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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

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. 35/2019

CLOSING AT 4.00 PM FRIDAY 02ND AUGUST 2019

FOR FULL CONTRACT OF MATERIALS PROCUREMENT
AND CONSTRUCTION OF 6KM OF POWER LINE
CONSTRUCTION FROM HULIWA TO HANDRA
RURAL ELECTRIFICATION PROJECT IN
YANGORU SAUSIA DISTRICT, WEWAK – EAST
SEPIK PROVINCE.

**HULIWA TO HANDRA (NEW NUMBO H/S) RE WORKS
YANGORU SAUSIA – EAST SEPIK PROVINCE**

TERMS OF REFERENCE

This Term of Reference is for the **Procurement, Supply, Delivery to site of Project Materials and the Construction of 6km High Voltage of Distribution Power Lines from Huliwa to Handra (New Numbo H/S), Yangoru Sausia 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 8km of High and 3 km of Low Voltage Distribution Lines including installation of transformers, commissioning and energizing from Huliwa to Handra, location of New Numbo High School, Yangoru Sausia District in East Sepik 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 30% 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 20% of the money is then paid to the contractor within three (3) weeks.
- 5.5.6 The contractor then issues the 10% invoice of final remaining 10% of the total contract amount to PPL which is then paid after the defects liability period which is 3 months after the successful commissioning of the completed power line extension works.

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.

**HULIWA TO HANDRA (NEW NUMBO H/S) RE WORKS
YANGORU SAUSIA DISTRICT – EAST SEPIK 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 Huliwa to Handra (New Numbo High School) RE Project, Yangoru Sausia District, East Sepik 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 6km 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 (Vanimo Town) all materials for the construction of 8km 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.
- If wood poles are used as power poles then the Contractor is 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

HULIWA TO HANDRA (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	6		
	1.3	Design	KM	6		
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	6		
	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	67		
	3.3	Dress the poles (LV/HV) with required electrical items in preparation for conducting	No	67		
	3.4	Erect Poles (LV/HV) upright, backfill with concrete	No	67		
4.0 STAY INSTALLATION	4.1	Dig Stay holes (HV)	No	33		
	4.2	Backfill stay holes (HV) with tensioned stay wires	No	56		

5.0 STRINGING/ CONDUCTORING	5.1	Stringing of HV lines Three Phase	KM	6		
	5.2	Stringing of LV lines Three Phase	KM	6		
6.0 TRANSFORMER INSTALLATION	6.1	Step down Transformers, 1 X 50kVA 3 ϕ , 2 X 25kVA 3 ϕ mounting, preparation and installation	No	3		
PROVISIONAL SUM Transport Hire		Transport / Freight cost to project site	Ls	1		
Land Cruiser	A	Suitable Supervisory Vehicle 4WD	Day	120		
3 Ton Lines Truck	B	Suitable Lines Truck	Day	120		
Crane Truck	C	Crane Truck	Hr	500		
SUBT TOTAL						
GST						
GRAND TOTAL						

Submitted by:



Bernard Ururu
PM MOMASE RE

Bill Of Quantities

PROJECT: HULIWA TO HANDRA (NUMBO HS) RURAL ELECTRIFICATION

NO.	VOCAB. NO.	DESCRIPTION	UNIT	QTY
1	111023	Conductor Alum.steel 6/4.75 ACSR 'Cherry'	Metre	22000
2	121041	Fuse expulsion Dropout 100A 11/22KV	Each	3
3	131021A	Pole Steel , 200UC 12 Metres	Length	25
4	131031A	Pole Steel , 150UC 12 Metres	Length	75
5	132001A	Insulator, strain "Polymer" 22KV	Each	115
6	132006	Insulator, 22KV Pin type	Each	335
7	132016	Pin, insulator HV type c/200/11	Each	335
8	132029	Bracket, Mild Steel, X-Arm LV/Hv	Each	155
9	132029A	Bracket,Strain Insulator, Steel Pole	Each	40
10	132031	Hook, tougue for 16MM clevis insulators	Each	115
11	132038	Insulator, stay type GY3 22KV	Each	45
12	132054	Cross arm, 2700x100x125MM Hard wood	Each	50
13	132055	Cross arm, 2700x100x100MM Hard wood	Each	20
14	132056	Cross arm, 2100x100x125MM Hard wood	Each	15
15	132057	Cross arm, 2100x100x100MM Hard wood	Each	80
16	132063	Guy lock, 19/2.00 galvanised steel	Each	25
17	132064	Guy lock, 19/2.5 galvanised steel	Each	20
18	132069	Grip 19/2.00 Galvanised steel	Each	75
19	132070	Grip 19/2.75 Galvanised steel	Each	60
20	132081	Plate, Base Mild Steel for 150UC Pole, 6MM x 225MM x 225MM	Each	75
21	132082	Plate, Base Mild Steel for 150UC Pole, 6MM x 325MM x 325MM	Each	25
20	132085	Stay rod & bow M20 x 2745MM	Set	20
21	132087	Stay rod & bow, M24 x 3200MM	Set	20
22	132098	Log stay, hardwood 1500mm x 300MM	Each	85
23	132101	Attachment, Stay Mild Steel 130 x 90 x 20MM	Each	50
24	132109	Thimble, wire rope Gal. 12MM	Each	20
25	132110	Thimble, wire rope Gal. 16MM	Each	20
26	132126	Stay wire, Galvanised steel 19/2.00	Metre	450
27	132127	Stay wire, Galvanised steel 19/2.75	Metre	300
28	132137	Armour rod, 6/4.75-7/1.60 ACSR 'Cherry'	Set	210
29	132143	Clamp, Parallel Groove for Al 9-16MM Dia.	Each	60
30	132157	Dead-end, 6/4.75 - 7/1.60 ACSR 'Cherry'	Each	115
31	132167	Splice, 6/4.75 - 7/1.60 ACSR 'Cherry'	Each	40
31	132180	Wire-tie, aluminium 5.18MM dia.	Kg	30
32	132181	Wire-tie, aluminium 4.12MM dia.	Kg	1
33	132182	Clevis-thimble, 16MM forpreformed Deadend	Each	115
34	139208	Bracket Pole top 6 x 75mm Flat Steel	Each	5
35	139241	Nail, knuckle, shunt plate 89 x 159 MM	Each	455
36	140091	Bolt & Nut, M16 160MM hexagen galvanised	Each	120
37	140093	Bolt & Nut, M16 140MM galvanised	Each	190
38	140657	Stud, M20 x 600MM galvanised	Each	60
39	140660	Stud, M20 x 500MM galvanised	Each	55
40	141024	Eye nut, M20 galvanised	Each	80
41	141051	Washers, round flat galvanised M16	Kg	7
42	141053	Washers, square flat 75 x 75MM M20 galvanised	Each	440

