 Unless otherwise specified closed circuit condenser water piping, primary and secondary chilled water piping and closed circuit hot water piping for heating circuits shall be medium class black piping to SABS 62 : 1971, painted or coated as specified prior to insulation where applicable.

4.30.1.4 Where specified in the Supplementary Specification chilled water piping and condenser water piping up to size 50mm diameter may be copper piping.
Where specified in the Supplementary Specification condenser water piping may be uPVC not less than class 6 or as specified.

4.30.1.5 Pipe connections from main circuits to unitary equipment such as fan coils, humidifiers etc. shall be annealed copper class 2 to SABS 460 : 1985, as amended.
4.30.1.6 Fittings and accessories larger than 50mm nominal bore size shall be flanged with standard flanges to SABS 1123.
Compressed mineral fibre joint rings shall be used for flanged joint packings.

4.30.1.7 Fittings and accessories smaller than 50mm nominal bore may use screwed connections.
Screwed fittings shall be of malleable cast iron to SABS 509 : 1975, amended. Ordinary light type or black iron fittings shall not be used.
Screw thread shall be to BS21 of ISO R7.
PTFE sealing tape or other approved sealing compound shall be used on screwed connections.

4.30.1.8 Welding to galvanised piping or fittings will not be permitted.
Where welding for whatever purpose is unavoidable the complete section shall be hot dip galvanised after manufacture.
Cold galvanising will not be accepted.

4.30.1.9 Full radius bends and sweep fittings must be used wherever possible. Elbows may only be used under exceptional conditions and only with written permission of the Department.

Where it is necessary to reduce pipes in size, reducing sockets only shall be used and not bushes.
In horizontal runs of piping, where there is only a slight fall eccentric fittings are to be used.

4.30.1.10 Pressure relief valves shall be of Spirax or approved manufacture and shall be installed in the positions indicated on the drawings.
Pressure relief valve drains shall be taken to a suitable safe discharge point.

4.30.1.11 Where pipes pass through walls etc., sleeve pipes must be provided by the Contractor. Sleeve pipes should be made in such a manner that they will not foul against any piping due to the natural expansions and contraction of the piping.

4.30.1.12 All pipelines must be provided with 15mm drain cocks at all low points in the system so that the pipework can be drained of liquid without dismantling. Sufficient drain points must be provided to drain the system completely.

4.30.1.13 Provision shall be made by tenderers in their tender price to have one in every twenty welded joints cut-out for inspection and testing and for making good afterwards. Should any of the test welds prove unsatisfactory the Contractor will be called upon to have all welds on the installation X-rayed and examined, at his own expense, by an approved Inspection

Authority. The Contractor will then be required to submit written test and inspection reports by the Inspection Authority before the installation will be considered for acceptance.

4.30.1.14 Horizontal pipes shall be installed with a slope of a least 1 in 500 to allow venting of air to the expansion tank wherever possible. Air pockets shall be avoided. High points shall be provided with automatic air vent valves or air bottles. Air vents or bottles shall be designed for at least 1,5 times the working pressure of the system.

4.30.1.15 Piping in plant rooms shall be so arranged that normal inspection and servicing of equipment is not obstructed.All pipes must be neatly fitted and shall be run in such a manner as to prevent the formation of air locks.On all circuits, screwed unions or flanged joints are to be provided to allow for the easy dismantling of pipes. Unions or flanges must be provided at all Tee-offs and adjacent to all valves. Pipes up to 50mm nominal size may use unions but pipes larger than 50mm must be flanged. On straight or continuous runs of pipe, unions or flanges shall be provided at intervals not exceeding 20 metres.

4.30.1.16 Pipes which are not dimensioned on drawings shall be sized as follows:-
a) The velocity shall not exceed 3m/s.
b) The friction rate shall not exceed 140 kPa per 100m length.
The pressure drop through all circuits shall be approximately the same. If this cannot be achieved by pipe sizing alone due to excessive resultant velocities, throttling or balancing type valves shall be provided where required.

4.30.1.17 Pipe supports and the positions of anchors shall be such as to allow for movement due to pipe expansion and contraction or expansion joints in the building structure as applicable. Expansion joints, where required, shall be of the bellows type manufactured from stainless steel or may be of the Viking Johnson pipe coupling or equal where moderate expansion movements are to be accommodated. Expansion joints shall be rated at not less than 1,5 times the maximum working pressure in the system. Expansion joints in hot water piping shall be suitable for water temperatures up to 120ºC.

4.30.1.18 Pipe hangers shall be of the spring, roller, chain or rod type. The maximum spacing of hangers and the minimum diameter of hanger rods shall be as follows:-
Nominal Pipe Size
mm
Maximum Span
m
Minimum Rod Diameter
mm
25 2,2 10
40 2,8 10
50 3,1 10
80 3,7 14
90 4,0 14
100 4,3 16
125 4,9 16
150 5,2 20
200 5,8 22
250 6,7 22
300 7,0 22

4.30.1.19 High compression type thermal insulation such as hard wood timber of the same diameter as the required insulation shall be provided between hangers and chilled and hot water pipes.

4.30.2 Strainers

4.30.2.1 Water strainers shall be of the pot or angle type. Strainers shall be designed for not less than 1 000 kPa or 1,5 times the maximum system working pressure whichever is the greatest. Strainer screens shall be of bronze, monel metal or stainless steel and shall have the following maximum perforation sizes:-
Strainer Size
mm
Perforation Size
mm
2 . 50 0,8
65 . 150 1,6

200 . 300 3,2
over 300 6,4

4.30.2.2 The effective free area of the screen shall in all cases be not less than 3 times the cross sectional area of the inlet opening.

4.30.2.3 Strainers shall be installed in accessible positions where the strainers can be easily removed and cleaned.

4.30.3 Pressure Gauges and Thermometers

4.30.3.1 Pressure gauges shall be of the "Bourdon" type to BS 1780 with at least a 100mm dial and calibrated in kPa with the maximum range not exceeding 1,5 times the system working pressure. Forged brass or gunmetal gauge cocks must be fitted with each pressure gauge.

4.30.3.2 Thermometers shall be of the replaceable glass type with bronze casings, fitted into pockets for removal without draining the system. The thermometers shall be calibrated in ?C and the scale length shall be at least 170mm. Pockets shall be of brass, filled with oil and shall be installed vertically.On pipes smaller than 50mm diameter, pipe sizes must be increased locally to install the sockets.

4.30.4 Air Release Valves

4.30.4.1 Automatic air release valves shall be provided where shown on the drawings, but shall in addition also be fitted to piping at all high points and other places where air may accumulate. As these points depend on the installation of the system, full responsibility for fitting these valves rests with the Contractor.

4.30.4.2 Valves shall be of the inverted float type similar or equal to Honeywell, Braukmann or Spirax. They shall have either integral shut-off valves or be preceded by a lock shield valve.

4.30.4.3 Connections to the service pipe shall be made at the highest point to ensure complete venting. Valves shall be mounted with the inlet connection exactly vertical.

4.30.5 Drain Cocks

4.30.5.1 Drain cocks shall be of copper alloy and be of the screw down pattern type to BS2879 : 1957, Type A. They shall be fitted to all low points in the installation to ensure full draining of the system.

4.30.6 Valves and Non-Return Valves

4.30.6.1 Isolating valves, unless otherwise specified in the Supplementary Specification shall be Saunders Type A or Type KB diaphragm valves or equal fitted with suitable diaphragms and rated for at least 1 000 kPa working pressure and the system temperature.
Diaphragm valves shall be provided with hand wheels. Valves of 80mm and larger which are installed higher than 2 500mm above floor level, shall be provided with chain wheels and chains.

4.30.6.2 Where isolating valves of the gate type are specified it shall be of the type with solid or flexible wedges in accordance with SABS 664 and SABS 776. Valves of 80mm nominal bore and smaller shall be of bronze or gunmetal.
In lieu of gate valves, other types of valves may also be offered provided that bodies, temperature and pressure ratings are generally as specified for gate valves and that the fluid pressure drop for wide open valves does not exceed that of 40 diameters of pipe of the same size.

4.30.6.3 Diaphragm type valves and gate valves shall not be used for balancing or throttling purposes.

4.30.6.4 Unless otherwise specified in the Supplementary Specification balancing valves shall be similar or equal to the STA-T shut-off/balancing valves. Valves shall be provided with drain cocks with hose connections and two pressure cocks across each valve to enable measuring the flow rate. A differential pressure gauge to measure the pressure drop across all the valves in the system and a flow chart for each valve size used shall be provided by the Contractor at first handover.

4.30.6.5 Throttling valves shall be either plug, globe, angle or "Y" valves. Provision shall be made to prevent opening and closing of throttling valves by unauthorised persons once they are set.

4.30.6.6 Check valves shall be of the swing or lift type with seats of neoprene, gunmetal or stainless steel,

discs of bronze, gunmetal or stainless steel and bronze or cast iron bodies, suitably rated for system pressure and temperatures.

4.30.7 General

4.30.7.1 Flexible connections shall be provided at all chiller and pump connections and where indicated on the drawings. These shall be of nylon reinforced moulded neoprene rubber with metal flanges at both ends. Metal reinforcing will not be accepted.The flexible connections shall be of spherical or double spherical construction as per clause 3.15.0.The flexible connections shall be installed strictly in accordance with the manufacturer's recommendations and shall be suitable for the system working pressures and temperatures.

4.30.7.2 Pressure gauges, thermometers and shut-off valves shall be provided in the following positions in each condenser water pipe circuit:

a) A pressure gauge, thermometer and shut-off valve before and after each condenser and selfcontained air conditioning unit.
b) A shut-off valve at the in- and outlet of each cooling tower.
c) A strainer shall be provided at the suction side of each pump.
d) A pressure gauge before and after each strainer and at each pump discharge for pump units.
e) A shut-off valve before each strainer and at each pump discharge for pump units.

4.30.7.3 Pressure gauges, thermometers, unions and shut-off valves shall be provided at the inlet and outlet of chilled water and central heating coils.

4.30.7.4 Strainers shall be provided upstream of coils and control valves.
4.30.8 Expansion Tanks
4.30.8.1 Expansion tanks shall be fitted to all closed circuit piping installations. The tank capacities shall be as specified in the Supplementary Specification but generally not less than 50 litres water capacity.

4.30.8.2 The tank shall be manufactured form at least 2mm galvanised sheet steel or be hot dip galvanised after manufacture. The minimum water level in the tank shall be kept at approximately 300mm from the bottom by means of a 20mm nominal size ball valve. A stopcock shall be provided in the makeup water line upstream of the ball valve.

The tank shall be provided with a separate quick filling connection, overflow, drain and a bolt-down lid with an air vent
.
4.30.8.3 The expansion tank shall be installed at least 1 200mm above the highest point of the relevant water system.

4.30.9 Copper Piping

4.30.9.1 Where specified in the Supplementary Specification copper piping may be used for chilled water and/ or condenser water piping.

4.30.9.2 All piping shall be the best quality copper pipe of approved make, free from any defects. The sizes shall be indicated on the main drawings and no pipe of a smaller size than 15mm shall be used.
4.30.9.3 All piping shall comply with SABS 460 . 1985 as amended, either half hard Class 1, 2 or 3 piping as specified in the Supplementary Specification.

All piping shall be suitable for a working pressure of not less than 1 300kPa.

4.30.9.4 In general, Class 1 and 2 piping shall be used inside buildings while only Class 3 piping shall be used for underground services.

4.30.9.5 All fittings shall be of the best quality and shall and shall be correctly matched to the size of piping to which they are connected.

4.30.9.6 Capillary type copper bends, elbows, tees, reducers, etc. are preferred wherever possible. These must be silver soldered using hard solders complying with SABS 23 . 1992 as amended. The use of soft tin-lead is not permissible.

4.30.9.7 Where it is necessary to provide dismantled connections in the pipework use may be made of brass .Flarex .or .Conex. type fittings.

4.3.9.8 .Conex. type fittings will not be permitted for use with Class 1 piping or in underground use.

4.3.9.9 Brass fittings must be made from a grade of brass or gunmetal, which will not be subject to dezincification.
4.30.9.10 Full radius bend and sweep fittings must be used wherever possible. Elbows may only be used under exceptional conditions and only with the express permission of the Department.

4.30.9.11 Where it is necessary to reduce pipes in size, reducing sockets and fittings only shall be used and not bushes.

In horizontal runs of piping, where there is only a slight fall, eccentric reducing fittings are to be used to prevent air locks.

4.30.9.12 Where practical copper pipes, particularly in sizes up to 28mm shall be bent or set around corners or obstacles. Where pipes are bent or set proper bending springs or pipe bends shall be used. No flattening of pipes at bends or sets will be permitted.

4.30.9.13 On all circuits, screwed .Flarex. or .Conex. unions o flanged joints are to be provided to allow for easy dismantling of pipes. Unions or flanges must be provided at all major tee offs and adjacent to all valves. Pipes up to 50mm may use unions but pipes above 50mm must be flanged. On straight or continuous runs of pipes, unions or flanges shall be provided at intervals not exceeding 20 meters.

4.30.9.14 Horizontal copper piping shall be supported unless otherwise indicated on the relevant drawings, as follows:

DIAMETER
MAXIMUM SUPPORT
SPACING METERS

15mm 1,8
22 . 28mm 2,4
34 . 54mm 3,0
76 . 108mm 3,6

.Unistrut copper piping shall be supported unless otherwise indicated on the drawings or in the specification. Pipe support hanger bolts and .U-bolts. shall in all cases be provided with lock nuts, which shall be brass or galvanised and must be arranged so as to cause no electrolytic corrosion of the copper pipe.

Where small bare copper pipes are chased in to brickwork or floors, they shall be first wrapped with suitable mineral fibre or glass fibre tape approximately 6mm thick.
4.41
4.30.10 uPVC Piping

4.30.10.1 Where applicable in the Supplementary Specification uPVC piping may be used for condenser water, above or below ground.

4.30.10.2 The class of piping to be used shall be as specified, but not less than class 6.

4.30.10.3 Piping, fittings and joints shall generally comply with SABS 956 . 1976 as amended.

4.30.10.4 Piping handling and installation shall generally be in accordance with Code of Practice SABS 0112 . 1992 as amended.
4.30.10.5 Only pipes and fittings bearing the SABS mark will be acceptable.

4.30.10.6 All horizontal pipework shall be adequately supported at intervals not exceeding those given in the table below which applies for ambient and water temperatures not exceeding 35ºC. For higher temperatures continuous support shall be provided.

Nominal pipe diameter (mm)
10 1,25 20 25 30 40 50 60 75 100 150 200
Maximum distance between supports (m)
0,25 0,30 0,30 0,35 0,35 0,45 0,45 0,50 0,60 0,90 1,0 1,0

It is essential that where metal holder bats or other types of support are used that all rough edges that may damage the pipe surfaces are removed prior to installation. Pipes must be free to slide axially in the pipe supports to accommodate expansion and contraction.

Where pipes pass through walls or floors, suitable non-metallic sleeves must be provided to allow freedom of axial movement. Unistrut pipe supports and hangers shall be used throughout unless otherwise indicated on the drawings or in the specification. Pipe support hangers and .U-bolts., hall in all cases be provided with locknuts, which shall be securely locked. All brackets and pipe clamps shall be suitably galvanised, hot dipped to SABS 763 . 1977.

For vertical piping the above spacing may be doubled.
Expansion loops or telescopic expansion units shall be fitted in straight runs of pipe at intervals of not more than 50 meters, Pipes must be suitably anchored at appropriate places to ensure that expansion takes place in the desired direction so that it can be correctly taken up by the expansion devices, Anchors must be so designed as to render damage to or crushing of the pipe impossible. Installation of expansion units on site must be done with due regard t the season and average ambient temperature prevailing when assembly takes place.
4.30.11 Testing of Piping Installations
4.30.11.1 Testing of the installation is to be carried out by the Contractor at his own expense in the presence of the Department's Representative. The following actions shall be carried out:

a) After the flushing and cleaning of the pipelines, all lines shall be completely filled with cold water and bled of all air.
b) The pipe system shall then be subjected to a test pressure of 1,5 times the working pressure by means of a test pump. This pressure shall be maintained for a minimum of 60 minutes.
c) Any leaks apparent during the test shall be made good and the test repeated until no further leaks exist.
e) Items not capable of withstanding this test pressure shall be isolated from the pipe system.

4.31.0 INSTALLATION OF PIPEWORK AND DUCTWORK

4.31.1 Pipework and ductwork shall be installed in accordance with the service drawings issued with the Supplementary Specification.

4.31.2 The tender drawings are schematic and do not purport to show exact positions of pipes or ducts or specific details of construction of the latter. All final dimensions must be checked on site before preparation of manufacturing drawings and the fabrication of ducting and piping.

4.31.3 Where beams, stanchions or other obstructions interfere with the straight running of pipes or ducts, suitable offsets shall be provided or alternatively changes in the section of the particular duct made, all in accordance with good engineering practice.

