



TENDER SPECIFICATIONS

Contract to Design and Prepare Tender Specification for:

- 1. The Construction of 132kV Transmission Line from Virara Settlement to Koronubu in Ba**
- 2. 132kV Switching Station at Virara and,**
- 3. 132/33kV Substation at Koronubu, Ba**

Tender No. MR 07/2017

January 2017

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FIJI ELECTRICITY AUTHORITY TENDER SPECIFICATION

EXECUTIVE SUMMARY

The Fiji Electricity Authority (FEA) is responsible for generating, transmitting and retailing electricity in Fiji. The FEA plays a critical role in advancing the national economy of Fiji. The FEA is evolving rapidly and its power capacity building programs involves almost doubling the generation capacity over the next ten years.

FEA currently produces above 900 GWh of electricity energy per annum with a demand growth of five percent per annum. The existing installed generation capacity is 300 MW, of which 126 MW is hydro power from Wailoa, Nadarivatu and Wainikasou power stations. The FEA has 147 km of 132kV and 530 km of 33kV transmission lines as well as 9,000 km of 11kV and low voltage distribution lines.

With the rapid increase in energy demand there is a corresponding requirement for transmission capacity augmentation by building new 132 kV power transmission lines and substations.

The Fiji Electricity Authority (FEA) intends to develop its high voltage transmission network by building

- a 30km, 132kV transmission line from Virara, Ba to Koronubu, Ba, and
- a 132kV switching station at Virara, Ba, and
- a 132/33kV substation at Koronubu, Ba

The route of the transmission line was selected in 2014. Typically, the land is low lying and almost flat for the first 12 km route from Koronubu. Steel pole structures have been considered for this section of the line. The land is generally used for sugar cane farming. Approximately 6 km of the route lies along the Fiji Sugar Corporation tram line. Approximate number of steel poles required for this section is 50.

The remaining 18 km of the country is hilly. This section of the land is generally used for grazing and pine plantation. Steel lattice towers are being considered for this section of the line. Approximate number of steel lattice towers required is 40.

The FEA invites you to tender for the design, prepare turn-key tenders for construction works and assist FEA in identifying most suitable contractor(s) for construction of the 132kV power transmission line from Virara Settlement to Koronubu in Ba, 132kV Switching Station at Virara and 132/33kV Substation at Koronubu, Ba.

The preliminary line route and sites for the two substations are provided in the attached zip file in the Google Earth. The design consultant will use his/her knowledge and experience to prepare and finalize the route selection, design and tender documents with complete engineering specification details for the construction of the transmission lines, switching station and substation.

The technical specifications should have a detailed enough scope of works to reduce the risk of possible variations.

FEA tender for the Environmental Impact Assessment (EIA) study for the 132kV Transmission Line from Virara Settlement to Koronubu in Ba, 132kV Switching Station at Virara and 132/33kV Substation at Koronubu, Ba was called on 7th January 2017. The tender reference number is MR 02/2017 and closes at 4.00pm (Fiji time) on 18th January 2017.

For a successful project the Design Consultant will ensure that the technical specification is very clear as to exactly what deliverables are to be provided to FEA.

The tender specification shall provide the breakdown of the entire project into the following phases:

- First Phase: Preparation of Design, Specifications and Tender documents;
- Second Phase: Review Of Route Selection and Environmental Impact Reports;
- Third Phase: Issuing and Reviewing of Tender for the Construction Phase of Works

One set of tender document is provided electronically to prospective tenderers and further copies of the documents will be provided by the Authority on request in writing from tenderers.

All tenders for the design consultancy shall be submitted on the appropriate **Form of Tender** provided and shall include the completed price schedule, technical schedule and schedules of experience etc. relevant copies of which are to be included in the bid. The tender shall be on the basis of a lump sum contract based on firm prices.

Should you be in any doubt as to the meaning or interpretation of any part of these documents you should seek clarification immediately by fax or email from the GM Commercial, Fiji Electricity Authority, Private Mail Bag, Suva, Fiji. Telephone No: (679) 3224185 or mobile phone no: (679) 9992436 and Fax No: (679) 3311882. You may also email your queries to the GM Commercial at TDelairewa@fea.com.fj

The deadline for submission of tenders shall be at **1600 hrs on Wednesday 8th February 2017**.

Tenders shall be opened on **Thursday 9th February 2017**. However, tenderers are advised to liaise with the Secretary Tender Committee, FEA on Telephone No. 3313333 for the confirmation of the opening time.

The interested tenderer shall communicate and confirm to the GM Commercial by **Monday 16th January 2017** his/her attendance for the site visit on **Friday 20th January 2017 at 09.30am at FEA's Navutu Depot, Lautoka**. Site visits will be at no cost to the Authority.

In undertaking site visits, a tenderer shall comply with the general health and safety rules and shall be deemed to have agreed to indemnify and keep FEA indemnified and their respective employees, agents and advisers from and against all claims, liabilities, costs, damages or expenses which any of them may suffer or incur as a result of the actions of the tenderer (including the actions of the tenderer's employees, agents and advisers) on the site, including the undertaking of any remedial work required as a result of such actions. Whilst on site, all communication shall be directed to the FEA Representative.

Before submission of the tender each tenderer shall be deemed to have inspected the preliminary transmission line route, tentative substation sites and to have satisfied himself/herself as to the nature of the ground along the line route and all physical conditions upon and off the site, and of the land adjoining the route and as to the means of access to and from the site and in general shall obtain all necessary information as to the risks, contingencies, and other circumstances which may affect any obligations under the tender and each tenderer is deemed to have allowed for any costs which may arise from such matters.

