Annexure B: Technical Requirements

Managed Bandwidth link between University of Fort Hare Alice Campus (UFH Alice) and Rhodes University (RU)
RFP No. 33579/27/07/2023

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Glossary

Abbreviation	Term	Description
BER	Bit Error Rate	The percentage of bits that have errors relative to the total number of bits received in a transmission.
CAC	Customer Acceptance Certificate	Certificate of Acceptance that the SANReN customer needs to sign off on when work done (including civil work) is done on the SANReN customer's premises.
CSIR	Council for Scientific and Industrial Research	A statutory body established in terms of Scientific Research Council Act 46 of 1988, as amended.
GIS	Geographic Information System	A system designed to capture, store, manipulate and visualise spatial or geographic data.
IETF	Internet Engineering Task Force	A body that defines standard Internet operating protocols such as TCP/IP.
ITU	International Telecommunication Union	The International Telecommunication Union, originally the International Telegraph Union, is a specialized agency of the United Nations that is responsible for issues that concern information and communication technologies. It is the oldest global international organization. Headquarters: Geneva, Switzerland Founded: 17 May 1865
LC/APC	Lucent/Little/Local Connector - Angled Physical Contact	Fibre optic connector of the LC type with angle-polishing on fibre end-face.
ODF	Optical Distribution Frame	A passive device that terminates fibre cables.
PoP	Point of Presence	A location where networking equipment may be accessed.

RFP	Request for Proposal	A request for organisations and companies to submit a proposal to supply goods and services to CSIR.
RU	Rack Unit	Unit of measure describes the height of electronic equipment designed to mount in a 19-inch rack. One rack unit is 1.75 inches (44.45 mm) high.
RU-Makhanda	Rhodes University - Makhanda	Situated in Makhanda, formerly Grahamstown.
UFH Alice	University of Fort Hare Alice Campus	
SANReN	South African National Research Network	The South African National Research Network (SANReN) is a high-speed network dedicated to science, research, education and innovation traffic.

Definition of Terms

Term	Definition
Managed Bandwidth Service	A service provided by telecoms companies where a point-to-point link service of a particular bandwidth capacity is provided to the customer.
Underground Fibre Required	Only Underground Fibre solutions will be considered.
Underground Fibre Preferred	Underground Fibre solutions are preferred but Overhead solutions will be accepted also.

Technical Requirements

Bidders must comply with the technical requirements in this document. These requirements will be evaluated in the Technical Compliance Matrix – Annexure C1. Bidders that wish to respond with solutions for this project must **complete a tab/sheet in the Annexure C1.** Failure to complete the technical compliance matrix will exclude the bidder from being considered.

1 Requirement Level Keywords

To eliminate ambiguity, bidders are to interpret the meaning of functional (technical) requirements using the keywords; "must", "must not", "required", "shall", "shall not", "should", "should not", "recommended", "may", and "optional", as defined by the IETF RFC (Request For Comments) document designated as RFC2119.

2 Technical Compliance

Bidders shall note the evaluation criteria applicable, and the weights attached to each criterion and complete the Technical Compliance Matrix accordingly.

2.1 Technical Evaluation Criteria

- The evaluation of the bidder's proposal will be based on their response to the Technical Compliance Matrix (in spreadsheet format) – Annexure C1.
- The bidder must complete the Technical Compliance Matrix in accordance with the instructions tabled in the Technical Compliance Matrix spreadsheet. The Technical Compliance Matrix is a mandatory submission designed to facilitate evaluation.
- Each link proposed will be evaluated individually and must be completed in a separate tab in Annexure C1 – Technical Evaluation Matrix/Rubrics.
- Proposals with functionality / technical points of less than the pre-determined minimum overall percentage of 70% and less than 50% on each of the individual criteria will be eliminated from further evaluation on Price and Preference Points Evaluation.

3 Link Specifications

Proposals are hereby invited for the supply of a fixed-line managed bandwidth circuit with a 10Gbps committed rate between the SANReN sites identified in the section below.

Due to increased vandalism, theft, and other risks, the CSIR prefers underground fibre solutions, but overhead fibre solutions will be accepted if there are no underground fibre solutions available and/or affordable.