4.31.4 Sufficient offsets or alternatively expansion bellows shall be allowed in piping installations to allow for expansion and contraction.

4.31.5 It is required that tenderers make themselves conversant with all the drawings of the particular building in order to determine the number of such offsets or changes in section and the positions in which they will be required.

Due allowance shall be made in the tender price for such offsets and changes required.
A complete set of drawings of the building may be inspected at the office of the Regional Representative of the Department.

4.32.0 PUMPS

4.32.1 Pumps shall be of the centrifugal type with non-overloading characteristics and volute casings. Pumps shall be selected for the maximum possible efficiency at the required duty point.

4.32.2 Pumps requiring an input power of less than 4,0 kW may be end suction pumps, close coupled to flange mounted motors.

4.32.3 Pumps requiring an input power of more than 4,0 kW may be end suction or horizontally split casing pumps mounted on a common baseplate with the drive motor with their shafts coupled with an approved flexible coupling.

4.32.4 Unless otherwise specified in the Supplementary Specification pump speed shall not exceed1 500 r/min.
No pump shall be operated at a speed exceeding the maximum recommended by the Manufacturer
.
4.32.5 Pumps shall be selected to handle the specified water flow quantities at the required total system resistance.

Pump pressure and flow characteristics shall be selected to match the total system requirements under all control conditions.

4.32.6 The Contractor shall ensure that the minimum Nett Positive Suction Head as required by the pump manufacturer is maintained throughout the required operating pressure and flow range at the pumped fluid temperature.

4.32.7 Renewable casing wearing rings shall be fitted on all pumps with discharge diameters of 80mm and larger and with delivery pressures in excess of 175 kPa. Wearing rings shall be manufactured of bronze, chromium steel, nickel steel or an alloy suitable for the particular application.

4.32.8 Impellers shall be manufactured of bronze and shall be statically and dynamically balanced. Impellers of pumps having 40mm diameter and larger discharge connections, shall be fully enclosed and hydraulically balanced.

4.32.9 Pumps shall be provided with mechanical seals matching the duty, fluid and temperature requirements.

4.32.10 Pump casing design pressure shall match the total system working pressure or be 1,5 times the discharge pressure, whichever is the greater.

Pump casings shall be of close-grained cast iron.
4.32.11 Suction and discharge connections shall be flanged with machined flanges corresponding to the pressure rating of the casing.

4.32.12 Bearings shall be grease lubricated ball and roller bearings selected for long duty life and to accommodate radial and axial loads.
Grease gun lubrication shall be provided. The grease gun nipples shall be of an approved type and shall comply with BS 1486 and be of the hexagonal "hookon" type 11 or 21.

4.32.13 A galvanised sheet metal drip tray with drain connection shall be provided underneath each pump. Drain connections shall be piped to the nearest drain or gully.In coastal applications the driptray shall be of stainless steel.

4.32.14 Pump shafts shall be of EN57 stainless steel with stainless steel mechanical seal holders.

4.32.15 Pumps with stuffing box type shaft seals will only be considered if:
a) The shaft is fitted with a replaceable stainless steel wearing sleeve,
b) A lantern ring is fitted,
c) A minimum of 4 standard packing rings can be fitted, and
d) Bronze thrust bushes are provided.

4.32.16 Drive motors shall be selected with at least 15% more power than the maximum pump requirements.

4.32.17 Pumps for water temperatures in excess of 90ºC shall be provided with water-cooled bearings and seals.
4.32.18 All pump casings shall be provided with plugged drain and vent trappings.
In addition pumps of 4,0 kW or larger input power shall be provided with plugged tappings for suction and delivery pressure gauges and a filling point.
Tappings or internal drilling shall be provided for gland and bearing cooling water where necessary.

4.32.19 Pumps of design different from that specified above offered as integral parts of factory made equipment, will also be considered.

4.33.0 HUMIDIFIERS

4.33.1 Humidifiers shall be of the electrical electrode steam generating self-contained type with electronic controls.
Pan type or water spray type humidifiers will not be acceptable unless specifically called for in the Supplementary Specification.
4.33.2 Humidifiers shall be suitable for the water of the particular application with controls fully adjustable to match local requirements.
4.33.3 Generator bottles shall be fully replaceable on electrode wear.
Units with openable, cleanable generator bottles and replaceable electrodes are preferred.

4.33.4 Steam injection shall not be in the air handler or upstream of the fan, filters, coils, etc., but downstream thereof.
Steam distribution shall be over the full width of the duct with stainless steel distribution pipework.

The pipework shall be so arranged that condensate is returned to the humidifier and does not end up in the duct.

4.33.5 The humidifier shall be selected for discharging the steam directly into the supply air duct against the operating static pressure. Steam shall be discharged as uniformly as possible into the air stream and the installation of the distribution manifold shall comply with the following:-

a) The manifold shall be installed across the widest dimension of the duct in the centre.
b) The manifold length shall not be less than 85% of the widest duct dimension.
c) Two or more distribution manifolds shall be installed where the duct dimension exceeds 800mm.
d) Where the distribution manifold may restrict the airflow in small ducts, the duct shall be enlarged at the point where the manifold must be installed.
e) A distance of at least 3m shall be provided between the distribution manifold and any downstream temperature controller.
f) A distance of at least 2m shall be provided between the distribution manifold and the first air outlet in the duct system.
g) The distribution manifold shall not be installed vertically downward from the humidifier.

4.33.6 A high limit duct humidity controller shall be provided to limit the output capacity or stop the humidifier when the humidity in the duct exceeds 90%. The humidity-sensing element shall be not less than 3m downstream of the distribution manifold.

4.33.7 The maximum output capacity of the humidifier shall be manually adjustable and limited to correspond with the specified maximum demand of the system.

4.33.8 Humidifiers shall be inter-locked with the relevant supply air fans to shut water and electrical supplies off when the particular fan is not running.

4.33.9 Humidifiers shall be connected to the available water supply point. A suitable stop valve shall be provided in the supply water connection. Wastewater from the humidifiers shall be discharged into an open tundish and connected with a 32mm nominal pipe to the nearest drain. Supply and drain piping shall be of galvanised steel.

4.33.10 Humidifiers shall be equipped with fail safe safety controls for low water level or interrupted water supplies.

4.33.11 The humidifier shall be electronically controlled with a minimum of three steps, proportional control is however preferred.The humidifier shall be complete with its own integral controls in a lockable panel. The electrodes must have built-in overcurrent protection and the unit must have an adjustable

automatic control for draining and filling.

4.33.12 Humidifying control shall be through the use of a controlled water level.
4.33.13 A high-level safety switch shall be provided to prevent overflow.
4.33.14 Each humidifier shall be provided with an ammeter or demand indicator, indicating LED lights for water level and drain cycle and an alarm for the cylinder to be changed.
4.33.15 Access to all components for servicing shall be arranged by panel casing design and construction.

4.34.0 WATER TREATMENT
4.34.1 General

4.34.1.1 Water treatment shall be provided for all cooling towers, open and closed circuit type as well as evaporative condensers.

4.34.1.2 Water treatment and water quality control shall be provided to match the specific application and local site and water conditions.

4.34.1.3 Water treatment for evaporative cooling units shall be provided only where specifically called for in the Supplementary Specification.

4.34.2 Water Softener

4.34.2.1 Water softeners shall be installed in the make-up lines to evaporative condensers and cooling towers.
4.34.2.2 Where capacities are not specifically specified the softener shall have sufficient capacity to ensure that the make-up demand is met under all operating conditions and that the softener will be capable of operating for at least 48 hours without regeneration.

4.34.2.3 The softener shall function automatically and must be of the base exchange type, manufactured from corrosion resistant materials.
4.34.2.4 The softener and dosing plant (where specified) shall be of the same manufacture and provided by the same supplier.
4.34.2.5 The resin bed exchange rate must not be higher than 45kg/m_3 during regeneration and the softened water shall not contain more than 10mg/ litre of total dissolved solids as $CaCO_3$.
4.34.2.6 The softener shall be complete with a Kent or equal flow recording meter, control wiring, brine tank etc. and a bypass valve arrangement.
4.34.2.7 Each water softener shall be equipped with a time control mechanism to automatically control the time lapse between regeneration cycles for any period between 24 hours and 7 days. Alternatively the regeneration cycle may be controlled volumetrically by means of a meter in the soft water outlet pipeline.
4.34.2.8 Each softener shall be equipped with an automatic diaphragm valve, salt solution tank, salt storage compartment, salt solution ball valve and the necessary connections for draw-off and refilling of salt solutions.

4.34.2.9 The brine tank shall hold at least one week's brine for summer conditions, and shall be manufactured from PVC, Polypropylene or similar material.

4.34.2.10 Drainage pipework must be piped to the nearest drainpipe.

4.34.2.11 The softener shall be installed to match the existing site water pressure. If the water pressure is too high a pressure-reducing valve similar and equal to Glenfield & Kennedy or approved shall be installed. If the water pressure is too low a booster pump of sufficient capacity shall be installed.

4.34.3 Water Dosing Plant

4.34.3.1 Unless otherwise specified cooling tower/condenser water circuits shall be provided with automatic dosing plant including bleed control.

4.34.3.2 Where capacities are not specified the dosing plant shall have sufficient capacity for the application and local water quality.

4.34.3.3 Each evaporative condenser or cooling tower circuit must be provided with it's own independent dosing plant and bleed control. The dosing system must be complete with all necessary chemicals, controls, valves and appliances.

4.34.3.4 The system shall comprise an automatic bleed-off valve controlled by an electronic measuring cell from the water conductivity and automatic measuring type dosing pump/s. The electronic measuring cell must continually measure the water conductivity and control the bleed-off valve and dosing pump/s accordingly.

4.34.3.5 The pre-set values of the water conductivity (TDS) must be adjustable. The TDS shall be controlled in the range of 600-800mg/ litre.

4.34.3.6 The water treatment shall ensure that:
a) Scale forming and corrosion are prevented,
b) Algae and microbiological growth is controlled,
c) Sediment is controlled with low water consumption.

4.34.3.7 Chemicals provided shall be well known products, and approved dilution tanks as reservoirs for the metering pumps must be provided.

4.34.3.8 Sufficient chemicals and salt must be provided at first hand over for three months use.

4.34.3.9 When the plant is in effective operation, water samples shall be drawn after the softener and from the condenser sump. The samples must be analysed by a recognised laboratory suitably equipped and the report submitted to the Regional Office.

4.34.3.10 Service calls with water analysis and recognised corrosion tests must be carried out every three months during the maintenance period and reports sent to the Regional Office.

4.34.3.11 The chemicals used shall be stable over at least a 12-month period and shall not break down and cause clogging of the dosing apparatus.

4.34.3.12 Isolating valves shall be provided to allow all components of the water treatment plant to be removed for maintenance without affecting the operating of the cooling plant.

4.34.3.13 The water treatment plant shall be electrically interconnected with the recirculating water pump so that it cannot operate unless the pump is running.

4.35.0 FIRE DAMPERS

4.35.1 Combination fire/smoke control dampers complying with SABS 193 and NFPA 90A are required in the positions indicated on the main drawings.
4.35.2 The dampers shall be UL (underwriters Laboratories) or SABS certified with proven low leakage in the closed position.
4.35.3 Dampers shall be actuated by fusible link, electrical solenoid or pneumatic means as specified in the Supplementary Specification.
4.35.4 Fire dampers shall be flanged both sides and access panels shall be provided in the ducting at each fire damper on the upstream side.
4.35.5 Each fire damper shall be clearly marked as per clause 4 of SABS 193.
4.35.6 Fire dampers shall have at least a 2-hour resistance rating when tested in accordance with SABS 193.
4.35.7 Insulating fire dampers shall be fitted where indicated on the drawings.
4.35.8 The open or closed status of the damper shall be clearly indicated outside the casing for inspection purposes.
4.35.9 Dampers shall be sized so that the nominal free air area when in the open position is not less than the connected duct free air area.
4.35.10 Dampers shall be installed so as to form part of a continuous barrier to passage of fire when in a closed position. Where a fire damper cannot be fitted immediately adjacent to the firewall, the section of ducting between damper and wall shall be of at least the same metal thickness and fire rating as the damper casing.

4.35.11 Dampers shall be self-supporting in case of duct destruction due to heat. Care shall be exercised that the frame be set so that the closing device will be accessible.

4.35.12 Suitable hand openings with tightly fitted covers shall be provided to make dampers accessible for inspection and maintenance.

4.36.0 DUCTWORK

4.36.1 Sheetmetal Ductwork

4.36.1.1 Sheetmetal ductwork shall be manufactured in accordance with SABS 1238 : 1979 as amended and installed, balanced and tested as set out in SABS 0173 : 1980, as amended.

4.36.1.2 Ductwork layouts, dimensions etc. shall be as indicated on the drawings issued with the Supplementary Specification.

4.36.1.3 Where changes in duct sizes indicated are necessitated on site, duct sizes shall be determined using equivalent diameters (hydraulic diameter) and not cross-sectional area.

4.36.1.4 Aspect ratios in excess of 4:1 shall be avoided in rectangular ductwork. Internal duct dimensions of less than 200mm in rectangular ducting will not be acceptable in low and medium velocity ductwork.

4.36.1.5 Adjustable opposed blade dampers, duct splitters and turning vanes shall be provided where shown on the drawings.

4.36.1.6 Unless otherwise specified ductwork shall be manufactured of galvanised sheet steel.
4.36.1.7 Ductwork shall be painted as specified.

4.36.1.8 Flexible joints shall be provided between all fans, airhandlers, vibration inducing equipment, etc. and ducting.

Flexible joints exposed to weather shall be provided with protecting galvanised sheet steel cover strips.

Flexible connections shall be made of fireproof fabric reinforced airtight material attached both sides with approved galvanised steel collars or frames.

4.36.1.9 Ductwork connected to equipment such as cooling towers, evaporative condensers. plenum chambers etc. shall be provided with flanged removable sections to allow for removal and access to eliminators etc.

4.36.2 Flexible Ductwork

4.36.2.1 Where indicated on the main drawings ductwork shall be connected to mixing boxes and integrally mounted ceiling diffusers by means of flexible ducting.

4.36.2.2 Flexible ducting shall consist of aluminium foil faced glass fibre fabric mechanically interlocked by a corrosion resistant metal spiral helix on the outside of the fabric.

4.36.2.3 Flexible ducting shall comply with local fire codes, NFPA Bulletin 90A and SABS 0400 fire resistance requirements.

4.36.2.4 Flexible ducts connected to diffusers or mixing boxes shall, unless otherwise shown or approved, not exceed 1,5m in length nor have more than the equivalent of two 90-degree bends. Bends shall be of the maximum possible radius without flattening or distorting the flexible ducting.

4.36.2.5 Flexible ducting shall be supported with sufficient and correct brackets that will ensure maintenance of shape
.
4.36.2.6 Flexible ducting shall be externally insulated where insulation of ductwork is called for in the Supplementary Specification.

4.36.3 PVC Ductwork

4.36.3.1 PVC ductwork where called for in the Supplementary Specification shall be of unplastisised polyvinyl chloride (uPVC) manufactured and installed in accordance with specification DW151 "Specification for Plastics Ductwork" of the "Heating and Ventilating Contractor's Association" and/or SMACNA - "Thermoplastic Duct Construction Manual".

4.36.3.2 The class of ducting used shall be as specified.
4.36.3.3 Proper provision shall be made for expansion and contraction of the ductwork.

4.36.3.4 Flexible connections shall be made of plasticised polyvinyl chloride (PVC).
4.36.3.5 Duct joints shall be welded flanges or male/female socket type welded all-round.
All welded joints and seams shall be tested by high frequency spark test at 40kV.

4.36.4 Testing
4.36.4.1 Unless otherwise specified the total ductwork installation shall be tested for leakage as per SABS 0173.

4.36.4.2 Leakage rates in excess of 5% of the required air flow quantity in any section of ductwork or in excess of the SABS permissible leakage, whichever is the smaller, will not be accepted.

4.37.0 AIR OUTLETS AND DAMPERS

4.37.1 Grilles

4.37.1.1 Supply and return air grilles shall be provided as indicated on the drawings.
Each grille shall be selected in accordance with the manufacturer's recommendations to be capable of passing the specified air quantity without creating excessive resistance, noise or local draughts.

4.37.1.2 Grilles shall be manufactured of stamped, extruded or rolled aluminium or steel sections, finished as specified and mounted in a neat frame.

4.37.1.2 Supply air grilles shall be provided with double deflection aerofoil vanes adjustable from the front of the grille.Vanes shall be spaced at not more than 20mm centres.
4.37.1.4 Exhaust and return air grilles in the same installation shall be similar in general appearance and construction to the supply air grilles but with a single set of fixed vanes.
4.37.1.5 Supply air grilles shall be provided with opposed blade volume control dampers adjustable from the front of the grille.
Return air grilles shall be provided with opposed blade dampers for volume control only where called for on the drawings. Dampers shall be adjustable from the front of the grille.