Bill of Quantities

PROJECT: HOLIWA TO NUMBO HIGH SCHOOL RURAL ELECTRIFICATION

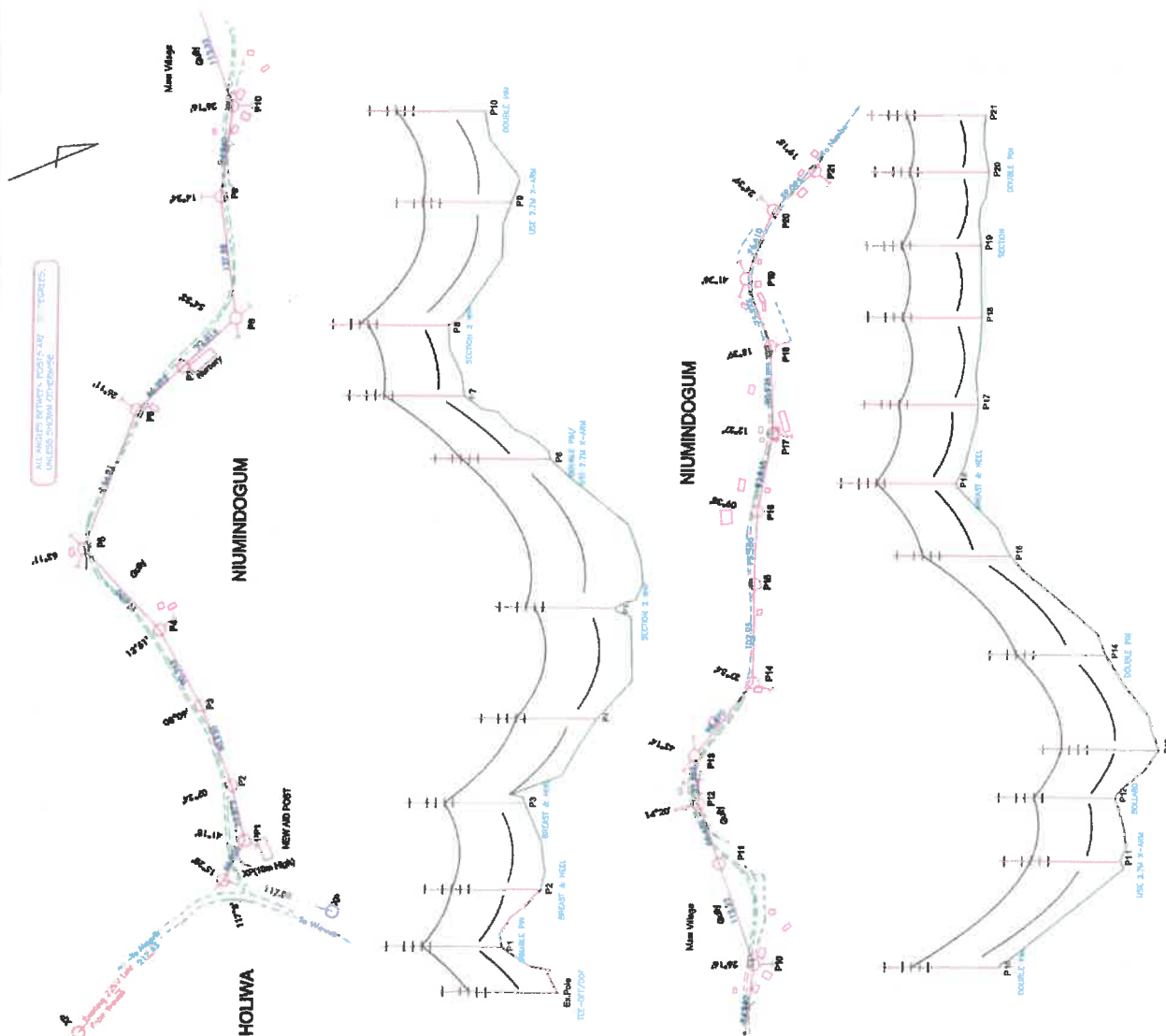
NO.	VOCAB. NO.	DESCRIPTION	UNIT	QTY
1	111023	Conductor Alum.steel 6/4.75 ACSR 'Cherry'	Metre	22000
2	121041	Fuse expulsion Dropout 100A 11/22KV	Each	3
3	131021A	Pole Steel , 200UC 12 Metres	Length	25
4	131031A	Pole Steel , 150UC 12 Metres	Length	75
5	132001A	Insulator, strain "Polymer" 22KV	Each	115
6	132006	Insulator, 22KV Pin type	Each	335
7	132016	Dis. insulator LV type 6/200/11	Each	225
8	132029	Bracket, Mild Steel, X-Arm LV/Hv	Each	155
9	132029A	Bracket, Strain Insulator, Steel Pole	Each	40
10	132031	Hook, tongue for 16MM clevis insulators	Each	115
11	132038	Insulator, stay type GY3 22KV	Each	45
12	132054	Cross arm, 2700x100x125MM Hard wood	Each	50
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14	132056	Cross arm, 2100x100x125MM Hard wood	Each	15
15	132057	Cross arm, 2100x100x100MM Hard wood	Each	80
16	132063	Guy lock, 19/2.00 galvanised steel	Each	25
17	132064	Guy lock, 19/2.5 galvanised steel	Each	20
18	132069	Grip 19/2.00 Galvanised steel	Each	75
19	132070	Grip 19/2.75 Galvanised steel	Each	60
20	132081	Plate, Base Mild Steel for 150UC Pole, 6MM x 225MM x 225MM	Each	75
21	132082	Plate, Base Mild Steel for 150UC Pole, 6MM x 325MM x 325MM	Each	25
20	132085	Stay rod & bow M20 x 2745MM	Set	20
21	132087	Stay rod & bow, M24 x 3200MM	Set	20
22	132098	Log stay, hardwood 1500mm x 300MM	Each	85
23	132101	Attachment, Stay Mild Steel 130 x 90 x 20MM	Each	50
24	132109	Thimble, wire rope Gal. 12MM	Each	20
25	132110	Thimble, wire rope Gal. 16MM	Each	20
26	132126	Stay wire, Galvanised steel 19/2.00	Metre	450
27	132127	Stay wire, Galvanised steel 19/2.75	Metre	300
28	132137	Armour rod, 6/4.75-7/1.60 ACSR 'Cherry'	Set	210
29	132143	Clamp, Parallel Groove for Al 9-16MM Dia.	Each	60
30	132157	Dead-end, 6/4.75 - 7/1.60 ACSR 'Cherry'	Each	115
31	132167	Splice, 6/4.75 - 7/1.60 ACSR 'Cherry'	Each	40
31	132180	Wire-tie, aluminium 5.18MM dia.	Kg	30
32	132181	Wire-tie, aluminium 4.12MM dia.	Kg	1
33	132182	Clevis-thimble, 16MM forpreformed Deadend	Each	115
34	139208	Bracket Pole top 6 x 75mm Flat Steel	Each	5
35	139241	Nail, knuckle, shunt plate 89 x 159 MM	Each	455
36	140091	Bolt & Nut, M16 160MM hexagen galvanised	Each	120
37	140093	Bolt & Nut, M16 140MM galvanised	Each	190
38	140657	Stud, M20 x 600MM galvanised	Each	60
39	140660	Stud, M20 x 500MM galvanised	Each	55
40	141024	Eye nut, M20 galvanised	Each	80
41	141051	Washers, round flat galvanised M16	Kg	7
42	141053	Washers, square flat 75 x 75MM M20 galvanised	Each	440

