



Report

Transmission

Title: **Ferrum - Uppington 400 kV Line -
Engineering Tender Evaluation Returnables**

Template Unique Identifier: **240-141157901**

Template Revision: **5**

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Document Unique Identifier: **LES1855**

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Documentation Type: **Report**

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DISCLOSURE**

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Date: **17 January 2024**

ENGINEERING TENDER EVALUATION CRITERIA

Ferrum - Upington 400 kV Line

List of ENGINEERING returnables for open tender:

Please submit all engineering documentation described in the tables below in a separate, standalone file that must be clearly marked **Engineering Tender Returnables: Ferrum - Upington 400 kV Line** i.e. the information submitted must only be related to Engineering and not to SHEQ.

The documents must be submitted in a **numbering** sequence as described in the table below; otherwise the tender submission will not be evaluated.

Please note that the minimum required percentage (or score) to pass Engineering:
for the Construction of the Transmission Powerline evaluation is **62%**.

for the Lines HV Equipment evaluation is **70%**

All safe work procedures are mandatory.

All site supervisors must have previous power line project experience in that role according to the minimum requirement in the criteria.


*If another supervisor will be on site other than the CV submitted, the supervisor must have the minimum requirements of the supervisor accepted in this evaluation

This evaluation will be done purely on the documentation provided; however, Eskom reserves the right to conduct scheduled or unscheduled visits to offices, factories and construction sites.

Please note that the following are to be supplied by the contractor and must be procured from Eskom approved suppliers (List will be provided*)

- * Phase conductor,
- * Groundwire,
- * OPGW and OPGW hardware,
- * Insulators,
- * Line hardware,
- * Towers, poles and other structures.
- * Foundations – concept conventional foundation designs will be provided by Eskom; however, the Contractor will be responsible for the appropriate use (depending on site and geotechnical conditions) of the foundation designs. In addition, contractors can also provide their own foundation designs for acceptance by Eskom;
- * Line labels - it should be noted that labels must be installed as per Eskom standard 240-75660336 entitled “Substation and Network Equipment Label Specification” and Eskom standard 240-120804300 entitled “Standard for the Labelling of Electrical Equipment within Eskom Wires Networks;” and,
- * Miscellaneous items (as per the bill of materials)

Eskom will provide design documents, specifications, tower drawings and line profile details.

| | | | | | | | | | |
|--|---|--|-----------|--------------------|-------------------|---|-------------------------|--------------------|---------------|
|  Transmission Engineering Line Engineering Services (LES) | | Engineering Tender Evaluation Returnables (for a Transmission Powerline) | | | | | | Template No.: | 240-141157901 |
| | | | | | | | | Template Rev: | 5 |
| | | | | | | | | Document No: | LES1655 |
| | | | | | | | | Document Rev: | 1 |
| | | | | | | | | Name of Supplier: | |
| Name of Project: | | Ferrum - Upington 400 kV Line | | | | | | Name of Evaluator: | |
| Item | Description | Select Option | Weighting | Score by Evaluator | Sub-section score | Details to be submitted in engineering returnables file | Comments from Evaluator | | |
| 1 | Specify the registration (SAGC) and power line experience of the proposed SURVEYOR to be used | No Registration (0) Registered with no power line experience (2) Registered with one power line project experience (4) Registered with two or more power line project experience (5) | 8% | 0 | 0% | Provide: - Name of surveyor - Professional registration details - List of power line projects as surveyor | | | |
| 2.1 | Specify the registration and power line experience of the proposed SOIL PROFILER to be used (requirement: Engineering geologist/geotechnical engineer; and/or suitably qualified practitioner; that is registered with the South African Council for Natural Scientific Professions (SACNASP) or Engineering Council of South Africa (ECSA)) | No Registration (0) Registered with no power line projects experience (2) Registered with one to three power line projects experience (4) Registered with four or more power line projects experience (5) | 8% | 0 | 0% | Provide: - Name of soil profiler - Professional registration details - Years of post registration soil profiling - List of power line projects as soil profiler | | | |
| 2.2 | Specify the registration and power line experience of the proposed FOUNDATION DESIGNER to be used. (requirement: ECSA registered Pt. Eng. or Pt. Tech. Eng. (Civil/Structural); also to be responsible for signing off safe work procedures) | No Registration (0) Registered (2) Registered with one power line project experience (4) Registered with two or more power line projects experience (5) | 8% | 0 | 0% | Provide: - Name of foundation designer - Professional registration details - List of power line projects as foundation designer and person responsible for compiling the safe work procedure | | | |
| 2.3 | Specify the experience of the proposed FOUNDATION SITE SUPERVISOR to be used (requirement: <u>At least two</u> transmission power line project experience as a foundation supervisor) | No experience (0) Two power line projects (4) Three or more power line projects (5) | 5% | 0 | 0% | Provide: - Name of foundation supervisor - List of power line projects as foundation supervisor | | | |
| 3.1 | Specify the experience of the proposed TOWER ASSEMBLY & ERECTION SITE SUPERVISOR to be used. (requirement: <u>At least two</u> minimum 400kV power line project experience as a tower assembly and erection supervisor) | No experience (0) Two power line projects (4) Three or more line project (5) | 5% | 0 | 0% | Provide: - Name of tower and erection site supervisor - List of power line projects as tower assembly and erection supervisor | | | |