4.37.1.6 Grilles shall in all cases be selected with free air passage areas not less than that indicated on the drawings.

4.37.2 Weather Louvres

4.37.2.1 Weather louvres shall be manufactured of extruded aluminium sections or ferrous metal hot dip galvanised after manufacture, as specified.
4.37.2.2 Weather louvres shall be constructed with drip edges to blades and rigid frame to enable building in.
4.37.2.3 Weather louvres shall be finished in natural anodised aluminium, powder coated or painted is specified.
4.37.2.4 Weather louvres shall be watertight even with nominal air velocity up to 3,0m/s.
4.37.2.5 Weather louvres shall be fitted with 12mm opening size galvanised expanded metal or wire mesh screen.
4.37.2.6 Top and bottom blades shall be fitted flush with the frame and smooth without grooves, channels or recess where dirt or water can collect.
4.37.3 Diffusers
4.37.3.1 Diffusers shall be square, round or rectangular with faceplates matching the ceiling grid as specified, manufactured from pressed or spun steel or aluminium sheet metal.

4.37.3.2 Each diffuser shall be selected in accordance with the manufacturer's recommendations to be capable of passing the specified air quantity without creating excessive resistance, noise or local draughts.

4.37.3.3 Each diffuser shall be provided with an opposed blade volume control damper. Dampers shall be selected and installed so as not to disturb the supply air distribution pattern or induction ratio of the diffuser.

4.37.3.4 Diffuser cores shall be removable for cleaning and access purposes.
4.37.4 Variable Volume Outlets

4.37.4.1 Variable volume outlets with controls and reheaters shall be provided where indicated on the drawings.

4.37.4.2 Only well-catalogued and proven products will be considered.

4.37.4.3 Minimum air volume shall be factory set and site checked for each outlet.

4.37.4.4 Outlets shall be selected and installed to ensure that no dumping or coning of supply air streams occur, particularly at low air flow rates.
4.37.4.5 Variable volume control shall be achieved with pneumatic or electric drives as specified. Low noise levels during operation is essential.
4.37.4.6 Reheaters shall be protected against overheat and shall be switched with an adequately rated and

reliable microswitch.

4.37.4.7 Easy access to all parts possibly requiring servi cing or setting shall be provided.
4.37.5 Dampers

4.37.5.1 Dampers for positive volume control purposes shall be manual, pneumatic or electric actuator driven as specified and provided where indicated on the drawings.

4.37.5.2 Damper blades, links and damper frames shall be of rigid construction galvanised steel generally as per SABS 1238, and of the opposed blade type.

4.37.5.3 Manually adjusted dampers shall be provided with adjusting levers in accessible positions with provision for positive locking in any position from fully open to fully closed.

4.37.5.4 Dampers shall be of the link or gear type as specified.

4.37.5.5 Dampers creating unacceptable vibrations and noise levels will be rejected and will need to be replaced at the Contractor's expense.

4.38.0 INSULATION

4.38.1 General
4.38.1.1 Insulation shall in all instances be applied by specialist contractors and be of the highest standard. Any section not installed to the approval of the Department shall be re-done at the Contractor's expense.
4.38.1.2 Prior to insulation being fitted, all pressure testing shall be completed satisfactorily.

4.38.1.3 Insulation, cladding and vapour barriers shall be painted as specified.

4.38.1.4 All items of plant likely to operate at temperatures below the surrounding ambient dew point shall be insulated and provided with a vapour barrier.

4.38.2 Ductwork

4.38.2.1 All air ducts carrying heated or cooled air, except where specifically excluded in the Supplementary Specification shall be thermally insulated.

4.38.2.2 Ductwork shall be internally or externally insulated as specified. If no mention is made in the Supplementary Specification, internal insulation shall be offered unless circular ducts are indicated on the drawings. These shall be externally insulated in all instances.

4.38.2.3 Ducts for ventilating plants supplying heating only shall be insulated except within the heated space.

4.38.2.4 Internal duct insulation shall consist of not less than 25mm thick neoprene or flexible fabric faced fibreglass which shall be secured to the duct by means of suitable adhesive in addition to metal fasteners similar or equal to Gripnail or Duradyne Weldpins, generally in accordance with SABS 1238 - 1979. Flexible fabric face insulation shall be similar or equal to Eurosonic.

4.38.2.5 External insulation shall generally be in accordance with SABS 0173 - 1980.

4.38.2.6 Fibreglass density shall be a minimum of 24kg/m_3 for internal insulation and external insulation in unexposed areas. For external insulation in exposed areas such as plantrooms, service trenches and service ducts, the minimum density shall be 48kg/m_3.
Thermal conductivity in both instances shall not exceed 0,037 W/m^{o}K.

4.38.2.7 In unexposed areas such as roof spaces, etc., external insulation shall be protected with a neoprene or aluminium foil cover. These shall be strapped at intervals not exceeding 500mm with

nylon straps and buckle clips or similar approved method.

4.38.2.8 All air conditioning ductwork externally insulated shall be provided with a continuous vapour barrier, sealed with adhesive aluminium tape or equal.
The vapour barrier shall comply with the flammability requirements for sealing membranes as per SABS 1238 - 1979.

4.38.2.9 Particular care shall be taken with insulation at ductwork joints to ensure maximum possible

insulation of duct surfaces, special reference shall be made to clauses 4.8.3 to 4.8.7 of SABS 1238.

4.38.2.10 External insulation in exposed areas shall comprise 40mm thick fibreglass to cover all flanges, joints, etc. It shall be externally clad with a galvanised sheetmetal skin over a vapour barrier and painted to specification.

Horizontal surfaces and joints in the sheet metal cladding shall be such that they shed water. Alternatively, the outer metal skin may be substituted with 25mm mesh wire netting, stapled to the insulation and then covered with a 10mm layer of hard setting plaster trowelled to a smooth even finish. The plaster shall be coated with one coat liquid polymer such as "Foster Sealer" or "Decadex", followed by a reinforced fibreglass scrim, fixed with a suitable adhesive, and a second coat of liquid polymer. The duct shall then be painted as specified.
The method employed shall be as set out in the Supplementary Specification.

4.38.2.11 Flexible ducting shall be proprietary made complete with insulation at least 40mm thick fibreglass equivalent and an acceptable fire retardant outer layer.

Where flexible-ducting joins on to sheet metal ducting the joints shall be sealed with foil backed adhesive tape.
4.38.3 Insulation of Hot Water Piping and Fittings

4.38.3.1 All hot water piping shall be insulated with pre-formed insulation matching pipe size and specified thickness, painted and colour coded as specified.

4.38.3.2 The insulating materials shall comprise pre-formed glass fibre rigid or mineral wool sections of long fine fibres, bonded with a temperature resistant binder. The thermal conductivity shall not exceed 0,038 W/mºK, and the density shall not be less than 80kg/m_3. The sections shall be rot-proof, odourless, non-hygroscopic and non-combustible.Minimum thickness shall be in accordance with the table below:
Pipe diameter (mm) 15-25 32-50 65-80 100 and larger
Glass fibre insulation thickness (mm) 20 25 40 50

4.38.3.3 Insulation shall be held in position by aluminium, galvanised steel, stainless steel or nylon straps. These straps are to be located at butt joints between lengths of insulation and at 300mm centres over the length of the insulation.

4.38.3.4 Insulation to bends on unexposed pipework (e.g. in roofspaces etc.) may be formed from mitred and trimmed sections, cut to ensure that a good contact with the surface to be insulated is made, alternatively moulded trowelled insulation may be applied.

4.38.3.5 To ensure maximum continuity of insulation, adjoining sections shall be firmly butted together and sealed with a self-adhesive tape at least 50mm wide. At valves, fittings and pipeline equipment the insulation shall be taped together in a similar fashion. Open ends of rigid sections shall be sealed off with a suitable mastic.

4.38.3.6 All piping, hot water valves and fittings shall be clean, dry and free of grease, loose rust and scale before any insulation is applied.
Where specified piping shall be painted prior to application of insulation.

4.38.3.7 Where hangers and/or supports occur along the run of the insulated pipes, a segmental section of hardwood approximately 70mm long shall be inserted, the outer diameter being identical to that of the insulated pipe and the ends thereof butted to the insulation. The insulation finish shall be continued over the hardwood insert and the finish shall be protected by means of sheet metal hoops under the bracket, against movement of the pipe and/or hanger.
Alternatively for pipes of diameter 80mm or less the pipes may be supported over the insulation with approved non-crushing hoop type hangers. Supports compressing the insulation will not be accepted.

4.38.3.8 All pipes exposed to the weather or where the insulation is likely to be damaged or where visible inside buildings and plantrooms, are to be provided with a covering of galvanised sheetmetal over the insulation, adequately secured. Sheetmetal thickness shall be not less than 0,5mm for pipe sizes up to 100mm diameter and not less than 0,8mm for larger pipe sizes.

The sheetmetal covering shall be held in position with 10mm wide stainless steel metal bands spaced to ensure a neat and firm finish at intervals not exceeding 500mm. Longitudinal overlap joints shall be arranged to be in one line at 10 o'clock or 2 o'clock and to be water shedding.

4.38.3.9 Flanged joints shall be separately covered by pre-formed insulation flange boxes (muff covers) held in position by removable metal bands and finished similarly to the lagging on piping.The flange boxes shall be capable of removal without damage to any other portion of the insulation.

4.38.3.10 Hot water pipes exposed to the weather shall be insulated and clad in such a manner that no moisture or rainwater may penetrate the insulation.

Support brackets, hangers, etc. shall be external to the insulation and cladding and no cut-outs will be permitted.

4.38.3.11 All bends on indoor pipework are to be insulated with moulded plastic lagging (see below) of same or better insulation property than the sectional insulation, trowelled to a smooth finish to the same diameter as the sectional insulation and then neatly bound with an approved tape and painted, or alternatively insulated with mitred sections.

4.38.3.11 Lobster back weatherproof galvanised sheet steel bends with segmented glass fibre lagging must be used where pipework is exposed to the weather.Alternatively, bends may be insulated with plastered hard setting moulded plastic asbestos lagging strengthened with galvanised wire netting and trowelled to a smooth finish of the same diameter as the sheet metal covering. The insulation shall be finished with 4 coats silicated soda and then neatly bound with an approved tape and painted as specified.

4.38.3.13 Pipes to be chased into brickwork shall be wrapped with suitable mineral fibre or glass fibre tape approximately 6mm thick.

4.38.3.14 Pipe insulation not covered with sheetmetal cladding shall be covered with canvas having at least a 50mm overlap at joints. Overlaps shall be sealed down with a suitable adhesive.

4.38.3.15 Hot water valves and fittings shall be insulated similarly.

4.38.3.16 Unless otherwise specified in the Supplementary Specification expanded high density polyethylene material may only be used where the pipework is entirely under cover and protected, e.g. roof spaces, etc. and only on pipes up to 50mm diameter. It shall not be used in plantrooms or where at risk of physical damage.

The material shall be of expanded cross-linked polyethylene, with SABS certified self- extinguishing properties similar and equal to "Thermaflex" type QE40.
The thermal conductivity of the material shall not exceed 0,038 W/mºK. Nominal insulation thickness shall be 20mm.

Straight sections shall be applied in 2 metre lengths where possible and closed by means of the zipper. Tees and elbows shall be insulated employing pre-formed sections. Alternatively mitred cut sections shall be employed, taped together with HDPE tape to ensure a sealed fit. Joints in straight lengths or between fittings and straight lengths shall be taped for a minimum of 40mm on either side of the joint, employing HDPE tape.

4.38.4 Insulation of Chilled Water Piping and Fittings

4.38.4.1 Chilled water and refrigerant suction piping shall generally be insulated as set out above with the specified material, material thickness and vapour barrier, painted and colour coded as specified.

4.38.4.2 All chilled water and refrigerant suction piping shall be insulated in a workmanlike manner to modern practice.

4.38.4.3 Insulation shall be sectional resin bonded glass fibre with density not less than 95kg/m3. The insulation thickness shall be not less than 25mm for pipe sizes up to 40mm diameter and not less than 40mm thick for larger diameter pipes and shall be provided with a factory applied canvas finish.

4.38.4.4 All circumferential joints to the insulation shall receive one application of "Foster Foamseal 30-45" or equivalent to the full thickness of the insulation during erection to prevent lateral penetration of moisture along the pipe when in service.

At all points where the vapour barrier is broken due to cutouts, the insulation shall be sealed as above, during erection.

4.38.4.5 Bends shall be insulated with 12mm or 27mm thick asbestos plastic insulation compound, covered by a 13mm thick layer of asbestos hard setting compound, trowelled to a neat smooth and symmetrical finish. Two coats of Decadex or equal shall be applied as vapour barrier prior to painting as specified.

4.38.4.6 Concealed and exposed chilled water piping and refrigerant suction lines, valves and fittings, shall be covered over the insulation with an aluminium foil/kraft paper vapour barrier with 50mm overlap at joints, sealed with a suitable adhesive, with no further cladding.

4.38.4.7 Concealed piping and fittings shall be vapour sealed over the insulation without any further cladding, but colour coded as specified.

4.38.4.8 Exposed chilled water piping and refrigerant suction lines, in plantrooms, and in areas where pipes are likely to be damaged or where exposed to the weather, shall be covered over the vapour barrier specified above with a 10mm thick layer of W.R. 700 Armour plaster or equal, trowelled to a smooth and even finish. When dry the plastered surface shall be painted as specified. Valves and fittings shall be plastered or wrapped in non-sweating "Denso" or equal tape where plaster is not possible and where diameters are 32mm or less.As an alternative to the plaster finish 0,9mm galvanised sheet metal or 1mm thick aluminium sheeting as a cladding may be provided over the vapour barrier specified. Valves and fittings shall be plastered as specified above. Galvanised sheet metal shall be painted as specified. No painting is required on aluminium coverings, except colour coding as specified.

4.38.4.9 As an alternative vapour barrier to the aluminium foil/kraft paper vapour barrier specified above the plaster cover to the insulation shall be painted when dry with Decadex LPL sealer or equal followed by two high build brush coats of Decadex Firecheck Copolymer liquid plastic or equal. The surface shall be reinforced by embedding a layer of open weave fibre-glass membrane in the Firecheck.

4.38.4.10 Refrigerant suction lines may alternatively be insulated by means of "Thermaflex"Type 40 QE cross-linked polyethylene foam tube insulation, neoprene rubber foam with quick zip fastener, or equal. The insulation material shall meet the following minimum requirements:
Temperature range : -80ºC to +120mºC
Thermal conductivity : 0,038 W/mºK at 0ºC
Thickness : 10mm
Density : 35kg/m^3
Odour properties : Neutral
Cellular structure : Totally closed
Fire properties : Self-extinguishing to SABS
The insulation shall be applied to form a continuous and homogeneous vapour barrier over bends, supports, etc.
Where these pipes are run in areas exposed to sunlight, they shall be installed inside suitable galvanised mild steel trunking or other approved method of covering.

4.38.4.11 When completed the installation shall ensure a complete vapour barrier and any signs of sweating or dripping shall cause the installation to be rejected.

4.38.5 Steam Piping

4.38.5.1 Steam piping shall generally be insulated as specified for hot water systems.

4.38.5.2 Pre-formed fibreglass or mineral wool sections of density not less than 96kg shall be used.

4.38.5.3 Thickness shall be as set out below:

Pipe diameter (mm) 15 20 25 32 40 50 65 80 and larger
Insulation thickness (mm) 25 25 25 40 40 40 40 50
4.38.5.4 Surface temperatures shall not exceed 40ºC when in use. Unless otherwise specified in the Supplementary Specification, condensate pipes shall not be insulated.

4.38.6 Shell and Tube Water Coolers

4.38.6.1 These shall be insulated with 25mm thickness fibreglass slabs fastened to the cooler by means of mechanical fasteners. Covering shall be as for exposed chilled water piping with a homogeneous vapour barrier.

4.38.6.2 Cutouts and penetrations shall be sealed with a vapour barrier.

4.38.6.3 Factory insulated equipment shall be acceptable provided this is to the approval of the Department.

4.39.0 AUTOMATIC CONTROL SYSTEMS

4.39.1 General

4.39.1.1 Unless otherwise specified in the Supplementary Specification controls shall be electric or electronic or a combination thereof.
Controls shall be analogue or direct digital as specified in the Supplementary Specification.
4.39.1.2 The performance of sensors, controllers and outputs shall be such that stability is ensured under all operating conditions.

4.39.1.3 Provision shall be made on controllers to enable adjusting control loop stability such as adjustable proportional bands, adjustable reset rates etc.

4.39.1.4 Closed loop control systems are required generally with one or more of the following control actions;
a) Two-position action, maximum/minimum or on/off.

