



**ENERGY FIJI LIMITED**

# **BIDDING DOCUMENT**

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**Vuda NCC Substation 132/33kV Transformer  
Replacement Project**

**Design & Construct Transformer  
Foundation Pad, Oil Separator Pit, Carry out  
Electrical and Civil Works.**

**TENDER NO: MR 276/2019**

# INVITATION FOR BIDS

Date: **4<sup>th</sup> September, 2019**  
Tender No: **MR 276/2019**

The ENERGY FIJI LIMITED (“The Employer”) invites sealed bids from reputable and suitable Bidders for the Design & Construct Transformer Foundation Pad, Oil Separator Pit, Carry out Electrical and Civil Work at Vuda NCC Substation.

All bids for the contract shall be submitted on the appropriate forms provided and shall include the completed price schedule, technical schedule and schedules of experience etc. The bid shall be on the basis of a lump sum contract based on firm prices.

Bidders may obtain further information from, and inspect and acquire the bidding documents, at

Design & Construct Transformer Foundation Pad, Oil Separator Pit, Carry out Electrical and Civil Work at Vuda NCC Substation.

ENERGY FIJI LIMITED  
The Secretary Tender Committee  
2 Marlow Street, Suva, FIJI.  
Suva

The deadline for submission of bids shall be **1600hrs (local time) on Wednesday 2<sup>nd</sup> October, 2019.**

During evaluation of bids the Authority may invite a bidder or bidders for discussions, presentations and any necessary clarification before awarding the contract price proposal.

## Section 1 - Instructions to Bidders

- 1. Scope of Bid** *ENERGY FIJI LIMITED (hereinafter referred to as "the Employer"), wishes to receive bids for the Design & Construct Transformer Foundation Pad, Oil Separator Pit, Carry out Electrical and Civil Work at Vuda NCC Substation, as defined in these bidding documents (hereinafter referred to as "the Works").*  
The successful bidder will be expected to complete the Works within 3 months from the date of commencement of the Works.
- 2. Eligible Bidders** This Invitation to Bid is open to bidders who have sound financial background and have previous experience in handling such civil projects.  
  
Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer as the Employer shall reasonably request.  
  
Bidders shall not be under a declaration of ineligibility for corrupt or fraudulent.
- 2. Eligible Materials, Equipment and Services** The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. At the Employer's request, bidders may be required to provide evidence of the origin of materials, equipment, and services.
- 3. Qualification of the Bidder** To be qualified for award of Contract, bidders shall submit proposals regarding work methods, scheduling and resourcing which shall be, provided in sufficient detail to confirm the bidder's capability to complete the works in accordance with the specifications and the time for completion.
- 4. Cost of Bidding** The bidder shall bear all costs associated with the preparation and submission of its bid and the Employer will in no case be responsible or liable for those costs.
- 5. Site Visit** The bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for the design-build and completion of the Works. The costs of visiting the Site shall be at the bidder's own expense. The pre-bid meeting is scheduled on Thursday 12<sup>th</sup> September, 2019 at 10.00am at EFL's Vuda NCC Substation Site.
- 6. Sealing and Marking of Bids** The bidder shall seal the original copy of the technical proposal, the original copy of the price proposal and each copy of the technical proposal and each copy of the price proposal in separate envelopes clearly marking each one as: "ORIGINAL-PROPOSAL", and "COPY PROPOSAL", etc. as appropriate.  
  
The bidder shall seal the original bids and each copy of the bids in an inner and an outer envelope, duly marking the envelopes as "ORIGINAL" and "COPY".

The inner and outer envelopes shall be addressed to the Employer at the following address: Tuvitu Delairewa

General Manager Commercial  
Energy Fiji Limited,  
2 Marlow Street, Suva, FIJI.  
Phone: 679 3224 185  
Facsimile: 679 331 1882  
Email: [TuvituD@efl.com.fj](mailto:TuvituD@efl.com.fj)  
And

bear the following identification:

- Bid for: Design & Construct Transformer Foundation Pad, Oil Separator Pit, Carry out Electrical and Civil Work at Vuda NCC Substation.
- Bid Tender Number: MR 276/2019
- DO NOT OPEN BEFORE Wednesday, 2<sup>nd</sup> October, 2019

**7. Deadline for  
Submission of  
Bids**

Bids must be received by the Employer at the address specified above no later than 1600 hours (Fiji Time) Wednesday 2<sup>nd</sup> October, 2019.

The Employer may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.

**8. Late Bids**

Any bid received by the Employer after the deadline for submission of bids prescribed in Clause 23 will be rejected and returned unopened to the bidder.

**9. Modification and  
Withdrawal of  
Bids**

The bidder may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by the Employer prior to the deadline for submission of bids.

The bidder's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause 22, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate. A withdrawal notice may also be sent by fax but must be followed by a signed confirmation copy.

No bid may be modified by the bidder after the deadline for submission of bids.

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|---|---|
| <b>10. Employer's Right to Accept any Bid and to Reject any or all Bids</b> | Notwithstanding Clause 34, the Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the Employer's action.  |
| <b>11. Notification of Award</b>  | <p>Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder by fax, confirmed by registered letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") shall name the sum which the</p> <p>Employer will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").</p> <p>The notification of award will constitute the formation of the Contract. Upon the furnishing by the successful bidder of a performance security, the Employer will promptly notify the other bidders that their bids have been unsuccessful</p>   |
| <b>12. Signing of Contract Agreement</b>                                    | <p>At the same time that he notifies the successful bidder that its bid has been accepted, the Employer will send the bidder the Form of Contract Agreement provided in the bidding documents, incorporating all agreements between the parties.</p> <p>Within 7 days of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to the Employer.</p>   |
| <b>13. Corruptor Fraudulent Practices</b>                                   | <p>The Employer requires that the Contractor observe the highest standard of ethics during the procurement and execution of such contracts. In Pursuance of this policy, the Employer:</p> <p>(a) defines, for the purposes of this provision, the terms set forth below as follows:</p> <p>(i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and</p> <p>(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition;</p> |

- (b) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

Furthermore, bidders shall be aware of the provision stated in Sub-Clause 1.16 and Sub-Clause 15.5 of the Conditions of Contract, Part II - Conditions of Particular Application.

