

Annexure B1: Technical Requirements

The Provision of a SANReN Managed Bandwidth diverse link between Teraco Rondebosch and SALT in Sutherland

RFP No. 3612/12/12/2023

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Glossary

Abbreviation	Term	Description
BER	Bit Error Rate	
CAC	Customer Acceptance Certificate	Certificate of Acceptance that SANReN will sign off once work (including civil work) is completed on the SANReN beneficiary'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.

Abbreviation	Term	Description
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. ¹
SAAO	South African Astronomical Observatory	South African Astronomical Observatory is the national centre for optical and infrared astronomy in South Africa.
SALT	Southern African Large Telescope	The Southern African Large Telescope is the largest single optical telescope in the southern hemisphere, and one of the largest in the world. Located and operated at SAAO outside Sutherland.
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 a telecommunications company 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.
Cross Connect	Refers to a fibre connection between separate units of facilities within a data centre. A cross connect is required between the SANReN terminating point and the bidder's terminating point if a link terminates in a datacentre, e.g. Africa Data Centres, Internet Solutions ,Teraco, etc.

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 **separate tab for each link proposed** in Annexure C1. Failure to complete the technical compliance matrix in full will result in the bidder being eliminated from evaluation.

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.
- Proposals with functionality / technical points of less than the pre-determined minimum overall percentage of 70% and less than 50% on any 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 link of 10Gbps committed rate between the SANReN sites identified in the sections below.

Due to increased vandalism, theft, and other risks: the CSIR prefers an underground route, however overhead will be accepted if there are no underground fibre solutions available and/or affordable. If a supplier does not have an end-to-end underground solution, a combination of underground and overhead will be accepted.

CSIR requests bidders to provide ALL possible physically diverse routes (to the current existing SANReN route) for the managed bandwidth point to point link that they can provide with 10Gbps bandwidth capacity as stated in the Technical Requirements (Annexure B1 – this document). The link shall not share any infrastructure with the current SANReN link (Openserve CCTID: 102453330) to SALT in Sutherland.

All proposed routes will be evaluated individually. As a result of this tender process, the best route will be procured. The link chosen will be physically diverse to Openserve CCTID: 102453330.

3.1 End Points

The name, address and, coordinates for each endpoint are provided in Table 1. The bidder must provide a 10Gbps managed bandwidth link between the endpoints specified below.

Table 1: Site Details

Site Name	Address	Co-ordinates	Fibre Installation (Required/Preferred)
Site A: Teraco data centre, Rondebosch, Cape Town	Great Westerford Building, 240 Main Road Rondebosch Cape Town	Latitude: -33.970400 Longitude: 18.464700	Underground fibre preferred, but overhead acceptable
Site B: SAAO SALT, Sutherland	IT Server Room SAAO, Old Fraserburg Road, Sutherland Northern Cape	Latitude: -32.380050 Longitude: 20.810600	Underground fibre preferred, but overhead acceptable

Please note that for links terminating at Teraco Rondebosch will require a cross connect from SANReN dedicated cabinet to the bidder's terminating point in the datacentre(s). The costs of the cross connects should be included in Annexure D1 – Pricing Schedule. Details regarding the termination point for the SANReN cabinet will be shared with the winning bidder.

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 circuit 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 the circuit 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 the 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 delivery of the service.

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 as long as this is disclosed.

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/in use by SANReN.

3.4 Network Diagram

The network in *Figure 1: Network Diagram*, illustrates the envisioned network. This diagram is for illustration purposes only and bidders must design the network to optimize their available infrastructure. Bidders are requested to provide solutions for as many routes where they have infrastructure between the two endpoints. Bidders must wherever possible provide a reasonably direct route between the endpoints.

Bidders must provide a diagram or detailed description, and a KML file, illustrating how the circuit will be provisioned over the **access and core infrastructure**. This diagram or description must be detailed enough to understand the physical routing of each of the links and any shared infrastructure as described in section 3.2 above. The description or diagram must include details of the towns and bidder PoPs that will be used along the route. In the event that 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 file during negotiations.