The differential shall be adjustable.
b) Floating action with the controller moving the controlled device to it's open or closed position with a neutral zone between the two positions allowing the controlled device to stop at any position whenever the controlled variable is within the differential of the controller.
Whenever the controlled variable gets outside the differential of the controller, the controller shall move the controlled device in the proper direction.

c) Proportional action where the controlled device is positioned proportionally in response to slight changes in the controlled variable.
The throttling range shall be adjustable to suit the application. Controllers with excessive droop or steady-state error will be rejected.

d) Proportional plus integral control and proportional-integral-derivative controls shall be provided on sensitive installations and where specified in the Supplementary Specification.

4.39.2 Controllers

4.39.2.1 Controllers shall be designed for minimum time lag around the control loop.

4.39.2.2 Adjustments shall be made to the various control modes of each controller to obtain maximum regulation quality. Systematic trial methods or adjustment shall be avoided as far as possible. Recommendations of the controller manufacturer shall be carefully followed or alternatively adjustments shall be made based on the ultimate sensitivity calculated method.

4.39.2.3 Non-adjustable controllers or controllers with inadequate adjustment facility will not be accepted.

4.39.2.4 Provision shall be made to prevent noise signal disturbances in the control loop. Where noise cannot be eliminated completely by means of filtering or averaging noise out of the signal or by shielding control wires against stray voltages, etc., proportional plus reset controllers shall be used.

4.39.2.5 Controllers and all control items shall be housed in a separate cubicle in the electrical control panel/switchboard.

4.39.2.6 Controllers shall be of the indicating type with the value of the controlled variable clearly indicated on a suitable scale.

4.39.2.7 Direct digital controllers shall make use of a microprocessor or computer to implement control algorithms on one or more multiple control loops as required.

Pre-programmed control routines shall be stored in permanent programmable read only memory unless otherwise specified.
User programmable controllers shall only be provided where specified in the Supplementary Specification.

4.39.2.8 Where intelligent programmable controllers are specified it shall comply with the following as a minimum;
□□flexible direct digital control
□□touch screen with pre-programmed control applications ensuring ease of commissioning and operation
□□simple interrogation and setting of control parameters through the touch screen with graphical LCD display

□□real-time feature enabling continued operation even after a power failure
□□graphics software package with easily programmed special applications
□□proportional plus integral plus derivative control actions that can be individually set to match application
□□full monitoring and logged data capacity combined with graphical display of stored data
□□providing full alarm monitoring
□□interfacing with building management system must be possible with standard interface facility for remote computer configuration

4.39.3 Control of Single Centrifugal Water Chillers

4.39.3.1 Unitary equipment such as centrifugal chillers shall be provided with it's own built-in control and safety systems, generally as supplied standard by the manufacturer.

4.39.3.2 Interlocks and interfacing with the system shall be provided as specified in the Supplementary Specification.

4.39.3.3 The following interlocks and safety controls shall however be provided as a minimum;
□□anti-freeze protection to evaporator
□□the compressor shall not run unless the chilled water pump, condenser water pump and cooling tower fans are running (water cooled)
□□the capacity regulating vanes shall remain closed until the motor is connected across the full line voltage
□□the capacity regulating vanes shall close, or at least in the limit, remain constant when the motor load exceeds full load. The motor overload control shall override the chilled water temperature control.

4.39.3.4 For off-season operation a manual demand-limit-control shall be fitted. This demand-limit-control shall override the automatic capacity control to limit current drawn by the chiller during off-season operation. This control shall be able to limit the motor current to a maximum of 50% of full load current.

4.39.3.5 Leaving chilled water temperature shall be controlled to within ± 1ºC of the specified temperature by suction vane positioning in the compressor intake.

4.39.3.6 On starting of the chilled water pump, local manually or remote automatically all chiller controls shall be energised and function automatically.

4.39.3.7 When cooling of the chilled water is required, the condenser water pump, cooling tower fans (or condenser fans if air-cooled) and compressor shall start automatically and in sequence.

4.39.3.8 All centrifugal chillers shall be provided with microprocessor unit control modules with serial interface for remote monitoring and/or control by a building management system.

Demand limiting control shall be possible from the remote building management system.
The microprocessor unit control modules shall generally provide the following as a minimum;
□□liquid crystal display with LED back lighting
□□entry section to enter setpoint changes, cancel inputs, set day and time
□□print section with standard printer port to permit hard copy printouts, with separate printer, of operating data for unit and history of fault shutdowns. (Printer by others)
□□program section to program functions such as cut-outs, unloading, anti-recycle timer, etc.
The following displays are required;
□□- water temperature in/out

□□- cut out settings;
water temperature
ambient temperature
suction temperature
□□pressures for each system;
suction
delivery
□□anti-recycle timer setting for each compressor
□□day, date and time
□□daily stop/start times
□□automatic or manual lead/lag control (where applicable)
□□fault shut downs
□□number of unloading step
□□percent full load motor current

4.39.4 Control of Reciprocating Water Chillers

4.39.4.1 On starting of the chilled water pump, local manually or remote automatically all chiller controls shall be energised and function automatically.

4.39.4.2 Leaving chilled water temperature shall be controlled to within ± 1ºC of the specified temperature by unloading of cylinders and/or switching compressors on or off as necessary.

4.39.4.3 Compressors shall be automatically stopped/started and loaded or unloaded in steps and in sequence in accordance with the return chilled water temperature.

4.39.4.4 Interlocks and interfacing with the system shall be provided as specified in the Supplementary Specification.

4.39.4.5 The following interlocks and safety controls shall however be provided as a minimum;
□□the compressor shall not run unless the chilled water pump, condenser water pump and cooling tower fans are running (water cooled)
□□anti-freeze protection to evaporator
□□compressors shall always start unloaded.

4.39.4.6 All chillers larger than 150kW cooling capacity (and where specified in the Supplementary Specification) shall be provided with microprocessor unit control modules with serial interface for remote monitoring and/or control by a building management system.

Clause 4.39.3.8 above shall generally apply.
4.39.4.7 On multiple circuit chillers compressor starting/stopping shall be in sequence and on units larger than 100kW cooling capacity (and where specified in the Supplementary Specification) automatic lead/lag control for equalising compressor running hours is required.

4.39.5 Control of Screw Compressor Water Chillers
4.39.5.1 Screw compressor water chillers shall generally be controlled as specified for centrifugal water chillers.

4.39.5.2 Clause 4.39.3.8 above shall generally apply.

4.39.6 Control of Airhandling Unit Equipped with Chilled Water Coil and Hot Water Coil or Electric Elements for Heating

4.39.6.1 Both heating and cooling shall be controlled by a single room or return air sensor and controller as specified.

4.39.6.2 A control range of approximately 15ºC . 30ºC is required with a dead zone of approximately 0,5ºC between cooling off and heating on and vice versa.

4.39.6.3 The controls shall maintain the specified temperature ± 1ºC by controlling the control valves on the cooling and heating coils. (or heating elements)

4.39.6.4 Electric heaters shall be controlled in steps as specified in the Supplementary Specification, with contactors.

4.39.6.5 The control circuit shall be interlocked with the supply air fan and shall only be in operation if the fan is running.

4.39.6.6 Where three-way valves are used it shall be in the full by-pass position when the system is off.

4.39.6.7 Three-way valves shall be fitted with balancing valves in the by-pass leg with the valve adjusted to ensure that the flow resistance across the by-pass leg shall equal the coil resistance at full flow.

4.39.6.8 The following interlocks shall be provided for electric heaters where used;
□□heater shall not be on unless the fan is on

□□a fire protection high temperature thermostat shall be provided in the supply air duct to stop the fan if the air temperature exceeds 50ºC and to switch all heaters off

□□a pressure switch or flap type mercury switch shall be fitted in the supply air duct to ensure that the heaters cannot be on unless air flow is established
□□provision to ensure that heating and cooling cannot be on simultaneously.

4.39.7 Control of Air Handling Unit Equipped with Direct Expansion Cooling Coil and Electric Elements for Heating

4.39.7.1 Both heating and cooling shall be controlled by a single room or return air sensor and controller as specified, generally as per 4.39.6 above.

4.39.7.2 In the cooling mode step control matching the refrigerant side with on/off, unloading/loading of compressors shall be provided.

4.39.7.3 Compressor i
nterlocks preventing operation unless heat rejection equipment is functioning shall be provided.

4.39.8 Condensing Pressure Control

4.39.8.1 Cooling towers, evaporative condensers and air-cooled condensers shall be provided with head pressure control to maintain condensing temperatures within the limits recommended by the compressor manufacturer.

4.39.8.2 Aerofoil dampers with proportional control shall be used on cooling towers and evaporative condensers to match cooling capacity with system heat rejection whilst saving on fan energy.

4.39.8.3 Other methods of condensing pressure control, such as variable fan speed and fan cycling will only be considered if the head pressure can be controlled within the limits recommended by the compressor manufacturer.

4.39.9 Control Valves and Actuators

4.39.9.1 Control valves shall be the reversible globe type, either single, two or three ported or angle type as required, suitable for a working pressure of 900 kPa or 1? times the operating pressure of the system, whichever is the greatest, for the specified fluid and fluid temperature to be controlled.

4.39.9.2 Single ported control valves with port sizes larger than 25mm in diameter shall, whenever possible, be installed so that flow tends to open the valve.

4.39.9.3 The design and materials of the valve and its operating motor shall be such that leakage of fluid from the stem seal cannot cause corrosion, freezing or overheating of any working part. Valves of 40mm and smaller, shall have cast bronze bodies with screw ends.

4.39.9.4 Valves between 50 and 80mm shall be of cast bronze, cast steel or cast iron with screwed or flanged connections. Valves of 100mm and larger, shall be of cast steel or cast iron with flanged connections. Valve trim (valve plug, seat rings, valve stem guide bushings, valve guide bushings, valve stem and internal stuffing box parts), shall be of austentic stainless steel or other hard facing materials suitable for the fluid to be controlled.

4.39.9.5 All control valves shall be provided with readily visible position indicators.

4.39.9.6 Electric actuators shall be of either the electric solenoid operated type or electric motor operated type.

4.39.9.7 Electric motor type actuators shall be of the shaded pole or capacity induction type capable of stopping at any point in the cycle or rotating in any direction. Provision shall be made for manual operation.

4.39.9.8 Electric actuators shall be installed in positions where they will not be subjected to any damp conditions due to condensation or overheating.

4.39.9.9 Actuator and valve and damper combinations shall be selected to suit the particular duty. All valves and actuators on a installation shall be of the same manufacturer.

4.39.9.10 Control valves with their actuators shall be installed in readily accessible positions for maintenance purposes and where position indicators are clearly visible.

4.39.9.11 Where fail safe controls are specified, actuators shall be provided with spring return to either the open or closed position or alternatively solenoid valves shall be added for this purpose. Solenoid valves shall fail either to the open or closed position as required by the system.

4.39.9.12 Damper actuators shall be selected to suit the specified control requirements and with sufficient torque output to drive the dampers smoothly without straining or overloading.

4.39.9.13 Damper actuators shall be mounted in accessible positions for maintenance and setting purposes.
4.39.9.14 Linkages between actuators and dampers shall be adjustable.

4.39.9.15 Thermostatic expansion valves shall be of the gas charged type with external superheat adjustment and solder joint or flanged pipe connections. On coils where the refrigerant pressure drop through the coils exceeds 15 kPa, the expansion valve shall be provided with an external equaliser to the suction line at a point beyond the remote bulb. Valves shall be able to move from fully open to fully closed on not more than 3ºC change in superheat. The superheat setting shall be between 4 and 8ºC and shall be as recommended by the coil manufacturer.

4.40.0 THERMOSTATS AND HYGROSTATS

4.40.1 Thermostats and hygrostats or alternatively temperature and humidity transmitters in occupied areas, shall be provided where indicated on the drawings and shall be installed against the wall at a height of approximately 1,5 metres from the floor. Units mounted against outside walls, shall be provided with insulated bases.

4.40.2 Temperature sensing primary elements shall be either bimetal strips, sealed bellows or resistance wires.

4.40.3 Humidity sensing primary elements shall be either human hair, leather, plastic or of the hygroscopic resistance type.

4.40.4 Duct, pipe and tank thermostats shall be of the capillary remote bulb immersion type. Alternatively, thermostats controlling air temperatures may have fast response coiled sensing elements.

4.40.5 Sensing elements in piping and tanks shall be installed in oil filled separable immersion wells, screwed into the pipe or tank. Immersion wells shall be of copper or brass. Small diameter pipes shall be enlarged at points where sensing elements are installed. Sensing elements in ducts shall be located where they will respond to a representative temperature within the duct.

4.40.6 Thermostats and hygrostats mounted out of doors shall be provided with splash proof enclosures.

4.40.7 Capillary type thermostats shall be installed at a height of approximately 1,5 metres above floor level in easily accessible positions for adjustment and maintenance purposes. Thermostats mounted against insulated ducts or pipes, shall be mounted on stand-off brackets. Capillary tubing shall be neatly installed and coiled where necessary and shall be protected against possible damage.

4.40.8 Fire protection and overheat thermostats shall be of the rigid stem insertion type.

4.40.9 Thermometers shall be provided in piping, ducts and tanks at the location of all control thermostats (not at limit or safety thermostats). Thermostats having built in thermometers, are also acceptable.

4.40.10 Thermostats and hygrostats shall not be installed in positions where they are subjected to direct sunlight. Thermostats near electric heater elements or other hot surfaces, shall be shielded against radiation.

4.40.11 Thermostats and hygrostats shall be protected against dust, dirt, corrosive fumes, chemicals and moisture.

4.40.12 Unless otherwise specified in the Supplementary Specification, all thermostats and hygrostats shall be of the relay-operated type.

4.40.13 Electric control relays shall be mounted inside the electrical switchboards.

4.40.14 Relays shall be suitable for the supply voltage required and shall have a contact rating well in excess of the load.

PRICING SCHEDULE/ BILLL OF QUANTITIES

Bid no: GQET-25/26-034

Bid/ Project Description: EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

DEPARTMENT OF PUBLIC WORKS
EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS

IN STATE BUILDINGS

PART 2.4
PRICE SCHEDULE

CONTENTS
SCHEDULE OF QUANTITIES

PROJECT:	**DEPARTMENT OF PUBLIC WORKS**
SERVICE:	**EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**
	BILL No: 1: Preliminary and General

Item	Description Preliminary And General	Qty	Unit Rate	Amount - ZAR
1	**Conditions of Contract: Compliance with contractual requirements and obligations in terms of Contract and Contract Data**			
1,1	Conditions accepted as elsewhere measured: Fixed	sum	1	
1,2	Conditions accepted as elsewhere measured: Time related months	36	1	
1,3	Conditions accepted as elsewhere measured: Value related	sum	1	
1,4	Surety, performance bond: Fixed	sum	1	
1,5	Insurance: Construction works: time related months	36	1	
1,6	Insurance: Public Liability: Time related months	36	1	
1,7	Insurance: Special Risks: (SASRIA): Time related months	36	1	
1,8	Insurance: Occupational Compensation (COID): Time related months	36	1	
1,9	Programme of Works: Compile & Submit: Fixed months	36	1	
1,10	Programme of Works: Maintaine current: Time related	sum	1	
1,11	Preliminary & General: balance of items: Fixed	sum	1	
	Facilities as specified or necessary for the duration of the contract including establishment at commencement and removal upon completion			
1,12	Admin facilities: Site Instruction book, communications etc. months	36	1	
1,13	Display boards places at each plant room or container	30	1	
	Occupational Health and Safty: Compliance with the applicable Act including specified additional requirements			
1,14	Safety Officer appoint	sum	1	
1,15	Submit Health and Safety Plan	sum	1	
1,16	First Aid kits: Supply and maintain (to be kept in vehicles)	36	1	
1,17	Safety meetings: conduct and record proceedings, copy to engineer	36	1	
1,18	Balance of safety related compliance	36	1	
	Supervision and Management of the progress of construction works including the attendance at meetings at the site with the Employer or the Engineer as and when required.			
1,19	Supervision and Management	36	1	
1,20	Access control and identification of staff	36	1	
1,21	Quality system	sum	1	
	Rubbish & waste management.	36	1	
CARRIED FORWARD				

Item	Description	Qty	Unit Rate	Amount - ZAR
	Brought forward			
2	**Allow for all costs that the Contractor may incur in terms of any or all of descriptions of these documents and of the drawings covered in the schedule below.**			
2,1	As-installed drawings, manuals and operating instructions.	Sum	1	
TOTAL FOR PRELIMINARY AND GENERAL - CARRIED FORWARD TO SUMMARY PAGE				