The proposed link will be evaluated taking the whole project into account. The purpose is to design a solution that have no overlap or shared infrastructure. If that is impossible, the aim is to minimize the overlap or shared infrastructure of links that make up the solution, ie. minimize common failures.

3.1 End Points

The name, address and coordinates for each endpoint are provided in Table 1. The bidder must provide 10Gbps a managed bandwidth link between the endpoints specified below in *Table 2* and the required bandwidth for the specific link. The required link is schematically shown in section 3.4 below.

Table 1: Site Details

Site Name	**Address**	**Co-ordinates**
Site A: University of Fort Hare Alice Campus	Chemistry/Microbiology Building Main Road Alice 5700	Latitude: -32.785600 Longitude: 26.843800
Site B: Rhodes University, Struben Building	Struben Building Artillery Road Makhanda (Grahamstown) 6139	Latitude: -33.312900 Longitude: 26.519300

Table 2: Proposed links for procurement

Link	**Capacity**	**Site A**	**Site B**	**Fibre Installation (Required/Preferred)**
Link 1	10 Gbps	University of Fort Hare (Alice)	Rhodes University, Struben Building (Makhanda)	Underground fibre preferred, but overhead acceptable

3.2 Network Design Philosophy

Bidders are requested to take note that network descriptions (including diagrams) serve to communicate to the bidders the CSIR's intent from a logical networking point of view. The mapping of a logical topology onto physical infrastructure may introduce common failure points that are not obvious from the logical design. The 10Gbps circuits must be provisioned on optic fibre end-to-end.

The CSIR is aware that it is not always feasible (in terms of cost and time constraints) for bidders to offer services that map cleanly from the logical design to physical infrastructure (in other words, without introducing common failure points), and it is therefore necessary to find a compromise on the acceptable level of failure risk.

To make the above determination, the CSIR requires detailed information about the underlying physical infrastructure over which the required link will be provisioned. Bidders must avoid provisioning circuits using shared infrastructure between the sites in this tender as much as possible. All instances of shared infrastructure must be clearly identified and communicated to the CSIR as part of the bidder's response. Bidders shall disclose this information with at least the level of detail necessary to identify all shared infrastructure within the scope of the bid, including the physical routing of cable infrastructure, shared equipment and exchange points. This will be used by the CSIR to independently determine where infrastructure is shared between link or with other providers that the CSIR could be obtaining services from. If overlapping infrastructure exists, the CSIR may request, during negotiations, that the bidder revise the physical routing of their solution to provide a solution without any overlapping infrastructure that may cause single points of failure on the network.

Partnership solutions must be specified and completed as one bid, identifying the partnership members and their individual responsibilities for service delivery.

3.3 Leased or otherwise shared infrastructure

Bidders that lease the underlying infrastructure offered as part of this bid with other downstream providers must disclose such information as part of their response. Bidders will not be penalised for offering solutions based on leased infrastructure if this is disclosed to the CSIR.

Bidders that have provided SANReN with services that are not part of this bid must clearly indicate if their proposed solution shares any infrastructure with any such service already offered to SANReN.

3.4 Network Diagram

The network diagram below, i.e., Figure 1, illustrates the envisioned network. This diagram is for illustration purposes only and bidders must design the network to optimize their available infrastructure. Bidders must wherever possible provide a reasonably direct route between the endpoints.

Bidders must provide a diagram or detailed text description illustrating how the circuits are provisioned over their core infrastructure. This diagram or description/s must be detailed enough to understand the physical routing of the link and any shared infrastructure as described in section 3.2 above. A high-level diagram or detailed text description of the fibre route is sufficient, but a KML file showing the physical routing will be preferred. If the winning bidder does not provide a KML file with detailed physical routing information i.e. when only a detailed text description of the route was shared, they will be required to provide a KML during negotiations.