1. Line designed for CHERRY
E.D.T. - 22% UTS, 20°C w/
.75 - 7/1.60 ACSR erected to SAG TENSION CHART SD 4/18-1, COASTAL
POLE SELECTION CHART SD-5/7/2.

2. Section poles at No's: PO's 3,P13,P19,P25

SECTION	M.E.S	T/60T		STRAINING TENSION (N)		
		W		25° (KG)	30° (KG)	35° (KG)
EX-POLE - P05	91.2	846 (825 temp. used)	6900 (703)	6310 (643)	5780 (589)	
P05 - P08	122.3	997 (875 temp. used)	7020 (716)	6510 (664)	6040 (616)	
P08 - P13	102.9	806 (825 temp. used)	6950 (708)	6390 (651)	5850 (598)	
P13 - P19	89.7	846 (825 temp. used)	5900 (703)	6310 (643)	5780 (589)	
P19 - P25	73.1	732 (750 temp. used)	6820 (695)	6180 (630)	5590 (569)	

3. For details of pole construction refer to SPW-2 series. Use 2100mm crossarms except where scheduled. All pin crossarms 100 x 10mm, All strain crossarms 100 x 125mm.
4. BURIAL DEPTH
2.0m for 14m poles, 1.7m for 12m poles, 1.5m for 10m poles and 1.5m for 9.0m poles.
5. Angle poles without stay to be BREAST and HEEL BLOCKED
6. STAY TYPE T = Trc
arse, L = Inline.

[illegible]

KUBALIA-EAST SEPIK PROVINCE

DISTRIBUTION LINE DESIGN FROM HOLIWA TO NUMBO H/SCH

Q - MRE 03/19

SHEET 1 OF 5

PNG POWER Ltd
P.O. Box 1100 BOROKO - National Capital District, Papua New Guinea
PH: (675) 324 3115 - FAX: (675) 325 0185 - EMAIL: pngpower@pngpower.com.pg

