DRAFT TERMS OF REFERENCE FOR CONDUCTING AN ENERGY AUDIT [insert the exact details of Site i.e. buildings, public lighting and/or waste water treatment plants where energy audit is to be conducted]

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ACRONYMS AND ABBRECIATIONS

BBBEE	Broad Based Black Economic Empowerment (BBBEE)
DMRE	Department of Mineral Resources and Energy
EE	Energy Efficiency
EEDSM	Energy Efficiency and Demand Side Management Programme
EEPBIP	Energy Efficiency in Public Buildings and Infrastructure Programme
EPC	Energy Performance Certificate
EnPC	Energy Performance Contracting
ESCOs	Energy Service Company
GHG	Greenhouse Gas
JV	Joint Venture
PPPFA	Preferential Procurement Policy Framework Act
PSC	Project Steering Committee
SOEs	State-Owned Entities

1 BACKGROUND

1.1. South Africa is facing significant electricity supply shortages. A key mitigation measure to alleviate the energy crisis and the impacts of the rising cost of energy, is effective energy management and/or the installation of energy efficiency (EE) technologies to reduce total energy use and peak demand. Energy efficiency in public institutions, has been identified by the Department of Minerals and Energy (DMRE) as a key priority to manage and reduce energy consumption in the country.

1.2. Reducing consumption through EE improvements can cost less than generating, transmitting, and distributing energy from power plants, and can provide multiple socio-economic and environmental benefits, including a reduction in air pollution and greenhouse gas (GHG) emissions, improved energy security and job creation.

1.3. Public sector infrastructure accounts for 2-3% of total final energy consumption in South Africa. Government recognises the importance of leading by example by demonstrating a commitment to improving EE across all public sector buildings and infrastructure.

1.4. Within this context the [insert details of Public Institution] seeks to identify and implement operational procedures and / or efficient technology to reduce energy usage in their facilities and operations.

1.5. [insert details of Public Institution] intends to conduct a detailed energy audit of [include details of all facilities to be audited].

1.6. The goal is for the [insert details of Public Institution] to have accurate and reliable data and information that can be used, where applicable, to develop a comprehensive and bankable business case for the implementation of EE interventions. A business case can be prepared through the support of the Energy Efficiency in Public Buildings and Infrastructure Programme (EEPBIP), which is a programme developed by DMRE to fast-track large-scale rollout of EE across public institutions.

1.7. Energy efficiency in the context of this activity includes both direct energy savings through technology interventions and/or operational changes, in addition to the use of embedded renewable energy interventions that reduce on-site energy demand.

1.8. [insert details of Public Institution] is inviting potential service providers with expertise and experience in conducting energy audits and developing energy consumption baselines in [buildings, public lighting and water/waste-water treatment plants: delete intervention(s) that are not applicable]. See **Annexure A** which contains minimum information regarding sites to be audited.

2 PROJECT RATIONALE

2.1. A major barrier impeding EE adoption in public institutions is the lack of detailed and accurate data of baseline energy consumption - a prerequisite to identifying the most financially and technically appropriate EE opportunities.

2.2. In some instances, such data is not collected, and in others it may be collected but is retained by different departments and existing processes do not allow suitable access or aggregation thereof.

2.3. This activity seeks to address this barrier by appointing a specialised consultancy to conduct a detailed energy audit and develop an energy baseline. The attached data collection templates **(Annexure C, D & E)** and Audit Report format **(Annexure B)** serve as a guide.

2.4. The activity should also identify and recommend data management and monitoring systems that could be implemented and used by the [insert details of Public Institution] to capture, store and analyse energy data and information beyond the assignment.

3 PROJECT OBJECTIVES

3.1. The appointed consultant is to conduct a detailed energy audit in [public buildings, public lighting and water/waste-water treatment plants: only include details of sites to be audited if not all] and develop an energy baseline report. This should be realized through the following sub-objectives:

3.1.1. Collection of data and information on the identified site(s) in line with the templates attached as **Annexure C, D & E**.

3.1.2. Develop a comprehensive energy data management status quo and recommendation report to the [insert details of Public Institution].

3.1.3. Develop energy consumption baseline/detailed Energy Audit report in line with the minimum content of the Energy Audit Report attached as **Annexure B**.