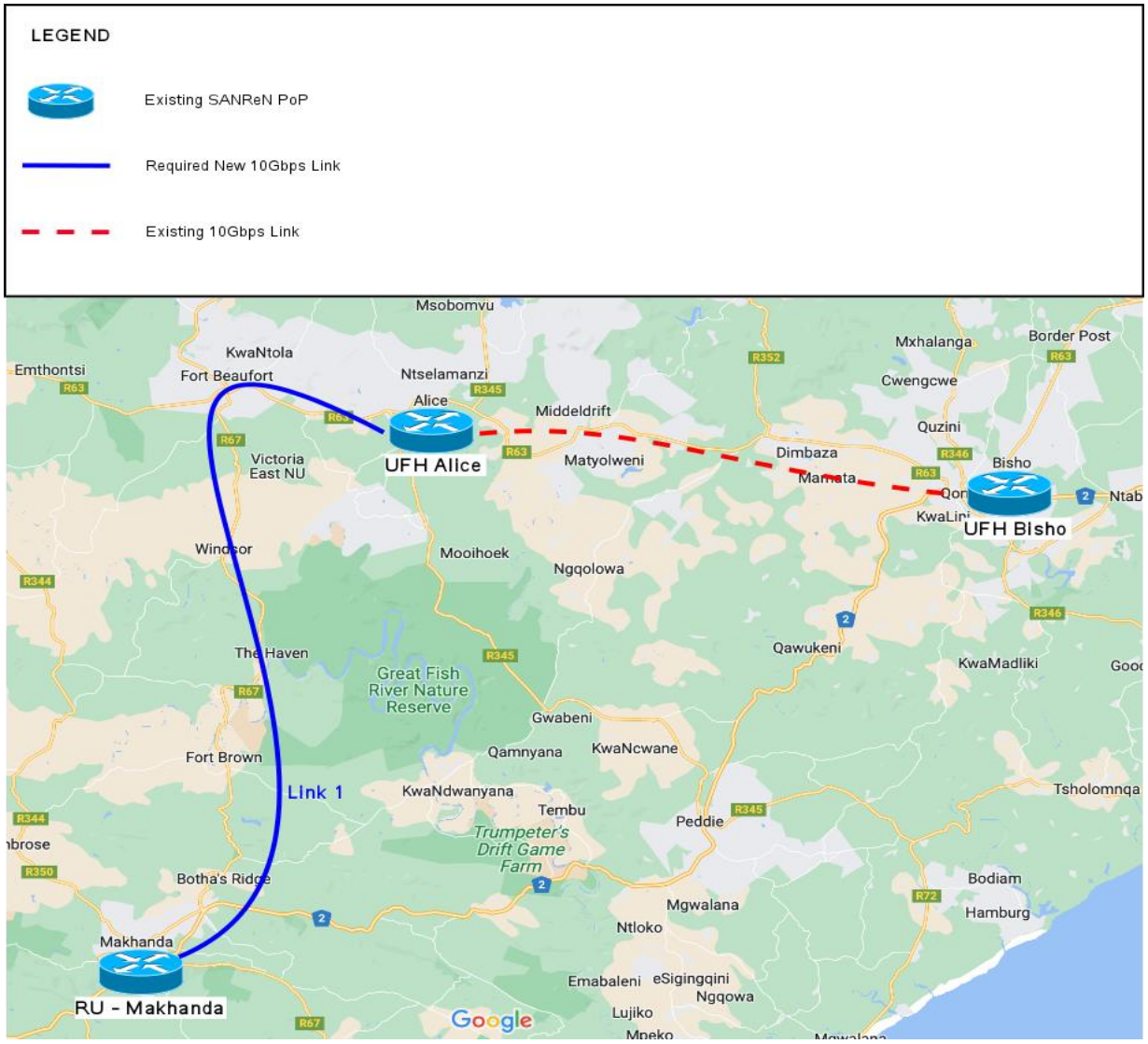

Figure 1: Geographic routing of required link from UFH Alice campus to RU in Makhanda via Fort Beaufort

3.5 Build Specifications

The bid is for end-to-end connectivity between the SANReN PoPs (this must include any “last mile builds” or link from the Bidder’s PoP to the endpoints). The bid may include as many routed paths between the SANReN POPs as the bidder can provide, whether it be existing or planned infrastructure. **The bidder must show through a diagram or a clearly comprehensible description that their link geographically/physically routes via Fort Beaufort or in a similar direction out of Alice**. This is important to SANReN as this will be a redundant link to a currently existing link and sharing of physical route infrastructure with the current link will defeat the purpose of the acquisition of this proposed link. Any planned infrastructure must be clearly marked and labelled. Should additional infrastructure be required to meet the specification, provisioning of the link must be delivered within the timelines stated in section 6 below.

