

52ST.305



## TENDER FORM

The Chairman – Tender Opening Committee  
PNG Power Ltd  
P. O. Box 1105  
**BOROKO 111 NCD**  
Papua New Guinea  
Phone: (675) 324 3381  
Fax: (675) 3250791  
Email: [supplyhelpdesk@pngpower.com.pg](mailto:supplyhelpdesk@pngpower.com.pg)

We (Full name of company).....  
.....  
.....  
.....

hereby tender for the undermentioned goods and services subject to the conditions of tendering and at the prices quoted in the scheduled therein

**TENDER No.** 49/2019

**CLOSING AT** 4.00 PM FRIDAY 30<sup>TH</sup> AUGUST 2019

**FOR**

FULL CONTRACT FOR MATERIALS  
PROCUREMENT AND DELIVERY TO SITE AND  
CONSTRUCTION OF 4KM HIGH VOLTAGE AND  
2KM LOW VOLTAGE POWER LINE FROM MIRAP  
TO MALAS, SUMKAR DISTRICT – MADANG  
PROVINCE.

**MIRAP TO MALAS RE WORKS  
SUMKAR DISTRICT – MADANG PROVINCE**

**TERMS OF REFERENCE**

This Term of Reference is for the **Procurement, Supply, Delivery to site of Project Materials and the Construction of 5km High Voltage and 2km Low Voltage of Distribution Power Lines from Mirap to Malas, Sumkar District in East Sepik Province.**

**1. BACKGROUND**

- 1.1 PNG Power Ltd (PPL) through the Rural Services Business Unit is responsible to coordinate its planned and budgeted programs such as the Rural Electrification work throughout the country.
- 1.2 The Funding for this Rural Electrification works has been made available through the Department of National Planning & Monitoring (DNPM).
- 1.3 The implementation of the RE Program is in line with the National Government's Medium Term Development Strategy (MTDS) to make electricity services accessible to 70% of the Papua New Guinea's rural population by 2030 and 100% renewable energy access by 2050.
- 1.4 The execution of the R.E Project is the responsibility of the Rural Services Business Unit (RSBU) within PNG Power Ltd (PPL). PPL RSBU has a lot of projects to deliver and thus had not met the delivery status expected by the national government to meet the government policy on electricity accessibility.
- 1.5 Moreover, the National Government through the Department of National Planning & Monitoring (DNPM) had impressed that PIP funding appropriated for a financial year for the Rural Electrification Project is spent by PPL on projects within that specific year.
- 1.6 The outsourcing of the material procurement and construction phase of the rural electrification project is critical for PPL RSBU to materialize the thoughts impressed by the National Government and also meet the government's policy targets.

## **2 OBJECTIVES**

The principle objective of outsourcing this Rural Electrification project, specifically on the implementation of material procurement and construction stages is as follows:

- 2.1 To ensure that the R.E Projects are implemented and commissioned as scheduled in accordance with the PPL RSBU Overall Program activities and within Budget.
- 2.2 To ensure that the Rural Services Business Unit within PPL is fully briefed at all times on the progress of implementation of the R.E Project and the same is conveyed to the project sponsor's through its agent, the Department of National Planning & Monitoring.

## **3 SCOPE OF WORKS**

### **3.1 General**

The scope of works the contractor shall undertake are as follows but not limited to:

- 3.1.1 Investigate and assess the load on the proposed line route from the existing PPL Grids through the existing design or by physical inspection and procure, supply, deliver to site project materials and construction of 5km of High and 2km of Low Voltage Distribution Lines including installation of transformers, commissioning and energizing from Mirap to Malas, Sumkar District in Madang Province.
- 3.1.2 The Bill of Quantity (BOQ) of all the High Voltage and Low Voltage Line Hardware materials including transformers to be used for the construction of the said works is as attached with the TOR.
- 3.1.3 The construction works to be undertaken by the contractor will be as per the designs which are also attached with the TOR or otherwise will be issued by the Project Manager MOMASE RE.
- 3.1.4 All materials used and the workmanship employed by the contractor for the construction of the said works must fully conform to PNG Power Ltd's Standards.
- 3.1.4 Liaise with PPL on matters relating to R.E project in terms of

- Mobilization
- Procurement of all line hardware materials, incl. transformers
- Supply of Step-up and step down transformers
- Supply of all materials for HV/LV reticulation lines construction works
- Supply of accessories, tools and equipment whenever required.
- Delivery to site
- Installation of all works as per the scope
- Test & Commissioning