# **Section 2**

Employer's Requirements  
Scope of Works

## 1. Scope of Works

The scope of works for this contract for the **Design & Construct Transformer Foundation Pad, Oil Separator Pit, Carry out Electrical and Civil Work at Vuda NCC Substation.**

Transformer Specifications (2 x 60MVA)	
Rating	60MVA each
	132kV / 33kV
Approx. Total Transformer Mass (kg)	120,000 each
Approx. Oil Volume (L)	28,400 each

## 2. GENERAL DESCRIPTION

This section covers the civil scope of work required to be carried for preparation of the transformer bay prior to installation of the new 2 x 60MVA 132/33kV Transformer at the Energy Fiji Limited's Vuda NCC Substation.

1. Carry out GEO Tech study on areas where transformer pads are to be constructed.
2. Design and Construct 2 X transformer pads (7600mm x 4490mm x 500mm from ground level) to support 145 Tonne weight. Desired transformer pad shall cater transformer base load and shall be constructed in accordance to the GEO Tech study.
3. Design and Construct transformer bund bases and wall 500mm high from floor level x 200mm thick wall. Bund dimension shall be in accordance to the transformer design drawing and meet the space limitation at the site.
4. Design and Installation of oil/water drainage system and oil separator pits as per NFA, USA standards. The pit should shall have capacity of 30,000L in case of any spill. There shall be one common oil separator pit for both the pads which shall have one control valve each for the pipe gong to the oil separator pit.
5. Design and construct 3000mm x 3000mm x 300mm concrete pad for NER to support weight of 3 tonne. It is bidders' responsibility to transport NER from EFL yard to the site, install on pad and carry out electrical connection (HV cable termination works).
6. Design and construct 3000mm x 2000mm x 300mm concrete pad for auxiliary earthing transformer with a support weight of 9 tonne. It is bidders' responsibility to transport auxiliary transformer from EFL yard to the site, install on pad and carry out electrical connection (HV cable termination works). The pad shall have 150mm X 4 conduits for HV, where the cables will go to the 33kV side of the 132/33kV transformer and 150mm x 1 conduit for LV side of the transformer. It shall be bidders' responsibility to carry out cable termination works on the auxiliary transformer and carry out laying of cables. Cables will be free issued by EFL.
7. Installation of high voltage cable conduits for 33kV cables for the 132/33kV power transformer, each circuit shall have 150mm X 4 conduits bends per phase, from pad to the 33kV switchyard and 33/0.415kV auxiliary earthing transformer respectively. Power cables will be free issued by EFL and it is bidders' responsibility to carry out trenching, laying, backfilling and cable termination works at transformer and 33kV switchgear end.
8. Earth grid design shall be carried out by reputable earth grid design engineer. Design shall be certified by the engineer as well.



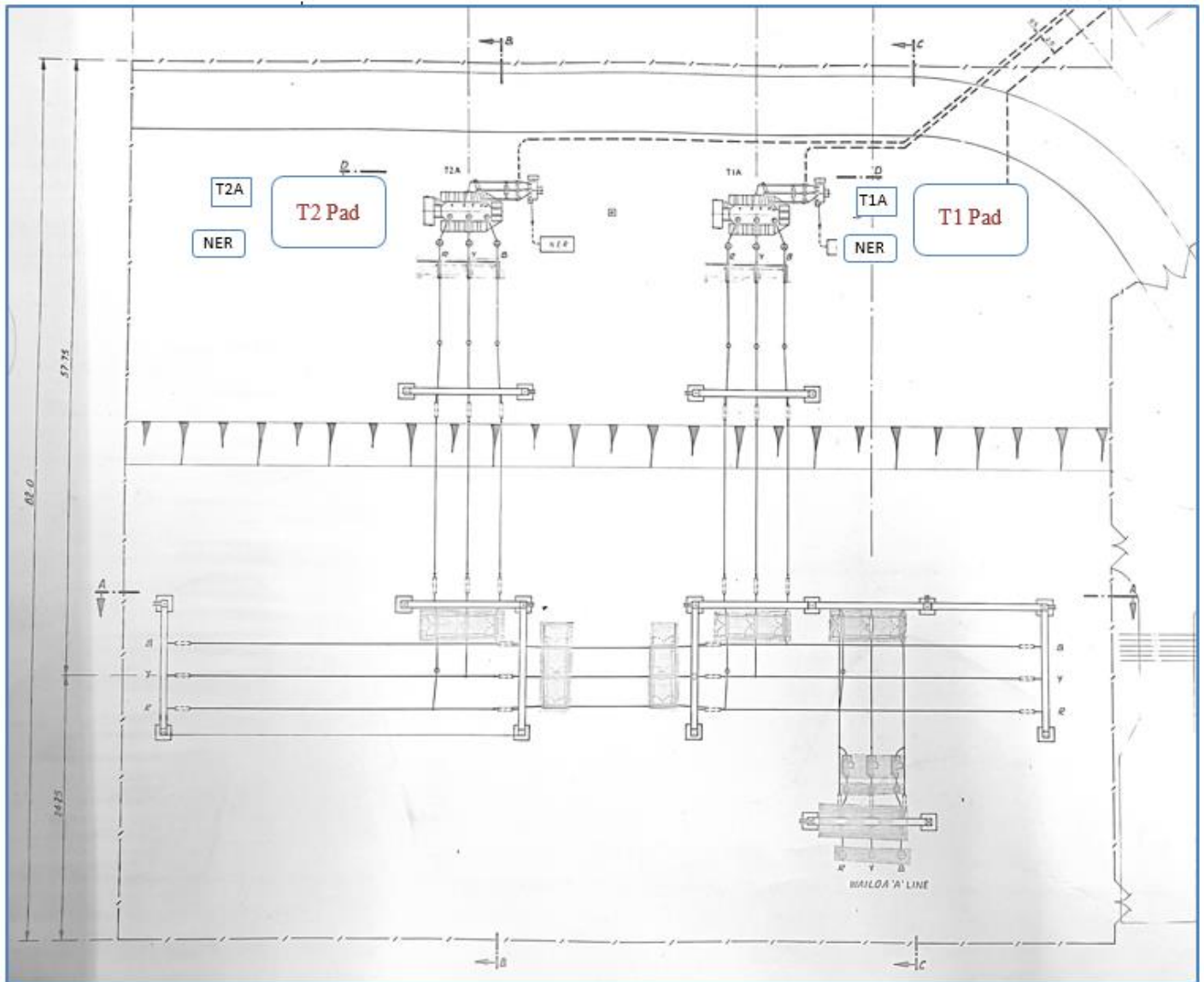
9. Supply and installation of 12x100W Philips brand LED floodlights, install two (2) lights on 6 steel poles. Steel poles to be supplied by the bidder and bidder to design and construct concrete pad for the poles. Poles to have necessary earthing connection as well. The LED lights to be operated via daylight/sunset switch wired to a contactor complete with all wiring up to the 415VAC board.
10. Bidder to supply and install 6 x support insulators with steel structure complete with concrete padding and earthing. Steel structure height shall be of minimum 2100mm. Support insulator – porcelain type shall be 145kV rated and shall be accordance to IEC60071 and IEC60273 standards. It shall have a one minute withstand voltage of 230kV and lightening impulse withstand voltage of 550kV. Pollution level should be in accordance to IEC 60815 and IEC 60273 standard. It shall have a Mechanical Load – Bending capacity of at least 16kN and Mechanical Load – Torsion capacity of at least 4kN.m.
11. Laying of HD orange conduits as per drawings provided and as directed by EFL representative on site. Bidder to carry out all power cable works, power cable to be transported from EFL Navutu Deport.
12. Bidder to carry out laying of control cable conduit from the transformer pad to the control building as required and carry out control cable trenching works for both the power transformers. Bidder to also lay control cable for the disconnecter and earth switch to the control building, cable will be provided by EFL.
13. Bidder to provide connectivity hardwares for the 132kV conductor that will be terminated on the 132kV disconnecter, 145kV earth switch and support insulators. It shall be bidders' responsibility to carry out conductor terminations. All lugs shall be compatible to AAC Ursula conductor. All connections shall be in accordance to the below standards.