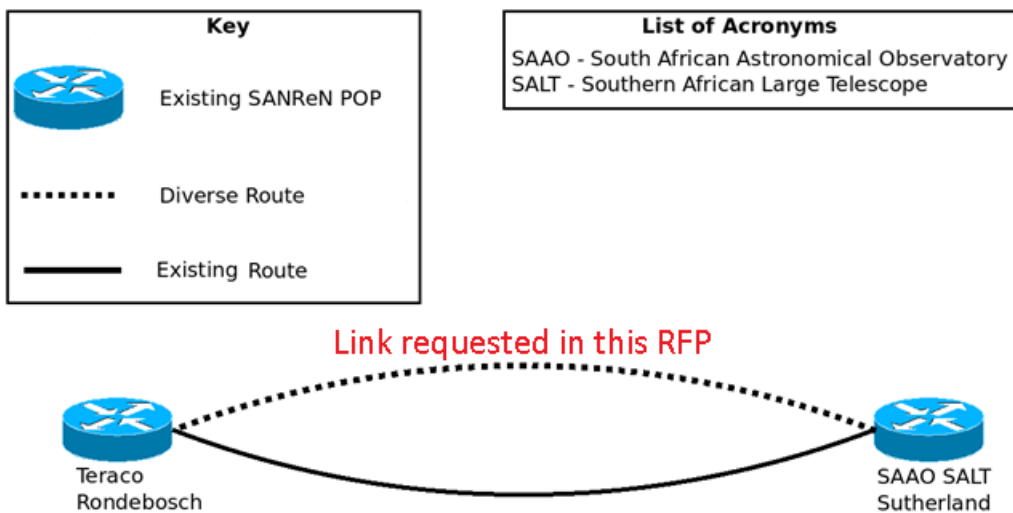


Figure 1: Network Diagram

3.5 Build Specifications

The bid is for end-to-end connectivity between the SANReN PoPs (this must include any “last mile builds” or links from the Bidder’s PoP to the endpoints). The bid may include as many routed paths between the two SANReN POPs as the bidder is capable of providing, whether it be existing or planned infrastructure. Any planned infrastructure must be clearly marked and labelled. Should

additional infrastructure be required in order to meet the specification, provisioning of the link must be delivered within the timelines stated in section 6 below.

The bidders must cater for an access build if it is required for the solution.

Bidders must provide an end-to-end solution, i.e. from one ODF to the next ODF.

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.
9. Underground fibre is preferred.

5 Reliability

5.1 Service Requirements

The CSIR requires that an end-to-end up-time of 99% (calculated per month) to be maintained for the link. To manage these requirements, the CSIR encourages all bidders to include a standard SLA (Service Level Agreement) as part of its response. The bidder 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 will be provided for the link:

1. Mean Time To Repair (MTTR);
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 being provided in this tender will be actively monitored or not. If the link is actively monitored, the bidder to provide the CSIR, or the SANReN network operator, regular notifications on the status of the link and other specific details when requested.

The successful bidder will be required to provide advance notice (minimum 1 week) for any support and maintenance activities that is required on the link for the duration of the contract.

6 Project Plan

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

Bidders must provide a schedule with timelines for the delivery of the link.

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

1. Planning Planned activities
2. Last Mile Civil Works (if applicable)

- a. Way Leaves
 - b. Trenching
 - c. Blowing/Stringing Fibre
3. Circuit Provisioning
 - a. Equipment procurement
 - b. Equipment deployment
 - c. Equipment configuration
 4. Link Testing and Commissioning
 5. Handover

7 Acceptance and As-deployed Documentation

In accepting the link, the CSIR will require the following documents:

1. Test results for the link.
2. CACs for the access builds at the end points (if applicable).
3. As-deployed documentation e.g., updated KML file;
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 provisioned link after the link has been commissioned.

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 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.