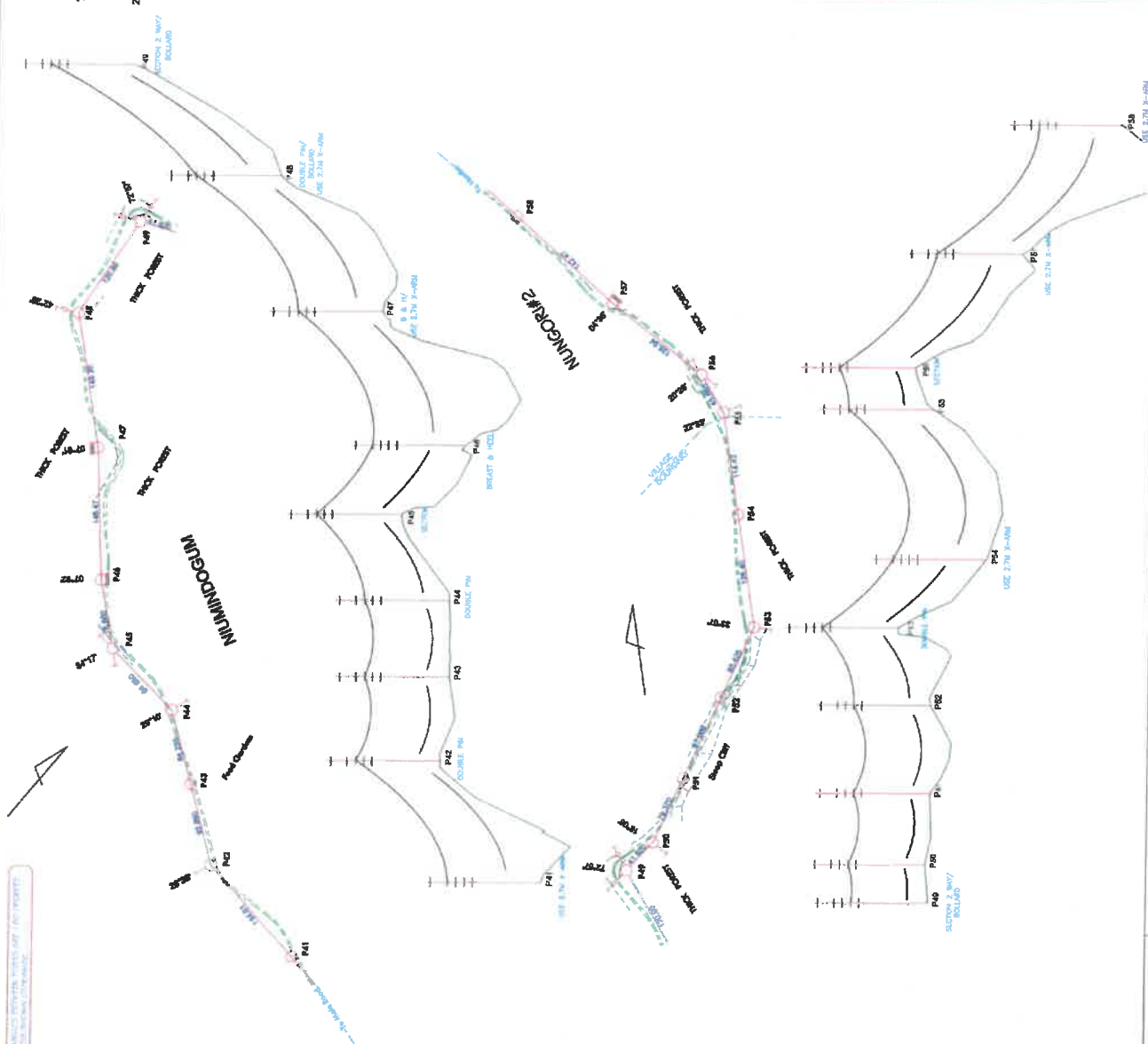
CNO Filament		Revelin	By	Chkl	Date
Date	Studs				
APRIL 2018	Horizontal : 2500 Vertical : 1:250				

1. Line designed for CHERRY - .75 - 7/1.60 ACSR erected to SAG TENSION CHART SD 4/18-1, COASTAL.
E.D.T. - 22% UTS, 20°C W/ POLE SELECTION CHART SD-5/7/2.