| | | | | | | | |
|-----|---|--|-----|---|----|---|--|
| 3.2 | Specify the registration and experience related to transmission power lines of the proposed TEMPORARY WORKS DESIGNER and the proposed SWP compiler for tower assembly and erection. (requirement: ECSA registered Pr. Eng. or Pr. Tech. Eng. and also to be responsible for signing off safe work procedures) | <div>No Registration (0)</div> <div>Registration with no experience (2)</div> <div>Registered with one power line project experience (4)</div> <div>Registered with two or more power line projects experience (5)</div> | 5% | 0 | 0% | Provide: - Name of temporary works designer for tower assembly and erection - Registration certificate(s) - List of the power line projects done by the temporary works designer and the SWP compiler | |
| 3.3 | Regarding power steel, steel poles and other structures provide a: 1. Signed letter of commitment from the proposed supplier. | <div>No submission (0)</div> <div>Signed letter of commitment provided (5)</div> | 5% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, | |
| 4.1 | Specify certification and experience of proposed earthing safety supervisor . (requirement: HV regs responsible person with power line safety earthing experience, also to be responsible for signing off safe work procedure. The contractor to ensure that the supervisor must be competent with the required certification and authorisation level depending on the task) | <div>No Certification (0)</div> <div>Certified with no experience (2)</div> <div>Certified with one power line project experience (4)</div> <div>Certified with two or more power line projects experience (5)</div> | 5% | 0 | 0% | Provide: - Name of earthing safety supervisor - Certification level and certificate - List of power line projects where person was responsible for earthing safety practices | |
| 5.1 | Specify the experience of the proposed DRESSING, STRINGING & REGULATION SITE SUPERVISOR . (requirement: at least two transmission power line project experience as a supervisor/working with triple bundle configuration or larger) | <div>No experience (0)</div> <div>Two power line projects (4)</div> <div>Three or more power line projects (5)</div> | 5% | 0 | 0% | Provide: - Name of dressing, stringing and regulating site supervisor - List of power line projects as dressing, stringing and regulation supervisor | |
| 5.2 | Specify the registration and experience related to Transmission power lines, of the proposed TEMPORARY WORKS DESIGNER and the proposed SWP compiler for dressing, stringing and regulation. (requirement: ECSA registered Pr. Eng. or Pr. Tech. Eng. and also to be responsible for signing off safe work procedures) | <div>No Registration (0)</div> <div>Registration with no experience (2)</div> <div>Registered with one power line project experience (4)</div> <div>Registered with two or more line project experience (5)</div> | 5% | 0 | 0% | Provide: - Name of temporary works designer and SWP compiler for dressing, stringing and regulation - Registration certificate(s) - List of the power line projects done by the temporary works designer and the SWP compiler. | |
| 6 | Provide a suitable support structure that will be used to cross over other power lines, roads, railways and conveyorbelt (system to cater for impact load in case of failure as well as maintaining a safe clearance). System shall be suitable to perform the crossing under live or dead conditions | <div>No (0)</div> <div>Only dead conditions (2)</div> <div>Dead and live conditions (5)</div> | 6% | 0 | 0% | Provide: - Details on the different types of crossing support structures to be used indicating <u>dead and live line</u> applicability | |
| 7.1 | Have you constructed transmission lines on at 400 kV level in the past 5 years? | <div>No (0)</div> <div>Yes as a subcontractor (2)</div> <div>Yes as a main contractor (5)</div> | 10% | 0 | 0% | Provide list of power line projects where: - Foundations, tower assembly and erection and stringing has been performed as well as the role (main contractor/sub contractor) | |
| 7.2 | Have you constructed transmission lines on challenging terrain whereby alternate methods of construction were required? (e.g. On pole erection etc) | <div>No (0)</div> <div>Yes as a subcontractor and details provided (2)</div> <div>Yes as a main contractor and details provided (5)</div> | 5% | 0 | 0% | Provide list of power line projects where: - Earthwire was replaced with OPGW and mention the type of method that was used | |