4 SCOPE OF WORK

The Public Institution must provide a high-level overview of the site(s) to be audited and reference **Annexure A** for more information to the bidders. This is to allow the consultant to understand the site(s) that is being planned to be audited and estimate the level of effort required to audit such site(s) and price the proposal accordingly. A provision should also be made to allow bidders who are interested to visit the sites prior to completion of proposals, and this could be achieved through a mandatory briefing session.

The appointed service provider(s) will be expected to undertake the following activities –

4.1. Develop an inception report detailing the methodologies that will be used to respond to the main and specific objectives of the assignment (Section 5 below).

4.2. Collect data and information on the identified site(s) in line with the data collection templates attached as **Annexure C, D & E**. Data types to be collected amongst other should include – monthly energy usage, maximum demand, facility size, occupancy, equipment type, location, specifications, frequency of use, etc.

4.2.1. Consult with [insert details of Public Institution] to collect all the available data and information.

4.2.2. Collect additional data through walkthroughs, metering and measurement on site.

4.3. Develop a comprehensive energy data management status quo and recommendation report for the [insert details of Public Institution].

4.3.1. Conduct an in-depth review of the [insert details of Public Institution] to map out the institutional structure and processes used to collect, store and manage energy data and information.

4.3.2. Based on the gaps identified develop and recommend templates and tools to be used for data collection, storage and analysis by the Public Institution.

4.4. Develop an energy consumption baseline and detailed Energy Audit report in line with the minimum content of the Energy Audit Report attached as **Annexure B.**

4.4.1. Analysis of data and information to develop energy audit/energy consumption baseline report.

4.4.2. Draft energy consumption baseline report (energy audit), which is endorsed by the team's measurement and verification specialist.

4.4.3. Final energy consumption report incorporating all stakeholder's inputs.

5 OUTPUTS AND DELIVERABLES

No.	Activities	Deliverables	Timeframe
1. Develop an inception report detailing the methodologies that will be used to respond to the main and specific objectives of the assignment.	1.1. Kick off meeting with all key stakeholders. 1.2. Draft inception report presented at Project Steering Committee. 1.3. Final inception report incorporating all stakeholder inputs.	Inception Report.	Up to 3 weeks after project start.
2. Collection of data and information on the identified site(s) in line with the templates.	2.1. Consultation with public institution to collect all the available data and information and access to meters and facility/ies. 2.2. Collection of additional data: bill analysis, walkthrough, metering and measurement on site.	Data collection report and the detailed baseline spreadsheet with the collected data – select relevant Annexure doc	Up to 6 weeks after approved inception report.
3. Develop a comprehensive energy data management status quo and recommendation report to the [insert details of Public Institution]	3.1. Conduct an in-depth review of the [insert details of Public Institution] to map out the institutional structure and processes related to collection and storage of data and information. 3.2. Based on the gaps identified develop and recommend templates and tools to be used for data collection, storage and analysis by the	Data management status quo and recommendation report.	Up to 9 weeks after approved inception report.

	[insert details of Public Institution].		
4. Energy consumption baseline and detailed Energy Audit report in line with the minimum content of the Energy Audit Report attached as **Annexure B**.	4.1. Analyse data and information to develop energy audit and consumption baseline report. 4.2. Draft energy consumption baseline report endorsed by the measurement & verification team's member. 4.3. Final energy consumption report incorporating all stakeholder's inputs.	Energy audit and consumption baseline report with initial recommendations of proposed retrofits	Up to 12 weeks after approved inception report.

6 DURATION

6.1. From commencement to the end, this project will take a total of [4 months] and it is expected that some of the deliverables listed on section 4 above should be grouped and delivered simultaneously.

7 PAYMENTS

7.1. The service provider(s) to be appointed to render the services required for this assignment will be procured through [insert details of Public Institution]

7.2. The successful service provider will be contracted to [insert details of Public Institution] for the duration of the assignment and the [insert details of Public Institution] will be responsible for financial and contract management. The payment will not be processed upfront to a successful service provider(s).

7.3. Payments(s) will only be processed in accordance with the delivered services (i.e. certified/approved deliverables and milestone) as agreed upon by both parties in line with the payment schedule and upon receipt of an original invoice that is based on an approved deliverable. The 30-day period (maximum time set for settlement of invoices) will be counted after all the required documents have been submitted to the [insert details of Public Institution].

7.4. The payment schedule will be negotiated with the recommend service provider(s) prior to parties concluding the service level agreement (SLA).