AS 1559	Hot - Dip galvanized steel bolts with associated nuts and washers for tower construction
AS 1252	High strength steel bolts with associated nuts and washers for structural engineering
AS 1627	Metal Finishing – preparation and treatment of surfaces
AS 1796	Certification of welders and welding supervisors
AS 2214	Certification of welding supervisors – structural steel welding
AS 2312	Guide to the protection of structural steel against atmospheric corrosion by use of protective coating
AS 4100	Steel structures
AS 4860	Hot – dipped galvanised (zinc) coatings on fabricated ferrous articles
ASTM	Standard specification for zinc (Hot-Dip Galvanizing) Coatings on iron and steel products
Welding	5mm FILLET UNO

14. Bidder to supply 500meter AAC Ursula Conductor, in steel drum, stranding and wire diameter of 61/3.50 (No/mm). Conductor to be purchased from Nexans Australia.
15. Bidder to carry out land scaping of the new area where the transformer pad will be placed for T1.
16. It will be contractor's responsibility to discard the surplus excavated soil as where EFL representative states.
17. Bidder to properly provide drainage excess to the new excavated land and reinstate any soil wall/ cliff if need be.
18. All damage crush metal to be replace by 200mm depth of 40mm crush metal with new weed mats.
19. Contractor to pull 630mm Power Cable as per the route as discussed during the site visit. A brief route is outlined and given in the appendix.
20. Contractor to de-tank and remove existing 132/33kV Transformer T1, Auxiliary transformer T1A and NER and scrap it at Navutu Store. It is contractor responsibility to remove and dispose the oil from the power transformer.

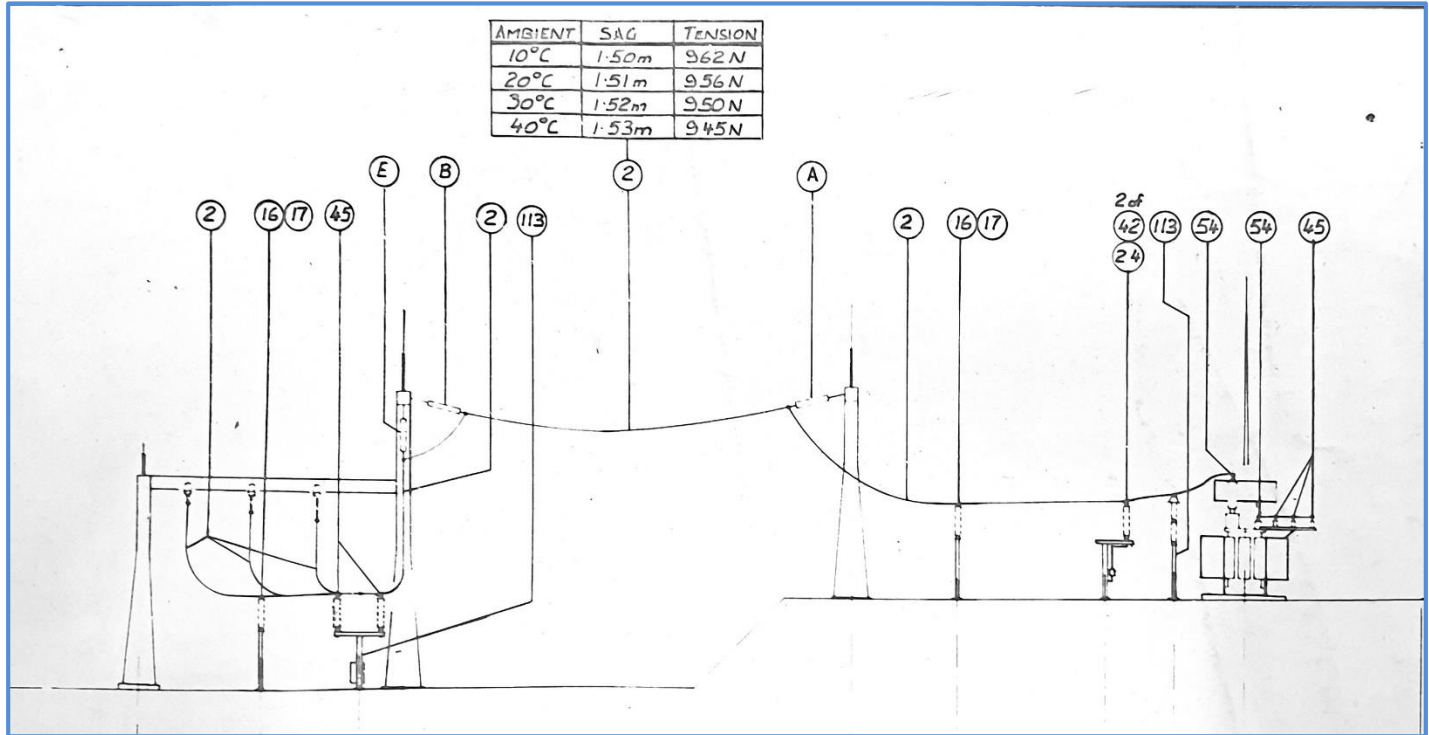
21. Carry out detailed layout drawing of 132kV Substation; civil, electrical, trenching, routing, etc.
22. Contractor must supply certificate stating concrete pad is ready for required loading and all concrete delivered to site must be tested for MPA rating and results to be supplied to EFL before pad pouring.
23. Contractor to remove and relocate fence and gate as discussed in the site meeting.
24. Bidder to design, supply and install two (2) x lighting mast in accordance to the lightening study. Bidder to carry out lightening study to precisely locate actual location of lightening mast.