#### **4 PROJECT MANAGEMENT AND DURATION**

- 4.1 The contracting firm or contractor shall provide all expert personnel, insurance cover for its employees, accommodation, transport, communications and travel for its employees.
- 4.2 The contracting firm or contractor shall provide all lifting and carting equipment necessary to load the line hardware materials at the port of arrival and deliver to site, construct, install and commission the HV/LV power line distribution works.
- 4.3 The contracting firm or contractor shall provide all tools and equipment necessary to construct the HV/LV distribution Lines at the port of arrival and delivery on site and execute construction.
- 4.4 The duration of the engagement shall be 6 months from the date of commencement; however it may be extended to further 2 months given the time frame for the procurement of distribution line hardware's to be shipped into the country.

#### **5.0 CONTRACT CLAUSES**

##### **5.1 GENERAL**

The employer is PPL through the Rural Services Business Unit

5.1.1 The parties are the Employer and the contractor.

5.1.2 The contract date is the date when this contract came into effect.

- 5.1.3 To provide the services means to do the work necessary to complete the work specified as procure, supply, cartage, construction and commission of the low voltage lines in accordance with the Contract and Terms of Reference.
- 5.1.4 The works to be done is as per the Terms of Reference.
- 5.1.5 Completion is the date when the contractor has provided the Project Schedule depicting the scope of works in accordance with his contract or as agreed to before the commencement of each project task.
- 5.1.6 The Project Schedule depicting scope of works shall be submitted detailing individual activities to be undertaken for the completion of the project.
- 5.1.7 All communication shall be in the English language and in writing.
- 5.1.8 The Employer and the contractor gives an early warning by notifying the other of any matter which could change the prices or program or of an ambiguity or inconsistency in or between the document so that it can be attended to and resolved before proceeding on with the tasks.

## **5.2 THE PARTIES RESPONSIBILITIES**

- 5.2.1 The employer provides information about the scope of works which is required for the contractor to effectively plan and execute the works required in this contract.
- 5.2.2 The contractor provides the services or works in accordance with the Terms of Reference or as instructed by the employer representative in this case, the Project Manager of the RE Projects.
- 5.2.3 Where necessary to provide works describe in this Terms of Reference, the contractor holds or attends meetings with others.
- 5.2.4 The contractor may engage sub-contractor for any part of the works, however approval for sub-contractors must be granted by the employer representative – the respective RE Project Manager. The contractor is responsible for the quality and product of task and eventual finish product.

### **5.3 TIME**

5.3.1 The Accepted Project Schedule depicting scope of works shall show:

- a). Every activity required to complete the task.
- b). Where the employer input may be required.

5.3.2 The Accepted Project Schedule shall be revised to show:

- a). Actual progress achieved on each activity.
- b). Effects on compensation events.
- c). Any other changes which the contractor proposes to make.

5.3.3 The Employer may provide assistance with unique plant and fleet like crane truck and forklift to the contractor to effectively deliver the project. The employer shall notify any restrictions to the contractor.

### **5.4 QUALITY**

5.4.1 The contractor must employ and enforce existing and accepted quality control measures for all tasks undertaken in this project.

### **5.5 PAYMENT SCHEDULE**

5.5.1 The Terms of Payment be that upon the approval and acceptance of this Terms of Reference, the contractor shall issue an invoice amounting to 40% of the total cost of the project for mobilization, procuring of line hardware and cartage to site.

5.5.2 The employer makes the payment of 40% of the total cost of the project within three (3) weeks for the purpose describe in item 5.5.1.

5.5.3 Upon receiving all the materials on site, the contractor issues the invoice amounting to 40% of the total cost. The employer makes payment within three (3) weeks of the receipt by him the invoice(s) after necessary corrections have been made if the amount invoiced is disagreed. In which case the employer informs the contractor on any changes to the value of the invoice before payment is effected. The contractor may provide further information to justify the invoice or accept corrections to the invoice value.

5.5.4 Upon the completion of the construction of the distribution power lines works, the contractor and the Employer conducts a joint inspection of the commissioned project after which the Contractor issue an invoice of 20% to the Employer.

5.5.5 Upon assessment and to the full satisfaction of the employer of all the deliverables achieved, the contractor shall furnish the project completion report where the remaining 20% of the money is then paid to the contractor within three (3) weeks.