PROJECT:	**DEPARTMENT OF PUBLIC WORKS**					
SERVICE:	**EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**					
	BILL No: 2: East London					
	Description	**Unit**	**Serv.**	**Qty**	**Rate**	**Amount**
	Service And Maintenance					
	Prices shall include all items as per the service schedules stipulated in the Part C3.					
	Consumables as per Part C2.1.7 will be included in the item prices for quarterly and annually services.					
	All Services will Include the following: labour, Material, Transport, Accomodation, etc					
	NOTE 1: On your first and last service you must conduct and submit an invetory list to all site.					
	NOTE 2: There will be 12 x Services in 3 years as follows: (1) Annual Service x 3 (Major service): At the beginning of the contract (2) Quarterly Services x 9 (Minor services): Following the annual service					
2,1	**East London**					
	SAPS Fleet Street					
2.1.1	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	10		
	Annual (3 x Services)	no	3	10		
2.1.2	**Window Type Units**					
	Quarterly (9 x quarterly services)	no	9	3		
	Annual (3 x Services)	no	3	3		
	Cassette Units					
2.1.3	Quarterly (9 x quarterly services)	no	9	10		
	Annual (3 x Services)	no	3	10		
	SAPS Woodbrook					
2.1.4	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	5		
	Annual (3 x Services)	no	3	5		
2.1.5	**Window Type Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
	Mdantsane Magistrates Courts					
2.1.6	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	8		
	Annual (3 x Services)	no	3	8		
TOTAL BILL 2 CARRIED FORWARD TO NEXT PAGE						

Item	Description Service And Maintenance	Unit	Serv.	Qty	Rate	Amount
TOTAL BILL 2 CARRIED FORWARD FROM PREVIOUS PAGE						
2.1.7	**Air Handling Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
2.1.8	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	8		
	Annual (3 x Services)	no	3	8		
2.1.9	**Chiller Plant**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
	SAPS Mdantsane					
2.1.10	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	13		
	Annual (3 x Services)	no	3	13		
2.1.11	**Console Units**					
	Quarterly (9 x quarterly services)	no	9	4		
	Annual (3 x Services)	no	3	4		
2.1.12	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	13		
	Annual (3 x Services)	no	3	13		
	SAPS Woodbrooke					
2.1.13	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	39		
	Annual (3 x Services)	no	3	39		
2.1.14	**Window Type Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
2.1.15	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	39		
	Annual (3 x Services)	no	3	39		
2.1.16	**Air Handling Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
2.1.17	**Chiller Plant**					
	Quarterly (9 x quarterly services)	no	9	4		
	Annual (3 x Services)	no	3	4		
TOTAL BILL 2 CARRIED FORWARD TO NEXT PAGE						

Item	Description Service And Maintenance	Unit	Serv.	Qty	Rate	Amount
TOTAL BILL 2 CARRIED FORWARD FROM PREVIOUS PAGE						
	EL Magistrates					
2.1.18	**Fan Coil Units**					
	Quarterly (9 x quarterly services)	no	9	151		
	Annual (3 x Services)	no	3	151		
2.1.19	**Fresh Air Units**					
	Quarterly (9 x quarterly services)	no	9	151		
	Annual (3 x Services)	no	3	151		
2.1.20	**Air Handling Units**					
	Quarterly (9 x quarterly services)	no	9	9		
	Annual (3 x Services)	no	3	9		
2.1.21	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	5		
	Annual (3 x Services)	no	3	5		
2.1.22	**Chiller Plant**					
	Quarterly (9 x quarterly services)	no	9	4		
	Annual (3 x Services)	no	3	4		
	DPW Ocean Terrace					
2.1.23	**Console Units**					
	Quarterly (9 x quarterly services)	no	9	560		
	Annual (3 x Services)	no	3	560		
2.1.24	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	150		
	Annual (3 x Services)	no	3	150		
2.1.25	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	150		
	Annual (3 x Services)	no	3	150		
	Un-identified Units					
2.2.	Provisional amount for un-identified air conditioning units in East London The unit prices as per above shall be applicable. The contractor will report on units not stipulated in the Schedules as per Part 2.5 as part of the survey during the first service module.	Sum		-	-	R 250 000,00
TOTAL BILL 2 CARRIED FORWARD TO SUMMARY PAGE						

SERVICE:	**EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**					
	BILL No: 3: King Williams Town					
Item	**Description: Service And Maintenance**	**Unit**	**Serv.**	**Qty**	**Rate**	**Amount**
	Prices shall include all items as per the service schedules stipulated in the Part C3.					
	Consumables as per Part C2.1.7 will be included in the item prices for quarterly and annually services.					
	All Services will Include the following: labour, Material, Transport, Accomodation, etc					
	NOTE 1: On your first and last service you must conduct and submit an invetory list to all site.					
	NOTE 2: There will be 12 x Services in 3 years as follows: (1) Annual Service x 3 (Major service): At the beginning of the contract (2) Quarterly Services x 9 (Minor services): Following the annual service					
3,1	**King Williams Town**					
	SAPS Zwelitsha					
3.1.1	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	101		
	Annual (3 x Services)	no	3	101		
3.1.2	**Window Type Units**					
	Quarterly (9 x quarterly services)	no	9	15		
	Annual (3 x Services)	no	3	15		
3.1.3	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	101		
	Annual (3 x Services)	no	3	101		
3.1.4	**Console Units**					
	Quarterly (9 x quarterly services)	no	9	15		
	Annual (3 x Services)	no	3	15		
	All Saints SAPS Training College					
3.1.5	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	20		
	Annual (3 x Services)	no	3	20		
	SAPS Air Wing Bulembu					
3.1.6	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	9		
	Annual (3 x Services)	no	3	9		
	Kieskammahoek Magistrates Courts					
3.1.7	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
TOTAL BILL 3 CARRIED FORWARD TO NEXT PAGE						

Item	Description Service And Maintenance	Unit	Serv.	Qty	Rate	Amount
TOTAL BILL 3 CARRIED FORWARD FROM PREVIOUS PAGE						
	Middledrift Magistrates Courts					
3.1.8	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
3.1.9	**Ducted Hideaway**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
	Deeds Office					
3.1.10	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	15		
	Annual (3 x Services)	no	3	15		
3.1.11	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	15		
	Annual (3 x Services)	no	3	15		
	Bulembu Airport					
3.1.12	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
	KWT SAPS VIP					
3.1.13	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	51		
	Annual (3 x Services)	no	3	51		
3.1.14	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	51		
	Annual (3 x Services)	no	3	51		
3.1.15	**Console Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
	SAPS New Training College					
3.1.16	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	60		
	Annual (3 x Services)	no	3	60		
3.1.17	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	60		
	Annual (3 x Services)	no	3	60		
	Zwelitsha Home Affairs					
3.1.18	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	24		
	Annual (3 x Services)	no	3	24		
3.1.19	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	24		
	Annual (3 x Services)	no	3	24		
TOTAL BILL 3 CARRIED FORWARD TO NEXT PAGE						

Item	Description Service And Maintenance	Unit	Serv.	Qty	Rate	Amount
TOTAL BILL 3 CARRIED FORWARD FROM PREVIOUS PAGE						
	Zwelitsha Magistrates					
3.1.20	**Fresh Air Units**					
	Quarterly (9 x quarterly services)	no	9	20		
	Annual (3 x Services)	no	3	20		
3.1.21	**Air Handling Units**					
	Quarterly (9 x quarterly services)	no	9	3		
	Annual (3 x Services)	no	3	3		
3.1.22	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
3.1.23	**Chiller Plant**					
	Quarterly (9 x quarterly services)	no	9	1		
	Annual (3 x Services)	no	3	1		
3.1.24	**Console Units**					
	Quarterly (9 x quarterly services)	no	9	9		
	Annual (3 x Services)	no	3	9		
	Old Embassy Building					
3.1.25	**Window Units**					
	Quarterly (9 x quarterly services)	no	9	3		
	Annual (3 x Services)	no	3	3		
3.1.26	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	7		
	Annual (3 x Services)	no	3	7		
	Bhisho High Court					
3.1.27	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	26		
	Annual (3 x Services)	no	3	26		
3.1.28	**Air Handling Units**					
	Quarterly (9 x quarterly services)	no	9	9		
	Annual (3 x Services)	no	3	9		
	KWT Divorce Courts					
3.1.29	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	18		
	Annual (3 x Services)	no	3	18		
3.1.30	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	18		
	Annual (3 x Services)	no	3	18		
3.1.31	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	9		
	Annual (3 x Services)	no	3	9		
TOTAL BILL 3 CARRIED FORWARD TO NEXT PAGE						

Item	Description Service And Maintenance	Unit	Serv.	Qty	Rate	Amount
TOTAL BILL 3 CARRIED FORWARD FROM PREVIOUS PAGE						
3.1.32	**Window Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
	KWT Magistrates Courts					
3.1.33	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	4		
	Annual (3 x Services)	no	3	4		
3.1.34	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	4		
	Annual (3 x Services)	no	3	4		
3.1.35	**Console Units**					
	Quarterly (9 x quarterly services)	no	9	9		
	Annual (3 x Services)	no	3	9		
3.2.	**Un-identified Units**					
	Provisional amount for un-identified air conditioning units in King Williams Town. The unit prices as per above shall be applicable. The contractor will report on units not stipulated in the Schedules as per Part 2.5, as part of the survey during the first service module.	Sum		-	-	R 200 000,00
TOTAL BILL 3 CARRIED FORWARD TO SUMMARY PAGE						

PROJECT:	**DEPARTMENT OF PUBLIC WORKS**					
SERVICE:	**EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**					
	BILL No: 4: Cathcart					
Item	**Description**					
	Service And Maintenance	**Unit**	**Serv.**	**Qty**	**Rate**	**Amount**
	Prices shall include all items as per the service schedules stipulated in the Part C3.					
	Consumables as per Part C2.1.7 will be included in					
	All Services will Include the following: labour, Material, Transport, Accomodation, etc					
	NOTE 1: On your first and last service you must conduct and submit an invetory list to all site.					
	NOTE 2: There will be 12 x Services in 3 years as follows: (1) Annual Service x 3 (Major service): At the beginning of the contract (2) Quarterly Services x 9 (Minor services): Following the annual service					
4,1	**Cathcart**					
	Magistrates court					
4.1.1	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
4.1.2	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
	SAPS					
4.1.3	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
4,2	**Un-identified Units**					
	Provisional amount for un-identified air conditioning units in Cathcart The unit prices as per above shall be applicable. The contractor will report on units not stipulated in the Schedules as per Part 2.5, as part of the survey during the first service module.	Sum		-		R 120 000,00
	TOTAL BILL 4 CARRIED FORWARD TO SUMMARY PAGE					

PROJECT:	**DEPARTMENT OF PUBLIC WORKS**					
SERVICE:	**EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**					
	BILL No: 5: Queenstown					
Item	**Description**	**Unit**	**Qty**	**Serv.**	**Rate**	**Amount**
	Service And Maintenance					
	Prices shall include all items as per the service schedules stipulated in the Part C3.					
	Consumables as per Part C2.1.7 will be included in the item prices for quarterly and annually services.					
	All Services will Include the following: labour, Material, Transport, Accomodation, etc					
	NOTE 1: On your first and last service you must conduct and submit an invetory list to all site.					
5,1	NOTE 2: There will be 12 x Services in 3 years as follows: (1) Annual Service x 3 (Major service): At the beginning of the contract (2) Quarterly Services x 9 (Minor services): Following the annual service					
	SAP Queenstown					
5.1.1	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	73		
	Annual (3 x Services)	no	3	73		
5.1.2	**Window Type Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
5.1.3	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	73		
	Annual (3 x Services)	no	3	73		
	Queenstown Magistrates Court					
5.1.4	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	17		
	Annual (3 x Services)	no	3	17		
	SAP Whittlesea					
5.1.5	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	25		
	Annual (3 x Services)	no	3	25		
	Tarkastad Magistrates Courts					
5.1.6	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	10		
	Annual (3 x Services)	no	3	10		
TOTAL BILL 5 CARRIED FORWARD TO NEXT PAGE						

Item	Description Service And Maintenance	Unit	Serv.	Qty	Rate	Amount
TOTAL BILL 5 CARRIED FORWARD FROM PREVIOUS PAGE						
5.1.7	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	10		
	Annual (3 x Services)	no	3	10		
	Steynsburg Magistrates Courts					
5.1.8	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
5.1.9	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
	Venterstad Magistrates Courts					
5.1.10	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	4		
	Annual (3 x Services)	no	3	4		
	Burgersdorp Magistrates Courts					
5.1.11	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	3		
	Annual (3 x Services)	no	3	3		
	SAPS Burgersdorp					
5.1.12	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	8		
	Annual (3 x Services)	no	3	8		
	Molteno Magistrates Courts					
5.1.13	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
5.1.14	**Ducted Hideaway Unit**					
	Quarterly (9 x quarterly services)	no	9	2		
	Annual (3 x Services)	no	3	2		
5.1.15	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	6		
	Annual (3 x Services)	no	3	6		
	Hofmeyer Magistrates Courts					
5.1.16	**Mid Wall Split Type Units**					
	Quarterly (9 x quarterly services)	no	9	7		
	Annual (3 x Services)	no	3	7		
TOTAL BILL 5 CARRIED FORWARD TO NEXT PAGE						

Item	Description	Unit	Serv.	Qty	Rate	Amount
	Service And Maintenance					
TOTAL BILL 5 CARRIED FORWARD FROM PREVIOUS PAGE						
5.1.17	**Cassette Units**					
	Quarterly (9 x quarterly services)	no	9	7		
	Annual (3 x Services)	no	3	7		
5.2.	**Un-identified Units**					
	Provisional amount for un-identified air conditioning units in Queenstown The unit prices as per above shall be applicable. The contractor will report on units not stipulated in the Schedules as per Part 2.5, as part of the survey during the first service	Sum		-	-	R 150 000,00
	TOTAL BILL 5 CARRIED FORWARD TO SUMMARY PAGE					

PROJECT:	**DEPARTMENT OF PUBLIC WORKS**				
SERVICE:	**EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**				
	BILL No: 6: New Installation				
Item	**Description**	**Unit**	**Qty**	**Rate**	**Amount**
	New Installation				
	NEW INSTALLATION				
	Supply and install of new aircons will include the following: Labour, materials (fittings ,copper, gas & brackets) and Transport. All aircon will be treated with bluechem or similar heavy duty protective spray coating of condensor coils.				
6.1	**Mid Wall Split Type Units & Undercieling units:**				
6.1.1	9 000 BTU	no	8		
6.1.2	12 000 BTU	no	7		
6.1.3	18 000 BTU	no	7		
6.1.4	24 000 BTU	no	5		
6.1.5	36 000 BTU	no	5		
6.1.6	48 000 BTU	no	5		
6,2	**Cassette Units:**				
6.2.1	18 000 BTU	no	5		
6.2.2	24 000 BTU	no	5		
6.2.3	36 000 BTU	no	5		
6.2.4	48 000 BTU	no	5		
6,3	**Console Type Units:**				
6.3.1	9 000 BTU	no	5		
6.3.2	12 000 BTU	no	5		
6.3.3	18 000 BTU	no	5		
6.3.4	24 000 BTU	no	5		
	TOTAL BILL 6 CARRIED FORWARD TO SUMMARY PAGE				

PROJECT:	**DEPARTMENT OF PUBLIC WORKS**					
SERVICE:	**EL AREA – SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**					
	BILL No: 7: General					
Item	**Description**		**Unit**	**Qty**	**Rate**	**Amount**
	Provisional amounts for expected transport, material and labour costs over the maintenance period of 36 months					
7,1	**TRANSPORT COSTS**					
	Transport costs are for a Vehicle with a load of (1) Ton. Inclusive of traveling time for a technician and (1) assistant	Prov Amount	km	50000		
7,2	**MATERIAL COSTS**					
	Provisional amount allowed for non scheduled items to be used for minor repairs (R1 500,000.00 x %profit + =Amount.)	Prov Amount	Sum %			R 1 500 000,00
7,3	**LABOUR COSTS**					
	Labour costs for installations and breakdowns will include for all overhead and statutory rates required by law. (Hours for traveling measured under "Transport")					
	Technician normal time	provisional	hrs	800		
	Semiskill normal time	provisional	hrs	800		
	Assistant normal time	provisional	hrs	800		
	Technician Overtime	provisional	hrs	350		
	Semiskill over time	provisional	hrs	350		
	Assistant overtime	provisional	hrs	350		
TOTAL BILL 7 CARRIED FORWARD TO SUMMARY PAGE						

DEPARTMENT OF PUBLIC WORKS
EL AREA SERVICING, MAINTENANCE & REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS IN STATE BUILDINGS

SUMMARY OF SCHEDULE OF QUANTITIES AND PRICE

DATE:

SCHEDULE	DESCRIPTION	AMOUNT (ZAR)
1	BILL No: 1: Preliminary and General	
2	BILL No: 2: East London	
3	BILL No: 3: King Williams Town	
4	BILL No: 4: Cathcart	
5	BILL No: 5: Queenstown	
6	BILL No 6 New Installation	
7	BILL No: 7 - General.	
	SUB-TOTAL	
	SUB-TOTAL	
	PLUS 15% VAT	
	TOTAL PRICE (to be carried forward to Form of Tender)	

SIGNED: _____ **DATE** _____

NAME _____

COMPANY _____

TEL _____
FAX _____
CELL _____

DRPW – 05 (EC) CONTRACT DATA

Project title:	**EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS**		
Tender / Quotation no:	**GQET-25/26-034**	**Closing date:** Tuesday, 02 December 2025	Time: **11H00**

	CONTRACT VARIABLES THE SCHEDULE (Contract Data [1.1.1.8]) The schedule is the listed variables in this agreement and contains all variables referred to in this document including specific changes made to GCC Third Edition (2015) documentation. It is divided into part 1: contract data completed by the employer and part 2: contract data completed by the contractor. Part 1 must be completed in full and included in the tender documents. Both the part 1 and part 2 form part of this agreement Spaces requiring information must be filled in, shown as 'not applicable' but not left blank. Where choices are offered, the non-applicable items are to be deleted. Where insufficient space is provided the information should be annexed hereto and cross referenced to the applicable clause of the schedule. Key cross reference clauses are italicised in *[ ]* brackets

	The Conditions of Contract applicable to this Contract are clauses 1 to 10 and contract price adjustment schedule of the GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS, THIRD EDITION (2015) prepared by The South African Institution of Civil Engineering Private Bag X200, Halfway House, 1685. Contractors are cautioned to read the GCC Third Edition (2015) and Contract Data [DPW-05 (EC)] together as some clauses in the GCC Third Edition (2015) have been amended in the Contract Data [DPW-05 (EC)] Specific data, which together with these General Conditions of Contract, collectively describe the risks, liabilities and obligations of the contracting Parties and the procedures for the administration of the Contract. Clauses as amended in the Contract Data amends or replaces the corresponding clauses in the GCC Third Edition (2015). Copies of these conditions of contract may be obtained through *www.saice.org.za*.