### Proposed Location of Pads



Please note, proposed locations of the pads are not to scale. T1's auxiliary transformer and NER pad, the existing T1, T1A and its NER has to be removed which will be the bidder's responsibility. Removal can only happen after energizing and commissioning new T2. After removed, then only the new pads for Auxiliary transformer and NER can be constructed.

## Side Plan of the Structures



Bidder to carry out the following works:

1. HV Conductor stringing, as labelled 2 above, from the 132kV Disconnector, as labelled 113 above, till HV bushing of the new power transformer as labelled 54 above. Bidder to procure palms, dead-ends and necessary connectors.
2. 145kV porcelain disks to be purchased by the bidder, as labelled as A, B & E.
3. Bidder to supply and install support insulator and carry out HV conductor securing on it as labelled as 16 & 17.
4. Bidder to carry HV conductor securing on 145kV earth switch as labelled as 42.
5. It is bidder responsibility to prepare a necessary detailed drawing, as above for the two bays, with dimensions and conductor details.
6. Bidder to ensure conductor, as labelled as 2 above, is in appropriate tension and sag and same standard is maintained throughout.

## **2.1 ELECTRICITY, WATER, GAS AND OTHER SERVICES**

The Contractor shall at his expense, provide all electricity, water, gas and other services necessary to execute and complete the Works on site. Prevailing tariff and service connection procedure shall be applicable.

## **2.2 STANDARDS**

All civil works shall be carried out in conformity with Fiji Building Code or the British Standard Institution. All electrical works shall be carried out in conformity to the IEC Standards in general. British or Australian standards may be applied where necessary. Any national or international standard may be used if such standards are not less exacting than corresponding standards IEC, BSI or Fiji Building Code. In all instances, a copy of the relevant standard adopted shall be forwarded to the Engineer.

## **2.3 PRELIMINARY WORKS:**

Site Survey

Geotechnical Study - as per Section 2 Technical Specifications.

## **2.4 EXCAVATION:**

Cutting and filling earth

- Formation levels shall be as approved by the Employer's Representative.

Surface chipping

- Area covered by earth mat.

## **2.5 CABLE CONDUITS LAYING:**

As per drawings and scope above.

## **2.6 FOUNDATIONS:**

Shall be as per the scope above.

## **2.7 WATER DRAINAGE SYSTEM:**

Surface water drainage system shall be in accordance to the design plan.

Internal surface water drainage system shall be directed as per the Environmental Management Plan.

## **2.8 CABLE TERMINATIONS**

Shall be as per the scope above.

### 3. TECHNICAL SPECIFICATIONS

3.1 **GEOTECHNICAL STUDY** - A detailed geotechnical study is to be conducted on the identified site to determine EFLsibility for the construction of two transformer pads, their respective bund walls, fire walls, casting of HV cable trenches, laying of earth mat and laying of multicore HV/LV cable conduits as shown on layout drawing.

3.1.1 The study shall be undertaken by a qualified geotechnical engineer. The said engineer will be tasked with the responsibility of undertaking the geotechnical investigations and providing the necessary geotechnical design parameters that will be used for foundation design and construction.

3.1.2 Samples shall be taken from a minimum of four (4) borings to determine soil bearing capacities. These shall be tested to determine the physical and chemical characteristics of various strata and of the ground water. A safe bearing capacity shall be determined for the purpose of foundation design.

3.1.3 A report of the investigation and study carried out shall be submitted. This will serve to clearly inform of the current suitability of the on-site materials for construction of the new transformer yard accounting for a total designed load of 80 Tons per transformer. The study will clearly advise on the sites ability to hold up without fail the combined installation load on the green patch and issue recommendations on type of foundation design.

3.1.4 The report must also serve to clearly inform the employer of any remedial works that will need to be undertaken so as to ensure the suitability of the site to hold up the transformer yard extension for the new transformers without fail for its projected 60 years' of service life. Detailed excavation work specifications and drawings for all remedial works shall be submitted together with the report.

3.1.5 The employer's written approval is to be given prior to commencing of any remedial earth works.

3.1.6 The safe bearing capacity of the sub-strata may be modified at the final design stage when the full site survey and investigation have been completed and the final layout, structural details etc. agreed. No variation in contract price will be made due to any variation in the bearing capacity leading to modification of foundation design at the final design stage. Special attention shall be paid to the ground water table and chemical composition of the ground water and soil in the substation area.

3.1.7 The following shall be considered as a minimum requirement, assuming uniform conditions over the Site. This shall be extended if significant inconsistencies arise.

- a) Depth of boreholes shall be continued up to bedrock if it does not meet the hard stratum of N- value more than 50.
- b) Borehole records shall describe and indicate level of all soils encountered and indicate the natural water table level. Rock core records shall specify total core recovery, solid core recovery and quality of the rock cored.
- c) Where applicable, samples of soil shall be obtained from all soil strata or at 2 meters intervals in a single stratum and tested to determine physical and chemical properties, particularly with respect to Substances, which would react with concrete or other materials to be used for the foundation works.
- d) Where applicable, in situ soil tests shall be completed for all soil strata or at 2 meter intervals in a single stratum. Standard Penetration test in non-cohesive soils, field vane tests in sensitive cohesive soils.
- e) Ground water samples shall be obtained from each bore-hole and tested in accordance with approved practice.

- f) Electrical resistivity of the soil shall be verified on four samples, in accordance with approved practice (IEEE 80-2004: IEEE Guide for Safety in AC Substation Grounding).

