## PART C3.1: DESCRIPTION OF WORKS

## DEFINITIONS AND ABREVIATIONS

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| Acceptance | Means that the goods shall have been accepted by Hessequa Municipality (HM) having been:<br>▪ inspected by the Engineer and found to comply with this specification.<br>▪ delivered, installed, and commissioned to the address in Hessequa defined in a purchase order issued by HM and |
| Approved | Approved in writing by the Engineer. |
| Practical Completion | means the works have passed the Practical Completion Test and the Facility is accepted for the purposes of Commercial Operation. The defects period and O&M Period of 24 months each begins. |
| Final Completion | means the works have passed the Final Acceptance Test and the Facility has demonstrated guaranteed performance expectations and is defect-free. The defects period and O&M Period conclude. |
| Client | Hessequa Municipality Electrical & Mechanical Services (HM), local government utility of Hessequa, South Africa |
| Contractor | Contractor appointed to Engineer, Procure and Construct the works as described in this specification |
| Document | This complete set of bound conditions, specifications, Bill of Quantities and schedules. |
| Drawings | Drawings issued with the Tender Documentation, where applicable. |
| Employer | Hessequa Municipality, local government, South Africa |
| Engineer | The person or persons authorised by HM to carry out inspections during manufacture, prior to or after delivery, of the items covered by this specification and acceptance thereof on behalf of the HM |
| Facility Meter / Tariff Meter | The logging tariff meter to be installed at the delivery point compliant with SANS 474/NRS 057, which will be used as the reference point for electricity produced in kWh by the Facility. |
| Install | To erect, connect and commission, complete with related accessories. |
| Marked Up drawings | Drawings clearly indicating with red all changes carried out at the site during the erection and testing work. The changed or cancelled items shall not be deleted by eraser or liquid corrector, but crossed only, in order to keep visible the cancelled part. |
| Professional Engineer | Professional Engineer registered as a PrEng with the Engineering Council of South Africa (ECSA). |
| Project Engineer | Same as Engineer |
| PV Facility | The functional and operating unit consisting of the materials, equipment and activities in the works able to generate and export electricity. The PV Facility remains an element of the works until Final Completion. |

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| Site | Hessequa Civic Centre area |
| Successful Tenderer | The Tenderer appointed as Contractor. |
| The Works | Complete, functional installation to be constructed/installed in terms of this Document. All Engineering, Procurement and Construction and related activities described in the Scope of Works to deliver a defect-free and operating Solar Photovoltaic (PV) Facility with a design lifetime of 25 years and installed capacity as specified in the Tender documentation and is constructed within the Site Boundaries defined. |
| EMS | Electrical & Mechanical Services, Hessequa Municipality |
| HM | Hessequa Municipality |
| LV | Low Voltage (230V or 400V) |
| MV | Medium Voltage (11kV for this project) |
| O&M | Operation and Maintenance |
| OSH Act | Occupational Health and Safety Act |
| RMU | Ring Main Unit |
| SHEQ | Safety, Health, Environmental and Quality |

# HES-TECH 19/2223: ENGINEERING, PROCUREMENT AND COMMISSIONING OF A 30KWP AC GRID-TIE COUPLED ROOFTOP SOLAR PV SYSTEM AT CIVIC CENTRE

### 3.1.1 DESCRIPTION OF THE WORKS

1. OVERVIEW OF THE WORKS

The Hessequa Municipality invites Tenders for the Engineering, Procurement and Construction (EPC) and 24-month Operations and Maintenance (O&M) Contract of a ground mounted 30kWp photovoltaic solar power facility at the Hessequa Civic Centre. The Contract will include training of Hessequa Municipal Staff during the O&M period.

The system is the extension of the existing approximate 30kWp solar system with an additional system which must equal the existing installation in capacity.

The Contractor's design must allow for a modular design, allowing for the commissioning and energization of the approximate 30kWp system. The defects and liability period, as well as operations and maintenance for the 30kWp will commence after the issue of the Certificate of Completion.

Tenderers must allow for all items, whether specified or not, required to complete the installation. No work will be undertaken by the Hessequa Municipality or other third party.