- Section poles at No's: P39 5, P49, P56, P87

SECTION	M.E.S.	T/60° W	STRETCHING TENSION (N)		
			25° (KG)	30° (KG)	35° (KG)
3B - P45	110.2	946 (900 temp. used)	6990 (713)	6450 (657)	5950 (607)
45 - P49	132.7	1035 (975 temp. used)	7050 (719)	6560 (669)	6120 (624)
49 - P56	98.5	895 (825 temp. used)	6950 (708)	6390 (651)	5850 (598)
56 - P61	114.6	972 (900 temp. used)	7000 (714)	6460 (665)	6000 (612)

3. For details of pole construction refer to SPW-2 series. Use 2100mm crossarms except where scheduled. All pin crossarms 100 x 10mm, All strain crossarms 100 x 125mm.
4. BURIAL DEPTH
2.0m for 14m poles, 1.5m for 12m poles, 1.7m for 11m poles, 1.8m for 10m poles and 1.2m for 9.0m poles.
5. Angle poles without stay to be BREAST and HEEL BLOCKED
6. STAY TYPE T = Truss
 L = lattice.



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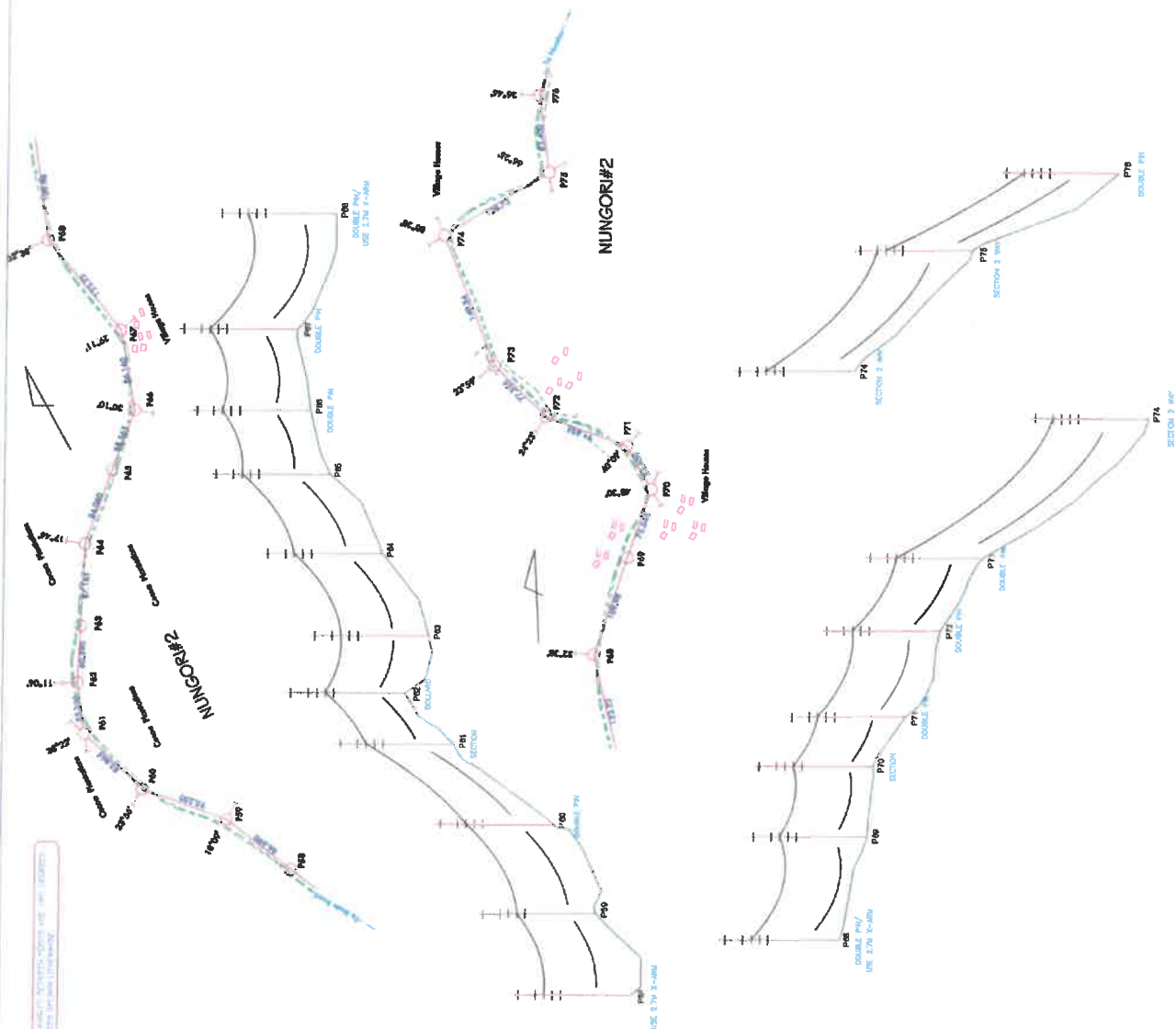
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1. Line designed for CHERRY .75 - 7/1.60 ACSR erected to SAG TENSION CHART SD 4/18-1, COASTAL.
E.O.T. - 22% UTS, 20°C US POLE SELECTION CHART SD-5/7/2.