**3.2 REMOVING OF EXISTING MASONRY/CONCRETE AND GENERATOR PART** - Unwanted foundations shall be demolished or up-rooted. The Contractor shall clear all areas required for the work. All unwanted materials, debris, etc. shall be removed from the employer's premises.

**3.3 EXCAVATION OF CABLE TRENCH** - The exact location of each trench shall be agreed at the site with the Employer's Representative before the installation work begins. Permits for excavation shall be obtained from the Employer's Representative.

3.3.1 Trenches shall be kept as straight and shall be excavated to approved formations and dimensions. Trenches shall have vertical sides and shall be close timbered and strutted where necessary to prevent subsidence.

3.3.2 The depth of excavated trenches for the installation of HV cables and MV cables shall be according to the Employer's Standards of 1500mm and 1500mm wide. The Employer's Representative shall make these standards available to the Contractor upon his request.

3.3.3 The Contractor shall use no power excavation tools for excavation within outdoor transformer yard. The contractor shall take all precautions to avoid damaging any other power cables along the cable route.

3.3.4 All excavation, cable laying and back filling shall be carried out only under the direct supervision of a responsible officer and only in the presence of a representative of the Employer's

**3.4 DE-WATERING** - All excavation works are to be kept dry and clean to ensure work is not affected or interfered with by water entering the excavations. The Bidder is to allow in his Tender for the costs of pumping, de-watering or other methods of dealing with the water during and after excavation. No concrete, masonry, brickwork or other materials shall be placed or built until the surfaces are properly drained.

**3.5 CONTROL & POWER CABLE CONDUIT and CABLE LADDERS** - The Contractor is responsible for all civil works required for building in cable conduits and Trench with covers. Cable entries into buildings shall be through conduits.

3.5.1 Power cable which passes under roads, hard standing areas or where they would otherwise be at risk shall be laid in approved ducts.

3.5.2 33kV and control cable conduits shall be encased in concrete casings with minimum thickness of 150mm and at depths of 1200mm and 600mm respectively on entry to the substation.

3.5.3 Dig and lay 33kV cable from transformer to 33kV circuit breaker. Reinstate trench and crush metal with weed control mat.

3.5.4 Dig and lay 0.145kV cable from transformer to 0.415kV distribution board in control room. Reinstate trench and crush metal with weed control mat.

3.5.5 4 x earthing conduits for the transformer shall be encased in concrete casings with minimum thickness of 100mm.

3.5.6 Fiber conduits shall be encased in concrete casings with minimum thickness of 50mm if required.

3.5.7 AC and DC conduits shall be encased in concrete casings with minimum thickness of 50mm separately.

3.5.8 Cable entries into buildings shall be sealed with approved using suitable materials ROXREC to prevent entry of any water, dust, vermin, etc. Cable entry to the control building shall be provided for future requirements.

3.5.9 All cable ducts shall be laid in straight lines and regular gradients between cable pits, as directed. All ducts shall be kept clear from earth, debris and other obstructions during and after being laid.

- 3.5.10 Conduit stubs protruding from transformer pads shall extend upwards by 50mm from the top of bund wall so as to inhibit ingress of oil/water should oil/water held in the bund fill up to maximum holding capacity.
- 3.5.11 Cable ducts shall be of Polyvinyl Chloride (PVC) type material approved by the Employer's Representative and obtained from an approved manufacturer.
- 3.5.12 each cable conduit shall be housed with galvanized draw wires of sufficient strength and size to pull cables that shall run within the conduits. The galvanized draw wires shall run the full length of the conduits.
- 3.5.13 Bidder to construct 1.5x1.5x1.5m power cable inspection chamber in the 33kV switchyard in the transformer bay. The chamber to be covered with appropriate chequer plates and be water proof.

**3.6 OIL CONTAINMENT/DRAINAGE SYSTEM** – The bund shall be equipped with an approved oil/water sump and an approved oil/water drainage system. These shall be designed to address three (3) main risks: 1) Catastrophic failure causing prolonged fire. 2) Catastrophic failure causing large amounts of oil spreading off site. 3) Minimize oil pollution during normal operation. This is as stipulated in the Ausgrid NS189 standard for Oil Containment for Major Substations.

The bund base of each transformer shall be designed to have a 1% slope directing all oil/water towards the designated oil/water sump. The sumps shall have an approved non-slip surface applied onto the inside walls and base.

The Ausgrid NS189 standard details two (2) drainage systems that can be installed for transformer bunds. These are the Closed Drainage PPS System and the Gravity Drainage System with Oil Containment Tank. The selection of the oil containment system that is most EFLsible for the transformer bunds shall be made by the Contractor as according to Ausgrid NS189 standard. The design of which shall be submitted for employer's approval prior to any construction and installation works. As detailed in Ausgrid NS189, the selection criteria for the oil containment system shall be based on a Life Cycle Cost (LCC) analysis together with an assessment of site constraints, site risks, environmental aspects and impacts upon project schedule.

The Contractor shall ensure that the breakout of any fire will be contained within the bund and not transferrable under any circumstance to the oil/water separators or oil tanks to be installed as per the design to be submitted for approval.

The oil containment system shall allow for effective discharging of storm water in the event of heavy rainfall or spraying down of the transformers in the event of a fire.

The oil containment shall be approx. 30,000L transformer oil.

**3.7 TRANSFORMER PADS** - transformer pads shall be designed to accept a total transformer weight of 120 ton. This is to account for future upgrades to higher rated and larger transformers.

The Contractor shall ensure that the transformer pad surface is levelled to a maximum deviation of  $\pm 2\text{mm}$ . The Contractor's engineer shall satisfy himself with the levelling of the two transformer pads.

**3.8 TRANSFORMER FOUNDATION** - The transformer foundations are to be designed to accept all normal applied dead and imposed loadings without causing any significant settlement. In addition, foundations shall be designed to accommodate any additional imposed loadings during installation and removal of the transformer. This shall be constructed with a minimum 300mm base thickness and an approved steel reinforcement layout.

**3.9 FILLING & REINSTATEMENT** - If it is required to fill the land, the Contractor shall get approval for the filling material and method of construction before the commencement of work.

Filling for trenches, excavations and levelling of the site shall be deposited in layers not exceeding 300 mm of uncompacted thickness, each layer watered when necessary and well rammed or otherwise compacted to within 98% of the maximum dry density obtained by the use of a Proctor Standard Compaction Test.