The technical specifications provided by the design consultant must be clear and protect the Authority from potential variations during the construction phase of the transmission lines and substations.

During evaluation of tenders the Authority may invite a tenderer or tenderers for discussions and any necessary clarification before awarding the contract. The tenderer or tenderers will be required to attend meeting and discussions at no cost to the Authority.

SECTION 1 INSTRUCTIONS TO TENDERERS

1. Program

The Fiji Electricity Authority (hereinafter called the Authority) is a statutory body vested with the responsibility for the provision of electricity supply throughout Fiji. The Authority is intending to build 132 kV power transmission line from Virara Settlement to Koronubu in Ba, 132kV Switching Station at Virara and 132/33kV Substation at Koronubu, Ba to transfer the electrical energy from its power stations to the major load centres in the Western Region of Vitilevu

The whole Works are expected to commence in **March 2017** and commissioned by **June 2018** in order to meet the increasing electricity demand in the Western Vitilevu area as well as to reinforce the existing sub-transmission network.

The anticipated program for the design is shown below.

Tender Close:	08/02/2017
Tender Evaluation Completed:	22/02/2017
Engagement of Design Consultant:	28/02/2017
Commencement of Design:	13/03/2017
Submission of Draft Design Report to FEA:	11/04/2017
Submission of Final Design Report to FEA:	01/05/2017
Preparation of Tender Documents for the Construction Phase of the Project:	08/05/2017
Complete Tender Documents and Call Tenders for the Construction:	30/05/2017
Assist FEA in Tender Evaluation and Award:	15/06/2017

Within one week of commencement, the Design Consultant shall submit to FEA a detailed work program outlining time inputs, field visits and the methodology, in MS Project format.

Fortnightly progress reports shall be submitted every Monday from the date of commencement.

FEA requires that the Design for the 132kV transmission line, the 132kV switching station and 132/33kV substation will be carried out in parallel and three separate Design reports will be produced.

The Design Consultant will provide, upon request from FEA, presentation of activities, findings and recommendations to the FEA steering committee and the executive management group at dates agreed by both parties with prior notification.

2. Type of Tender

The Tenderer shall submit a lump-sum fixed price tender.

3. Tender Documents

For the Tenderers information the Technical Specification includes general information as to site conditions, limitation of space, climatic, geographical and other conditions of the Works. The Tenderer shall be deemed to have acquainted himself with all conditions affecting his tender including those relating to site and to facilities available in Fiji.

If the Tenderer has any doubts as to the meaning or intention of any of the tender documents or if he requires further information he shall apply to the Authority in writing for clarification or additional information.

The contract will be based on FIDIC General Terms and Conditions of FIDIC Client/Consultant Contract Model Services Agreement (White Book) Fourth Edition 2006. Any modifications/additional clauses will be discussed prior to awarding the contract to the successful bidder(s).

4. Issue of Tender Documents

Each prospective Tenderer will be issued with one set of tender document via Tender Link, FEA's electronic tender hosting website.

5. Firms Eligible to Tender

Firms that have sound financial background and have previous experience in handling such projects are eligible to submit tender. A requirement of submission of track record for similar services undertaken in the past ten years is essential.

6. Addenda to Tender

Where the Authority finds it necessary to make amendments to or clarify the requirements of the tender documents during the period of tendering copies of each Addendum will be uploaded in the Tender Link, FEA's electronic tender hosting website.

7. Compliance with Specification

The tender shall be based on the design work specified and shall be in accordance with this tender document. The Tenderer shall tender for the whole of the Works included in this document.

8. Delivery Periods

The Tenderer shall submit his tender on the basis which will permit the Works to be completed under normal circumstances by the completion dates stated in this tender document.

9. Currency and Currency Equivalent

The tender shall be expressed in Fijian currency and/or in the currency of the Tenderer's home country except that the portion of the price, which the Tenderer expects to spend in Fiji, shall be separately stated in Fijian dollars.

The Fijian component of the tender price should not be subject to any currency exchange rate variation or to any Consumer Price Index (CPI) adjustments.

For Tender comparison purposes the currency or currencies in which the tender is offered will be valued in terms of Fijian dollars at the exchange rate quoted for the sale of the foreign currency for Fijian dollars quoted by the Reserve Bank of Fiji on the day the tenders are opened.

10. Information forming part of the Tender

A copy of the Tenderer's covering letter shall be submitted with this tender and shall be accompanied by a full set of supporting information which the Tenderer wishes to have considered by the Authority as supporting information for his/her tender.

11. Validity Period of Tenders

Tenders shall remain valid for acceptance within 90 days from the date of opening of tenders and a Tenderer shall not withdraw or amend his tender prior to the expiration of the Validity Period.

In exceptional circumstances prior to expiry of the original tender validity period, the Authority may request the Tenderer for an extension in the period of validity. The request and the response thereto shall be in writing. A tenderer agreeing to the request will not be permitted to amend his tender price.

12. Extension of Closing Time for Tenders

The right is reserved to amend the date set for the opening of tenders to any later date. If it is decided to extend the time for submission of tenders all prospective Tenderers to whom tender documents have been issued will be promptly notified.