## **5.6 COMPENSATION EVENTS**

5.6.1 The following shall be compensation events:

- a). The employer gives an instruction, which changes the TOR or the task affecting the initial scope of works.
- b). The employer does not provide something, which he is to provide for the successful completion of the project works.
- c). The employer changes a decision, which he has previously communicated to the contractor.
- d). The employer requires a defect to be corrected if it is not the making of the contractor to implement the project works.
- e). The employer does not reply to a communication within reasonable time as stated in the contract.
- f). The employer withholds an acceptance for a reason not stated in this contract.

5.6.2 The contractor submits quotation or rates for compensation events and a revised scope of works. The quotation shall include details for his new rate should that be necessary.

5.6.3 The employer assesses the quotation received in light of the compensation event and notifies the contractor shall include details for his new rate should that be necessary.

## **5.7 TITLE**

- 5.7.1 The employer takes ownership of the distribution assets provided by the contractor for use as stated in the TOR after he has paid the contractor in full.
- 5.7.2 The employer remains the sole owner of all installed and commissioned assets.

## **5.8 RISKS AND INSURANCES**

- 5.8.1 The contractor carries the risks of claims, proceedings, compensation and costs payable for personal injury and death or loss or damage to property resulting from a failure by the contractor to use reasonable skill and care in providing the works.
- 5.8.2 The risks of personal injury and death and loss of or damage to the property, which are not the contractor's risks are carried by the employer.
- 5.8.3 The contractor provides the following insurance for the following and takes outright obligations in the event if it does occur.
- a). Event – A failure of the contractor to use reasonable skill and care in providing the service.  
Cover – The amount stated in this contract.
  - b). Event – personal injury, death or loss of or damage to property which is the contractor's risks.  
Cover – The amount stated in this contract.
  - c). Event – the loss of or damage to property provided by the employer for the use of the contractor.  
Cover – The amount stated in this contract.

## **5.9 DISPUTES AND TERMINATION**

- 5.9.1 As far as possible any disputes that arise in the course of executing this contract, shall be solved amicably by the both parties in the first instance with established procedures and precedence.

Any adjudicator may be called upon to make his assessment only when necessary. An adjudicator is nominated by both parties and named in the contract data.



- 5.9.2 If the adjudicator's assessment is rejected by any one party and wish to refer the matter to tribunal for settlement then he may do so. The tribunal has the power to review and revise the decision of the adjudicator. The arbitration is conducted using the PNG's arbitration procedures.
- 5.9.3 Either party may terminate if the other party has done one of the following:
- a). Become bankrupt or insolvent
  - b). Had a bankruptcy order raised against him
  - c). Gone into liquidation
- 5.9.4 The contractor may terminate if the employer has not paid an amount due to the contractor after notice to the employer that payment is overdue.
- 5.9.5 The employer may terminate:
- a). If the services are no longer required.
  - b). If the contractor has substantially failed to comply with his obligations.
  - c). Upon the completion or expiry of the contract date.
- 5.9.6 After termination the contractor does no further work necessary to provide the services and the employer may:
- a). Complete the service himself or employ other people to do so
  - b). Use any material to which he has title to
  - c). Require the contractor to assign the benefit of any sub-contractor or other contract related performance of this contract to the employer.

After the final payment has been made, the contractor gives to the employer the product inspected and commissioned to date which he has the responsibility under this contract.

## **5.10 TERM**

5.10.1 The term of the contract shall be 6 months from the date the mobilization payment is received as first payment for the contractor to initiate materials procurement. However a further 2 months extension can be granted for delays that are beyond the control of employer or contractor.

Notwithstanding this contract term, the contract may be terminated if clause 5.9 is breached or deemed to occur.

## **5.11 EMPLOYERS AGENT**

5.11.1 The employer's administrative and Technical agent is the Rural Services Business Unit and the contact person is the RE Project Manager or whoever is appointed to act in that position from time to time.

## **CONTRACT EQUIPMENT**

### **PART 1: EQUIPMENT PROVIDED BY THE EMPLOYER**

#### **1. GENERAL**

The conditions of contract are the clauses included in this Contract.

- The employer is:

PNG Power Ltd  
P O Box 1105, BOROKO – NCD  
Ph: (+675) 324 3200

- The employer's Technical agent is:

Rural Electrification Project Manager  
PNG Power Ltd  
P O Box 1105, BOROKO – NCD  
Ph: (+675) 324 3466

- The Adjudicator is:

PNG Power Ltd, Legal Services Group  
P O Box 1105, BOROKO – NCD  
Ph: (+675) 324 3200

- The Services are as per the Terms of Reference.
- The language of this contract is the English Language.
- The period of reply to a communication is two (2) weeks.
- The period of retention of documents is one year following completion and commissioning of the R.E Project and hand over to the employer the original document.