2. PROJECT DESCRIPTION

2.1. Scope of Contract

The project description below and Hessequa Municipality Standard, PV Plants Turnkey Installations, provide the full Scope of Work and Specifications for the new PV Plant at the Hessequa Civic Centre.

The Contract with the successful tenderer will consist of a standard EPC contract, consisting of 30kWp, followed by a 24-month operations and maintenance Contract. The O&M contracts will include a Training Program for the Hessequa Municipal staff.

The Contractor shall perform all work in accordance with this Tender package and applicable Hessequa Municipal Standards. In case of any conflicts between this Tender package and any of Hessequa Municipality standards and/or the Local Statutory authorities' regulations and safety codes, the Contractor shall refer to the Engineer for clarification.

2.2. Scope of Works

The EPC contract will be a turnkey project for the construction of a new 30kWp grid tied photovoltaic solar power facility at the Hessequa Civic Centre, complete with all PV modules, inverters, cabling control, protection, safety, SCADA, synchronizing ancillary equipment and Rooftop mounted structure

All materials supplied shall be new.

The proposed single line diagram shall indicate the entire plant and interface into the building main 400V DB which is situated in the Main LV Room of the Civic Centre. The power measuring point shall be taken at the 400V power input point on the building main incoming Distribution Board in the LV Room.

The site to be utilised for the new Rooftop PV Plant is the current rooftop of the Civic Centre and will have to remain as such once this project is completed. The Tenderer's proposal will have to be approved by the Hessequa Municipality before manufacturing of the streel structures can commence.

The following must be allowed for:

a) Construction of the plant in portions to allow for the safe movement of Hessequa Municipal staff and vehicles.
b) Development of a Construction Work Methodology and Health and Safety Plan. The proposed methodology must be agreed with the Project Manager.
c) All construction zones must be clearly demarcated. An existing LV Room has been allocated for the installation of the inverters. The Contractor will be responsible for the refurbishment of this room, including a new screed floor. The inverters will be housed indoors in the dedicated inverter room.
d) Any necessary extensions must be made to the existing LV switchboard at the Civic Centre.
e) The Operations & Maintenance will consist of a contract for the 30kWp System.
f) The Contractor will be responsible for a training program of the Hessequa Municipal staff.
g) The Contractor will be responsible for the Security at the site during the Construction phase of the works.

h) No geotechnical survey and soil data is available or necessary for the site.

2.3. Engineering, Procurement and Construction

The Contractor's responsibilities for the EPC portion of the works includes: complete Engineering of Works (refer to Section 2.7), setting out, purchasing, transportation and offloading of all equipment and materials, construction, erection, installation, assembling, testing, commissioning and performance testing, identifying and remedying defects for a defects period of 36 months after Practical completion.

2.4. Operations and Maintenance

The Contractor shall be responsible for the effective day-to-day monitoring, operating and maintaining of the plant for 24 months after Practical Completion. An O&M Contract will be entered into for the 30kWp system.

For the purposes of Tender, the Bidder shall submit a high-level review of their proposed O&M plan detailing preventative and corrective maintenance procedures and committed response times.

2.5. Training Plan

The Contractor is required to develop and effect a training programme for Hessequa Municipal staff to assist with:

- Maintenance of PV Plant.

For the duration of the first portion's O&M Period Hessequa Municipal Maintenance staff will assist with basic operations, maintenance and safety related tasks of the Facility.

For the purposes of Tender, the Bidder shall submit a high-level training plan outlining how the staff will be trained in the day-to-day procedures of operating the Facility.

2.6. Quality Assurance Plan

The Contractor shall submit a Quality Assurance Plan (QAP) for the Project Manager's approval. This need not be a ISO 9001 compliant plan, but such certification shall be deemed favourable. The QAP shall detail as a minimum:

- Management philosophy and structure of the business
- Supply chain management
- Subcontractor management philosophy (indicating split of in-house and subcontracting)
- Quality of materials and equipment management
- Staff training and development philosophy
- Project quality standards
- Ethics

For the purposes of Tender, the Bidder shall submit a high-level overview of their QAP in Schedule.