8 PROJECT MANAGEMENT

8.1. Project Director/Champion

8.1.1. The project director will be the [Public Institutions to specify the relevant portfolio of the official].

8.2. Project Management Team

8.2.1. The project manager responsible for the activities described in this document will be [Public Institutions to specify details of the project manager]. The project manager will be the contact person for all [insert details of Public Institution]-consultant interactions and reporting will be through the project director.

8.2.2. A Project Steering Committee (PSC) to support implementation of the project will also be established and comprise of representatives from [insert details of Public Institution], and other relevant departments and institutions (such as the DMRE).

8.3. Reporting Requirements and Progress

8.3.1. The [insert details of Public Institution] will require an initial meeting with successful service provider (s) to agree the project process and implementation. This will be followed up by an inception workshop with all PSC members for recommending approval of the inception report by the project director, sharing of experiences and identifying any concerns.

8.3.2. A plan for progress meetings shall be included in the inception report and will be subject to the [insert details of Public Institution] approval after recommendation from the PSC.

8.3.3. Some meetings will be held in [Public Institutions to specify]. Representatives from service provider's organization shall be obliged to attend. Meetings may be held via conference call or online (MS Teams or similar) subject to mutual consent.

8.3.4. The service provider will provide record of all progress meetings which shall be held [monthly].

9 CONFIDENTIATLITY OF INFORMATION

9.1. [Public Institutions to specify in line with their bid requirements].

10 EVALUATION METHODOLOGY

10.1. Cost

10.1.1. The service provider(s) will be requested to provide a quote regarding the work to be undertaken for this project.

10.1.2. The total cost must be VAT inclusive and should be quoted in South African currency (i.e. Rands).

10.1.3. Detailed costing should be aligned with project activities and project deliverables.

10.2. Company Experience

10.2.1. The service provider should demonstrate a minimum of 5 years track record of undertaking detailed energy audits and implementation of energy projects on sites aligned with the ToR. This must be supported by up to five (5) signed reference letters for relevant projects with contact details as proof of the projects executed.

10.2.2. A company profile of the service provider(s) should be provided and if more than one (1) company is involved with the proposal, profiles for all those companies must be submitted. Details of any joint venture (JV) if there is any should be provided including attaching the JV Agreement between the parties.

10.2.3. Proposals should also include the allocated human resource/s per project activity.

10.3. Team Leader and Team Members Experience and Qualifications

The successful service provider(s) shall provide professional experts whose experience and qualifications include but not limited to the following –

10.3.1. Team leader should be a qualified electrical engineer with at least honours degree in electrical engineering and 5 years' experience in auditing and developing energy related projects. He/she should have led five (5) projects that audited energy projects and have experience in project management. Contact details for reference checks in line with the 5 projects should be provided in the CV. Good organization, communication and report writing track record should also be demonstrated. **Copies of certified certificates to be provided.**

10.3.2. At least one (1) of the individual team members should be certified energy auditor/measurement and verification professional with at least three (3) years' experience in the measurement and verification of energy savings with 3 energy projects reflected in the CV. **Copies of certified certificates to be provided.**

10.3.3. At least one (1) of the individual team members should be a qualified electrician with wireman's license with 3 electrical projects reflected on CV. **Copies of certified certificates to be provided**.

10.3.4. Both team leader and team member(s) must be familiar with South African energy policy including EE and carbon emissions, reporting and monitoring processes.

10.3.5. CVs of the proposed project team leader and member(s) describing their relevant skills and experience, and roles in the proposed projects must be included in the proposal. **Failure to attach, service provider(s) will forfeit points. Each CV must not exceed 4 pages.**

10.4. Project Plan

10.4.1. Project plan with timelines linked to deliverables and how the intermediate and final outputs of the project will be met.

10.4.2. The proposed project methodology which details how the required data will be collected.

10.4.3. The relevant stakeholders should be identified and how they will be engaged on the project (i.e. communication strategy and plan) should be part of the project plan.

10.4.4. Project management and accountability should be clearly outlined. This should include the team roles related to the work plan and deliverables.

11 EVALUATION CRITERIA

11.1. The proposals will be evaluated in two phases and partnering with local SMME's is encouraged to support transformation, enterprise development and skills transfer.

11.1.1. **Phase 1:** Bidder(s) will be evaluated based on technical functionality. The minimum threshold for functionality is [institutions to set their minimum threshold……out of 100 points] on technical functionality. Bidder(s) who fail to meet the minimum threshold will be disqualified and will not be evaluated further for price.

11.1.2. Phase 2: Bidder(s) will be evaluated 80/20 points [institutions to set out empowerment conditions that will sum to 20 points].