## **2. PAYMENT**

- The assessment interval shall be three (3) weeks minimum.
- No price adjustment to be negotiated.
- The currency shall be PNG Kina.
- The interest rate is 6% per 2 months for the value above K 5, 000.00 of the corrected invoice value.
- The liquidated damages charged for each uncompleted or delayed task shall be 5% of the final contract or agreed sum for any one task.
- All insurances as required shall be provided.

## **PART 2: DATA PROVIDED BY CONTRACTOR**

### **1. GENERAL**

- Key personnel and personal details of each for anyone tasks
- The rates for each of the following on an hourly basis or on charged out rates:
  - ✓ Key personnel
  - ✓ Foreman
  - ✓ Skilled Casual Workers
  - ✓ Unskilled Casual Workers
  - ✓ On an hourly basis or on charged out rates
  - ✓ Transport
- Percentage fee for reimbursable costs, e.g. Plane tickets, hire of helicopters, etc.
- Reports where required a fee shall be agreed upon based on a charged out rate before actual work and paid upon presentation of the report.
- Model, type and make of logistics to be utilized in executing the project.

## 2. INSURANCES

Event: Failure of the contractor to use reasonable skill and care in providing the services.

Cover: K10, 000 or 10% of contract Value or anyone assigned task whichever is the lesser of the two.

Event: Personal Injury, death or loss of or damage to property which is the contractors' risks.

Cover: K10, 000 per occurrence with the number of occurrence unlimited.

Event: The loss of or damage to property provided by the employer for the use of the contractor.

Cover: The full replacement cost or cost for full repair and /or maintenance

Event: Failure of the contractor to use reasonable skill and care in providing the services.

Cover: K10, 000 or 10% of contract value or anyone assigned task whichever is the lesser of the two.

Event: Personal injury, death or loss of or damage to property which is the contractor's risks.

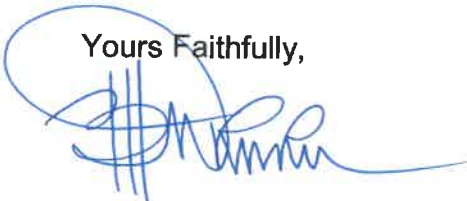
Cover: K10, 000 per occurrence with the number of occurrence unlimited.

Event: The loss of or damage to property provided by the employer for the use of the contractor.

Cover: The full replacement cost or cost for full repair and /or maintenance.

The contractor will then acknowledge receipt and confirm the acceptance within 5 days of the date of this TOR.

Yours Faithfully,



Bernard Ururu

**PROJECT MANAGER – MOMASE R.E.**

**MIRAP TO MALAS RE WORKS  
SUMKAR DISTRICT – MADANG PROVINCE**

**SCOPE OF WORKS**

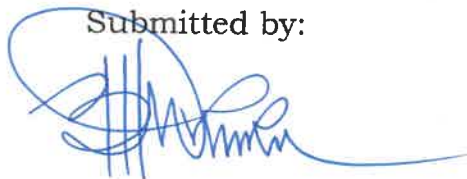
The scope of works for this project involves the procurement, supply, delivery to site of all project line hardware materials, construction works, testing and commissioning of 8km of HV/LV distribution power lines including step-down transformers for the Mirap to Malas RE Project, Sumkar District, Madang Province.

The Works shall include but not limited to:

- Contractor to carry out the joint field visit to the project site with the PNG Power Limited Rural Electrification Representative, inspect the proposed total load for the distribution **HV/LV** lines extension route.
- Contractor and PNG POWER Ltd to conduct public awareness to all communities within the surrounds of the RE project at the start of the project.
- Contractor to mobilize on site and ensure the full establishment of site accommodation, materials laydown and fabrication area. Provide necessary labour, Plant & Equipment required to carry out construction of 5km of HV/LV distribution power line extensions with the necessary works define in the scope of works for this specific Rural Electrification Project.
- Contractor to procure, supply and deliver to site (Mirap) all materials for the construction of 5km of HV/LV distribution power line.
- Contractor to engage semi and unskilled labor with chain saws, bush knives, axes and other necessary tools to cut tall trees and clear bushes along the proposed **HV/LV** lines route within the specific width as per PPL standards or as directed by the Team leader Construction/Project Manager.
- Contractor to use local labor with necessary tools to dig holes for poles erection, the hole diameter and the depth shall be dug within given diameter and length respectively **as per the PPL standards** specified or as directed by the Construction Team Leader/Project Manager.
- Contractor to use local labor to dig stay holes, the hole diameter and the depth shall be dug within given diameter and length respectively **as per the PPL standards** specified or as directed by the Constructing Team Leader/Project Manager.
- Pole Dressing, Contractor to use technical and skilled labour with required tools to dress the poles with required electrical items to fully compliment the standardized dressed power pole prepared for stringing of conductors under the direct supervision of the Team Leader Construction/Project Manager.