2. Section poles at No's: P56 .P70,P74,P75,7B

SECTION	M.E.S	T (°C)	STRING TENSION (N)		
			25° (KG)	30° (KG)	35° (KG)
55 - P61	114.6	972 (900 temp. used)	7000 (714)	6490 (662)	6000 (612)
61 - P70	91.2	846 (825 temp. used)	6900 (703)	6310 (643)	5780 (589)
70 - P74	112.6	946 (900 temp. used)	6990 (711)	6450 (657)	5950 (607)
74 - P75	128.7	1035 (975 temp. used)	7050 (719)	6560 (668)	6170 (624)
75 - P78	178.0	1212 (1200 temp. used)	7150 (729)	6810 (694)	6460 (659)

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| 3. | For details at pole corners refer to SPW-2 series. Use 2100mm crossarms except where scheduled. All pin crossarms 100 x 125mm. All strain crossarms 100 x 125mm. |
| 4. | SURFAC DEPTH
2.0m for 14m poles, 1.0m for 12m poles, 1.7m for 11m poles, 1.6m for 10m poles and 1.5m for 9.0m poles. |
| 5. | Angle poles without stay to be BREAST and MEEL BLOCKED |
| 6. | STAY TYPE T = Tri angle, L = inline. |



P001	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	1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(No)	(Nm)	(Mn)	(Mx)
KUBALIA-EAST SEPIK PROVINCE			

DISTRIBUTION LINE DESIGN FROM HOLIWA TO NUMBO H/SCH

D - MRE 03/19

SHEET 4 of 5



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Revision	By	Date
TURNKEY BY JF2008 - 10.03.19		

[illegible]

- | SECTION | M.E.S. | T/40
W | STRAINING TENSION (N) | | |
|----------|--------|------------------------|-----------------------|------------|------------|
| | | | 25° (KG) | 30° (KG) | 35° (KG) |
| 5 - P78 | 178.0 | 1212 (1200 temp. used) | 7150 (729) | 6810 (694) | 8460 (659) |
| 7B - P79 | 98.1 | 871 (925 temp. used) | 6930 (706) | 6350 (647) | 5920 (593) |
| 79 - P84 | 159.6 | 1148 (1125 temp. used) | 7120 (726) | 6710 (684) | 6446 (646) |
| 84 - P85 | 186.2 | 1242 (1200 temp. used) | 7200 (734) | 6850 (698) | 6820 (666) |
| 85 - P88 | 84.5 | 820 (825 temp. used) | 6900 (702) | 6290 (641) | 5730 (625) |