| | | | | | | | | | |
|--|--|--|--|--|------------------------|---|----|--|--|
| 7.3 | Provide a registered project manager (SACPMP) with minimum 400 kV power line experience? | No Registration (0) | | | 5% | 0 | 0% | Provide: - Name of project manager (construction PM) - Registration details - List of power line projects as project manager | |
| | | Registered with no experience (2) | | | | | | | |
| | | Registered with one power line project experience (4) | | | | | | | |
| | | Registered with over two power line project experience (5) | | | | | | | |
| 7.4 | Provide a registered construction site manager with minimum 400 kV power line construction experience? (SACPMP) | No Registration(0) | | | 10% | 0 | 0% | Provide: - Name of construction site manager (site manager) - Registration details - List of power line projects as construction site manager | |
| | | Registered with no experience (2) | | | | | | | |
| | | Registered with one power line project experience (4) | | | | | | | |
| | | Registered with over two power line project experience (5) | | | | | | | |
| 7.5 | Explain the process followed to compile a set of AS-BUILT documentation. This documentation should include a complete file including all final tower positions, foundation and geotechnical reports, tower types, tower footing measurements, line impedance measurement, incident reports, inspection reports and airborne laser scan (if specified) and infra-red scan if specified. | Nothing provided (0) | | | 5% | 0 | 0% | Provide: Detailed plan for capturing as-built data of all aspects of the transmission line | |
| | | Basic plan provided with key aspects missing (2) | | | | | | | |
| | | Detailed plan with all key aspects captured (5) | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| A total of 62% or higher is required to pass this section of the evaluation | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| I HAVE READ AND UNDERSTOOD ALL REQUIREMENTS OF THE TRANSMISSION LINE SPECIFICATION, TRM5CAAC AND OTHER REFERENCED SPECIFICATIONS AND AGREE TO ADHERE TO THESE. | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| SUPPLIER STAMP HERE | | | | | | | | | |
| | | | | | | | | | |
| Overall Comments by Evaluator: | | | | | | | | | |
| | | | | | | | | | |
| Evaluated and/or coordinated by | | | | | Reviewed by | | | Authorised by | |
| Name of Evaluator: | | | | | Name of Reviewer: | | | Name of Authoriser: | |
| Signature of Evaluator: | | | | | Signature of Reviewer: | | | Signature of Authoriser: | |
| Date: | | | | | Date: | | | Date: | |


| Score | (%) | Definition |
|-------|-----|--|
| 5 | 100 | COMPLIANT <ul style="list-style-type: none"> • Meet technical requirement(s) AND; • No foreseen technical risk(s) in meeting technical requirements. |
| 4 | 80 | COMPLIANT WITH ASSOCIATED QUALIFICATIONS Meet technical requirement(s) with: <ul style="list-style-type: none"> • Acceptable technical risk(s) AND/OR; • Acceptable exceptions AND/OR; • Acceptable conditions. |
| 2 | 40 | NON-COMPLIANT <ul style="list-style-type: none"> • Does not meet technical requirement(s) AND/OR; • Unacceptable technical risk(s) AND/OR; • Unacceptable exceptions AND/OR; • Unacceptable conditions. |
| 0 | 0 | TOTALLY DEFICIENT OR NON-RESPONSIVE |

Note 1: The scoring table does not allow for scoring of 1 and 3.

