PART 3: WORKS INFORMATION

Document reference	Title	No of pages
C3.1	The Scope	6
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Structural analysis of a Gamagara River Bridge near Sishen Railway Station (investigations, strengthening designs, and construction supervision)

Works Information
Contract Number:

Revision number: 00

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C3.1: SCOPE OF WORKS

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1. General description of the works

1.1 ***Employer's*** **objectives**

The Employer's objective is to enter into a contract with a bridge engineer to provide a service for the structural analysis of the existing Gamagara River Bridge for the purposes of carrying axle loading of 26 tons. The analysis must also include the structural suitability of the Bridge to carry the current axle loading of 21 tons. Depending on the outcomes of the analysis, the bridge engineer must design the strengthening of the Bridge and supervise the construction of the strengthening of Gamagara River Bridge near Sishen, on the railway section between Kamfersdam and Hotazel. This shall be supported by the following services:

1.1.1 Plan and execute a geotechnical investigation on the abutments and piers of the existing three (3) span Bridge. The objectives of geotechnical investigations are to confirm the bearing capacity of the existing founding material as well as verify the thicknesses of the foundations. The drawings for the Bridge indicate that the the foundation depths must be a minimum of 3 ft and as decided by the Resident Engineer. It remains unknown what the actual thicknesses of those foundations are.

1.1.2 From the drawings it appears that there is no reinforcement on the foundations. This must be confirmed through reinforcement scanning.

1.1.3 The Bridge must be analysed to check if it is structurally capable of carrying axle loading of 26 tons. Currently the Bridge carries axle loading of 21 tons, and its suitability for 21 tons must also be analysed. Transnet will conduct deflection measurements on one span of the deck. These measurements will be used to calibrate the deflections from the analysis. The appointed bridge engineer must be present when deflection measurements are conducted, since the measurements will be input into the analysis.

1.1.4 Depending on the outcome of the structural analysis, the bridge engineer must design the strengthening of the Bridge for 26 tons axle loading.

1.1.5 Produce designs, bill of quantities and specifications for the strengthening of the Bridge.

1.1.6 Compile a report for all engineering, designs and strengthening. This report may be submitted later.

1.1.7 Quality inspections of construction work. The engineer will approve the concrete mix design and will also be responsible for the testing of the concrete in accordance with the applicable standards, if concrete is used in strengthening the Bridge. Applicable approvals and testing will also be done where different construction materials are used.

1.1.8 Close out, including signed-off as-built drawings.

1.2 **Project Goal**

The goal of the project is to introduce axle loading of 26 tons over Gamagara River Bridge. This forms part of the upgrading of the railway portion between Haakboslegte and Hotazel to axle loading of 26 tons. The Bridge must also be analysed for the current axle loading of 21 tons.

1.3 **The Business Goal**

The optimal functioning of this line is essential for the rail efficiencies between the manganese mines in Hotazel in the Northern Cape and the Port of Saldanha in the Western Cape.

2. Site Location

The Project work will be carried out on the Manganese Corridor. Gamagara River Bridge is situated on the Kamfersdam – Hotazel railway section between Droespruit and Sishen stations. The site's coordinates are -27.834894,22.993933.

3. Applicable Regulations and Standards

All work done as part of this project must take cognisance of and incorporate relevant Transnet norms and standards. *The engineer* is required to adhere to but not limited to the documents listed in the table below.

Table 1. Regulations and Standards

Document Title	Document	Revision
Railway Safety Regulations		2014
The National Railway Safety Regulator Act 2002 (Act 16, 2002)		2002
Construction Regulations		2014
Design of Highway Bridges and Culverts inSouth Africa	TMH7	1989
British Soil Classification System (BSCS)	BS 5930	1981
Structural Steel	SANS 1200H	
Structural Use of Concrete	SANS 10100	
Structural Use of Steel	SANS 10162	
Portland and rapid hardening Portland cement	SANS 1491	
Detailing of steel reinforcement for concrete	SANS 10144	
Welded steel fabric for reinforcement of concrete	SANS 1024	
Construction works: Structural steelwork.	SANS 2001-CS1	
Concrete works (structural).	SANS 2001-CC1	
Aggregates for concrete	SANS 1083	
South African Transport Services BridgeCode	SATS Bridge Code	1983
SAICE, January 2010 – *Site Investigation Code of Practice*		2010
Occupational Health and Safety Act (Act 85of 1993) & Construction Regulations		1993
Explosive Act (Act 26 of 1956)		1956
National Environmental Management Act 107		1998
Quality Management System requirements	ISO 9001:2015	2015

Standard Specifications for Road and Bridge Works for South African Road Authorities	COTO	2020
Manual for the Visual Assessment of Road Structures	TMH19	2020

4. Project Key Deliverables

The project key deliverables are:

- Investigations (geotechnical investigations and structural analysis of the Bridge)
- Detailed engineering designs
- Design reports
- Construction supervision
- As-built drawings

In fulfilling the project objectives, timelines and scope *the engineer* is required to ensure availability of competent and skilled personnel prior to commencing with any work.