2.7. Complete Engineering of Works

It will be the responsibility of the Contractor to prepare and provide all the designs for the works to comply with the Employer's design requirements, which will consist of all Detailed Designs, Engineering and Construction Designs, including all calculations and drawings, for each element of the Works, to the Engineer for their review and approval, prior to the Procurement and/or Construction of any work. This will be at no additional cost to the project or the Client. The Complete Engineering Works will include, but not limited to, structural, mechanical and electrical aspects. The PV facility shall have a design life of 25 years.

Immediately after the starting date, the Contractor shall start with the design of the works and the equipment.

During this design phase of the contract the Contractor is required to hold design review meetings to confirm all Employer requirements and to obtain the Engineer's acceptance for all design concepts, design interfaces and specifications to ensure that quality is designed into the final product.

Structural and component design shall be verified and signed by the Contractor's Professional Engineer.

If required by the Employer, the services of an independent third party will be engaged by the Employer to review the Contractor's design and the Contractor must give the necessary co-operation and supply all the necessary design data as required. The cost of the design review by the third party will be borne by the Employer.

All shop drawings to be presented, discussed and confirmed with the Engineer prior to manufacture.

Time required for all the activities associated with the design of the equipment must be allowed for and indicated by the Contractor in his programme.

## 3. PROGRAM AND COMPLETION

### 3.1. Tender Period

The program and appointment of Contractor will be subject to the availability of funds. The EPC Contract is to commence in the 2022/23 financial year and be completed in the same year.

Tenderers must state in their proposal the completion period of the 30kWp in weeks from date of official purchase order until the date of practical completion. The Operation & Maintenance Contract, in conjunction with the Training Program, will be for a period of 24 months.

### 3.2. Construction Program

The Tenderer is to submit his Proposed Construction Programme, which proposes the scheduling of tasks necessary to achieve the Milestones by the Key Dates indicated in the Engineer's Preliminary Programme, indicated below:

The estimated programme is as follows:

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| (i) | Appointment of Contractor | ..... |
| (ii) | Completion of Contract Documentation | ..... |
| (iii) | Contractor on site | ..... |
| (iv) | Completion of project | ..... |

The Construction Program will be finalised during Contract Negotiations.

## 4. SITE INFORMATION

### 4.1. General

The installation shall be at the Civic Centre of Hessequa Municipality in Riversdale.

### 4.2. Security

#### *4.2.1.1. Site Security*

The Contractor shall provide security services for the duration of the construction works. The Tenderer shall ensure that he inspects the site during the mandatory site meeting and make sufficient allowance to secure the entire site during the works. The Contractor's security personnel will have to liaise with the Hessequa Municipal staff.

During the O&M phase of the works, the Employer will be responsible for security at the site.

#### *4.2.1.2. Site Access*

There are several access routes to the site, which are also used by Hessequa Municipal staff throughout the construction period.

The Municipal Staff's normal working hours are weekdays between 7:45 - 16:30.

4.3. Site Facilities

The contractor shall allow on site for a suitable storage facility (e.g., containers). The contractor may have a portable site office at the Municipality's premises, if necessary. The is ablution facilities for the contractor and his team. The Contractor will be responsible for all services (electricity mainly) required and must include in his tender price.

4.4. Hidden and other services within the site

It will be the responsibility of the Contractor to identify all services on site prior to construction, if applicable.

Refer to Hessequa Standard HM 004 with regards to wayleaves and the identification of other services on site.

5. GENERAL SPECIFICATIONS

5.1. Engineer's Drawings

No engineer's drawing is available for the project. It will be responsibility of the Tenderer to prepare his own design with layout drawings and line diagrams for approval by the Engineer.

The Contractor shall submit his preliminary design as part of his Tender submission demonstrating adherence to the tender conditions and applicable standards. These drawings shall include:

- A single line schematic diagram of their proposal. Special attention is to be given to earthing arrangements.
- A drawing showing the proposed layout of the PV arrangement suitable for Hessequa Municipality approval of the scheme.

5.2. Project Notice Board

A project notice board shall be provided by the Contractor as part of the contract and erected at the entrance of the Construction Site.