- Pole Erection, Contractor to provide labor to erect pole upright and backfill with the suitably selected soil material as directed by the Team Leader Construction/Project Manager.
- Contractor to use technically skill labor to do the stringing of conductors determine by the design **three (3) phase or single phase HV/LV lines** between every adjacent pole with the direct supervision of the Team Leader Construction/Project Manager.
- Contractor to prepare suitable mounting for Transformer installation as specified by PPL standards and accordingly carry out the transformer installation at identified location within entire Distribution HV/LV line route with the direct supervision of the Team Leader Construction/Project Manager.
- Contractor to provide labor to do the Wood Pole numbering and in addition to this, carry out the Bandaging and application of fire redundant paint to the pole base to a length specified by PPL standards or length directed by the Construction Team Leader/Project Manager.
- Contractor to call for and carry out the joint inspection exercise with lines Inspector or his/her delegate to verify and confirm that all works are done within PPL standard and is certified correct for energizing and commissioning. Any incomplete works shall be done at the cost of the contractor as directed by the Lines Inspector or his/her delegate.
- Contractor to keep accurate record or details of all economic tree crops cut down during the clearance of bushes along the proposed HV/LV lines route.

Submitted by:



Bernard Ururu  
**PM MOMASE RE**

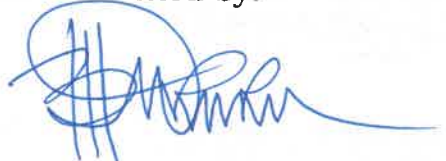
**HOLIWA TO NEW NUMBO H/S RE WORKS  
YANGORU SAUSIA DISTRICT – EAST SEPIK PROVINCE**

**1. PRICED BILL OF QUANTITIES**

| Item Part             | Item No. | Description  | BOQ  |     |      |            |
|-----------------------|----------|--|------|-----|------|------------|
|                       |          |  | Unit | Qty | Rate | Total Cost |
| 1.0 GENERAL           | 1.1      | Visit site to identify and check in person scope of works and ascertain the correctness of the information given on the general scope of works | Ls   | 1   |      |            |
|                       | 1.2      | Survey   | KM   | 5   |      |            |
|                       | 1.3      | Design   | KM   | 5   |      |            |
| 2.0 SITE MANAGEMENT   | 2.1      | Procure, supply, deliver to site all HV/LV line hardware materials incl. steel poles, x-arm brackets, etc.                                     | Ls   | 1   |      |            |
|                       | 2.2      | Procure, supply, deliver to site of Steel poles & X arm brackets   |      | 1   |      |            |
|                       | 2.3      | Mobilization to Project Site & Camp Setup  | Ls   | 1   |      |            |
|                       | 2.4      | Bush Clearance, trees felling  | KM   | 3   |      |            |
|                       | 2.5      | Supervision & Management   | Ls   | 1   |      |            |
| 3.0 POLE ERECTION     | 3.1      | Steel Poles Fabrication Works  | Ls   | 1   |      |            |
|                       | 3.2      | Dig holes for Pole erection (LV/HV) with specified depth/diameter  | No   | 88  |      |            |
|                       | 3.3      | Dress the poles (LV/HV) with required electrical items in preparation for conducting   | No   | 88  |      |            |
|                       | 3.4      | Erect Poles (LV/HV) upright, backfill with concrete  | No   | 88  |      |            |
| 4.0 STAY INSTALLATION | 4.1      | Dig Stay holes (HV)  | No   | 70  |      |            |
|                       | 4.2      | Backfill stay holes (HV) with tensioned stay wires   | No   | 70  |      |            |