Any fill material used within 500 mm of concrete structures cement bound materials shall have a soluble sulphate content not exceeding 2.5g per liter when tested in accordance with BS 1377, special precautions shall be taken to protect the concrete or cement bound materials to the approval of the Employer's Representative.

Where excavations whether in rock or other material, are made to a greater depth than detailed, the Intervening space shall be brought up to the proper level in plain concrete at the Contractor's expense.

Any formation encountered in the excavations which is not sufficiently strong to carry the loads which will be imposed on it, shall be excavated to an adequate load bearing stratum and replaced with mass concrete.

Unless otherwise described, directed or permitted, imported filling shall consist of pervious naturally occurring material, free from mud, silt, clay, peat, vegetable or injurious matter and water soluble salts harmful to copper and other metals. Filling shall be imported only from approved areas.

- 4.0 STABILITY OF FILL AND EMBANKMENT** - The Contractor shall be responsible for the stability of embankments, which formed either by cutting or filling, and precautions taken to protect the earthworks from deterioration under adverse weather conditions. Wherever applicable the recommendations contained in the following codes of practice shall be followed in calculations, detailing and performance of the earthworks and drainage. **Earthworks - British Standard Code of Practice BS 6031-1981.**

Should any slips occur in the excavations, banks or filling during the execution of the Works or during the period of maintenance from any cause whatsoever, the Contractor shall execute the necessary remedial work in such manner, and with such materials as approved by the employer's representative, at the Contractor's expense.

- 4.1 READY MIXED CONCRETE – 30MPA** Ready-mixed concrete shall be provided as defined in BS 5328, which batched off the Site, may be used only with the agreement of the Employer's Representative and comply with all requirements of the Contract.

The concrete shall be carried in purpose made agitators operating continuously, or truck mixers. The concrete shall be compacted and in its final position within 2 hours of the introduction of cement to the aggregates, unless a longer time is agreed by the Employer's Representative. The time of such introduction shall be recorded on the delivery note together with the weight of the constituents of each mix. When truck-mixed concrete is used, water shall be added under supervision, either at the Site or at the central batching plant, as agreed by the Employer's Representative but in no circumstances shall water be added in transit. Unless otherwise agreed by the Employer's Representative, truck mixer units and their mixing and discharge performance shall comply with the requirements of BS 5328 part 3.

- 4.2 BUND WALL** - Commencement of wall construction shall be done following the installation of the transformers. Each transformer bund base shall be surrounded by a low enclosing bund wall designed as per the scope above. An approved non-slip surface shall be applied to the inside bund walls and bases by the Contractor. The Contractor shall ensure that all bunds are designed as according to AS 1940-2004. The bund walls shall be designed for all expected imposed loadings with provision for vertical extension of EI 240 (4 hours) rated fire resistance fire wall.

- 4.3 STONE CHIPPING AND ACCESS ROAD** - Stone chipping used for substation surfacing are to be clean hard crushed stone graded to 40mm (minimum depth 300mm). The formation in areas where stone chipping are to be used shall be well compacted to the approval of the Employer's Representative, and treated with an approved total weed killer, used in accordance with the manufacturer's instructions.



The layout drawing shows the area to be compacted with stone chipping for the transformer yard access road. The said area shall be compacted to allow for all expected imposed loadings.

**4.4 CRUSH METAL** – The contractor must reinstate all crush metal that are to be removed for construction works or have been contaminated with soil and other material due to construction activity. 200mm of depth crushed metal (screened 40mm – 3000ohmm) to be applied on weed control mats. All materials to be supplied by contractor and to be approved by EFL Engineer before application. Attached drawings shows area of crush metal works required.

**4.5 MISCELLANEOUS WORK** - Shall be carried out according to the relevant clause of this specification.

## **5. EARTHING SYSTEMS**

### **5.1 GENERAL**

The earthing of all equipment and the provision of earthing systems, electrodes and connections shall be in accordance with the recommendations in the “Guide for safety in Substation Grounding” IEEE No. 80 and the requirements of this Chapter.

Steelworks and supporting structures shall be bonded and earthed to the substation earthing system. Earth connections shall be made approximately 250 mm above the top of the finished foundation level. Connections shall be made also to the earth terminals of each transformer.

Trench earthing – inside 11kV power cable trench, copper 50mm X 6mm flat bar route length – 20m and 20 insulator holders.

Earthing conductors will be of soft annealed high conductivity copper stranded in accordance with Table 4 in BS.6346. Earthing conductors will normally be buried directly in the ground but where necessary they may be cleated to walls, fixed to cable racks or laid in the cable trenches as convenient.

### **5.2 EARTHING EQUIPMENT**

5.2.1 Earthing of new 33kV/11 kV transformer yard shall be properly performed with copper strip 50mmX6mm and 185mm<sup>2</sup> bare copper, which enable connection to the equipment installed in and linked to main grid with more than two wires. The bidder to allow for 40-X connections and 40-T connection joints using CADWELD methods.

### **5.3 JOINTING AND BONDING**

5.3.1 Connections to plant and equipment shall be made using the earthing terminals specified in the Contract. Where a strip has to be drilled to fit an earth terminal the hole shall not be greater than half the width of the strip.

5.3.2 Joints in earthing strip shall employ chemical welding or high compression joints.

5.3.3 The main EFL Grid and the Transformer Grid shall be connected in at least 4 points.

## **6. INSPECTION AND TESTS**

6.1 The Authority’s Engineer representative shall have the right to inspect the works and to confirm conformity to the contract specifications.

6.2 Should any inspected works fail to conform to the specifications, the Authority may reject them and the Contractor shall make all alterations necessary to meet the specification requirements.

6.3 Nothing in this clause shall in any way release the Contractor from any other obligations under this contract.

## **7. SITE CONDITIONS**

- 7.1 The site is located at the 132/33kV Substation in Vuda NCC and 33kV/11 Vuda RCC Substation in Lautoka. The Contractor shall be deemed to have visited the site of the works to satisfy him/her as to the accuracy of all information supplied to the Tenderers and to the feasibility of construction of the works.
- 7.2 The proposed location is in a Substation equipped with therefore all necessary Safety Gear must be worn by the Contractor's Staff at all times.
- 7.3 The Contractor may only enter the site upon provision of access by an Authorized EFL representative. The Contractor is not to execute any work without direct supervision from the EFL representative. The times for work are 8am to 4.30pm Monday to Thursday, and 8am to 4pm on Fridays.