The wording shall be approved prior to sign writing. The board shall remain in place until the end of the defects liability period at which time it shall be removed by the Contractor.

5.3. Weather Measurements

The measurement of weather during the construction period must be placed at the site

The following weather measurements must be recorded for each month:

- the cumulative rainfall (mm);
- the number of days with rainfall more than 10mm; and
- the number of days with minimum air temperature less than 0 degree Celsius.

5.4. Materials to be Free issued by Others

It is Hessequa Municipality's intention is to supply no free issue items for this contract. However, should the Municipality provide free-issue items, the Contractor shall be responsible for the collection of these materials from the Municipality's stores in Hospital Street in Hessequa, delivery to site and installation thereof. Provision has been made in the Bill of Quantities for the necessary handling fee in this regard.

6. SERVICE CONDITIONS

Refer to Hessequa Electrical and Mechanical Standards, specifically HM 002 - Atmospheric Conditions and HM 004.

7. ITEMS REQUIRING SPECIAL ATTENTION

The pre-treatment works to prevent growth on the roof of the Civic Centre.

8. LOCAL LABOUR AND LOCAL AUTHORITIES

8.1. Local Labour

It is intended that the project must make maximum possible use of local labour which is presently unemployed in the area of which the project is performed. All unskilled labour shall be from Hessequa.

Engagement of local labour might be required through the local ward councillor.

8.2. Liaison with Local Authorities

It is the contractor's onus to immediately contact all these authorities and to accommodate their involvement in his programme of work. The contractor should also warn the authorities at least 48 hours before the actual work commence. Compensation for delays, losses or accidents will not be considered should the contractor at any time have failed to keep the local authorities informed.

The engineer or employer must immediately be notified, should the contractor experience any problem regarding work, which involves a local authority.

8.3. Community Liaison and Community Relations

In all dealings with the community and workers employed from within the community, the Contractor shall take due cognisance of the character, culture and circumstances of the community involved and shall at all times use his best endeavours to avoid the development of disputes and to foster a spirit of co-operation and harmony towards the project.

The Contractor shall at all times, keep the Engineer fully informed on all matters affecting the contractor and the community, and shall attend all community meetings relating to the project as may be reasonably required by the Engineer. All matters concerning the community shall be discussed and where possible, resolved at such meetings.

9. SITE MEETINGS

If required regular site meetings will be convened soon after acceptance of tender at a time and place to be arranged.

Site meetings will be held at two-week intervals, or longer or shorter as may be necessary, at a time and day of the week to be mutually agreed, for the duration of the Contract.

10. PARTICULARS

Refer to the Conditions of Tender.

**3.1.2 STATUTORY REQUIREMENTS, SPECIFICATIONS AND STANDARDS**

1. STANDARDS AND REFERENCES

1.1. Conditions of Contract

FIDIC General Conditions of Contract (Yellow Book) - Not issued with the Tender Documentation.

1.2. Applicable Standards

The contract shall be carried out in accordance with Hessequa Municipality Standard HM 004, PV Plants Turnkey Installations.

1.3. Latest Equipment Standards

Equipment offered must comply to the latest relevant standards listed in HM-004.

Preference may be given to equipment that complies to later or latest standards. It is therefore essential for Tenderers to state clearly to what SANS and/or international standards their equipment comply.

### 3.1.3 TECHNICAL SPECIFICATION

1. REQUIREMENTS

The Contract shall be a turnkey project integrating the PV plant into the existing building 400V electrical network through a Grid Tied system where excess power is fed back into the Hessequa Municipal Electrical Network Grid and the tender shall include for all the necessary equipment to control the plant.

The system shall be installed on the rooftop of the Civic Centre.

The particulars of the turnkey projects are discussed in this tender document and Hessequa Electrical & Mechanical Services Standard HM-004.

All materials supplied shall be new.

Items discussed in the following sections are additional to the technical particulars provided to HM-004.

2. SUPPORTING STEELWORK

There shall be appropriate space between the roof and the PV modules to allow air circulation for sufficient ventilation.

The structural design must be approved by the Hessequa Municipality before manufacture commences.