4 Link Requirements

The link must comply with the following requirements:

1. The link must be provisioned on fixed-line fibre infrastructure.
2. The link must terminate on active equipment at the sites specified.
3. All equipment deployed at the specified sites must be AC powered (220V 50Hz).
4. All equipment used must have their dimension requirements specified.
5. The link must support Link Loss Forwarding.
6. The link must support Jumbo Frames of 9000 bytes.
7. The link handoff must be an Ethernet handoff on a 10GBASE-LR PHY interface.
8. The client hand-off must terminate on a patch panel.

5 Reliability

5.1 Service Requirements

The CSIR requires that a minimum end-to-end up-time of 99% (calculated per month) to be maintained for each circuit that is part of this tender. To manage these requirements, the CSIR encourages all bidders to include a standard SLA (Service Level Agreement) as part of its response. The tenderer must commit, as a minimum, to comply to the following criteria to pass the evaluation:

1. 24/7 access to a Network Operations Centre (NOC) to log support requests;
2. Maximum response time of 4 hours;
3. Maximum service restoration time of 8 hours; and

4. Quarterly end-to-end up-time reports for each circuit that is part of this tender.

The 99% is calculated as follows:

- Using the formula: total number of days in the month, multiplied by 24 hours multiplied by 99% equals minimum end-to-end up-time;
- For a 30 day month, 99% equates to an effective uptime of 712,8 hours out of 720 hours, allowing for 7.2 hours of downtime in the month; and
- For a 31 day month, 99% equates to an effective uptime of 736.56 hours out of 744 hours, allowing for 7.44 hours of downtime in the month

For suppliers who wish to calculate the minimum end-to-end uptime on a quarterly basis, the number of days in the quarter under review, multiplied by 24 hours multiplied by 99% will equal the minimum end-to-end up time. Suppliers need to **explicitly state** whether their minimum end-to-end uptime of 99% will be calculated either monthly or quarterly.

5.2 Maintenance

Details about the following aspects of the bidder's maintenance and support capabilities are required in order to evaluate the quality of the maintenance that the bidder will provide with respect to these link:

1. MTTR (mean time to repair).
2. Same day response, Working day response only, etc.
3. Fault Logging Procedures.
4. Maintenance down time procedures and advance warning procedures.
5. Fault Monitoring and Alerting capability.
6. Scheduled reporting of incidents & performance measurements; and
7. Customer responsibilities indicated.

The bidder must specify whether the link is/are being provided in this tender will be actively monitored or not. If the link is/are actively monitored, the bidder is to provide the CSIR, or a CSIR designated party, regular notifications on the status of the link and other specific details when requested.

6 Project Plan

Bidders who plan to deliver the link(s) within 6 months from the date of award will obtain full marks in the project plan section of the Technical Compliance Matrix. Bidders who plan to deliver the link(s) after 6 months will score points as per the Technical Compliance Matrix.

Bidders must submit a project plan and schedule for this Project. The project plan must, at a minimum, cover the following items:

1. Planned activities
2. Last Mile Civil Works (if applicable)
    a. Way Leaves
    b. Trenching
    c. Blowing Fibre
3. Circuit Provisioning
    a. Equipment procurement
    b. Equipment deployment
    c. Equipment configuration
4. Link Testing
5. Handover

7 Acceptance and As-deployed Documentation

In accepting a link, the CSIR will require several documents:

1. Test results for link.
2. CACs for the access builds at the end points (if applicable).
3. As-deployed documentation e.g., KML file; and
4. Acceptance test certificate documentation.
5. Photographs of the deployed equipment at each endpoint with clearly identifiable and labelled demarcation points

7.1 Test results

The test results are to be provided for the link tested. The following information must be included on the Test Result Sheet / Acceptance Test Sheet:

1. 24-hour soak test results
2. BER Test results

3. Routing maps (Logical and/or Physical) of the actual service that was provisioned.

7.2 Customer Acceptance Certificates

For access builds, CACs need to be signed off to ensure that all involved parties are satisfied with the work done by the supplier including required plans developed by the supplier be approved by relevant parties.

7.3 Sample Acceptance Documentation

Bidders must provide sample test results for previous similar work. The sample of the test result documentation must include samples of all acceptance documentation described above.