PART 1: CONTRACT DATA COMPLETED BY THE EMPLOYER:

A PROJECT INFORMATION

A 1.0 Works [1.1.1.35]

Works description	Refer to document *PG01.1 (EC) – Scope of Works* for detailed description
EAST LONDON(EL) AREA: SERVICING, MAINTENANCE AND REPAIRS OF AIR CONDITIONING EQUIPMENT FOR 36 MONTHS	

TENDER/ QUOTATION NO: GQET-25/26-034

A 2.0 Site [1.1.1.29]

Erf / stand number	
Site address	VARIOUS SITES
Township / Suburb	
City / Town	PORT ELIZABETH
Province	EASTERN CAPE
Local authority	
GPS Coordinates	

A 3.0 EMPLOYER AND ITS REPRESENTATIVE

A 3.1 Employer:

Official Name of Organ of State / Public Sector Body	Government of the Republic of South Africa in its Department of Public Works & Infrastructure		
Business registration number	Not applicable	VAT number	Not applicable
E-mail	Portia.Mvana@dpw.gov.za	Telephone	041 408 2181
Postal address	Private Bag X3913 North End Gqeberha 6056		
Physical address	Eben Donges Building, Cnr Robert and Hancock Street North End Gqeberha 6056		

A 3.2 Employer's representative:

Name	BONGIWE NDABA	Telephone number	041 408 2015
E-mail	Bongiwe.ndaba@dpw.gov.za	Mobile number	NONE
Postal address	Private Bag X3913 North End Gqeberha 6056		
Physical address	Eben Donges Building, Cnr Robert and Hancock Street North End Gqeberha 6056		

TENDER/ QUOTATION NO: GQET-25/26-034

A 4.0	Principal Agent [1.1.1.16]	Discipline	Project Manager

Name	PORTIA MVANA		
Legal entity of above		Contact person	PORTIA MVANA
Practice number		Telephone number	041 408 2181
Country	South Africa	Mobile number	082 327 4062
E-mail	Portia.Mvana@dpw.gov.za		
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

A 5.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

A 6.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

TENDER/ QUOTATION NO: GQET-25/26-034

A 7.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

A 8.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

A 9.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

TENDER/ QUOTATION NO: GQET-25/26-034

A 10.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

A 11.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

A 12.0	Agent [1.1.1.16]	Discipline	

Name			
Legal entity of above		Contact person	
Practice number		Telephone number	
Country		Mobile number	
E-mail			
Postal address	insert postal address insert suburb insert town insert postal code		
Physical address	insert physical address insert suburb insert town insert postal code		

TENDER/ QUOTATION NO: GQET-25/26-034

B CONTRACT INFORMATION

B 1.0 Definitions [1.1.1.2]

Bills of quantities: System/Method of measurement	SANS 1200

B 2.0 Law, regulations and notices [1.3.2]

Law applicable to the works, state country [1.3.2]	Law of the Republic of South Africa

B 3.0 Offer and acceptance [1.1.1.20]

Currency applicable to this agreement [1.1.1.20]	South African Rand

B 4.0 Documents [1.1.1.7]

The original signed agreement is to be held by the principal agent [1.1.1.7], if not, indicate by whom	Employer
Number of copies of construction information issued to the contractor at no cost. (3 Copies of all relevant construction documentation – this to includes 1 priced Bills of Quantities and 2 unpriced Bills of Quantities)	3

Documents comprising the agreement	Page numbers
GCC GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS, THIRD EDITION (2015)	
DPW-05: (EC): GCC 2015: 3RD EDITION	
The GCC General Preliminaries for use with the GCC 2015: 3RD EDITION	
Contract participation goal documentation as further defined in clause 1.1.1.37 [CD]	
Drawings as per drawing register issued with the tender	

Specifications issued with the tender	
Schedules issued with the tender	
Bills of Quantities issued with the tender	
Addenda as issued during tender stage, if applicable	As issued

TENDER/ QUOTATION NO: GQET-25/26-034

B 5.0 Employer's agents [3.0]

Authority is delegated to the following agents to issue contract instructions and perform duties for specific aspects of the works [3.0] [3.2.3 [CD]]
Principal Agent *Zubenathi Siganga*

Principal agent's and agents' interest or involvement in the works other than a professional interest
Zubenathi Siganga

B 6.0 Insurances [8.6]

Insurances by contractor
NB: Insurances submitted must be issued by either an insurance company duly registered in terms of the Insurance Act [Long-Term Insurance Act, 1998 (Act 52 of 1998) or Short-Term Insurance Act, 1998 (Act 53 of 1998)] or by a bank duly registered in terms of the Banks Act, 1990 (Act 94 of 1990). Insured amounts to include VAT.

	New works [8.6.1.1.1] With a deductible not exceeding 5% of each and every claim	Contract sum plus 10%	Not Applicable
Or	Works with practical completion in sections with a deductible not exceeding 5% of each and every claim	Contract sum plus 10%	Not Applicable

Or	Works with alterations and additions (reinstatement value of existing structures with or including new works) With a deductible not exceeding 5% of each and every claim	Contract sum plus 10%	Not Applicable
	Direct contractors [8.6.1.1.2] where applicable, to be included in the contract works insurance	R Eng / PQS to determine value	Not Applicable
	Sub-Contractors insurance [8.6.3] where applicable, if not included in works insurance	R Eng / PQS to determine value	Not Applicable
	Professional fees not included in the Contract Price, payable in respect of the repair or reinstatement of damage to the Works or said movables, plus Escalation thereon (if not included above). Minimum R1m unless other amount indicated. [8.6.1.1.3]	R Eng / PQS to determine value	Not Applicable
	Free issue where applicable, to be included in the contract works insurance	R Eng / PQS to determine value	Not Applicable

TENDER/ QUOTATION NO: GQET-25/26-034

Public liability insurance [8.6.1.3]]	R 5 000 000	Applicable
Ground support insurance [8.6.1.4]	R Eng / PQS to determine value	Not Applicable
Other insurances		
Hi Risk Insurance when the project is being executed in a geological area classified as a “High Risk Area [8.6.8[CD]]	R Eng / PQS to determine value	Not Applicable
Other insurances: If applicable, description 1:	R Eng / PQS to determine value	Not Applicable
Other insurances; If applicable, description 2:	R Eng / PQS to determine value	Not Applicable

B 7.0 Obligations of the employer

Existing premises will be in use and occupied [5.4.1 & 5.4.2]	Not Applicable
If applicable, description:	
Restriction of working hours [5.8]	Not Applicable
If applicable, description:	
Natural features and known services to be preserved by the contractor [4.7]	Not Applicable

If applicable, description:			
Restrictions to the site or areas that the contractor may not occupy [5.4.1 & 5.4.2]			Not Applicable
If applicable, description:			
Supply of free issue of material and goods [8.6.1.1.2]	Amount	R	Not Applicable
If applicable, description:			

TENDER/ QUOTATION NO: GQET-25/26-034

B 8.0 Subcontractors [4.4]

Select	If applicable, description of specialisation

Specialisation 1	
Specialisation 2	
Specialisation 3	
Specialisation 4	
Specialisation 5	

B 9.0 Description of different portions of the works, if applicable [5.14.7]

Select	If applicable, description of sections
Section 1	
Section 2	
Section 3	
Section 4	
Section 5	
Section 6	
Remainder of the works.	

B 10.0 Contract period [B18: 1.2], Construction period [B18: 1.1], Possession of site [5.4.1], Practical Completion [1.1.1.14, 5.14.1], Completion (Final Approval Certificate) [5.16.1] and Penalties [5.13]

B 10.1 Contract Period

Contract period: Period in months as indicated, include the time from the date of award (commencement date [5.2.1]) for submitting contractual obligatory documents, submission of Health & Safety Plan and approval, period for obtaining the Construction Permit (if applicable), the Construction Period and the Defect Liability Period up to and including Final Completion	
The contract period is determined as follows (Period/s indicated in months):	
Period to submit contractual obligatory documents including submission and approval of health and safety plan by the appointed Health & Safety Agent	21 Days
Period to obtain Construction Permit from Department of Labour upon approval of the Health & Safety Plan by the appointed Health & Safety Agent	n/a

TENDER/ QUOTATION NO: GQET-25/26-034

Total construction period for the Works as a whole up to and including Practical Completion, as indicated below [1.1.1.14, 5.14.1]	36 Months
Period to achieve Completion [5.14.4]	36 Months
Defect liability period up to and including issuing Final Approval Certificate in months [5.16.1]	3
Total Contract Period	36 Months
Penalty amount per calendar day for late submission of contractual obligatory documents: Ten percent (10%) of the penalty amount per calendar day for late Practical Completion, excluding VAT. [5.13]	R 500.00

B10.2 Construction Period for completion of the Works as a whole

Construction period [B18: 1.2] and Practical Completion for the Works as a whole [5.14.1] The time for achieving Practical Completion of the whole of the Works is measured from the date of possession of the site by the contractor inclusive of all public holidays, special non-working days and builders' holiday shut down periods.	Not Applicable
The date for practical completion for the works as a whole shall be the period in months as indicated, starting from the date of possession of the site by the contractor inclusive of all special non-working days and builders' holiday shut down periods [1.1.1.14, 5.4.1, 5.14.1]	36 Months
Notification period for inspection in working days by the principal agent.	
Penalty amount per calendar day for late Practical Completion, excluding VAT. [5.13].	R 500.00
Penalty amount per calendar day for late Completion [5.14.4, 5.13]: Thirty percent (30%) of penalty amount per calendar day for late Practical Completion, excluding VAT.	R 500.00

Penalty amount per calendar day for late Final Completion (Issuing of Final Approval Certificate) [5.16, 5.13]: Fifteen percent (15%) of penalty amount per calendar day for late Practical Completion, excluding VAT.	R 500.00

B10.3 Construction Period for completion of the Works in portions

Construction period and Practical completion for portions of the Works [5.14.7]					Not Applicable	
Portions of the Works in sections:	1	2	3	4	5	6
Notification period for inspection by the principal agent in working days.						
The date for practical completion shall be the period in months as indicated from the date of possession of the site by the contractor [1.1.1.14, 5.14.1]						

TENDER/ QUOTATION NO: GQET-25/26-034

The date for practical completion for the whole of the Works, if applicable shall be the period in months as indicated from the date of possession of the site by the contractor inclusive of all public holidays, special non-working days and builders' holiday shut down periods [12.2.7; 24.1]	36 Months
Penalty for late Practical Completion, *if completion in sections is required,* excluding VAT [5.13]	
The penalty amount per day for failing to complete section 1 of the Works is:	R 500.00
The penalty amount per day for failing to complete section 2 of the Works is:	R 500.00
The penalty amount per day for failing to complete section 3 of the Works is:	R 500.00
The penalty amount per day for failing to complete section 4 of the Works is:	R 500.00
The penalty amount per day for failing to complete section 5 of the Works is:	R 500.00
The penalty amount per day for failing to complete section 6 of the Works is:	R 500.00
The penalty amount per day for failing to complete the whole of the Works, if applicable, is:	R 500.00
Penalty amount per calendar day for late Completion [5.14.4, 5.13]: To be calculated at Thirty percent (30%) of penalty / calendar day to complete the section, excluding VAT	
Penalty amount per calendar day for late Final Completion (Issuing of Final Approval Certificate) [5.16, 5.13]: To be calculated at Fifteen percent (15%) of penalty / calendar day to complete the section, excluding VAT	

B 11.0 Criteria to achieve Practical Completion [1.1.1.14, 5.14.1]

Criteria to achieve Practical Completion not covered in the definition of practical completion	
13.1	Obtain Occupation Certificate from the relevant authority prior to issuing the Practical Completion certificate
13.2	All relevant CoCs

13.3	All guarantees
13.4	Training on electrical, security and mechanical installations if contractually required
13.5	Maintenance / operating manuals
13.6	CPG and cidb BUILD programme achievement certificates submitted with substatiating documentation
13.7	
13.8	
13.9	
13.10	

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B 12.0 Defects liability period [5.16]

Defects liability period: Refer B10.1

Applicable	If applicable, description of applicable elements

14.1	All civil works (e.g. roads, storm water system, paving, sewer and water lines, etc.)
14.2	Mechanical equipment (e.g. pumps including switchgear, etc.)
14.3	Landscaping including automated systems (irrigation)
14.4	Electrical equipment (e.g. emergency generators, electronic switchgear,etc..)
14.5	Security system/s (e.g. Access control, Intruder alarm, etc.)
14.6	Air conditioning system and plant
14.7	
14.8	
14.9	
14.10	

B 13.0 Payment [6.10]

Date of month for issue of regular payment certificates Refer [6.10.1]	*n/a*
Contract price adjustment / cost fluctuations [6.8.2]	Not Applicable
If yes, method to calculate [6.8.2 [CD]]	Contract price adjustment factor
Employer shall pay the contractor within: Refer [6.10.4 [CD]]	Thirty (30) calendar days

B 14.0 Dispute resolution [10.5 [CD]]

Mediation	YES
Name of nominating body	Association of Arbitrators (Southern Africa)
Appointment of Mediator	State Attorney
Litigation	Court with Jurisdiction

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B 15.0 SPECIFIC CHANGES MADE TO GCC 2015: 3RD EDITION

CONTRACT SPECIFIC DATA	
The following contract specific data, referring to the General Conditions of Contract for Construction Works, Third Edition (2015) are applicable to this Contract:	
CLAUSES	COMPULSORY DATA
1.1.1.5	Amend Clause 1.1.1.5 as follows: 'Commencement Date' means the date of possession of site by the contractor.
1.1.1.8	Amend Clause 1.1.1.8 to include the word "rights" to read as follows: "Contract Data" means the specific data which, together with these General Conditions of Contract, collectively describe the rights, risks, liabilities and obligations of the contracting parties and the procedures for the administration of the Contract.
1.1.1.13	Amend Clause 1.1.1.13 as follows, clarify when the defects liability period starts: "Defects Liability Period" means the period stated in the Contract Data, commencing on the date indicated on the Certificate of Completion for the works as a whole or Certificates of Completion in the event of more than one Certificate of Completion is issued for different parts of the Works, during which the Contractor has both the right and the obligation to make good defects in the materials, Plant and workmanship covered by the Contract.
	Defects Liability Period is: 12 months. The Defects Liability Period for the works shall commence on the calendar day following the date of the Certificate of Completion for the works as a whole or Certificates of Completion in the event of more than one Certificate of Completion is issued for different parts of the Works and end at midnight (00:00) three hundred and sixty five days (365) calendar days from the date of the Certificate of Completion.
1.1.1.15	The name of the Employer's Project Manager as appointed from time to time: Refer to A3.2
1.1.1.21.A	NEW CLAUSE INTEREST: The interest rates applicable on this contract, whether specifically indicated in the relevant clauses or not, will be the rate as determined by the Minister of Finance from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No 1 of 1999) as amended, calculated as simple interest, in respect of debts owing to the State, and will be the rate as published by the Minister of Justice and Correctional Services from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No 55 of 1975) as amended, calculated as simple interest, in respect of debts owing by the State
1.1.1.27	This Pricing Strategy is a: Re-measurement Contract.
1.1.1.31	No Clause.
1.1.1.35	Insert the definition of "Value of Works" as Clause 1.1.1.35: "Value of Works" means the value of the Works certified by the Employer's Agent as having been satisfactorily executed and shall include the value of the works done, the value of the materials and/or plant and Contract Price Adjustments.