## **8. SETTING OUT**

- 8.1 All tenderers shall inspect and examine the site, its surroundings, and shall satisfy himself before submitting his tender, as to the form and nature of the site, the nature and type of existing work, the quantities and natures of the work and materials necessary for the completion of the Works and the means of access to the site, the accommodation he may require, the availability, conditions and rates of pay of labour and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his tender.
- 8.2 The Contractor shall be responsible for the correct detailed setting out of the Works as indicated in the Tender Documents and shall, at his own cost, amend any errors during the progress of the Works arising from inaccurate setting out.
- 8.3 If a tenderer has any doubt as to the meaning of any portion of the Works, he shall when submitting his tender, include a statement of the interpretation upon which he replies and upon which his tender has been prepared and submitted.

## **9. MATERIALS, WORKMANSHIP AND PLANT**

- 9.1 Materials in all trades shall be new and the best of their kinds specified and necessary complying with relevant standards (Fiji, Australia, New Zealand or USA) where applicable and subject to approval or rejection by the Engineer.
- 9.2 The Contractor shall at all times ensure that adequate protection is provided to finished work and materials to be used in the construction of the work. Where necessary, make good any damage to property.
- 9.3 The Contractor shall provide all workmen, both skilled and unskilled, plant, equipment and materials necessary for the expeditious completion of the work.

## **10. OCCUPATIONAL HEALTH AND SAFETY**

- 10.1 The Contractor shall comply with the Health and Safety at Work Act, 1996 and regulations and Amendments thereto and the EFL HSE Policy.

## **11. GENERAL FOREMAN**

- 11.1 The Contractor shall appoint a competent General Foreman who shall be constantly on the works during the progress of the same, to whom instructions may be given by the Engineer.
- 11.2 The Engineer may require the Contractor to dismiss the General Foreman or other person shall he be incompetent or shall misconduct himself or for any other good reason to be assigned by the Engineer to the Contractor.

## **12. MAINTENANCE AND DEFECTS**

- 12.1 Period of maintenance shall be 2 year (24) calendar months after practical completion of works. All defects during this period shall be made good by the Contractor, at his cost.

## **13. CLEANING UP**

- 13.1 On completion, remove all surplus materials from site and leave site in a clean and tidy condition.
- 13.2 The Contractor shall remove and cart away all rubbish and trade debris as it accumulates during the progress of the works.

## **14. PROGRAM**

- 14.1 Within seven (7) days of acceptance of his tender, the Contractor shall submit to the Authority, for approval a Program showing the order in which he proposes to carry out the works. The contractor shall ensure all civil and earth grid works shall be complete by the October, 2018. Construction and installation of the bund walls and other miscellaneous work as specified by the employer's representative shall take place following installation and commissioning of the two new transformers.

## **15. INSURANCE**

The Contractor is to effect the following insurance policies:

- 15.1 Contractor's All Risk Insurance - \$500,000
- 15.2 Public Liability Insurance - \$500,000
- 15.3 Workmen's Compensation - \$250,000

# **Section 3**

## **Form of Proposals and Appendices**

## SECTION 3

The Schedules are intended to provide the Employer with essential supplementary information in an organized format. Examples of more commonly used Schedules are given herein. Others may be devised and added in accordance with the requirements of the Instructions to Bidders.

All the Schedules are essential for bid evaluation and some in contract execution; they should all be incorporated in the Contract, and appropriate changes introduced with the approval of the Employer or its representative.

The schedules are to be completed and submitted as part of the Technical Proposal and Price Proposal in accordance with the Instructions to Bidders Clause 13, Documents Comprising the Bid. **Bidders whose Bids do not contain the data in the required format will be treated as non-responsive.**

## 1 SCHEDULE OF PRICES & CONDITIONS OF PAYMENT

### 1.1 CONTRACT PRICE

The Contract Price is comprehensive in that, in consideration of the Contractor meeting all obligations, conditions and liabilities under the Contract, including the Contractor's allowance for the cost of supply of all labor, materials, plant, supervision required to complete the Contract Works, overheads and profit, subject only such adjustment as is provided for the Contract.

The contractor shall fill in the table below for the pricing of the below scope of work.

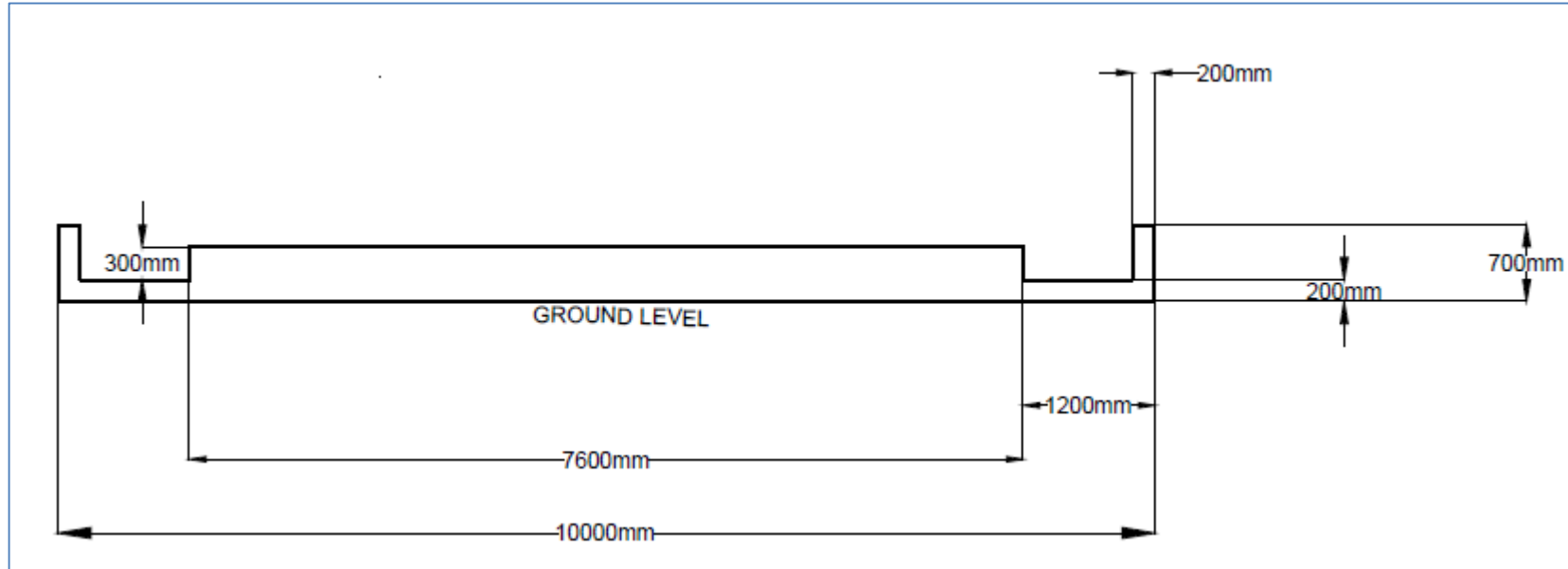
No.	Scope of Work	Unit Price VIP FJD	Total Price in VIP FJD
1	Design and construct 2 x Transformer Foundation Pad for 132/33kV Transformer, control cable trenching and a common oil separator pit.	\$	\$
2	Design and Construct 2 x concrete pad for 33/0.415kV auxiliary earthing transformer	\$	\$
3	Design and Construct 2 x concrete pad for NER	\$	\$
4	Electrical Works – Power cable laying and termination, control cable termination, 132kV conductor stringing and termination and substation light works.	\$	\$
5	Earth Grid Design and earthing works.	\$	\$
6	Design, Supply and Install 2 x Lighting Mast – galvanized pole.	\$	\$
	<b>Total Cost of the Project – LUMP SUM</b>	<b>\$</b>	<b>\$</b>