Phase 2: Technical Functionality

1=poor; 2=below satisfactory; 3=satisfactory; 4=good; 5= excellent

No	Criteria (including rating)	Weight	Score
1.	**Company experience** The bidder(s) experience/track record in energy auditing and implementation of energy projects should be supported by up to five (5) reference signed letters for relevant projects with client contact details as proof of the projects executed. **Note**: If more than one (1) of the listed relevant projects were undertaken for the same client, one (1) letter from the client listing all the projects will suffice. These must be separate i.e different locations. For example, if one (1) client lists three (3) relevant projects then the letter will be scored as three (3) projects instead of one (1) project if all three (3) projects are relevant. **IT SHOULD BE NOTED THAT PROPOSALS THAT ARE UNCLEAR AND DO NOT ADHERE TO THE INSTRUCTIONS WILL FORFEIT POINTS.**	**15**	Nonresponsive = 0 1 reference letter = 1 2 reference letters = 2 5 reference letters = 3 6 reference letters = 4 ≥7 reference letters = 5
2.	**Team leader and members experience**	**20**	
	• Team leader should at least have 5 years' experience in energy audits and developing energy related projects. He/she should be an energy management specialist with strong project management expertise. He/she should have led 5 projects that audited and developed energy projects. Contact details for reference checks in line with the 5 projects should be provided.	9	≤3 years' experience with 3 projects or less = 1 4 years' experience with 4 projects = 2 5 years' experience with 5 projects = 3 6 years' experience with 6 projects = 4 ≥7 years' experience with ≥7 projects = 2
	• At least one of the individual team members should have 3 years' experience in measurement and verification of energy baselines should have conducted measurement and verification on 3 energy projects.	7	1 year experience with 1 project = 1 2 years' experience with 2 projects = 2 3 years' experience with 3 projects = 3 4 years' experience with 4 projects = 4 ≥5 years' experience with ≥5 projects = 5
	• At least one of the individual team members should have 3 years' experience in electrical field and referenced projects to support the experience.	4	1 year experience = 1 2 years' experience = 2 3 years' experience = 3 4 years' experience = 4 ≥5 years' experience = 5
	NB: Copies of CVs of the proposed project team members describing their skills and experience, and roles must be included. Failure to attach,		

	bidder(s) will forfeit points. Each CV must not exceed 4 pages.		
3	**Qualifications for team leader and members** • Team leader should at least have honours degree in electrical engineering or other related qualifications. Certified copies of certificates should be attached to the proposal as proof. Failure to attach, bidder(s) will forfeit points. • At least one (1) of the individual team members should have a certificate in Energy Auditor/Measurement and Verification Professional. **Certified copies of certificates should be attached to the proposal as proof. Failure to attach, bidder(s) will forfeit points.** • At least one (1) of the individual team members should be a certified Electrician with a wireman's license. **Certified copies of certificates should be attached to the proposal as proof. Failure to attach, bidder(s) will forfeit points.**	**20** 10 5 5	 Diploma/Certificate = 1 Degree = 3 Honours Degree = 4 Master's Degree = 5 None certificate = 1 Certificate in Energy Auditor/Measurement and Verification certificate = 5 None certificate = 1 Certificate without wireman's license = 2 Certified electrician wireman's license = 5
2.	**Project Methodology and Plan** • A clear methodology, milestones, and timelines within the duration of the projects. The methodology must outline how the planned work will be carried out showing clearly how each task will logically lead to specific deliverables. • Management structure with roles and responsibilities of both team leader and team members. • Partnering with local SMME's to support transformation, enterprise development and skills transfer. **NB: A copy of the company's organogram indicating all team members must be included in the proposal.**	**45** 20 15 10	 No project methodology = 0 Project methodology with milestones = 2 Project methodology with milestones and timelines = 3 Project methodology with activities, milestones, and timelines = 4 Project methodology with logical linked activities, milestones, and timelines = 5 Management structure not provided = 1 Management structure provided = 3 Management structure with roles and responsibilities = 5 No partnering with local SMME = 0 Partnering with local SMME = 3 Partnering with local SMME and more than 2 locals employed= 5

12 FORMAT AND SUBMISSION OF THE PROPOSAL

12.1. [Public Institutions to specify in line with their bid requirements]

13 CLOSING DATE

13.1. Proposals must be submitted to [insert details of Public Institution] by a date specified by [insert details of Public Institution] Bid Committee.