1.1.1.36	Insert the definition of “Latent and Patent Defects” as Clause 1.1.1.36: A 'latent defect' is a material defect, which was not visible after 'reasonable' inspection. The latent defect period commences at the date of Final Approval Certificate and ends 5 years [after that date [5.16.3]. A patent defect is a flaw that is not hidden and ought to be easily identified upon reasonable inspection.
1.1.1.37	Contract participation goal documentation are as indicated in the tender data document DPW 03 (EC): TENDER DATA.
1.2.3.	Replace Clause 1.2.3. with the following: The Employer’s Agent is as indicated in clause B 5.0 and shall have the authority to act on behalf of the employer as indicated in the contract document read with the contract data. [3.2.3].
1.3.4	Not applicable to this Contract.
1.3.5	Replace Clause 1.3.5 with the following: The Employer will become the owner of the information, documents, advice, recommendation and reports collected, furnished and/or compiled by the Contractor during the course of, and for the purposes of executing this Contract, all of which will be handed over to the Employer on request during the contract, but in any event on completion of contract, the termination and/or cancellation of this Contract for whatever reason. The Contractor relinquishes its lien / retention or any other rights thereon to which it may be entitled. (b) The copyright of all documents, recommendations and reports compiled by the Contractor during the course of and for the purposes of finalizing the Works will vest in the Employer, and may not be reproduced or distributed or made available to any person outside the Employer’s service, or to any institution in any way, without the prior written consent of the Employer. The Employer shall have the right to use such material for any other purpose without the approval of information or payment to the Contractor. (c) The copyright of all electronic aids, software programmes etc. prepared or developed in terms of the Contract shall vest in the Employer, who shall have the right to use such material for any other purpose without the approval of, information or payment to the Contractor.
	(d) In case of the Contractor providing documents, electronic aids, software programs or like material to the Employer, the development of which has not been at the expense of the Employer, copyright shall not vest in the Employer. The Contractor shall be required to indicate to which documents, electronic aids, software programs or like material this provision applies. (e) The Contractor hereby indemnifies the Employer against any action, claim, damages or legal cost that may be instituted against the Employer on the grounds of an alleged infringement of any copyright, patents or any other intellectual property right in connection with the Works outlined in this Contract. (f) All information, documents, recommendations, programs and reports collected or compiled must be regarded as confidential and may not be communicated or made available to any person outside the Employer’s service and may not be published either during the currency of this Contract or after termination thereof without the prior written consent of the Employer.

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1.3.7	Replace Clause 1.3.7 with the following By entering into this contract, the Contractor waives any lien that he may have or acquire, notwithstanding any other condition/s in this contract.
3.2.3	1. The Employer’s Principal Agent’s authority to act and/or to execute functions or duties or to issue instructions are expressly excluded in respect of the following, unless same has been approved by the employer: (a) Appointment of Sub-contractors – clause 4.4.4; (b) Granting of an extension of time and/or ruling on claims associated with claims for extension of time – clauses 5.12, 10.1.5; (c) Rulings on claims and disputes – clauses 10.1.5, 10.2.3 and 10.3.3;

	(d) Suspension of the Works – clause 5.11.2; (e) Final Payment Certificate – clause 6.10.9; (f) Issuing of *mora* notices to the Contractor – clauses 9.1.1, 9.1.2.1 and 9.2.1; (g) Cancellation of the contract between the Employer and Contractor – clauses 9.1.1, 9.1.2.1 and 9.2.1. (h) Any variation orders – clause 6.3.1 2. In order to be legally binding and have legal bearing and consequence, any ruling in respect of the above matters (a) to (h) must be on an official document, signed and issued by the Employer to the Contractor. 3. The Contractor must submit claims, demands, notices, notifications, updated particulars and reports in writing, as well as any other supporting documentation pertaining thereto, in respect of any of the above listed matters (a) to (h), to the Employer's Agent within the time periods and in the format(s) as determined in the relevant clauses of the Conditions of Contract. Failing to deliver such to the Employer's Agent and in the correct format will invalidate any claim and the consequences of such failure will *mutatis mutandis* be as stated in clause 10.1.4. 4. Clauses 6.10.9 and 10.1.5 shall be amended as follows to indicate the limitation on the Employer's Agent authority in respect thereof: Clause 6.10.9 – Amend to read as follows: Within 14 days of the date of final approval as stated in the Final Approval Certificate, the Contractor shall deliver to the Employer's Agent a final statement claiming final settlement of all moneys due to him (save in respect of matters in dispute, in terms of Clauses 10.3 to 10.11, and not yet resolved). The Employer's Agent shall within 14 days issue to the Contractor a Final Payment Certificate the amount of which shall be paid to the Contractor within 30 days of the date of such certificate, after which no further payments shall be due to the Contractor (save in respect of matters in dispute, in terms of Clauses 10.3 to 10.11 and not yet resolved). Clause 10.1.5 – Amend to read as follows: Unless otherwise provided in the Contract, the Employer shall, within 28 days after the Contractor has delivered his claim in terms of Clause 10.1.1 as read with Clause 10.1.2, deliver to the Contractor his written and adequately reasoned ruling on the claim (referring specifically to this Clause). The amount thereof, if any, allowed by the Employer shall be included to the credit of the Contractor in the next payment certificate. If no ruling has been made within the 28 days, as referred to in clause 10.1.5. or any extension thereof as agreed to by the parties, the claim shall be regarded as rejected by the Employer.

	5. Insert the following under 3.2.3: Provided that, notwithstanding any provisions to the contrary in the Contract, the Employer shall have the right to reverse and, should it deem it necessary, to amend any certificate, instruction, decision or valuation of the Employer's Agent and to issue a new one, and such certificate instruction, decisions or valuations shall for the purposes of the Contract be deemed to be issued by the Employer's Agent, provided that the Contractor shall be remunerated in the normal manner for work executed in good faith in terms of an instruction issued by the Employer's Agent and which has subsequently been rescinded.
3.3.2.1	Amend Clause 3.3.2.1 to insert the word "plant" to read as follows: Observe how the Works are carried out, examine and test materials, plant and workmanship, and receive from the Contractor such information as he shall reasonably require.
3.3.3.2	Amend Clause 3.3.3.2 to insert the word "plant" to reads as follows: Notwithstanding any authority assigned to him in terms of Clauses 3.3.2 and 3.3.4, failure by the ~~E~~ Employer's Agent's Representative to disapprove of any work, workmanship, plant or materials shall not prejudice the power of the Employer's Agent's thereafter to disapprove thereof and exercise any of his powers in terms of the Contract in respect of thereof.
3.3.2.2.3 3.3.2.2.4	Add to Clause 3.3.2.2.3 and 3.3.2.2.4 the following: All oral communication must be reduced into writing to be binding on the parties.
4.4.4	Ref Clause 3.2.3
4.8.2.1	Amend Clause 4.8.2.1 to include the word "person", as follows: Makes available to the Employer, or to any such contractor, person or authority, any roads or ways for the maintenance of which the Contractor is responsible, or
4.8.2.2	Amend Clause 4.8.2.2 to include "Employer" and "contractors", as follows: Provides any other facility or service of whatsoever nature o the Employer or to any of the said contractors, persons or authorities,
4.12.3	Add to Clause 4.12.3 the following: All oral communication must be reduced into writing to be binding on the parties.
5.3.1	The documentation required before commencement with Works execution are: Health and Safety Plan to be provided within 14 calendar days from award (Ref Clause 4.3) Initial programme to be provided within 21 calendar days of handing over the site to the contractor (Ref Clause 5.6) Security (Ref Clause 6.2) Insurance (Ref Clause 8.6) *insert other requirements* insert other requirements insert other requirements
5.3.2	The time to submit the documentation required before commencement with Works execution is: 21 days.

5.4.2	The access to, and possession of, the Site referred to in Clause 5.4.1 shall be *enter "exclusive" or "not exlcusive"* to the Contractor. In the event of access to, and possession of, the Site is not exclusive to the Contractor, the following limitations apply: *Insert an exposition of limitation.*
5.8.1	The non-working days are: Saturdays and Sundays
	The special non-working days are: Public Holidays; The year-end break annually published by the BCCEI (Bargaining Council for the Civil Engineering Industry)
5.9.1	Amend Clause 5.9.1 as follows: On the Commencement Date, the Engineer shall deliver to the Contractor three (3) copies, at no cost to the Contractor, of the drawings and any instructions required for the commencement of the Works. The cost of any additional copies of such drawings and/or instructions, as may be required by the Contractor, will be for the account of the Contractor.
5.11.1	No Clause
5.11.2	Ref Clause 3.2.3
5.11.5	No Clause
5.11.6	No Clause
5.12	Ref Clause 3.2.3
5.12.2.2	Add the following to Clause 5.12.2.2 to read: “Abnormal climatic conditions means any weather conditions i.e. rain, wind, snow, frost, temperature (cold or heat) that are not in the norm for the area where the construction takes place and during which no work is possible on site”
5.13.1	Add the following to Clause 5.13.1: The penalty for failing to complete the Works: Refer to B10 CD
5.14.1	Amend the second paragraph of Clause 5.14.1 as follows: When the Works are about to reach the said stage, the Contractor shall, in writing, request a Certificate of Practical Completion and the Employer’s Agent shall, within 14 days after receiving such request, issue to the Contractor a written list setting out the work to be completed to justify Practical Completion. Should the Employer’s Agent not issue such a list within the 14 days, the Contractor shall notify the Employer accordingly. Should the Employer not issue such a list within
	7 days of receipt of such notice, Practical Completion shall be deemed to have been achieved on the 14th day after the contractor requested the Certificate of Practical Completion.
5.14.4	Add the following to Clause 5.14.4: Penalty for late due completion date will be 30% of penalty / calendar day. Penalty for late completion date will be 15% of penalty / calendar day.

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5.16.1	Amend Clause 5.16.1 by deleting the provision in the third paragraph of this clause.
5.16.2	Amend Clause 5.16.2 as follows: No certificate other than the Final Approval Certificate referred to in Clause 5.16.1 shall be deemed to constitute approval of the Works or shall be taken as an admission of the due performance of the Contract or any part thereof, nor of the accuracy of any claim made by the Contractor, nor shall any other certificate exclude or prejudice any of the powers of the Employer’s Agent and/or the Employer.
5.16.3	The latent defect period for all works is: 5 years

6.2.1	The type of security for the due performance of the Contract, as selected by the Contractor in the Contract Data, must be delivered to the Employer.
6.2.3	Amend Clause 6.2.3 as follows: If the Contractor has selected a performance guarantee as security, he shall ensure that it remains valid and enforceable as required in terms of the Contract.
6.3.1	Add the following to the last paragraph "subject to obtaining approval from the Employer" (3.2.3)
6.5.1.2.3	The percentage allowance to cover overhead charges is: 33%, except on material cost where the percentage allowance is 10%.
6.8.2	When Contract Price Adjustment is applicable [B13] the value of payment certificates is to be adjusted by a Contract Price Adjustment Factor (CPAF): The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Factor with the following values: The value of "x" is 0.15. The values of the coefficients are: a = 0.25. (Labour) b = 0.3 (Contractor's equipment) c = 0.3 (Material) d = 0.15 (Fuel) The values of the coefficients for "Repair and Maintenance Project" (RAMP) contracts are: a = 0.35 (Labour) b = 0.20 (Contractor's equipment) c = 0.35 (Material) d = 0.10 (Fuel) The urban area nearest the Site is *insert name of urban area*. *(Select urban area from Statistical News Release, P0141, Table A)* The applicable industry for the Construction Material Price Index for materials / plant is *insert name of industry*. *(Select the applicable industry from Statistical News Release, P0151.1, Tables 2,4,5)* The area for the Producer Price Index for fuel is *insert name of area*. *(Select the area from Statistical News Release, P0142.1, Table 1.)* The base month is *insert month insert year*. *(The month prior to the closing of the tender.)*
6.8.3	Price adjustments for variations in the costs of special materials are not allowed.

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6.9.1	Replace Clause 6.9.1 with the following: "Plant and materials will only be certified and paid for upon furnishing proof of ownership by the contractor. Once paid, material and goods shall become the property of the Employer and shall not be removed from site without the written authority of the Employers Agent.
6.10.1	Add at end of Clause 6.10.1 The contractor shall provide the Employer's Agent every month, on dates as agreed between parties / instructed by the Principal Agent, with the following information: Monthly Local content report, EPWP / NYS payment register, labour reports and certified ID document of EPWP/ NYS beneficiaries, Contract between Contractor and EPWP/ NYS beneficiaries, attendance register. (if applicable) Tax Invoice Labour intensive report Contract participation goal reports
6.10.1.5	The percentage advance on materials not yet built into the Permanent Works is: 85 %.

6.10.3	The limit of retention money is dependent on the security to be provided by the Contractor in terms of Clause 6.2.1.
6.10.4	Replace “28 days” with “30 days” provided all required documents have been submitted and are correct in all respects.
6.10.5	Replace Clause 6.10.5 with the following: In respect of contracts up to R2 million and in respect of contracts above R2 million where the Contractor elects a security by means of a 10% retention, 50% of the retention shall be released to the Contractor when the Employer’s Agent issues the Certificate of Completion in terms of clause 5.14.4. The remaining 50% of the retention shall be released in accordance with the provisions of the conditions of contract and will become due and payable when the Contractor becomes entitled, in terms of Clause 5.16.1, to receive the Final Approval Certificate. In respect of contracts above R2 million, where the Contractor elects a security by means of a cash deposit or fixed guarantee of 5% of the Contract Sum (excl. VAT) and a 5% retention of the Value of the Works (excl. VAT), the cash deposit or fixed guarantee, whichever is applicable, shall be refunded to the Contractor or return to the guarantor, respectively, when the Employer’s Agent issues the Certificate of Completion in terms of Clause 5.14.4. The 5% retention of the Value of the Works (excl. VAT) shall become due and payable when the Contractor becomes entitled, in terms of Clause 5.16.1, to receive the Final Approval Certificate. In respect of contracts above R2 million, where the Contractor elects a security by means of a cash deposit or a variable guarantee of 10% of the Contract Sum (excl. VAT), the cash deposit or the variable guarantee, whichever is applicable, will be reduced to 5% of the Value of the Works (excl. VAT) when the Employer’s Agent issues the Certificate of Completion in terms of Clause 5.14.4. The balance of the cash deposit shall become due and payable or the variable guarantee shall expire when the Contractor becomes entitled in terms of Clause 5.16.1 to receive the Final Approval Certificate.
6.10.6.2	Replace Clause 6.10.6.2 with the following: “In the event of failure by the Employer to make the payment by the due date, he shall pay to the Contractor interest, at the rate as published by the Minister of Justice and Correctional Services from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No 55 of 1975) as amended, calculated as simple interest, in respect of debts owing by the State”. (1.1.1.21.A).
6.10.9	Ref Clause 3.2.3.

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7.2.1	The last sentence to read “Failing requirements or instructions, the Plant, workmanship and materials of the respective kinds shall be suitable for the intended purpose provided that materials procured for the works are from South African manufactures and suppliers. Imported materials shall only be considered under exceptional circumstances, based on compelling technical justifications, and subject to the approval by the DPWI. Failing to comply, unless specified or approval granted will result in a ten percent (10%) penalty of the value of imported material used without approval.
7.5.3	Add the following to Clause 7.5.3 “Should the work inspected by the Employer’s Agent be rejected, all consultant’s fees / costs pertaining to the unsuccessful inspection shall be recovered from the contractor”.
7.9.1	Insert the following at the end of Clause 7.9.1: Provided that, should the Contractor on demand not pay the amount of such costs to the Employer, such amount may be determined and deducted by the Employer from any amount due to or that may become due to the Contractor under this or any other previous or subsequent contract between the Contractor and the Employer.
8.2.2.1	Insert the following as a second paragraph to Clause 8.2.2.1: The Contractor shall at all times proceed immediately to remove or dispose of any debris arising from damage to or destruction of the Works and to rebuild, restore, replace and/or repair the Works, failing which the Employer may cause same to be done and recover the reasonable costs associated therewith from the Contractor.