# **Section 3**

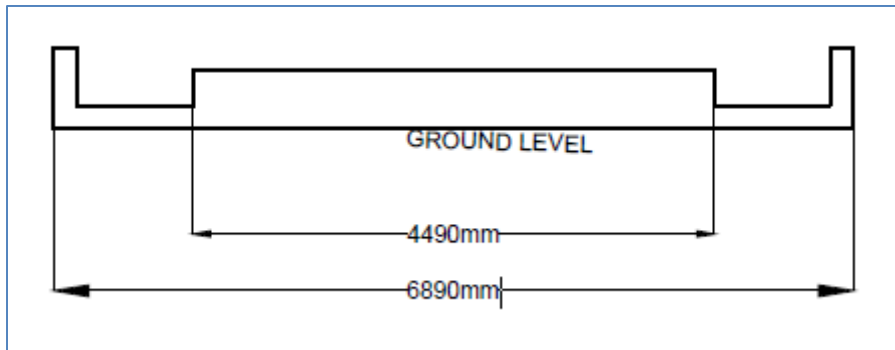
## **Drawings and Literature**

# 1. *Typical Drawing of transformer pad.*

Front View of the Pad



Side View



**Power Cable Route (marked in orange) from both the new 132/33kV Power Transformer to the 33kV Switchyard.**





## **1 OTHER DOCUMENTS & DRAWINGS TO BE SUBMITTED WITH BID**

As a minimum and mandatory, the following documents & drawings shall be submitted with the Bid for Evaluation.

**COMPLIANCE CHECKLIST**

Compliance – the following documents are to be provided with the tender bid:

No.	Compliance	Check(✓)
1	Valid FRCS tax compliance certificate.	
2	Valid FNPF certificate of Compliance.	
3	Previous list of similar work experience.	
4	Work procedure for working at heights and use of scaffolding.	
5	Gantt chart.	
6	Business registration details.	
7	Insurance cover details – Public Liability, Workers Compensation, Contractor's all risk	

**Bidders are to ensure that the above item are included as part of their bid. Failure to provide documentation for the above will disqualify the bid.**

Name of Authorized Person	
Signature of the Bidder	
Company Stamp	
Date	

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**Tender Submission - Instruction to bidders**

**Two (2) hard copies** of the tender bids in sealed envelope shall be deposited in the tender box located at the Supply Chain Office at the EFL Head Office, 2 Marlow Street, Suva, Fiji.

**Courier charges for delivery of Tender Document must be paid by the bidders.**

**This tender closes at 4:00 p.m. (16.00hrs Fiji time) on Wednesday 2<sup>nd</sup> October, 2019.**

Each tender shall be sealed in an envelope with the envelope bearing only the following marking:

**MR 276/2019**  
**Design & Construct Transformer Foundation Pad, Oil Separator Pit, Carry Out**  
**Electrical & Civil Works at Vuda NCC Substation**

The Secretary, Tender Committee  
Energy Fiji Limited  
Supply Chain Office  
Private Mail Bag,  
Suva

**It must also indicate the name and address of the tenderer on the reverse of the envelope.**

**All late tenders, unmarked Envelopes and envelopes without bidder's name and address on the reverse on the envelope will be returned to the Tenderers unopened. (Bids via e-mail or fax will not be considered).**

**The bidders must ensure that their bid is inclusive of all Taxes payable under Fiji Income Tax Act and must have the most current Tax Compliance Certificate.**

**For further information or clarification please contact our Supply Chain Office on phone (+679) 3224360 or (+679) 9991587.**

**Bidders are requested to submit a:**

- **Valid Tax Compliance Certificate**
- **FNPF Compliance Certificate**

**TENDER SUBMISSION CHECK LIST**

***The Bidders must ensure that the details and documentation mention below must submitted as part of their tender Bid***

Tender Number \_\_\_\_\_

Tender Name \_\_\_\_\_

1. Full Company Name: \_\_\_\_\_

**(Attach copy of Registration Certificate)**

2. Director/Owner(s): \_\_\_\_\_

3. Postal Address: \_\_\_\_\_

4. Phone Contact: \_\_\_\_\_

5. Fax Number: \_\_\_\_\_

6. Email address: \_\_\_\_\_

7. Office Location: \_\_\_\_\_

8. TIN Number: \_\_\_\_\_

**(Attach copy of the VAT/TIN Registration Certificate - Local Bidders Only)**

9. Company Registration Number: \_\_\_\_\_

**(Attach copy of the Business License)**

10. FNPF Employer Registration Number: \_\_\_\_\_

**(For Local Bidders only)**

11. Contact Person: \_\_\_\_\_

I declare that all the above information is

correct. Name: \_\_\_\_\_

Position: \_\_\_\_\_

Sign: \_\_\_\_\_ Date: \_\_\_\_\_