13.2. No late bids will be accepted.

14 ENQUIRIES

14.1. All technical enquiries to be directed in writing to the contacts below. All technical telephonic enquiries should be followed or confirmed in writing to enable the technical team to address the as expected.
[insert details of relevant official]

14.2. All administrative bid enquiries to be directed to the following [insert details of relevant person].

Annexure A: Minimum Site(s) Information

(*this information is to be attached on the terms of reference by the institution)

Buildings

Site ID	Description	District/area	Address	GPS Coordinate	Site Type	Site Category	Building Size
1.					i.e. Building	A1: Entertainment and public assembly A2: Theatrical and indoor sports A3: Places of instruction A4: Worship F1: Large shop/shopping malls G1: Offices H1: Hotels Health Facility	

Public lighting (where applicable must comply with SANS 10098)

Site ID	Description	District/area	Address	GPS Coordinates	Site Type	Site Category
2.					1.e. Streetlighting	A1: Freeway and expressway with median, free of level crossings, for speed limits exceeding 90KM/h A2: Major roads, for speed limits not exceeding 90km/h A3: Important urban traffic routes for speed limits not exceeding 60km/h A4: Connecting roads, local distributor roads, residential major roads B1: Residential streets with medium to high volume traffic B2: Residential streets with medium volume traffic Residential streets with low volume traffic C1: Wholly pedestrian C2: Wholly pedestrian in local shopping mall

Water Facility

Site ID	Description	District/area	Address	Site Type	Site Category

				i.e. Water facility	Waste water treatment plant Water purification plant Pump station

Annexure B: Minimum content of the Energy Audit Report

1. Executive summary

The summary to provide a description of the systems and facilities covered, as well as overview of the existing conditions, measures, methodology, results and a summary table presenting the cost and savings estimates for each recommended energy efficiency measure. It should also include a summary of the recommended measures and costs as well as the financial indicators of the project.

2. Background

Background about the Public Institution and project should be provided.

3. Facility description

Details of the existing facilities audited – ie water treatment, street lighting, traffic signals, water pumping or waste water treatment, buildings including hospitals.

4. Energy scenario

Energy consumption details of all facilities included in the audit and their energy sources.

5. Inventories

This section should cover inventories of all relevant electrical systems and fittings.

6. Energy consumption baseline calculations, baseline parameters and adjustments

Methodology followed in establishing the baseline including parameters and the criteria followed in adjusting it should be described. Provide all the baseline calculation sheets, parameters and the calculation procedure in an annex (attached as energy audits sheets per facility).

7. Data collection

List the various types of data collected and their sources. Include the data in the annex (as audit sheets, template are provided).

8. System mapping

Describe the methodology followed for system mapping and include the maps in the annex, where applicable.

9. List of EE potential projects

This session should list of all identified measures with estimates of the savings and payback periods on investments.

10. Review of current operation & maintenance practices

Provide detailed description of current operation and maintenance (O&M) practices within the Public Institution facility. This should include discussion with operators, engineers and other staff, observing the day-to-day O&M and reviewing the log sheet during the field study. (The Public Institution to identify areas for improvement and suggest the strategy and methodology for implementation.

11 Findings and Recommendations

Provide a summary of the audit findings which includes recommendations and how to proceed. This should include a hierarchy of which interventions will deliver the greatest savings and an explanation of why any opportunities have been excluded.

A clear differentiation of the energy savings that can be achieved by behaviour and technology should be provided and explained, as well as how the link between the two can be bridged to maximise energy savings. Finally, the report should include recommendations that the facility should implement immediately. For example, accurate billing, ensuring all meters are working and checked regularly, basic and sensible practises, such as AC and geyser settings.

ANNEXURE C: BULDING DATA COLLECTION TEMPLATE

Building Information		Floor area data		Occupancy rate in net floor area					List the energy users in the building				Data source & resource used
Building information for the EnPC	**Data collected**	**Data collected from the building plans**	**Total m^2**	**Data required**	**Occupied floor area of full-time staff and operating hours**	**Occupied floor area of remote working staff/temporary staff**	**Occupancy/ operating hours and days for full-time staff**	**Occupancy/operation hours and days of remote staff/temporary staff**	**Energy users in the entire building complex**	**Data collected**	**Operating Hours**	**Excluded area or included area**	
Name of building		Gross floor area		Occupancy of staff in office building, remote workers, school calendar etc Other (details)					Electrical appliances				
Building owner		Vertical building components area							Lighting				
Accounting officer ID, name and position		Exclusion areas as per building plan							Cooling				
Building description		Total number of occupants – list these and their gross net floor area for each occupied							Heating				
Location and address		Unoccupied areas (for the last 2 years) as per management confirmation							Other (stipulate):				
Number of floors		Other (details)											