8.3.1.10	Replace Clause 8.3.1.10 with the following: "Ionising, radiation, or contamination by radioactivity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuels, excluding leakages of any radioactive material / gases / corrosive liquids/chemicals, which are harmful to the environment and biological life, brought on to site for installation or used in the Works prior to final approval".
8.4.3	Add the following as Clause 8.4.3: Where the Contractor has caused damage to property (moveable and immovable), of any person, the Employer or third parties, the Contractor shall on receiving a written instruction from the Employer's Agent immediately proceed at his own cost to remove or dispose of any debris and to rebuild, restore, replace and/or repair such property and to execute the Works.
8.6.1	Replace Clause 8.6.1 with the following: Except if provided otherwise in the Contract Data, the Contractor, without limiting his obligations in terms of the Contract, shall effect and keep the respective insurances [CD] in force, in favour of the employer as beneficiary, from the date of possession of the site until the issue of the certificate of practical completion and with an extension to cover the contractors obligations after the date of practical completion [8.2.1]
8.6.1.1.1	Ref B6.0 CD for value of insurance.
8.6.1.1.2	Ref B6.0 CD for value of insurance.
8.6.1.1.3	Ref B6.0 CD for value of insurance.
8.6.1.3	Amend Clause 8.6.1.3 to delete reference to limit of indemnity, to read as follows: Liability insurance that covers the Contractor against liability for the death of, or injury to any person, or loss of, or damage to any property (other than property while it is insured in terms of Clause 8.6.1.1) arising from or in the course of the fulfilment of the Contract, from the Commencement Date to the date of the end of the Defects Liability Period, if applicable, or otherwise to the issue of the Certificate of Completion.
8.6.4	Omit clause

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8.6.6	Replace Clause 8.6.6 with the following: Without limiting the contractor's obligations in terms of the contract, the contractor shall, within twenty-one (21) calendar days of the date of letter of acceptance, but before commencement of the works, submit to the employer all the policies by which the insurances are effected and due proof of upfront payment of all premiums thereunder to keep the policies effective from the Commencement Date to the date of the end of the Defects Liability Period, if applicable, or otherwise to the issue of the Certificate of Completion.
8.6.7	Replace Clause 8.6.7 with the following: If the Contractor fails to effect and keep in force any of the insurances referred to in Clause 8.6.1, the Employer may cancel the Contract in terms of Clause 9.2.
8.6.8	Add the following as Clause 8.6.8. HIGH RISK INSURANCE In the event of the project being executed in a geological area classified as a "High Risk Area", that is an area which is subject to highly unstable subsurface conditions that might result in catastrophic ground movement evident by sinkhole or doline formation the following will apply: (1) Damage to the Works The Contractor shall, from the date of Commencement of the Works until the date of the Certificate of Completion, bear the full risk of and hereby indemnifies and holds harmless the Employer against any damage to and/or destruction of the Works consequent upon a catastrophic ground movement as mentioned above. The Contractor shall take such precautions and security measures and other steps for the protection of the Works as he may deem necessary.

	When so instructed to do so by the Employer's Agent, the Contractor shall proceed immediately to remove and/or dispose of any debris arising from damage to or destruction of the Works and to rebuild, restore, replace and/or repair the Works, at the Contractor's own costs. (2) Injury to Persons or Loss of or damage to Properties The Contractor shall be liable for and hereby indemnifies and holds harmless the Employer against any liability, loss, claim or proceeding arising during the Contract Period whether arising in common law or by Statute, consequent upon personal injuries to or the death of any person whomsoever resulting from, arising out of or caused by a catastrophic ground movement as mentioned above. The Contractor shall be liable for and hereby indemnifies the Employer against any and all liability, loss, claim or proceeding consequent upon loss of or damage to any moveable, or immovable or personal property or property contiguous to the Site, whether belonging to or under the control of the Employer or any other body or person whomsoever arising out of or caused by a catastrophic ground movement, as mentioned above, which occurred during the Contract Period. (3) It is the responsibility of the Contractor to ensure that he has adequate insurance to cover his risk and liability as mentioned in Clauses 8.6.8(1) and 8.6.8 (2) above. Without limiting his obligations in terms of the Contract, the Contractor shall, within 21 days of the Commencement Date and before Commencement of the Works, submit to the Employer proof of such insurance policy, if requested to do so. (4) The Employer shall be entitled to recover any and all losses and/or damages of whatever nature suffered or incurred consequent upon the Contractor's default of his obligations as

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	set out in Clauses 8.6.8 (1), 8.6.8 (2) and 8.6.8 (3). Provided that, should the Contractor on demand not pay the amount of such costs to the Employer, such amount may be determined and deducted by the Employer from any amount due to or that may become due to the Contractor under this or any other existing or subsequent contract between the Contractor and the Employer.
9.1.1	Ref Clause 3.2.3
9.1.2.1	Ref Clause 3.2.3
9.1.4	Replace the first paragraph of Clause 9.1.4 with the following: "In the circumstances referred to in Clauses 9.1.1, 9.1.2 or 9.1.3 (provided that the circumstances in 9.1.3 is not due to the fault of the Contractor, his employees, contractors or agents), and whether or not the Contract is terminated under the provisions of this Clause, the Contractor shall be entitled on proof of payment of any increased cost of or incidental to the execution of the Works which is specifically attributable to, or consequent upon the circumstances defined in Clauses 9.1.1, 9.1.2 or 9.1.3; …….. necessary changes"
9.1.5	Replace the first paragraph of Clause 9.1.5 with the following: If the Contract is terminated on any account in terms of this Clause (provided that the circumstances in 9.1.3 is not due to the fault of the Contractor, his employees, contractors or agents) , the Contractor shall be paid by the Employer (insofar as such amounts or items have not already been covered by payments on account made to the Contractor) for all measured work executed prior to the date of termination, the amount (without retention), payable in terms of the Contract and, in addition: "
9.1.5.5	No Clause
9.1.6	No Clause
9.2.1	Ref Clause 3.2.3
9.2.1.3.9	Add the following as Clause 9.2.1.3.9: Has failed to effect and keep in force any of the insurances referred to in Clause 8.6.1.
9.2.4	Add the following as Clause 9.2.4: In the case where a contract is terminated by the Employer by no fault by any party, the contractor shall be entitled to no other compensation than for work done and materials on site as certified by the Principal Agent at the date of termination.
9.3.2.2	Replace Clause 9.3.2.2 with the following:

	All Plant and Construction Equipment, Temporary Works and unused materials brought onto the Site by the Contractor, and where ownership has not been transferred to the Employer (see Clause 6.9.1), shall be removed from the Site on termination of the contract by any party.
9.3.2.3	No Clause
9.3.3	Add the following at the end of Clause 9.3.3 After cancellation of the Contract by the Contractor, the Contractor, when requested by the Employer to do so, shall not be entitled to refuse to withdraw from the Works on the grounds of any lien or a right of retention or on the grounds of any other right whatsoever. Nothing in this Clause shall prejudice the right of the Contractor to exercise, either in lieu of or in addition to the Contractor rights and remedies specified in this Clause, any other rights or remedies to which the Contractor may be entitled under the Contract or common law.

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10.1.3.1	Replace Clause 10.1.3.1 with the following: All facts and circumstances relating to the claims shall be investigated as and when they occur or arise. For this purpose, the Contractor shall deliver to the Employer's Agent, records in a form approved by the Employer's Agent, of all the facts and circumstances which the Contractor considers relevant and wishes to rely upon in support of his claims, including details of all construction equipment, plant, labour, and materials relevant to each claim. Such records shall be submitted promptly after the occurrence of the event giving rise to the claim.
10.1.4	Ref Clause 3.2.3.
10.1.5	Ref Clause 3.2.3.
10.1.6	Add the following as Clause 10.1.6: If the Employer fails to give his ruling within the period referred to in Clause 10.1.5 he shall be deemed to have given a ruling dismissing the claim.
10.2.1	Replace Clause 10.2.1 with the following: In respect of any matter arising out of or in connection with the Contract, which is not required to be dealt with in terms of Clause 10.1 or which does not require the decision or ruling of the Employer, the Contractor or the Employer shall have the right to deliver a written dissatisfaction claim to the Employer's Agent. This written claim shall be supported by particulars and substantiated.
10.2.2	Replace Clause 10.2.2 with the following: If, in respect of any matter arising out of or in connection with the Contract, which is not required to be dealt with in terms of Clause 10.1 or which does not require the decision or ruling of the Employer, the Contractor or the Employer fails to submit a claim within 28 days after the cause of dissatisfaction, he shall have no further right to raise any dissatisfaction on such matter.
10.2.3	Ref clause 3.2.3.
10.3.2	Replace Clause 10.3.2 with the following: If either party shall have given notice in compliance with Clause 10.3.1, the dispute shall be referred immediately to mediation under Clause 10.5, unless amicable settlement is contemplated.
10.3.3	Replace Clause 10.3.3with the following:: In respect of a ruling given by the Employer (Ref clause 3.2.3), and although the parties may have delivered a Dispute Notice, the ruling shall be in full force and carried into effect unless and until otherwise agreed by both parties, or in terms of a mediation decision or court judgement.
10.4.2	Replace Clause 10.4.2 with the following: If the other party rejects the invitation to amicable settlement in writing, or does not respond in writing to the invitation within 14 days, or amicable settlement is unsuccessful, referral to mediation shall follow immediately. Should mediation be unsuccessful, the dispute shall be resolved by Litigation.
10.4.4	Replace Clause 10.4.4 with the following: Save for reference to any portion of any settlement, or decision which has been agreed to be final and binding on the parties, no reference shall be made by or on behalf of either party

	in any subsequent court proceedings, to any outcome of an amicable settlement, or to the fact that any particular evidence was given, or to any submission, statement or admission made in the course of the amicable settlement.

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10.5	Replace Clause 10.5 with the following: The parties may, by agreement and at any time before Litigation, refer a dispute to mediation, in which event: 10.5.1 The appointment of a mediator, the procedure, and the status of the outcome shall be agreed between the parties. 10.5.2 Regardless of the outcome of a mediation the parties shall bear their own costs concerning the Mediation and equally share the costs of the mediator and related expenses.
10.6	No Clause
10.7	No Clause
10.10.3	Replace Clause 10.10.3 with the following: The court shall have full power to open up, review and revise any ruling, decision, order, instruction, certificate or valuation of the Employer's Agent and Employer and neither party shall be limited in such proceedings before such court to the evidence or arguments put before the Employer's Agent or Employer for the purpose of obtaining his ruling.

B 16.0 CONTRACT **PARTICIPATION** GOAL TARGETS AND CIDB B.U.I.L.D. PROGRAMME

The contractor shall achieve in the performance of the contract the following Contract Participation Goals (CPGs) as described in PG-01.2 (EC): Scope of Work and PG-02.2 (EC): Pricing Assumptions and in accordance with the feasibility study, which forms part of the specifications in the CPG Section of the Specification of this contract.

(a)	Minimum Targeted Local Manufacturers of Material Contract Participation Goal, in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	*Select*
(b)	Minimum Targeted Local Building Material Suppliers Contract Participation Goal in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	*Select*
(c)	Minimum Targeted Local Labour Skills Development Contract Participation Goal in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	*Select*

(d)	cidb BUILD Programme: Minimum Targeted Enterprise Development Contract Participation Goal in accordance with the cidb Standard for Indirect Targeting for Enterprise Development through Construction Works Contracts, No 36190 Government Gazette, 25 February 2013, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	*Select*

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(e)	cidb BUILD Programme: Minimum Targeted Contract Skills Development Goal in accordance with the cidb Standard for Developing Skills through Infrastructure Contracts as published in the Government Gazette Notice No. 48491 of 28 April 2023. and the cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	*Select*
(f)	DPWI National Youth Service training and development programme (NYS) – Condition of Contract.	*Select*
(g)	Labour Intensive Works – Condition of Contract.	*Select*
(h)		*Select*
(i)		*Select*

PART 2: CONTRACT DATA COMPLETED BY THE TENDERER:

C TENDERER'S SELECTIONS

C 1.0 Securities [11.0]

In respect of contracts with a contract sum up to R1 million, the security to be provided by the contractor to the employer will be a payment reduction of five per cent (5%) of the value certified in the payment certificate (excluding VAT).

In respect of contracts with a contract sum more than R1 million, the security to be provided by the contractor to the employer will be selected by the Contractor as indicated below:

Guarantee for construction: Select Option A, B, C, D or E	n/a

Option A	cash deposit of 10 % of the contract sum (excluding VAT)
Option B	variable construction guarantee of 10 % of the contract sum (excluding VAT) (DPW-10.3 EC)
Option C	payment reduction of 10% of the value certified in the payment certificate (excluding VAT)
Option D	cash deposit of 5% of the contract sum (excluding. VAT) and a payment reduction of 5% of the value certified in the payment certificate (excluding. VAT)
Option E	fixed construction guarantee of 5% of the contract sum (excluding VAT) and a payment reduction of 5% of the value certified in the payment certificate (excluding VAT) (DPW-10.1 EC)]

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NB: Insurances submitted must be issued by either an insurance company duly registered in terms of the Insurance Act [Long-Term Insurance Act, 1998 (Act 52 of 1998) or Short-Term Insurance Act, 1998 (Act 53 of 1998)] or by a bank duly registered in terms of the Banks Act, 1990 (Act 94 of 1990) on the pro-forma referred to above. No alterations or amendments of the wording of the pro-forma will be accepted.

Guarantee for payment by employer [11.5.1; 11.10]	Not applicable
Advance payment, subject to a guarantee for advance payment [11.2.2; 11.3]	Not applicable

C 2.0 Payment of preliminaries [25.0]

Contractor's selection

Select Option A or B	B

Where the contractor does not select an option, Option A shall apply

Payment methods

Option A	The preliminaries shall be paid in accordance with an amount prorated to the value of the works executed in the same ratio as the amount of the preliminaries to the contract sum, which contract sum shall exclude the amount of preliminaries. Contingency sum(s) and any provision for cost fluctuations shall be excluded for the calculation of the aforesaid ratio

Option B	The preliminaries shall be paid in accordance with an amount agreed by the principal agent and the contractor in terms of the priced document to identify an initial establishment charge, a time-related charge and a final dis-establishment charge. Payment of the time-related charge shall be assessed by the principal agent and adjusted from time to time as may be necessary to take into account the rate of progress of the works

Lump sum contract

Where the amount of preliminaries is not provided it shall be taken as 7.5% (seven and a half per cent) of the contract sum, excluding contingency sum(s) and any provision for cost fluctuations.

C 3.0 Adjustment of preliminaries [26.9.4]

Lump sum contract

Where the amount of preliminaries is not provided it shall be taken as 7.5% (seven and a half per cent) of the contract sum, excluding contingency sum(s) and any provision for cost fluctuations.

Contractor's selection

Select Option A or B	

Where the contractor does not select an option, Option A shall apply.

Provision of particulars

The contractor shall provide the particulars for the purpose of the adjustment of preliminaries in terms of his selection. Where completion in sections is required, the contractor shall provide an apportionment of preliminaries per section.

Option A	An allocation of the preliminaries amounts into Fixed, Value-related and Time-related amounts as defined for adjustment method Option A below, within fifteen (15) working days of the date of acceptance of the tender
Option B	A detailed breakdown of the preliminaries amounts within fifteen (15) working days of possession of the site. Such breakdown shall include, inter alia, the administrative and supervisory staff, the use of construction equipment, establishment and dis-establishment charges, insurances and guarantees, all in terms of the programme

Adjustment methods

The amount of preliminaries shall be adjusted to take account of the effect which changes in time and/or value have on preliminaries. Such adjustment shall be based on the particulars provided by the contractor for this purpose in terms of Options A or B, shall preclude any further adjustment of the amount of preliminaries and shall apply notwithstanding the actual employment of resources by the contractor in the execution of the works.

Option A	The preliminaries shall be adjusted in accordance with the allocation of preliminaries amounts provided by the contractor, apportioned to sections where completion in sections is required Fixed - An amount which shall not be varied. Value-related - An amount varied in proportion to the contract value as compared to the contract sum. Both the contract sum and the contract value shall exclude the amount of preliminaries, contingency sum(s) and any provision for cost fluctuations. Time-related - An amount varied in proportion to the number of calendar days extension to the date of practical completion to which the contractor is entitled with an adjustment of the contract value [23.2; 23.3] as compared to the number of calendar days in the initial construction period [26.9.4].
Option B	The adjustment of preliminaries shall be based on the number of calendar days extension to the date of practical completion to which the contractor is entitled with an adjustment of the contract value [23.2; 23.3] as compared to the number of calendar days in the initial construction period [26.9.4]. The adjustment shall take into account the resources as set out in the detailed breakdown of the preliminaries for the period of construction during which the delay occurred.

Failure to provide particulars within the period stated

Option A	Where the allocation of preliminaries amounts for Option A is not provided, the following allocation of preliminaries amounts shall apply: Fixed - Ten per cent (10%) Value-related - Fifteen per cent (15%) Time-related - Seventy-five per cent (75%) Where the apportionment of the preliminaries per section is not provided, the categorised amounts shall be prorated to the cost of each section within the contract sum as determined by the principal agent
Option B	Where the detailed breakdown of preliminaries amounts for Option B is not provided, Option A shall apply