13. Lodgment of Tender

The Tenderer shall submit the Original Tender and Copy of Tender duly completed. Each of the Tenders shall be sealed in an inner and outer envelope or packet. The inner envelope or packet shall be prominently endorsed as follows:

Tender Number: MR07-2017
"Tender for the design of 132kV Transmission Line from Virara to Koronubu, 132kV Switching Station at Virara and 132/33kV Substation at Koronubu, Ba"
Do Not Open Before Tender Opening Date

The inner envelope or packet should be prominently endorsed with the Tenderer's name and address. The outside envelope or packet should be addressed to the Secretary Tender Committee, Fiji Electricity Authority, Private Mail Bag, Suva, Fiji and shall bear no reference to the Tender called.

The Original Tender and Copy thereof shall be delivered to the Secretary Tender Committee, Fiji Electricity Authority, Head Office, 2 Marlow Street, Suva, Fiji on or before the time set for the opening of tenders or shall be posted to the Secretary, Fiji Electricity Authority Tender Committee, Private Bag, Suva, Fiji, to arrive in the ordinary course of mail not later than one hour prior to that time.

14. Opening of Tenders

Tenders will be opened at the Head Office of the Fiji Electricity Authority at 2 Marlow Street, Suva at the time and date stated in the Tender Invitation.

15. Acknowledgement of Tenders

All tenders received will be acknowledged by email or post within 7 days after the date set for receipt of tenders.

16. Tender Evaluation

After a preliminary analysis to ascertain whether or not the tender is in accordance with the requirements of the tender documents each tender will be considered with particular reference to its price, completion date, design capability, evidence of past performance on contracts of a similar nature, financial status and all other matters affecting the Tenderers ability to complete the Contract in accordance with the Authority's requirements. Particular emphasis will be placed on the Tenderer's capability to complete the Works by the required completion date stated in this document. The Tenderer should therefore quote the earliest completion he is prepared to guarantee subject to liquidated damages.

17. Adjustment of Errors

The Authority reserves the right to adjust arithmetical or other errors in the Tender. Any adjustments made by the Authority to a Tender will be stated to the Tenderer prior to acceptance of the Tender.

18. Acceptance of Tenders

Each tenderer agrees that FEA, in its sole discretion, may:

- accept any tender even though it may not be in accordance with this Invitation;
- accept any tender even though it may not be the lowest priced tender;
- accept any tender at any time prior to the expiry of the Tender Validity Period;
- reject any or all tenders, including the lowest priced tender;
- re-advertise for further or additional tenders;
- waive any irregularities or informalities in the tender procedure or a tender;
- discontinue the tender process at any time for any reason, whether prior to or following the Tender Closing Time.

No tender shall be deemed to have been accepted unless such acceptance is notified to the Tenderer by notice in writing either by handing such notice to the representative of the successful Tenderer or by sending such notice by email, facsimile or airmail post. Such notice shall include any essential identifying details of the tender.

The date of acceptance of Tender shall be the date on which the above mentioned notice is given or posted. If the notice shall have been transmitted by fax confirmation of the fax will be sent by airmail post within 48 hours of such transmission.

19. Language of Tender

All Tenders together with any documents submitted by the Tenderer as part of any Tender shall be written in the English language.

20. Taxation

Tenderers are strongly advised to check with the Inland Revenue Department, Waisomo House, Thurston St, Private Mail Bag, Suva, regarding income tax and corporate tax which may become payable in Fiji, and to make particular note of arrangements and procedures which are necessary because of the existence or non-existence of taxation agreements between Fiji and other countries.

Tel No. (679) 3312800
Fax No. (679) 3304936

21. Work Permits

All expatriate employees of the Design Consultant are required to have permits to work in Fiji. Application for permits must be lodged with the Director of Immigration, P O Box 2224, Government Buildings, Suva, or at any overseas High Commission or Embassy of Fiji. Applications for work permits must be accompanied by a cash or bank bond to cover the economy airfare for the employee and his family and dependants back to the country of origin or domicile or last residence whichever is the furthest plus 20%.

A pre-requisite for the issue of a work permit is that a person possessing the skills and qualifications of the person for whom the permit is required has been sought and found unavailable in Fiji. The Department of Labour before granting a permit usually requires proof of unavailability in the form of a newspaper advertisement and replies received.

Tenderers are required to check with the Ministry of Labour regarding the exact procedure for obtaining work permits and to obtain full details.

Tel No. (679) 3312671
Fax No. (679) 3301653

22. Registration in Fiji

Tenderers shall be deemed to have satisfied themselves as to the need to register the company in Fiji and to ascertain all necessary laws and regulations with which they must comply in carrying out the works in Fiji.

23. Law and Language

The language of the Contract shall be English. The Contract shall be governed and construed with reference to the Law for the time being in force in Fiji.

24. Customs and Import Duties

Full information regarding Customs Import and Fiscal Duties etc. may be obtained from the Comptroller of Customs, P O Box 175, Suva, Fiji.

Tel No. (679) 3302322
Fax No. (679) 3302864

Customs and Import duties and taxes (**such as Value Added Tax, etc.**) if any in respect of machinery, equipment, vehicles imported for use in design and survey shall be borne by the design consultant.