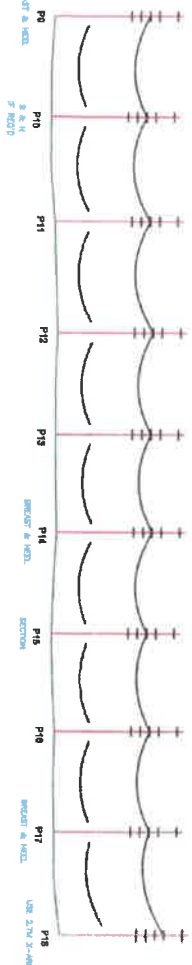
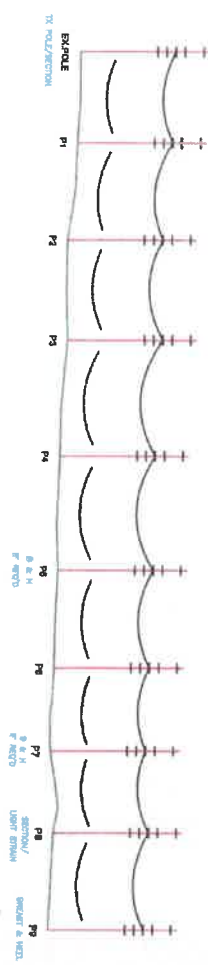
|                                      |     |   |     |     |                    |  |
|--------------------------------------|-----|---|-----|-----|--------------------|--|
| 5.0 STRINGING/<br>CONDUCTORING       | 5.1 | Stringing of HV lines<br>Three Phase  | KM  | 5   |                    |  |
|                                      | 5.2 | Stringing of LV lines<br>Three Phase  | KM  | 5   |                    |  |
| 6.0<br>TRANSFORMER<br>INSTALLATION   | 6.1 | Step down<br>Transformers, 2 X<br>25kVA,3phase,<br>mounting preparation<br>and installation | No  | 2   |                    |  |
| PROVISIONAL<br>SUM Transport<br>Hire |     | Transport / Freight cost<br>to project site   | Ls  | 1   |                    |  |
| Land Cruiser                         | A   | Suitable Supervisory<br>Vehicle 4WD   | Day | 120 |                    |  |
| 3 Ton Lines Truck                    | B   | Suitable Lines Truck  | Day | 120 |                    |  |
| Crane Truck                          | C   | Heavy Crane Truck   | Hr  | 300 |                    |  |
|                                      |     |   |     |     | <b>SUBT TOTAL</b>  |  |
|                                      |     |   |     |     | <b>GST</b>         |  |
|                                      |     |   |     |     | <b>GRAND TOTAL</b> |  |

Submitted by:



Bernard Ururu  
**PM MOMASE RE**




[illegible]


| SECTION      | M.E.S | 1/507                |            | STRENGTH TENSION (N) |            |          |  |
|--------------|-------|----------------------|------------|----------------------|------------|----------|--|
|              |       | W                    | 235 (Kgf)  | 307 (Kgf)            | 35 (Kgf)   | 35 (Kgf) |  |
| EX.POLE - P8 | 87.0  | 871 (825 temp. used) | 6930 (708) | 6350 (647)           | 5820 (592) |          |  |
| P8 - P15     | 99.4  | 806 (825 temp. used) | 6950 (708) | 6350 (651)           | 5850 (596) |          |  |
| P15 - P19    | 117.5 | 987 (975 temp. used) | 7020 (716) | 6510 (664)           | 6040 (616) |          |  |

3. For details of pole construction refer to SPW-2 series. Use 2100mm crossarms except where scheduled,  
All pin crossarms 100 x 100mm, All strain crossarms 100 x 125mm.

4. BULVAL DEPTH  
2.0m for 14m poles, 1.8m for 12m poles, 1.7m for 11m poles, 1.8m for 10m poles and 1.5m for 9.0m poles.