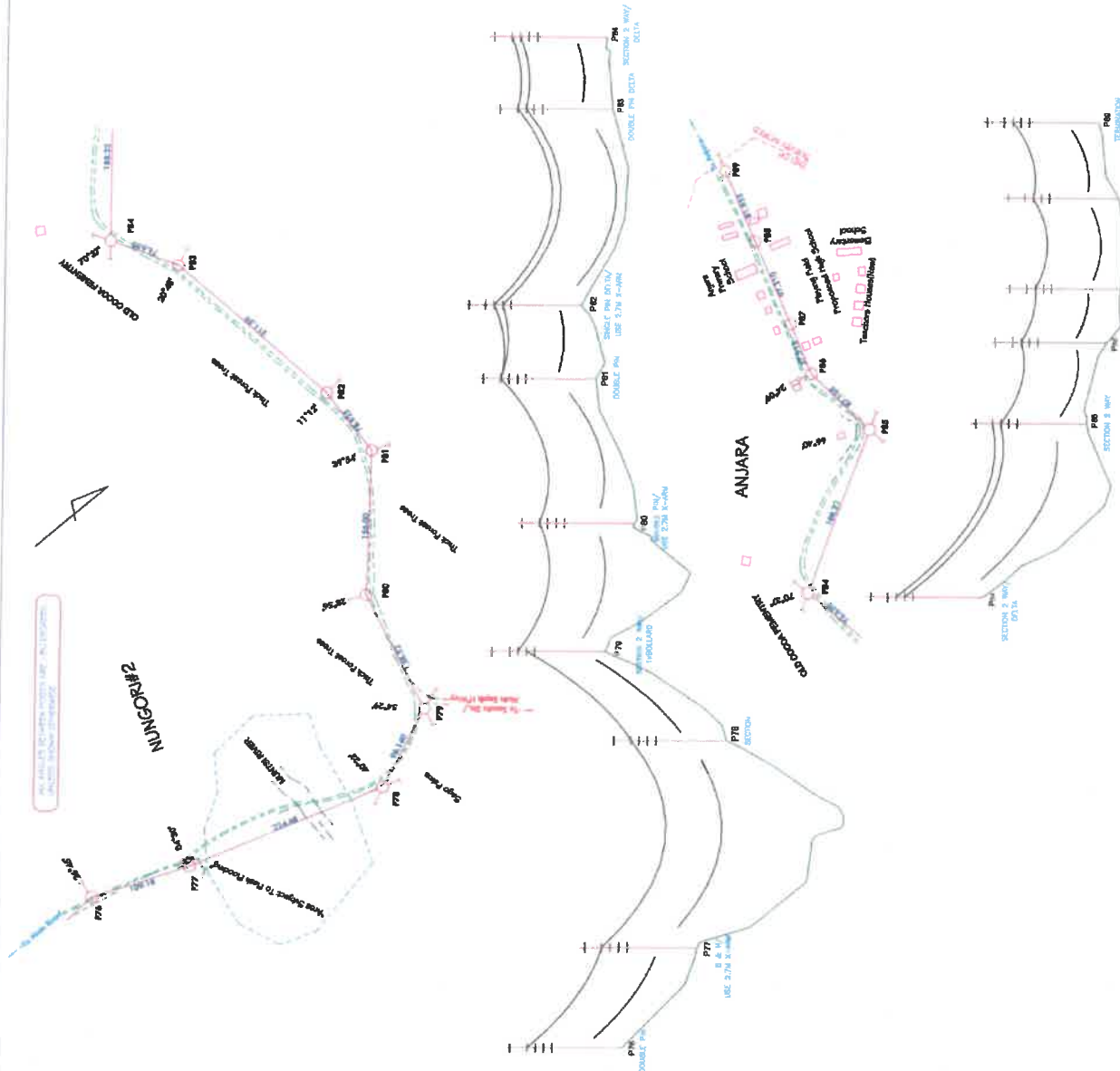
3. For details of pole construction refer to SPW-2 series. Use 2100mm crossarms except where scheduled. All pin crossarms 100 x 125mm. All strain crossarms 100 x 125mm.

4. BURIAL DEPTH

2.0m for 14m poles, 1.5m for 12m poles, 1.7m for 11m poles, 1.6m for 10m poles and 1.5m for 9.0m poles.

5. Angle poles without stay ; b6 BREAST and HEEL BLOCKED

5. STAY TYPE T = TRO HRS, L = LINE.

[illegible]

KUBALIA-EAST SEPIK PROVINCE

DISTRIBUTION LINE DESIGN FROM HOLIWA TO NUMBO H/SCH

D - MRE 03/19

SHEET 5 of 5

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