25. Payment Terms

The entire project is divided into four parts:

1. 132kV Switching Station at Virara Settlement
2. 132/33kV Substation at Rarawai, Ba
3. 132kV Transmission Line Section 1 – Lattice Towers (Hilly Terrain)
4. 132kV Transmission Line Section 2 – Steel Poles (Flat Terrain)

Payments will be made in proportion to the progress towards completion of the following components of the Works:

- design;
- tender documents;

The fixed price and the schedule of rates should include:

- profit and overheads;
- all disbursement costs, including allowances, per diems, transportation costs, travel costs, necessary consultations, inductions and inspections;

- compliance with all Laws and the cost of all necessary statutory and other approvals, licenses, permits, consents, assurances, authorizations and similar requirements necessary to perform the design consultant's obligations under this Contract;
- all outgoings, including insurances and all taxes (except GST), duties and all other levies and duties (including customs duties) on the Services, by whatever description

The Tenderer shall state any mark up on disbursements.

Payment terms are:

- Advance payment upon receipt of the Performance Security in the form of Bank Guarantee from the Design Consultant – 15%
- Progress Payment 1 upon submission of draft design document of 132kV transmission line, 132kV Switching Station and 132/33kV Substation – 20%;
- Progress Payment 2 upon submission of final design document of 132kV transmission line, 132kV Switching Station and 132/33kV Substation – 20%;
- Progress Payment 3 upon submission of draft turn-key tender documents for the construction of 132kV transmission line, 132kV Switching Station and 132/33kV Substation – 20%;
- Progress Payment 4 upon submission of final turn-key tender documents and award of tender(s) to the successful contractor(s) for the construction of 132kV transmission line, 132kV Switching Station and 132/33kV Substation – 20%;
- Final Payment upon receipt of the final as-built engineering drawings – 5%

The local (Fijian) component of the tender price shall not be subjected to any currency exchange rate variation.

All payments shall be due and payable by the FEA in accordance with the payments terms detailed above. The payments shall be made on completion of milestones as identified and agreed by both the FEA's Representative and the Design Consultant.

25.1 Off-Shore Work

All invoices issued for off-shore work pursuant to this Contract shall be expressed in the foreign currency, and will be issued using Design Consultant's overseas office letterhead. No GST or VAT shall be included in the invoice. Payment of the foreign currency shall be paid at the prevailing exchange rate as at the date of payment.

The FEA shall pay the invoice amount in foreign currency to each overseas bank account nominated by Design Consultant within 30 days of receipt of the invoice.

25.2 On-Shore Work

All invoices issued for on-shore work pursuant to this Contract shall be expressed in Fiji Dollar currency obtained by converting any foreign currency amounts to Fiji dollars using the corresponding foreign exchange rate prevailing on the date of the invoice. Any Value added Tax (VAT) amount component at the prevailing VAT rate shall be added to indicate the VAT inclusive price (VIP). The invoice shall be issued using Design Consultant's Fijian registered entity letterhead. The FEA shall pay the amount agreed to be in foreign currency to an overseas bank account nominated by the Design Consultant. The

FEA shall pay the amount agreed to be in Fiji dollars including the VAT amount to a local bank account nominated by the Design Consultant.

The FEA shall pay the invoiced amounts within 30 days of receipt of the invoice.

- a. The Design Consultant shall advise the FEA the details of its Fijian registered entity including the Tax Identification Number, Certificate of Exemption (COE) given by the Fiji Islands Revenue and Customs Authority (FIRCA) as soon as possible after the execution of this Agreement.
- b. The FEA shall not be responsible to pay invoices issued by the Design Consultant or its Fijian registered entity if such invoices are not in conformance with the above stated requirements.
- c. All matters relating to taxation such as income tax, withholding tax, PAYE and other tax issues shall be the responsibility of the Design Consultant and its Fijian registered entity. Similarly any superannuation related issues such as FNPF liabilities (where applicable) shall be the responsibility of the Design Consultant and its Fijian registered entity.

SECTION 2 TECHNICAL SPECIFICATIONS, RESPONSIBILITIES AND REQUIREMENTS

1. Nature and Scope of Design Work

The Fiji Electricity Authority intends to construct a 132kV Switchyard interconnecting its existing Vuda – Nadarivatu 132kV transmission line at Tower T92 at Virara Settlement, construct 132kV transmission line from Virara Settlement to Rarawai, Ba and construct 132/33kV step down substation at Ba to link with the existing 33/11kV zone substations at Rarawai and Tavua in the Western Region of Vitilevu, the main land of Fiji.

At the proposed substation in Ba, FEA would like to seek to procure and install 2 x 132/33 kV, (HV/LV), 20/25 MVA 50Hz three phase ONAN/ONAF power transformers. The transformers shall be fitted with an on-load diverter switch tap-changer (OLTC) with 33 kV cable end boxes.

This specification covers the basic requirements for the design of 132kV overhead power transmission line and substations necessary for the safe construction and efficient operation of the 132kV transmission lines specified below.

A 132kV overhead transmission line of approximately 30 kilometres route length is to be designed for construction from Tower T92 at Virara Settlement to Koronubu, Ba in the Western Region of Vitilevu Target date for commissioning is June 2018.

A 132kV Switchyard is to be designed for construction at Tower T92 near Virara Settlement. Target date for commissioning is June 2018.

A 132/33kV Substation is to be designed for construction at Rarawai, Ba along Koronubu Road.. Target date for commissioning is June 2018.