Single or multiple occupancy													
Year of construction													
Building plan approval date													
Occupancy certificate date													
Year of last major renovation													
Climatic (Energy) zone SANS10400XA:2021													
Cadastral information (Erf info)													

Installed Technology								
Technology Category	**Type of Technology**	**Number of Items**	**Capacity (W)**	**Estimated time of use (hours/day)**	**Total Usage per Day (kWh/day)**	**Total Usage per Year (kWh/a)**	**Cost for Consumed Electricity (ZAR/a)**	**Cost for Installed kW (ZAR/a)**
i.e. Lighting	i.e. T5							

Grid electricity annual energy consumption data for referenced year			On site renewable energy generation: annual energy consumption usage data for referenced year				Liquid fuel annual energy consumption for referenced year				
Energy source	**kWh reading and from date**	**kWh reading and to date**	**Energy source**	**kWh reading and from date**	**kWh reading and to date**	**Data source & resource used**	**Energy source**	**Opening tank reading in litres (L) and date**	**Closing tank reading in L and date**	**Tank refill in L and date**	**Data source & resource used**

Example: Electricity	*Example:* 1216394 on 01/01/20XX	*Example:* 1221531 on 31/12/20XX	*Example: Solar PV, Wind*	*Example: 1216394 on 01/01/20XX*	*Example: 1221531 on 31/12/20XX*	*Example: Utility bill or meter*	*Example: Diesel*	*Example: 5,942 L on 01/01/20XX*	*Example: 11,293 L on 31/12/20*	*Example: 6,820 L on 25/08/20XX*	*Example: Calibrated scale*
							Paraffin				
							Other (name types)				

Gas annual energy consumption for referenced year					**Annual energy consumption data of all sources for tenants of multiple occupancy building**				**Energy user's data of the excluded areas**				
Energy source	**Opening inventory reading in tonnes (t) and date**	**Closing inventory reading in t and date**	**Purchase or refill added to inventory in t and date**	**Data source & resource used**	**Tenant**	**Opening reading and date**	**Closing reading and date**	**Data source & resource used**	**Energy used for**	**Watts per unit**	**No of units**	**Time of use/Operational Hours**	**Data source & resource used**
Example: LPG	*Example:* 8.2 kg on 01/01/20XX	*Example:* 5.7 kg on 31/12/20	*Example:* 9 kg on 25/08/20XX	*Example:* Calibrated scale	*Example: Floor 7 tenanted by XYZ Services*	*Example: 01/01/20XX*	*Example: 31/07/20XX*	*Example: Facilities manager/Sub-meter*	*Example: Parking outside lights*	*Example: 58*	*Example: 25*	*Example: 24/7*	*Example: Level 1 energy audit*
Natural Gas					*Example: Floor 3 tenanted by ABC Services*	*Example: 01/08/20XX*	*Example: 31/12/20XX*	*Example: Facilities manager/Sub-meter*	*Fridges in storage area*				
Other (name types)									*List others*				

Note: For detailed specifications of equipment listed in the above table, the consultancy should use Annexure E as a guideline to present the technical specifications of each.

ANNEXURE D: STREETLIGHTING DATA COLLECTION TEMPLATE

Pole (number)	Street name	Street light number	Type of Lamp	Wattage	Type of Fixture	Height of Pole	GPS Coordinate	Operational Hours

ANNEXURE E: WATER TREATMENT PLANTS

(*A useful reference guide to assist can be found here: https://www.sagen.org.za/publications/all-publications/99-a-practical-guideline-for-energy-efficiency-audits-at-waste-water-treatment-plants/file*)

Site		**Installed Technology**													
Site ID	**Site Description**	**Purpose**	**Process/Stage**	**Machine Characteristic**	**Year of Manufacture**	**Motor Capacity**	**Estimated Time of use (hours/day**	**Operating Days per Year(days/year)**	**Ave VSD Speed (%)**	**Measured Current (Amps)**	**Load (%)**	**Actual Power (KW)**	**Annual Energy for this Motor (kWh)**	**Annual Energy for All Motors at the site (kWh)**	**Site Annual Energy Use (kWh/a)**