5. Angle poles without stops to be BREAST and HEEL BLOCKED 

6. STAY TYPE Y = Transverse . L = inline.



1. Line designed for CHERBY 6/4.75 - 7/1.60 ACSR erected to SAG TENSION CHART SD 4/18-1, COASTAL E.O.T. - 22% UTS, 20°C using POLE SELECTION CHART SD-5/7/2

2. Section poles at No's: PB,P15,P19

| SECTION | M.E.S | T/60° | W | STRETCHING TENSION (N) |
|---------|-------|-------|---|------------------------|
|         |       |       |   | 250 (100)              |
|         |       |       |   | 300 (120)              |
|         |       |       |   | 350 (140)              |

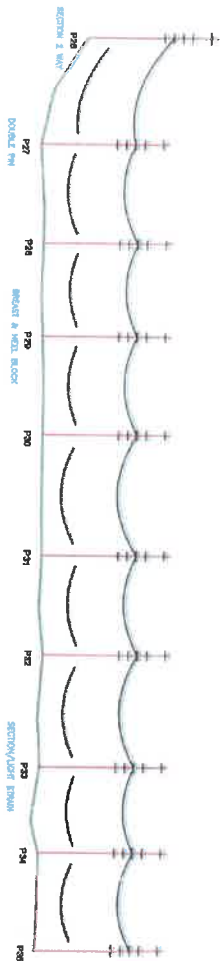
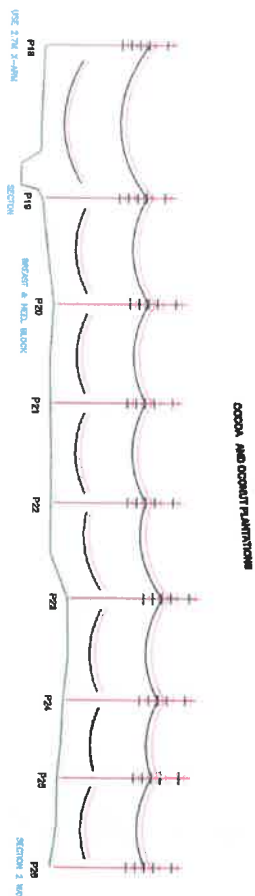
|            |       |                      |            |            |            |
|------------|-------|----------------------|------------|------------|------------|
| KNOLE - P8 | 97.0  | 871 (825 temp. used) | 6930 (706) | 6350 (647) | 5820 (593) |
| P8 - P15   | 98.4  | 896 (825 temp. used) | 6950 (708) | 6390 (651) | 5850 (596) |
| P15 - P19  | 117.5 | 987 (975 temp. used) | 7020 (716) | 6510 (664) | 6040 (616) |

3. For details of pipe construction refer to SPW-2 series. Use 2100mm crossarms except where scheduled. All pin crossarms 100 x 100mm. All strain crossarms 100 x 125mm.

4. **BURIAL DEPTH**  
2.0m for 14m poles, 1.8m for 12m poles, 1.7m for 11m poles, 1.6m for 10m poles and 1.5m for 9.0m poles.

6. STAY TYPE      T = Transverse ; L = Inline.


$$\frac{10}{18} \div \frac{1}{12}$$



| SECTION    | M.E.S. | STRAINING TENSION (N) |            |            |
|------------|--------|-----------------------|------------|------------|
|            |        | 1/60<br>W             | 25 (KG)    | 35 (KG)    |
| P13 -- P19 | 117.5  | 997 (975 temp.-used)  | 7020 (716) | 6510 (664) |
| P15 -- P16 | 94.1   | 871 (828 temp.-used)  | 6830 (706) | 6210 (647) |
| P20 -- P33 | 102.2  | 890 (825 temp.-used)  | 6950 (708) | 6390 (651) |
| P33 -- P40 | 80.3   | 846 (825 temp.-used)  | 6800 (703) | 6310 (643) |
|            |        |                       |            | 5780 (589) |

- 

| CND Filenames            |   | Revision                       | By | Class | Date |
|--------------------------|---|--------------------------------|----|-------|------|
| ACAD/DESIGN/STANDARD.DWG |   | 0000001 07 JUL 2019 - 16:38:15 |    |       |      |
| Date                     | Scale                                   |                                |    |       |      |
| JUL 2019                 | Horizontal 1 : 5000<br>Vertical 1 : 250 |                                |    |       |      |