A brief description of the proposed transmission line is included in the preliminary report. The Design Consultant is required to collect and include additional information on:

- The type of terrain the lines are to be built on;
- The pollution that will be encountered along the line routes, i.e. high medium low etc;
- Topographical information, such as the height of the line above sea level and any significant changes along the line route;
- The easement widths available and the position of the 11kV line in the easement;
- Maintenance practices that will be used to maintain the line, such as live line or de-energized procedures; and
- The proposed design life of the transmission line, e.g. 40 years.

The Design Consultant will need to obtain information of the easement widths and any other limitations associated with constructing the line in that easement.

The Design Consultant will need to obtain additional topographical information to take into consideration the line height above sea level as winds and temperature change with elevation.

For an efficient design of the transmission lines and substation, the Design Consultant will need to obtain details on pollution as it is an expensive exercise just building the line and substation to the worst pollution category as the towers and insulators need to be longer and bigger.

The Design Consultant will be required to obtain terrain details so that line can be designed for the terrain and its wind shielding effects rather than just the worst condition.

The Design Consultant will be responsible for obtaining information on wind speeds and direction which are essential for the construction of an economical transmission line and substation structures.

The 132kV transmission line between Virara Settlement and Ba is to:

- Be constructed with single circuit steel poles and towers; and
- Include OPGW for the overhead earth wire.

The 132kV switchyard at Virara Settlement is to:

- Be constructed with outdoor gantry structures, CTs, VTs, disconnectors, circuit breakers, auxiliary equipment, earth switches, earth mats and boundary fence; and
- Include control building, battery chargers, control panels, protective relays, SCADA and communication facilities etc.

The 132/33kV substation at Ba is to:

- Be constructed with outdoor gantry structures, CTs, VTs, disconnectors, circuit breakers, power transformer, auxiliary equipment, earth switches, earth mats and boundary fence; and
- Include control building, battery chargers, control panels, protective relays, SCADA and communication facilities etc.

The major risks associated with this project are:

- Route selection for the new lines without easements in place at present;
- Access road to the Switching Station at Virara Settlement;
- Access road to the Towers and Poles; and
- Possible local resistance to the construction of the line.

The Design Consultant shall be required to carry out a detailed scope of works of the route selection and easements to ensure that FEA is free of any risk associated with the project.

2. Design Consultant's Responsibilities

The detailed design of transmission line, plant and equipment including plant layout, protection, control, supervisory interface equipment, earthing, civil works designs requirement etc. shall be carried out by the design consultant in accordance with acceptable standards and codes of practice.

The Design Consultant's responsibilities shall include but not necessarily be limited to:

1. Design complete power transmission line. The design route selected shall have minimal impact on the environment. The design shall be in compliance with the safety and national environmental laws. The required width of right-of-way for the line easement and vertical ground clearance shall be provided by the design consultant. .
2. Design profile and tower/pole plotting, tower/pole pegging on site.
3. Check and confirm existing easements for survey of the line route.
4. Classification, sampling and testing of soil types in relation to tower/pole foundation design and selection of appropriate foundation designs for each tower to the approval of the FEA engineer.
5. Design of all tower/pole foundations.
6. Select the most appropriate routes for the 132kV lines from Rarawai, Ba to Virara Settlement.
7. Transportation to and from tower/pole sites of all personnel and equipment.
8. Design complete 132kV Switching Station and 132/33kV Substation.
9. Landscaping for switchyard and substation
10. Undertake switchyard and substation earthing studies, modeling and analysis and site audit service, testing and identifications and modeling to ensure that protection systems on high voltage installations will operate appropriately during a fault and to prevent damage to Network asset and personnel. The earthing design shall be suitable for at least 40kA fault level.
 - i. Soil resistivity to assess the impedance of the soil surrounding the electrodes
 - ii. resistance to check the integrity of the earthing system
 - iii. continuity to ensure that all equipment is bonded together and to earth
 - iv. connectivity to ensure all connections to plants and equipments are connected properly with almost zero micro-ohms
 - v. step and touch protection as per the recognized Standard(s)
 - vi. Grounding System including connections of all steel structures and electrical apparatus to earth mesh and grounding electrodes.
 - vii. Lightning protection design of the entire switchyard and substation
11. Provide survey data on 3D computer model with a simulation of the earthing system's performance under fault conditions and the effects of changes in the system on performance.
12. Preparation of tender for construction works and identification of most suitable contractor for the construction of lines, switching station and substation
13. Supervision of construction works in the near future.
14. Supervise commissioning on completion of the construction works.

15. Provide warranty

3. Details Required from the Design Consultant

The Design Consultant shall be required to provide the deliverables which include:

- A geo-technical report;
- An earthing study and report;
- A transmission line survey;
- A switchyard/substation reports
- An interference report – adjacent metallic structures;
- A RFI and TVI interference report;
- An insulation coordination report etc.

4. Preparation of Design, Specifications and Tender Documents

The Design Consultant shall prepare the design, specifications and tender documents for review by FEA. The design consultant shall ensure that the best solutions are being sought for FEA. The Design Consultant shall support his/her assumptions with detailed cost analysis.