Note 2: Foreseen acceptable and unacceptable risk(s), exceptions and conditions shall be unambiguously defined in the relevant Tender Technical Evaluation Strategy.

Clarification Notes:

1. It is important to file all documents properly, in separate sections of the file. Clearly mark the sections. (Section 1-7)
2. Not providing the supporting documentation will result in a ZERO score for that particular question.
3. ECSA is preferred but other equivalent (ECSA acceptable) registrations will be considered.
4. SWP - Safe Works Procedure
5. Please note that if the relevant registered professional mentioned above, changes, the profile of the person taking up this post as a replacement must have an equivalent profile as outlined above.

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|--|--|--|--|--|--|--------------------------------------|
|  Eskom Transmission Engineering Line Engineering Services (LES) | Engineering Tender Evaluation Returnables | | | | | Template No.: 240-141157901 |
| | Lines HV Equipment | | | | | Template Rev: 5 |
| | | | | | | Document No: LES1855 |
| | | | | | | Document Rev: 1 |
| | | | | | | Ferrum - Upington 400 kV Line |
| Name of Evaluator: | | | | | | |

| Item | Description | Select Option | Weighting | Score by Evaluator | Sub-section score | Details to be submitted in engineering returnables file | Comments from Evaluator | Name and signature of Evaluator |
|------|--|---|-----------|--------------------|-------------------|--|-------------------------|---------------------------------|
| 1.1 | Regarding Phase Conductors , provide a: 1. Signed letter of commitment from the proposed supplier. 2. Product specification from supplier- this is required for us to see if the correct product is being acquired 3. Letter from supplier stating that products have been fully type-tested and ready for use. | <div>No submission (0)</div> <div>Signed documents received for all points in description (5)</div> | 12% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Product specification and - Evidence that products have been fully type-tested and are ready for use as per 240-152844641 - Phase conductor standard for Eskom overhead lines. Note: Type-test must be valid to reflect the current raw materials specs and manufacturing processes. | | |
| 1.2 | Regarding Earthwires , provide a: 1. Signed letter of commitment from the proposed supplier. 2. Product specification from supplier- this is required for us to see if the correct product is being acquired 3. Letter from supplier stating that products have been fully type-tested and ready for use. | <div>No submission (0)</div> <div>Signed documents received for all points in description (5)</div> | 12% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Product specification and - Evidence that products have been fully type-tested and are ready for use. Note: Type-test must be valid to reflect the current raw materials specs and manufacturing processes. | | |
| 1.3 | Regarding Insulators , provide a: 1. Signed letter of commitment from the proposed supplier. 2. Commitment of product drawings from supplier- (the actual drawings will be required for Eskom's acceptance before supplying) 3. Letter from supplier stating that products have been fully design and type-tested and ready for use. | <div>No submission (0)</div> <div>Signed documents received for all points in description (5)</div> | 13% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Commitment of product drawings and - Evidence that products have been fully design and type-tested according to the relevant IEC product standard Note: Type-test must be valid to reflect the current raw materials specs and manufacturing processes. | | |
| 1.4 | Regarding Line Hardware , provide a: 1. Signed letter of commitment from the proposed supplier. 2. Commitment of product drawings from supplier- (the actual drawings will be required for Eskom's acceptance before manufacturing) 3. Letter from supplier stating that products have been fully type-tested and ready for use. | <div>No submission (0)</div> <div>Signed documents received for all points in description (5)</div> | 13% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Commitment of product drawings and - Evidence that products have been fully type-tested and are ready for use. Note: Type-test must be valid to reflect the current raw materials specs and manufacturing processes. | | |