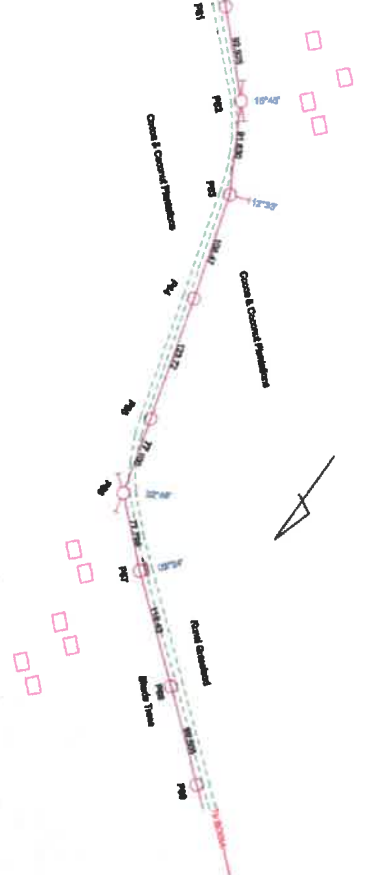
**PNG POWER Ltd**  
 P O Box 1105 BOKOND National Capital District, Papua New Guinea  
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SUMKAR - MADANG PROVINCE  
22KV DISTRIBUTION LINE DESIGN FROM MIRAP TO MALAS  
D - MIRE 1119  
SHEET 2 of 8









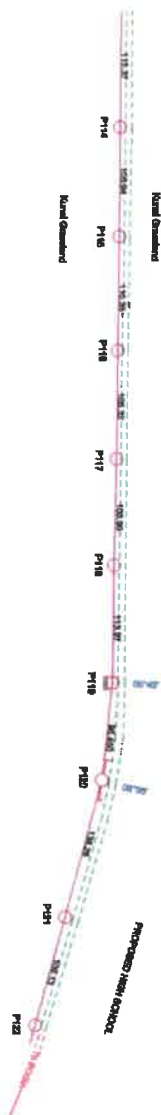
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d. STAY TYPE    T = Transverse , L = Inline.





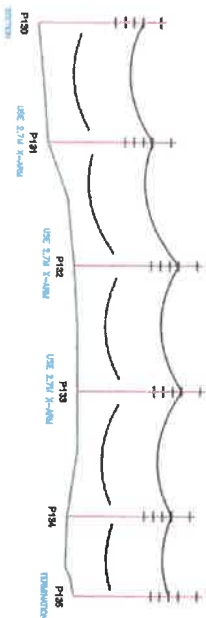
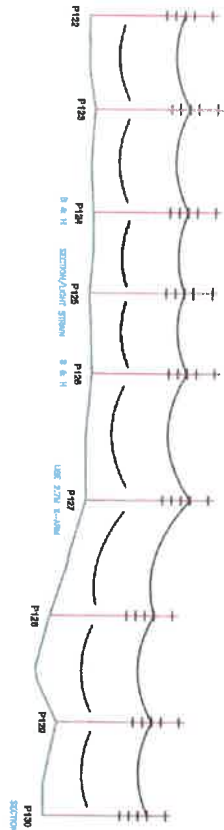


| SECTION     | M.E.S. | 1/50" STRAINING TENSION (N) |            |            |
|-------------|--------|-----------------------------|------------|------------|
|             |        | 25 (40)                     | 50 (40)    | 75 (65)    |
| P106 - P113 | 111.1  | 946 (900 temp. used)        | 6890 (713) | 6450 (657) |
| P113 - P120 | 107.4  | 921 (900 temp. used)        | 6890 (712) | 6420 (654) |
| P120 - P125 | 100.5  | 946 (900 temp. used)        | 6890 (713) | 6450 (657) |


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**SUMKAR - MADANG PROVINCE**  
**22KV DISTRIBUTION LINE DESIGN FROM MIRAP TO MALAS**  
**D - MRE 1119**  
 SHEET 7 of 8



- | SECTION     | M.E.S. | T/60°<br>°            |            |            |
|-------------|--------|-----------------------|------------|------------|
|             |        | STRAINING TENSION (N) |            |            |
|             |        | 25 (65)               | 30 (65)    | 35 (60)    |
| P120 - P125 | 109.3  | 6890 (713)            | 6450 (657) | 5950 (607) |
| P125 - P130 | 105.2  | 6880 (712)            | 6420 (654) | 5900 (601) |
| P130 - P135 | 114.7  | 872 (800 temp. used)  | 7000 (714) | 6400 (662) |
|             |        |                       |            | 6000 (612) |

3. For details of pole construction refer to SPW-2 series. Use 2.00mm crossmembers except where indicated. All pin crossmembers 100 x 100mm. All arch crossmembers 100 x 125mm.
4. **BURIAL DEPTH**  
2.0m for 1.4m poles, 1.8m for 1.2m poles, 1.7m for 11m poles, 1.6m for 10m poles and 1.5m for 8.0m poles.
5. **Angle poles without stays to be BRISTLE and HELD BLOKED** 
6. **STAY TYPE** T = Transverse, L = radial.