The phase would include but not limited to:

1. Collection of preliminary design data and available climatic data;
2. Collection of geo-technical and earth resistivity data and other information required for transmission line and substation design;
3. Selection of the reliability level in terms of return period of limit loads;
4. Selection of the security requirements;
5. Listing of the safety requirements imposed by mandatory regulations and construction and maintenance loads;
6. Calculation of the climatic variables corresponding to selected return periods of limit loads;
7. Calculation of the climatic limit loads on components;
8. Calculation of loads corresponding to security requirements;
9. Calculation of loads relating to safety requirements during construction and maintenance;
10. Determination of the suitable strength coordination between line components;
11. Selection of the appropriate load and strength factors applicable to load strength equations;

12. Calculation of the characteristic strengths required for components;
13. Design of line components for the above strength requirements;
14. Selection of conductor to meet required RIV, TVI and audible noise levels;
15. Determination of conductor and substation equipment rating;
16. Determination of structure geometry;
17. Selection of insulation required; and
18. Calculation of lightning performance.

It is also recommended that in addition to the above, the following limit state loads be considered in determining structure deflections and conductor, insulator and fitting strength ratings of the transmission line:

- Deflection limitation loads - This loading condition is for setting deflection limit of structures, such as poles, in situations where the electrical clearances will not be infringed.
- Damage limitation loads - The nominated wind load is between 2 and 4 times more likely to occur than the ultimate strength load.
- Sustained load condition - The loads on the structural system with a conductor temperature equivalent to the mean of the winter season temperature with negligible wind loads. This temperature generally varies between 50°C and 150°C depending on the location.
- Everyday load condition - The loads on the structural system with a conductor temperature equivalent to the mean of local temperatures in the coldest month with negligible wind loads.
- Weather related loads - These loads are caused by extremes of wind, ice, snow and temperature or a combination of these.
- Conductor tensions and longitudinal loads - Conductor tensions used for design should be based on the lowest temperature likely to coexist with the design wind pressure. 15°C is common for Australia. The extreme wind gust may not affect all spans between tension structures, so a Reduction Factor should be calculated.
- Failure containment loads - The following should be taken into consideration in the determination of an economic design for the line:
 - Resisting the combination of longitudinal load and wind load;
 - Directing the increase in structural strength required by the above to increase the reliability of the line;
 - Reducing the effect of longitudinal load by utilising load release mechanisms;
 - Accepting some secondary structure failures but containing these to spans adjacent to the primary failure;

- Combinations of the above; or
- Utilizing stop structures at regular intervals to limit cascades.
- Broken conductor loads - These loads may be considered as a subset of failure containment loads. The factors used for failure containment may also be used for the broken conductor condition.
 - Number of conductors in a phase bundle
 - Flexibility of the structure and support system
 - The purpose of the structure and consequence of failure
 - Maintenance and Construction Loads

The conditions should be based on the worst weather conditions under which maintenance will be carried out. The limiting wind velocity for maintenance work is generally taken as 10m/sec.

Structural elements should be designed to withstand the design load without permanent distortion. Structural elements that fail under ductile yielding may, at the discretion of the engineer, be allowed to exhibit elastic-plastic yielding prior to failure.

5. Review of Route Selection and Environmental Impact Assessment Reports

This will involve a detailed study of all the possible transmission line route options and include identification of cost implications as well as the environmental impacts of each option. These studies will then be used by FEA and the Design Consultant to select the best possible transmission line routes.

This is an important phase of the project. Without a detailed review of the best route selection and environmental impact report, projects can be delayed which can be costly for both FEA and the Design Consultant.

The FEA shall use these reports to get approval for the establishment of land easements and for tree clearing in sensitive areas.

6. Issuing and Reviewing of Invitation to Tender (ITT) for the Turn-key Construction Phase of Works

The Design Consultant shall develop and issue the ITT for the construction phase of works and will assist FEA by reviewing the tender submissions for award.

The Design Consultant shall use the FIDIC document as the contract model for the construction tender.

7. Work Program

The Design Consultant shall submit with his/her tender a proposed program of design work in which all major activities of the design work is shown.

Such program shall fully detail the activities required for the complete design of the entire project.

8. Authority's Responsibilities

For the 132kV transmission line and substation design, Authority's responsibilities will include but not necessarily be limited to the following:

- Providing access into switchyards and substations;
- Providing all inductions for personnel for access to FEA sites;
- Providing basic information on preliminary transmission line design route;
- Providing single line drawings of the existing transmission network;
- Providing access to line routes where easements are not in place at present;
- Obtaining easements once line routes have been designed and agreed;
- Providing list of FEA preferred suppliers/manufacturers of major electrical and structural items required for the design and construction of the transmission lines, switchyard and substations; and
- Providing list of Engineering Standards that sets out minimum requirements for the design, operation and installation of the power transmission lines and substations (if required).

9. Site Conditions

Vitilevu is situated at longitude 177° east and latitude 17° south. Section of the proposed transmission line is across open hilly country with forest on both sides. The proposed switchyard at Virara Settlement is to be located on the open hilly area adjacent to the existing Vuda – Nadarivatu 132kV transmission line.

Temperature: The maximum recorded dry bulb temperature is 38°C and the minimum recorded temperature approximately 10°C. The mean maximum daily temperature for the hottest month is 31°C.

The Design Consultant shall obtain the daily temperature readings for the last 10 years for the design of the conductor and other items. It would be the responsibility of the Design Consultant to verify accuracy of the data obtained.

Rainfall: Average annual rainfall varies from 1800 millimetres in the west to above 4000 millimetres in the east. The wet season is from November to April. The Design Consultant will be required to obtain the daily rainfall data for the past 10 years for the design of the structures. The maximum and minimum rainfall for the area would be required.

Wind: Fiji is subject to cyclonic conditions. The Design Consultant shall design the structures using the minimum standards for the design, construction and performance of the lines and substations to withstand extreme category 5 cyclones.