| | | | | | | | |
|--|---|--|------|----|----|---|--|
| 1.5 | Regarding OPGW , provide a: 1. Signed letter of commitment from the proposed supplier. 2. Product specification from supplier- this is required for us to see if the correct product is being acquired 3. Letter from supplier stating that products have been fully type-tested and ready for use. | No submission (0) Signed documents received for all points in description (5) | 13% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Product specification and - Evidence that products have been fully type-tested and are ready for use. Note: Type-test must be valid to reflect the current raw materials specs and manufacturing processes. | |
| 1.6 | Regarding OPGW Hardware , provide a: 1. Signed letter of commitment from the proposed supplier. 2. Commitment of product drawings from supplier- (the actual drawings will be required for Eskom's acceptance before manufacturing) 3. Letter from supplier stating that products have been fully type-tested and ready for use. | No submission (0) Signed documents received for all points in description (5) | 13% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Product specification and - Evidence that products have been fully type-tested and are ready for use. Note: Type-test must be valid to reflect the current raw materials specs and manufacturing processes. | |
| 1.7 | Regarding Labels , provide a: 1. Signed letter of commitment from the proposed supplier. 2. Product specification from supplier- this is required for us to see if the correct product is being acquired | No submission (0) Signed documents received for all points in description (5) | 12% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Product specification and a detailed drawing example | |
| 1.8 | Regarding Miscellaneous Items provide a: 1. Signed letter of commitment from the proposed supplier/s 2. Commitment of product drawings from supplier- (the actual drawings will be required for Eskom's acceptance before manufacturing) 3. Letter from supplier stating that products have been fully type-tested and ready for use. | No submission (0) Signed documents received for all points in description (5) | 12% | 0 | 0% | Provide: - Signed letter of commitment from the supplier, - Product specification and - Evidence that products have been fully type-tested and are ready for use. Note: Type-test must be valid to reflect the current raw materials specs and manufacturing processes. | |
| | | | 100% | 0% | 0% | | |
| A total of 70% or higher is required to pass this section of the evaluation | | | | | | | |
| The following four rows must be completed by the supplier: | | | | | | | |
| I HAVE READ AND UNDERSTOOD ALL REQUIREMENTS OF THE TRANSMISSION LINE SPECIFICATION, TRMSCAAC AND OTHER REFERENCED SPECIFICATIONS AND AGREE TO ADHERE TO THESE. | | | | | | | |
| Technical Tender Returnable Form Populated by: | | | | | | | |
| Signature: | | | | | | | |
| Date: | | | | | | | |
| SUPPLIER STAMP HERE | | | | | | | |

Overall Comments by Evaluator:

| | | | | | |
|---------------------------------|--|------------------------|--|--------------------------|--|
| Evaluated and/or coordinated by | | Reviewed by | | Authorised by | |
| Name of Evaluator: | | Name of Reviewer: | | Name of Authoriser: | |
| Signature of Evaluator: | | Signature of Reviewer: | | Signature of Authoriser: | |
| Date: | | Date: | | Date: | |

| Score | (%) | Definition |
|--|-----|--|
| 5 | 100 | COMPLIANT <ul style="list-style-type: none">• Meet technical requirement(s) AND;• No foreseen technical risk(s) in meeting technical requirements. |
| 4 | 80 | COMPLIANT WITH ASSOCIATED QUALIFICATIONS Meet technical requirement(s) with: <ul style="list-style-type: none">• Acceptable technical risk(s) AND/OR;• Acceptable exceptions AND/OR;• Acceptable conditions. |
| 2 | 40 | NON-COMPLIANT <ul style="list-style-type: none">• Does not meet technical requirement(s) AND/OR;• Unacceptable technical risk(s) AND/OR;• Unacceptable exceptions AND/OR;• Unacceptable conditions. |
| 0 | 0 | TOTALLY DEFICIENT OR NON-RESPONSIVE |
| Note 1: The scoring table does not allow for scoring of 1 and 3. | | |
| Note 2: Foreseen acceptable and unacceptable risk(s), exceptions and conditions shall be unambiguously defined in the relevant Tender Technical Evaluation Strategy. | | |

Clarification Notes:

1. It is important to file all documents properly, in separate sections of the file. Clearly mark the sections. (Section 1.1 -1.8)

2. Not providing the supporting documentation will result in a ZERO score for that particular question.

Tern ACSR conductor

ALTERNATIVE PHASE CONDUCTOR

If an alternative conductor is offered, the following electrical and mechanical properties shall be observed:

- Resistance (Ohms/km) ≤ 0.0718
- Conductor diameter (mm) ≈ 27.00
- Ultimate Tensile Strength (kN) ≥ 98.70
- Conductor linear mass (kg/km)- ungreased value ≈ 1340
- Modulus of elasticity final (MPa) ≈ 66600
- Coefficient of linear expansion, β , (1/°C) $\approx 21.12 \times 10^{-6}$

A/B SCHEDULES PHASE CONDUCTOR SPECIFICATION SHEETS

Schedule A: Purchaser's specific requirements

Schedule B: Particulars of equipment to be supplied

Conductor Type: Tern ACSR conductor

| Description | Schedule A | Schedule B |
|---|---------------------------------------|------------|
| IEC Code | IEC Code 403.77-A1/S1A-45/3.38-7/2.25 | |
| Conductor Overall Diameter (mm) | 27 | |
| Area Aluminium (mm ²) | 403.77 | |
| Area Total (mm ²) | 431.6 | |
| Aluminium wires (number off) / (diameter mm) | 45/3.38 | |
| Steel wires (number off) / (diameter mm) | 7/2.25 | |
| Conductor linear mass (kg/km)- ungreased value | 1340 | |
| Ultimate Tensile Strength (kN) | 98.7 | |
| Resistance DC @ 20°C (Ohms/km) | 0.0718 | |
| Modulus Elasticity Final (MPa) | 66600 | |
| Coefficient of Linear Expansion, β , (1/°C) | 21.12 x 10 ⁻⁶ | |
| Drum Lengths (m) | 3000 | |
| Matched Sets | Yes | |
| Greased/Ungreased | Ungreased | |

Horse ACSR conductor**ALTERNATIVE phase conductor**

If an alternative conductor is offered, the following electrical and mechanical properties shall be observed:

- Resistance (Ohms/km) ≤ 0.3939
- Conductor diameter (mm) ≈ 13.95
- Ultimate Tensile Strength (kN) ≥ 60.7
- Conductor linear mass (kg/km)- ungreased value ≈ 541
- Modulus of elasticity final (MPa) ≈ 108000
- Coefficient of linear expansion, β , (1/°C) $\approx 15.84 \times 10^{-6}$

A/B SCHEDULES phase conductor Specification Sheets

Schedule A: Purchaser's specific requirements

Schedule B: Particulars of equipment to be supplied

Conductor Type: Horse ACSR conductor

| Description | Schedule A | Schedule B |
|---|--------------------------------|------------|
| IEC Code | IEC Code 73.36-A1S1A-12/7/2.79 | |
| Conductor Overall Diameter (mm) | 13.95 | |
| Area Aluminium (mm ²) | 73.36 | |
| Area Total (mm ²) | 116.16 | |
| Aluminium wires (number off) / (diameter mm) | 12/2.79 | |
| Steel wires (number off) / (diameter mm) | 7/2.79 | |
| Conductor linear mass (kg/km)- ungreased value | 541 | |
| Ultimate Tensile Strength (kN) | 60.7 | |
| Resistance DC @ 20°C (Ohms/km) | 0.3939 | |
| Modulus Elasticity Final (MPa) | 108000 | |
| Coefficient of Linear Expansion, β , (1/°C) | 15.84×10^{-6} | |
| Drum Lengths (m) | 1000/1500/2000 | |
| Matched Sets | Yes | |
| Greased/Ungreased | Ungreased | |