10. System Conditions

System Particulars for 132kV, 33kV and 11kV system applicable in Fiji Islands are stated below:

Normal system voltage	132kV	33 kV	11 kV
System Highest voltage	145kV	36 kV	12 kV
Frequency	50 Hz	50 Hz	50 Hz
Earthing of Neutral point	Directly earthed	Earthed through earthing Transformer	Directly earthed with or without resistor
Design Symmetrical fault level	31.5 kA	31.5 kA	31.5 kA

11. Design Calculations

Preliminary design calculations shall be provided in the tender document.

All design calculations shall be provided in the final design report on completion of the design work.

All design calculations shall be finally confirmed and re-submitted on completion of the actual construction works together with as-built drawings.

12. Specification Drawings

Drawings shall be produced in digital AutoCAD format suitable for copying and editing.

All drawings submitted shall be clear and legible without imperfection of any sort. Drawings which in the opinion of the Authority's Engineer are of an inadequate standard will be rejected.

All drawings shall be to scale and fully detailed. All drawings other than diagrams, site layouts and type dimension prints shall be to a suitable scale of not less than 1:20. All important dimensions shall be figured and dimensions not to scale shall be underlined or marked N.T.S. Material of which each part is to be constructed shall be indicated. All legends and notes on the drawings shall be in the English language.

Any drawings modified from a previously submitted drawing shall bear a revision number or letter, and the nature of the modifications shall be clearly indicated.

The Design Consultant shall be responsible for any discrepancies, errors or omissions in the design. .

13. Site Access and Survey

The Design Consultant shall provide the names and categories of personnel he proposes to provide and the period for which they would remain in Fiji.

14. Design and Standardisation

Except where otherwise specified the design works shall comply with the requirements of the latest applicable recommendations of the International Electro-Technical Commission (IEC), the British Standards, the Australian/New Zealand Standards or similar standards that uses best international industry practice.

The Works shall be designed to ensure satisfactory operation in which continuity of service is the first consideration, and to facilitate inspection, cleaning and repairs. The design work must ensure satisfactory operation of all apparatus under the atmospheric conditions prevailing at the site and under such variations of load as may be met with under working conditions on the system including those due to faulty synchronising and short circuit.

The design shall incorporate every reasonable precaution and provision for the safety of all those concerned in the operation and maintenance of the Works and of associated works supplied under other contracts.

The design of all electrical connections and contacts shall be of ample section and surface for carrying continuously the specified currents without undue heating.

All apparatus, connections and cabling shall be designed and arranged to minimise the risk of fire and any damage which might be caused in the event of fire.

If any design error(s), omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the Design Consultant's documents, they shall be corrected at the Consultant's cost.

SECTION 3 FINANCIAL INFORMATION

The Tenderer shall state hereunder:

- (a) The full name, business address, nationality and type of organization.
- (b) The full name and business address of any Fijian agent.
- (c) The date of the Tenderer's formation.
- (d) The Tenderer's capitalization and total sales over the preceding three fiscal years.
- (e) Details of design of a similar nature undertaken in the previous ten years, giving details of at least three contracts stating the location, purchaser, dates of commencement and completion and value of the contract in the total foreign currency equivalent.
- (f) Details of any contracts on which the Tenderer has defaulted or on which liquidated damages have been applied in the previous five years giving location, purchaser, and value of the contract and nature of the default or penalty.
- (g) Name and address of two banks and the name and address of an independent accountant, all of whom shall be authorized to provide promptly on request any information about the financial status of the Tenderer which is required by the FEA on the understanding that such information will be kept confidential and will only be used to assess the financial ability of the Tenderer to undertake the Contract.

Form of Tender

To: Mr. Tuvitu Delairewa,
General Manager Commercial,
Fiji Electricity Authority
2 Marlow St, Suva, Fiji

Contract No: _____

Gentlemen:

We have carefully examined the requirements of this document (Tender MR 07/2017). We have understood and checked this document. We accordingly offer to design, prepare tender for construction works and assist FEA in identifying most suitable contractor(s) for construction of the 132kV power transmission lines from Virara Settlement to Koronubu, Ba, 132kV switching station at Virara and 132/33kV substation at Kronubu, Ba in conformity with this document and the enclosed Proposal, for the fixed lump sum of (in currencies, of payment) _____ or other such sums as may be determined in accordance with the terms and conditions of the Contract.

We agree to abide by this Bid until _____ and it shall remain binding upon us and maybe accepted at any time before that date.

If our bid is accepted, we will provide the specified performance security, commence the Works as soon as reasonably possible after receiving the Employer's Representative's notice to commence, and complete the Works in accordance with the above-named documents within the time stated in the document.

Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest or any bid you may receive.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Name and Address of Agent	Amount and Currency	Purpose of Commission or Gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

(if none, state "none").

We are, Gentlemen
Yours faithfully

Signature _____ in the capacity of _____ duly

authorized to sign bids for and on behalf of

Address _____

Date _____

Form of Contract Agreement

This Agreement made this ____ day of _____ 20 ____ between _____ of Fiji Electricity Authority (FEA) of the one part and _____ of _____ (Design Consultant) of the other part

Whereas the FEA desires that the Works known as design, prepare tender for construction works and assist FEA in identifying most suitable contractor(s) for construction of the 132kV power transmission lines from Virara Settlement to Koronubu, Ba, 132kV switching station at Virara and 132/33kV substation at Koronubu in Ba has accepted a Bid by the Design Consultant for the said Works.

The FEA and the Design Consultant agree as follows:

1. The following documents shall be deemed to form and be read and construed as part of this Agreement:
 - a. The Letter of Acceptance dated _____
 - b. The FEA's Requirements
 - c. The Bid dated _____
 - d. The Completed Schedules, and
 - e. The Design Consultant's Proposal.
2. In consideration of the payments to be made by the FEA to the Design Consultant, the Design Consultant hereby covenants with the FEA to design, prepare tender for construction works and assist FEA in identifying most suitable contractor(s) for construction of the 132kV power transmission lines from Virara Settlement to Koronubu, Ba, 132kV switching station at Virara and 132/33kV substation at Koronubu in Ba therein in conformity in all respects with the provisions of the Contract.
3. The FEA hereby covenants to pay the Design Consultant, in consideration of the design, prepare tender for construction works and assist FEA in identifying most suitable contractor(s) for construction of the 132kV power transmission lines from Virara Settlement to Koronubu, Ba, 132kV switching station at Virara and 132/33kV substation at Koronubu in Ba therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
4. This Agreement shall come into effect on signing by both parties.

In Witness whereof the parties hereto have caused this Agreement to be executed the day and year first before written in accordance with their respective laws.

Authorized signature of FEA
SEAL
(if any)

Authorized signature of Design Consultant
SEAL
(if any)

in the presence of:

Name _____
Signature _____
Address _____

in the presence of:

Name _____
Signature _____
Address _____

Form of Performance Security (Bank Guarantee)

To: Fiji Electricity Authority
2 Marlow St, Suva
Fiji

Tender Name: Design, prepare tender for construction works, assist Fiji Electricity Authority (FEA) in identifying most suitable contractor(s) for construction of the 132kV power transmission lines from Virara Settlement to Koronubu, Ba, 132kV switching station at Virara and 132/33kV substation at Koronubu in Ba

Tender No: MR 07/2017

WHEREAS _____ [name and address of Design Consultant] (hereinafter called "the Design Consultant") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Design Consultant shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with its obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Design Consultant such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Design Consultant, up to a total of _____ [amount of Guarantee] _____ [in words], such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of Guarantee] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Design Consultant before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Design Consultant shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until the date of issue of the Performance Certificate.

Signature and Seal of the Guarantor _____
Name of Bank _____
Address _____
Date _____

Form of Advance Payment Security (Bank Guarantee)

To: Fiji Electricity Authority
2 Marlow Street,
Suva, Fiji

_____ *[name of Contract]*

Tender Name: Design, prepare tender for construction works, assist FEA in identifying most suitable contractor(s) for construction of the 132kV power transmission lines from Virara Settlement to Koronubu, Ba, 132kV switching station at Virara and 132/33kV substation at Koronubu in Ba

Tender No: MR 07/2017

Gentlemen:

In accordance with the provisions of the Conditions of Contract, Sub-Clause 13.2 ("Advance Payment") of the above-mentioned Contract, _____ *[name and Address of Design Consultant]* (hereinafter called "the Design Consultant") shall deposit with Fiji Electricity Authority a bank guarantee to guarantee its proper and faithful performance under the said Clause of the Contract in an amount of _____ *[amount of Guarantee]* _____ *[in words]*.

We, the _____ *[bank or financial institution]*, as instructed by the Design Consultant, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to Fiji Electricity Authority on its first demand without whatsoever right of objection on our part and without its first claim to the Contractor, in the amount not exceeding _____ *[amount of Guarantee]* _____ *[in words]*.

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed thereunder or of any of the Contract documents which may be made between Fiji Electricity Authority and the Design Consultant, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until Fiji Electricity Authority receives full repayment of the same amount from the Contractor.

Yours truly, _____
Signature and Seal: _____

Name of Bank/Financial Institution: _____
Address: _____
Date: _____

Tender Submission - Instruction to bidders

It is mandatory for Bidders to upload a copy of their bid in the **TENDER LINK** Electronic Tender Box no later than **4:00pm, on Wednesday 8th February, 2017.**

To register your interest and tender a response, view 'Current Tenders' at:
<https://www.tenderlink.com/fea>

For further information contact The Secretary Tender Committee, by e-mail
TDelairewa@fea.com.fj

In additional, hard copies of the tender, one original and one copy must be deposited in the tender box located at the FEA Head Office, 2 Marlow Street, Suva, Fiji no later than **4:00pm, on Wednesday 8th February, 2017**- Addressed as

Tender – MR 07/2017 – Contract to Design and Prepare Tender Specification for:

- 1. The Construction of 132kV Transmission Line from Virara Settlement to Koronubu in Ba**
- 2. 132kV Switching Station at Virara and,**
- 3. 132/33kV Substation at Koronubu, Ba**

**The Secretary Tender Committee
Fiji Electricity Authority
Head Office
Suva
Fiji**

- **Hard copies of the Tender bid will also be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and it is dispatched before the closing date and time.**

Tenders received after **4:00pm** on the closing date of **Wednesday 8th February, 2017.**

- will not be considered.
- Lowest bid will not necessarily be accepted as successful bid.

- **It is the responsibility of the bidder to pay courier chargers and all other cost associated with the delivery of the hard copy of the Tender submission including any Duties/Taxes. Hard copies of the Tender submission via Post Box will not be considered.**